



Marine Stewardship Council Full Assessment

Public Comment Draft Report (PCDR)

For:

Omega Protein Corporation U.S. Atlantic menhaden purse seine

Client:

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Report Code: MSC 030
Report Date: December 4th, 2018

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Foreword

The MSC Fisheries Standard sets out requirements that a fishery must meet to enable it to claim that its fish come from a well-managed and sustainable source. The standard applies to wild-capture fisheries that meet the scope requirements. The MSC Fisheries Standard comprises three core principles:

Principle 1: Sustainable target fish stocks

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

Principle 2: Environmental impact of fishing

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

Principle 3: Effective management

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

A full description of the MSC Fisheries Certification Requirements and Processes followed during this assessment can be found in MSC Fisheries Certification Requirements and Guidance. This assessment uses the version of the MSC Standard and follows the processes outlined in the MSC Fisheries Certification Requirements (FCR) v2.0 re-released on 1st October, 2015. The definitive version of all documents are maintained on the MSC's website www.msc.org. Any discrepancy between copies, versions or translations shall be resolved by reference to the definitive English version.

Readers should verify that they are using the copy of the MSC FCR (and other documents) that are relevant to this assessment. Updated documents, together with a master list of all available MSC documents, can be found on the MSC's website.

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Glossary

ABC	Allowable Biological Catch
ACCSP	Atlantic Coastal Cooperative Statistics Program
ACFCMA	Atlantic Coastal Fisheries Cooperative Management Act (Atlantic Coastal Fisheries Act)
AL	Alabama
A_{m50}	Age at 50% maturity
APs	Advisory Panels
ASC	Assessment Science Committee
ASMFC	Atlantic States Marine Fisheries Commission
ATL	Atlantic
B	Stock biomass
B_0	Total stock biomass that would be expected in the absence of fishing
BAM	Beaufort Assessment Model
BDTRP	Bottlenose Dolphin Take Reduction Plan
BDTRT	Bottlenose Dolphin Take Reduction Team
BERP WG	Biological and Ecological Reference Point Work Group
B_{LIM}	Limit reference point for biomass
BMF	Bureau of Marine Fisheries (New Jersey)
CA	Consequence Analysis (part of MSC RBF)
CAP	Client Action Plan
CDFR	Captains Daily Fishing Report (daily logbook)
CEP	NOAA's Cooperative Enforcement Program
CESS	Committee on Economics and Social Sciences
CG	Coast Guard
CITES	Convention on International Trade in Endangered Species (of Wild Fauna and Flora)
CMR	Commission on Marine Resources (Mississippi)
CoC	Chain of Custody
COMAR	Code of Maryland Regulations
CPUE	Catch per Unit Effort
CSA	Consequence Spatial Analysis (part of MSC RBF)
CT	Connecticut
CV	Coefficient of Variation
CZM Act	Coastal Zone Management Act
DDT	Dichlorodiphenyltrichloroethane
DE	Delaware
DEC	Department of Environmental Conservation (New York)
DENR	Department of Environment and Natural Resources (North Carolina)
DFW	Division of Fish and Wildlife (New Jersey)
DMF	Division of Marine Fisheries (North Carolina)
DMR	Department of Marine Resources (Mississippi)
DMS	Data Management Subcommittee
DPS	Distinct Population Segment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
eNGO	environmental Non-Governmental Organisation
EPA	Environmental Protection Agency

ERP	WG Ecological Reference Point Work Group (formerly the BERP workgroup)
ERPs	Ecosystem/ecological reference points
ESA	Endangered Species Act
ESRP	Ecosystem Services Research Program
ETPs	Endangered Threatened and Protected Species
EwE	Ecopath with Ecosim
F	Fishing mortality
FCR	MSC Fisheries Certification Requirements
FEC	Population fecundity (number of maturing ova)
FL	Florida
FL	Fork length
F _{limit}	Limit reference point for fishing mortality
FMP	Fisheries Management Plan
F _{MSY}	
F _{target}	Target reference point for fishing mortality
FWC	Fish and Wildlife Conservation Commission (Florida)
FY	Financial Year
GA	Georgia
GCR	MSC General Certification Requirements
GT	Generation Time
GMFMC	Gulf of Mexico Fishery Management Council
GSMFC	Gulf States Marine Fisheries Commission
HAIP	Habitat Assessment Improvement Plan
HCR	Harvest Control Rule
IFMP	Integrated Fishery Management Plan
IJF	Interjurisdictional Fisheries
IPI	Inseparable or Practicably Inseparable species
ISFMP	Interstate Fisheries Management Program
IUU	Illegal, Unreported and Unregulated fishing
JEAs	Joint Enforcement Agreements
kg	kilogram
lb(s)	pound(s)
LEC	Law Enforcement Committee
LMR	Living Marine Resources
LTL	Lower Trophic Level
M	Natural mortality
MA	Massachusetts
MAFMC	Mid-Atlantic Fishery Management Council
MCS	Monitoring, Control and Surveillance
MD	Maryland
ME	Maine
MLE	Maritime Law Enforcement Program
MMPA	Marine Mammal Protection Act
MPA(s)	Marine Protected Area(s) and other spatial management approaches i.e. nature reserves.
MPRS	Act Marine Protection, Research, and Sanctuaries Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act (see also MSFCMA)
MSC	Management and Science Committee (part of ASMFC)

MSC	Marine Stewardship Council
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act (see also MSA)
MSTC	Multispecies Technical Committee
MSVPA	Multispecies Virtual Population Analysis
MSY	Maximum Sustainable Yield
mt	metric tonnes (1 mt = 2,204.6 lbs)
NAD	Northern adult index
NC	North Carolina
NED	Northeast Division (Part of OLE)
NEFMC	New England Fishery Management Council
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organisation
NH	New Hampshire
NJ	New Jersey
NMFS	National Marine Fisheries Service
NOA	North Atlantic Oscillation
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NY	New York
OLE	Office of Law Enforcement (part of NOAA)
OSPAR	OSPAR Convention (Convention for the Protection of the Marine Environment of the North-East Atlantic)
P1	Principle 1: Sustainable target fish stocks (MSC terminology)
P2	Principle 2: Environmental impact of fishing (MSC terminology)
P3	Principle 3: Effective management (MSC terminology)
PBR	Potential Biological Removal
PCDR	Public Comment Draft Report (MSC terminology)
PCR	Public Certification Report (MSC terminology)
PDT	Plan Development Team
PI	Performance Indicator (MSC terminology)
PID	Public Information Document
PISG(s)	Performance Indicator Scoring Guidepost(s) (MSC terminology)
PRC	MSC's Peer Review College (MSC terminology)
PRFC	Potomac River Fisheries Commission
PRI	Point of Recruitment Impairment
PRT	Plan Review Team
PSA	Productivity Susceptibility Analysis (part of MSC RBF)
RBF	Risk-Based Framework (MSC terminology)
RI	Rhode Island
SAD	Southern adult index
SAFMC	South Atlantic Fishery Management Council
SAS	Stock Assessment Subcommittees
SC	South Carolina
SCeMFiS	Science Centre for Marine Fisheries
SEAMAP	Southeast Area Monitoring and Assessment Program
SED	Southeast Division (Part of OLE)
SEDAR	Southeast Data, Assessment and Review

SG(s)	Scoring Guidepost(s) (MSC terminology)
SI(s)	Scoring Issue(s) (MSC terminology)
SICA	Scale Intensity Consequence Analysis (part of MSC RBF)
SEFSC	Southeast Fisheries Science Center
SP Act	Shore Protection Act
SPR	Spawning Potential Ratio/Spawner-Per-Recruit
SPR _{limit}	Limit reference point for SPR
SS	Single Species
SSB	Spawning Stock Biomass
SSB ₀	Spawning stock biomass that would be expected in the absence of fishing
SSB _{limit}	Limit reference point for SSB
SSB _{target}	Target reference point for SSB
SST	Sea Surface Temperature
SURF	Supportive Role to Fishery ecosystems index (MSC terminology)
TAC	Total Allowable Catch
TC	Technical Committee
TFAC	Tidal Fisheries Advisory Commission (Maryland)
TL	Total length
TLA	Traffic Light Analysis
TRT	Take Reduction Teams
UoA	Unit of Assessment (MSC terminology)
UoC	Unit of Certification (MSC terminology)
U.S.	United States
USACOE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
VA	Virginia
VIMS	Virginia Institute of Marine Science
VME	Vulnerable Marine Ecosystem
VMP	Virginia Marine Police
VMRC	Virginia Marine Resources Commission
VMS	Vessel Monitoring System
YOY	Young-of-the-year
ZMRG	Zero Mortality Rate Goal

1. Executive Summary

This report includes the details of the MSC assessment of the Omega Protein Corporation U.S. Atlantic menhaden purse seine against the MSC Principles and Criteria for Sustainable Fishing. The report includes an introduction to the fishery, the results of the assessment, the rationales that substantiate the scores for each performance indicator (PI) and a recommendation as to whether the fishery is eligible for Certification. The applicant fishery had not previously been assessed against the MSC Principles and Criteria for Sustainable Fishing.

This Assessment was carried out by an SAI Global Assessment Team consisting of Dr. Ivan Mateo (Team Leader), Sam Dignan and Bob Allain; further details are provided in [Section 2.1 Assessment Team](#). Metric tons are used in this document by convention. The conversion of pounds to metric tons (mt) is 1 mt = 2,204.6 lbs.

1.1. Assessment process and summary of assessment activities

The assessment process began in May 2017. This assessment was conducted according to requirements laid out in MSC Fisheries Certification Requirements (FCR) v.2.0, using the information and documents collected during desktop review, an on-site and through emails and calls with stakeholders involved in the fishery. The below MSC Scheme Documents and report template were used during the assessment.

MSC Scheme Document	Version	Issue Date	Implementation
MSC Fisheries Certification Requirements v2.0	2.0	January 14 th , 2013	Standard
MSC FCR and Guidance v2.0	2.0	October 1 st , 2014	Process
General Certification Requirements v.2.1	2.1	February 20 th , 2015	Process
Full Assessment Reporting Template v2.0	2.0	October 8 th , 2014	Process

SAI Global would like to thank all management and scientific agencies, industry bodies and stakeholders for their collaboration and for providing the information and data necessary to carry out this assessment.

1.2. Main strengths and weaknesses of the Atlantic menhaden purse seine fishery

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ Extensive research surveys and monitoring of the Mid-Atlantic ecosystem and the Atlantic menhaden stock. ▪ Menhaden-specific conservation and management measures are in place. ▪ There is a comprehensive FMP in place. ▪ Menhaden biomass is well above single species threshold levels and fishing effort is well below single species threshold levels. ▪ There is a robust governance and policy framework. ▪ Robust consultation and decision-making processes are in place. ▪ There is a system for monitoring and evaluating the performance of the fishery-specific management system. 	<ul style="list-style-type: none"> ▪ The role of menhaden in the ecosystem is not considered when formulating harvest strategies or harvest control mechanisms. ▪ There is no regular review of measures in place to minimise the fishery's impact on ETP species. ▪ The impacts on bycatch species are poorly known. Data on bycatch are only collected on an <i>ad hoc</i> basis at infrequent intervals. ▪ Clear long-term fishery-specific objectives are not explicit within the management system. ▪ Due to the small number of entities in both the UoA and UoC there are potentially some issues with data being confidential; however, these can be managed accordingly.

1.3. Overall conclusion and Recommendation

A rigorous assessment against the MSC Principles and Criteria was undertaken by the assessment team and detailed, fully referenced scoring rationale is provided in [Appendix 1](#) of this report. The fishery achieved the minimum required score of 80 or above on each of the three MSC Principles independently and did not score less than 60 against any Performance Indicator (PI). Final Principles scores are shown in the table below.

Principle	Score
Principle 1 – Target Species	82.5*
Principle 2 – Ecosystem	87.4*
Principle 3 – Management System	92.2

*Although the assessment team found the overall Principles to be in overall compliance with the MSC FCR v2.0, it was found that three PIs fell below the established compliance mark; a Condition has been raised in each of these the details of which can be found in [Appendix 1.3](#).

1.4. Certification Recommendation

On completion of the scoring process, the assessment team has provisionally recommended that the Atlantic menhaden purse seine fishery is eligible to be certified according to the MSC Principles and Criteria for Sustainable Fishing subject to the Conditions and related corrective actions outlined in this report.

1.5. Conditions

Three Performance Indicators (PIs) which contribute to the overall assessment score were assessed as scoring less than the unconditional pass mark, and therefore three conditions were attached to the fishery, which must be addressed within specified timeframes. Conditions are applied to improve the performance of the fishery to at least the unconditional pass mark within a period set by the certification body.

The below table presents a summary of the conditions raised during the assessment. Note: This table is for summary purposes only and a complete listing of Conditions, rationales and their associated corrective actions are presented in [Appendix 1.3](#).

Condition number	Condition	PI	Related to previously raised condition?
1	The Client Group must provide evidence of the implementation of a harvest strategy that is designed to take into consideration the ecological role of Atlantic menhaden and is responsive to the state of the stock with respect to its role in the U.S. Northwest Atlantic ecosystem.	1.2.1	NA
2	The client must provide evidence of implementation of well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden as key low trophic level in the U.S. Northwest Atlantic and that; <ol style="list-style-type: none"> 1. ensure the exploitation rate is reduced as the point where serious ecosystem impacts could occur and; 2. are expected to keep the stock fluctuating around a target level consistent with ecosystem needs. 	1.2.2	NA
3	There shall be a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate. “Regular review” in this context meaning at least once every 5 years. The ‘regular review’ at SG80 may be met if at least one review of alternative measures has been undertaken, that measures are implemented as appropriate, and there is a commitment from the client or the management body to have another review within the 5 year window.	2.3.2	NA

1.6. Recommendations

In addition to the above Conditions the Assessment Team also made a number of recommendations. Recommendations are not obligatory and while they do not require actions on the part of the fishery the client is encourage to act upon them within the spirit of MSC certification.

Recommendation 1

The assessment team strongly recommends that bycatch studies be undertaken on an ongoing basis and that, in order to ensure comparability between studies, these future bycatch studies should be conducted in a more cohesive and standardized manner than has historically been the case. In addition every effort should be made to ensure that studies are designed in such a way that the composition of catches by weight can be estimated.

Recommendation 2

The Assessment Team was somewhat constrained in reporting on the roles and responsibilities of all established ASMFC committees and sub-committees owing to the absence of publicly-available information regarding their mission, objectives, and consultation/engagement processes. The team recommends that this information be compiled and posted on the Commission's website.

Recommendation 3

Scoring Issue C of Performance Indicator 3.1.1 - Legal and/or Customary Framework - focuses on "whether a suitable framework exists or does not exist to address the legal rights created explicitly or established by customs of people dependent on fishing for food or livelihood." Where any legal rights have been recognized by legislatures or the courts, the Assessment Team recommends that the FMP be amended to reflect the nature and scope of the legal rights held by Native American Tribes.

Recommendation 4

The Assessment Team noted that State and Federally-reported enforcement and compliance information and data on the operations of the client's purse seine fleet are generally not recorded and/or reported. While we acknowledge the existence and importance of confidentiality rules regarding the reporting of enforcement and compliance information, we also believe that transparency and accountability requisites are not well served when the outcomes of enforcement and compliance activities are not available publicly. The Team recommends that the client and the Commission's Law Enforcement community collaborate in designing and implementing a reporting format that captures each agency's annual enforcement inputs and outcomes while respecting any confidentiality provisions.

2. Authorship and Peer Reviewers

2.1. Assessment Team

Dr. Ivan Mateo (Lead Assessor, primary responsibility for Principle 1)

Dr. Ivan Mateo has over 20 years' experience working with natural resources population dynamic modelling. His specialization is in fish and crustacean population dynamics, stock assessment, evaluation of management strategies for exploited populations, bioenergetics, ecosystem-based assessment, and ecological statistical analysis. Ivan received a Ph.D. in Environmental Sciences with Fisheries specialization from the University of Rhode Island. He has studied population dynamics of economically important species as well as candidate species for endangered species listing from many different regions of the world such as the Caribbean, the Northeast US Coast, Gulf of California and Alaska. He has done research with NMFS Northeast Fisheries Science Center' Ecosystem Based Fishery Management on bio-energetic modeling for Atlantic cod. He also has been working as environmental consultant in the Caribbean doing fieldwork and looking at the effects of industrialization on essential fish habitats and for the Environmental Defense Fund developing population dynamics models for data poor stocks in the Gulf of California. Recently Ivan worked as National Research Council postdoc research associate at the NOAA National Marine Fisheries Services Ted Stevens Marine Research Institute on population dynamic modelling of Alaska sablefish.

Sam Dignan (Assessor, primary responsibility for Principle 2 and Traceability)

Sam Dignan is a fisheries scientist who has previously worked with the Department of Environment, Food and Agriculture (DEFA), Isle of Man and Bangor University Fisheries and Conservation Science Group (Wales). He has a BSc in Biological and Chemical Sciences with Zoology from University College Cork and an MSc in Marine Environmental Protection from Bangor University. He has experience conducting stock assessments, from the survey design and implementation phases through to final analysis and report presentation; from 2013 to 2015 he was a member of the ICES working group on scallop stock assessment. He has been involved in providing scientific data to ensure fishery compliance with the Marine Stewardship Council's (MSC) certification framework and has participated in MSC surveillance audits from a client's perspective. Sam has extensive experience of interacting directly with fishers and their representative organisations as well as members of scientific and government institutions. He was previously an advisor to the Isle of Man Queen Scallop Management Board that manages the MSC certified Isle of Man queen scallop fishery. He has also worked on the spatial analysis of fishing activity, using Vessel Monitoring System (VMS) and logbook data, to spatially quantify fishing activity and fisheries-ecosystem interactions. Sam is an ISO approved lead auditor.

R. J. (Bob) Allain (Assessor, primary responsibility for Principle 3)

R. J. (Bob) Allain is the president and principal consultant of OceanIQ Management Services Inc. He is a former senior executive with over 30 years' experience with Canada's Federal Department of Fisheries and Oceans in fisheries management, strategic policy development and analysis, program design and delivery, human and financial resources management, media and inter-governmental relations, facilitation and conflict resolution, and mentoring. He has consulted internationally for the Canadian International Development Agency, the (former) International Centre for Ocean Development, the World Bank, and the Food and Agricultural Organization of the United Nations. Bob has participated in several Atlantic Canadian pelagic, demersal, and crustacean fishery assessments under the MSC Standard since 2010 as a P3 expert, auditor, client representative, and, most recently, as a peer reviewer.

2.2. Peer Reviewers

The Peer Review of this fishery will be conducted through the MSC's Peer Review College by two of the following (Note Peer Reviewers will be referred to as Peer Reviewer A and Peer Reviewer B in this report):

- Kristin Kleisner
- William Karp
- Tom Jagielo
- Lisa Borges

With respect to these Peer Reviewers, a summary of their experience and qualifications is included in the Peer Reviewer shortlist announcement available on the MSC website at the following address:

<https://fisheries.msc.org/en/fisheries/omega-protein-corporation-u.s.-atlantic-menhaden-purse-seine/@@assessments>

Further details of their experience are available on request by email to the Peer Review College:

PeerReviewCollege@msc.org.

3. Description of the Fishery

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

3.1.1. UoA and Proposed Unit of Certification (UoC)

3.1.1.1. Statement that fishery is within scope of MSC certification

The fishery is eligible for certification and able to be assessed within the scope of the MSC Principles and Criteria for Sustainable Fishing (MSC FCR v2.0 7.4):

- The target species is not an amphibian, a reptile, a bird, or a marine mammal.
- Fishing operations are not conducted using destructive fishing practices such as poisons or explosives.
- The fishery is not conducted under a controversial unilateral exemption to an international agreement.
- There is a mechanism to resolve possible disputes.
- The fishery does not include an entity that has been successfully prosecuted for violations against forced labor laws.

3.1.1.2. Description of the UoA

Table 1. Unit of Assessment for the Atlantic menhaden purse seine fishery.

Unit of Assessment (UoA)	
Species	Atlantic menhaden (<i>Brevoortia tyrannus</i>)
Geographical Area	US EEZ Atlantic Coast (Virginia, North Carolina, New Jersey, Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, Delaware Maryland, Potomac River Fisheries Commission, South Carolina, Georgia, Florida)
Stock	Atlantic menhaden in western coastal Atlantic waters (Nova Scotia to Florida)
Method of capture	Purse seine
Management system	<p>When operating in State waters, the fishery is managed by the respective state authorities with inter-state coordination via the Atlantic States Marine Fisheries Commission (ASMFC).</p> <ul style="list-style-type: none"> ▪ Virginia (VA) – Virginia Marine Resources Commission (VMRC). ▪ North Carolina (NC) – Department of Environmental Quality (DEQ), Division of Marine Fisheries. ▪ New Jersey (NJ) – Department of Environmental Protection (DEP), Division of Fish and Wildlife. ▪ Maine (ME) – Department of Marine Resources (DMR). ▪ New Hampshire (NH) – Fish and Game Department, Division of Marine Fisheries. ▪ Massachusetts (MA) – Department of Fish and Game, Division of Marine Fisheries. ▪ Rhode Island (RI) – Department of Environmental Management (DEM), Division of Fish and Wildlife. ▪ Connecticut (CT) – Department of Energy and Environmental Protection (DEEP), Bureau of Natural Resources, Division of Fisheries. ▪ New York (NY) – Department of Environmental Conservation, Division of Marine Resources. ▪ Delaware (DE) – Department of Natural Resources and Environmental Control (DNREC), Division of Fish and Wildlife. ▪ Maryland (MD) – Department of Natural Resources, Division of Fisheries and Boating Services. ▪ Potomac River Fisheries Commission (PRFC) ▪ South Carolina (SC) – Department of Natural Resources (DNR), Division of Marine Resources ▪ Georgia (GA) – Department of Natural Resources (DNR), Division of Coastal Resources ▪ Florida (FL) – Fish and Wildlife Conservation Commission (FWC), Division of Marine Fisheries Management.
Client Group and other eligible fishers	All professional fishermen in the US Atlantic entitled to fish Atlantic menhaden with purse seines. There are other eligible fishers.

3.1.1.3. Rationale for choosing the UoA

The MSC Guidance for the Fisheries Certification Requirements defines the Unit of Certification (UoC) and the Unit of Assessment (UoA) in G7.4.7 – G7.4.9. The UoC (i.e., the unit entitled to receive an MSC certification) is defined as follows:

“The target stock or stocks (=biologically distinct unit/s) combined with the fishing method/gear and practices (including vessel type/s) pursuing that stock and any fleets, groups of vessels, or individual vessels of other fishing operators.”

The UoA defines the full scope of what is being assessed and is therefore equal to or larger than the UoC. If it is larger, it means it will include other eligible fishers. Other eligible fishers are fishers who are not members of the client group and fish for the target species using the same fishing gear under the same management system. Accordingly, the UoA and UoC for the Atlantic menhaden fishery are defined as in Table 1 and Table 2.

3.1.1.4. Description of proposed UoC and other eligible fishers

Table 2. Proposed Unit of Certification for the Atlantic menhaden purse seine fishery.

Unit of Certification (UoC)	
Species	Atlantic menhaden (<i>Brevoortia tyrannus</i>)
Geographical Area	US EEZ Atlantic Coast (Virginia, North Carolina, New Jersey, Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, Delaware Maryland, Potomac River Fisheries Commission, South Carolina, Georgia, Florida)
Stock	Atlantic menhaden in western coastal Atlantic waters (Nova Scotia to Florida)
Method of capture	Purse seine
Management system	<p>When operating in State waters, the fishery is managed by the respective state authorities with inter-state coordination via the Atlantic States Marine Fisheries Commission (ASMFC).</p> <ul style="list-style-type: none"> ▪ Virginia (VA) – Virginia Marine Resources Commission (VMRC). ▪ North Carolina (NC) – Department of Environmental Quality (DEQ), Division of Marine Fisheries. ▪ New Jersey (NJ) – Department of Environmental Protection (DEP), Division of Fish and Wildlife. ▪ Maine (ME) – Department of Marine Resources (DMR). ▪ New Hampshire (NH) – Fish and Game Department, Division of Marine Fisheries. ▪ Massachusetts (MA) – Department of Fish and Game, Division of Marine Fisheries. ▪ Rhode Island (RI) – Department of Environmental Management (DEM), Division of Fish and Wildlife. ▪ Connecticut (CT) – Department of Energy and Environmental Protection (DEEP), Bureau of Natural Resources, Division of Fisheries. ▪ New York (NY) – Department of Environmental Conservation, Division of Marine Resources. ▪ Delaware (DE) – Department of Natural Resources and Environmental Control (DNREC), Division of Fish and Wildlife. ▪ Maryland (MD) – Department of Natural Resources, Division of Fisheries and Boating Services. ▪ Potomac River Fisheries Commission (PRFC) ▪ South Carolina (SC) – Department of Natural Resources (DNR), Division of Marine Resources ▪ Georgia (GA) – Department of Natural Resources (DNR), Division of Coastal Resources ▪ Florida (FL) – Fish and Wildlife Conservation Commission (FWC), Division of Marine Fisheries Management.
Client Group	Omega Proteins Corporation, Alpha VesselCo Holdings, Inc. vessels and other named bait vessels.

There are other eligible fishers who are not members of the client group and who fish for the target species using the same fishing gear under the same management system. These other eligible fishers include all professional fishermen in the U.S. Atlantic entitled to fish menhaden with purse seines who are not part of the client group.

In accordance with FCR 7.8.3.3 and FCR 7.4.12.2 the client has prepared and published a statement of their understanding and willingness for reasonable certificate sharing arrangements (see Appendix 1) and has informed other eligible fishers of the above to the extent practicable.

3.1.2. Final UoC(s)

[REQUIRED FOR PCR]

If the Assessment progress to the Public Certification Report stage, the PCR will describe:

- a. The UoC(s) at the time of certification.
- b. A rationale for any changes to the proposed UoC(s) in “Description of proposed UoC and other eligible fishers” above.
- c. The final other eligible fishers at the time of certification.

3.1.3. Total Allowable Catch (TAC) and Catch Data

In 2012, as part of Amendment 2 to the menhaden FMP, the ASMFC Atlantic Menhaden Management Board established a coastwide TAC for the commercial menhaden fishery (bait + reduction) for the first time. Amendment 2 established a TAC of 170,800 mt for the 2013 and 2014 fishing season. Since the TAC was first introduced, and considering the outcomes of stock assessments, the Board has authorized a number of increases to the TAC to 187,880 mt for the 2015 and 2016 seasons, 200,000 mt for the 2017 season and most recently to 216,000 mt for the 2018 and 2019 seasons.

With regards to the menhaden reduction fishery specifically, Amendment 2 to the menhaden FMP specified an annual coastwide TAC of about 129,900 mt which was subsequently raised to 142,894 mt in 2015 and 152,112 mt starting in 2017. In November 2017, the Board set the coastwide TAC for 2018, and made adjustments to how quota was allocated between fleet sectors and states, resulting in a total of approx. 151,000 mt being allocated to the reduction fishery.

Total directed (i.e. non-bycatch) commercial (reduction + bait) Atlantic menhaden landings in 2017 were 171,512 mt (378.12 million pounds) against a coastwide commercial TAC of 200,000 mt (440.9 million pounds), representing a 14% underage of the 2017 coastwide TAC, and a 4.7% decrease from the 179,985 mt (396.8 million pounds) landed in 2016. The 2017 harvest for reduction purposes was 128,911 mt (284.2 million pounds), representing a 6.2% decrease from 2016 reduction landings which were approx. 137,393 mt (302.9 million pounds). Estimated coastwide bait harvests in 2017 were approx. 43,826 mt (96.62 million pounds) representing a 1.8% increase from the 2016 bait harvest.

Table 3. TAC and Catch Data (Source: NOAA 2018).

TAC	Year	2017	Amount	216,000 mt	476.2 million pounds
UoA share of TAC	Year	2017	Amount	152,112 mt	335.4 million pounds
UoC share of TAC	Year	2017	Amount	152,112 mt*	335.4 million pounds*
Total green weight catch by UoC*	Year (most recent)	2017	Amount	128,911 mt*	284.2 million pounds*
	Year (second most recent)	2016	Amount	137,393 mt*	302.9 million pounds*

* All entities involved in the Atlantic menhaden reduction fishery (i.e. Omega Protein Corporation, Alpha VesselCo Inc. and bait vessels that have unloaded menhaden for reduction purposes in recent years) are included in the UoC.

3.1.4. Scope of Assessment in Relation to Enhanced Fisheries

Not Applicable. The U.S. Atlantic menhaden fishery is not an enhanced fishery.

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

Not Applicable. The U.S. Atlantic menhaden fishery is not an Introduced Species Based Fishery.

3.2. Overview of the fishery

3.2.1. Biology, ecology, and life history of Atlantic menhaden

Menhaden (*Brevoortia spp.*) are members of the Clupeidae family of pelagic fishes which also includes herrings, sprats, pilchards, anchovies and shads. Atlantic menhaden (*Brevoortia tyrannus*) are silvery colored fishes characterized by a moderately compressed body and a black spot on their shoulder behind their gill openings. They can reach a size of approximately 15 inches (Figure 1).

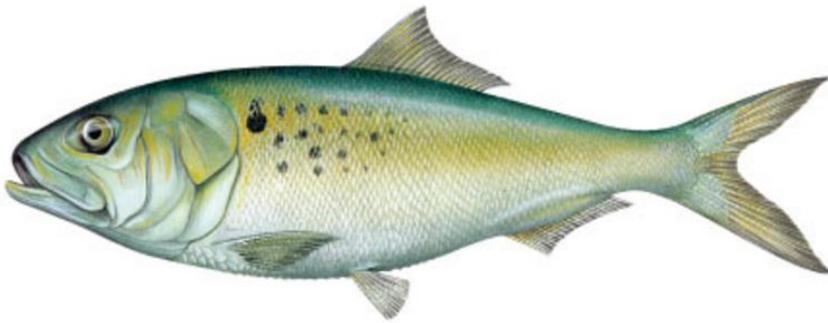


Figure 1. Atlantic menhaden (*Brevoortia tyrannus*) (Source: <http://www.asmf.org>).

The Genus *Brevoortia* is distinguished from other Clupeidae by a large head, absence of teeth, pectinated scales, and the location of the dorsal fin over the interval between the pelvic and anal fins. Other important generic characters are the cephalic sensory canals, pharyngeal accessory organ, gill rakers, and muscular pyloric stomach or gizzard (Gunter and Demoran, 1961; Monod, 1961).

Two species occur in the Atlantic Ocean; Atlantic Menhaden (*B. tyrannus*), and yellowfin menhaden (*B. smithi*). Atlantic menhaden can be distinguished from yellowfin menhaden in several ways; Atlantic menhaden have larger coarser scales in regular rows, pointed (vs. rounded) scale pectination, and a row of lateral spots behind the humeral spot (Dahlberg 1970). Among menhaden species, *B. tyrannus* is the most abundant species on the Atlantic coast which occurs from Nova Scotia to Jupiter Inlet, Florida.

3.2.1.1. Distribution

Atlantic menhaden occupy estuaries and coastal waters from northern Florida to Nova Scotia and are believed to consist of a single population (Figure 2). Adult and juvenile menhaden form large, near-surface schools, primarily in estuaries and nearshore ocean waters from early spring through early winter. By summer, menhaden schools stratify by size and age along the coast, with older and larger menhaden found farther north. The majority of the population migrates south of New Jersey to spawn during the winter months. As the water warms in the spring, menhaden begin to move northward along the coast, with larger fish moving farther north. During fall-early winter, menhaden of all sizes and ages migrate south around the North Carolina capes complete their migratory loop (Figure 3).

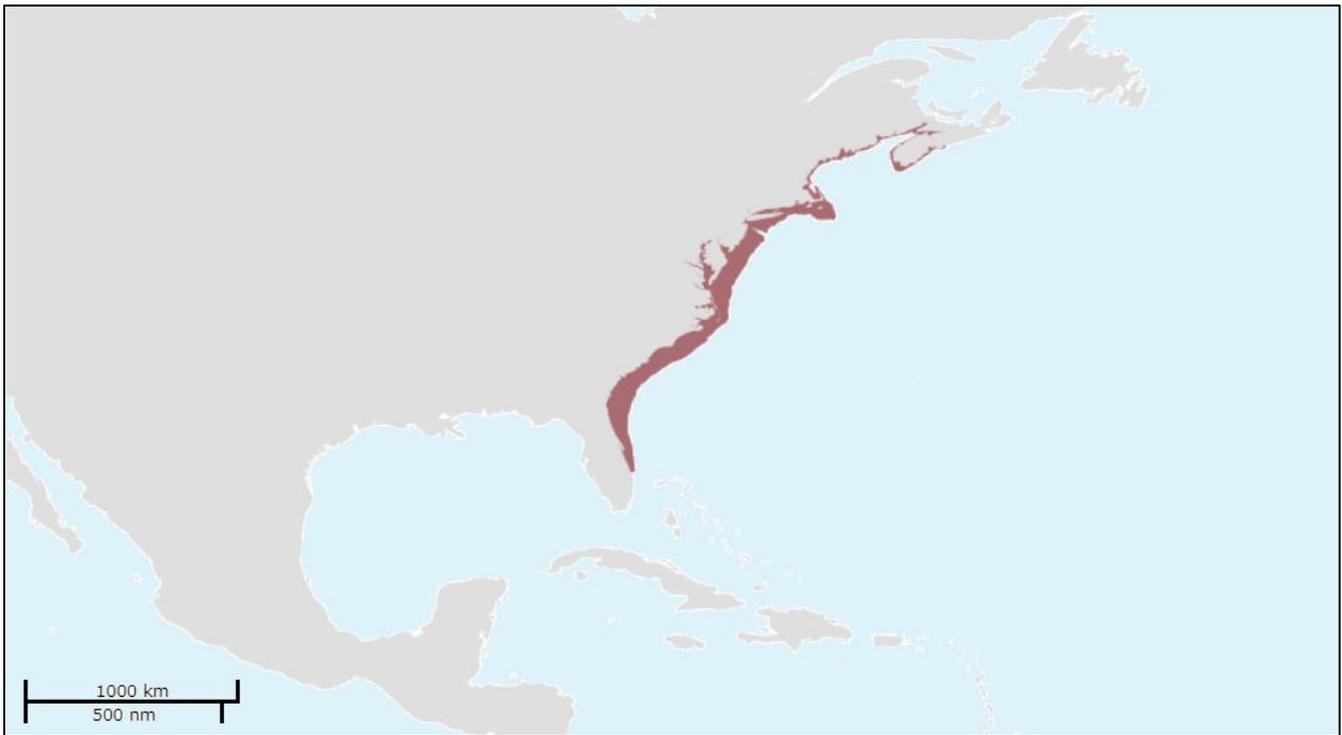


Figure 2. Menhaden distribution map (Source: www.fao.org).

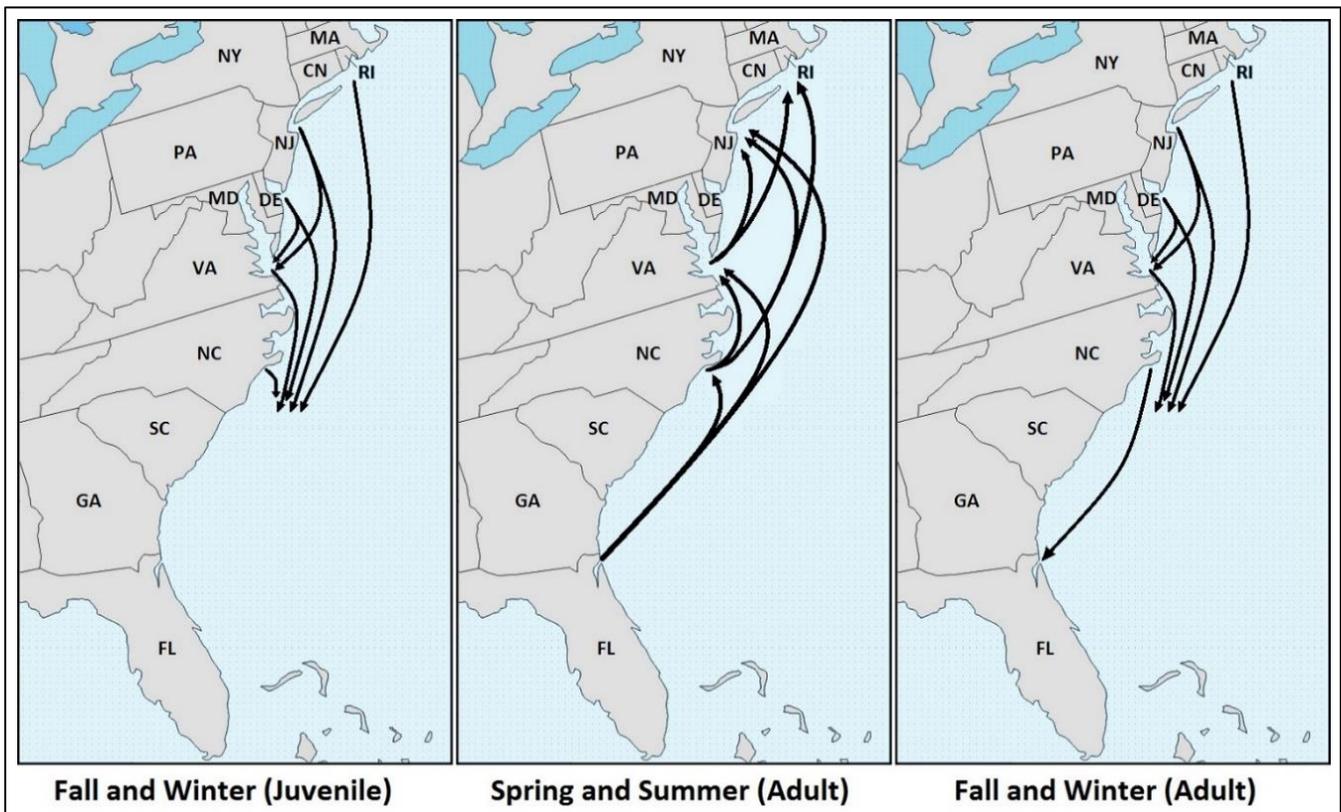


Figure 3. Juvenile and adult migrations of Atlantic menhaden (Source: Adapted from ASMFC 1981).

3.2.1.2. Age and Growth

Juvenile growth

Young-of-the-year (YOY) menhaden range widely in size (Ahrenholz, 1991), with lengths varying as a function of density, timing of larval ingress, temperature and chl-a availability¹. Mean growth rates of YOY menhaden in Chesapeake Bay were lowest (0.38 mm d⁻¹) during years of peak YOY recruitment while mean growth rates were highest (0.62 and 0.71 mm d⁻¹) during years of low recruitment. Other growth rates reported for YOY menhaden in Chesapeake Bay have ranged from 0.50 to 0.91 mm d⁻¹ (McHugh, 1967; Rippetoe, 1993).

Adult Growth

During the 1950s and early 1960s, Atlantic menhaden older than age-6 were present in the spawning population; however, fish older than age-6 have been uncommon in recent years. Today, the majority of the landings are comprised of fish ages 1 – 4 (SEDAR, 2015) with the relative contribution of each age class to total landings varying from year to year (Figure 4).

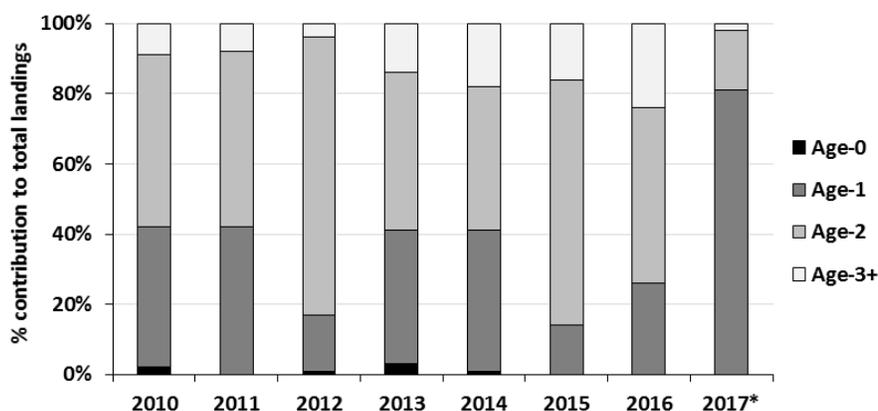


Figure 4. % age contribution to total landings in the Atlantic menhaden reduction fishery (2010 – 2017) (Source: NOAA 2018).

The growth of Atlantic menhaden varies from year-to-year and occurs primarily during the warmer months (AMTC, 2006). Growth of juveniles is density-dependent (Ahrenholz et al., 1987) such that growth rates are accelerated during the first year when juvenile abundance is low and are reduced when juvenile abundance is high. Lengths of young-of-year menhaden range in size, and this variation is a function of density, timing of larval ingress, temperature, and food availability (Ahrenholz, 1991; Houde, 2011). Adult menhaden can reach a total length of up to 500 mm and a weigh over 1.5 kg (Cooper, 1965; SEDAR, 2015; Smith and O’Bier, 1996). Due to their extensive migratory range (see *Section 1.2.1.1*), larger fish of a given age are captured farther north than smaller fish of the same age (Nicholson, 1978; Reish et al., 1985). This fact complicates attempts to estimate overall growth for the entire stock from size-at-age data compiled from a single area along the coast. Maximum size has been documented at 50 cm.

On the latest stock assessment update estimated von Bertalanffy growth parameters were calculated from the equation:

$$L(t) = L_{\infty} * [1 - \exp(-K*(t-t_0))].$$

$L_{\infty} = 30.16$ cm, $K = 0.47$ per year and $t_0 = -0.72$ year

¹ <http://www.mdsg.umd.edu/sites/default/files/files/EBFM-Menhaden-Briefs.pdf>

Mortality

The Atlantic menhaden population is subject to a high natural mortality rate, particularly during the first two years of life. Estimates of natural mortality have ranged from $M = 0.37$ (Schaaf and Huntsman, 1972) to $M = 0.52$ (Dryfoos et al., 1985). Previous assessments, beginning with Ahrenholz et al. (1987), used $M = 0.45$, whereas the 2015 Benchmark Stock Assessment endorsed the use of an age-varying but time-invariant approach using the methods of Lorenzen (1996) scaled to tagging estimates of natural mortality for ages 4 – 6 (SEDAR, 2015).

3.2.1.3. Feeding habits

Menhaden are very efficient filter feeders. Water is pushed through specialized gill rakers that are formed into a basket that allows them to capture plankton. Menhaden occupy two distinct types of feeding niches during their lifetime. Phytoplankton is the major food of juvenile and young adult menhaden. The role of zooplankton in the diet becomes more important in older menhaden as gill-raker spacing on their filtering apparatus increases in size (Friedland et al., 1984; 2006). The relative importance of each food type varies with ontogeny, region, and local availability. Adult and juvenile menhaden feed by straining plankton from the water, their gill rakers forming a specialized basket to efficiently capture tiny food.

3.2.1.4. Reproduction and early life history

Sexual Reproduction

Most Atlantic menhaden reach sexual maturity during their third year of life (late age 2) at lengths of 180 - 230 mm fork length (FL). Spawning occurs year-round throughout much of the species' range, with maximum spawning off the North Carolina coast during late fall and winter. Adults then move inshore and northward in spring and stratify by age and size along the Atlantic coast (Rogers and Van Den Avyle 1989). During this northern migration, spawning occurs progressively closer inshore and by late spring, some spawning occurs within coastal embayments. There are definite spring and fall spawning peaks in the Middle and North Atlantic Regions, with some spawning occurring during the winter in the shelf waters of the Mid-Atlantic Region.

Atlantic menhaden are relatively prolific spawners. Predicted fecundities range from 38,000 eggs for a small female (180 mm FL) to 362,000 for a large female (330 mm FL) Lewis et al. (1987):

Early Life History

Atlantic menhaden produce pelagic eggs about 1.5 mm in diameter which hatch within 2.5-2.9 days at an average temperature of 15.5°C (Hettler 1981). Larvae which hatch offshore are transported shoreward and enter estuaries in the south Atlantic region after 1-3 months at sea (Reintjes 1961) at a size of 14-34 mm FL (Reintjes and Pacheco 1966). Larval migration into estuaries occurs during May-October in the north Atlantic region, October-June in the mid- Atlantic, and December-May in the south Atlantic (Reintjes and Pacheco 1966). Larval condition improved rapidly after fish entered two North Carolina inlets (Lewis and Mann 1971).

Metamorphosis to the juvenile stage occurs at about 38 mm total length (TL) during late April-May in North Carolina estuaries and later in the year farther north. Most larvae entered the White Oak estuary (North Carolina) in March and moved upstream to a fresh water-low salinity zone where they transformed into "pre-juveniles" in late March-April and then into juveniles in late April-May (Wilkins and Lewis 1971). Other studies (Weinstein 1979; Weinstein et al. 1980; Rogers et al. 1984) also show young menhaden are more abundant in shallow, low salinity (< 5‰) estuarine zones. Metamorphosis to the "pre-juvenile" stage occurs at lengths >30 mm TL and to the juvenile stage beyond 38 mm TL (Lewis et al. 1972).

The morphological changes that occur at metamorphosis are associated with a change in feeding behavior. Larvae feed on individual zooplankters, whereas juveniles rely more heavily on filter feeding (June and Carlson 1971;

Durbin and Durbin 1975). This shift in feeding behavior is associated with a loss of teeth and an increase in the number and complexity of the gill rakers through which sea water is filtered as it passes through the gills. Older larvae (25-32 mm) feed on large copepods, but only rarely on small zooplanktonic organisms (Kjelson et al. 1975). Fish larger than 40 mm FL feed primarily on phytoplankton (June and Carlson 1971), but zooplankton has also been reported as an equally important food source in juvenile Atlantic menhaden (Richards 1963; Jeffries 1975).

Young-of-the-year menhaden congregate in dense schools as they leave shallow, estuarine waters for the ocean, principally during August to November (earliest in the north Atlantic region) at lengths of 75-110 mm TL (Nicholson 1978). Many of these juveniles migrate south along the North Carolina coast as far as Florida in late fall and early winter and then redistribute northward by size as age-1 fish during the following spring and summer (Kroger and Guthrie 1973; Nicholson 1978). Larvae which enter the estuaries late in the season may remain there for an additional year and emigrate to the ocean at age 1. Age-1 menhaden migrate north and south along the coast over a greater distance than young-of-the-year juveniles (Nicholson 1978).

Recruitment

Sexual maturity begins as early as age one to just before age three, with major spawning areas from the Carolinas to New Jersey. The majority of spawning occurs primarily offshore (20 – 30 miles) during winter. Buoyant eggs hatch at sea, and larvae are carried into estuarine nursery areas by ocean currents. Juveniles spend most of their first year in estuaries, migrating to the ocean in late fall.

Population dynamics of Atlantic menhaden are believed to be controlled by processes that affect juvenile recruitment in Chesapeake Bay, the center of its distribution and historical fishery (Maryland Sea Grant [MDSG], 2009). Lack of a strong stock-recruitment relationship for Atlantic menhaden indicates that environmental fluctuations are a primary driver of recruitment variability in Chesapeake Bay and coast-wide (SEDAR, 2015). Specifically, climate fluctuations indexed by inter-annual winter-spring conditions in the mid-Atlantic, are suggested as a primary cause of menhaden recruitment variability. Several studies state that factors contributing to interannual variability of survival, growth, and recruitment levels in Atlantic menhaden include variability of water quality, climate conditions, predation rates, primary productivity, and associated phytoplankton levels.

Bioenergetics modelling support the hypothesis that age-0 Atlantic menhaden production is related to the level of phytoplankton biomass in Chesapeake Bay (Luo et al., 2001; Brandt and Mason, 2003; Annis et al., 2011), and a degree-days model indicates a strong effect of temperature on growth (Humphrey et al., 2014). Houde et al., (2016) documented consistent positive relationships between measures of primary productivity and abundance of age-0 Atlantic menhaden in Chesapeake Bay from 1989 to 2004, years when remotely sensed Chl a data were available. Furthermore, Houde et al., (2016) showed that age-0 Atlantic menhaden grew faster and were larger in years of high primary production. Recent bioenergetics modelling also indicated faster growth in years of high phytoplankton stock (Annis et al., 2011).

3.2.1.5. The ecological role of Atlantic menhaden

Atlantic menhaden is important forage for many fish, bird and mammalian predators along the Atlantic Coast (Rogers and Van Den Avyle 1989; Munroe and Smith 2000). Within Chesapeake Bay, piscivorous fishes and birds prey upon menhaden and share the menhaden resource with the fishery (Hartman and Brandt 1995; Smith 1999; Walter et al. 2003; Viverette et al. 2007). Menhaden is important prey for striped bass, weakfish, and bluefish in Chesapeake Bay (Hartman and Brandt 1995; Walter et al. 2003) and these piscivores are key elements of the Bay's recreational and commercial fisheries.

Piscivorous fishes are size-selective and gape-limited predators and, as such, consume small prey fishes such as bay anchovy when they initiate piscivory. Juvenile menhaden represent the next step in piscivory as the predators grow to larger size (Juanes 1994; Hartman and Brandt 1995; Uphoff 2003; Walter et al. 2003). A switch early in life from an invertebrate to fish diet by bluefish, weakfish, and striped bass categorizes them as specialized piscivores that exhibit high growth rates, implying the need for forage of appropriate size (Persson and Brönmark 2002). Diet studies by Walter and Austin (2003) and Overton et al. (2008) reported that large striped bass, >900 mm, could eat fish prey >400 mm, a length approximating that of the largest Atlantic menhaden (Ahrenholz 1991). Bluefish, a pelagic predator has a large gape relative to its length that is indicative of its ability to consume large as well as small prey fishes (Scharf et al. 2000). Unlike striped bass and bluefish, weakfish does not expand the size range of items in its diet with growth (Scharf et al. 2000) and largely remains a predator on fish in the size range of bay anchovy and small, juvenile menhaden.

Of the three piscivorous fishes important to the Bay, striped bass is most likely to have a large impact on menhaden abundance. Consumption of menhaden and river herrings by the recovered striped bass population is potentially high enough to substantially impact abundance of these forage fishes along the Atlantic coast (Hartman 2003; Uphoff 2003; Savoy and Crecco 2004). Potential consumption (a measure of potential, not actual consumption) of age 0-2 Atlantic menhaden by striped bass increased steadily from a small fraction of the coastal commercial landings in 1982 until it exceeded landings after 1994. Potential consumption exceeded estimated menhaden abundance after 1997 (Uphoff 2003). Estimated consumption of menhaden by bluefish along the Atlantic coast in 1995 was approximately 5% of menhaden landings (Buckel et al. 1999).

Striped bass may prefer Atlantic menhaden, but will prey on other organisms when menhaden are not sufficiently abundant (Overton 2003; ASMFC 2004; Rudershausen et al. 2005). The prey to predator ratio in biomass of age 1+ menhaden (ASMFC 2006) to age 2+ striped bass (NEFSC2008) fell from an average of 73 in 1982-1987 to an asymptotic low of about 6 after 1996.

Potential susceptibility of menhaden to striped bass predation along the Atlantic Coast can be indexed by this ratio (Uphoff 2003). Diet studies on striped bass and weakfish in Chesapeake Bay indicated major shifts in the past decade (Uphoff 2003, 2006). Menhaden became less frequent in diets from the early 1990s to early 2000s and invertebrates became more important (Hartman and Brandt 1995; Griffin and Margraf 2003; Overton 2003; Bonzek et al. 2004).

Switching to alternative prey potentially has implications for populations of those prey taxa that had previously been unimportant in striped bass diets. Since the close of the DDT era in the early 1970s, piscivorous bird populations grew exponentially throughout the tidal reaches of Chesapeake Bay (Viverette et al. 2007). Menhaden historically has been one of their most important prey. The actual or potential consumption of menhaden by bird predators that include the bald eagle and osprey, but also terns, gannet, loons, great blue heron, double-crested cormorant, brown pelican, and some gulls in the Bay watershed, has increased substantially in the past three decades, as has their demand for fish (Viverette et al. 2007). Predator-prey interactions between piscivorous birds and fish prey have received little attention from wildlife managers (Steinmetz et al. 2003) or fishery managers.

Diet studies have been conducted on osprey. Menhaden is a major component of the diet of coastal osprey populations in New England (Poole 1989), coastal New Jersey (Steidl et al. 1991a) and the Delaware Bay (Steidl et al. 1991b). The only published diet study of osprey in Chesapeake Bay, conducted in high salinity reaches of the lower Bay during the mid-1980s, found that menhaden comprised 75% of nest deliveries (McClellan and Byrd 1991).

The double-crested cormorant (*Phalacrocorax auritus*) has increased in abundance throughout the Chesapeake watershed. The first record of breeding in the region occurred in 1978 within the tidal freshwater James River (Blem et al. 1980) and the population then grew rapidly (Watts and Bradshaw 1996). Cormorants are now common in the Bay, but feeding habits are unreported. However, it is probable that cormorants consume menhaden as part of their diets. Research on feeding habits of cormorants in other regions indicate feeding on small individuals (~75 – 125 mm) of many fish taxa. An adult cormorant can consume substantial amounts of fish, approximately one pound per day (U.S. Fish and Wildlife Service 2009), highlighting the consumption potential of bird predators when they are abundant.

For detailed consideration of Atlantic menhaden as a candidate key-Lower Trophic Level (LTL) species see 3.3.5 below.

3.2.2. Fishery location

The location of the menhaden fishery has varied over time in line with changes in the distribution of the menhaden stock and the number and location of menhaden processing facilities. Since the 1950s the geographic range of the menhaden stock has fluctuated with the stock’s range contracting in the 1960s, expanding in the 1970s and 1980s, and contracting again in the 1990s. Consolidation and plant closures has also lead to a gradual decrease in the number of menhaden production facilities to the point where only a single facility located in Reedville, VA remains.

In spring 2012, North Carolina moved to prohibit purse seining for Atlantic menhaden within its territorial sea. Thus, menhaden reduction vessels from Virginia were prohibited from fishing on traditional fishing grounds along the northern and central North Carolina coast (SEDAR 40).

In recent years the Atlantic menhaden fishery has primarily taken place in waters off the U.S. states of Virginia, Maryland, Delaware, New Jersey and North Carolina and in Chesapeake Bay (Figure 5).

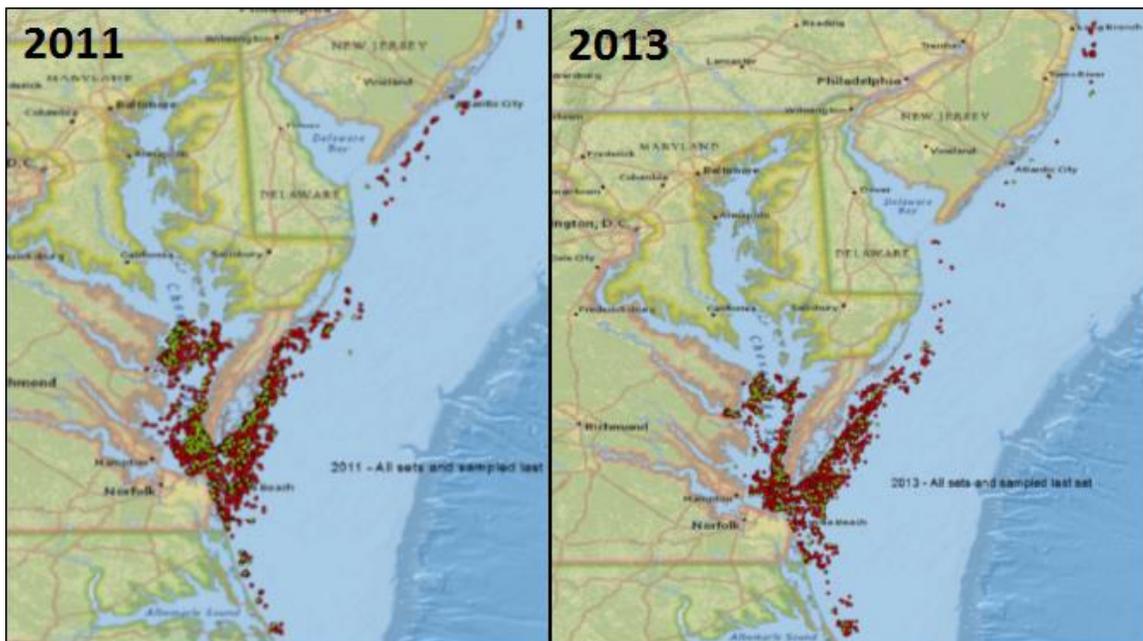


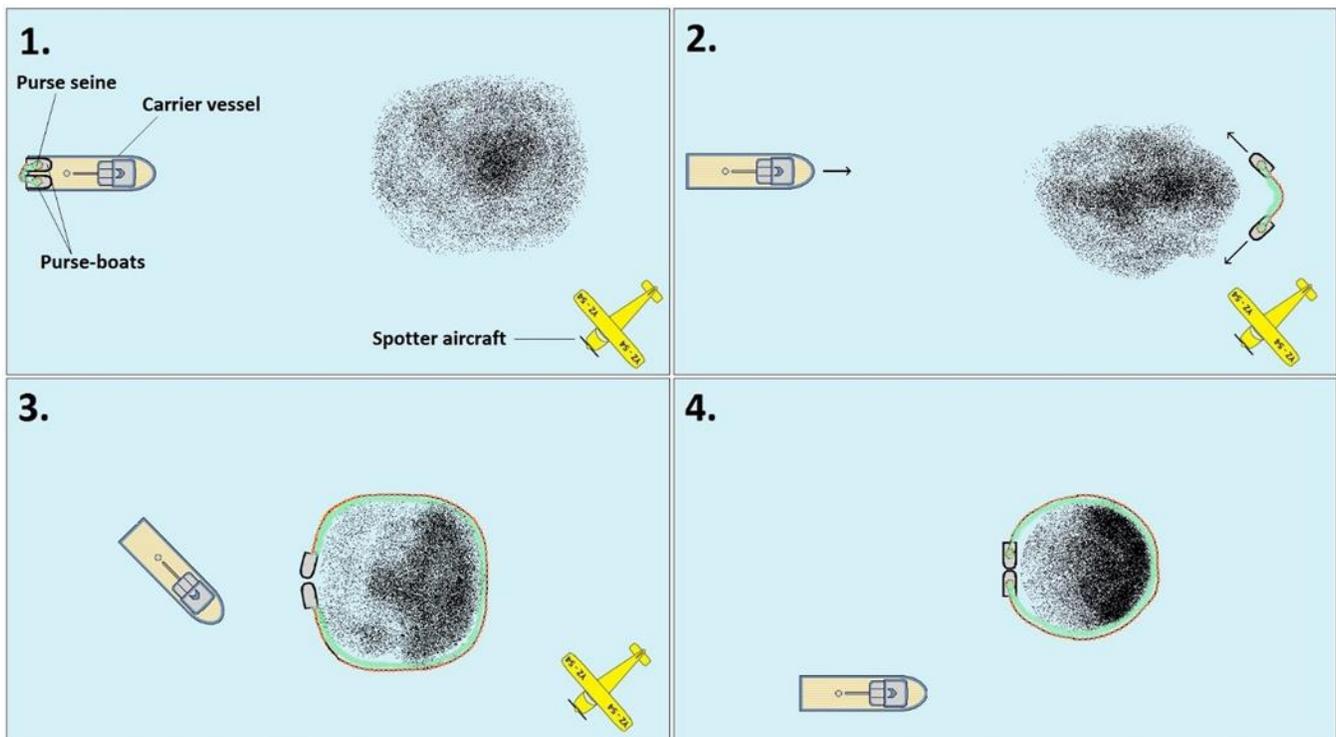
Figure 5. Locations of all purse-seine sets by Omega Protein vessels (red) and last sets of trips that were sampled for age and size composition of the catch (= port samples; green) during 2011 (left) and 2013 (right); data are from CDFR data base.

3.2.3. Fishing gears and methods

Purse seines are used to target dense aggregations close to the surface and within range of the purse seine gear. Typically, the purse seines used in the fishery are up to 1,800 ft in length and 65ft to 90ft (20m to 27m) deep with a bar mesh of 7/8 in (2.2 cm). A purse seine net is shot in a circle, with the aim being to completely surround the target shoal with a deep curtain of netting. The top of the seine is maintained on the surface by floats while small lead weights, tom weight, on the underside of the curtain ensure that the bottom of the net sinks quickly to surround the target shoal. The net is then “purse” (closed) under the shoal by heaving on the purseline which runs through steel rings attached to the lower edge of the net.

The steps involved in a purse seine set in the Atlantic menhaden fishery are outlined below and in Figure 6.

1. The search for menhaden is conducted with the aid of a spotter plane. Once a suitable shoal known as a ‘color’ or ‘whip’ is sighted, the spotter pilot directs the vessel towards the target shoal.
2. The purse-boats are deployed, each carrying half of the purse seine net. Once in position, the purse boats, directed by the spotter aircraft, separate and begin to set the net in a half circle around the target shoal.
3. The purse-boats each complete their half of the set and meet with the shoal surrounded by the net.
4. The purse line, running through the bottom rings, is pulled tight to close the bottom of the seine and confine the menhaden by dropping the tom weight. The spotter plane goes in search of the next target shoal.
5. The seine is retrieved mechanically by the power block aboard each purse-seine boat forcing the fish into a relatively small section of the net known as the ‘bunt.’
6. The carrier vessel moves to the purse boats where they are secured to the port side. The net is raised closer to the surface by a large boom and the catch is pumped aboard, across dewatering screens and into the refrigerated hold. Once the fishing trip has been completed, the carrier vessel returns to the plant where the fish are pumped ashore for processing.



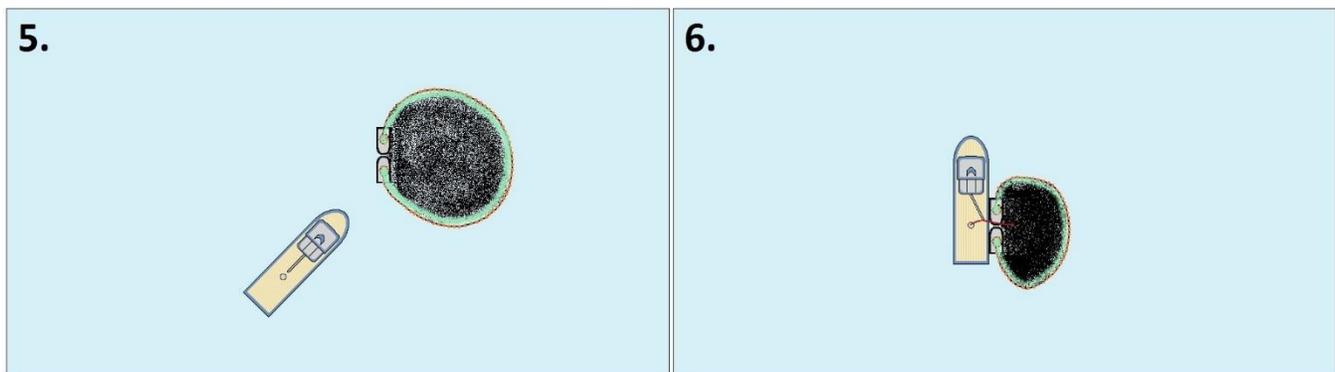


Figure 6. Steps involved in shooting a purse seine in the Atlantic menhaden fishery (Source: SAIG 2018).

3.2.4. History of the Atlantic menhaden fishery

The menhaden fishery is one of the oldest and largest commercial fisheries in the United States. Beginning in colonial times, seine fisheries for Atlantic menhaden, *Brevoortia tyrannus*, were established at various sites along the New England coast, using beach seines. By 1845 purse seines were introduced to the New England area (Frye, 1978) and the fishery, no longer dependent on localized abundance of fish schools or beach seining sites, expanded into nearshore coastal waters.

After the Civil War menhaden reduction plants were established in Virginia and North Carolina. By about 1895 a scarcity offish north of Cape Cod caused a collapse of the fishery in New England, and by the early 1900's the industry was concentrated in the Middle and South Atlantic states (Nicholson, 1971). Harrison (1931) reported that by the late 1920's much of the menhaden catch was milled into farm animal feed, while the amount of fertilizer produced declined. After World War II the modern menhaden industry and purse seine fleet developed. (Smith, 1991) (Figure 7).

The first coastwide fishery management plan (FMP) for Atlantic menhaden was passed in 1981 (ASMFC 1981). The 1981 FMP did not recommend or require specific management actions, but provided a suite of options should they be needed. After the FMP was approved, a combination of additional state restrictions, imposition of local land use rules, and changing economic conditions resulted in the closure of most reduction plants north of Virginia by the late 1980s (ASMFC 1992). In 1988, the ASMFC concluded that the 1981 FMP had become obsolete and initiated a revision to the plan.

The 1992 Plan Revision included a suite of objectives to improve data collection and promote awareness of the fishery and its research needs (ASMFC 1992). Under this revision, the menhaden program was directed by the ASMFC Atlantic Menhaden Management Board, which at the time was composed of up to five state directors, up to five industry representatives, and one representative each from the National Marine Fisheries Service and the National Fish Meal and Oil Association.

Amendment 1, passed in 2001, provided specific biological, social/economic, ecological, and management objectives. Amendment 1 led to the restructuring of the Menhaden Management Board thereby removing five industry representative seats and the National Fish Meal and Oil Association seat and replacing them with the current structure. Industry input would instead be captured in the Advisory Panel

Addendum I (2004) addressed biological reference points for menhaden, the frequency of stock assessments (every three years), and updated the habitat section of the FMP.

Addendum II (2005) instituted a harvest cap on Atlantic menhaden by the reduction fishery in Chesapeake Bay. This cap was established for the fishing seasons in 2006 through 2010. The TC determined the following research priorities to examine the possibility of localized depletion of Atlantic menhaden in Chesapeake Bay: determine menhaden abundance in Chesapeake Bay; determine estimates of removal of menhaden by predators; exchange of menhaden between Bay and coastal systems; and larval studies (determining recruitment to the Bay).

Addendum III (2006) was initiated in response to a proposal submitted by the Commonwealth of Virginia that essentially mirrors the intent and provisions of Addendum II. It placed a five-year annual cap on reduction fishery removals from Chesapeake Bay. The cap, based on the mean landings from 2001 – 2005, was in place from 2006 through 2010. Addendum III also allowed a harvest underage in one year to be added to the next year's quota. The maximum cap in a given year was 122,740 metric tons. Though not required by the plan, other states have implemented additional conservation management measures in their waters. Addendum IV (2009) extended the Chesapeake Bay harvest cap three additional years (2011-2013) at the same cap levels as established in Addendum III.

Addendum V (2011) established a new F threshold and target rate (based on maximum spawning potential; MSP) with the goal of increasing abundance, spawning stock biomass, and menhaden availability as a forage species.

Amendment 2 (2012) established a 170,800 mt total allowable catch (TAC) beginning in 2013 and continuing until completion of, and Board action on, the next benchmark stock assessment, scheduled for 2014. The TAC represented a 20% reduction from the average of landings from 2009-2011 and an approximately 25% reduction from 2011 levels. The Amendment also established new biological reference points for biomass based on MSP, with the goal of increasing abundance, spawning stock biomass, and menhaden availability as a forage species. These new reference points use the same metric (e.g., MSP) used to define overfishing (fishing mortality target of $F_{30\% \text{ MSP}}$ and threshold of $F_{15\% \text{ MSP}}$). Amendment 2 allocated the TAC on a state-by-state basis based on landings history of the fishery from 2009-2011; allocation will be revisited three years after implementation. Further, it reduced the Chesapeake Bay reduction fishery harvest cap by 20% (this is an adjustment of cap that has been in place since 2006). States are required to close their fisheries when the state specific portion of the TAC has been reached; any overages must be paid back the following year.

Amendment 2 enabled the Atlantic Menhaden Management Board to set aside 1% of the overall TAC for episodic events. Episodic events are defined as times and areas where Atlantic menhaden are available in higher abundance than they normally occur. The set aside was designed to enable increased harvest of Atlantic menhaden during episodic events. Technical Addendum I to Amendment 2 (May 2013) established a mechanism for New England state(s) to use the set aside through Board action that includes a qualifying definition of episodic events, required effort controls to scale a state's fishery to the set aside amount, and a timely reporting system to monitor the set aside. If the episodic event set aside quota is unused as of October 31, it is redistributed to all the states on November 1 based on the Amendment 2 allocation percentages (SEDAR, 2015).

Amendment 3 (2017) maintains the management program's current single-species biological reference points until the review and adoption of menhaden-specific ecological reference points as part of the 2019 benchmark stock assessment process. It also addresses a suite of commercial management measures including allocation, quota transfers, quota rollovers, incidental catch, the episodic events set aside program, and the Chesapeake Bay reduction fishery cap and set the TAC for the 2018 and 2019 fishing seasons at 216,000 mt with the expectation that the setting of the TAC for subsequent years will be guided by menhaden-specific ecological reference points.

Amendment 3 also changes fishery allocations in order to strike an improved balance between gear types and jurisdictions. The Amendment allocates a baseline quota of 0.5% to each jurisdiction with the exception of VA and NJ, and then allocates the rest of the TAC based on historic landings between 2009 and 2011. This measure provides fishing opportunities to states which currently have little quota while still recognizing historic landings in the fishery. The Board also agreed to maintain the quota transfer process, prohibit the rollover of unused quota, maintain the 6,000 lb trip limit for non-directed and small-scale gears following the closure of a directed fishery, and set aside 1% of the TAC for episodic events in the states of New York through Maine.

Finally, the Amendment reduces the Chesapeake Bay cap, which was first implemented in 2006 to limit the amount of reduction harvest within the Bay, to 51,000 mt from 87,216 mt. According to the ASMFC, this recognizes the importance of the Chesapeake Bay as nursery grounds for many species by capping recent reduction landings from the Bay to current levels.

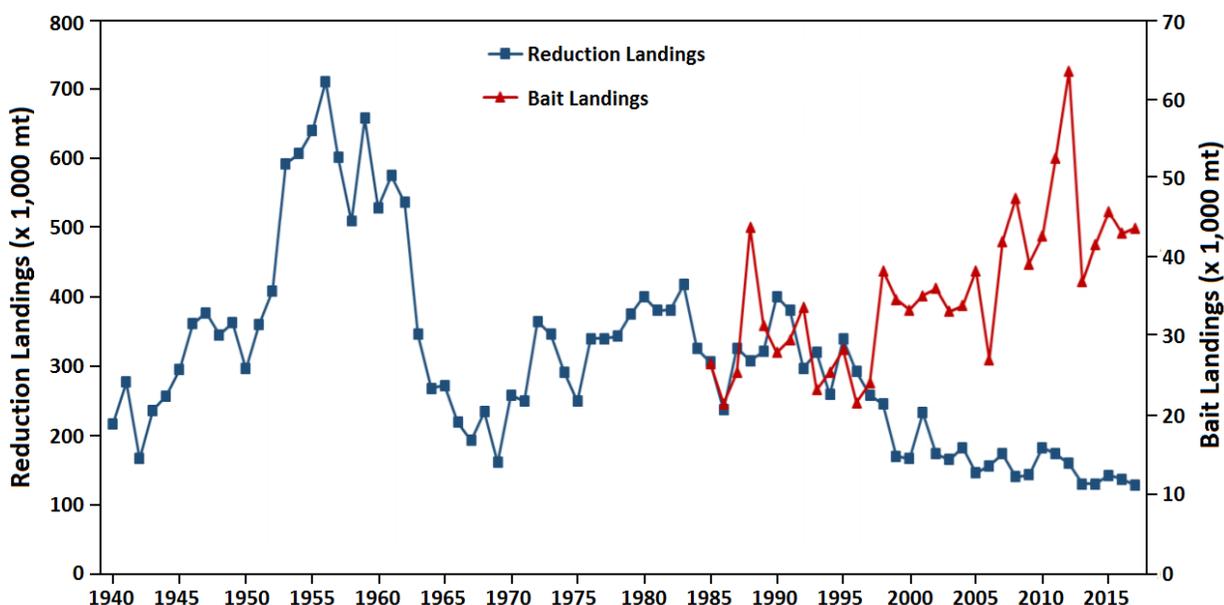


Figure 7. Landings from the reduction purse seine fishery (1940 -2015) and bait fishery (1985 – 2015) for Atlantic menhaden.

3.2.5. Economic and market information

The U.S. Atlantic menhaden fishery is a reduction fishery. Menhaden do not go for direct consumption but are instead processed into three products: fish meal, fish oil, and condensed fish solubles. Fish solubles are produced as a by-product of fish oil production. During the processing of fish to recover the oil fraction a mixture of water and oil is produced. Then after this mixture is centrifuged to remove the oil the water containing fraction can then be condensed or dried to produce condensed fish solubles or dried fish solubles.

Fish meal is a valuable ingredient in animal/fish feeds with the aquaculture industry being heavily dependent on fish meal. In the past few years approx. 50 – 60% of menhaden fish meal has gone for domestic consumption while demand from Asia, and in particular China, is rapidly growing due to increasing aquaculture activities. Menhaden oil may be added in its crude state to animal and aquaculture feeds or it may be further refined to allow it to be used for human consumption. Most of the fish solubles (roughly 90%) are added back to the meal fraction during the production process to enhance nutrient levels and to improve the attractant properties of aquaculture feeds (i.e. to attract the fish being fed to the feed).

The value and price of reduction fishery products varies greatly from year to year. The primary drivers of value and price are worldwide supply-and-demand of industrial fisheries products, and competition with other products such as corn, soybeans and palm and canola oils.

The value and price of reduction fishery products varies greatly from year to year (Figure 8). The primary drivers of value and price are worldwide supply-and-demand of industrial fisheries products, and competition with other products such as corn, soybeans and palm and canola oils. Landings in 2015 along the Atlantic coast were 436 million pounds valued at more than \$41.4 million.

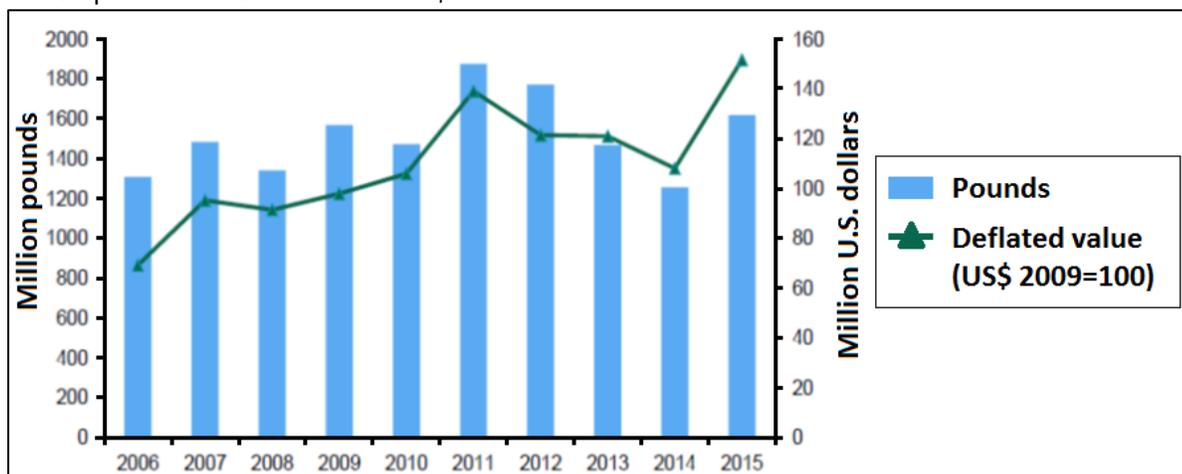


Figure 8. Trend in commercial landings of Atlantic and Gulf menhaden landings (million pounds), total value (million dollars) (2006 – 2015). (Source: [NOAA, Fisheries of the United States](#))

3.2.6. Legal/administrative status of the Atlantic menhaden fishery

Atlantic menhaden are distributed throughout coastal waters of the north-west Atlantic from Nova Scotia to Florida; however, they are almost exclusively fished off Virginia, New Jersey and New England and Mid-Atlantic regions. The U.S. Atlantic menhaden fishery operates in a single jurisdiction with the U.S. EEZ (MSC FCR Annex SA4.1.1) and is not shared between nation states.

Due to the wide distribution of Atlantic menhaden, the population is affected by the jurisdictions and authorities of a large number of federal and state agencies. Menhaden are predominantly found in coastal waters within the territorial waters of the U.S. Atlantic states. Consequently, the fishery is primarily managed at the state level with individual states, and not Federal Authorities, exercising the most direct management authority.

3.3. Principle One: Target Species Background

3.3.1. Stock Structure

Atlantic menhaden are considered a single stock. Historically there was considerable debate relative to stock structure of Atlantic menhaden on the US East Coast, with a northern and southern stock hypothesized based on meristics and morphometrics (Sutherland 1963; June 1965). Based on size-frequency information and tagging studies (Nicholson 1972 and 1978; Dryfoos et al. 1973), the Atlantic menhaden resource is believed to consist of a single unit stock or population. Recent genetic studies (Anderson 2007; Lynch et al. 2010) support the single stock hypothesis.

3.3.2. Regional Stock Assessment of Atlantic menhaden

The latest update stock assessment was conducted by NMFS in 2017. The last benchmark assessment was conducted jointly by NMFS, the ASMFC and Southeast Data, Assessment and Review (SEDAR) process in 2015 with the next benchmark assessment scheduled for 2019.

3.3.3. Atlantic menhaden stock status

3.3.3.1. Abundance Indices

Fishery-Dependent Indices

For the 2015 benchmark stock assessment, four fishery-dependent datasets (MA pound net, NJ gillnet, MD pound net, and PRFC pound net) were used to create state-specific indices of relative abundance. The fishery-dependent (FD) datasets revealed that FD indices had significant positive correlations with fishery-independent (FI) indices, within their respective regions. The FD data sets lacked both age and length data and because the FI datasets had longer time series and were generally of a higher quality (i.e., fewer issues of concern; e.g., one data set was one permit holder), all FD indices were removed from consideration in assessment models and were not updated for this report Fishery-Independent Indices

Fishery-independent Indices

YOY Index (1959 – 2016)

Sixteen fishery-independent young-of-the-year (YOY) survey data sets were used to create a coastwide index of recruitment for use in the base run of the Atlantic menhaden assessment model. The individual indices were combined using hierarchical modeling as described in Conn (2010). The resultant YOY index shows the largest recruitments occurring during the 1970s and 1980s (Figure 9). Recruitment has since been lower but with increases in recruitment in the last three years. The CV for the index ranged from 0.37 to 1.04. This index was used to inform annual recruitment deviations in the model along with the catch at age data.

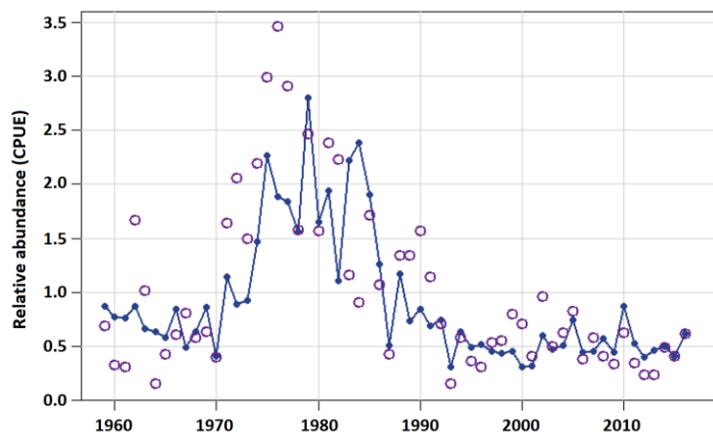


Figure 9. The observed and predicted recruitment index for 1959 – 2016 comprised of a series of state surveys.

Age-1+ Indices

Two coastwide indices of adult abundance were developed from nine FI surveys. A northern adult index (NAD) was created using the method of Conn (2010) that included VIMS, CHESMAP, CHESFIMS, NJ, CT, and DE 16- and 30-ft trawls for the years 1980-2016 (Figure 10). A southern adult index (SAD) was created using the method of Conn (2010) that included the SEAMAP trawl survey and the GA trawl survey for the years 1990-2016 (Figure 11).

The NAD adult index for the assessment indicates an increase in abundance in the most recent years, while the SAD adult index for the assessment indicates a slightly decreasing abundance in the most recent years. The CV associated with the SAD index ranged from 0.40 to 0.71, and the CV associated with the NAD index ranged from 0.29 to 0.88. The length compositions for each of the adult indices were combined across surveys. Raw lengths in 10-mm bins from each survey by year were summed and then divided by the total number of length samples for that year. Length compositions with sample sizes over 100 (number of sets, trawls, etc.) were available continuously for 1990-2016 for the SAD and for 1988-2016 for the NAD and were used to determine selectivity of the respective indices

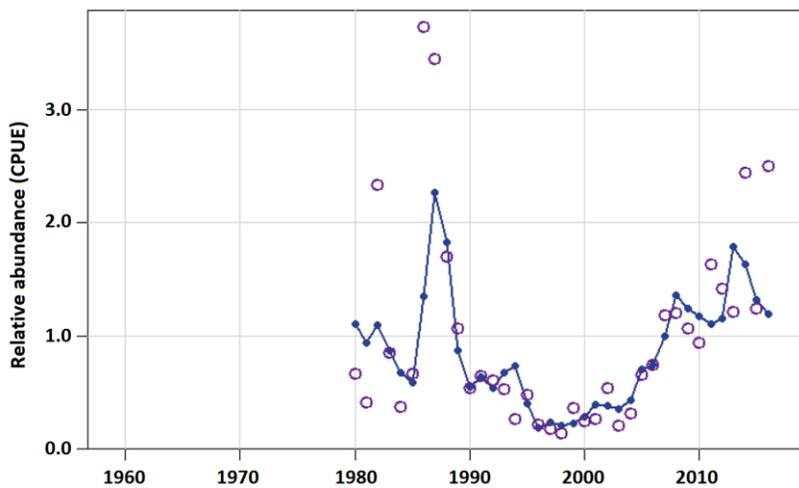


Figure 10. The observed and predicted NAD index for 1980-2016 comprised of a series of state trawl surveys in the northern region.

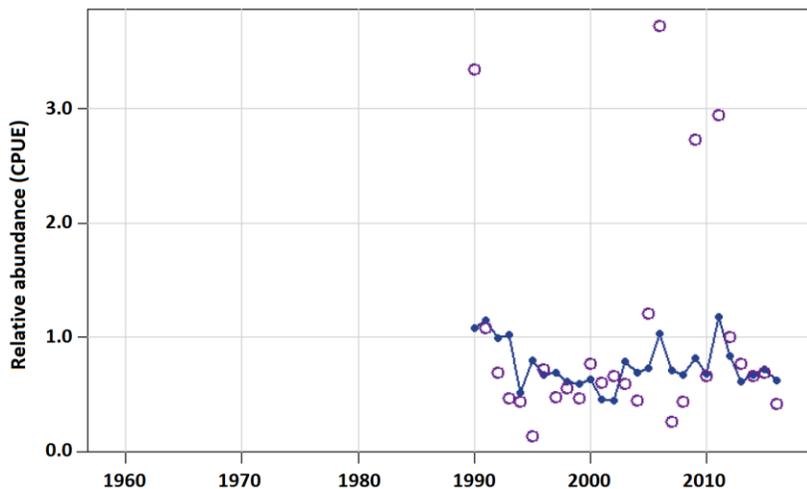


Figure 11. The observed and predicted SAD index for 1990-2016 comprised of two state trawl surveys in the southern region.

Treatment of Indices

The two adult indices, SAD and NAD, were included in the base run of the BAM along with length compositions because they were deemed as accurate representations of the population over time and best available science.

3.3.3.2. Spawning Stock Biomass

The base BAM model estimated population numbers-at-age (ages 0 – 6+) for 1955 – 2016 (Figure 12). From these estimates, along with growth and reproductive data, different estimates of reproductive capacity were computed. Population fecundity (i.e., Total Egg Production) was the measure of reproductive output used as in the benchmark assessment.

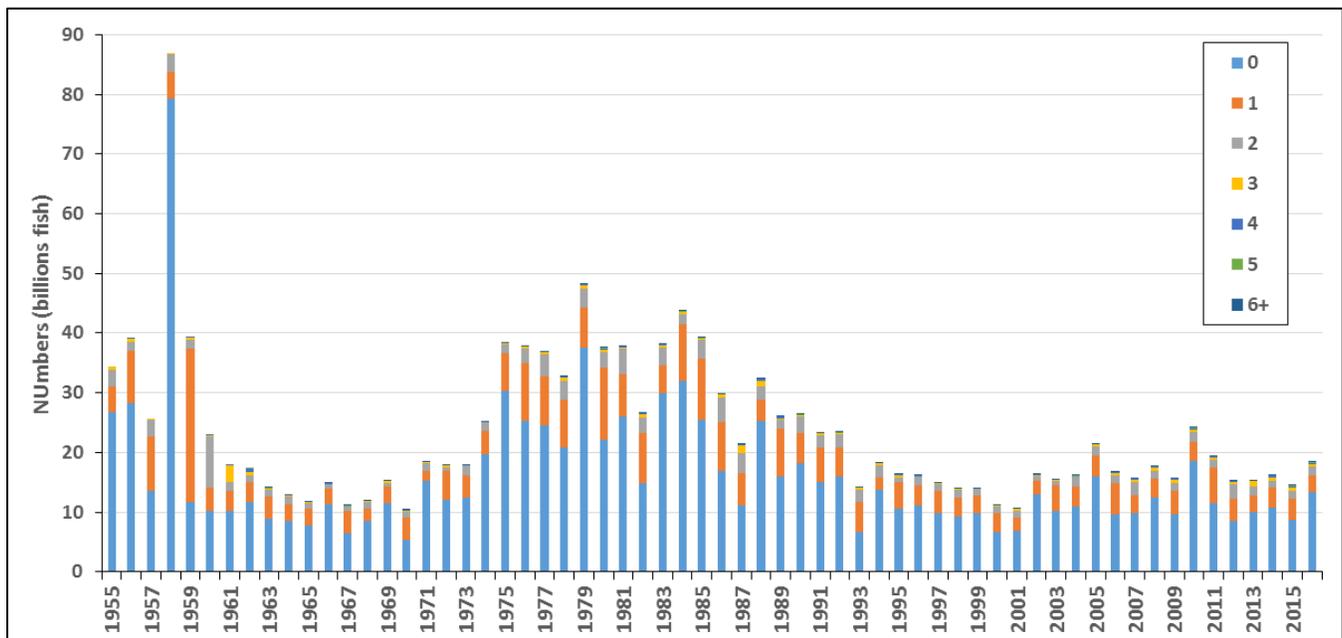


Figure 12. Numbers at age (above) and proportion of numbers at age (next page) estimated from the base run of the BAM for ages 0 – 6+ (1955 – 2016).

Population fecundity (*FEC*, number of maturing ova) was highest in the early 1960s, early 1970s, and during the more recent years and has generally been higher with older age classes making up a larger proportion of the *FEC* (Figure 13).

Biomass has fluctuated with time from an estimated high of over 2,288,000 mt in 1958 to a low of 567,000 mt in 2000 (Figure 14). Biomass was estimated to have been largest during the late-1950s, with lows occurring during the 1960s and mid-1990s to mid- 2000s, and was relatively stable through much of the 1970s, 1980s, and 2010s. Biomass is likely increasing at a faster rate than abundance because of the increase in the number of older fish at age, which weigh more than younger individuals (Figure 14; Figure 15; Figure 16).

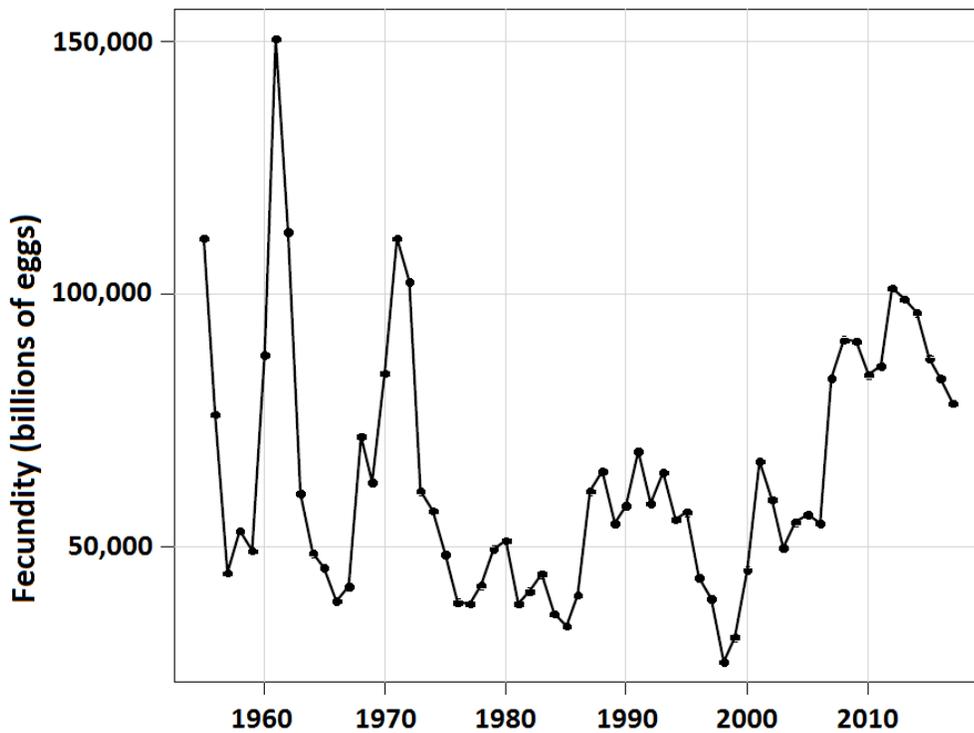


Figure 13. Fecundity in billions of eggs (1955 – 2017), with the last year being a projection based on 2016 mortality. Note y-axis does not start at 0.

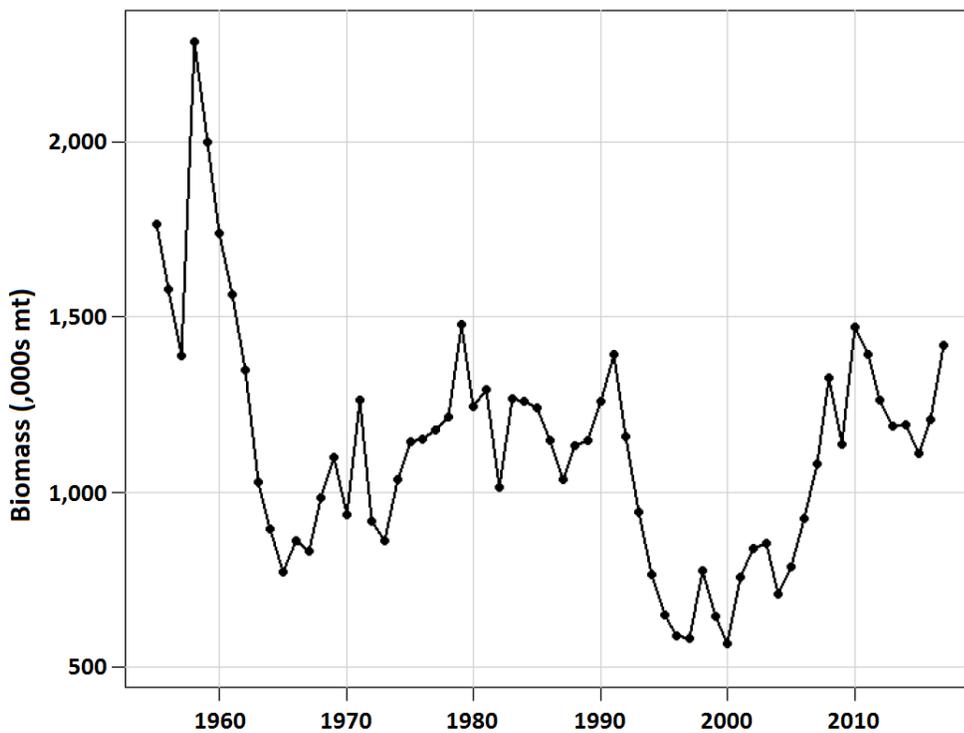


Figure 14. Biomass over time as predicted from the base run of the BAM for Atlantic menhaden, with the last year being a projection based on 2016 mortalities. Note y-axis does not start at 0.

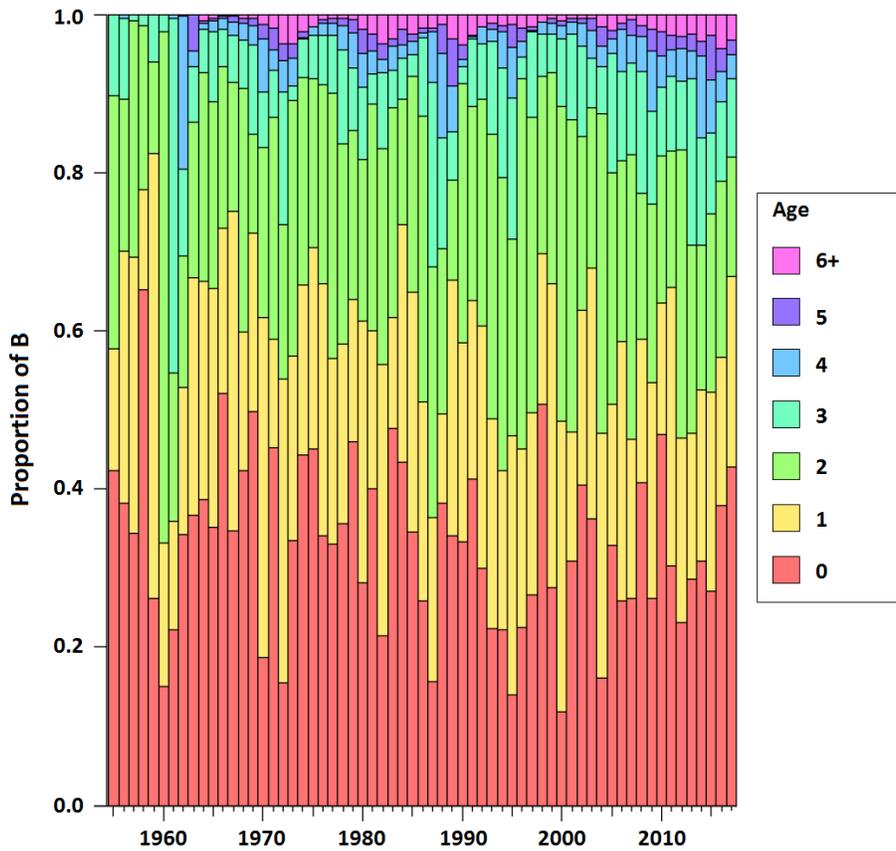


Figure 15. Proportion of biomass at age over time as predicted from the base run of the BAM for Atlantic menhaden, with the last year being a projection based on 2016 mortalities.

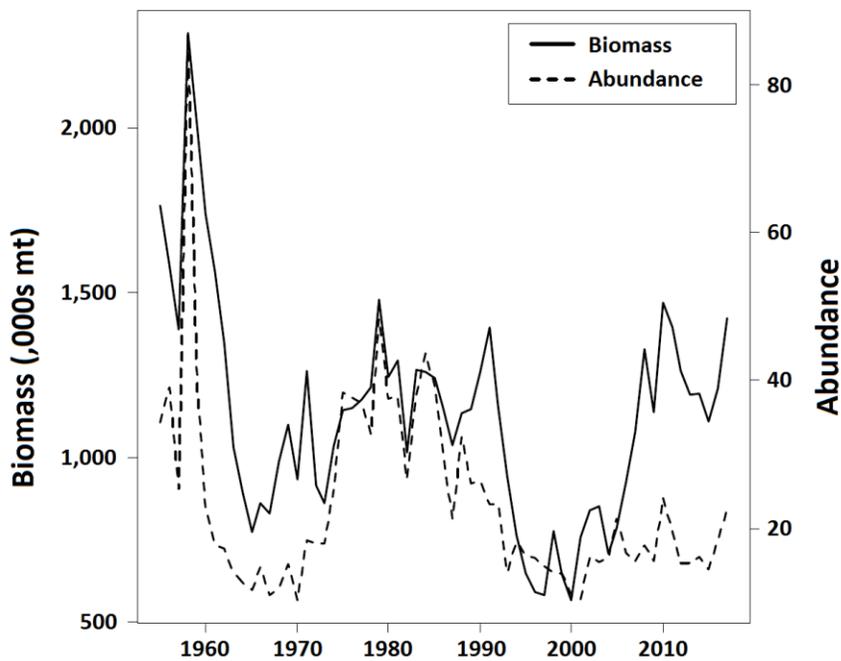


Figure 16. Biomass (,000s mt) and abundance over time for Atlantic menhaden (1959 – 2016).

3.3.3.3. Fishing Mortality

During the 2017 Update Assessment, four fisheries were explicitly modeled. Southern and northern fleets of both the reduction fishery and the bait fishery were explicitly modeled to account for differences in selectivity due to size and age based migratory patterns. Being such a small proportion of the landings in each year, recreational landings were combined with the bait fishery landings. Fishing mortality rates were estimated for each year for each fishery by estimating a mean log fishing mortality rate and annual deviations.

There was high variability on the fishing mortalities throughout the entire time series. The highest fishing mortalities for the commercial reduction fishery in the north were in the 1950s, while the highest fishing mortality rates for the commercial reduction fishery in the south were during the 1970s to the late-1990s (Figure 17).

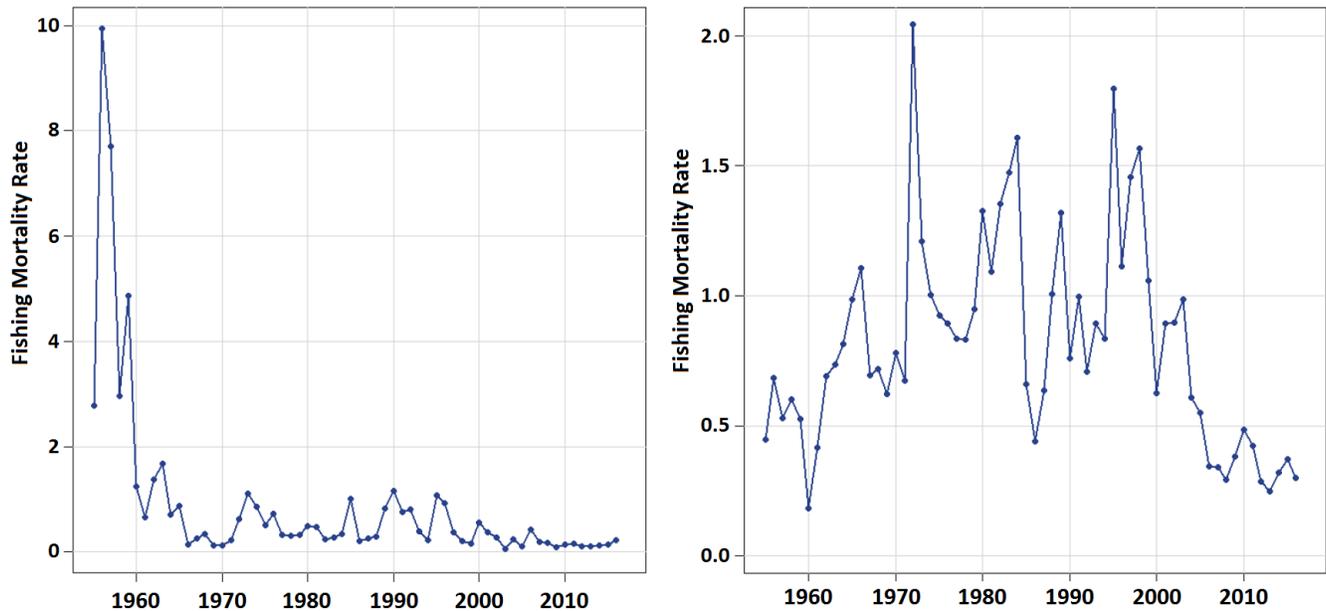


Figure 17. Full fishing mortality rates (1955 – 2016) for the northern (left) and southern (right) commercial reduction fisheries.

The highest fishing mortalities for the commercial bait fishery in the north were in the 1950s and 1990s, while the highest fishing mortality rates for the commercial bait fishery in the south were during the late 1990s and 2000s (Figure 18).

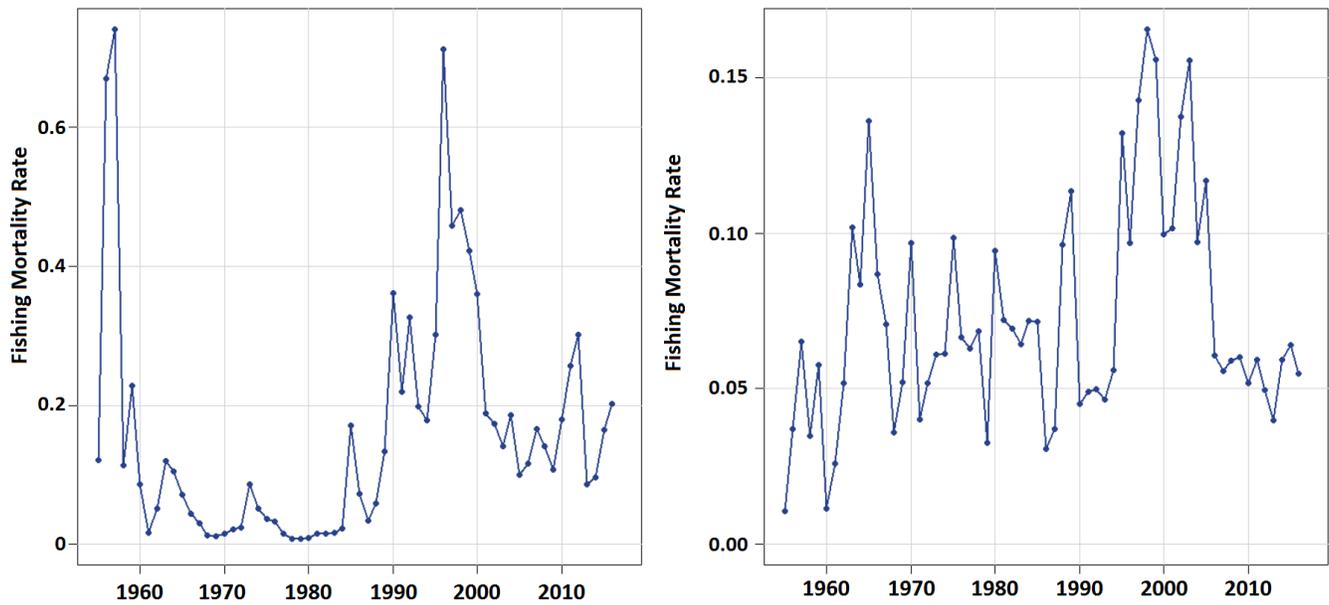


Figure 18. Full fishing mortality rates (1955 — 2016) for the northern (left) and southern (right) commercial bait fisheries.

Fishing mortality rate over time was reported as the geometric mean fishing mortality rate of ages-2 to -4 (Figure 19). In the most recent decade, the geometric mean fishing mortality rate has ranged between 0.31 and 0.59 with a 10-year average F of 0.46; the geometric mean fishing mortality rate for 2016 was 0.51.

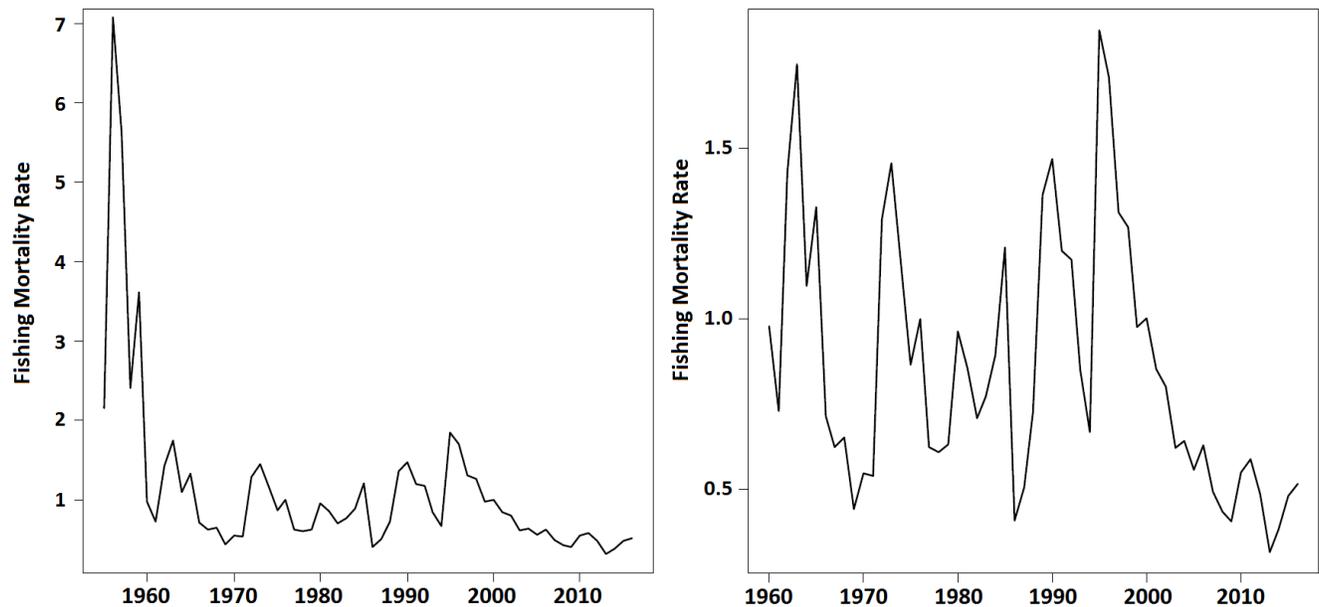


Figure 19. Geometric mean F across ages 2 to 4 over the history of the fishery from 1955 – 2016 (left) and truncated to 1960 – 2016 (right).

3.3.3.4. Recruitment

Age-0 recruits of Atlantic menhaden (Figure 20) were highest during the 1970s and 1980s. An extremely large year class was also predicted for 1958. More recently, larger year-classes have also been estimated in 2005, 2010, and 2016.

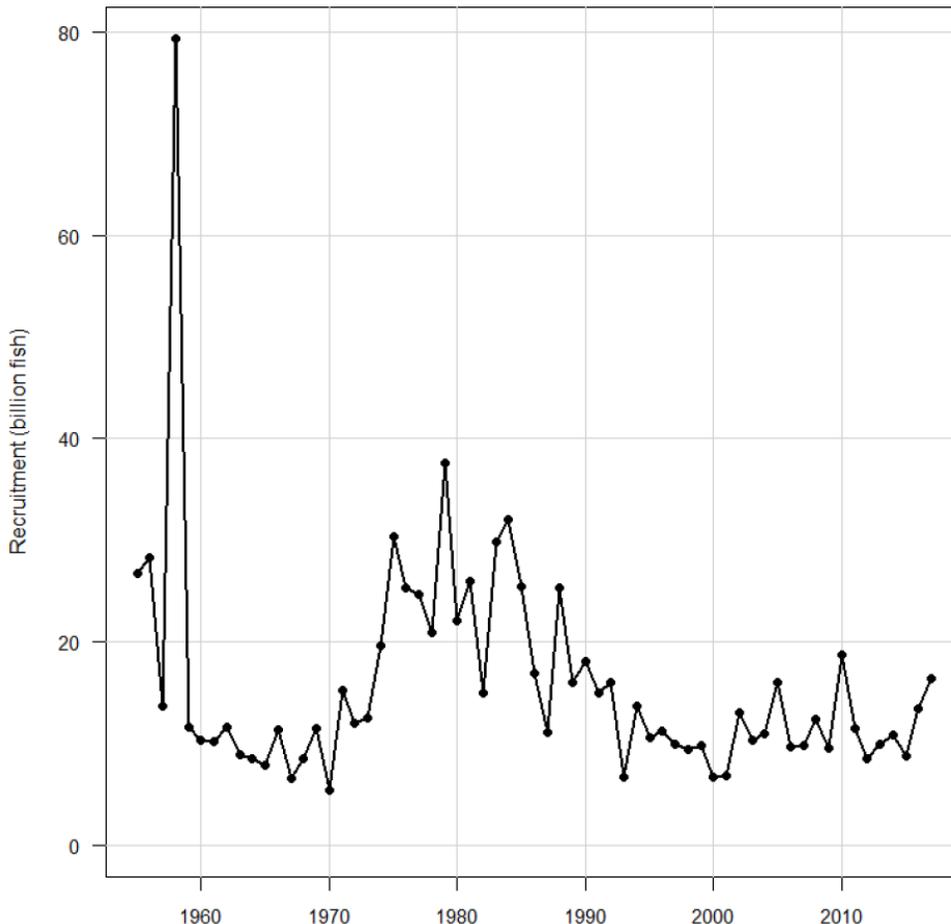


Figure 20. Number of recruits in billions of fish predicted from the base run of BAM for 1955 – 2017, with the last year being a projection based on 2016 mortality.

3.3.3.5. Catch and Landings

The Atlantic menhaden commercial fishery has two major components, a purse-seine reduction sector that harvests fish for fish meal and oil and a bait sector that supplies bait to other commercial and recreational fisheries.

Commercial Reduction Landings

Landings and nominal fishing effort (vessel-weeks, measured as number of weeks a vessel unloaded at least one time during the fishing year) are available since 1940 (Figure 21). Landings rose during the 1940s, peaked during the late 1950s (>600,000 mt for five of six years; record landings of 715,200 mt in 1956), and then declined to low levels during the 1960s (from 578,600 mt in 1961 to 162,300 mt in 1969). During the 1970s the stock rebuilt (landings rose from 250,300 mt in 1971 to 375,700 mt in 1979) and then maintained intermediate levels during the 1980s.

Landings during the 1990s declined from 401,100 mt in 1990 to 171,200 mt in 1999. By 1998, the fishery had contracted to only two factories, one in Virginia and one in North Carolina. Landings dipped to 167,300 mt in 2000, rose to 233,600 mt in 2001, and then stabilized until the North Carolina reduction plant closed in 2005, leaving the sole plant along the Atlantic coast in Virginia. Between 2006 and 2012, reduction landings averaged 162,100 mt.

The first coastwide TAC on Atlantic menhaden was implemented in 2013 and since that time, reduction landings have ranged from 131,000 mt in 2013 to 143,500 mt in 2015. In 2016, reduction landings were 137,400 mt and accounted for approximately 76% of coastwide landings.

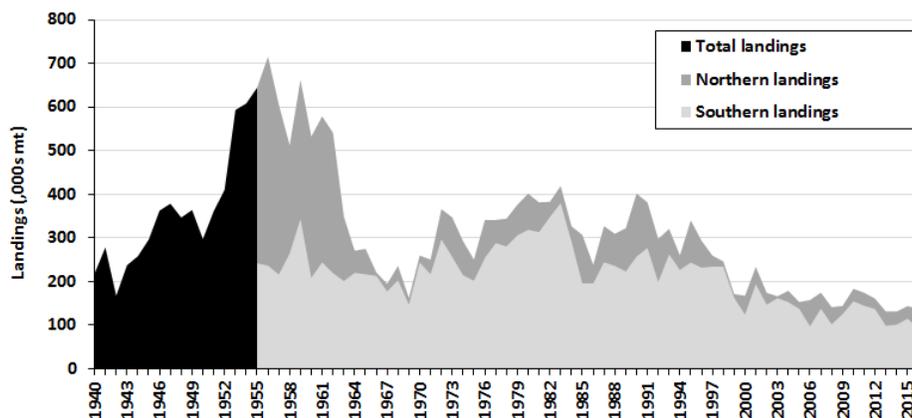


Figure 21. Total menhaden reduction landings (,000s mt) (1940 – 2016), divided into northern and southern reduction landings after 1955.

Commercial Bait Landings

Coastwide bait landings of Atlantic menhaden have generally increased from 1985 through 2016 (Figure 22). During 1985 to 1997 bait landings averaged 28,000 mt, with a high of 43,800 mt landed in 1988 and a low of 21,600 mt landed in 1986. Between 1998 and 2005, bait landings were fairly stable around 35,500 mt and then generally increased through 2016, peaking in 2012 at 63,700 mt. In 2016, bait landings were 43,100 mt and comprised 24% of coastwide landings.

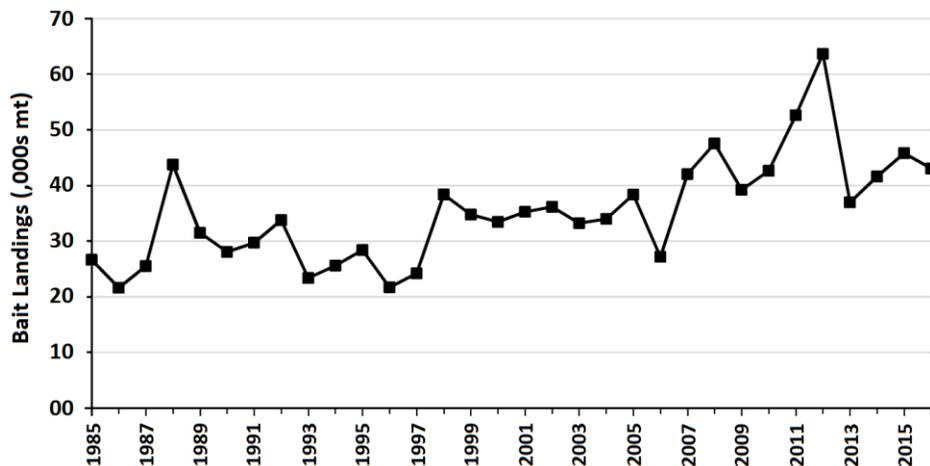


Figure 22. Atlantic menhaden bait landings (,000s mt) (1985 – 2016).

Bycatch Landings

Menhaden are also landed as bycatch in various commercial fisheries, such as pound nets, haul seines, and trawls. In the past, there were problems in documenting bycatch in menhaden because menhaden taken as bycatch in other commercial fisheries were often reported as "bait" together with other caught fish species. Additionally, menhaden was harvested for personal bait use or sold "over-the-side" and were unreported (ASMFC 2017c).

Nevertheless, despite problems associated with estimating menhaden bycatch landings, data collection has improved (ASMFC 2017c). For example, some states license directed bait fisheries and require detailed landings records. More recently, harvest data reporting requirements changed through the implementation of Amendment 2 to the Atlantic Menhaden FMP because of the need for states to monitor in-season harvest relative to their newly implemented state specific quotas. Beginning in 2013, several states went from monthly reporting to weekly or daily reporting to avoid exceeding their allocated quota.

Bycatch landings in 2016 totaled 2.2 million pounds, which represents a 63% decrease from 2015 bycatch landings (ASMFC 2017c). The 2016 bycatch landings accounted for approximately 0.55% of the coastwide landings. In 2016, the states of Maryland, Virginia, New York, and Maine comprised 78% of the bycatch landings with Rhode Island, New Jersey, Delaware, PRFC, and Florida accounting for the remaining 22% (Table 4) (ASMFC 2017). The predominant gears used from 2013 – 2016 include pound nets (61%) and anchored/staked gill nets(23%), which together accounted for 84% of the average landings from 2013 through 2016 (Table 4). A total of 1,908 trips landed bycatch of Atlantic menhaden in 2016. A majority of the bycatch trips (69%) landed less than 1,000 pounds from 2013 – 2016 (Table 5).

Table 4. Average landings under the bycatch allowance from 2013 – 2016 by gear type (stationary and mobile) and jurisdiction. Highlighted cells represent the gear type with the highest landings within a jurisdiction. (C) = confidential landings, and (-) = no landings.

State/Jurisdiction	ME	RI	CT	NY	NJ	DE	MD	PRFC	VA	FL	Sum lbs. (NonConf)	% of Total
Stationary Gears While Fishing												
Pound net	-	47,907	-	96,176	C	-	1,943,711	688,428	112,609	-	2,888,830	61.36%
Anchored/stake gill net	-	C	913	0	79,850	23,227	19,722	1,704	966,832	C	1,092,248	23.20%
Pots	-	-	-	C	-	C	C	-	-	C	-	0.00%
Fyke nets	-	-	-	-	C	-	C	26	77	-	103	0.00%
Mobile Gears While Fishing												
Cast Net	-	C	-	152,669	C	-	C	-	-	150,585	303,253	6.44%
Drift Gill net	-	-	-	24,443	83,697	53,381	12,061	-	62,189	-	235,771	5.01%
Purse Seine	C	-	-	-	-	-	-	-	-	-	-	0.00%
Seines Haul/Beach	-	-	-	177,173	-	-	C	35	3,840	-	181,048	3.85%
Trawl	-	C	C	6,565	C	-	-	-	-	-	6,565	0.14%
Hook & Line	-	C	C	-	-	-	C	-	-	C	-	0.00%
Sum lbs (NonConf)	-	47,907	913	457,025	163,547	76,608	1,975,494	690,193	1,145,547	150,585	4,707,818	
% of Total	0.00%	1.02%		9.71%	3.47%	1.63%	41.96%	14.66%	24.33%	3.20%		

Total confidential landings (i.e., sum of all C's) are 183,747 lbs. Note the sum of pounds and percent of total columns do not include confidential data.

Table 5. Total number of bycatch trips by year from 2013-2016 separated into 1,000 pound landings bins.

Bins (LBS)	2013 Trips	2014 Trips	2015 Trips	2016 Trips	Total Trips	% of Total Trips (2013 – 2016)
1 – 1,000	1,875	3,673	3,163	1,450	10,161	69%
1,001 – 2,000	252	517	582	148	1,499	10%
2,001 – 3,000	148	318	316	73	855	6%
3,001 – 4,000	110	190	139	48	487	3%
4,001 – 5,000	131	206	132	48	517	4%
5,001 – 6,000	158	265	196	108	727	5%
6,000+	130	109	140	33	412	3%
Total	2,804	5,278	4,668	1,908	14,658	

3.3.3.6. Single species reference points

Note. This section relates to the single-species reference points under which the menhaden fishery is currently managed. For a discussion of “rule of thumb” ecological reference points and their applicability to the menhaden fishery see Section 3.3.5.2 below.

Current benchmarks for Atlantic menhaden, calculated in the 2017 update assessment, are $F_{36\%}$, $F_{21\%}$, $FEC_{36\%}$, and $FEC_{21\%}$; the 2015 benchmark reference points for Atlantic menhaden were $F_{38\%}$, $F_{57\%}$, $FEC_{38\%}$, and $FEC_{57\%}$. The benchmarks are calculated through spawner-per-recruit analysis using the mean values of any time-varying components (i.e., growth, maturity) as in the benchmark assessment (SEDAR 2015) and geometric mean fishing mortality rate at ages-2 to 4 for each year (Figure 23).

The base BAM model benchmark estimates and terminal year stock status are indicated in Table 6. Based on the current adopted benchmarks, **the Atlantic menhaden stock status is not overfished and overfishing is not occurring** (i.e. the stock is below the current fishing mortality and above the current FEC thresholds (Figure 23 (left) and Figure 24 (left) respectively)). In addition, the stock is currently below the current fishing mortality target (Figure 23 (right)); however, the stock is below the current FEC target (Figure 24 (right)).

Table 6. Fishing mortality and fecundity benchmarks (targets and thresholds) along with terminal year values from the base run of the BAM. Fecundity (FEC) is in billions of eggs.

Reference Points	Benchmark value	Current value	Current value above/below reference point?
$F_{21\%}$ (threshold)	1.85	0.51	Below
$F_{36\%}$ (target)	0.80	0.51	Below
$FEC_{21\%}$ (threshold)	57,295 (billions of eggs)	83,486	Above
$FEC_{36\%}$ (target)	99,467 (billions of eggs)	83,486	Below

Based on the latest assessment, fishing mortality rates have remained below the overfishing threshold (1.85) since the 1960s and hovered around the overfishing target (0.8) through the 1990s. In 2003, fishing mortality dropped below the target and was estimated to be 0.51 in 2016 (the latest year in the assessment update). Generally, fishing mortality has been decreasing throughout the history of the fishery.

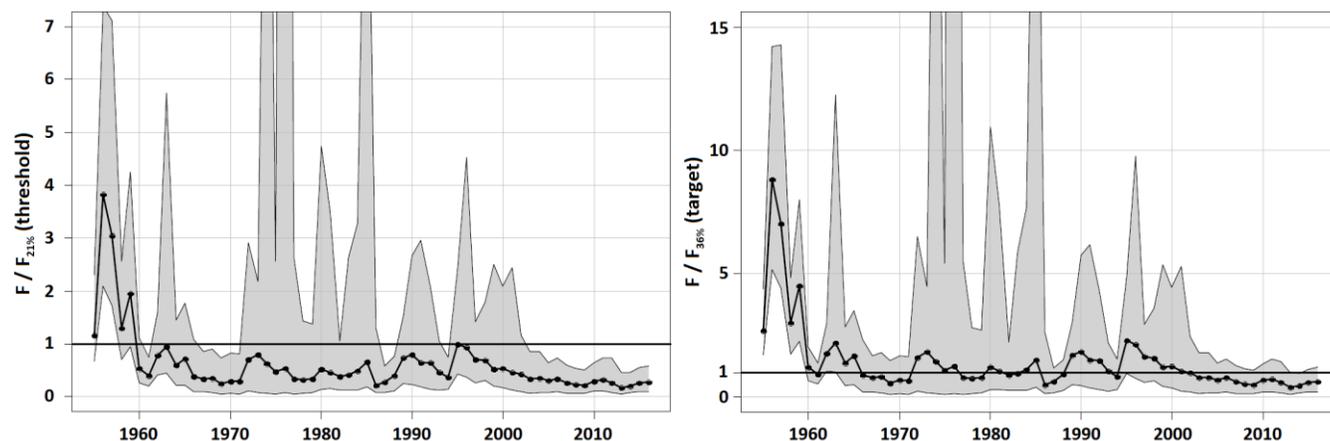


Figure 23. Geometric mean fishing mortality at ages-2 to -4 over time compared to the recommended SPR benchmarks, $F_{21\%}$ threshold (left) and $F_{36\%}$ target (right), based on the minimum and median $FX\%$ during the time period 1960 – 2012.

The biological reference point used to determine the fecundity target is defined as the mature egg production one would expect when the population is being fished at the threshold fishing mortality rate. Population fecundity, a measure of reproductive capacity, has been well above the threshold (57,295 billion eggs) and at or near the target (99,467 billion eggs) in recent years. In 2016, fecundity is estimated to be 83,486 billion eggs, still well above the threshold but below the target.

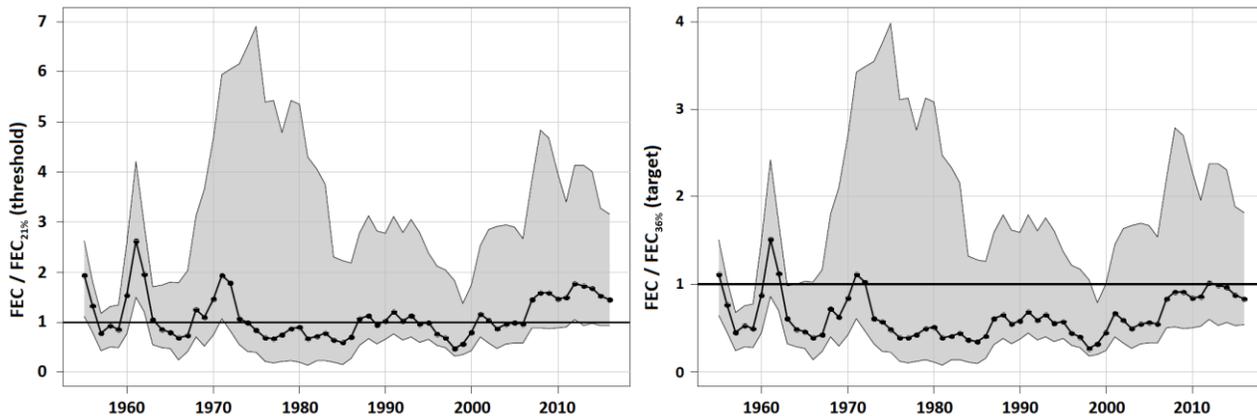


Figure 24. Fecundity over time compared to the recommended fecundity-based benchmarks associated with the SPR benchmarks, $FEC_{21\%}$ threshold (left) and $FEC_{36\%}$ target (right), based on the minimum and median $FX\%$ during the time period 1960 – 2012.

3.3.3.7. Ecological Reference Points (ERPs)

Atlantic menhaden is currently managed in a single species (SS) context (ASMFC 2012; SEDAR 2015). The current position (as of Amendment 3) is that these single species reference points are interim values while appropriate ecological reference points (ERPs), which more explicitly account for the ecological role of menhaden, are developed (ASMFC 2012; SEDAR 2015). The timeline for the BERP Workgroup’s development of menhaden-specific ERPs is outlined in Amendment 3 of the FMP and Table 7 below.

Table 7. Timeline for BERP Workgroup development of menhaden-specific ecosystem reference points.

Year	Season	Action
2016	Summer	Review Steele-Henderson multi-species model
		Evaluate data needs of model
		Review preliminary methodology of statistical catch-at-age and production models
	Fall	Review results of Ecopath with Ecosim model
2017	Winter	Review multi-species statistical catch at age model
		Evaluate data needs of model
	Summer	Review multi-species production model
		Evaluate data needs of model
	Fall	Review finalized modeling plan and candidate models
		Decide which candidate models will be included for ERP development and peer review
		Discuss data requirements of the models and data sources
2018	Winter	Data Workshop #1
		Review data sources for the multi-species models
		Develop criteria for inclusion of data in models
	Summer	Data Workshop #2
		Approve data sources of multi-species models
		Discuss standardization of data across sources

Year	Season	Action
2019	Winter	Assessment Workshop #1
		Review base run results from multi-species models
		Discuss sensitivity runs for models
	Spring	Assessment Workshop #2
		Review final model results of multi-species models
		Summarize findings and recommendations
	Summer	Write stock assessment report
Fall	Peer Review Workshop	
	Independent review of multi-species models and single-species BAM mode	

MSC key-LTL requirements as they apply to ‘rule of thumb’ reference points

The following is presented in order to provide background on the extensive discussion that took place between SAI Global and MSC in the course of this assessment in order to clarify the nature and intent of the MSC key-LTL requirements and how they should be applied. The rationale surrounding these discussions and the ultimate clarification from MSC are presented below.

The MSC FCR v2.0 includes specific requirements for species considered to represent key-LTL species. These requirements stipulate that the point where serious ecosystem impacts could occur shall be interpreted as being substantially higher than the point at which recruitment is impaired (PRI), as determined for the target species in a single species context. These criteria are based on ‘rule of thumb’ ERPs calculated in Smith *et al.*, (2011) and Pikitch *et al.*, (2012).

In assessing this fishery, the Assessment Team became aware that the MSC FCR v2.0 continually refers to B_0 while simultaneously referring to the spawning stock level that would be expected in the absence of fishing; the spawning stock level that would be expected in the absence of fishing should more correctly be referred to SSB_0 . Neither Smith *et al.* (2011) nor Pikitch *et al.*, (2012), on which MSC’s key-LTL requirements are ostensibly based, refer to spawning stock levels needing to be maintained above certain levels. The specific use of SSB_0 in the MSC FCR initially precluded the use of the calculations conducted by ASMFC’s BERP committee in support of proposed changes to the menhaden FMP. The reason these calculations could not initially be used was due to their being based on total biomass rather than SSB a decision which stemmed from this being what was recommended in Smith *et al.* (2011) and Pikitch *et al.*, (2012); Note many of the BERP’s calculations were actually conducted in consultation with a number of the key authors of Pikitch *et al.*, (2012).

In many ways the use of B_0 , rather than SSB_0 , when assessing the state of the Atlantic menhaden stock with respect to ecosystem needs would appear to be more appropriate given the fact that there is little/no evidence of a stock recruit relationship and that the ecosystem role of menhaden is likely served more by immature rather than mature individuals (i.e. available evidence from diet studies suggest that juvenile rather than adult menhaden make up a greater proportion of the key diet of key predatory species).

Considering all of the above, SAI Global decided to ask MSC to clarify the intent of the key-LTL requirements as to whether the use of reference points predicated on total biomass (as recommended in Smith *et al.* (2011) and Pikitch *et al.*, (2012)) rather than spawning stock level (as stipulated in the MSC FCR v2.0) would be permissible. MSC provided the following response (see [Relevant interpretation 1](#)):

“Either indicator can be used, total stock biomass (B) or spawning stock biomass (SSB) (in the absence of fishing), so long as the intent remains that the default target level would be 75% of the respective indicator used (i.e. B or SSB). In the event a higher or lower target biomass level is to be used (i.e. less than or greater than the default 75%), SA2.2.13b shall be adhered to.”

Following this clarification, the Assessment Team deemed total biomass to be the most appropriate measure of the ecosystem role of the menhaden stock. In addition, it was in this area that a large body of evidence with which to assess the fishery was available. Therefore, the Assessment Team determined that the impacts of the fishery on the ecosystem role of the menhaden stock would more appropriately be measured against total biomass in the absence of fishing rather than against spawning stock level in the absence of fishing.

It is therefore important to bear in mind that in this assessment where spawning stock biomass in the absence of fishing (SSB_0) is specified in the MSC FCR v2.0 it has been replaced with stock biomass in the absence of fishing (B_0). Where either of these metrics is used every effort will be made to be as clear as possible as to which is being referred to.

However, there are also disadvantages surrounding the use of reference points that preserve a certain proportion of total biomass instead of spawning stock biomass or fecundity. A concern in this regard has previously been expressed by the ASMFC's BERP committee due to the fact such reference points may result in a level of spawning potential well below the current single species fecundity limit. This concern results from the fact that Age 0 and 1 menhaden represent a significant proportion of total menhaden biomass, but do not contribute to the spawning population (they are also not targeted by the fishery) with most Atlantic menhaden reaching maturity around late age 2. Therefore, the level of fishing pressure that reduces total biomass to $40\%B_0$ is higher than almost anything seen in the history of the fishery.

Ultimately the current 'rule of thumb' reference points would seem to be ill-suited to menhaden and this is why the ASMFC set up the BERP committee to consider and develop alternatives that are better suited to the menhaden stock.

Rule of thumb Ecological Reference Points (ERPs)

As discussed above, Atlantic menhaden specific ERPs do not currently exist. In November 2017 the ASMFC determined that Atlantic menhaden should continue to be managed using the current single-species reference points until the review and adoption of menhaden-specific ecological reference points. In advance of this determination a number of candidate "rule of thumb" ERPs options were considered including some based on the recommendation contained in the same studies on which the MSC key-LTL requirements are based (Smith *et al.*, (2011); Pikitch *et al.*, (2012)). While none of the proposed "rule of thumb" options were ultimately selected, calculations conducted in order to evaluate those options are still extremely useful in evaluating the fishery against the MSC criteria for key-LTL species.

An evaluation of the current state of the Atlantic menhaden stock with respect to those "rule of thumb" reference points that correspond to the MSC key-LTL requirements contained in the MSC FCR v2.0 is presented below. Note to allow for the comparison of the various reference points on a common scale, the fishing mortality values used here are biomass-weighted full-F (biomass-weighted averages over the entire population (ages 0 – 6+)). This means that the fishing mortality experienced by each age class is weighted by the total biomass of that age class. This differs from how the single species reference points are reported in the stock assessment as they are based on the geometric mean fishing mortality values over ages 2 – 4 (the most heavily exploited age classes).

It is important to note that the greatest amount of menhaden biomass is concentrated in ages 0 and 1; however, the greatest level of fishing mortality occurs on ages 2 through 4. Therefore, when calculating fishing mortality across all age groups, some of which are not heavily exploited, the resulting fishing mortality value is lower than what would be calculated on ages 2 – 4.

Biomass with respect to 75%B₀ (and 40%B₀)

According to MSC FCR v2.0 SA2.2.13, when scoring PI 1.1.1A scoring issue (b), the expectations for key LTL species shall be a default biomass target level consistent with ecosystem needs of 75% of the [~~spawning stock level~~] total biomass (see rationale above) that would be expected in the absence of fishing.

Based on the 2017 Assessment the BERP estimated the B₂₀₁₇ to be 46.7% of the total biomass that would be expected in the absence of fishing (i.e. B₂₀₁₇/B₀ = 0.467); therefore, the stock is below the MSC default biomass target for a key-LTL (B/B₀ = 0.75).

However, the MSC FCR v2.0 (SA2.2.13b) does allow for the use of a higher or lower target level, down to a minimum of 40% of the level that would be expected in the absence of fishing, if it can be demonstrated, through the use of credible ecosystem models or robust empirical data that the level adopted:

- i. Does not impact the abundance levels of more than 15% of the other species and trophic groups by more than 40% (compared to their state in the absence of fishing on the target LTL species); and
- ii. Does not reduce the abundance level of any other species or trophic group by more than 70%.

The most recent such study was Buchheister et al., (2017) which developed an ecosystem model of the US Northwest Atlantic Continental Shelf to inform an ecosystem approach to fisheries management for Atlantic menhaden. It is important to note that the lack of an F_{MSY} from the single-species NMFS assessment model hinders comparisons between Buchheister et al.'s EwE and the single-species assessment model. Full details on model configuration can be found in Buchheister et al., (2017) which is open source and easily available online. The Buchheister model included much of the spatial/temporal/fishery type detail also included in the single species assessment model as well as the most relevant groups of prey/predators (n=45). The model also explored uncertainty through simulations thereby lending weights to the authors' conclusions. The Assessment Team are therefore confident that Buchheister et al., (2017) represents a reasonable, comprehensive and ultimately credible ecosystem model.

Buchheister et al., 2017 estimated that with B = 40%B₀, 6% of the other groups and trophic species (included in the model) decreased by 50%. The study also found that striped bass were the most impacted of any single species as a result of fluctuation in the abundance of menhaden and that if menhaden are fished at their approximate F_{MSY} striped bass yield is predicted to be 40% of (or a 60% reduction from) levels expected with no fishing on menhaden (Figure 25). Therefore, were the menhaden fishery to reduce the stock to 40% of the SSB that would be expected in the absence of fishing, the level adopted should not impact the abundance levels of more than 15% of the other species and trophic groups by more than 40% (compared to their state in the absence of fishing on the target LTL species) or reduce the abundance level of any other species or trophic group by more than 70%.

In addition recognizing that the model estimated F_{MSY} (0.8) was significantly larger than the proxies for both the target and threshold F (FSS_{target*} = 0.29 based on F = 0.38 and FSS_{threshold*} = 0.58 based on F = 1.26 respectively) from the single species assessment by ASMFC for menhaden (SEDAR 2015), it would appear very unlikely that fishing menhaden at even the limit level estimated from the 2015 single species assessment (F = 0.126) would result in precipitous declines in any single species of dependent predator.

Buchheister estimated the impacts of fishing menhaden at the single species target level calculated during SEDAR 2015 of F = 0.38 (or FSS_{target*} = 0.29) Table 8); note the fishery is actually managed to reduce the likelihood of the stock going below its target rather than its limit as is normally the case. The study found that fishing menhaden at F_{target} calculated during SEDAR 2015 would result in 4% of affected groups decreasing by >25% but no group decreasing by >50%. In addition, the most affected single species (striped bass) still maintained 72% of the abundance level that would be expected in the absence of fishing.

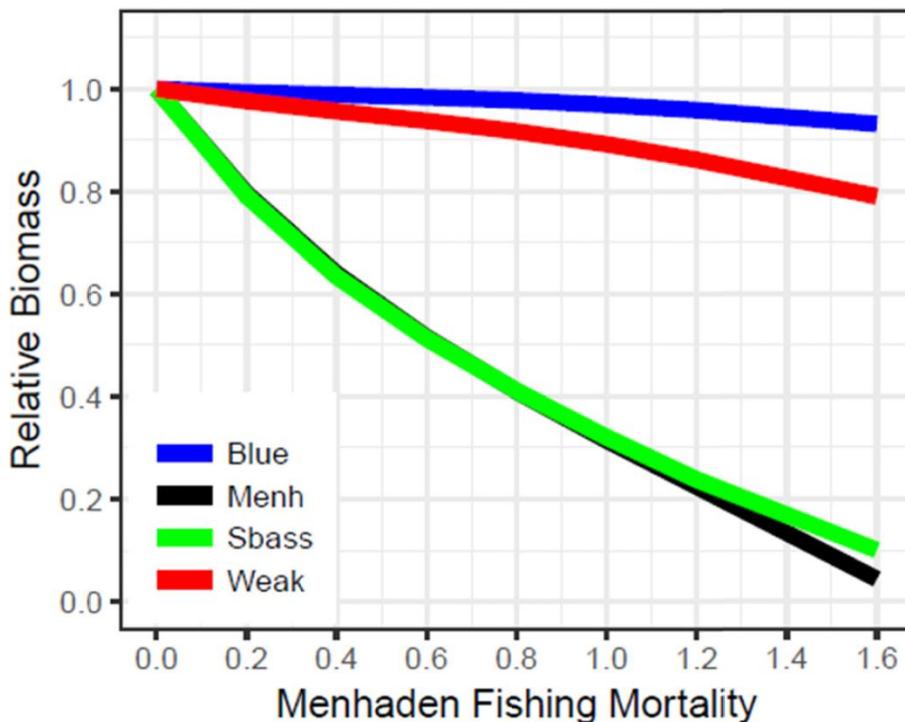


Figure 25. Simulated relative biomass for menhaden and three predators as functions of fishing mortality scenarios for medium menhaden. Colored lines represent bluefish (blue), menhaden (black), striped bass (green) and weakfish (red) (Source: Buchheister *et al.*, 2017).

Table 8. Relevant rows from Table 1 of Buchheister *et al.*, (2017)

Indicator	Descriptor	F Reference Points				B Reference Points	
		F _{SS-target*} (0.29)	0.5F _{MSY} (0.4)	F _{SS-threshold*} (0.58)	F _{MSY} (0.8)	75%B ₀ (0.26)	40%B ₀ (0.82)
Relative Biomass	Menhaden	0.73	0.64	0.53	0.41	0.75	0.40
	Striped bass	0.72	0.63	0.52	0.41	0.74	0.40
Relative Yield	Menhaden	0.59	0.75	0.91	1.00	0.54	1.00
% of groups affected	Decr. by >25%	4%	8%	10%	13%	2%	13%
	Decr. by >50%	0%	0%	0%	6%	0%	6%

It is the Assessment Team’s determination that the model developed by Buchheister *et al.* 2017;

1. represents a “credible ecosystem model”, and;
2. were the fishery to reduce the stock to 40% of the SSB that would be expected in the absence of fishing, the level adopted would not impact the abundance levels of more than 15% of the other species and trophic groups by more than 40% (compared to their state in the absence of fishing on the target LTL species) or reduce the abundance level of any other species or trophic group by more than 70%.

Therefore, the Assessment Team has determined that a reduction in the biomass target from the default 75%B₀ level specified in the MSC FCR v2.0 (potentially to a target level as low as 40%B₀) could be appropriate for Atlantic menhaden.

Based on the 2017 Assessment the BERP estimated the B_{2017} to be 46.7% of the total biomass that would be expected in the absence of fishing (i.e. $B_{2017}/B_0 = 0.467$); therefore, the stock is above the lowest biomass target potentially allowable under MSC for a key-LTL stock ($B = 40\%B_0$).

While the case can be made for a lower target than 75%B₀ whether a target as low as 40% B₀ is in actual fact appropriate is not clear at this point.

Fishing mortality with respect to 0.5M

According to MSC FCR v2.0 SA2.2.15a, where fishing mortality rate is used to score stock status, the default fishing mortality required to maintain a stock fluctuating around the level consistent with ecosystem needs shall take the value of 0.5M or $0.5F_{MSY}$, where F_{MSY} has been determined in a single species context. The associated guidance (MSC FCR v2.0 GSA2.2.15) makes reference to Generation Time (GT) and where and for how long F should be in relation to 0.5M or $0.5F_{MSY}$ for a fishery to meet SG60, SG80 and SG100.

The MSC defines Generation Time (GT) as the average age of a reproductive individual in a stock. For a stock where $0.1 \geq M \geq 2$ (which is the case for Atlantic menhaden) this may be approximated based on the following equation:

$$GT = \frac{1}{M} + A_{m50}$$

Where: A_{m50} (age at 50% maturity) = 2
 M (Natural mortality) = 0.5

Therefore, for Atlantic menhaden:

$$GT = \frac{1}{0.5} + 2 = 4$$

So, in the context of the above, two generation times is 8 years.

Based on the 2017 Assessment the BERP estimated the biomass-weighted F that would result in $F = 0.5M$ to be 0.367. Biomass-weighted Full- $F_{2016} = 0.204$. In addition, the Assessment Team investigated the trend in biomass-weighted Full-F and found it to have been below $F = 0.5M$ (0.367) for the last 12 years (i.e. the last three generation times) (Figure 26).

Fishing mortality with respect to F_{40%B₀} and F_{75%B₀}

According to MSC FCR v2.0 SA2.2.13, when scoring PI 1.1.1A scoring issue (b), the expectations for key LTL species shall be a default biomass target level consistent with ecosystem needs of 75% of the spawning stock level [or total biomass (see rationale above)] that would be expected in the absence of fishing.

Based on the 2017 Assessment the BERP estimated the biomass-weighted F that would be expected to result in biomass = $75\%B_0$ to be 0.16 while the corresponding value that would be expected to result in biomass = $40\%B_0$ was estimated to be 1.493. Estimated $F_{2016} = 0.204$ or in other words $F_{2016}/F_{40\%B_0} = 0.14$ and $F_{2016}/F_{75\%B_0} = 1.28$. Therefore, fishing mortality has been below the level expected to result in $B = 40\%B_0$ for almost the entire time series and close to the level expected to result in $B = 75\%B_0$ for the last 9 years (i.e. the last 2.25 generation times).

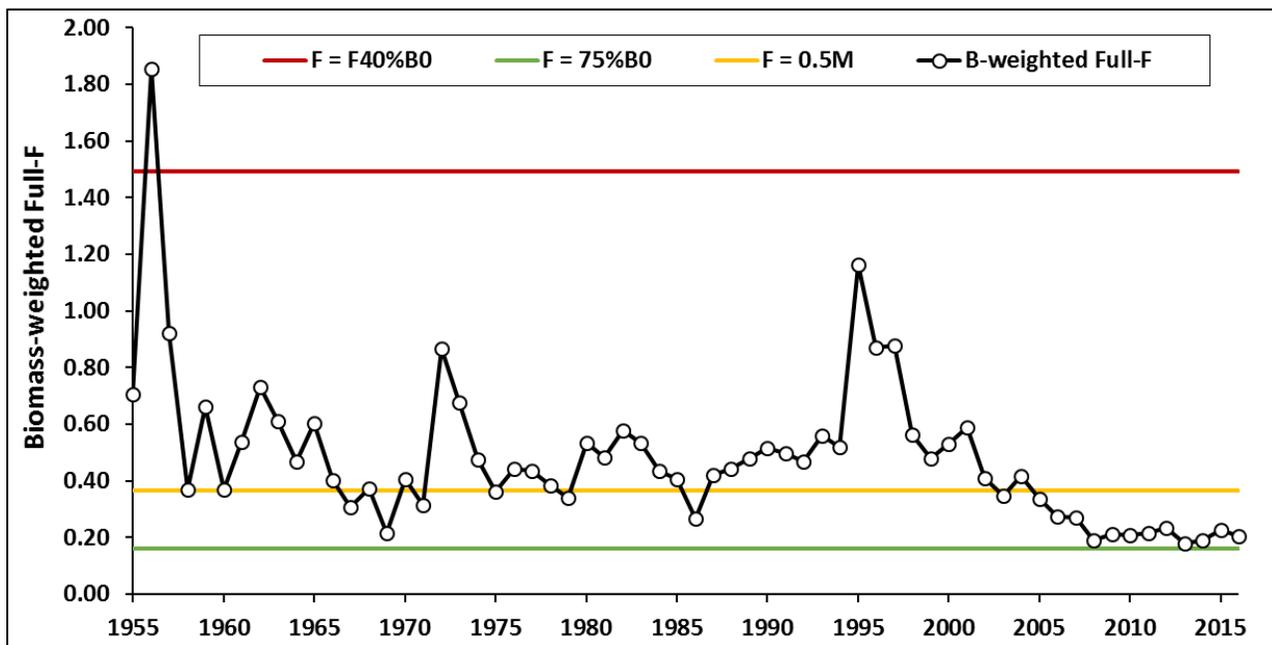


Figure 26. Biomass-weighted Full-F for Atlantic menhaden in relation to various ‘rule of thumb’ reference points (Source: data from the 2017 Stock Assessment and BERP committee memos).

3.3.4. Harvest strategy and Control Rules

3.3.4.1. Harvest Strategy

Atlantic menhaden are currently managed under Amendment 3 to the Interstate Fishery Management Plan (FMP) for Atlantic Menhaden. Approved in November 2017, the Amendment maintains the management program’s current single-species biological reference points until the review and adoption of menhaden-specific ecological reference points as part of the 2019 benchmark stock assessment process. It also addresses a suite of commercial management measures including allocation, quota transfers, quota rollovers, incidental catch, the episodic events set aside program, and the Chesapeake Bay reduction fishery cap. In addition to its Amendment 3 deliberations, the Board set the total allowable catch for the 2018 and 2019 fishing seasons at 216,000 mt with the expectation that the setting of the TAC for subsequent years will be guided by menhaden-specific ecological reference points.

Amendment 3 also changes fishery allocations in order to strike an improved balance between gear types and jurisdictions. The Amendment allocates a baseline quota of 0.5% to each jurisdiction, and then allocates the rest of the TAC based on historic landings between 2009 and 2011. This measure provides fishing opportunities to states which currently have little quota while still recognizing historic landings in the fishery. The Board also agreed to maintain the quota transfer process, prohibit the rollover of unused quota, maintain the 6,000 lb trip limit for non-directed and small-scale gears following the closure of a directed fishery, and set aside 1% of the TAC for episodic events in the states of New York through Maine.

Finally, the Amendment reduces the Chesapeake Bay cap, which was first implemented in 2006 to limit the amount of reduction harvest within the Bay, from 87,216 mt to 51,000 mt. This recognizes the importance of the Chesapeake Bay as nursery grounds for many species by capping recent reduction landings from the Bay to current levels.

To comply with the Interstate Fishery Management Plan for Atlantic menhaden each state outlines its own regulations regarding the fishing of Atlantic menhaden.

3.3.4.2. Harvest Control Rules

The ASMFC adopted harvest control rules for the menhaden fishery to avoid overfishing under Addendum V and Amendment 2.

Addendum V states that when overfishing is occurring the Board will take steps to reduce F to the target level. In order to end overfishing and reduce F to the target, the Board needs to consider changes in the management tools used to regulate the fishery.

Amendment 2 also adopted new biological reference points for biomass which are based on maximum spawning potential, with the goal of increasing abundance, spawning stock biomass, and menhaden availability as a forage species. The harvest control rules under Amendment 2 are as follows:

“2.6 MAINTENANCE OF STOCK STRUCTURE

2.6.1 Stock Targets

The Management Board will evaluate the current estimates of F with respect to its reference points (Section 2.5) before proposing any additional management measures. If the current F exceeds the threshold level, the Board will take steps to reduce F to the target level; if current F exceeds the target, but is below the threshold, the Board should consider steps to reduce F to the target level. If current F is below the target F , then no action would be necessary to reduce F .

The Management Board will evaluate the current estimates of SSB with respect to its reference points (Section 2.5) before proposing any additional management measures. If the current SSB is below the threshold level, the Board will take steps to increase SSB to the target level; if current SSB is below the target, but above the threshold, the Board should consider steps to increase SSB to the target level. If current SSB is above the target SSB, then no action would be necessary to increase SSB.

2.6.2 Stock Rebuilding and F Reduction Schedules

SSB Rebuilding Schedule

The Board shall take action to rebuild the Atlantic menhaden stock to at least the target SSB level in a time frame that shall be no longer than 10 years.

F Reduction Schedule

Ending Overfishing (Reducing F to the threshold)

Through the implementation of Amendment 2 the Board is taking immediate action to end overfishing.

Timeframe to Achieve the F Target

Upon receipt of results from a new benchmark peer-reviewed assessment, the Board shall specify a timeframe and take action to reduce F to at least the target $F_{30\%MSP}$.”

3.3.5. Consideration of Atlantic menhaden as a Lower Trophic Level (LTL) species

According to the MSC FCR v2.0, menhaden are defined by default as a “key LTL stock” based on their particular traits life history (i.e. feed primarily on plankton, low trophic level, small body size, early maturity, highly fecund, short lived and forms dense schools). However, as previously stated, the trophic dynamics of many commercially and recreationally important species in the mid-Atlantic region are not well understood and studies have met with distinct interpretations of the true ecosystem importance of menhaden.

Numerous studies have found Atlantic menhaden to be an important forage fish in the mid-Atlantic Region (Nicholson 1978) being consumed by a diverse assemblage of predators (e.g., Walter and Austin 2001; Glass and Watts 2009; Butler et al. 2010; Buchheister and Latour 2015). In addition, the prevailing view amongst stakeholders in this fishery is that menhaden are critically important to the normal functioning of the ecosystem (e.g. see attached stakeholder comments). On the other hand, other studies have suggested that menhaden may not play as big a role in maintaining predator dynamics as previously thought (e.g. Hilborn et al., 2017). Ecosystem studies, such as Buchheister et al., (2017), Christensen et al., (2009), Butler (2007) and Okey (2001), are extremely useful in evaluating the true ecosystem importance of Atlantic menhaden.

In evaluating whether a stock under assessment represents a key LTL stock for the purposes of MSC assessment the Assessment Team is required to consider the trophic position of target stocks to ensure precaution in relation to their ecological role, in particular for species low in the food chain (MSC FCR v2.0 SA2.2.8).

The Assessment Team is required to treat a stock under assessment against Principle 1 as a key LTL stock if:

- a.** *It is one of the species types listed in Box SA1 and in its adult life cycle phase the stock holds a key role in the ecosystem, such that it meets at least two of the following sub-criteria i, ii and iii.*
 - i.** *A large proportion of the trophic connections in the ecosystem involve this stock, leading to significant predator dependency;*
 - ii.** *A large volume of energy passing between lower and higher trophic levels passes through this stock;*
 - iii.** *There are few other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, such that a high proportion of the total energy passing between lower and higher trophic levels passes through this stock (i.e., the ecosystem is ‘wasp-waisted’).*

(MSC FCR v2.0 SA2.2.9)

Guidance to calculate metrics for key LTL species are provided in MSC 2.0 and are as follows:

Key LTL criterion i – Connectance

Connectance criteria requires that the LTL stock is eaten by the majority of predators, as stated: “a large proportion of the trophic connections in the ecosystem involve this species, leading to significant predator dependency. The team used the weighted **SURF index** (Supportive Role to Fishery ecosystems).

SURF is calculated as follows

$$SURF_i = \frac{\sum_{j=1}^n (p_{j,i})^2}{T}$$

where $p_{j,i}$ is the diet fraction of predator j on prey i (the proportion of the diet of predator j that is made up of prey i) and T . The total connectance T in a diet matrix is the Number of all positive (non-zero) diet interactions between components (i.e., predator-prey).

SURF values of less than 0.001 will normally indicate a non-key LTL stock. SURF values of greater than 0.005 will normally indicate a key-LTL stock

SURF has the advantage that it is relatively insensitive to the grouping of predator and prey species; connectance is highly sensitive to them.

Key LTL criterion ii – Energy Transfer

- This sub-criterion requires that “a large volume of energy passing between lower and higher trophic levels passes through this stock”;
- Argument to determine whether sub-criterion 1b is triggered may be based on 1) empirical data, 2) credible quantitative models, and/or 3) information about the relative abundance of the LTL stock in the ecosystem.
- Consumer biomass ratio is calculated as the biomass of the candidate key LTL stock, divided by the biomass of all consumers in the ecosystem (i.e., all ecosystem components that are not primary producers or detritus), i.e., $\text{Consumer Biomass Ratio} = B_{\text{LTL}}/B_{\text{consumers}}$.
- Model-based results suggest that any LTL stock that constitutes more than 5% of the consumer biomass in the ecosystem should be regarded as a key LTL stock.

Key LTL criterion iii – Wasp-waisted-ness

- The ‘wasp-waisted-ness’ sub-criterion requires that “there are few other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, such that a high proportion of the total energy passing between lower and higher trophic levels passes through this stock”.
- Simple food webs will be sufficient to determine whether there are significant other functionally similar species (at a similar trophic level) to the candidate LTL stock.
- Although for the candidate LTL species, the focus is on the adult component of the stock (SA2.2.9.a, SA2.2.9b), the consideration of other species at the same trophic level should consider all life stages (including juveniles) of those species.

Calculation of MSC criteria

MSC requirements around the evaluation of an LTL stocks role in the ecosystem are based on a number of peer review studies (Plagyani and Essington, 2014; Plagyani and Essington, 2012). These studies examined a number of LTL stocks around the world, one of which was Atlantic menhaden. In examining Atlantic menhaden, they used a previous EwE study (Christensen et al., 2009) and concluded that menhaden met those requirements for consideration as a key LTL that were examined; note this the spatial scale of Christensen et al., (2009) covered only the Chesapeake Bay.

The team elected to calculate the metrics laid out in the MSC FCR v2.0 for any ecosystem studies for which data were available to the team; the results of this evaluation are presented in Table 9 below. The evaluation reflected the uncertainty surrounding the true role of Atlantic menhaden in the ecosystem with disagreements between the various studies examined. The evaluation also highlighted the fact that spatial scale is an important consideration and that menhaden may play a more important role in some areas (i.e. the Chesapeake Bay) than when their role is considered across the region as a whole.

Table 9. Results of the calculation of MSC metrics for the evaluation of the role of LTL stocks in the ecosystem (SURF, PC and Consumer Biomass Ratio) from four ecosystem studies in the mid-Atlantic Region.

Study	Region	Criterion (i)		Criterion (ii)	Criterion (iii)
		Connectance		Energy transfer	Wasp-waistedness ⁴
		S.U.R.F. ¹	PC ²	B _{LTL} /B _{consumers} ³	
Buchheister et al., 2017	U.S. Northwest Atlantic continental shelf (NWACS)	0.002	3.2%	2.3%	The ecosystem is not wasp-wasted.
Christensen et al., 2009	Chesapeake Bay	0.007	2.4%	15.1%	
Butler 2007 ⁵	South-Atlantic Bight	0.067	12.5%	0.8%	
Okey 2001 ⁵	Mid-Atlantic Bight	0.002	3.0%	1.5%	

^{1.} Values <0.001 will normally indicate a non-key LTL stock; values >0.005 will normally indicate a key-LTL stock.

^{2.} Values <4% would normally indicate a non-key-LTL stock; values >8% would indicate a key LTL stock.

^{3.} Any LTL stock that constitutes >5% of the consumer biomass in the ecosystem should be regarded as key LTL.

^{4.} There are few other species at this trophic level through which energy can be transmitted.

^{5.} Menhaden were not split into juvenile and adults.

Menhaden must meet 2 of the 3 criteria outlined in SA2.2.9 before a team is required to treat them as a key LTL and with there being numerous other forage species that could play a role the transfer of energy between lower and high trophic levels it quickly became apparent that the mid-Atlantic ecosystem is not ‘wasp-waisted’ as defined in the MSC FCR v2.0. While for the candidate LTL species, the focus is on the adult component of the stock (MSC FCR v2.0; SA2.2.9.a, SA2.2.9b), the consideration of other species at the same trophic level should consider all life stages (including juveniles) of those species.

Menhaden are undoubtedly an important and efficient pathway for energy transfer between producers and higher trophic level consumers. However, there are numerous other forage fish species, including other clupeids (herrings, menhaden, pilchards, sardines, sardinellas and sprats), engraulids (anchovies) through which energy can be transmitted from lower to higher trophic levels. Therefore, there are numerous alternative pathways for the transfer of energy between lower and higher trophic levels. The mid-Atlantic ecosystem is not ‘wasp-waisted’.

Menhaden are therefore required to meet BOTH criterion (i) AND criterion (ii) before an Assessment Team is required to treat them as a key LTL stock for the purpose of an MSC assessment; the following presents a study-by-study guide as to whether both criteria were met (where SURF and PC are not in agreement, SURF takes precedence):

- Buchheister et al., (2017) suggests that for sub-criterion i, the SURF threshold is marginally met (i.e. 0.001<SURF<0.005) and PC is not met (i.e. PC<4%) and sub-criterion ii is not met (B_{LTL}/B_{consumers}<5%); therefore, menhaden should not be treated as a key LTL.
- Christensen et al. (2009) suggests that for sub-criterion i, the SURF threshold is met (i.e. SURF>0.005) but PC is not met (i.e. PC<4%) and sub-criterion ii is met (B_{LTL}/B_{consumers}>5%); therefore, menhaden should be treated as a key LTL.
- Butler (2007) suggests that for sub-criterion i, both the SURF and PC thresholds are met (i.e. SURF>0.005 and PC>8%) but sub-criterion ii is not met (B_{LTL}/B_{consumers}<5%); therefore, menhaden should not be treated as a key LTL.
- Okey (2001) suggests that for sub-criterion i, neither the SURF nor PC thresholds are met (i.e. SURF<0.001 and PC<4%) and in addition sub-criterion ii is also not met (B_{LTL}/B_{consumers}<5%); therefore, menhaden should not be treated as a key LTL.

Other considerations

Chief amongst the other considerations to be considered is the fact that the ASMFC itself considers Atlantic menhaden to be important enough in the ecosystem to warrant the development of menhaden specific Ecological Reference Points (ERPs). In addition, given the nature of the fishery, occurring in both coastal areas and within the confines of the Chesapeake Bay, the importance of menhaden to the ecosystem likely varies between areas. As presented above, Christensen et al., (2009) which confined their study to the Chesapeake Bay found menhaden to play a much more important role to the Chesapeake Bay ecosystem than Buchheister et al., (2017) did when considering the role of menhaden across the U.S. Northwest Atlantic continental shelf.

Final Determination

The final results of the Assessment Team’s deliberations are presented in Table 10 below; this evaluation does not represent a comment on the ecological importance of Atlantic menhaden in the ecosystem, rather it is simply an assessment of whether they meet the MSC definition of a key-LTL as outlined in MSC FCR v2.0.

While the role of Atlantic menhaden has yet to be definitively determined, with menhaden being defined as a default key-LTL species under MSC, it is for the Assessment Team to prove that menhaden do **NOT** represent a key-LTL stock. Where it cannot be proven that the stock is not a key-LTL then the team must consider it as a key-LTL stock.

Table 10. MSC Criteria for the evaluation of key Lower Trophic Level (LTL) species.

MSC Criteria	Applicability to Atlantic menhaden
<i>i. A large proportion of the trophic connections in the ecosystem involve this stock, leading to significant predator dependency.</i>	A large proportion of trophic connections in the mid-Atlantic likely involve menhaden. While on a species-by-species basis predators may not be particularly dependent on <u>adult menhaden</u> taken together there may be significant predator dependency; this criterion is likely met.
<i>ii. A large volume of energy passing between lower and higher trophic levels passes through this stock.</i>	Energy transfer may be critically dependent on menhaden. While there are numerous alternative energy transfer pathways (involving highly abundant non-menhaden forage fish species) between lower and higher trophic levels, menhaden are an important energy transfer pathway between lower and higher trophic levels; this criterion is likely met.
<i>iii. There are few other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, such that a high proportion of the total energy passing between lower and higher trophic levels passes through this stock (i.e., the ecosystem is ‘wasp-waisted’).</i>	There are numerous species that take part in the energy transfer. The mid-Atlantic ecosystem is not ‘wasp-waisted; this criterion is not met.

The Assessment Team recognizes that menhaden form an important link between the lower and upper levels of food webs, whereby they assimilate energy from planktonic organisms and are in turn predated upon by numerous predators including predatory fishes, birds and marine mammals. Therefore with; 1) menhaden being a default key-LTL species; 2) the stock having met some of the criteria for designation as a key-LTL stock across the studies examined; 3) menhaden likely being vitally important at least at local spatial scales; 4) the Assessment Team being unable to prove that at least 2 of the 3 sub-criteria are **NOT** met, and 5) the ASMFC itself considering menhaden to be important enough to warrant the development of menhaden specific ERPs, for the purpose of this assessment the Atlantic menhaden stock is defined as a key-LTL stock. As a consequence of the Atlantic menhaden stock being defined as a key-LTL stock, PI 1.1.1a rather than PI1.1.1 will be scored.

3.3.6. Inseparable or Practicably Inseparable (IPI) species

The U.S. Atlantic menhaden fishery harvests almost exclusively Atlantic menhaden, (*Brevoortia tyrannus*); however, there is the potential for some mixing with yellowfin menhaden (*Brevoortia smithi*), in the extreme south of their range. Incidental catches of yellowfin menhaden would be practicably indistinguishable from the target species during normal fishing operations. While some catches of IPI stocks may have occurred historically, when the range of the menhaden fisheries was much greater than it is today, the current distribution of menhaden fishing activity makes it extremely unlikely that there is any catches of potentially IPI stocks; this will need to be reviewed if the range of the menhaden fishery again expands southwards.

3.4. Principle Two: Ecosystem Background

3.4.1. Primary and Secondary species

The menhaden purse seines fishery is highly targeted and exploits highly homogeneous shoals of menhaden. As a consequence of the highly targeted nature of the fishery, yields are generally extremely homogeneous, comprising high proportions of the target species. As such, there is very little mixing of non-target species in the fishery’s catches. The U.S. Atlantic menhaden fishery targets and harvests almost exclusively Atlantic menhaden (*Brevoortia tyrannus*). Menhaden comprise over 99% of catches in the commercial purse-seine fishery with a minor aggregation of other fish species.

Bycatch in the Atlantic menhaden fishery is considered very low (ASMFC, 2012c). The Virginia Institute of Marine Science studied bycatch levels of finfish, turtles, and marine mammals in the Atlantic menhaden fishery. Results from that study indicated that bycatch in the 1992 Atlantic menhaden reduction fishery was minimal, comprising about 0.04% by number (Austin et al. 1994).

Under non-target species that are not Endangered, Threatened or Protected Species (ETP, see section 3.4.3), the MSC considers two components: Primary and Secondary Species. Table 11 gives the definition of these two components bearing in mind that primary and secondary species can be either landed or discarded.

Table 11 Definition of Primary and Secondary Species according to MSC Guidance for the Fisheries Certification Requirements, 2014.

Primary Species	Secondary Species
<ul style="list-style-type: none"> ▪ In scope species, e.g. fish and shellfish ▪ Managed with tools controlling exploitation ▪ Reference points are in place ▪ Analytical or empirical derived stock assessment in place 	<ul style="list-style-type: none"> ▪ Fish and shellfish, and out of scope species (birds, reptiles, amphibians and mammals) that are not ETP species ▪ Reference points are not in place ▪ No analytical or empirical derived stock assessment in place

3.4.1.1. Evaluation of Non-target Species

In order to categorize bycatch species, the Assessment Team examined NOAA observer program data from 2007 to 2012 and data from a 1995 study on Bycatch in the Virginia Menhaden Fishery (Kirkley, 1995). All species identified to the species level were considered as bycatch species.

All identified bycatch species were then evaluated in order to determine under what category they should be assessed. Initially the contribution of all bycatch species to the catch compositions of the menhaden fishery was examined in order to determine whether the species represented a Main, Minor or Negligible non-target species (Table 12).

The MSC does not provide specific guidance as to when a species is considered “Negligible” so for the purpose of this assessment the term is applied to any species that did not contribute at least 0.001% to total catches; for context if 10kg of a species were present in 1,000 mt of catch then that species is considered in detail in this assessment. Where a species represented a Minor species in one dataset and a “Negligible” species in the other, a more conservative approach was adopted, and that species was treated as a Minor species.

Table 12. % contribution to total catches for each species in data from NOAA observer program (2007 – 2012) and Kirkley 1995.

Species	Latin name	Data source	% of total	Category (Study)	Category (Species)
Atlantic menhaden	<i>Brevoortia tyrannus</i>	Kirkley 1995	99.420%	Target	Target
		NOAA data (2007 – 2012)	99.923%		
American butterfish	<i>Poronotus triacanthus</i>	Kirkley 1995	0.003%	Minor	Minor
American harvestfish	<i>Peprilus paru</i>	Kirkley 1995	0.007%	Minor	Minor
Atlantic croaker	<i>Micropogonias undulates</i>	Kirkley 1995	0.008%	Minor	Minor
		NOAA data (2007 – 2012)	0.002%	Minor	
Atlantic thread herring*	<i>Opisthonema oglinum</i>	Kirkley 1995	0.001%	Minor	Minor
Black drum	<i>Pogonias cromis</i>	NOAA data (2007 – 2012)	0.001%	Minor	Minor
Bluefish	<i>Pomatomus saltatrix</i>	Kirkley 1995	0.078%	Minor	Minor
		NOAA data (2007 – 2012)	0.005%	Minor	
Bullnose ray	<i>Myliobatis freminvillii</i>	NOAA data (2007 – 2012)	0.004%	Minor	Minor
Cownose ray	<i>Rhinoptera bonasus</i>	Kirkley 1995	0.107%	Minor	Minor
		NOAA data (2007 – 2012)	0.011%	Minor	
Hogchoker	<i>Trinectes maculatus</i>	Kirkley 1995	0.004%	Minor	Minor
Ladycrab	<i>Ovalipes ocellatus</i>	Kirkley 1995	0.001%	Minor	Minor
Red drum	<i>Sciaenops ocellatus</i>	NOAA data (2007 – 2012)	0.001%	Minor	Minor
Silverperch*	<i>Bairdiella chrysoura</i>	Kirkley 1995	0.004%	Minor	Minor
Spidercrab	<i>Libinia emarginata</i>	Kirkley 1995	0.001%	Minor	Minor
Spiny butterfly ray	<i>Gymnura altavela</i>	NOAA data (2007 – 2012)	0.001%	Minor	Minor
Spot	<i>Leiostomus xanthurus</i>	Kirkley 1995	0.001%	Minor	Minor
		NOAA data (2007 – 2012)	0.008%	Minor	
Striped bass	<i>Morone saxatilis</i>	Kirkley 1995	0.119%	Minor	Minor
Vermillion snapper	<i>Rhomboplites aurorubens</i>	NOAA data (2007 – 2012)	0.001%	Minor	Minor
Weakfish	<i>Cynoscion regalis</i>	NOAA data (2007 – 2012)	0.001%	Minor	Minor
Witch flounder	<i>Glyptocephalus cynoglossus</i>	Kirkley 1995	0.003%	Minor	Minor
Blue crab	<i>Callinectes sapidus</i>	Kirkley 1995	0.002%	Minor	Minor
		NOAA data (2007 – 2012)	0.000%	Negligible	
Sandbar/brown shark	<i>Carcharhinus plumbeus</i>	Kirkley 1995	0.020%	Minor	Minor
		NOAA data (2007 – 2012)	0.000%	Negligible	
Spanish mackerel	<i>Scomberomorus maculatus</i>	Kirkley 1995	0.214%	Minor	Minor
		NOAA data (2007 – 2012)	0.000%	Negligible	
Summer flounder (Fluke)	<i>Paralichthys dentatus</i>	Kirkley 1995	0.003%	Minor	Minor
		NOAA data (2007 – 2012)	0.000%	Negligible	
Atlantic cutlassfish	<i>Trichiurus lepturus</i>	NOAA data (2007 – 2012)	0.000%	Negligible	Negligible
Atlantic sharpnose shark	<i>Rhizoprionodon terraenovae</i>	NOAA data (2007 – 2012)	0.000%	Negligible	Negligible
Clearnose skate	<i>Raja eglanteria</i>	NOAA data (2007 – 2012)	0.000%	Negligible	Negligible
Horseshoe crab	<i>Limulus polyphemus</i>	NOAA data (2007 – 2012)	0.000%	Negligible	Negligible
Oystertoad	<i>Opsanus tau</i>	Kirkley 1995	0.000%	Negligible	Negligible
Sheepshead	<i>Archosargus probatocephalus</i>	NOAA data (2007 – 2012)	0.000%	Negligible	Negligible
Smooth dogfish	<i>Mustelus canis</i>	NOAA data (2007 – 2012)	0.000%	Negligible	Negligible
Butterfly ray spp.**	<i>Gymnura micrura spp.</i>	NOAA data (2007 – 2012)	0.010%	**	**
Hammerhead shark spp.**	<i>Sphyrnidae spp.</i>	NOAA data (2007 – 2012)	0.000%	**	**
Herring spp.**		NOAA data (2007 – 2012)	0.024%	**	**

Species	Latin name	Data source	% of total	Category (Study)	Category (Species)
Jellyfish spp.**		NOAA data (2007 – 2012)	0.001%	**	**
Ray spp.**		NOAA data (2007 – 2012)	0.000%	**	**
Seatrout**	<i>Cynoscion spp.</i>	Kirkley 1995	0.004%	**	**
Seaweed spp.**		NOAA data (2007 – 2012)	0.000%	**	**
Shark spp.**		NOAA data (2007 – 2012)	0.004%	**	**
Squid**	<i>Loligo spp.</i>	Kirkley 1995	0.000%	**	**

* Calculation error in original analysis

** Not identified to species level

Following the initial evaluation outlined above and in Table 12 each individual species was further examined to determine whether or not it 1) constituted an ETP species; 2) was within scope and 3) is managed using reference points (Table 13).

Based on the combined results obtained during the first and second parts of the two-step evaluation process each species was placed into one of six categories; Main Primary, Minor Primary, Main Secondary, Minor Secondary, Negligible Primary and Negligible Secondary (Table 13). Analyses resulted in 15 Minor Primary, 8 Minor Secondary, 1 Negligible Primary and 6 Negligible Secondary species; there were no Main Primary or Main Secondary species.

The results of the evaluation for each species are presented in Table 12 and Table 13 and each category is discussed in detail in the following sections.

Table 13. Bycatch species in the ATL menhaden purse seine fishery. % UoA catch values taken from data presented in Table 12.

Species	Latin	ETP?	Out of Scope?	Managed?	% UoA Catch	Main/Minor	Primary/Secondary	Category
American butterflyfish	<i>Poronotus triacanthus</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Atlantic croaker	<i>Micropogonias undulatus</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Black drum	<i>Pogonias cromis</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Blue crab	<i>Callinectes sapidus</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Bluefish	<i>Pomatomus saltatrix</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Red drum	<i>Sciaenops ocellatus</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Sandbar/Brown shark	<i>Carcharhinus plumbeus</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Spanish mackerel	<i>Scomberomorus maculatus</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Spot	<i>Leiostomus xanthurus</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Striped bass	<i>Morone saxatilis</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Summer flounder (Fluke)	<i>Paralichthys dentatus</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
Weakfish	<i>Cynoscion regalis</i>	No	No	Yes	<1%	Minor	Primary	Minor Primary
American harvestfish	<i>Peprilus paru</i>	No	No	No	<1%	Minor	Secondary	Minor Secondary
Atlantic thread herring	<i>Opisthonema oglinum</i>	No	No	No	<1%	Minor	Secondary	Minor Secondary
Bullnose ray	<i>Myliobatis freminvillii</i>	No	No	No	<1%	Minor	Secondary	Minor Secondary
Cownose ray	<i>Rhinoptera bonasus</i>	No	No	No	<1%	Minor	Secondary	Minor Secondary
Hogchoker	<i>Trinectes maculatus</i>	No	No	Yes	<1%	Minor	Secondary	Minor Secondary
Ladycrab	<i>Ovalipes ocellatus</i>	No	No	No	<1%	Minor	Secondary	Minor Secondary
Silverperch*	<i>Bairdiella chrysoura</i>	No	No	No	<1%	Minor	Secondary	Minor Secondary
Spidercrab	<i>Libinia emarginata</i>	No	No	Yes	<1%	Minor	Secondary	Minor Secondary
Spiny butterfly ray	<i>Gymnura altavela</i>	No	No	No	<1%	Minor	Secondary	Minor Secondary
Vermillion snapper	<i>Rhomboplites aurorubens</i>	No	No	No	<1%	Minor	Secondary	Minor Secondary
Witch flounder	<i>Glyptocephalus cynoglossus</i>	No	No	No	<1%	Minor	Secondary	Minor Secondary
Atlantic sharpnose shark	<i>Rhizoprionodon terraenovae</i>	No	No	Yes	<0.001%	Negligible	Primary	Negligible Primary
Atlantic cutlassfish	<i>Trichiurus lepturus</i>	No	No	No	<0.001%	Negligible	Secondary	Negligible Secondary
Clearnose skate	<i>Raja eglanteria</i>	No	No	No	<0.001%	Negligible	Secondary	Negligible Secondary
Horseshoe crab	<i>Limulus polyphemus</i>	No	No	No	<0.001%	Negligible	Secondary	Negligible Secondary
Oystertoad	<i>Opsanus tau</i>	No	No	No	<0.001%	Negligible	Secondary	Negligible Secondary
Sheepshead	<i>Archosargus probatocephalus</i>	No	No	No	<0.001%	Negligible	Secondary	Negligible Secondary
Smooth dogfish	<i>Mustelus canis</i>	No	No	No	<0.001%	Negligible	Secondary	Negligible Secondary

3.4.1.2. Negligible Species

Any species that did not contribute at least 0.001% to total catches were treated as ‘negligible’ catches. These species occurred infrequently and at very low, negligible levels, and as such are not considered further in this assessment. A complete list of species treated as ‘negligible’ catches is presented in Table 13 above.

3.4.1.3. Main Primary Species

No species meets the respective thresholds for main species; there are no Main Primary species. In the case of very large fisheries it is at the discretion of the Assessment Team as to whether they evaluate species that do not meet the default thresholds to main species status. Given the current level of landings the ATL menhaden fishery does not meet the MSC definition of a very large fishery.

3.4.1.4. Minor Primary Species

Minor primary species are managed species with tools controlling exploitation, reference points in place and some form of stock assessment in place; minor primary species for the ATL menhaden fishery and their status with respect to management reference points are outlined in Table 14.

Table 14. Minor primary species in the ATL menhaden purse seine fishery.

Species	Latin	Overfishing?	Overfished?	B/Bmsy or B/Bmsy proxy	Source
American butterfish	<i>Poronotus triacanthus</i>	No	No	1.74	NMFS 2014
Atlantic croaker	<i>Micropogonias undulates</i>	Unknown	Unknown		ASMFC 2018a
Atlantic striped bass	<i>Morone saxatilis</i>	No	No	0.81	ASMFC 2018a
Black drum	<i>Pogonias cromis</i>	No	No		ASMFC 2018a
Blue crab	<i>Callinectes sapidus</i>	No	No	0.68	CBSAC 2018
Bluefish	<i>Pomatomus saltatrix</i>	No	No	0.86	ASMFC 2018a
Red drum*	<i>Sciaenops ocellatus</i>	No	Unknown		ASMFC 2018a
Sandbar/Brown shark	<i>Carcharhinus plumbeus</i>	No	Yes	0.66	NMFS 2016
Spanish mackerel	<i>Scomberomorus maculatus</i>	No	No		ASMFC 2018a
Spot	<i>Leiostomus xanthurus</i>	Unknown	Unknown		ASMFC 2018a
Summer flounder/Fluke	<i>Paralichthys dentatus</i>	Yes	No	0.58	ASMFC 2018a
Weakfish	<i>Cynoscion regalis</i>	No	Yes		ASMFC 2018a

* Based on the area in which the menhaden fishery operates these are most likely to be from the Northern red drum stock.

3.4.1.5. Main Secondary Species

No species meets the respective thresholds for main species; there are no Main Secondary species. In the case of very large fisheries it is at the discretion of the Assessment Team as to whether they evaluate species that do not meet the default thresholds to main species status. Given the current level of landings the ATL menhaden fishery does not meet the MSC definition of a very large fishery.

3.4.1.6. Minor Secondary Species

Minor secondary species are out of scope species that are not ETP species or species without tools controlling exploitation, reference points or some form of stock assessment; minor secondary species for the ATL menhaden fishery are outlined in Table 15.

Table 15. Minor secondary species in the ATL menhaden purse seine fishery.

Species	Latin	Category
American harvestfish	<i>Peprilus paru</i>	Minor Secondary
Atlantic thread herring	<i>Opisthonema oglinum</i>	Minor Secondary
Bullnose ray	<i>Myliobatis freminwillii</i>	Minor Secondary
Cownose ray	<i>Rhinoptera bonasus</i>	Minor Secondary
Hogchoker	<i>Trinectes maculatus</i>	Minor Secondary
Ladycrab	<i>Ovalipes ocellatus</i>	Minor Secondary
Silverperch	<i>Bairdiella chrysoura</i>	Minor Secondary
Spidercrab	<i>Libinia emarginata</i>	Minor Secondary
Spiny butterfly ray	<i>Gymnura altavela</i>	Minor Secondary
Vermillion snapper	<i>Rhomboplites aurorubens</i>	Minor Secondary
Witch flounder	<i>Glyptocephalus cynoglossus</i>	Minor Secondary

3.4.2. Endangered, Threatened and Protected (ETP) species

ETP species are Endangered, Threatened and Protected species recognized by national ETP legislation and/or listed in binding international agreements. Binding in this context refers to the agreement being binding on the parties to the agreement and does not require the state in whose waters the fishery takes place to be a signatory to the agreement for it to be applicable. Species listed under CITES Appendix 1 shall be considered ETP species, even if the national management authority does not recognize it as an ETP species, unless it can be shown that the particular stock of the CITES listed species impacted by the fishery under assessment is not endangered.

Assessment Teams are required to consider all ETP species that are vulnerable to being impacted by the fishery in the area covered by the assessment. In situations where data on interactions with ETP species are limited, the Assessment Team should take a more inclusive approach (i.e., all ETP species in the geographic area); therefore Table 16 below includes all ETP species in the Northwest Atlantic that are recognized by national legislation and/or listed in binding international agreements. In reality the ATL menhaden fishery takes place in coastal waters and is unlikely to impact any of the species that are generally distributed further offshore in continental shelf (20 – 200 m) and/or oceanic waters (>200 m).

Table 16. Endangered, Threatened and Protected species in the U.S. Atlantic that are recognized by national ETP legislation and/or listed in binding international agreements.

Group	Species name	Latin	Listed	ETP Status
Whales	Right whale	<i>Eubalaena glacialis</i>	MMPA	Endangered
	Humpback whale	<i>Megaptera novaeangliae</i>	MMPA, ESA	Endangered
	Fin whale	<i>Balaenoptera physalus</i>	MMPA, ESA	Endangered
	Minke whale	<i>Balaenoptera acutorostrata</i>	MMPA	Protected
	Blue whale	<i>Balenoptera musculus</i>	MMPA	Endangered
	Sei whale	<i>Balenoptera borealis</i>	MMPA, ESA	Endangered
	Sperm whale	<i>Physeter macrocephalus</i>	MMPA, ESA	Endangered
	Beaked whales	<i>Ziphius and Mesoplodon spp.</i>	MMPA	Protected
	Bryde's Whale	<i>Balaenoptera edeni</i>	MMPA	Protected
	North Atlantic Right Whale	<i>Eubalaena glacialis</i>	MMPA	Protected
	Gervais' beaked whale	<i>Mesoplodon europaeus</i>	MMPA	Protected
	Blainville's beaked whale	<i>Mesoplodon densirostris</i>	MMPA	Protected
	Cuvier's beaked whale	<i>Ziphius cavirostris</i>	MMPA	Protected
	Sowerby's Beaked Whale	<i>Mesoplodon bidens</i>	MMPA	Protected

	Sperm Whale	<i>Physeter macrocephalus</i>	MMPA, ESA	Endangered
	Pygmy Sperm Whale	<i>Kogia breviceps</i>	MMPA	Protected
Turtles	Leatherback turtle	<i>Dermochelys coriacea</i>	MMPA	Endangered
	Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	MMPA	Endangered,
	Green sea turtle	<i>Chelonia mydas</i>	MMPA	Endangered
	Loggerhead turtle	<i>Caretta caretta</i>	ESA, CITES	Threatened
Porpoise	Harbor porpoise	<i>Phocoena phocoena</i>	MMPA, CITES	Proposed for ESA listing
Manatee	Florida manatee	<i>Trichechus manatus latirostris</i>	MMPA, ESA	Endangered
Dolphins	Bottlenose dolphin	<i>Tursiops truncatus</i>	MMPA	Protected
	Risso's dolphin	<i>Grampus griseus</i>	MMPA	Protected
	Pilot whale	<i>Globicephala macrorhynchus</i>	MMPA	Protected
	Striped Dolphin	<i>Stenella coeruleoalba</i>	MMPA	Protected
	Fraser's Dolphin	<i>Lagenodelphis hosei</i>	MMPA	Protected
	Melon-headed whale	<i>Peponocephala electra</i>	MMPA	Protected
	Pygmy Killer Whale	<i>Feresa attenuata</i>	MMPA	Protected
	Orca	<i>Orcinus orca</i>	MMPA	Protected
	Atlantic Spotted Dolphin	<i>Stenella frontalis</i>	MMPA	Protected
	Spinner Dolphin	<i>Stenella longirostris</i>	MMPA	Protected
	Clymene Dolphin	<i>Stenella clymene</i>	MMPA	Protected
	False Killer Whale	<i>Pseudorca crassidens</i>	MMPA	Protected
	Rough-toothed dolphin	<i>Steno bredanensis</i>	MMPA	Protected
	Pantropical spotted dolphin	<i>Stenella attenuata</i>	MMPA	Protected
	Fish	Shortnose sturgeon	<i>Acipenser brevirostrum</i>	MMPA
Atlantic salmon		<i>Salmo salar</i>	ESA	Endangered
Seals	Harbor seal	<i>Phoca vitulina</i>	MMPA	Protected
	Gray seal	<i>Halichoerus grypus</i>	MMPA	Protected
	Harp seal	<i>Phoca groenlandica</i>	MMPA	Protected
Coral	Elkhorn coral	<i>Acropora palmata</i>	ESA	Threatened
	Staghorn coral	<i>Acropora cervicornis</i>	ESA, CITES	Threatened

3.4.2.1. Marine mammals

Over 30 different species of marine mammal are known to occur in the Northwest Atlantic waters, all of which are protected under the Marine Mammal Protection Act (MMPA) of these, 6 are also listed as endangered under the Endangered Species Act (ESA) (sperm, sei, fin, blue, humpback and North Atlantic right whales). Only two species of dolphin (Atlantic spotted dolphins, Risso's dolphins), and three seal species (Harbour, Gray, Harp) commonly occur in nearshore waters of the Atlantic. No threatened or endangered species of whales are generally found in nearshore waters. Bottlenose dolphins are the most commonly observed marine mammal species in nearshore waters of the Atlantic and are the only species of marine mammal recorded as being incidentally killed or injured in the Atlantic menhaden fishery is bottlenose dolphin; therefore, bottlenose dolphin are the only marine mammal evaluated under the ETP species PIs.

NMFS are required to implement monitoring programs to estimate the human-caused mortality and serious injury of marine mammals from interactions with commercial fisheries, and to estimate the potential biological removal (PBR) for marine mammal stocks. The PBR for a stock is the maximum number of individuals that may be removed from that stock while allowing that stock to reach or maintain its optimum sustainable population; note PBR does not include natural occurring deaths.

Under the MMPA commercial fisheries (state and federal) are classified into one of three categories (I, II, III) based on their associated risk of serious injuries and mortalities to marine mammals. Category I fisheries are estimated to pose the greatest risk. If the cumulative level of fishing-related mortality for a marine mammal stock exceeds PBR, it is designated as a Strategic Stock. Declining stocks and marine mammal species listed as Threatened or Endangered under the ESA also receive this designation. The MMPA directs NMFS to develop Take Reduction Plans (TRPs) to reduce the mortality of Strategic Stocks.

The mid-Atlantic menhaden purse seine fishery historically reported an annual incidental take of 1 to 5 common bottlenose dolphins (NMFS 1991, pp. 5-73). The incidental take of a humpback whale in the menhaden fishery has also been reported; however, in 2005 humpback whales were removed from the list species killed or injured in the fishery because an interaction had not been reported in a number of years. There has been very limited observer coverage since 2008, but no takes have been observed. (NOAA, 2015)

As a Category II fishery all fishers participating in Atlantic menhaden purse seine fishery are required to accommodate an onboard observer upon request. NMFS may develop and implement take reduction plans for any Category II fishery that interacts with a strategic stock and fishers would then be required to comply with these plans. In addition, any vessel owner or operator participating in the Atlantic menhaden fishery must report all incidental mortalities and injuries of marine mammals that occur during commercial fishing operations to NMFS within 48 hours of the end of the fishing trip.

During 2011 – 2015, there were no documented mortalities or serious injuries in mid-Atlantic menhaden purse seine gear of common bottlenose dolphins that could be ascribed to the Northern Migratory Coastal Stock. The mid-Atlantic menhaden purse seine fishery historically reported an annual incidental take of one to five common bottlenose dolphins (NMFS 1991, pp. 5 – 73). There has been very limited federal observer coverage since 2008. No observer coverage was allocated to this fishery during 2011 or during 2013 – 2015, and for 2012 only three trips were observed. Because there is no systematic observer program for this fishery, no estimate of bycatch mortality is available.

Bottlenose dolphins

Common bottlenose dolphins inhabit coastal waters in the western North Atlantic. NMFS manages dolphins based on the hypothesis that dolphins occupying dissimilar habitats exhibit particular characteristics that restrict their movements between habitats; these distinct sub-populations are therefore assumed to constitute separate stocks. For management purposes there are 15 distinct stocks of bottlenose dolphin in the western North Atlantic, 1 oceanic or offshore stock, 5 coastal stocks and 9 estuarine stocks.

Coastal and continental bottlenose dolphin stocks

The 5 coastal stocks of bottlenose dolphin in the North western Atlantic occupy coastal waters between the shore, barrier islands or outer bay boundaries out to the 20m isobath (Figure 27). The western North Atlantic continental shelf stock of bottlenose dolphins occupies waters to seaward of these coastal stocks between the 20 and 200m isobath from the U.S. - Canadian border to the Florida Keys (Figure 28). Given the current spatial distribution of the menhaden fishery, it is not known to interact with either the South Carolina/Georgia, Northern or Central Florida coastal or continental shelf stocks of bottlenose dolphin. The status of the northern and southern coastal migratory stocks of bottlenose dolphin is presented below.

Western North Atlantic Northern Migratory Coastal Stock

Based on the latest stock assessment, the best available abundance estimate for this stock is 6,639 while the minimum is 4,759 (Garrison *et al.*, 2017a; Hayes *et al.*, 2018). This estimate was derived from aerial surveys conducted during the summer of 2016 covering coastal and shelf waters from Assateague, Virginia, to Sandy Hook, New Jersey. PBR for the stock is 48 and so the zero-mortality rate goal, 10% of PBR, is 4.8. While the total annual human-caused mortality and serious injury for the stock during 2011 – 2015 is unknown, the minimum total mean annual human-caused mortality and serious injury for this stock during the period ranged between 6.1 and 13.2.

The total fishery-related mortality and serious injury for this stock is not less than 10% of the calculated PBR and therefore, cannot be considered to be insignificant and approaching a zero mortality and serious injury rate. The impacts of two large UMEs on the status of this stock are unknown. Analysis of trends in abundance suggests a probable decline in stock size between 2010 – 2011 and 2016, concurrent with a large UME in the area; however, there is limited power to evaluate trends given uncertainty in stock distribution, lack of precision in abundance estimates, and a limited number of surveys.

Southern Migratory Coastal Stock

Based on the latest stock assessment, the best available abundance estimate for this stock is 3,751 while the minimum is 2,353 (Garrison *et al.*, 2017a; Hayes *et al.*, 2018). This estimate was derived from aerial surveys conducted during the summer of 2016 covering coastal and shelf waters from Florida to New Jersey. PBR for the stock is 23 and so the zero-mortality rate goal, 10% of PBR, is 2.3. While the total annual human-caused mortality and serious injury for the stock during 2011 – 2015 is unknown, the minimum total mean annual human-caused mortality and serious injury for this stock during the period ranged between 0 and 14.3.

The total fishery-related mortality and serious injury for this stock is not less than 10% of the calculated PBR and therefore, cannot be considered to be insignificant and approaching a zero mortality and serious injury rate. The impacts of two large UMEs on the status of this stock are unknown. Although there was no statistically significant difference in abundance for this stock between the 2010–2011 and 2016 surveys, a statistically significant decline in population size of all common bottlenose dolphins in coastal waters from New Jersey to Florida between 2010–2011 and 2016 was detected (Garrison *et al.* 2017a), concurrent with a large UME in the area; however, there is limited power to evaluate trends given uncertainty in stock distribution, lack of precision in abundance estimates, and a limited number of surveys.

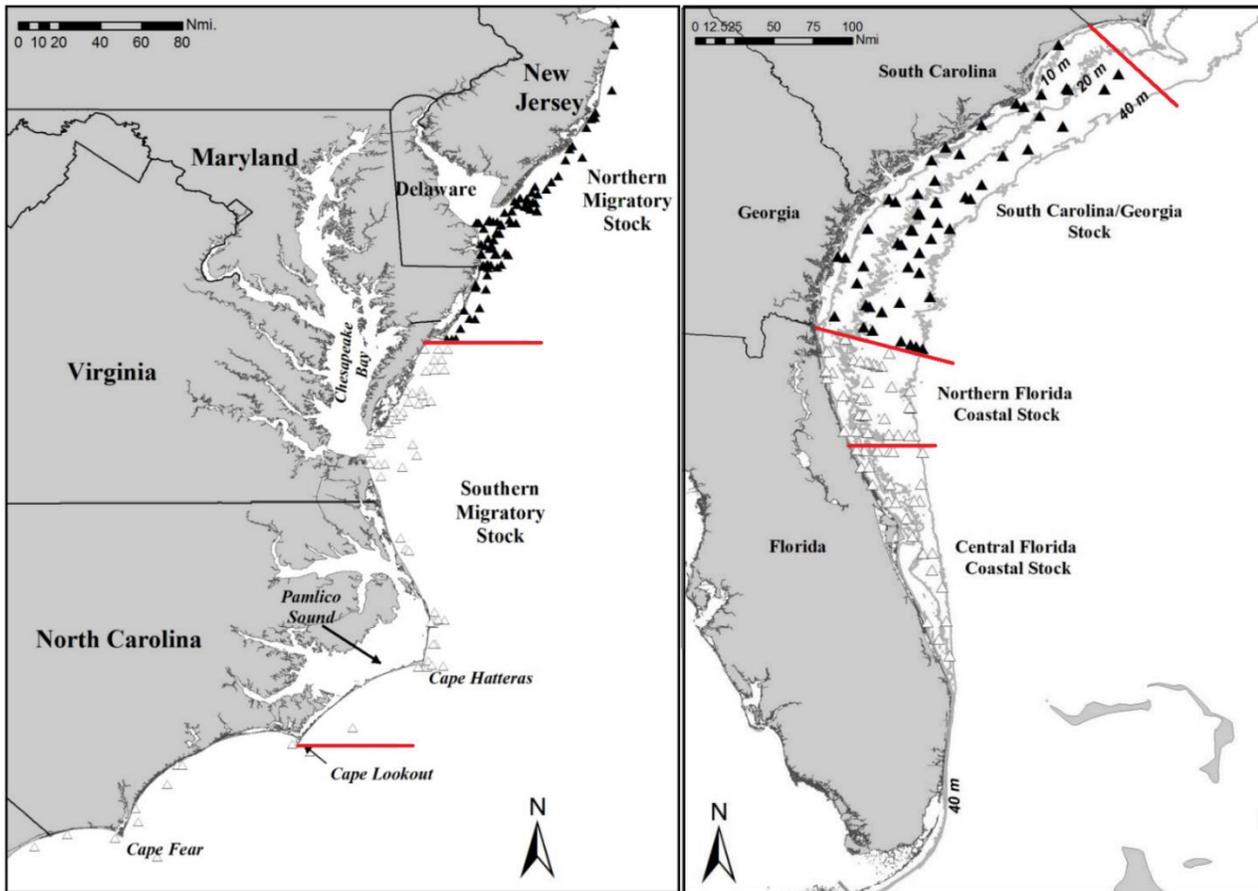


Figure 27. The distribution of common bottlenose dolphin stocks occupying coastal waters from New Jersey to North Carolina (left) and from South Carolina to Central Florida (right) Sighting locations from aerial surveys are plotted as triangle symbols with the North-South extent of each stock delimited by red lines (Source: modified from Waring et. al 2015).

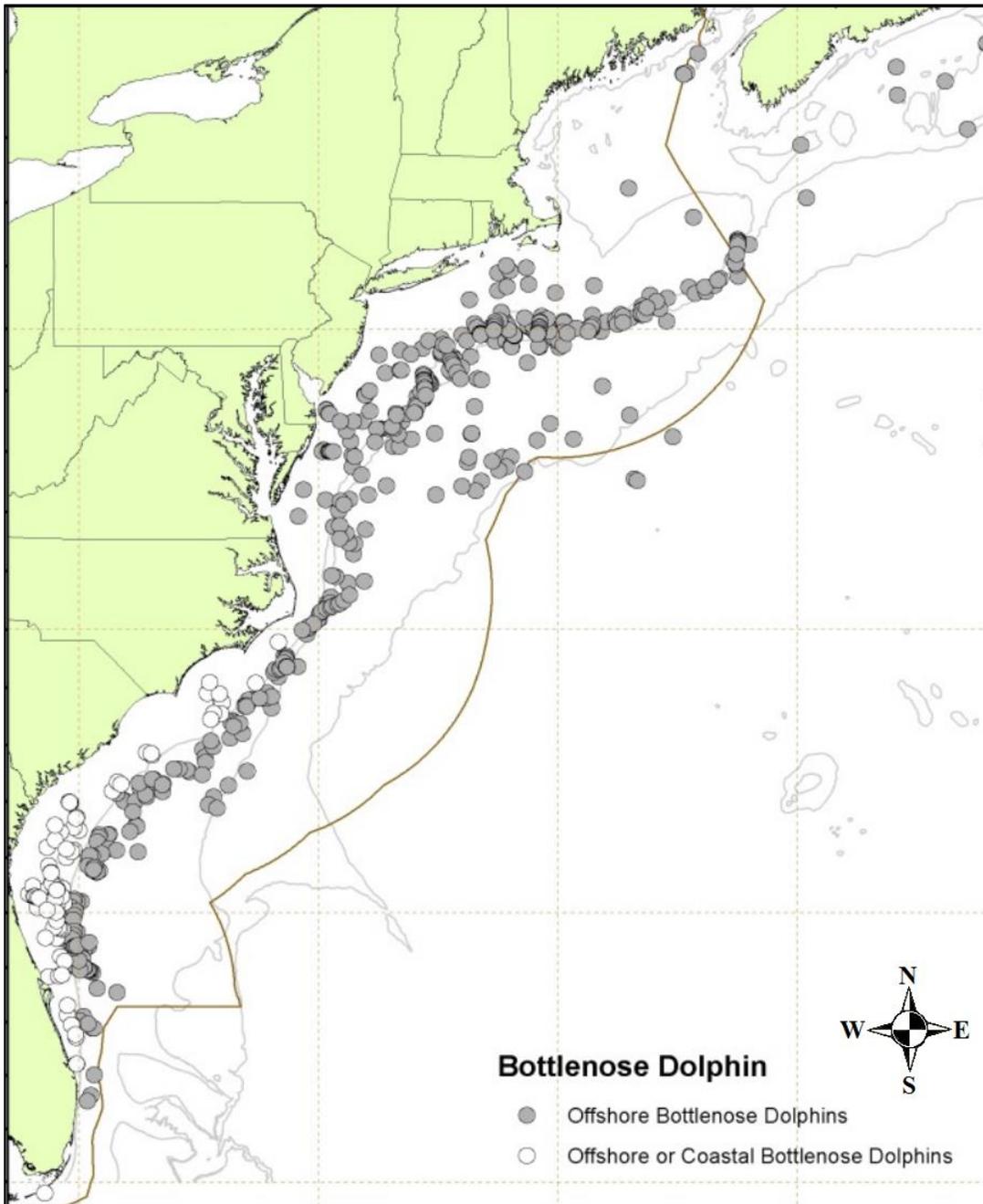


Figure 28. Distribution of bottlenose dolphin sightings from aerial surveys during summer in 1998, 1999, 2002, 2004, 2006 and 2011. Isobaths are the 100m, 1,000m and 4,000m depth contours (Source: Waring et.al. 2015).

Estuarine Stocks

As previously mentioned, NMFS currently recognizes 9 estuarine stocks of bottlenose dolphins in the western North Atlantic. Given the current spatial distribution of the menhaden fishery, the only estuarine stock it might potentially interact with (based on the potential for spatial overlap) is the Northern North Carolina Estuarine System stock (Figure 29).

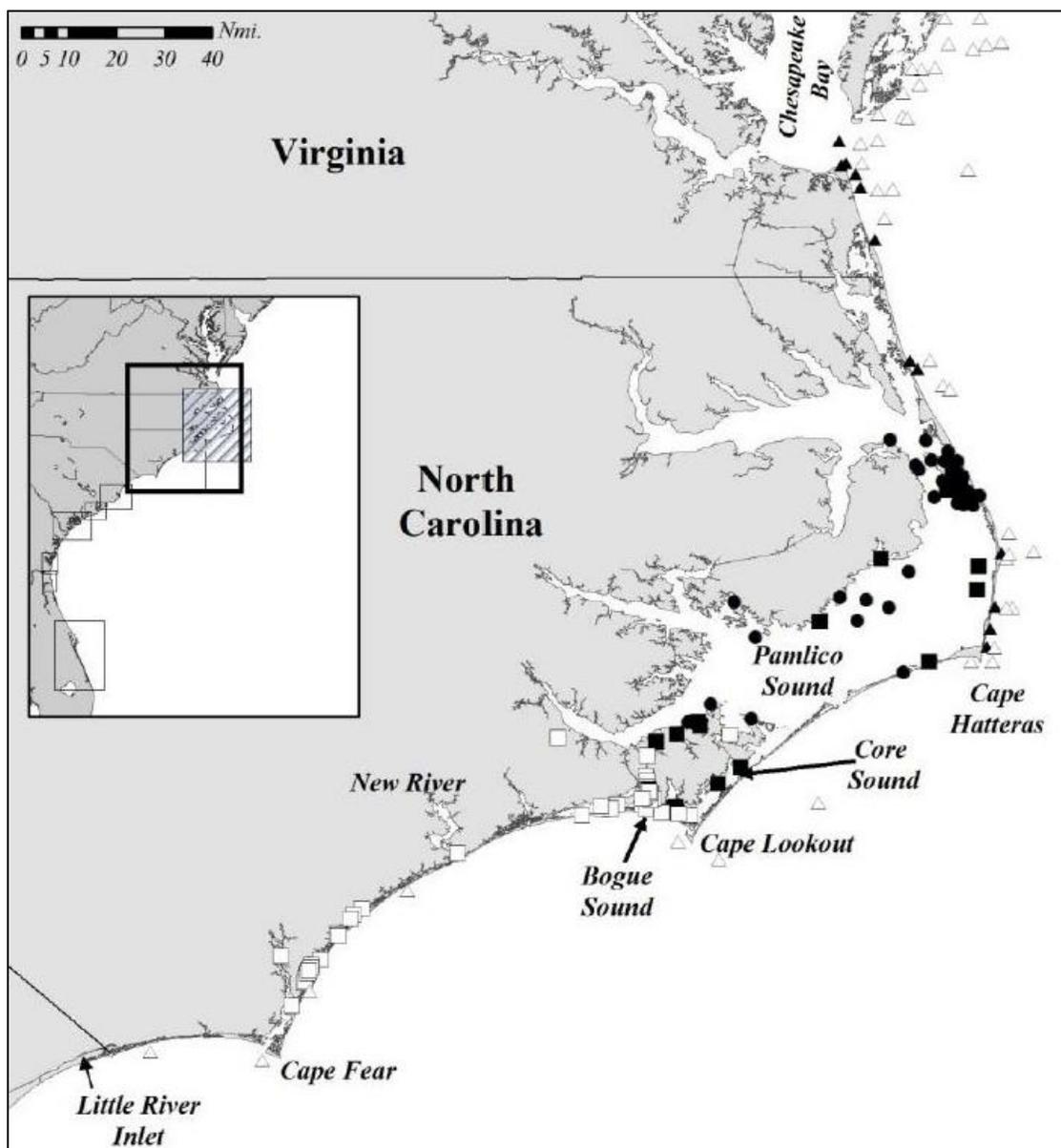


Figure 29. The distribution of bottlenose dolphins occupying coastal and estuarine waters in North Carolina and Virginia during July- August. Aerial surveys (triangles), satellite-linked telemetry (circles), and photo-identification studies (squares) (Source: Waring et.al. 2015)

Northern North Carolina Estuarine System Stock

The North Carolina Marine Fisheries Commission voted in 2012 to prohibit the use of purse seines deployed from a mother ship for the harvest of menhaden within the state’s three-mile jurisdiction effectively banning the menhaden fishery in North Carolina state waters. However, while members of this stock primarily occupy estuarine waters of Pamlico Sound they are also thought to make use of coastal waters (<1 km from shore) of North Carolina and southern Virginia including the lower Chesapeake Bay during warm water months (July-August). It is these lower Chesapeake Bay waters that the NNCES stock of bottlenose dolphins could potentially come into conflict with the menhaden fishery.

However, according to Waring et.al. (2015), the commercial fisheries that interact, or that could potentially interact, with the NNCES bottlenose dolphin stock are the Category I mid-Atlantic gillnet fishery; the Category II North Carolina long haul seine; North Carolina inshore gillnet; mid-Atlantic haul/beach seine; Virginia pound net; North Carolina roe mullet stop net; and Atlantic blue crab trap/pot fisheries; and the Category III U.S. mid-Atlantic mixed species stop seine/weir/pound net fishery, which includes the North Carolina pound net fishery; and the Atlantic Ocean, Gulf of Mexico, Caribbean commercial passenger fishing vessel (hook and line) fishery. The U.S. Atlantic menhaden purse fishery is not mentioned and is therefore not considered to impact the NCCES stock for the purpose of this assessment.

Menhaden fishery impacts on bottlenose dolphin stocks

Due to the area in which the menhaden fishery operates, interactions are primarily with the northern and southern coastal migratory stocks of bottlenose dolphins. While there are a small number of vessels in the fleet there are a fairly large number of sets. Observer coverage has been limited with only a pilot program in 2011 in which three encirclements of bottlenose dolphins were observed, all of which were released alive and uninjured. Historically, Atlantic menhaden purse seine fishermen have reported an annual incidental take of one to five coastal bottlenose dolphins (NMFS 1991); however, it should be noted that this information is prior to the widespread use of large bycatch excluders by the fleet.

The Atlantic menhaden fishery has been designated a Category II fishery under the MMPA, but this is primarily based on analogy to other purse seine fisheries, such as the Category II Gulf of Mexico Menhaden purse seine fishery, and potential interactions with bottlenose dolphins (Northern Migratory coastal and Southern Migratory coastal stocks).

Without an ongoing observer program, it is not possible to obtain statistically reliable information for this fishery on the number of sets annually, the incidental take and mortality rates, and the communities from which bottlenose dolphins are being taken. Given large bycatch excluders and the reduction in the number of vessels operating in the fishery it would be beneficial if more current estimates of dolphin mortality resulting from the menhaden fishery were available.

3.4.2.2. Sea turtles

NMFS and the U.S. Fish and Wildlife Service (USFWS) share Federal jurisdiction for sea turtles, with NMFS having lead responsibility in the marine environment and USFWS on nesting beaches. The ESA includes five sea turtle species Kemp's ridley (Endangered), loggerhead (Threatened), green (Threatened), leatherback (Endangered), and hawksbill (Endangered).

From September 1978 through early 1980, approximately 40 sea days were observed for fish sampling aboard menhaden purse seiners fishing from Maine south to North Carolina. No sea turtles were recorded as bycatch. Several states have indicated that sea turtles have been incidentally captured in menhaden fixed nets and trawls, but not for seine nets (ASMFC, Atlantic Coastal Fisheries Characterization Database, unpublished data). ASMFC, 2012 (Amendment 2 to the Interstate Fishery Management Plan for Atlantic Menhaden)

An observer program was recently required in the purse seine fishery to better evaluate interactions with sea turtles (NOAA, 2012b). From the catch data supplied by Omega Protein (2007 – 2012) two loggerhead turtles were recorded as being released alive.

Of the sea turtle species known to interact with the menhaden fishery, Kemp's ridley turtle and hawksbill turtle consist of a single recognised population. The other two green turtle and loggerhead turtle consist of 11 and 9 Distinct Population Segments (DPSs) respectively; of these the menhaden fishery is likely to interact with the North Atlantic DPS of green turtles and the Northwest Atlantic Ocean DPS of loggerhead turtles.

NMFS's determination is based on the extent of spatially and temporal overlap between the fishery and sea turtles, evidence of the fishery possibly leading to elevated sea turtle strandings, whether of gears or techniques used by the fishery are known or likely to result in incidental take of sea turtles and the levels of funding available to the NMFS. At present 14 fisheries are listed on the 2015 Annual Determination and are therefore required to take observers upon request from NMFS for a period of 5 years up until December 2019. The level of risk posed by the Atlantic menhaden fishery to sea turtle populations has not been deemed by NMFS to be sufficient to warrant inclusion on the current list of fisheries.

While the level of interactions between the menhaden fishery and sea turtles are likely to be extremely low where they do occur, they are not likely to result in mortality or serious injury. This is due to the fact that in general, purse seines are not left underwater for extended periods of time, meaning the risk of sea turtle mortality from forced submergence is low compared to other gear types. If they are caught, turtles being air breathers should be able to reach the surface.

3.4.2.3. Fishes

There are two marine fish species (Shortnose sturgeon and Atlantic salmon) protected under the ESA in the U.S. Atlantic coast. There have been no recorded interactions between the Atlantic menhaden fishery and either of these species; consequently, neither of these two species are evaluated under the ETP species PIs.

3.4.2.4. Corals

The Atlantic menhaden fishery takes place in shallow coastal waters over bottom types dominated by sand, silt and clay. There are no interactions between protected coral species (elkhorn coral, staghorn coral) and the Atlantic menhaden fishery; coral species are not evaluated under the ETP species PIs.

3.4.3. Habitats

Atlantic menhaden is mainly caught by purse seines, which is a gear that operates in the water column. Although contact with the bottom may occasionally occur in purse seine fisheries, particularly in shallow waters, physical and biological impact on sea floor is usually low (Chuenpagdee *et al.*, 2003; NOAA, 2012a).

Nearly all estuarine and coastal waters from Nova Scotia to Florida are important habitat for juvenile and adult Atlantic menhaden. Adults are found mainly in coastal ocean waters while juveniles are found in estuarine waters. Most of the menhaden fishery is focused in ocean waters or large estuaries. There is little to no impact from menhaden fishing to habitat in these areas (ASMFC 2011a).

3.4.3.1. Benthic sediments

The predominantly rocky coast north of Portland, Maine is characterized by steep terrain and bathymetry, with numerous islands, embayments, pocket beaches, and relatively small estuaries. Tidal marshes and mud flats occur along the margins of these estuaries. Farther south, the coastline is more uniform with few sizable bays, inlets, or islands, but with many small coves. Extensive tidal marshes, mud flats, and sandy beaches along this portion of the coast are gently sloped. Marshes exist along the open coast and within the coves and estuaries.

The coastal zone of the Mid-Atlantic States varies from a glaciated coastline in southern New England to the flat and swampy coastal plain of North Carolina. Along the coastal plain, the beaches of the barrier islands are wide, gently sloped, and sandy, with gradually deepening offshore waters. The area is characterized by a series of sounds, broad estuaries, large river basins (e.g., Connecticut, Hudson, Delaware, and Susquehanna), and barrier islands. Conspicuous estuarine features are Narragansett Bay (Rhode Island), Long Island Sound and Hudson River (New York), Delaware Bay (New Jersey and Delaware), Chesapeake Bay (Maryland and Virginia), and the nearly continuous band of estuaries behind barrier islands along southern Long Island, New Jersey, Delaware, Maryland, Virginia, and North Carolina. The complex estuary of Currituck, Albemarle, and Pamlico Sounds behind the Outer Banks of North Carolina (covering an area of 2,500 square miles) is an important feature of the region. Coastal marshes border small estuaries in Narragansett Bay and much of the glaciated coast from Cape Cod to Long Island Sound. Nearly continuous marshes occur along the shores of the estuaries behind the barrier islands and around Delaware Bay.

At Cape Hatteras, the Continental Shelf extends seaward approximately 20 miles (33 km) and widens gradually northward to about 68 miles (113 km) off New Jersey and Rhode Island where it is intersected by numerous underwater canyons.

The south Atlantic coastal zone extends in a large oceanic bight from Cape Hatteras south to Biscayne Bay and the Florida Keys. North of Florida it is bordered by a coastal plain that stretches inland for a hundred miles and a broad continental shelf that reaches into the ocean for nearly an equal distance. This broad shelf tapers down to a very narrow and precipitous shelf off the southeastern coast of Florida. The irregular coastline of North Carolina, South Carolina, Georgia, and eastern Florida is generally endowed with extensive bays and estuarine waters, bordered by nutrient-rich marshlands. Barrier beaches and dunes protect much of the shoreline. Along much of the southern coast from central South Carolina to northern Florida estuarine saltmarsh is prominent. Most of the east coast of Florida varies little in general form. Sand beaches with dunes are sporadically interrupted by mangrove swamps and low banks of earth and rock. (ASMFC, 2012).

The predominant benthic sediment types in the area in which the Atlantic menhaden fishery takes place are sand, silt and clay (Figure 30). In addition information on benthic habitats is freely available (Figure 31).

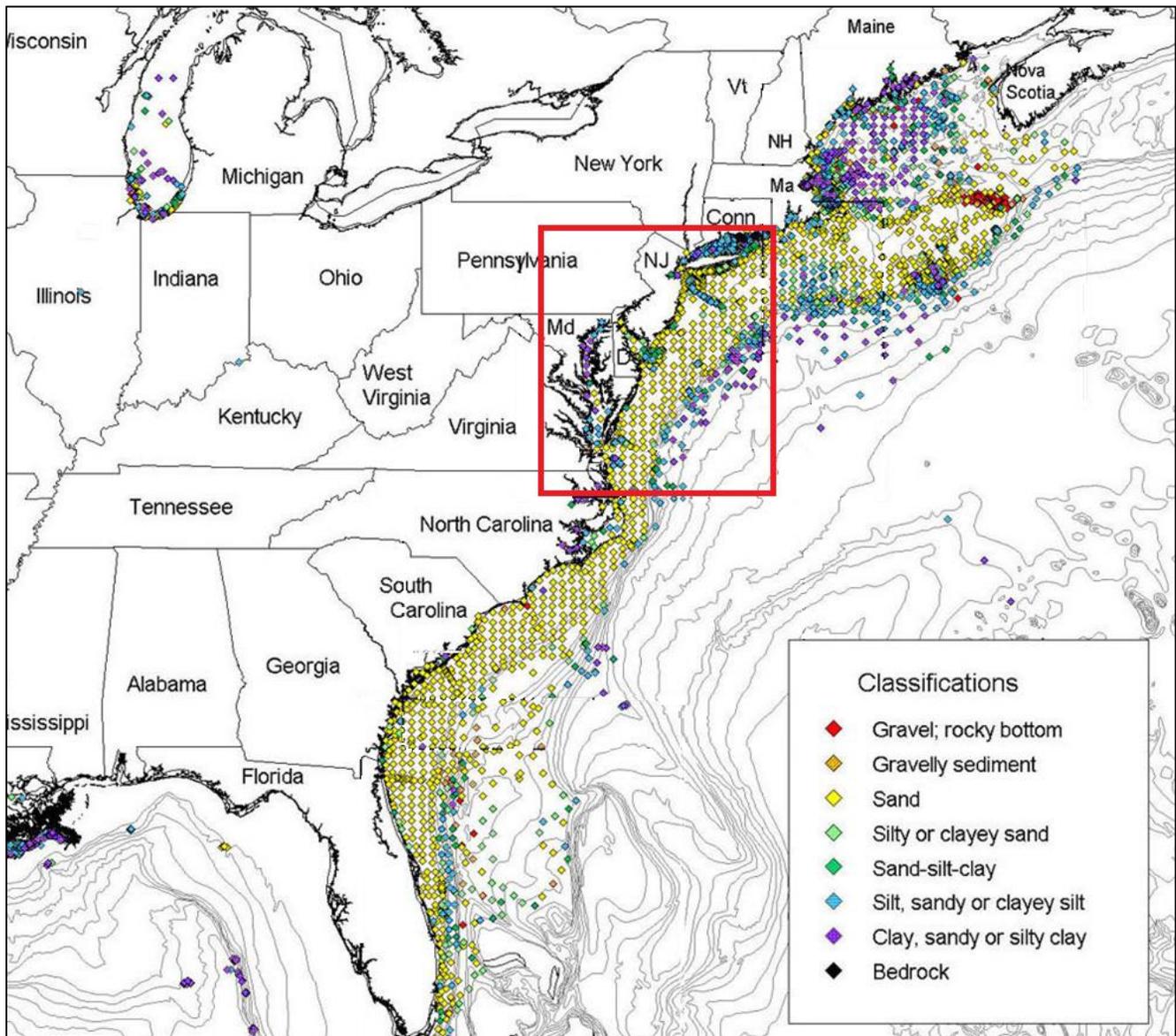


Figure 30. Map of sediments from the USGS East Coast Sediment Texture Database; the normal area of operation of the fishery under assessment is within the red box (Source: Modified from USGS East Coast Sediment Texture Database).

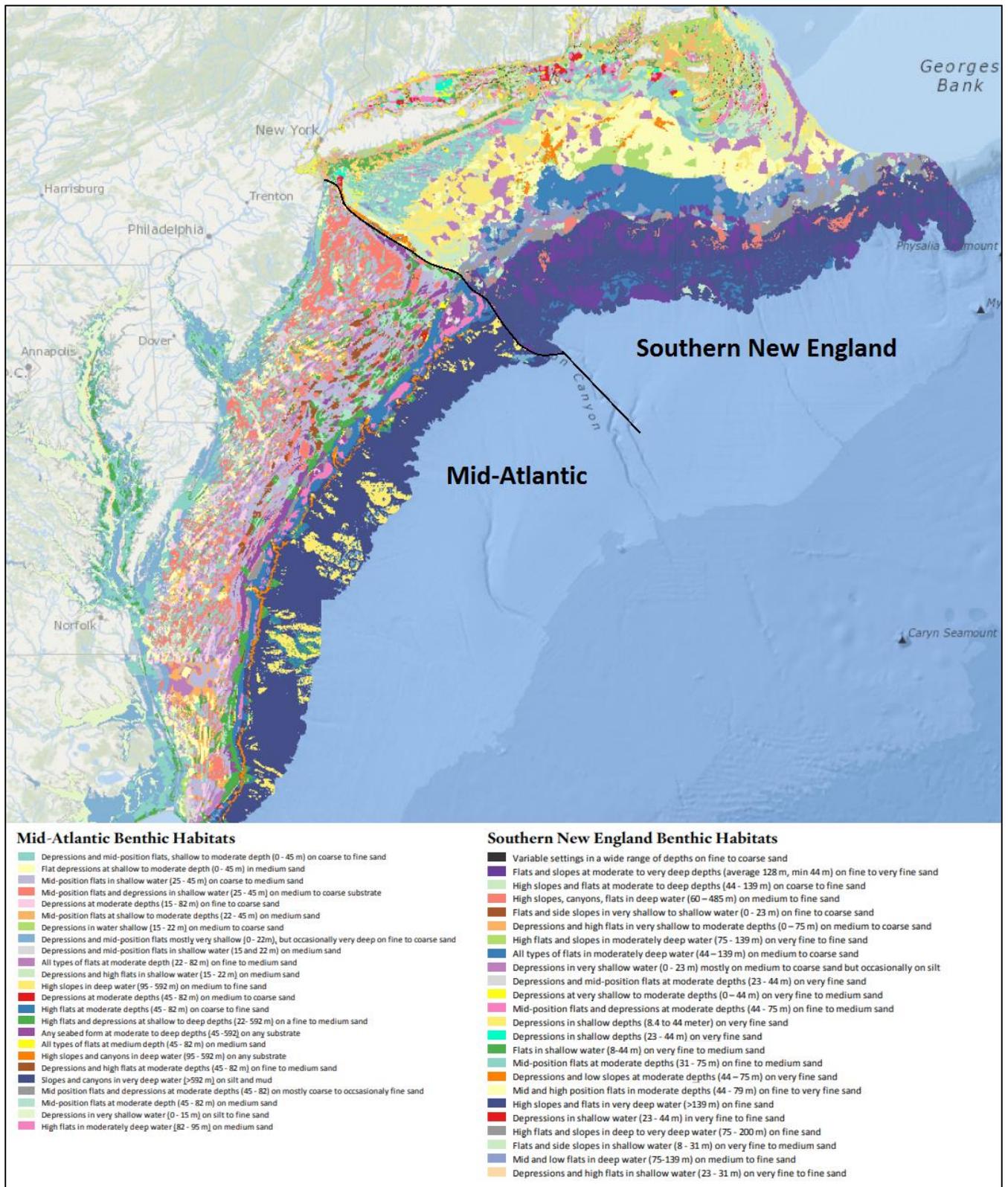


Figure 31. Map of benthic habitats in the Mid-Atlantic/Southern New England Region (Source: Mid-Atlantic Ocean Data Portal: <http://portal.midatlanticocean.org/>).

3.4.3.2. Critical Habitats

NMFS and the USFWS are responsible for designating critical habitat areas under the Endangered Species Act. On the Northwest Atlantic U.S coast, critical habitats have been designated for Loggerhead turtles (Figure 32), elkhorn and staghorn corals (Figure 33) and North Atlantic Right Whales (Figure 34). Critical habitat areas designated for staghorn and elkhorn coral and North Atlantic Right Whales do not spatially overlap with the menhaden fishery; these critical habitats are not evaluated under the VME PIs. There is limited spatial overlap between critical habitat areas designated for Loggerhead turtles and the Atlantic menhaden fishery, so these areas are evaluated under Vulnerable Marine Ecosystem (VME) PIs.

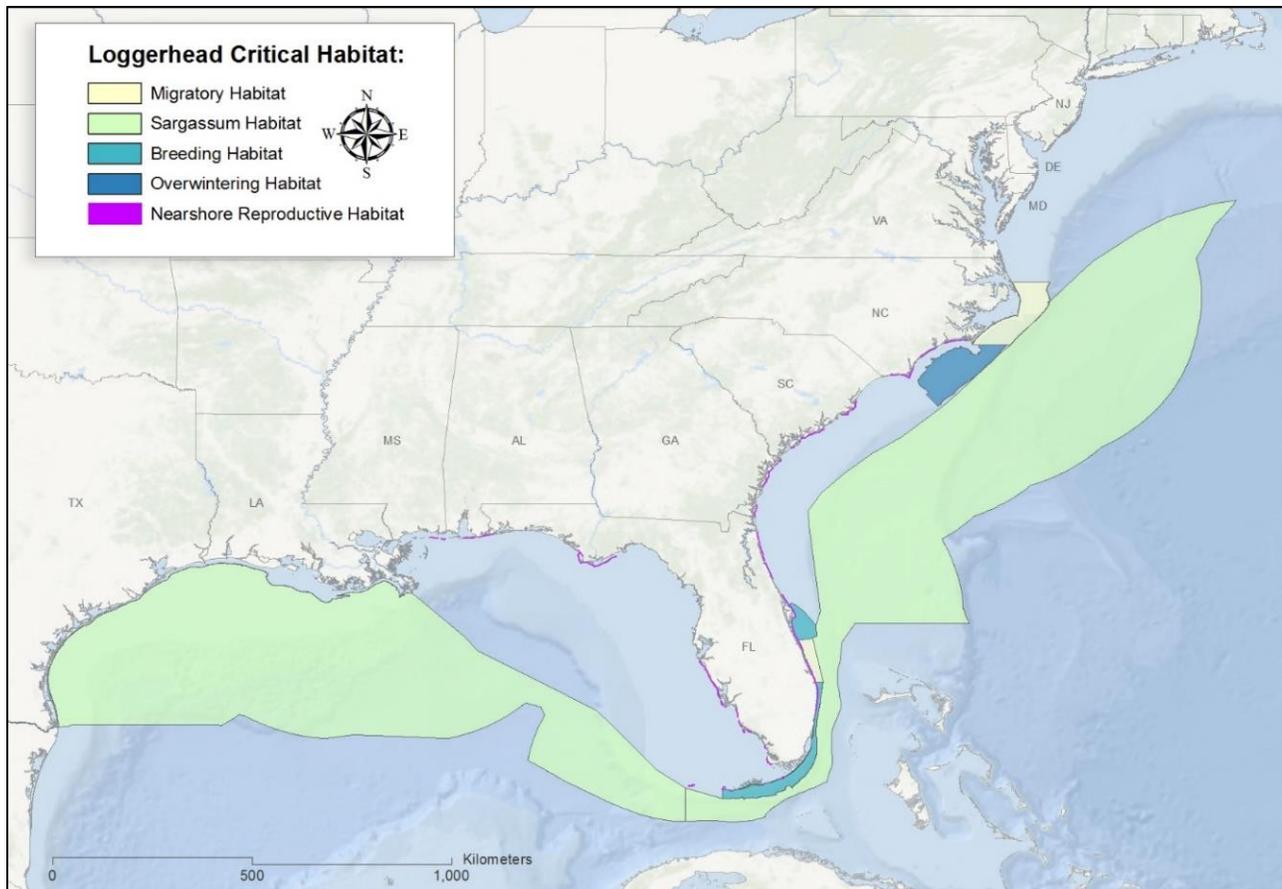


Figure 32. Loggerhead turtle Northwest Atlantic critical habitat (Source: http://www.nmfs.noaa.gov/pr/species/turtles/images/loggerhead_critical_habitat_map.jpg)

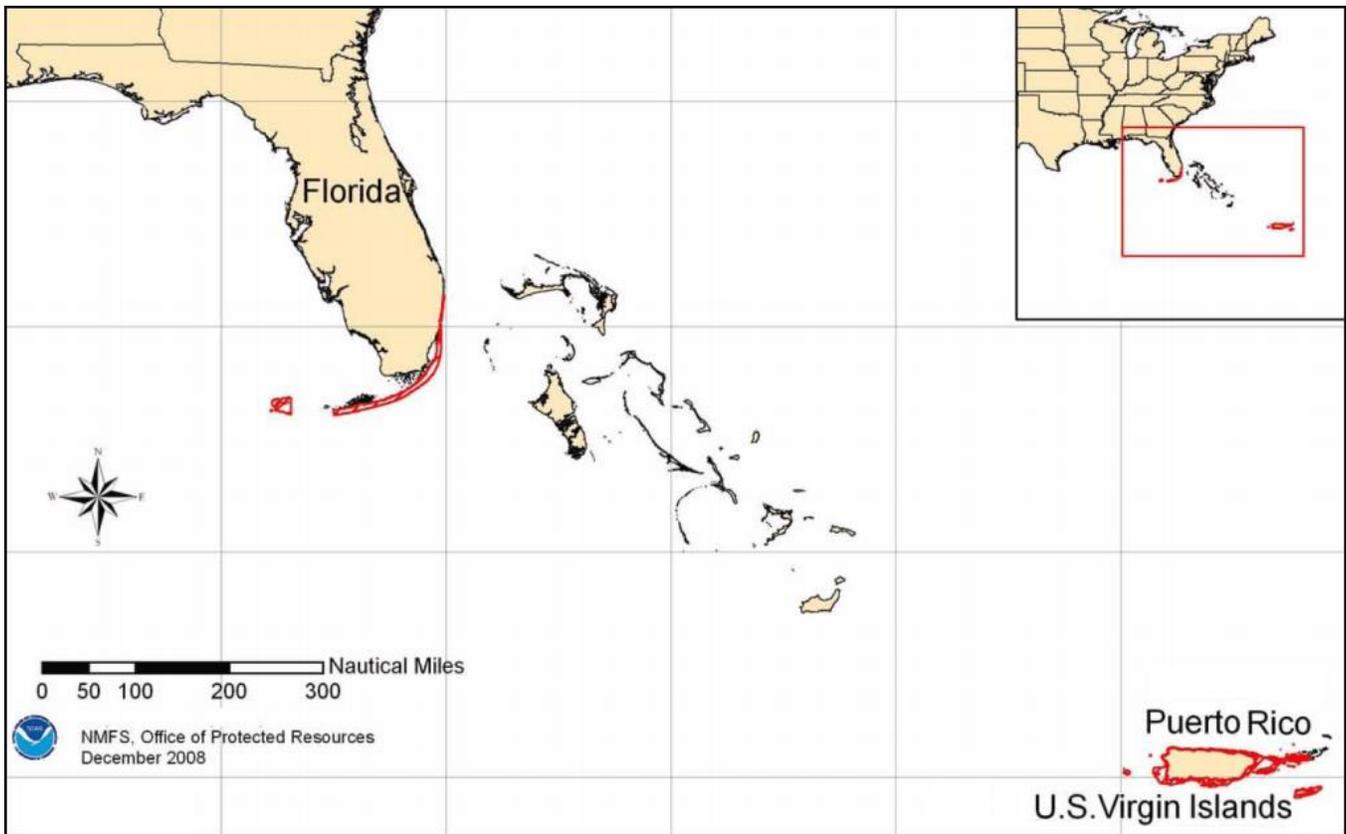


Figure 33. Elkhorn and staghorn critical habitat (Source: <http://www.nmfs.noaa.gov>).

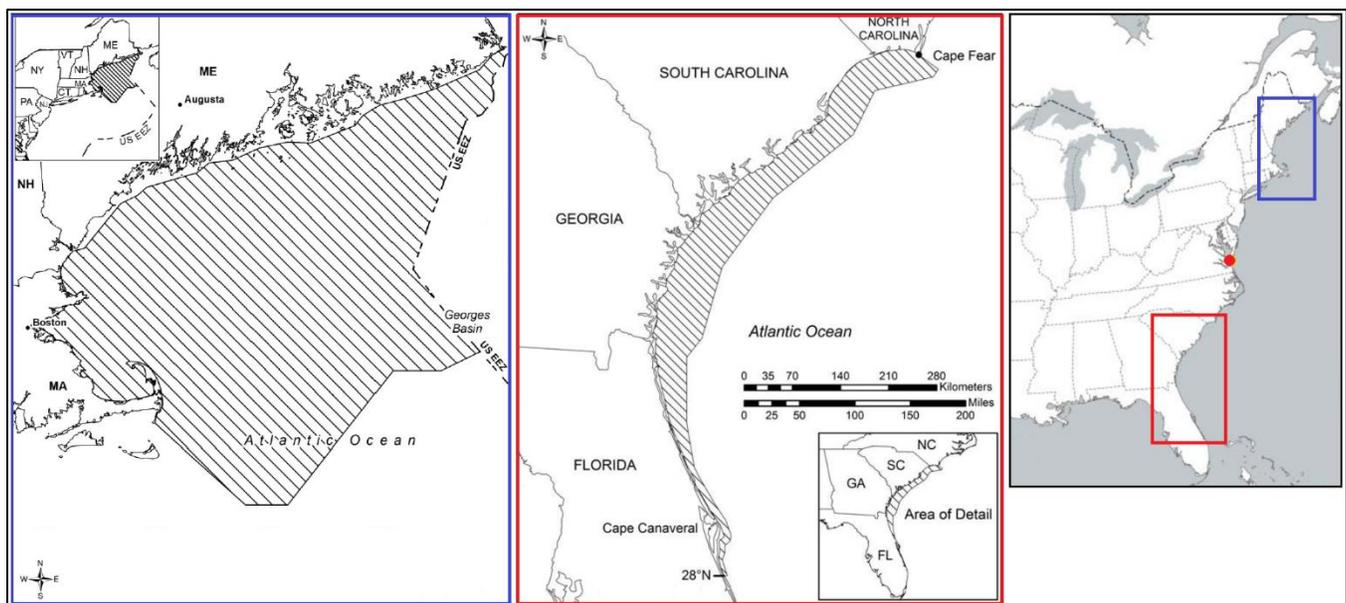


Figure 34. NA right whale critical habitat – North-eastern U.S Foraging area (left) and NA right whale critical habitat South-eastern U.S Calving Area (center). The right image shows the extent of the outlined areas with the Chesapeake Bay where the menhaden fishery is centered highlighted as a red dot. (Source: modified from NMFS).

3.4.3.3. Essential Fish Habitats (EFH)

Almost all of the estuarine and nearshore waters along the Atlantic coast from Florida to Nova Scotia, serve as important habitat for juvenile and/or adult Atlantic menhaden. Spawning occurs in oceanic waters along the Continental Shelf, as well as in sounds and bays in the northern extent of their range (Judy and Lewis 1983). Larvae are carried by inshore currents into estuaries from May to October in the New England area, from October to June in the mid-Atlantic area, and from December to May in the south Atlantic area (Reintjes and Pacheco 1966). After entering the estuary, larvae congregate in large concentrations near the upstream limits of the tidal zone, where they undergo metamorphosis into juveniles (June and Chamberlin 1959, Houde 2011). The relative densities of juvenile menhaden have been shown to be positively correlated with higher chlorophyll a levels in the lower salinity zones of estuaries (Friedland et al. 1996, Houde and Harding 2009). As juvenile menhaden grow and develop, they form dense schools and range throughout the lower salinity portions of the estuary, most eventually migrating to the ocean in late fall-winter.

Every Atlantic coast state has a coastal habitat protection program in place (Table 11.27 in ASMFC 1992). These protection programs have greatly reduced the loss of vital coastal habitat to dredging and filling since the mid-1970s. Virtually all proposals affecting coastal habitat are now reviewed by a variety of local, state, and federal agencies, and wholesale destruction of coastal wetlands is rare. Many important estuarine habitats are now protected as part of various wildlife refuges, national and state parks, and public and private nature preserves. In addition, a federal permit program is conducted by the U.S. Army Corps of Engineers, generally in cooperation with the state programs. Every state also conducts water quality protection programs under the federal Clean Water Act. National Pollution Discharge Elimination System permits are required for point-source discharges. (ASFMC, 2012).

3.4.4. Ecosystem

Atlantic menhaden occupy a wide variety of habitats during their life history. Adult Atlantic menhaden spawn primarily offshore in continental shelf waters. Larvae are carried by inshore currents to estuaries where they congregate in large concentrations near the upstream limits of the tidal zone and undergo metamorphosis into juveniles (June and Chamberlin 1959). As juvenile menhaden grow and develop, they form dense schools and range throughout the lower salinity portions of the estuary, eventually migrating to the ocean in late fall-winter.

The geographic range of Atlantic menhaden contains three large sub-regions (Figure 35). The northernmost region is the Gulf of Maine, a semi-enclosed sea bordered on the east, north, and west by the coasts of Nova Scotia, New Brunswick, and the New England states and bordered to the south by the open ocean of Georges Bank. The mid-Atlantic region extends from Cape Cod, MA to Cape Hatteras, NC. The south Atlantic region extends from Cape Hatteras south to Biscayne Bay and the Florida Keys.



Figure 35 Bathymetry of the Atlantic States coastal ocean ecosystem running from Nova Scotia in the north to Miami, Florida in the south showing the three sub-regions occupied by Atlantic menhaden.

Many factors in the estuarine environment affect the behavior and health of Atlantic menhaden. The combined influence of weather, tides, and river flow can expose estuarine fish to rapid changes in temperature and salinity. It has been reported that salinity affects menhaden temperature tolerance, activity and metabolic levels, and growth (Lewis 1966; Hettler 1976). Factors such as waves, currents, turbidity, and dissolved oxygen levels can impact the suitability of the habitat, as well as the distribution of fish and their feeding behavior (Reintjes and Pacheco 1966). However, the most important factors affecting natural mortality in Atlantic menhaden are considered to be predators, parasites, and fluctuating environmental conditions (Reish et al. 1985; ASMFC, 2011).

Ecosystem status report for the Northeast Large Marine Ecosystem (NOAA, 2016a)

- The North Atlantic Oscillation (NOA), a major ecosystem driver in the North Atlantic Basin, underwent a strong reversal in 2010. There has been increased variability in the NAO over the last decade.
- Sea surface temperatures (SST) on the Northeast Continental Shelf reached record levels in 2012 and have remained high. Increased seasonal variability in SST has been observed over the last two decades.
- Production of microscopic plants at the base of the food web has declined over the last three years.
- Evidence for changes in the relative abundance of small and large zooplankton species points to decadal-scale regime shifts at the base of the food web.
- Elasmobranch and small pelagic fish biomass has increased over the last several decades.
- Shifts in the center of distribution of many fish species have been documented as environmental conditions change.
- Fish condition (weight at a given length) has declined for a substantial number of species since 2000.
- Coherence in recruitment survival ratios for twenty groundfish stocks has been observed, suggesting the effects of system-wide factor.
- Landings for commercial and recreational fish have declined but commercial scallop and lobster landings remain strong.

- For stocks that can be categorized with respect to both overfishing and overfished status, a total of nine are currently classified as overfished and six continue to experience overfishing.
- Right whale and seal populations continue to increase.
- Environmental stressors such as lead, mercury, and DDT contamination have generally declined.
- Composite indices that integrate many variables from the Ecosystem Status Report point to broad-scale scale shifts in the state of the system.

3.5. Principle Three: Management System Background

The intent of Principle 3 (P3) of the MSC's Fisheries Certification Requirements (FCR, v2.0, 1st October 2014) is "to ensure that there is an institutional and operational framework appropriate to the size and scale of the UoA for implementing Principles 1 and 2, and that this framework is capable of delivering sustainable fisheries in accordance with the outcomes articulated in these Principles."

The P3 default tree structure divides the Performance Indicators (PIs) into two Components - Governance and Policy, and Fishery-Specific Management System. The first component "captures the broad, high-level context of the fishery management system within which the UoA is found"; it consists of three PIs:

- Legal and/or Customary framework (PI 3.1.1);
- Consultation, roles and responsibilities (PI 3.1.2); and
- Long term objectives (PI 3.1.3)

The second component "focuses on the management system directly applied to the fishery" and is informed by four PIs:

- Fishery-specific objectives (PI 3.2.1);
- Decision-making processes (PI 3.2.2);
- Compliance and enforcement (PI 3.2.3); and
- Monitoring and management performance evaluation (PI 3.2.4)

As is the case for Principles 1 and 2, MSC-certified assessors evaluate, analyze and score P3-specific parameters using publicly-available information and data from various sources, with interpretive guidance from the MSC's FCR and other relevant scheme documents.

3.5.1. The Legal Basis and Scope of the Management System

The Atlantic menhaden fishery operates in a single jurisdiction within the US EEZ (MSC FCR Annex SA4.1.1). As Atlantic menhaden are distributed along the Atlantic seaboard from Nova Scotia to Florida, the population is affected by the jurisdictions and authorities of a large number of federal and state agencies. Based on the latest available information, the Atlantic commercial reduction menhaden fishery is predominantly fished in the territorial waters of the Commonwealth of Virginia.

The following sections highlight some of the more important federal statutes that affect Atlantic menhaden and their habitat, including key government departments and agencies.

3.5.1.1. Federal Legislative Authority

Legislative Authority²

A. The Magnuson-Stevens Fishery Conservation and Management Act³ (Magnuson-Stevens Act)

This statute is the primary law governing marine fisheries management in US federal waters. First passed in 1976, the Magnuson-Stevens Act fosters long-term biological and economic sustainability of the country's marine fisheries out to 200 nautical miles from shore. Key objectives of the *Magnuson-Stevens Act* are to: (i) prevent overfishing; (ii) rebuild overfished stocks; (iii) increase long-term economic and social benefits, and; (iv) ensure a safe and sustainable supply of seafood.

² The federal statutes listed here are but a small representation of the suite of statutes with application to the fisheries.

³ http://www.nmfs.noaa.gov/sfa/laws_policies/msa/

Prior to the Act, waters beyond 12 nautical miles were international waters and fished by fleets from other countries. The 1976 law extended US jurisdiction to 200 nautical miles and established eight regional fishery management councils with representation from the coastal states and fishery stakeholders. The Councils' primary responsibility is development of fishery management plans (FMPs). These FMPs must comply with a number of conservation and management requirements, including 10 National Standards - principles that promote sustainable fisheries management.

Congress has twice made significant revisions to the *Magnuson-Stevens Act*, first in 1996 with the passage of the *Sustainable Fisheries Act*⁴, and in 2007 with the *Magnuson-Stevens Fishery Conservation and Management Reauthorization Act*⁵. The latter includes a number of important principles and regulatory provisions of relevance to the national governance regime for fishery management in US waters. Chief among these are:

- Establishing national standards for fishery and habitat conservation and management;
- Creating regional fishery management councils;
- Defining fishery management plan standards;
- Recognizing State jurisdiction;
- Specifying criminal offenses, civil forfeitures, and enforcement; and
- Enabling fishery monitoring and research

Sec. 306 of the *Magnuson-Stevens Fishery Conservation and Management Reauthorization Act* lays the legal foundation for State management of the Atlantic menhaden fishery. State Jurisdiction 16 U.S.C. 1856 97-453, 98-623 (a) In General— A State may regulate a fishing vessel outside the boundaries of the State in the following circumstances:

- The fishing vessel is registered under the law of that State, and (i) there is no fishery management plan or other applicable Federal fishing regulations for the fishery in which the vessel is operating; or (ii) the State's laws and regulations are consistent with the fishery management plan and applicable Federal fishing regulations for the fishery in which the vessel is operating.
- The fishery management plan for the fishery in which the fishing vessel is operating delegates management of the fishery to a State and the State's laws and regulations are consistent with such fishery management plan. If at any time the Secretary determines that a State law or regulation applicable to a fishing vessel under this circumstance is not consistent with the fishery management plan, the Secretary shall promptly notify the State and the appropriate Council of such determination and provide an opportunity for the State to correct any inconsistencies identified in the notification. If, after notice and opportunity for corrective action, the State does not correct the inconsistencies identified by the Secretary, the authority granted to the State under this subparagraph shall not apply until the Secretary and the appropriate Council find that the State has corrected the inconsistencies.

B. Interjurisdictional Fisheries Act (1986)⁶ (IJF Act)

The purposes of this statute are to promote and encourage: (i) State activities in support of the management of interjurisdictional fishery resources; (ii) management of interjurisdictional fishery resources throughout their range; and (iii) research in preparation for the implementation of the use of ecosystems and interspecies approaches to the conservation and management of interjurisdictional fishery resources throughout their range.

⁴ http://www.nmfs.noaa.gov/sfa/laws_policies/msa/documents/sustainable_fisheries_act.pdf

⁵ http://www.nmfs.noaa.gov/sfa/management/catch_shares/legislation_history/documents/msa_amended_2007.pdf

⁶ <https://legcounsel.house.gov/Comps/Interjurisdictional%20Fisheries%20Act%20of%201986.pdf>

C. Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA)

The *Atlantic Coastal Fisheries Cooperative Management Act*⁷ (Atlantic Coastal Fisheries Act) was signed into law in December 1993. It provides a mechanism to ensure Atlantic coastal state compliance with mandated conservation measures in Commission-approved fishery management plans. In the event of non-compliance, the Secretary of Commerce may impose a moratorium in that state's waters for harvesting the species in question.

D. Marine Protection, Research, and Sanctuaries Act of 1972⁸ (MPRSA Act), Titles I and III

The MPRSA provides protection of fish habitat through the establishment and maintenance of marine sanctuaries.

E. Shore Protection Act of 1988⁹ (SPA Act)

The MPRSA and the SPA regulate ocean transportation and dumping of dredged materials, sewage sludge, and other materials. Criteria for issuing such permits include consideration of the effects of dumping on the marine environment, ecological systems, and fisheries resources.

F. Coastal Zone Management Act of 1972¹⁰ (CZM Act), as amended

The CZM Act encourages coastal states to develop and implement coastal zone management plans, thereby allowing states and the federal government to work together for the protection of U.S. coastal zones from the overdevelopment of the environment which can be harmful. States receive federal assistance grants to maintain federally-approved planning programs for enhancing, protecting, and utilizing coastal resources. These are state programs, but the act requires that federal activities must be consistent with the respective states' CZM programs. Depending upon the individual state's program, the act provides the opportunity for considerable protection and enhancement of fishery resources by regulation of activities and by planning for future development in the least environmentally damaging manner.

G. Endangered Species Act of 1973¹¹ (ESA), as amended

The Endangered Species Act provides for the listing of plant and animal species that are threatened or endangered. Once listed as threatened or endangered, a species may not be taken, possessed, harassed, or otherwise molested. It also provides for a review process to ensure that projects authorized, funded, or carried out by federal agencies do not jeopardize the existence of these species or result in destruction or modification of habitats that are determined to be critical.

H. National Environmental Policy Act¹² of 1970 (NEPA), as amended

The National Environmental Policy Act (NEPA) requires that all branches of government give proper consideration to the environment in the course of their decision-making prior to undertaking any major federal action that significantly affects the environment. Environmental Assessments (EAs) and Environmental Impact Statements (EISs), which are assessments of the likelihood of impacts from alternative courses of action, are required from all Federal agencies and are the most visible NEPA requirements.

⁷ http://www.fisheries.noaa.gov/sfa/management/state_federal/documents/acfcma.pdf

⁸ <https://www.epa.gov/enforcement/marine-protection-research-and-sanctuaries-act-mprsa-and-federal-facilities>

⁹ <https://www.epa.gov/laws-regulations/summary-shore-protection-act>

¹⁰ <https://definitions.uslegal.com/c/coastal-zone-management-act-of-1972/>

¹¹ <http://www.nmfs.noaa.gov/pr/laws/esa/>

¹² <https://www.epa.gov/laws-regulations/summary-national-environmental-policy-act>

3.5.1.2. Scope of Management System

Federal fishery management is conducted under the authority of the *Magnuson-Stevens Fishery Conservation and Management Act* (Magnuson-Stevens Act (MSA)) (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. With the passage of the MSA, federal government assumed responsibility for fishery management within the US EEZ, a zone contiguous to the territorial sea and whose inner boundary is the outer boundary of each coastal state.

Along the Atlantic coast of the US, there are 3 Regional Fishery Management Councils that are responsible for developing fishery management plans and recommending management measures to the Secretary of Commerce through the National Marine Fisheries Service (NMFS) for various fisheries within the US EEZ (3-200 nm). The Councils coordinate their management activities closely with several other management bodies to ensure that fisheries are managed effectively across jurisdictional boundaries. Because many of the Councils' managed fisheries are fished for in state waters or outside, the Councils work with the ASMFC to ensure that state and federal fishery management programs are coordinated, consistent, and complementary between federal and state waters. **The Atlantic commercial menhaden fishery in federal waters is not regulated or managed by the Councils. The ASMFC is the only entity with a management plan for Atlantic menhaden and there is no cooperative or complementary plan in federal waters.** The Commission plan provides coastwide regulations for the management of menhaden, some of which pertain to the reduction fleet (i.e. the Chesapeake Bay Reduction Fishery Cap).¹³ The three regional councils and their associated member states include:

- New England Fishery Management Council - Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut
- Mid-Atlantic Fishery Management Council - New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia and North Carolina
- South Atlantic Fishery Management Council - North Carolina, South Carolina, Georgia and east Florida to Key West

As previously stated, the Atlantic menhaden fishery operates primarily in state management jurisdictions. Consequently, the primary influence of Federal laws and regulations on the menhaden resource is through the maintenance and enhancement of habitat, preservation of water quality and food supplies and control of pollution. Federal regulations also govern the quality and saleability of certain end products of the menhaden fishery (i.e. fishmeal and fish oil).

Federal agencies involved, either directly or indirectly, in the management of the menhaden fishery include the National Park Service (NPS), the US Army Corps of Engineers (USACOE), the US Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA), and the Environmental Protection Agency (EPA). These agencies along with various state agencies administer programs to regulate land and water use, pollution control, wetlands protection, and other activities that could affect menhaden populations.

The *Atlantic Coastal Fisheries Cooperative Management Act* is instrumental in supporting and encouraging the development, implementation, and enforcement of effective interstate conservation and management of Atlantic coastal fishery resources. It recognizes that the failure by one or more Atlantic States to fully implement a coastal fishery management plan can affect the status of Atlantic coastal fisheries, and can discourage other States from fully implementing coastal fishery management plans. Prior to the passage of this Act, state implementation of a Commission fishery management plan was voluntary, with the exception of the Fishery Management Plan for Atlantic Striped Bass.

¹³ M. Ware (ASMFC), pers. email, 15th September, 2017.

The scope of federal support for State coastal fisheries programs is defined in Section 5103 of the Act. Specifically, “The Secretary (of Commerce) in cooperation with the Secretary of the Interior shall develop and implement a program to support the interstate fishery management efforts of the (Atlantic States Marine Fisheries) Commission. The program shall include activities to support and enhance State cooperation in collection, management, and analysis of fishery data; law enforcement; habitat conservation; fishery research, including biological and socio-economic research; and fishery management planning.

Atlantic States Marine Fisheries Commission (ASMFC)

Mandate

The Commission is an outgrowth of the Eastern Conservation Conference begun in 1937. Seven states, including Maryland, ratified a compact in 1941 (Chapter 435, Acts of 1941). This compact, approved by the US Congress and signed by the President in 1942, is the legal basis of the Commission.

All fifteen Atlantic seaboard states are members of the Commission. They include: Connecticut, Delaware, Florida, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, and Virginia. Each member state is represented by three commissioners. One commissioner represents the state agency charged with conservation of fisheries resources, one is a legislator, and one is selected by the governor for a three-year term. Each participating state pays dues for the support of the Commission in proportion to the value of its marine fisheries catch (Code Natural Resources Article, Sections 4-301 through 4-305).

According to Section 5104 of the ACFCM Act, the Commission “shall prepare and adopt coastal fishery management plans to provide for the conservation of coastal fishery resources. In preparing a coastal fishery management plan for a fishery that is located in both State waters and the exclusive economic zone, the Commission shall consult with appropriate Councils to determine areas where such coastal fishery management plan may complement Council fishery management plans. The coastal fishery management plan shall specify the requirements necessary for States to be in compliance with the plan. Upon adoption of a coastal fishery management plan, the Commission shall identify each State that is required to implement and enforce that plan.”

A coastal Atlantic menhaden fishery management plan (FMP) was developed by the ASMFC in 1981. The plan was revised in 1992, replaced by Amendment 1(2001: including 5 addenda; 2004, 2005, 2006, 2009, 2011) and currently managed under Amendment 2 (2012). The Commission’s Menhaden Management Board tracks and regulates harvest under Amendment 2 to the Interstate Fishery Management Plan for Atlantic menhaden. Although the Commission is made up of representatives of all member states, seasons, catch limits and other management measures must generally be approved by the governmental bodies in each applicable state before they are implemented. In other words, the ASMFC does not have direct control over states’ fishery management measures. Additionally, while there are some landings from the federal waters¹⁴ between 3-200nm from shore, management authority is vested in the states because the large majority of menhaden are caught in the state waters within 3nm of shore (as per the Atlantic Coastal Fishery Conservation and Management Act). In addition to the data collection and analysis conducted by individual states and the ASMFC, further scientific support is provided by the federal National Oceanic and Atmospheric Administration (NOAA).

¹⁴ The Assessment Team was unable to report on the extent of Omega Proteins’ participation in the Atlantic Menhaden fishery in Federal waters as we were informed by ASMFC the information was confidential and could not be disclosed.

The Commission confirmed to the Assessment Team that Omega Proteins’ menhaden commercial reduction fishery can operate in federal waters of the east coast. This is authorized because of a lack of a federal management plan for menhaden, rather than a specific statute or rule. Moreover, ASMFC is the only entity with a management plan for Atlantic menhaden and there is no cooperative or complementary plan in federal waters. The Commission plan provides coastwide regulations for the management of menhaden, some of which do pertain to the reduction fleet (i.e. the Chesapeake Bay Reduction Fishery Cap).¹⁵

Interstate Fisheries Management Program

The Commission carries out an Interstate Fisheries Management Program (ISFMP), authorized by Article IV of the Commission's Rules and Regulations. It is the policy of the Commission that its ISFMP promote the conservation of Atlantic coastal fishery resources, be based on the best scientific information available, and provide adequate opportunity for public participation.

The Commission is the final approval authority for any fishery management plan (FMP) and FMP amendment, and any final determination of a state's non-compliance with the provisions of a Commission approved FMP.

Boards and Committees

The Commission’s organization structure consists of a number of committees and technical support groups (Figure 36)¹⁶.

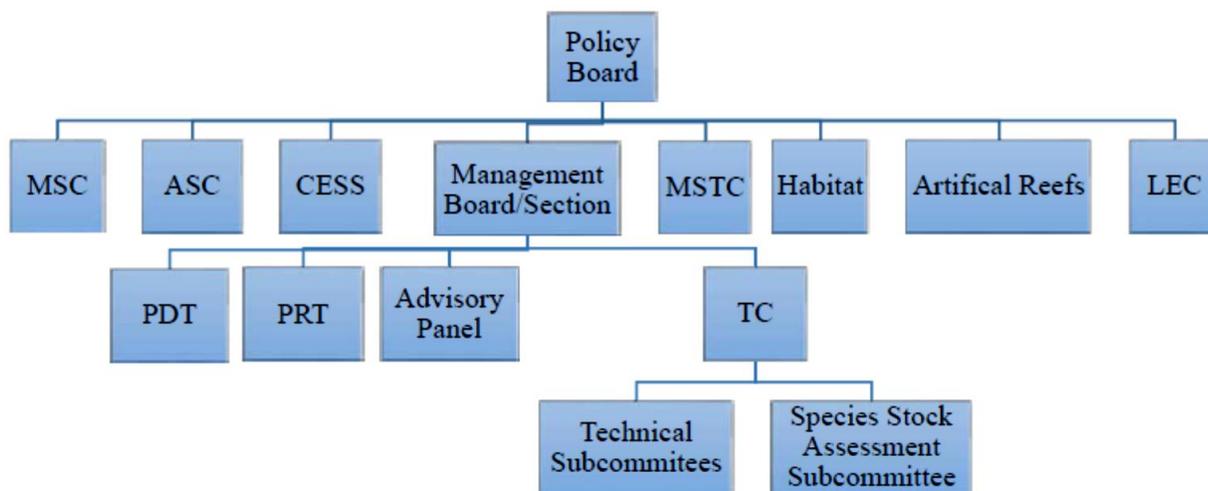


Figure 36. Organization Structure of ASFMC (Source: ASFMC, February 2016).

The ISFMP Policy Board is responsible for the overall administration and management of the Commission's fishery management programs. The goal of the program is to promote the cooperative management of marine, estuarine, and anadromous fisheries in state waters of the East Coast through interstate fishery management plans (FMPs). The major objectives of the ISFMP are to:

- Determine the priorities for interjurisdictional fisheries management in coastal state waters;
- Develop, monitor, and review FMPs;

¹⁵ Email: M. Ware, dated September 15th, 2017.

¹⁶ The information on this and accompanying pages was extracted from a publication of the Atlantic States Marine Fisheries Commission pursuant to National Oceanic and Atmospheric Administration Award No. NA15NMF4740069. Similar information is available at: https://www.asmfc.org/files/pub/ISFMPCharter_Feb2016.pdf.

- Recommend to states, regional fishery management councils, and the federal government management measures to benefit these fisheries;
- Provide an efficient structure for the timely, cooperative administration of the ISFMP; and
- Monitor compliance with approved FMPs.

Management Boards and Sections are established by and advise the ISFMP Policy Board. Each board/section is comprised of the states/jurisdictions with a declared interest in the fishery covered by that board/section. The boards/sections consider and approve the development and implementation of FMPs, including the integration of scientific information and proposed management measures. In this process, the boards/sections primarily rely on input from two main sources – species technical committees and advisory panels. Boards/sections are responsible for tasking plan development teams (PDTs), plan review teams (PRTs), technical committees (TCs), advisory panels (APs) and stock assessment subcommittees (SAS). Each management board/section shall select its own chair and vice-chair. Chairmanship will rotate among the voting members every two years.

Plan Development Teams are appointed by boards/sections to draft FMPs. They are comprised of personnel from state and federal agencies who have scientific and management ability, knowledge of a species and its habitat, and an interest in the management of species under the jurisdiction of the relevant board. Personnel from regional fishery management councils, academicians, and others as appropriate may be included on a PDT. The size of the PDT is based on specific need for expertise but is generally to be kept to a maximum of six persons.

Advisory Panels members include stakeholders from a wide range of interests including the commercial, charter boat, and recreational fishing industries, conservation interests, as well as non-traditional stakeholders. Members are appointed by the three Commissioners from each state with a declared interest in a species because of their particular expertise within a given fishery. APs provide guidance about the fisheries that catch or land a particular species. The AP's role is to provide input throughout the entire fishery management process from plan initiation through development and into implementation.

Technical Committees members are appointed by Management boards/sections to address specific technical or scientific needs requested periodically by the respective board/section, PDT, PRT, or the Management and Science Committee (MSC). A TC may be comprised of representatives from the states, federal fisheries agencies, Regional fishery management councils, Commission, academia, or other specialized personnel with scientific and technical expertise and knowledge of the fishery or issues pertaining to the fishery being managed. The TC should consist of only one representative from each state or agency with a declared interest in the fishery, unless otherwise directed by the board/section.

Stock Assessment Subcommittees

Upon the request of a board/section, the TC shall nominate individuals with appropriate expertise in stock assessment and fish population dynamics to a species stock assessment subcommittee (SAS), which will report to the TC. SAS nominations are approved by the board/section and shall continue in existence as long as the board/section requires. Membership of a species SAS will be comprised of TC members with appropriate knowledge and experience in stock assessment and biology of the species being assessed. Individuals from outside the TC with expertise in stock assessment or biology of the species may also be nominated and appointed, if necessary. The TC chair will serve as an ex-officio member of the species SAS. Overall membership should be kept to a maximum of six persons unless additional analytical expertise is requested by the board, TC or SAS.

Management and Science Committee (MSC)

The MSC provides advice concerning fisheries management and the science of coastal marine fisheries to the ISFMP Policy Board. MSC's major duties are to provide oversight to the Commission's Stock Assessment Peer Review Process, review and provide advice on species-specific issues upon request of the ISFMP Policy Board, evaluate and provide guidance to fisheries managers on multispecies and ecosystem issues, and evaluate and provide advice on cross-species issues. The MSC also assists in advising the Policy Board regarding stock assessment priorities and timelines in relation to current workloads. The MSC is comprised of one representative from each member state/jurisdiction, the NOAA Fisheries Northeast and Southeast Regions, and the USFWS Regions 4 and 5 who possess scientific as well as management and administrative expertise.

Assessment Science Committee (ASC)

The ASC is a stock assessment advisory committee that reports to the ISFMP Policy Board. ASC is comprised of one representative from each state/jurisdiction, the NOAA Fisheries Northeast and Southeast Regions, the 3 East Coast regional fishery management councils, and the USFWS. All agencies may nominate individuals for appointment to the ASC based on stock assessment and population dynamics expertise. The ISFMP Policy Board should review all nominations and appoint members to the ASC based on expertise, as opposed to agency representation. The ASC membership should be kept to a maximum of 25 members and periodic rotation of membership should be considered. The ASC is responsible for reviewing and recommending changes to the update and benchmark stock assessment schedule, advising the Policy Board regarding priorities and timelines in relation to current workloads, providing stock assessment advice and guidance documents for TCs and boards on technical issues as requested, and providing oversight to the Commission's Stock Assessment Training Program.

Multispecies Technical Committee (MSTC)

The MSTC is appointed by and advises the ISFMP Policy Board on multispecies modeling efforts with the goal of moving towards the use of multispecies model results in management decisions. The MSTC is comprised of state, federal, and academic scientists from the TCs with the expertise necessary to complete multispecies tasks on the species of interest and modeling approaches being employed. Individuals from outside the TC with expertise in stock assessment or biology of the species may also be appointed, if necessary.

Habitat Committee

The Habitat Committee is a standing Commission committee appointed at the discretion of the Commission Chair on an annual basis. The Committee advises the ISFMP Policy Board with the goal of enhancing and cooperatively managing vital fish habitat for conservation, restoration, and protection, and supporting the cooperative management of Commission managed species. The Habitat Committee is primarily responsible for developing habitat sections of FMPs and creating habitat management series publications as needed. Membership includes state representatives, the - USFWS, NOAA Fisheries, National Ocean Service, Environmental Protection Agency, U.S. Geological Survey, and the Army Corps of Engineers. Two seats are available on the Habitat Committee for members from non-governmental organizations (NGOs).

Law Enforcement Committee (LEC)

The LEC is a body of professionals in marine fisheries enforcement. It is comprised of representatives from each of the Commission's participating states and the District of Columbia. Members also represent NOAA Fisheries, the U. S. Coast Guard and USFWS. The LEC carries out assignments at the specific request of the Commission, the ISFMP Policy Board, the boards/sections, the PDTs, and the PRTs. In general, the Committee provides information on law enforcement issues, brings resolutions addressing enforcement concerns before the Commission, coordinates enforcement efforts among states, exchanges data, identifies potential enforcement problems, and monitors enforcement of measures incorporated into the various FMPs.

Committee on Economics and Social Sciences (CESS)

The purpose of the CESS is to provide socioeconomic technical oversight for both the ISFMP and the Atlantic Coastal Cooperative Statistics Program (ACCSP). CESS's major duties are to develop and implement mechanisms to make economic and social science analysis a functioning part of the Commission's decision-making process; function as the technical review panel for social and economic analyses conducted by the Commission and the ACCSP; and nominate economists and social scientists to serve on each species TC, Socioeconomic Subcommittee, or PDT, in order to provide technical support and development of socioeconomic sections of FMPs (including amendments and addenda). The CESS is comprised of one representative from each member state, two representatives from NOAA Fisheries Headquarters (one economist and one social scientist), the NOAA Fisheries Northeast and Southeast Regions, and one representative from the USFWS who possess social science expertise and familiarity with fisheries management.

Other Technical Support Subcommittees

Upon the approval of a board/section, the TC shall appoint individuals with special expertise, as appropriate, to other technical support subcommittees (not including SASs) in order to support TC deliberations on specific issues. These kinds of subcommittees include species tagging and stocking subcommittees, but do not include ISFMP socioeconomic subcommittees. All technical support subcommittees shall report to the TC and shall continue in existence so long as the Management board/section requires. All technical support subcommittees should elect their own chair and vice-chair, who will be responsible for reporting to the TC and the management board/section as necessary. Overall membership should be kept to a maximum of six persons unless additional expertise is requested by the TC or board.

Special Issue Technical Committees

The ISFMP Policy Board may form new TCs to address special issues (e.g., Interstate Tagging Committee, Fish Ageing Committee, Fishing Gear Technology Work Group, Fish Passage Working Group). Nominations are approved by the Policy Board. Special TCs meet as often as necessary (resources permitting) to address specific Policy Board tasks. One such committee is the Ecological Reference Point Work Group (ERP WG).

Ecological Reference Point Work Group (ERP WG)

In May 2010, the Board tasked the then Multi-Species Technical Committee (MSTC) with developing alternative reference points for menhaden that account for predation. After having initially focussed exclusively on a Multispecies Virtual Population Analysis (MSVPA) approach, the group was renamed the Biological Ecological Reference Points Workgroup (BERP WG) when the suite of models under consideration expanded beyond the MSVPA; the BERP workgroup is now known as the Ecological Reference Point Work Group (ERP WG).

The ERP WG has been tasked with developing menhaden-specific ecosystem reference points that account for the abundance of menhaden and the species role as a forage fish. In 2017, the work group held three workshops to review candidate ERP models including a Bayesian surplus production model with a time-varying population growth rate, a Steele-Henderson model which permits non-fisheries effects (predation and environment) to be quantified and incorporated into the single species stock assessments, and a multispecies statistical catch-at-age model in which single species models are linked to provide a predator-prey feedback between the population models. An Ecopath with Ecosim model is also being evaluated for strategic planning purposes and exploring tradeoffs. The ERP Work Group has decided to continue to pursue the development of each approach until available data has been full vetted.

The latest ERP WG meeting took place from October 9 – 12, 2018 where the WG focussed on completing a thorough review of all data to be used in both the ecosystem-based benchmark assessments. The ERP WG is also continuing to explore various modeling approaches to evaluate the health of the stock and inform the management of the species in an ecological context. It is expected that a peer-review of the menhaden-specific ERP model(s) will coincide with the peer-review of the singles-species benchmark assessment at the end of 2019.

3.5.1.3. State Legislative Authority and Scope of Management System

Legislative Authority

Each Atlantic coastal state has an administrative body tasked with the management of commercial and recreational fisheries within their jurisdiction (see Table 17). The key states involved in the Atlantic menhaden commercial fishery and their lead departments or agencies include: Maryland – Department of Natural Resources, Division of Fisheries and Boating Services and the Potomac River Fisheries Commission, New York – Department of Environmental Conservation Division of Marine Resources, New Jersey – Department of Environmental Protection Division of Fish and Wildlife, North Carolina – Department of Environmental Quality Division of Marine Fisheries, and Virginia – Marine Resources Commission. Each state authority is empowered to introduce and enforce fisheries regulations, through either the State administrative code, statutes, or specific legal instruments.

Table 17. Regional – state agencies.

State	Agency
Maine (ME)	Department of Marine Resources: http://www.maine.gov/dmr/commercial-fishing/index.html
New Hampshire (NH)	Department of Fish and Game, Division of Fisheries: http://www.wildlife.state.nh.us/index.html
Massachusetts (MA)	Department of Fish and Game, Division of Marine Fisheries: http://www.mass.gov/eea/agencies/dfg/dmf/recreational-fishing/atlantic-menhaden.html
Rhode Island (RI)	Department of Environmental Management – Bureau of Natural Resources, Division of Fish and Wildlife: http://www.dem.ri.gov/programs/fish-wildlife/marine-fisheries/index.php
Connecticut (CT)	Department of Energy and Environmental Protection, Bureau of Natural Resources: http://www.ct.gov/deep/site/default.asp
New York (NY)	Department of Environmental Conservation, Division of Marine Resources: http://www.dec.ny.gov/24.html
New Jersey (NJ)	Department of Environmental Protection, Division of Fish and Wildlife: http://www.njfishandwildlife.com/about.htm
Maryland (MD)	Department of Natural Resources, Division of Fisheries and Boating Services: http://dnr2.maryland.gov/Fisheries/Pages/management.aspx
Delaware (DE)	Department of Natural Resources and Environmental Control, Division of Fish and Wildlife: http://www.dnrec.delaware.gov/fw/Pages/AboutUs.aspx
Potomac River Fisheries Commission (PRFC)	http://prfc.us
Virginia (VA)	Virginia Marine Resources Commission: http://www.mrc.virginia.gov/mrcoverview.shtm
North Carolina (NC)	Department of Environmental Quality, Division of Marine Fisheries: https://deq.nc.gov/about/divisions/marine-fisheries
South Carolina (SC)	Department of Natural Resources, Division of Marine Resources: http://www.dnr.sc.gov/marine.html
Georgia (GA)	Department of Natural Resources, Division of Coastal Resources: http://coastalgadnr.org
Florida (FL)	Fish and Wildlife Conservation Commission, Division of Marine Fisheries Management: http://myfwc.com
Note: States shown in RED either prohibit the use of Mobile Gear or prohibit commercial menhaden reduction fishing in their waters. Currently, only New York and the Commonwealth of Virginia permit a commercial menhaden reduction fishery in their waters, with various restrictions ¹⁷ . According to the Commission, the Omega purse seine fleet has engaged in fishing menhaden in federal waters off Virginia, Maryland and New Jersey in recent years.	

¹⁷ ASMFC IFMP for Atlantic Menhaden (Amendment 2):Table 9 – Summary of State Regulations as of 2011, p.88

Scope of Management System

Section 5104 of the ACFCM Act addresses the statutory obligations of states in implementing and enforcing the measures of coastal fishery management plans that are proposed and adopted by the Commission. For example, states are required to implement and enforce¹⁸ a plan's measures within the timeframes set out in the plan. Failure to implement and enforce within the prescribed timeframe could lead to a finding of non-compliance by the Commission. Should a non-compliance determination be confirmed by the Secretary of Commerce, meaning that the state had failed to carry out its responsibility and that the measures it failed to implement and enforce were necessary for conservation, the Secretary shall declare a moratorium on the fishery in question within the waters of the non-complying state. The moratorium may be lifted upon a finding of compliance by the Secretary.

Jurisdictional Authority and Menhaden Management of Select States¹⁹

A. Virginia

Management of commercial and recreational fisheries in Virginia's coastal waters is the responsibility of the Virginia Marine Resources Commission (VMRC). In particular, the Fisheries Management Division of the VMRC collects fisheries statistics and data, develops fishery management plans, and participates in fisheries management at the inter-state level, including with the ASMFC. The VMRC is also responsible for licensing, control and enforcement in Virginia waters. Important state fisheries legislation informing the operation of the VMRC includes the Wetlands Act (1972), the Marine Patrol Act (1979), and the Fishery Management Policy Act (1984).

The Fisheries Management Division carries out current and long-term State policies affecting saltwater, recreational and commercial fisheries in Virginia's tidal waters. The Division's goal is to provide the maximum benefit and long-term use of the Commonwealth's finfish and shellfish resources through conservation and enhancement. Its objectives are to:

- collect comprehensive and timely statistics and information on Virginia's fisheries to determine fishery stock conditions;
- develop FMPs for commercially and recreationally important species found in Virginia waters;
- promote recreational fishing activity by the development of artificial fishing reefs and the Virginia Saltwater Fishing Tournament; and
- participate in organizations at the interstate and federal level regarding Virginia's fisheries and their management.

Omega Protein's sub-regional quota of Atlantic menhaden for the area of Chesapeake Bay that lies within state waters is capped at a specified tonnage. The State has a specific regulatory provision which governs this fishery as stipulated in the Virginia Compact²⁰. Given its informative value, it is printed in its entirety below.

§ 28.2-1000.2. Annual closure of the Chesapeake Bay purse seine fishery for Atlantic menhaden²¹

A. For the purpose of this section:

"Chesapeake Bay" means the territorial waters of the Commonwealth west of the Chesapeake Bay Bridge-Tunnel.

"Purse seine fishery for Atlantic menhaden" means those vessels licensed pursuant to § 28.2-402 that harvest menhaden for the purpose of manufacturing them into fertilizer, fish meal, or oil.

¹⁸ According to the Act, the words "implement and enforce" mean: to enact and implement laws or regulations as required to conform with the provisions of a coastal fishery management plan and to assure compliance with such laws or regulations by persons participating in a fishery that is subject to such plan."

¹⁹ The states highlighted in this section were chosen for having well-reported commercial Menhaden fisheries management frameworks for MSC evaluation purposes. Of note, the majority of Atlantic states prohibit a menhaden commercial reduction fishery in their waters.

²⁰ A compact is an interstate agreement between two or more signatory states that is approved by Congress. *Updated annually*

²¹ <https://law.lis.virginia.gov/compacts/atlantic-states-marine-fisheries-compact>

B. Upon a determination that the purse seine fishery for Atlantic menhaden meets the annual menhaden harvest cap in the Chesapeake Bay, the Commissioner shall promptly publish a notice in the Virginia Register announcing the date of closure. The Commissioner shall also notify the operators of the purse seine fishery for Atlantic menhaden by the most convenient and expeditious means available. The date of closure shall be based on mandatory daily landings reports required to be submitted under §28.2-400.5 by the purse seine fishery for Atlantic menhaden.

C. The annual menhaden harvest cap for the purse seine fishery for Atlantic menhaden shall be 87,216 metric tons, subject to annual adjustment for underages or overages as specified in subsection D. In no event, however, shall the harvest of this fishery exceed 98,192 metric tons in any one year.

D. If the harvest of the purse seine fishery for Atlantic menhaden does not exceed 87,216 metric tons in any year to which the harvest cap applies, then the difference between the actual harvest and the harvest cap shall be applied as a credit applicable to the allowable harvest for the purse seine fishery for Atlantic menhaden for the following year. The credit may be used only for the subsequent annual harvest and shall not be spread over multiple years. Any annual harvest in excess of the harvest cap shall be deducted from the harvest cap, as modified pursuant to this subsection and subsection C for the subsequent annual harvest.

E. No person shall take Atlantic menhaden by purse seine for reduction purposes from the Chesapeake Bay after the later of the date of closure implemented pursuant to subsection B or the date that actual notice is provided of such closure pursuant to subsection B. Any person violating this provision shall be guilty of a Class 1 misdemeanor.

B. Rhode Island²²

The commercial marine fisheries in Rhode Island are the responsibility of the Bureau of Natural Resources' Fish and Wildlife Division, one of nine divisions which report to the Bureau.

Mandate

The Division is responsible for setting seasons, size limits, methods of taking, and daily limits for the harvest of all wildlife as well as all recreational and commercial fisheries in the state. It is divided into three separate sections: Marine Fisheries, Freshwater Fisheries, and Wildlife Management. Each section is responsible for specific program activities. These activities include fisheries and wildlife research and management, freshwater fish hatcheries and fish stocking programs, habitat restoration, public access, land acquisition, education and information, public angling and hunting programs, and commercial fisheries management.

Mission

The Division's mission statement is: "to ensure that the Freshwater, Marine, and Wildlife Resources of the State of Rhode Island will be conserved and managed for equitable and sustainable use."

Marine Fisheries Regulatory Provisions²³

Part XVI of the Marine Fisheries Regulations (March 2017) deals specifically with the regulatory provisions of the commercial menhaden fishery in State waters. These are detailed in Section 16. 1 of the regulations and cover such measures as:

- Menhaden management area

²² <http://www.dem.ri.gov/programs/fish-wildlife>

²³ These regulations are adopted pursuant to Title 20, Chapters 42-17.1, 42-17.6, and 42- 17.7, and in accordance with Chapter 42-35-18(b)(5), Administrative Procedures Act of the Rhode Island General Laws of 1956, as amended.

- Opening and closure of the fishery
- Purse seine restrictions
- Commercial vessel restrictions
- Reporting requirements
- Landing requirements under State quota program
- Episodic event set aside program

The provisions notwithstanding, Section 16.1.6 - Prohibition on the harvesting of menhaden for reduction processing - states: ***“The taking of Menhaden for reduction (fish meal) purposes is prohibited in Rhode Island waters. A vessel will be considered in the reduction (fish meal) business if any portion of the vessel’s catch is sold for reduction.”***

C. Maryland

The mission of the Department of Natural Resources’ Fisheries and Boating Services Division is to:

- Develop a management framework for the conservation and equitable use of fishery resources;
- Manage fisheries in balance with the ecosystem for present and future generations;
- Monitor and assess the status and trends of fisheries resources; and
- Provide high quality, diverse, accessible fishing opportunities.

The management objective for all areas is to maintain sustainable fisheries by using biological, technical, and socio-economic data to develop science-based management strategies for commercial, recreational, and ecologically important species. Public input regarding proposed management actions is developed through the use of interim commissions, task forces, and committees. Tidal water fisheries management encompasses all Maryland tidal waters of the Chesapeake Bay and tributaries (excluding the main stem Potomac River which is managed by the Potomac River Fisheries Commission in cooperation with Maryland Department of Natural Resources and Virginia Marine Resources Commission), Maryland coastal bays, and Maryland coastal waters out to 3 miles offshore. FMPs are developed at the state, Chesapeake Bay, and coastal level to ensure conservation and sustainability of a species.

Purse seining, the predominant gear type for the commercial menhaden fishery, has been prohibited in state waters and in the Maryland portion of the Chesapeake Bay since before the 1950s. It is permitted along the Atlantic coast and in the Virginia half of the Chesapeake Bay.

Annual management plan particulars for the commercial fisheries are made public by way of a notice issued by the Secretary of the Department of Natural Resources pursuant to the Code of Maryland Regulations (COMAR). An agency wishing to adopt, amend, or repeal regulations must first publish in the Maryland Register a notice of proposed action, a statement of purpose, a comparison to federal standards, an estimate of economic impact, an economic impact on small businesses, a notice giving the public an opportunity to comment on the proposal, and the text of the proposed regulations. The opportunity for public comment must be held open for at least 30 days after the proposal is published in the Maryland Register.

D. Delaware

The responsibility for the State’s management of Atlantic Menhaden within its waters is conferred upon the Department of Natural Resources and Environmental Control, Division of Fish and Wildlife, by Title 7 of Delaware’s Administrative Code 3000: 3500: 3588. The regulatory provisions²⁴ are highlighted below.

²⁴ 17 DE Reg. 648 (12/01/13)

According to § 919, Chapter 9 of the Code, (a) It shall be unlawful for any person to fish, use, employ or attempt to fish, use or employ any purse seine to take or attempt to take menhaden in the tidal waters of this State; and (i) Whoever violates this section shall be guilty of a Class A environmental misdemeanor. § 927 of the Code further states that (a) No person shall fish with or use in the tidal waters of this State any type of trawl net that is operated in any manner by wind or sail power, motor power, hydraulics, pulleys, by being pulled by a power vessel or other mechanical advantage, or any purse seine operated in any manner, or any run around gill net, except as provided by § 911 (Scientific permit) and § 919 (Menhaden fishing: penalties) of this title, and (b) Any person who is determined to be in violation of this section shall be fined not less than \$2,000 and not more than \$5,000, plus the payment of costs, and/or imprisoned for up to 6 months; and for any subsequent violation of this section the person shall be fined not less than \$5,000, plus the payment of costs, and/or imprisoned for up to 6 months.

Atlantic Menhaden Regulatory Provisions (Other than Purse seining)

Atlantic Menhaden Quota

- The annual quota for Atlantic menhaden shall be determined in accordance with the Atlantic States Marine Fisheries Commission's Interstate Fishery Management Plan for Atlantic Menhaden and its subsequent amendments and addenda.
- Any person who has been issued a valid commercial food fishing license may take and reduce to possession Atlantic menhaden during the period beginning at 12:01 AM January 1 and ending when the Department has determined that the annual Atlantic menhaden quota has been landed.
- The Department shall establish, based on recent fishery performance and landings, a date and time to order the directed fishery closed.

Atlantic Menhaden Bycatch Allowance

- It is unlawful for any person who has been issued a valid commercial food fishing license to take and reduce to possession more than 6,000 pounds of Atlantic menhaden during any one day once the Department has determined that the Atlantic menhaden fishery is closed.
- It shall be unlawful for any person who has been issued a valid commercial food fishing license or any vessel, regardless of the number of licensed commercial fisherman onboard that vessel, to possess or land more than 6,000 pounds of Atlantic menhaden in any one day once the Department has determined the annual Atlantic menhaden fishery is closed.

Atlantic Menhaden Reporting Requirements

- It is unlawful for any person who has been issued a valid commercial food fishing license to not accurately and completely report their Atlantic menhaden landings to the Department, via the interactive voice phone reporting system, within 24 hours of landing.
- In addition to the requirement to phone in daily landing reports, it is unlawful for any person who has been issued a valid commercial food fishing license to not accurately and completely compile and file monthly log sheets detailing their daily landings of Atlantic menhaden on forms supplied by the Department. These forms must be submitted by the 10th of the month next ensuing. Failure to submit these monthly reports on a timely basis may be cause for revocation or non-renewal of their commercial food fishing license.

Atlantic Menhaden Landing Restrictions

- It is unlawful for any person who has been issued a valid commercial food fishing license to offload Atlantic menhaden to any other vessel or means of conveyance prior to landing.

Fisheries Conservation and Management

The State's fisheries conservation and management regime is set out in Title 7, Chapter 9 - Finfishing in Tidal Waters.²⁵ The regime is tethered by the following key principles:

- It shall also be the policy of the State to manage tidal water finfisheries in accordance with management objectives that maintain optimum yields of fish, that provide a viable experience for recreational fishers and that provide sound business opportunities for commercial fishers and for those providing services to fishers. Management shall be accomplished in cooperation with the federal government, the governments of other states and local fishing interests. Management shall be biologically and socioeconomically sound.
- In recognition of these fishes as migratory species which routinely spend some part of their life in the territorial seas and interior waters of different coastal states and the fishery conservation zone (3-200 nautical miles), interstate fishery management plans for each species or group of closely related species may be developed by the Department in cooperation with other interested Atlantic coast states and the appropriate federal agencies in the U.S. Department of the Interior and the U.S. Department of Commerce. The development of each interstate fishery management plan shall include an appropriate Delaware Citizens Advisory Committee whose membership shall consist of individuals who are residents of this State and shall represent the commercial and recreational interest for that fishery. Both the Citizens Advisory Committees and the Department shall abide by the following management principles in the development of an interstate fishery management plan:
 - Fisheries management shall prevent overfishing while achieving on a continuing basis the optimum yield from each fishery;
 - Fisheries management shall be based upon the best available scientific and socioeconomic information;
 - Fisheries management shall, to the extent practical, manage individual stocks of fish as a unit in cooperation with other states and federal authorities throughout the range of fish;
 - Fisheries management shall, to the extent practical, allocate or assign fishing privileges among fishers to conform to historic fisheries landing statistics and be reasonably calculated to promote conservation;
 - If it becomes necessary to allocate or assign fishing privileges among the citizens of this State, such allocation shall, to the extent practical, promote efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as the sole purpose; and
 - Fisheries management, to the extent practical, shall minimize costs and avoid unnecessary duplications.

E. New Jersey

Management of marine fish stocks in New Jersey's state waters falls under the jurisdiction of the Bureau of Marine Fisheries (BMF), part of the NJ Division of Fish and Wildlife (DFW), which itself is a component of the Department of Environmental Protection. According to the Division's Annual Report for FY 2016²⁶, its mission is to protect and manage the State's fish and wildlife to maximize their long-term biological, recreational and economic values for all New Jerseyans. It pursues this mission guided by three overarching goals:

- To maintain New Jersey's rich variety of fish and wildlife species at stable, healthy levels and to protect and enhance the many habitats on which they depend.
- To educate New Jerseyans on the values and needs of our fish and wildlife and to foster a positive human/wildlife co-existence.
- To maximize the recreational use and economic potential of New Jersey's fish and wildlife for both present and future generations.

²⁵ <http://delcode.delaware.gov/title7/c009/index.shtml>

²⁶ http://www.nj.gov/dep/fgw/pdf/2016/ann_rprt_2016.pdf

The Division's fisheries management activities are assigned to two Bureaus or Offices - the Bureau of Law Enforcement (BLE), and Marine Fisheries Administration (MFA) which includes the Bureau of Marine Fisheries (BMF). The MFA supervises and coordinates the planning, organization, operation and management of the State's marine and estuarine finfish and shellfish resources. It also coordinates the State's management activities on a coastwide basis with the Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery Management Council. The BMF conducts fisheries research, develops and implements management plans, and protects and enhances fish stocks and habitats. This research is combined with information from other Atlantic states and federal management agencies to support coastwide management plans.

Legislative Authorities

As previously reported, Federal legislation mandates that states implement all of the fishery management plans approved by the ASMFC. Each plan requires that states employ the required management measures, enforce those rules and monitor the status of the fishery population. States failing to comply with the requirements of the plan risk a federally-imposed moratorium in their state for those species covered.

New Jersey Fish and wildlife regulations are based on Permanent Statute Titles 23, 39, 50, 58, 2C-Code of Criminal Justice, and the Administrative Code N.J.A.C. 7:25 et. seq. Legislation is generally contained within Title 23 of the New Jersey Permanent Statute (Fish and Game, Wild Birds, and Animals). Fisheries management measures required by the ASMFC must first be approved by the Division's Marine Fisheries Council. The Council usually addresses these issues at their March meeting with the management measures becoming effective in mid-to-late April or early May. The Marine Digest is published in May. Regulations remain in effect until changed.

According to Subsection b of the NJ Rev Stat § 23:3-51 (2013) - License to Take Menhaden, prohibited takings: "Notwithstanding the provisions of subsection a. of this section, the provisions of P.L.2013, c.74 (C.23:3-51.2 et al.), or the provisions of any other law, or any rule or regulation adopted pursuant thereto, to the contrary, **the commissioner shall not issue a license for the taking of menhaden, and no person shall take menhaden, from State coastal waters, including the Delaware, Great, Raritan, and Sandy Hook bays, for the purpose of reduction, including the conversion of menhaden to fish meal, oil, or other components.**²⁷

New Jersey does regulate the commercial non-reduction, recreational and bait menhaden fisheries in its waters through a variety of management measures and policies (below).

Atlantic Menhaden Commercial Fishery Management Measures²⁸

General Quota Provisions

The New Jersey Atlantic menhaden commercial quota is currently 22,159.75 metric tons, equivalent to approximately 48.853 million pounds.

- 95% of the State's commercial quota is allocated to the purse seine fishery (approx. 46,411,186 pounds)
- 5% is allocated to all other gear types combined, i.e. pound net, gill net, trawl, and bait net licensed gear such as cast nets and beach seines (approx. 2,442,694 pounds).
- When a gear specific quota (purse seine and all others) is projected to be landed the Commissioner shall close the season by giving no less than 2 days public notice.
- If the menhaden season closes prematurely, the Commissioner may re-open the season for a specified time period.

²⁷ <http://law.justia.com/codes/new-jersey/2013/title-23/section-23-3-51/>

²⁸ New Jersey's Atlantic Menhaden Management Program - Quota Implementation and Monitoring - in response to the implementation of the ASMFC's Amendment 2 to the Interstate Fishery Management Plan for Atlantic Menhaden.

- All closure and opening notifications will be communicated to the public via e-mail and posted on the Division of Fish and Wildlife's website.
- Any quota overage incurred by a gear type(s) will be deducted from the following year's quota.
- Once a gear specific season is closed, menhaden landing license holders (see below) will be allowed an incidental catch of no more than 6,000 pounds per day.
- Current open seasons by gear type are as follows:
 - Purse seine: January 1 – December 31
 - Gill Net: January 1 – December 31
 - Pound Net: January 1 – December 31
 - Trawl: January 1 – December 31
 - Bait Net: January 1 – December 31
- A vessel or individual that does not qualify for a menhaden landing license (see below) shall be permitted to land for the purpose of sale no more than 100 pounds of menhaden at any time on any trip or day.

License Requirements

Menhaden Purse Seine Fishing Vessel License – required if intending to take menhaden with a purse seine or shirred net from any State waters.

- The fees for this license range from \$20 - \$700 depending on vessel tonnage.
- The license needs to be renewed annually.
- Vessel is designated as either the catch or carry vessel.
- The maximum length of any vessel in the State's waters purse seine fishery is 90 feet.
- The maximum length of the purse seine net is 150 fathoms (900 feet).
- The removal of fish from the purse seine shall be by brailing or dip net only.
- All fishing and related activities may not occur within 0.6 nautical miles from shore.
- No fishing is permitted between sunset and sunrise.
- No fishing is permitted on Saturdays, Sundays, and any holiday officially observed by the State of New Jersey.
- Transferability and/or vessel upgrade is allowed within this State's waters fishery.
- In the case of carry vessels licensed to land by purse seine, the replacement vessel shall be no greater than 10% in length or 10% in hold capacity, as measured in cubic feet, of the originally licensed carry vessel.

Menhaden Purse Seine Fishing Vessel Operators License– required if the Menhaden Purse Seine Fishing Vessel License owner is not the operator of the licensed purse seine vessel (i.e. issued to an operator/captain if person is not the owner of the Menhaden Purse Seine Fishing Vessel License).

- Fees: Resident - \$50; Non-resident - \$75.
- Issued to and in the name of the vessel operator.

New Jersey Menhaden Landing License - required in order to land more than 100 pounds of menhaden at any time for the purpose of sale or barter and to participate in the directed fishery for menhaden.

- Limited Entry License
- License is specific to the gear type listed on the license.
- The owner of a New Jersey Menhaden Landing License will be required to sell all menhaden to an entity in possession of a New Jersey Menhaden Dealer License.
- The owner of a New Jersey Menhaden Landing License will also be required to report all landings monthly in a format provided by the Department of Environmental Protection.
- All license holders must provide, at the time of licensure, their e-mail address in order for the Commissioner to provide timely notice of any season closure.

- The license needs to be renewed annually.
- The cost of the New Jersey Menhaden Landing License is as follows:
- Landing license assigned to a purse seine vessel costs \$150 residents; \$750 non-residents.
- Landing license assigned to all other gear costs \$50 residents; \$250 non-residents.
- A vessel or individual that does not possess a New Jersey Menhaden Landing License or Personal Use

Limited Sale License shall be permitted to land no more than 100 pounds of menhaden at any time on any trip or day. Also, these landings must be sold to an entity in possession of a New Jersey Menhaden Dealer License. Purse seine fishing for menhaden exclusively in the Federal waters of the Exclusive Economic Zone (EEZ), 3-200 nautical miles from shore, is not governed by the above license requirements, except that carry vessels must possess a New Jersey Menhaden Landing License and report landings each week.

Before fishing on any given day, holders of a Purse Seine Fishing Vessel License or Purse Seine Fishing Vessel Operator's license must notify the Department by phone of their intent to fish for menhaden using a purse seine and their intended fishing location. They must also notify the Department by phone of any anticipated change in the vessel's fishing location for that day.

F. North Carolina

The North Carolina Division of Marine Fisheries (DMF), part of the Department of Environment and Natural Resources (DENR), is responsible for the management and conservation of the state's marine and estuarine resources. Agency policies are established by the 9-member Marine Fisheries Commission and the Secretary of the DENR. The DMF is divided into nine sections, including Fisheries Management, Marine Patrol, License & Statistics, and Habitat Protection. Important legislation includes the *Fisheries Reform Act* (1997) and Chapter 3 of the NC Administrative Code 2013.

The North Carolina Marine Fisheries Commission Rules²⁹ is a collection of state rules and statutes governing activities impacting marine and estuarine resources in coastal and joint fishing waters, including the brackish waters of the state's rivers and their tributaries, sounds and bays, and in saltwater extending out to three miles offshore in the Atlantic Ocean. The NC General Assembly enacts fisheries statutes, or laws, and provides the Commission authority to adopt rules to implement those statutes. These rules are found in Chapters 3 and 18A of Title 15A of the N.C. Administrative Code (<http://www.ncoah.com/rules/>)

The public may comment on proposed rules at public meetings of the commission and its committees and at public hearings announced in the North Carolina Register. Persons proposing the commission amend, repeal or adopt a fisheries rule may suggest rule changes through public comment opportunities provided at commission meetings or by filing a petition with the commission following the procedures set out in 15A NCAC 03P .0300.

Another tool the state uses to manage fisheries is the proclamation. The commission has the authority to delegate to the fisheries director the ability to issue public notices, called proclamations, suspending or implementing particular commission rules that may be affected by variable conditions. The proclamation authority granted to the fisheries director includes the ability to open and close seasons and fishing areas, set harvest and gear limits, and establish conditions governing various fishing activities. Proclamation authority and proclamation measures are codified in rules.

²⁹http://portal.ncdenr.org/c/document_library/get_file?uuid=a23a5a92-cad8-497c-bda1-219c349c0906&groupId=38337

The Act and subsequent amendments established the requirement to create fishery management plans for all of North Carolina's commercially and recreationally significant species or fisheries. The contents of the plans are specified, advisory committees are required and reviews by the Department of Environmental Quality secretary and the Joint Legislative Commission on Governmental Operations are mandated.

The DMF's mission is to ensure sustainable marine and estuarine fisheries and habitats for the benefit and health of the people of North Carolina. The Fisheries Management Section houses the majority of the DMF's biologists and is responsible for conducting fisheries and gear research, resource monitoring, and collection of biological information.

Marine Fisheries Commission

The commission is responsible for managing, protecting, preserving and enhancing the marine and estuarine resources under its jurisdiction. In support of these responsibilities, the DMF conducts management, enforcement, research, monitoring, statistics and licensing programs to provide information on which to base decisions on rule making. The division presents information to the commission and department in the form of fishery management and coastal habitat protection plans and proposed rules. The DMF administers and enforces the commission's adopted rules.

There are currently 13 state fishery management plans, 12 of which are updated annually and reported publicly. The remaining plan is the North Carolina Fishery Management Plan for Interjurisdictional Fisheries, which includes the Atlantic Menhaden fishery in state waters. This plan adopts by reference management measures appropriate for North Carolina contained in approved federal Council or Atlantic States Marine Fisheries Commission fishery management plans. These management measures are implemented by Marine Fisheries Commission rules to provide compliance or consistency with the approved plans and amendments. The goals of these plans, established under the Magnuson-Stevens Fishery Conservation and Management Act (federal Councils plans) and the Atlantic Coastal Fisheries Cooperative Management Act (Atlantic States Marine Fisheries Commission plans), are similar to the goals of the North Carolina Fisheries Reform Act of 1997 to "ensure long-term viability" of these fisheries. The state interjurisdictional plan reduces duplication of effort while meeting the requirements of North Carolina General Statute 113-182.1, Fishery Management Plans.

Effective January 1, 2013, a law was passed making it unlawful to harvest menhaden with a purse seine net deployed by a mother ship and one or more runner boats within North Carolina's three-mile jurisdiction.

G. New York

The New York State Department of Environmental Conservation (DEC) was created on July 1, 1970 to combine in a single agency all state programs designed to protect and enhance the environment. DEC is headed by a commissioner, who is assisted by executive managers. The department has 24 divisions and offices and is further organized into bureaus to fulfill the functions and regulations established by Title 6 of New York Codes, Rules and Regulations (6NYCRR).

Mission Statement

The department's mission is: "To conserve, improve and protect New York's natural resources and environment and to prevent, abate and control water, land and air pollution, in order to enhance the health, safety and welfare of the people of the state and their overall economic and social well-being."

DEC's goal is to achieve this mission through the simultaneous pursuit of environmental quality, public health, economic prosperity and social well-being, including environmental justice and the empowerment of individuals to participate in environmental decisions that affect their lives.

Law Enforcement Division³⁰

The Law Enforcement Division is found in the Office of Public Protection. Its mission is "To protect and enhance the environment and natural resources of the State of New York while also protecting the health and safety of its people through the enforcement of Environmental Conservation and related laws and public education."

This mission is accomplished by over 330 sworn Environmental Conservation Police Officers who focus their efforts on Environmental Conservation Law enforcement although they are empowered to enforce all laws of the state. Their mission encompasses two broad enforcement areas: fish and wildlife and environmental quality. Fish and wildlife enforcement includes addressing complaints of poaching, the illegal sale of endangered species, and checking hunters, fishermen, trappers and commercial fishermen (lobsters, clams, bait fish, food fish) for compliance. Environmental quality enforcement includes investigating timber thefts, illegal water pollution, improper use or application of pesticides, commercial vehicles producing excessive emissions, freshwater and saltwater wetland degradation, illegal mining and almost any area that affects air, land or water quality law violations.

Marine law enforcement is carried out by the Marine Enforcement Unit (MEU), a cadre of specialized Environmental Conservation Officers charged exclusively with enforcing State and Federal marine resource laws and regulations both on and off-shore.

Complementing the uniformed staff of the LED is the Bureau of Environmental Crimes Investigation, who investigate significant environmental crimes including misdemeanors and felonies. The division also has a full-time dispatch center, a permanent training academy, a police K-9 unit and a marine enforcement unit.

Advisory Boards and Commissions

A number of independent organizations have been established that are independent of the Department of Environmental Conservation. They are established by law. The function of the various organizations is to advise or make recommendations concerning issues that impact the environment. Members are volunteers or appointees selected by the State's Governor. The Department provides coordination and secretarial services to these organizations.

The Marine Resources Advisory Council³¹ is one such organization. It was established by the New York State Legislature in 1987 to provide advice to the Department of Environmental Conservation on issues pertaining to New York's living marine resources and the fisheries these resources sustain. The statutory duties of the council include to:

- review DEC allocations and expenditures for the care, management, protection and enlargement of marine resources;
- issue reports and information regarding DEC's marine resources program to commercial and recreational harvesters;
- consult with commercial and recreational harvesters to develop recommendations regarding marine resource program needs;

³⁰ <http://www.dec.ny.gov/regulations/2437.html>

³¹ <http://www.dec.ny.gov/about/568.html>

- assist DEC's efforts to expand available income to meet (marine) program needs; and
- review and provide recommendations to DEC on any proposed regulations for the management of marine fisheries

During a calendar year, the Council holds seven regularly-scheduled meetings: January, March, April, May, July, September, and November. These meetings are supplemented with extraordinary meetings as occasion and circumstances warrant.³²

In an effort to keep the public informed about the Council's activities, deliberations, and positions, a bulletin series is produced.³³ The bulletin briefly describes the major discussions at each of the Council's regularly-scheduled meetings, along with any motions made during a meeting and whether the motion was adopted or not. Each issue of the bulletin also identifies the dates of the Council's remaining regularly-scheduled meetings in that calendar year and lists the agenda items for the next Council meeting. Past issues of the Council Bulletin are available below.

The Council is comprised of fifteen members, seven representatives each from the state's commercial and recreational fishing industries and the Dean of the School of Marine and Atmospheric Sciences, or his/her designee, as chairperson.

Marine Fisheries and Conservation

Title 1, Article 13, Section § 13-0105 of the State's Environmental Conservation Statute sets out the primary principle governing marine fisheries management and conservation.

1 (a). It is the policy of the state that the primary principle in managing the state's marine fishery resource is to maintain the long-term health and abundance of marine fisheries resources and their habitats, and to ensure that the resources are sustained in usable abundance and diversity for future generations. Utilization and allocation of available resources will be administered consistent with the restoration and maintenance of healthy stocks and habitats. The state shall actively manage its marine fisheries and shall endeavor to: protect and conserve habitats; restore habitats in areas where they have been degraded; and maintain water quality at a level that will foster occurrence and abundance of marine resources. The state shall optimize the benefits of resource use so as to provide valuable recreational experiences and viable business opportunities for commercial and recreational fisheries.

(b) The marine fisheries conservation and management policy shall be carried out through achievement of the following objectives:

- the state shall strive to obtain the best possible scientific information through research and monitoring of the resources;
- the state shall use the best available scientific information in managing the resources;
- the state recognizes that an informed public is integral to the management system and shall inform and involve constituents in management decisions;
- the management of the state's transboundary and migratory species shall be consistent with any interjurisdictional management plans, interstate or state-federal;
- in the event that fishery conservation and management require actions that result in resource allocation impacts, the state shall endeavor to assure such allocation impacts are distributed equitably among user groups, giving priority to existing fisheries within the state;

³² <https://you.stonybrook.edu/mrac/meetings/>

³³ <https://you.stonybrook.edu/mrac/bulletins/>

- the state shall minimize waste and reduce discard mortality of marine fishery resources;
- the state shall investigate and encourage the development of aquaculture of economically important species, both to relieve pressure on and enhance wild stocks and to provide economic opportunity;
- the state shall encourage and, when feasible, provide access to the state's marine fishery resources consistent with marine fisheries conservation and management policy; and
- the state recognizes that adequate law enforcement services are integral to the success of any marine resource management program and shall endeavor to provide the necessary law enforcement services to ensure the protection of the resources and compliance of users with laws and regulations designed to manage and allocate those resources.

Menhaden Fishery Management

The Statute's provisions for the management of menhaden in its waters are outlined in § 13-0333 and include, *inter alia*:

- Menhaden (*Brevoortia tyrannus*) from which oil or meal is made, subject to the provisions of section 13-0343, may be taken from the waters of the marine district with a purse seine provided a license is first obtained from the department.
- Each license shall be issued to cover one vessel and pertinent equipment by which such fish are taken and shall be issued in the name of the owner, lessee or operator of each vessel so used. License fees shall be computed on the basis of gross tonnage of the vessel to be licensed as indicated in the document, certificate of award, register, registration, enrollment or license of such vessel issued by the United States or any state.
- The license fee shall be: For each vessel: 30 gross tons or less 25 dollars more than 30 gross tons and less than 200 gross tons 500 dollars more than 200 gross tons 2,000 dollars All licenses issued under this section shall expire on December 31 following date of issue.
- For the purpose of this chapter, commercial menhaden purse seines may not be used or set:
 - a. in the area of Long Island Sound extending west of an imaginary line from the New York state-Connecticut boundary line (Byram River) extending easterly and southerly to buoy 13 (off Eaton's Neck).
 - b. in Long Island Sound south of a straight line one-half mile seaward of a straight line between buoy 13 (off Eaton's Neck) and buoy 9 (off Sound Beach).

Distances shall be determined from straight lines drawn between the designated buoys and navigational aids.

- No person shall take menhaden by purse seining except during the period commencing on the Monday following the fourth day of July and ending on the third Friday in October. Nothing in this subdivision shall be construed as legalizing the taking of menhaden by purse seining on weekends or legal holidays during the period provided for in this subdivision.
- The department shall, in consultation with the menhaden industry, have the authority to require menhaden purse seine vessels to carry a department-approved observer during their operation in New York state waters. Beginning July sixth, nineteen hundred ninety-eight, the department shall require menhaden purse seine vessels equal to or greater than two hundred gross tons to carry a department-approved observer during their operation in New York state waters. Such observers shall independently note and record information, as directed by the department, on such items as fishing location, menhaden catch, by-catch, and any user conflicts. The license holder for the vessel for which an observer is required will be responsible for the costs of such observer. The department shall promulgate rules and regulations to establish appropriate procedures for the assessment and collection of costs for the observers.
- The operator of a menhaden purse seine vessel shall report to the department twenty-four hours prior to entering the waters of the state and shall submit to the department a regular and timely report of their total harvest. The department shall develop regulations six months from the effective date of this subdivision related to this reporting requirement.

- The department shall, in cooperation with the Connecticut Department of Environmental Protection and consistent with the Long Island Sound Bi-state committee resolution regarding commercial menhaden fishing, undertake a water quality assessment of the effect of menhaden vessel fish hold waste on Long Island Sound water quality. The department shall report back within one year of the effective date of this subdivision thereon to the governor, the temporary president of the senate, the speaker of the assembly, and the chairmen of the senate and assembly environmental conservation committees with its findings and recommendations for reducing or eliminating the adverse aesthetic, ecological, and water quality impacts of said discharge.
- Licensees shall be legally and financially responsible for the cleanup of fish lost during any fishing or fish handling operations. The department shall establish regulations to enforce this subdivision.
- The department shall adopt regulations to prohibit or further limit menhaden fishing when required by, and consistent with, the Interstate Fishery Management plan for Atlantic menhaden adopted pursuant to the Fishery Conservation and Management Act (16 USC 1800 et seq.) and adopted by the Atlantic States Marine Fisheries Commission.
- The department, in cooperation with the Connecticut Department of Environmental Protection and consistent with the Long Island Sound Bi-state committee resolution regarding commercial menhaden fishing, shall evaluate the appropriateness and effectiveness of establishing a limit on the number of purse seine vessels that may be allowed to fish on Long Island Sound. The department shall, in cooperation with the Connecticut Department of Environmental Protection and consistent with the Long Island Sound Bi-state committee resolution regarding commercial menhaden fishing, evaluate the benefits and effectiveness of establishing a cap on the quantity of menhaden that can be harvested from Long Island Sound in one year. The department shall, in consultation with the menhaden fishing industry, investigate means of regulating the depth at which menhaden purse seines are set with respect to the depth of the water in their respective locations. The department shall, in cooperation with the Connecticut Department of Environmental Protection and consistent with the Long Island Sound Bi-state committee resolution regarding commercial menhaden fishing, provide a report of its findings and recommendations thereon to the governor, the temporary president of the senate, the speaker of the assembly, and the chairmen of the senate and assembly environmental conservation committees within one year of the effective date of this subdivision.

H. Potomac River Fisheries Commission

The Potomac River Fisheries Commission (Commission) is the Maryland-Virginia bi-state regulatory authority authorized by the U.S. Congress under the Potomac River Compact of 1958 for fishery matters in the mainstream tidal Potomac River from Washington, DC to the Chesapeake Bay. The Commission is comprised of eight members, four appointed by the governor of Maryland and four appointed by the governor of Virginia.

Mandate

The Commission is responsible for adopting the rules, regulations and licenses for the recreational and commercial taking, catching or attempting to take or catch fish, crabs, oysters and clams from the Potomac River.

Management and Regulatory System

The Commission coordinates regulations with the Maryland Department of Natural Resources (DNR), the Virginia Marine Resources Commission (VMRC) and the Department of Game and Inland Fisheries (DGIF), and with the other Atlantic coastal states through the Atlantic States Marine Fisheries Commission (ASMFC). Its regulations carry the full force and effect of law and are jointly enforced by the Maryland Natural Resources Police (NRP) and the Virginia Marine Resources Commission (VMRC) Marine Police. Both the Maryland District Courts and Virginia General District Courts have jurisdiction to adjudicate violations of the Commission's regulations.

3.5.2. Consultation, roles and responsibilities

Atlantic States Marine Fisheries Commission

The first Atlantic coastwide management plan was formulated in 1981 by the Atlantic Menhaden Management Board as part of the Commission's Interstate Fishery Management Program. Several committees were created at that time, and since, many others have been added (refer to [Boards and Commissions](#)).

The Commission and its subordinate structures have well-established, inclusive and transparent consultation and engagement processes in which to seek input and comments from affected and impacted stakeholder groups and the general public on important policy and management changes. On-going consultations with interest groups were in evidence from the scheduled hearings organized in the Atlantic coastal states of Maine through Florida to gather public comment on the Public Information Document (PID) for Draft Amendment 3 to the Interstate Fishery Management Plan for Atlantic menhaden.³⁴ Atlantic States were similarly engaged by publicizing notices and pertinent information on their departmental websites, and facilitating meetings.

The PID outlines a number of issues in the fishery and solicits feedback on how the resource should be managed. Specifically, the PID presents a suite of tools to manage the menhaden resource using ecological reference points and provides options to allocate the resource among the states, regions and user groups. In addition to the specific issues identified in the PID, stakeholder groups and individuals are welcome to provide input on all aspects of the fishery and resource, including recommendations for future management. Stakeholders are encouraged to provide input on the PID either by attending the state public hearings or providing written comment.

The Commission's consultation framework employed by its various committees and boards is formally set out in a document entitled: "Technical Support Group Guidance and Benchmark Stock Assessment Process" of February 2016. Section 6 of the document deals with Meeting Policies and Procedures, and Section 7 with Communications Policies and Guidelines. In both sections, the information presented is quite detailed and structured. The Atlantic States reviewed in this report all have similar guidelines in place that can be easily found on departmental websites.

Public Comment Guidelines³⁵

The Commission's ISFMP Policy Board has approved the following guidelines for use at management board meetings that are intended to result in a fair opportunity for public input.

1. For issues that are not on the agenda, management boards will continue to provide opportunity to the public to bring matters of concern to the board's attention at the start of each board meeting. Board chairs will use a speaker sign-up list in deciding how to allocate the available time on the agenda (typically 10 minutes) to the number of people who want to speak.
2. For topics that are on the agenda, but have not gone out for public comment, board chairs will provide limited opportunity for comment, taking into account the time allotted on the agenda for the topic. Chairs will have flexibility in deciding how to allocate comment opportunities; this could include hearing one comment in favor and one in opposition until the chair is satisfied further comment will not provide additional insight to the board.
3. For agenda action items that have already gone out for public comment, it is the Policy Board's intent to end the occasional practice of allowing extensive and lengthy public comments. Currently, board chairs have the discretion to decide what public comment to allow in these circumstances.

³⁴ ASFMC Press Release issued on August 17, 2017.

³⁵ <http://www.asmf.org/home/2016-annual-meeting>

In addition, a timeline has been established for the submission of written comment for issues for which the Commission has not established a specific public comment period (i.e. in response to proposed management action).

- Comments received 3 weeks prior to the start of a meeting week will be included in the briefing materials.
- Otherwise, comments will be distributed electronically to Commissioners/Board members prior to the meeting and a limited number of copies will be provided at the meeting.

Commission's Engagement with Stakeholders and General Public

The Atlantic Menhaden fishery is accorded considerable attention by a number of entities that comprise the Commission's organizational structure, such as

- the Menhaden Management Board,
- the Menhaden Technical Committee,
- the Menhaden Advisory Panel, and
- the Menhaden Plan Review Team.

The Commission's Law Enforcement Committee is also active, and provides advisory and analytical services on many menhaden fishery elements during commission meetings. Committee meeting deliberations are web-posted on the Commission's site going back to 2000.

Delaware

Meeting notices, agendas and minutes of all Advisory Committees under the Department of Natural Resources and Environmental Control, Division of Fish and Wildlife are available to the public through the State's Public Meeting Calendar.³⁶

A Citizens Tidal Fin Fish Advisory Council is mandated by §904 of Title 7 of the State Code to advise the Director on all matters relating to tidal finfisheries management. Of the 7-member committee, 3 members are designated to represent recreational finfishing interests, 3 members are designated to represent commercial finfisheries interests, and the Chair. Appointments are for up to 4 years to ensure that no more than 2 members' terms expire in any year. The Council meets quarterly on the third Wednesday in January, April, September and November, with additional meetings scheduled as needed. This meets the criteria for frequency as dictated in the State Code.

Maryland

Fishery management advisory services, including public consultation and engagement, are assigned to the Tidal Fisheries Advisory Commission (TFAC) through the state's Code of Maryland Regulations (COMAR) 08.01.01.06. Natural Resources Article 4-204(a)(2)(i) lists the Commission as consisting of (i) up to 14 commercial waterman; (ii) 1 member of the Sport Fisheries Advisory Commission; and (iii) 1 representative of the Aquaculture Industry. Additionally, the composition of the Commission shall reflect the geographic regions of the State where the commercial fishing industry is operating. The term of a member is 2 years, and terms are staggered. The roles and responsibilities of the Commission's membership are stipulated by Operating Guidelines published on September 1, 2009³⁷, and include:

- Prepare for Meetings: Read distributed meeting information in advance of meeting; discuss pertinent issues with the constituents you represent; and prepare to communicate and discuss constituent's viewpoints at meetings.

³⁶ <https://publicmeetings.delaware.gov/?agencyId=59>

³⁷ <http://dnr.maryland.gov/fisheries/Documents/SFACTFACOperationalGuidelinesFinalProposed90809.pdf>

- Service Between Meetings: Maintain regular communication with the constituents you represent, informing them on the status of the TFAC and representing the TFAC accurately.
- Work in Meetings: Attend to process; follow agenda; suggest solutions or compromises; search for closure.
- Participate: Use the capacities and resources you possess; promote the ideas, perspectives, and constituencies you represent while adhering to the purpose of the TFAC.

TFAC meeting notices and minutes are posted on the Commission's home page, resulting in easy public access and scrutiny.

Virginia

The Commission meets on a regular basis, usually monthly, with meeting notices, agendas and minutes posted on the Commission's web-based calendar.³⁸ A link to ASMFC meetings is also provided. The Commission has established a number of advisory committees and boards, including a Commercial Fishing Advisory Board. Apart from the Board's membership, the Assessment Team was unable to locate information regarding the Board's mandate, roles and responsibilities, administrative practices, and meeting deliberations.

The Commission's regulatory process is described on its website.³⁹ Almost all aspects of the Commission's Management Programs are authorized or mandated by State law. In some circumstances, federal law may play a role in the actions of the Commission. Currently, laws related to the Commission are either approved by the General Assembly directly on an annual basis or are developed by the Commission throughout the year when so authorized by the General Assembly.

The Fisheries Management Division is responsible for developing regulatory proposals that are then considered by the full Commission. Normally, regulations are proposed by citizens, private companies or other groups involved with marine fisheries, or from the Fisheries Division, itself, in response to General Assembly mandates or fisheries conservation plans. Proposals are usually reviewed by the appropriate committee before being brought to the Commission for approval for public hearings. If the Commission agrees to consider a proposal, a public notice is prepared to schedule a public hearing and to request public input. Public Hearings are usually held at one or more public locations in areas affected by the proposal. A final hearing is held at the Commission's monthly meeting, after which the Commission votes on whether or not to make the proposal a regulation. In some special circumstances, the Commission is authorized by statute to bypass the public notice/public hearing process and promulgate an Emergency Regulation. All Emergency Regulations must go through the public notice/public hearing process if the effect of the regulation extends beyond 30 days.

Potomac River Fisheries Commission

The Commission meets four to six times each year. All Commission meetings are open, and the public is invited and encouraged to attend. The Commission also has three citizen advisory committees, one for finfish matters, one for crab issues, and one for oyster and clam concerns. These committee meetings are, likewise, open public meetings and are held in Colonial Beach, VA. The Assessment Team was unable to source additional information on the mandates and administrative rules and procedures of the advisory committees. It is not known whether meeting agendas, materials and minutes are available to the general public.

³⁸ http://www.mrc.virginia.gov/commission_agendas/commagendaindex.shtml

³⁹ <http://www.mrc.virginia.gov/regulations/regulatoryprocess.shtml>

3.5.3. Decision-making processes

Atlantic States Marine Fisheries Commission

The Commission serves as a deliberative body of the 15 Atlantic coastal member states, coordinating the conservation and management of nearshore fishery resources, including marine, shell, and anadromous species. Each state is represented on the Commission by three Commissioners; the director of the state's marine fisheries management agency; a state legislator; and an individual appointed by the state's governor to represent fishery interests. These Commissioners participate in deliberations in the Commission's main policy arenas: interstate fisheries management, fisheries science, habitat conservation, and law enforcement. Through these activities, the states collectively ensure the sound conservation and management of Atlantic coastal fishery resources and the resulting benefits that accrue to their fishing and non-fishing public.

The diverse personal, educational, financial, and professional backgrounds of Commissioners are one of the Commission's most important assets. However, this diversity means that some Commissioners will have personal financial interests in the outcomes of management decisions at times. The Commission's Policy on Financial Disclosure and Conflict of Interest⁴⁰ was implemented in August 2014 to ensure transparency, accountability, and integrity in the Commission's decision-making process.

Commission Rules and Regulations

The Commission has adopted a number of administrative rules and regulations that inform its decision-making process. These are derived from provisions of Article V of the Compact as entered into by and among member states and as assented to by an Act of Congress entitled *An Act granting the consent and approval of Congress to an interstate Compact relating to the better utilization of the fisheries (marine, shell and anadromous) of the Atlantic seaboard and creating the Atlantic States Marine Fisheries Commission*.⁴¹

The Commission's current version of its rules and regulations were adopted on February 4, 2016.⁴² They have been amended some 15 times since being originally adopted in 1942, and were, in fact, completely revised in 1996. The particular provisions of Article V that guide the Commission's decision-making process include:

- Article I, Section 1 (b) – Code of Conduct; Section 2 – Powers and Duties
- Article II, Section 1 – Meetings
- Article III, Section 1 – Quorum; Section 2 – Voting; Section 3 – Proxies

Commission Appeal Process

Under the Commission's current management process, the primary policy development responsibility lies with the individual species management boards. And, in the case of development of new fishery management plans or amendments, the full Commission has final approval authority prior to implementation. The purpose of the appeals process is to provide a mechanism for a state/jurisdiction to petition for a management decision to be reconsidered, repealed or altered. The appeals process is intended to only be used in extraordinary circumstances where all other options have been exhausted. The Management Boards have the ability to go back and correct errors or address additional technical information.

While the involved states have frequently demonstrated their willingness to compromise and the overall process has proven to be very successful, there have been instances where a state/jurisdiction has expressed concern that the ISFMP Policy Board's decisions have not been consistent with language of an FMP, resulted in unforeseen

⁴⁰www.asmfc.org/files/commissionerManual/AllOtherSections/4b_FinancialDisclosureAndConflictOfInterestPolicy_Aug2014.pdf

⁴¹ Public Law 539, 77th Congress, approved by the President on May 4, 1942; and as amended by the member states, such amendment being assented to by Act of Congress Public Law 721, 81st Congress, approved by the President August 19, 1950.

⁴² https://www.asmfc.org/files/pub/CompactRulesRegs_Feb2016.pdf

circumstances or impacts, did not follow established processes, or were based on flawed technical information. To rectify these occurrences, the Board charged the Administrative Oversight Committee to develop an Appeals Process. The policy was subsequently approved by the Board in August 2004.⁴³ The Board remains the deliberative body that will consider valid appeals.

Criteria have been established to guide what type of decisions can be appealed. In general, management measures established through the FMP/amendment/addendum process can be appealed. However, the appellant must use one of the following criteria to justify an appeal:

- Decision not consistent with FMP
- Failure to follow process
- Insufficient/inaccurate/incorrect application of technical information
- Historical landings period not adequately addressed
- Management actions resulting in unforeseen circumstances/impacts

The following issues cannot be appealed:

- Management measures established via emergency action
- Out-of-compliance findings (this can be appealed but, through a separate, established process)
- Changes to the ISFMP Charter

If a state is successful in an appeal and the management program is altered, another state may be negatively impacted by the appeals decision. In order to prevent an appeal “chain reaction,” the Policy Board’s recommendation and the resulting management board’s decision will be binding on all States. All states with an interest in the fishery will be obligated to implement the changes as approved by the management board. Upon completion of the appeals process, a state is not precluded from taking further action beyond the Commission process to seek relief.

If the Policy Board supports the appeal and determines that corrective action is warranted, the potential for management changes to negatively impact other states will be evaluated by the Policy Board and the species management board.

Atlantic Menhaden Management Board

The Commission’s Atlantic Menhaden Management Board meetings are open to the public and the proceedings are published on-line.

⁴³ <http://www.asmf.org/uploads/file/ASMFCAppealsProcess.pdf>

3.5.4. Management Plan Reviews

Internal

Atlantic States Marine Fisheries Commission

The ASMFC's Atlantic Menhaden Plan Review Team (PRT) conducts annual reviews of the performance of the menhaden commercial fishery and state compliance with the provisions of the plan. Recommendations proposed by the Team are forwarded to the Atlantic Menhaden Management Board for consideration. Reviewed reports are available on the Commission's website and include reports dating back to 2000.

North Carolina

The State's Division of Marine Fisheries also conducts annual reviews of its management plans.⁴⁴ The Fishery Management Plan Review is a compilation of annual updates about state-managed, federally-managed, and Atlantic States Marine Fisheries Commission-managed species for which there are fishery management plans for North Carolina. The updates are based on data through the previous calendar year and the document is presented to the Marine Fisheries Commission at its annual August business meeting.

External

PEW Charitable Trust

The PEW Charitable Trust published a Fact Sheet of Atlantic Menhaden Conservation and Management⁴⁵ (May 15, 2014) which examined the outcomes of the Commission's December 2012 implementation of Amendment 2 of the Atlantic Menhaden Interstate Fishery Management Plan to end overfishing and reduce fishing mortality to a target level set by managers. The Trust reported that in 2013:

- The coastwide menhaden catch did not exceed the target level in 2013. Because of Amendment 2, approximately 300 million more menhaden were left in the Atlantic Ocean to fulfill their ecological role.
- The new management structure, including enforceable limits and reporting, is now in place in all 15 ASMFC states. The coastwide target TAC was not exceeded, and only Florida, New York, and Rhode Island exceeded their allocations. The amendment's flexibility was demonstrated when North Carolina and Massachusetts transferred uncaught quota to allow states that had gone over their limit to comply with the regulations.
- The new biological reference points were adopted and will inform management decisions as the new stock assessment is implemented in early 2015.
- Some states underestimated the extent of bait fisheries when allocations were determined, in large part due to a lack of reporting and incomplete historical records. As a result, several states were forced to close their bait fisheries early or risk exceeding their allocations. The commission discussed a possible reallocation, but such a process has not been initiated.

Science Centre for Marine Fisheries (SCeMFIS)

The SCeMFIS is a National Science Foundation Industry/University Cooperative Research Centre. Its mission utilizes academic and fisheries resources to address urgent scientific problems limiting sustainable fisheries. SCeMFIS develops methods, analytical and survey tools, datasets, and analytical approaches to improve sustainability of fisheries and reduce uncertainty in biomass estimates. SCeMFIS university partners, University of Southern Mississippi (lead institution), and Virginia Institute of Marine Science, College of William and Mary, are the academic sites. Collaborating scientists who provide specific expertise in finfish, shellfish, and marine mammal research, come from a wide range of academic institutions including Cornell University, Rutgers University, University of Massachusetts-Dartmouth, University of Maryland, and University of Washington.

⁴⁴http://portal.ncdenr.org/c/document_library/get_file?p_l_id=1169848&folderId=30207658&name=DLFE-133943.pdf

⁴⁵<http://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2014/05/15/atlantic-menhaden-conservation-and-management>

An example of the Centre's peer reviewed research on menhaden includes:

- Hilborn, R., Amoroso, R., Bogazzi, E., Jensen, O.P., Parma, A., Szuwalski, C., and C.J. Walters. (2017). *When does fishing forage species affect their predators?* Fisheries Research. 191 (2017) 211–221.⁴⁶

3.5.5. Long-term objectives

The fishery's long- term objective as stated in the 1981 IFMP is to:

- Achieve the greatest continuing yield for each area by determining the age at which menhaden should be harvested and eliminating other restrictions which do not contribute to the management goal.

Amendment 2 (2012) to the Interstate Fishery Management Plan for Atlantic Menhaden replaced Amendment 1 to the 1981 FMP for Atlantic Menhaden, and updated the Plan's defined Goals and Objectives. Draft Amendment 3, which is currently out for public comment, seeks to manage the menhaden resource in a way that balances menhaden's ecological role as a prey species with the needs of all user groups. To this end, the Draft Amendment 3 considers the use of ecosystem reference points (ERPs) to manage the resource and changes to the allocation method. In addition, it presents a suite of management options for quota transfers, quota rollovers, incidental catch, the episodic events set aside program, and the Chesapeake Bay reduction fishery cap. If approved, the Assessment Team anticipates that current Plan goals and objectives will be amended as will 2018 specifications for the fishing season. Specifications for the 2018 fishery will occur following Board approval of the Amendment. The Commission's Business Session will meet immediately following the conclusion of the Atlantic Menhaden Board meeting to consider final approval of the Amendment.⁴⁷

3.5.5.1. Management goal

The goal of Amendment 2 to the Interstate Fishery Management Plan (1981) for Atlantic Menhaden is "to manage the Atlantic menhaden fishery in a manner that is biologically, economically, socially and ecologically sound, while protecting the resource and those who benefit from it."⁴⁸ When fully implemented, the Amendment is designed to minimize the chance of a population decline due to overfishing, reduce the risk of recruitment failure, reduce impacts to species which are ecologically dependent on Atlantic menhaden, and minimize adverse effects on participants in the fishery. The following objectives are selected to support the goal of Amendment 2.

3.5.5.2. Management objectives^{49,50}

The following objectives are selected to support the goal of Amendment 2:

Biological Objectives

- Protect and maintain the Atlantic menhaden stock at levels to maintain viable fisheries and the forage base with sufficient spawning stock biomass to prevent stock depletion and guard against recruitment failure.
- Maintain a uniform data collection system for the reduction fishery and develop new protocols for other harvesting sectors, including biological, economic, and sociological data (ACCSP protocols as a minimum; NMFS reduction fishery monitoring system should be continued).
- Evaluate, develop, and improve approaches or methodologies for stock assessment including fishery-independent surveys and variable natural mortality at age or by area.
- Optimize utilization of the resource within the constraints imposed by distribution of the resource, available fishing areas, and harvest capacity.

⁴⁶ http://scemfis.org/Reports/fishing_forage_fish.pdf

⁴⁷ ASFMC Press Released issued on August 23, 2017.

⁴⁸ ASFMC Amendment 2 to the IFMP for Atlantic Menhaden, Section 2, p.35

⁴⁹ ASFMC Amendment 2 to the IFMP for Atlantic Menhaden, Section 2, p.36

⁵⁰ For the purpose of this MSC assessment, and given the multi-year nature of the IFMP, the Assessment Team considers the objectives to be both long-term and fishery-specific.

Socio/Economic Objectives

- Maintain existing social and cultural features of the fishery to the extent possible.
- Develop a public information program for Atlantic menhaden, including the fishery, biology, estuarine ecology and role of menhaden in the ecosystem.

Ecological Objectives

- Protect fishery habitats and water quality in the nursery grounds to insure recruitment levels are adequate to support and maintain a healthy menhaden population.
- Improve understanding of menhaden biology, food web ecology and multispecies interactions that may bear upon predator-prey and recruitment dynamics.
- Protect and maintain the important ecological role Atlantic menhaden play along the coast.
- Improve understanding of climatic drivers of recruitment.

3.5.6. Monitoring, surveillance and enforcement

As a general introduction to this PI, the MSC fisheries standard requires that there be a monitoring, control and surveillance (MCS) system in place as evidence that fishers comply with the requirements of the management system and there is no evidence of systematic non-compliance. This requirement extends to compliance with management measures associated with Marine Protected Areas (MPAs) and other spatial management approaches i.e. nature reserves.

Along the Atlantic Coast, in waters where Omega Protein's purse seine fleet is permitted to operate, Monitoring, Surveillance and Enforcement activities (often referred to as MSC – Monitoring, Surveillance and Control) are undertaken at two levels: (i) federal-states planning and coordination, and (ii) federal-states operations, usually in accordance with the provisions of a Joint Force Agreement (JFA) where it exists. Aside from a JFA, state agencies are mandated by state laws and regulations to carry out MSC activities within their respective maritime boundaries (0-3 nm).

3.5.4.1. Coordination Mechanisms and Roles

Federal-States Law Enforcement Coordination

The Law Enforcement Committee (LEC) is a standing committee appointed by the ASMFC Commission. LEC carries out assignments at the specific request of the Commission, the ISFMP Policy Board, the management boards/sections, the PDTs, and the PRTs. In general, the Committee provides information on law enforcement issues, brings resolutions addressing enforcement concerns before the Commission, coordinates enforcement efforts among states, exchanges data, identifies potential enforcement problems, and monitors enforcement of measures incorporated into the various interstate fishery management plans.

LEC is comprised of law enforcement representatives from each member state, the US Fish and Wildlife Service, NOAA Fisheries, the US Coast Guard, and US Department of Justice. The LEC convenes working meetings in the spring, meets in conjunction with the Commission's Annual Meeting, and convenes other meetings as needed.

Among its ISFMP duties, the LEC:

- Provides advice to PDTs regarding the enforceability of measures contemplated for inclusion in FMPs; analysis of the enforceability of the proposed measures; and, if the FMP provides for conservation equivalency, enforcement procedures for alternative management measures;
- Provides advice to each PRT at least annually or as provided in a given FMP regarding the adequacy and effectiveness of states' enforcement of the measures implemented pursuant to the FMP;

- Coordinates, among law enforcement personnel, the preparation of reports concerning state law enforcement and compliance in order to ensure these analyses are comparable; and
- Upon request or on its own initiative, provide enforcement advice and information regarding any FMP to any committee, team, board/section, or advisory panel.

State Enforcement Obligations

All states are responsible for the full and effective implementation and enforcement of FMPs within areas subject to their jurisdiction. Each state is required to submit a written report on compliance with required measures of a specific FMP in conformance with reporting requirements and schedules specified in the plan, which includes submission of copies of relevant laws and regulations for the Commission's record. At any time, the Commission may determine a state is not fully and effectively implementing and enforcing the required provisions of an FMP, and is therefore not in compliance with that plan. As previously reported, the Commission is empowered to compel states to bring their MCS activities into compliance with the requirements of the FMP.

3.5.4.2. Program Information

Corporate Accountability and Stewardship

Omega Protein's Marine Safety and Environmental Compliance System includes a chapter – Menhaden Fishing Code of Ethics (Revised April 2017) – which details the responsibilities of all Captains, crewmembers, and shore side employees that have oversight or management responsibilities for fishing operations, including conducting all operations within the law and with respect for the rights of all others who utilize the sea and its resources in any way. Specifically, the code stipulates that:

- No vessel may fish in any areas where menhaden fishing is forbidden by law or in any area Omega Protein has voluntarily agreed with governmental authorities not to fish.
- Extreme caution must be taken when setting nets on or near oyster grounds, crab pots, lobster or bass posts. Stakes or markers in these areas must not be disturbed.
- Care should be exercised when traversing known oyster beds not to disturb the sea floor.
- Fish should not be released at any time unless for the safety of the vessel or crew. Should there be more fish in the net than can be handled, the Captain must immediately call another Omega Protein vessel to take the excess fish.
- The attitude of the Captain and crewmembers toward recreational fishermen, oystermen, lobstermen, pound net operators, crabbers, operators of pleasure craft, party boats, and everyone else will be friendly and cooperative at all times.
- Each vessel Captain and crewmember will be required to pursue all reasonable means of cooperative use of state waters with fellow users. The fact that a vessel may have a legal right to operate in a given area will not excuse the Captain from "going the extra mile" to peacefully coexist.

The Code also addresses, *inter alia*:

- The allowable fishing areas for the Omega Protein fishing vessels.
- The procedure to minimize the catch of non-targeted species by Omega Protein fishing vessels.
- The general procedures that must be observed by Omega protein fishing vessels.
- The waste management procedures that must be observed by all Omega Protein fishing vessels.

MCS Information

A number of MCS programs at the Federal and State levels are profiled in this section. Unless otherwise noted, information for this component of the report was sourced from relevant federal and state agencies websites, and, occasionally, from email exchanges when additional information and data were sought by the Assessment Team.

Web-based information from all agencies was presumed to be reflective of current program goals, objectives, priorities, and activities.

Requests were made to acquire background MCS operational data from appropriate management/regulatory agencies, and, where possible, data of particular relevance to Omega Protein's purse seine reduction fishery. Federal and/or State confidentiality provisions were invoked which restricted the Assessment Team's access to information.

Commercial reduction fishery monitoring

The NMFS's Southeast Fisheries Science Center continues to monitor and process landings and bio sample data collected on the Atlantic menhaden purse-seine reduction fishery. The Center's Beaufort Laboratory processes and ages all reduction samples collected on the Atlantic Coast. In addition, the purse seine reduction fishery continues to provide Captains Daily Fishing Reports (CDFRs) to the Beaufort Laboratory where NMFS personnel enter data into a database for storage and analysis.

The Commonwealth of Virginia requires that the reduction purse seine fleet complete and make available daily landings data for the area of Chesapeake Bay under its control, and where a quota cap exists. In New Jersey state waters, before fishing on any given day, holders of a Purse Seine Fishing Vessel License or Purse Seine Fishing Vessel Operator's license must notify the DFW by phone of their intent to fish for menhaden using a purse seine and their intended fishing location. They must also notify the Department by phone of any anticipated change in the vessel's fishing location for that day.

3.5.4.3. Federal Marine Enforcement Program

NOAA Law Enforcement⁵¹

The Office of Law Enforcement (OLE) investigates violations of marine resource protection laws, the Office of the General Counsel's Enforcement Section is NOAA's civil prosecutor. Together, the two offices make up NOAA's enforcement program. OLE directly supports the core mission mandates of NOAA Fisheries— maximizing productivity of sustainable fisheries and fishing communities, as well as protection, recovery, and conservation of protected species—through its efforts to enforce and promote compliance with the marine resource protection laws and implementing regulations under NOAA's purview. OLE jurisdiction generally covers ocean waters between 3 and 200 miles offshore and adjacent to all US states and territories.

NOAA's Cooperative Enforcement Program (CEP) aims to increase living marine resource conservation, endangered species protection, and critical habitat enforcement while strengthening state and territorial enforcement resources. Under the CEP, OLE has signed 28 Joint Enforcement Agreements (JEAs), which deputize state and US territorial marine law enforcement agencies to enforce federal laws and regulations. Agreements have signed with all 15 Atlantic States except North Carolina which is currently considering the possibility. OLE agents and officers leverage JEA partnerships to conduct joint operations to carry out OLE's mission.

Two NOAA OLE divisional offices are involved in enforcement in areas that overlap with the menhaden fishery. They are the Southeast Division covering Federal waters off Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina and North Carolina – 7 States have JEAs in place) and the Northeast Division covering Federal waters off Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland and Virginia (10 States have formal CEPs in place).

⁵¹ http://www.nmfs.noaa.gov/ole/docs/2017/ole_ar_fy16_web.pdf

OLE Priority-Setting Process

OLE has established a 5-year priority-setting process to help accomplish its mission, guide its strategic planning, and focus the use of its enforcement assets where they are most needed. To guide this process, OLE uses NOAA strategic plans, historical enforcement data, emerging threat, and stakeholder input to identify areas in greatest need of enforcement effort – whether to maintain an existing level of compliance or to target areas where increased compliance may be required.

The goal of the process is to make the best use of limited resources to maximize results. By design, the priority-setting process must make calculated choices about where to focus efforts, and how best to leverage existing capabilities to successfully address responsibilities. The outcome of the process seeks to ensure that OLE has the right people, in the right places, focusing on the right priorities.

Enforcement Outcomes - Northeast Division (NED)

In the 2015 financial year, the Northeast Division consisted of 42 full-time employees and 3 contractors operating out of 9 Field Offices. The NED has maintained strong working relationships with the coastal state fishery enforcement agencies under the CEP. In addition to state partners, NED works closely with the New England Fishery Management Council, the Mid-Atlantic Fishery Management Council, and the ASMFC.

In FY 2015 the NED documented 813 incidents (Figure 37). The majority of the incidents were related to the MSA and the ACFCMA Acts. Of the 813 incidents, NED documented 726 investigations and closed 697 incidents. The majority of the incidents (276) were completed by education and outreach programs.

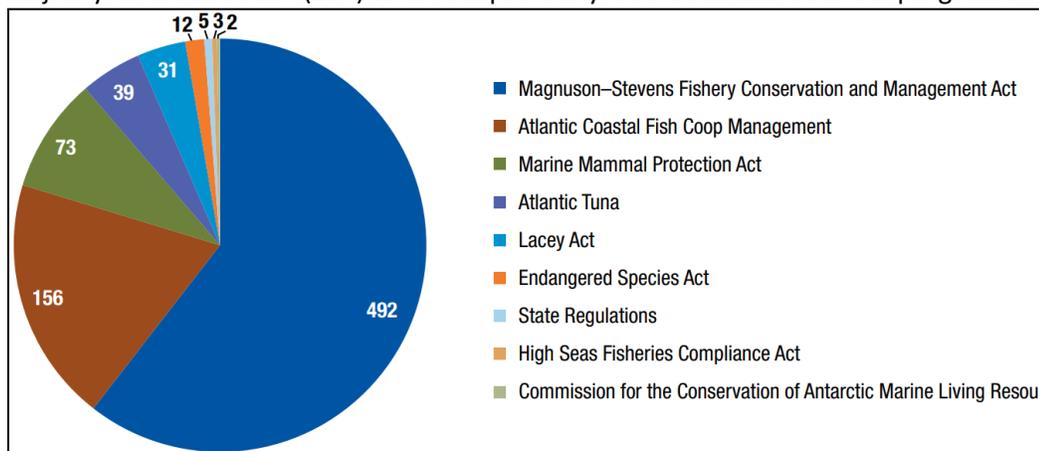


Figure 37. Disposition of Incidents by Federal Statute for Fiscal Year 2015 - NED Source: OLE Annual Report FY 2016.

Enforcement Outcomes - Southeast Division (SED)

In the 2015 financial year, the SED consisted of 40 full-time employees and 2 contractors operating out of 12 Field Offices. The SED worked closely with the Fisheries Science Center, both the ASMFC and GSMFC, the South Atlantic Fishery Management Council (SEAFMC) as well as partnering with local, state and federal agencies.

In FY 2015 the SED documented 538 incidents (Figure 38). The majority of the incidents were related to the MSA and ACFCM Acts. Of the 538 incidents, SED documented 477 investigations and closed 493 incidents. In order to close 139 incidents, OLE worked with the General Counsel to adjudicate cases.

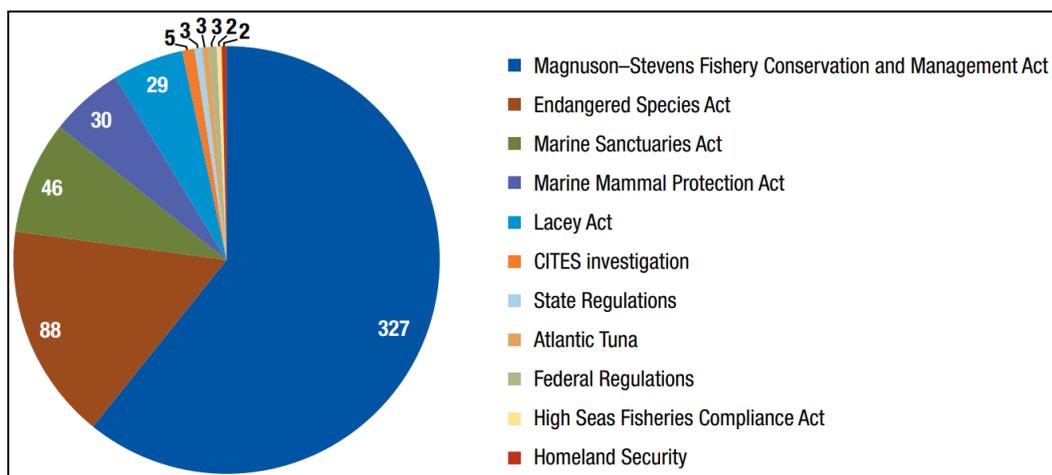


Figure 38. Disposition of Incidents by Federal Statute for Fiscal Year 2015. Source: OLE Annual Report FY 2016.

United States Coast Guard Law Enforcement

The Coast Guard is the principal Federal agency responsible for maritime safety, security, and environmental stewardship in U.S. ports and waterways. In this capacity, the Coast Guard protects and defends more than 100,000 miles of U.S. coastline and inland waterways, and safeguards an Exclusive Economic Zone (EEZ) encompassing 4.5 million square miles stretching from North of the Arctic Circle to South of the equator, from Puerto Rico to Guam, encompassing nine time zones – the largest EEZ in the world.

The Coast Guard manages six major operational mission programs, including Maritime Law Enforcement (MLE) Program. The MLE program protects America’s maritime borders from encroachment, defends our Nation’s maritime sovereignty from illicit activity, facilitates legitimate use of the waterways, and suppresses violations of federal law on, under and over the high seas and waters subject to the jurisdiction of the United States. The Coast Guard is the lead federal maritime law enforcement agency and the only agency with both the authority and capability to enforce national and international law on the high seas, outer continental shelf, and inward from the U.S. Exclusive Economic Zone (EEZ) to inland waters. Coast Guard responsibilities include detecting and interdicting contraband and illegal drug traffic; at sea enforcement of U.S. immigration laws and policies; enforcing our Nation’s fisheries and marine protected resource laws and regulations; ensuring the integrity of the EEZ, monitoring compliance with international living marine resource regimes and international agreements to which the U.S. is party; and through compliance with international agreements, combating Illegal, Unreported and Unregulated (IUU) fishing that negatively impacts maritime and economic security in coastal and regional areas worldwide.⁵²

A component of the MLE Program includes Living Marine Resources (LMR) Law Enforcement which is an obligation under the *Magnuson-Stevens Fishery Conservation and Management Act*, the *Endangered Species Act* and several other federal laws focused on the protection of marine resources. The core objective of these efforts is to provide effective and professional enforcement to advance national goals for the conservation, management, and recovery of living marine resources, marine protected species, and national marine sanctuaries and monuments. This includes the enforcement of LMR regulations in addition to numerous other activities that strengthen both domestic and international fisheries management regimes.

⁵² http://www.overview.uscg.mil/Missions/Maritime_Law/

The USCG's Mid-Atlantic District provided the Assessment Team via the client with some operational data for the 2012 - 2016 fiscal years covering at-sea boardings by their officers. A total of 5 sea patrol days and 19 vessel boardings were logged over the period with no citations or charges issued to the Omega purse seine fleet. The CG noted that the boardings dealt solely with vessel safety inspections and not with compliance checks of fishing regulations "given that the vessels were in state waters."⁵³

Commission's Law Enforcement Committee (LEC)

The LEC is a standing committee of the Atlantic States Marine Fisheries Commission and its duties are outlined in the Interstate Fisheries Management Program Charter. The LEC is comprised of representatives from each of the Commission's participating states and the District of Columbia. Members also represent NOAA Fisheries Service, the US Coast Guard and the US Fish and Wildlife Service.

The LEC meets twice a year, during the Commission's annual and spring meetings. It provides a forum for law enforcement officials to work together to explore new techniques, discuss funding and budget needs, provide advice and input to member states and agencies, and to consider long-term needs for marine fisheries management enforcement programs.

Additional meetings and conference calls may be held as needed. The LEC provides advice and guidance to Commission members and staff in the following areas:

- Provides input on the efficacy and enforceability of proposed regulations in management plans
- Reports on effectiveness and recommends improvements for existing management plans.
- Brings emerging enforcement issues or concerns to the attention of the Commission.
- Provides a forum for the review and exchange of enforcement information and areas of concern.
- Provides a forum for coordinating law enforcement efforts across jurisdictions and for sharing resources.
- Considers needs and opportunities for enhancing stakeholder awareness of and compliance with Commission management plans and resulting regulations.

An example of the LEC's contribution to the FMP for Atlantic Menhaden is the development of Guidelines for Resource Managers on the Enforceability of Fishery Management Measures. The guidelines were discussed and adopted at the August 2015 meeting of the ISFMP Board.

Select State MCS Operations⁵⁴

Virginia

The Virginia Marine Police (VMP) comprise the largest division within the Virginia Marine Resources Commission, and are responsible for enforcing state and federal commercial and recreational fishery laws and regulations. To this end, they are empowered to check fishing licenses, conduct vessel and catch inspections, and have full powers of arrest. Marine Police Officers also conduct search and rescue operations, enforce boating safety laws, respond to emergency calls, investigate boating accidents and criminal activity, and provide counter-terrorism patrols to Virginia military installations, shipyards, nuclear power plants, and other high-value maritime assets.

⁵³ Email response from USCG representative to client dated September 21, 2017.

⁵⁴ Currently, 2 Atlantic States (Virginia and New York) permit varying levels of Atlantic commercial menhaden reduction fishing in their waters.

Table 18. Menhaden specific enforcement data for Virginia State waters (0 to 3 nm from shore) for years 2014 to 2017⁵⁵. Source: VMRC’s Basic Activity Summary Report.

Year	Menhaden		Overall		Total	
	Hours	Inspections	Hours	Inspections	Hours	Inspections
2017 ⁵⁶	16.5	102	8,892	81,564	57,049	264,743
2016	60.5	53	16,447	140,301	100,472	424,921
2015	44.5	194	16,950	134,739	104,991	404,410
2014	37.0	225	16,595	139,096	100,203	388,107

Menhaden fisheries inspections by the VMRC’s Marine Police constitute a very small fraction of annual overall inspections. Inspections are not reported as ‘in port’ or ‘at sea’. The Commission also reported that no summons or citations were issued for the reporting years.

North Carolina

The Division of Marine Fisheries ran a search of citations, warnings and notices of violations between January 1, 2012 and December 31, 2016 and found none against Omega Protein.⁵⁷ As previously noted NC General Statute 113-187(e), adopted in 2012, states that “any person who takes menhaden or Atlantic thread herring by the use of a purse seine net deployed by a mother ship and one or more runner boats in coastal fishing waters is guilty of a Class A1 misdemeanor.”

New Jersey

The Bureau of Law Enforcement, within the DEP’s Division of Fish and Wildlife, constitutes New Jersey’s wildlife law enforcement agency. The Division employs 50-60 Conservation Officers who enforce wildlife laws and regulations, educating and informing the public in the process regarding the rules, laws, procedures and management practices involving the recreational and commercial uses of fish and wildlife resources to ensure the protection of the environment. Each month, Conservation Officers average about 7,000 hours of duty time, conduct 3,500 inspections and initiate 315 enforcement actions. This equates to approximately 84,000 hours, 42,000 inspections and 3,780 enforcement actions per year (although these statistics are across all wildlife law enforcement activities and are not specific to commercial fisheries).⁵⁸

New Jersey Fish and wildlife regulations are based on Permanent Statute Titles 23, 39, 50, 58, 2C-Code of Criminal Justice, and the Administrative Code N.J.A.C. 7:25 et. seq.

⁵⁵ Dr. Erik Barth, Director of Management Information Services at VMRC, per. email 28th August 2017

⁵⁶ Data are preliminary.

⁵⁷ Patricia Smith, Division of Marine Fisheries, NC Department of Environmental Quality, pers email 12th September 2017.

⁵⁸ <http://www.nj.gov/dep/fgw/lawhome.htm>

3.5.7. Monitoring and management performance evaluation

According to the ASMFC's Interstate Fisheries Management Program Charter, a Plan review is an evaluation of an FMP, considering adequacy and relevance of the goals and objectives, stock status, fishery status, implementation status, research activities, and recommendations.

The performance of FMPs approved by the Commission, including for the Atlantic Menhaden Fishery, are subject to scheduled evaluations by a Plan Review Team (PRT). The evaluations occur on an annual basis or as provided in a given FMP and must, as a minimum, address the following topics:

- adequacy and achievement of the FMP goals and objectives (including targets and schedules),
- status of the stocks,
- status of the fisheries,
- status of state implementation and enforcement,
- status of the habitat,
- research activities, and
- other information relevant to the FMP (e.g. Socio-economic factors)

Commission's 2017 Action Plan

The Commission's 2017 Action Plan⁵⁹ includes numerous goals, strategies and tasks. In some cases, the tasks are specific to the Atlantic menhaden fishery. Given the detailed nature of the Plan's content, tasks that were judged to be of little relevancy to this assessment were omitted. Sub-tasks were not included.

Goal 1: *Rebuild, maintain and fairly allocate Atlantic coastal fisheries*

Strategy 1.1: Manage interstate resources that provide for productive, sustainable fisheries using sound science.

Tasks (Atlantic Menhaden):

- Continue work with the Technical Committee and Ecological Reference Points Working Group to develop ecosystem reference points based on Board-defined goals and objectives.
- Hold a workshop to discuss and review potential ERPs to include in Draft Amendment 3, if identified by the Board as a priority and resources allow.
- Finalize and implement Amendment 3 to revisit quota allocation and address ERPs.
- Complete the 2017 stock assessment update and consider management response to the assessment findings.
- Monitor the 2017 episodic events set aside quota and set the 2018 fishery specifications.
- Monitor fishery for consistency with management program and state compliance.

Strategy 1.2: Strengthen state and federal partnerships to improve comprehensive management of shared fishery resources.

Tasks:

- Participate on the East Coast Regional Fishery Management Councils and committees regarding matters of mutual interest.
- Participate on the NRCC and SouthEast Data, Assessment and Review Steering Committee to set state/federal management and assessment priorities.
- Work with the Regional Fishery Management Councils and NOAA Fisheries to improve alignment between state and federal fishery management programs.
- Work with the Regional Fishery Management Councils and NOAA to review the guidance on Changes to National Standard 1.
- Work with NOAA Headquarters and regional leadership to improve alignment of state/federal budget priorities.

⁵⁹ https://www.asafc.org/files/pub/2017ActionPlan_Final.pdf

Strategy 1.3: Adapt management to address emerging issues.

Tasks:

- Continue to monitor developments related to climate change, ocean acidification, stock distributions, ecosystem services, ocean planning and potential fisheries reallocations.
- Consider approval of Risk and Uncertainty Work Group draft policy for management implementation.

Strategy 1.4: Practice efficient, transparent, and accountable management processes.

Tasks:

- Continue to track status of stocks relative to biological reference points to evaluate and drive improvement and results in the Commission's fisheries management process.
- Continue the use of decision documents and working groups to structure Board discussion on complex management decisions and increase transparency of pending board action.
- Continue to focus Board attention on developing clear problem statements prior to initiating management changes.
- Continue to use roll call voting procedures for Commission final actions.

Strategy 1.5: Evaluate progress towards rebuilding fisheries.

Tasks:

- Conduct annual Commissioner Assessment of progress towards achieving the Commission's mission, vision, and goals using an on-line survey. Report findings to the ISFMP Policy Board.
- Continue the use of the annual performance of the stock to evaluate species rebuilding progress. Report findings to the ISFMP Policy Board.

Strategy 1.6: Strengthen interactions and input among stakeholders, technical, advisory, and management groups.

Tasks:

- Engage species advisory panels (APs) in the development of FMPs and Amendments. Solicit state membership of current active APs and appoint new membership where necessary.
- Review advisory panel guiding documents including chair term limits.
- Continue communication with non-active advisory panels (species in the maintenance mode).
- Integrate non-traditional constituents into Advisory Panels.

Goal 2: *Provide the scientific foundation for and conduct stock assessments to support informed management actions*

Strategy 2.1: Conduct stock assessments based on comprehensive data sources and rigorous technical analysis.

Tasks:

- Address data deficiencies and priorities for stocks with limited data or stocks of unknown status. Collect more comprehensive information for data poor stocks in order to transition from problematic to more certain assessment models, including menhaden fishery-independent data.
- Complete assessment updates for various fisheries, including Atlantic menhaden.
- Through the Assessment Science Committee (ASC) and Management and Science Committee (MSC), develop the long-term stock assessment schedule to prioritize stocks by management need; present tradeoffs to the Policy Board when assessment scheduling changes are requested.
- Through the Risk and Uncertainty Policy Workgroup, finalize a Commission policy regarding risk and uncertainty, and provide to the ISFMP Policy Board for consideration and approval.
- Conduct a Commissioner workshop on management risk and uncertainty.

Strategy 2.2: Proactively address research priorities through cooperative state and regional data collection programs and collaborative research projects.

Tasks:

- Update the master list of ASMFC Research Priorities by species as benchmark assessments are completed and new priorities emerge; distribute Research Priorities to the states, NOAA Fisheries, USFWS, and university researchers.
- Organize a Sea Grant Workshop with research directors from the Atlantic states' Sea Grant programs to identify common research priorities and pursue funding opportunities (if funding is available).
- Participate in proposal reviews for NMFS Cooperative Research Programs, Saltonstall-Kennedy, Research Set-Aside, NFWF, ACCSP, MARFIN, and MARMAP, when requested, to evaluate projects and monitor new research activities to promote the states' needs.
- Communicate with the National Fish and Wildlife Foundation (NFWF) on shared research priorities and funding opportunities (e.g., fish passage, catch shares). Participate in NFWF proposal reviews for the Fisheries Innovation Fund.
- Participate on the ACCSP's Coordinating Council, Operations Committee, Bycatch Prioritization Committee, Biological Review Panel, Recreational and Commercial Technical Committees, Outreach Committee and the Computer Technical Committee.
- Coordinate and implement the Northeast Area Monitoring and Assessment Program (NEAMAP).
- Coordinate the South Atlantic component of the Southeast Area Monitoring and Assessment Program (SEAMAP).
- Continue the Tagging Certification Program and support the use of tagging data in ASMFC stock assessments.
- Continue to participate in the development and implementation of the Marine Recreational Information Program (MRIP).
- Coordinate fish ageing activities among Atlantic coast states and university laboratories in order to provide consistent, accurate age data to stock assessments.
- Coordinate the activities of the Committee on Economics and Social Sciences (CESS).

Strategy 2.3: Facilitate stakeholder involvement in research initiatives and the stock assessment process.

Tasks:

- Seek stakeholder input at data workshops during development of stock assessments. Continue to issue press releases calling for new data when new assessments begin.
- Develop outreach materials that highlight opportunities for public engagement in the Commission's fisheries management and stock assessment processes.

Strategy 2.4: Promote data collection and research to support ecosystem-based management.

Tasks:

- Ecological Reference Points Workgroup: continue to develop ecosystem-based reference points that align with Board-approved management objectives for Atlantic menhaden.
- Continue to improve multispecies modeling efforts to support single species assessments, including development of a new multispecies statistical catch-at-age model.
- Identify opportunities to collaborate with state, federal, and university researchers to use existing data collection platforms to advance ASMFC ecosystem models (e.g. diet studies, surveys of spawning and nursery habitats).
- Through the MSC, track the development of state and federal activities related to climate change and impacts to fisheries; provide updates to the Policy Board and Commissioner Work Group.

- Convene the Fishing Gear Technology Work Group (FGTWG) to evaluate the efficacy of bycatch reduction devices in southern shrimp trawl fisheries to reduce Sciaenid bycatch; conduct FGTWG evaluation of the efficacy of lobster trap design to ensure escapement from derelict gear.
- Participate as members of the Chesapeake Bay Sustainable Fisheries Goal Implementation Team and Forage Fish Workgroup.

Goal 3: *Promote compliance with fishery management plans to ensure sustainable use of Atlantic coast fisheries*

Strategy 3.1: Develop practical compliance requirements that foster stakeholder buy-in.

Tasks:

- Develop practical compliance requirements that foster stakeholder buy-in.
- Evaluate and report on compliance issues associated with newly implemented regulatory measures for ASMFC-managed species as requested.

Strategy 3.2: Evaluate the enforceability of management measures and the effectiveness of law enforcement programs.

Tasks:

- Work with LEC Coordinator to ensure the input of the LEC throughout the management process on the enforceability of management options proposed in FMPs, amendments, addenda and conservation equivalency proposals.
- Incorporate and reference the revised “Guidelines for Resource Managers” in reviews and evaluations of proposed changes to management programs.
- Report on the enforceability of existing FMPs as part of the annual compliance review for each species.
- Engage and support NMFS and USFWS Offices of Law Enforcement, U.S. Department of Justice and U.S. Coast Guard to facilitate the enforceability of Commission FMPs.
- Exchange information and best practices related to the enforcement of protected and endangered species regulations.
- Annually review and comment on (as needed) NMFS enforcement priorities to ensure they support the enforceability and effectiveness of Commission management programs.

Strategy 3.3: Promote coordination and expand existing partnerships with state and federal natural resource law enforcement agencies.

Tasks:

- Maintain communications with the law enforcement advisory committees of the regional fishery management councils, interstate commissions, and other conservation organizations to seek opportunities for collaboration and ensure consistent law enforcement strategies.
- Exchange information regarding planned and ongoing enforcement actions and facilitate communications regarding joint efforts that can assist in long-term fisheries enforcement.
- Share enforcement techniques and law enforcement success stories and provide regional training sessions (if resources allow) to enhance law enforcement efficiency along the Atlantic coast.
- Share information and resources for locating and obtaining enforcement related grants.
- Review and evaluate inter-agency measures to enhance tracking of fishery shipment and sale across jurisdictional boundaries.
- Advance any recommendations of the Aerial Enforcement Subcommittee that would support or enhance existing state-federal enforcement for ASMFC-managed species.

Strategy 3.4: Enhance stakeholder awareness of management measures through education and outreach.

Tasks:

- Continue to highlight the outcomes of law enforcement investigations (penalties and fines) through various outreach tools (website, social media, press releases, fact sheets).

Strategy 3.5: Use emerging communication platforms to deliver real time information regarding regulations and the outcomes of law enforcement investigations.

Tasks:

- Report on enforcement issues associated with differing federal, interstate, and state regulations using social media and timely press releases.
- Provide forum for enforcement agencies to display successful development and use of enforcement technologies.

Goal 4: *Protect and enhance fish habitat and ecosystem health through partnerships and education*

Strategy 4.1: Identify critical habitat through fisheries management programs and partnerships.

Tasks:

- Review existing reference documents for Commission managed species to identify gaps or updates needed to describe important habitat types.
- Review and revise species habitat factsheets as new data become available.
- Coordinate artificial reef activities among the Atlantic coast states, and between the Atlantic and Gulf States Marine Fisheries Commissions.

Strategy 4.2: Educate Commissioners, stakeholders, and the general public about the importance of habitat to healthy fisheries and ecosystems.

Tasks:

- Facilitate coordination and distribution of information for ecosystem-based management and marine protected area activities, and the potential consequences of significant anthropogenic activities on habitats of concern.
- Participate in regional and national habitat meetings and scientific conferences to facilitate increased communication with agencies and programs that have jurisdiction over habitat.
- Publish annual issue of *Habitat Hotline Atlantic*.
- Review and update the Habitat Management Series: *Living Shorelines and Submerged Aquatic Vegetation* for ISFMP Policy Board review and acceptance. Identify a subsequent topic (e.g. climate change, sand mining, power plant impingement, document, innovative wetland restoration techniques).

Strategy 4.3: Engage local, state, and regional governments in mutually beneficial habitat protection and enhancement programs through partnerships.

Tasks:

- Work with ACFHP to foster partnerships with like-minded organizations at local levels to further common habitat goals.
- Provide stakeholders with the tools to effectively communicate, promote and accomplish habitat protection, restoration, and enhancement programs at the local level.
- Serve as a point of contact and information conduit at the Commission for energy-related issues affecting fish habitat.
- Coordinate the activities of the Fish Passage Working Group (FPWG) to carry out priority tasks as defined by the ISFMP Policy Board. Promote development of effective fish passage approaches and projects through state and federal collaboration.

- Continue to provide coordination support for ACFHP, under the direction of the National Fish Habitat Action Plan (NFHAP) Board.

Strategy 4.4: Foster partnerships with management agencies, researchers, and habitat stakeholders to leverage regulatory, political, and financial support.

Tasks:

- Provide information or comment on Atlantic coast projects and permits in accordance with ASMFC project review protocol.
- Solicit funding and promote fish habitat research through diverse activities including partnerships, funding opportunities, workshops, identification of research needs and other strategies.
- Identify partnership opportunities and forge additional relationships with organizations – such as non-governmental organizations and the recreational fishing community – to facilitate the promotion of fish habitat through a collaboration of strengths of different stakeholder groups.
- Seek improvements to habitat webpages, continue to use social media to connect with regional and local decision makers, and otherwise more effectively disseminate the work of the Habitat Committee.

Strategy 4.5: Identify mechanisms to evaluate ecosystem health.

Tasks:

- Review habitat program goals and evaluate accomplishments annually.
- Work with state and federal agencies, the Councils, and non-governmental organizations to build on existing coastwide GIS efforts, to identify important fish habitats for Commission managed species as defined in the ACFHP Species-Habitat matrix.

Strategy 4.6: Engage in state and federal agency efforts to ensure climate change response strategies are included in habitat conservation efforts.

Tasks:

- As revisions to habitat sections of FMPs are made include recommendations that account for climate change in fisheries management decisions.
- Identify gaps in state coastal regulatory planning regarding climate change impacts and make recommendations to increase resiliency.
- Increase communication on ecosystem-based management with Commission committees to find overlap with fish habitat related issues.

Goal 5: Strengthen stakeholder and public support for the Commission

Strategy 5.1: Increase public understanding and support of activities through expanded outreach at the local, state, and federal levels.

Tasks:

- Use website to promote ASMFC activities to state and federal partners and stakeholders.
- Promote ASMFC through attendance at fisheries-related trade shows and conferences.
- Promote Commission activities regarding recently assessed and/or high-profile species, habitat and law enforcement activities, as well as emerging issues such as fishery allocations and shifting populations due to climate change, to a broader constituency through mechanisms such as targeted press releases, informational brochures, webpage highlights and conference/trade show participation.
- Develop and distribute youth-based educational materials designed to increase awareness of fisheries science and understating of fisheries management to key venues (e.g., teacher kits, Eco-camps, charter boat operations, aquatic educators) to help promote marine stewardship and ocean literacy.

- Collaborate with East Coast Aquaria (New England, Baltimore, North Carolina, Virginia) and relevant partners to promote interstate fisheries management and science activities at the aquaria.
- Promote Commission's mission and programs through outreach meetings with various marine policy and marine science graduate programs.
- Participate in the Mid-Atlantic and New England Fishery Management Councils Marine Resource Education Program.

Strategy 5.2: Clearly define Commission processes to facilitate stakeholder participation, as well as transparency and accountability.

Tasks:

- Publish and distribute 2016 Annual Report to Congress, state legislators, and stakeholders to provide overview of our activities and progress in carrying out the Commission's mission and public trust responsibilities.
- Prepare Stock Assessment Overviews (in layman's terms) for benchmark and stock assessment updates to facilitate stakeholder understanding of the science behind our management decisions. Focal species for 2017 are black sea bass, Atlantic croaker, red drum, spot, Atlantic sturgeon, northern shrimp, Atlantic menhaden, and river herring.
- Enhance engagement in advisory panels and through solicitation of new members and increased participation of existing members.
- Develop outreach materials that highlight opportunities for public engagement in the Commission's fisheries management and stock assessment processes.
- Develop a fisheries management 101 page for the website.

Strategy 5.3: Strengthen national, regional, and local media relations to increase coverage of Commission actions.

Tasks:

- Track media communications and coverage through ASMFC-related news clippings and media tracking sheet.
- Conduct a training workshop for science and ISFMP staff on story mapping and photo journaling to expand staff skill set and enhance communication tools.
- Conduct annual meeting of Atlantic Coast Fisheries Communication Group, comprised of Public Information Officers from the Councils, states and federal agencies, to share successful tools, identify key media contacts and work cooperatively on joint projects.
- Use new technologies and communication platforms to more fully engage the broader public in the Commission's activities and actions.
- Use social media tools to increase ASMFC visibility and improve stakeholder engagement.
- Use website capabilities (e.g., video clips) to promote Fisheries Science 101 webinars, videos of fisheries surveys and state on-the-ground projects.
- Monitor the success of website and social media platforms in reaching broader constituency and effectively communicating ASMFC mission, programs and activities.

Goal 6: Advance Commission and member states' priorities through a proactive legislative policy agenda

Strategy 6.1: Increase the Commission's profile and support in the U.S. Congress by developing relationships between Members and their staff and Commissioners, the Executive Director, and Commission staff.

Tasks:

- Provide opportunities for in person Commissioner interactions with Members and congressional staff during Meeting Weeks.
- Provide opportunities for the Executive Director to meet with congressional staff on a regular basis.
- Focus interactions on Members of Congress from Atlantic coast states and those that serve on committees of importance to the Commission.

- Make connections (via correspondence and in-person meetings) with newly elected Atlantic coast members of the 115th Congress and appropriate Committee Chairs and members.

Strategy 6.2: Communicate the Commission's federal funding needs to Congress and advocate for sufficient appropriations.

Tasks:

- Clearly convey funding needs to congressional staff.
- Justify the need for federal dollars by the Commission through demonstrating the social, economic, and ecological benefits of Commission activities.
- Work with Commissioners to identify funding needs and develop a strategy to secure funding for priority programs (Atlantic Striped Bass Conservation Act, Atlantic Coastal Fisheries Cooperative Management Act, Interjurisdictional Fisheries Act Grants, Stock Assessments line item, Federal Aid in Sport Fish Restoration, Atlantic Coastal Fish Habitat Partnership, and Fisheries Information Networks). Seek funding for long-term monitoring surveys including Horseshoe Crab Benthic Trawl, NEAMAP, and SEAMAP.
- Demonstrate the value of the Commission as an effective management entity and resource to Members of Congress and their staffs.
- Provide state-specific perspectives to staff and Members in meetings, especially management successes and challenges.
- Contact home state Commissioners before communicating with Members or Congressional staff to get a local perspective.
- Coordinate with the Gulf, Pacific, and Great Lakes Commissions on policy items of mutual interest including federal funding for fisheries programs. Executive Directors should continue providing unified positions on funding and legislative priorities to lawmakers and federal agencies, where appropriate.
- Communicate Commission funding needs to NOAA Fisheries.

Strategy 6.3: Engage Congress on fishery-related legislation affecting the Atlantic coast.

Tasks:

- Monitor federal legislation affecting the Commission, including policy and annual appropriations bills and develop Commission positions on pending federal legislation, including the Atlantic Coastal Fisheries Cooperative Management Act, Interjurisdictional Fisheries Act, Anadromous Fish Conservation Act, Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Federal Aid in Fish Restoration Act, in addition to new legislation addressing emerging issues such as marine national monuments and alternative energy initiatives.
- Update Commissioners on pending congressional actions that may affect fisheries management as appropriate.
- Coordinate with the Legislative Committee and Government Relations firm to identify relevant policy and legislative issues.
- Monitor congressional hearings related to fisheries issues, and testify or provide statements for the record when appropriate.
- Engage Commissioners in the formulation of the Commission's position on federal legislative policy.

Strategy 6.4: Promote member states' collective interests at the regional and national levels.

Tasks:

- Communicate member states' needs to Congress and management partners.
- Participate with national organizations and management partners to address issues of mutual interest.

Strategy 6.5: Promote economic benefits of the Commission's actions (return on investment).

Tasks:

- Provide state-specific economic and jobs statistics related to commercial and recreational marine fishing to lawmakers and staff.
- Use specific examples to show successful management can be linked to economic success and increased jobs.
- Demonstrate the differences between federal and state fishery management tools and the economic benefits of the state management approach (flexibility, closer to stakeholders, quicker response time).

Goal 7: *Ensure the fiscal stability & efficient administration of the Commission*

Strategy 7.1: Conservatively manage the Commission's operations and budgets to ensure fiscal stability.

Tasks:

- Monitor and update as necessary guidelines for cost effective meeting locations and meeting attendee travel policies.
- Responsibly manage and review as necessary the Commission's reserve fund according to the approved investment policy. Review investments annually with AOC.
- Monitor expenditures on a monthly basis and project variances to ensure complete and timely use of available funds relative to grant cycles. Distribute monthly financial report to Senior Staff.
- Prepare for and work cooperatively with CPA firm to conduct annual audit.
- Launch Inventory module in accounting software to electronically track physical inventory. Update physical inventory.
- Fully incorporate ACCSP into the Commission under the new governance structure.
- Develop Commission compensation plan with updated job classifications and salaries based on location.

Strategy 7.2: Utilize new information technology to improve meeting and workload efficiencies, and enhance communications.

Tasks:

- Ensure consistency of software across the Commission and continue to cross-train administrative staff.
- Provide targeted staff training for full use of office equipment and software.
- Document standards for electronic record retention and develop site map of Commission electronic filing system for internal use, including protocols for document archiving.
- Continue to audit Commission databases to verify contacts and relevant information.
- Review SOPPs annually and revise as necessary.

Strategy 7.3: Refine strategies to recruit professional staff, and enhance growth and learning opportunities for Commission and state personnel.

Tasks:

- Promote Commission's programs and activities and recruit new talent by conducting seminars to graduate level marine programs.
- Provide opportunities for undergrad and graduate students to participate in summer internships at the Commission.
- Review and revise position descriptions as necessary.
- Review vacancy announcement distribution list and update as necessary.
- Conduct stock assessment methods training workshop.
- Facilitate staff participation at national and regional conferences; provide professional training opportunities.
- Facilitate educational opportunities targeted to specific staff based on job responsibilities and facilitate participation.
- Communicate human resources support available to state-based employees.

- Conduct annual meeting with financial advisor to review retirement program performance with staff and provide opportunities for staff and provide opportunities for staff to meet individually with financial advisor to match financial goals with investment choices for retirement.

Strategy 7.4: Fully engage new Commissioners in the Commission process and document institutional knowledge.

Tasks:

- Work with Executive Committee to determine the appropriate transition and orientation program for new Commissioners.
- Update, on an ongoing basis, the Commissioner Manual. Inform Commissioners when the update is substantial, no less than twice a year.
- Continue to provide orientation materials for new members of Commission supporting committees.

Strategy 7.5: Utilize legal advice on new management strategies and policies, and respond to litigation as necessary.

Tasks:

- Respond as needed to litigation regarding challenges to Commission FMPs.
- Work with Commission attorney to develop a potential information request policy for consideration by full Commission (FOIA equivalent).
- Ensure annual submission of Conflict of Interest form by Legislative and Governor Appointee Commissioners.
- Continue to work with human resources attorney to ensure all human resources practices are consistent with states laws.

For the Atlantic menhaden fishery, evaluations are carried out by a Program Review Team (PRT) and, when completed, are forwarded to the Atlantic Menhaden Management Board for appropriate action. Compliance review shall be consistent with the requirements of Sections Six and Seven of the ISFMP Charter and the respective FMP requirements. In addition to the scheduled compliance reviews, the PRT may conduct a review of the implementation and compliance of the FMP at any time at the request of the management board/section, Policy Board, or the Commission. When a plan amendment process is initiated by the management boards/sections, the PRT will continue its annual review function applicable to the existing plan. In carrying out its activities, the PRT seeks advice from the appropriate technical committee, stock assessment sub-committee, advisory panel, Committee on Economics and Social Sciences, and the Assessment Science, Habitat, Artificial Reef, Law Enforcement, and Management and Science Committees.

4. Evaluation Procedure

4.1. Harmonized Fishery Assessment

Certification Bodies assessing fisheries that have areas of overlap are required to ensure consistency of outcomes so as not to undermine the integrity of MSC fishery assessments (FCR 7.4.16 and Annex PB). The FCR requirements provide guidance for harmonisation where a fishery in assessment overlaps with an already certified fishery.

The scope of the Atlantic menhaden fishery does not overlap with any other certified or applicant fisheries.

4.2. Previous assessments

The fishery has not previously been assessed against MSC Principles and Criteria.

4.3. Assessment Methodologies

The MSC Principle and Criteria for Sustainable Fishing Standard sets out the requirements for a certified fishery. The Certification Methodology adopted by the MSC involves the interpretation of these Principles and Criteria into specific Performance Indicators against which the performances of the fishery can be measured according to pre-specified guideposts. A fishery is assessed against three Principles. The default assessment tree developed by the MSC includes 28 Performance Indicators. Principle 1 addresses the need to maintain the target stock at a sustainable level; Principle 2 addresses the need to maintain the ecosystem in which the target stock belongs to; and Principle 3 addresses the need for an effective fishery management system to fulfil Principles 1 and 2 and ensure compliance with national and international regulations.

PRINCIPLE 1: Sustainable fish stock

A fishery must be conducted in a manner that does not lead to overfishing or depletion of the exploited populations, and for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

PRINCIPLE 2: Minimizing environment impact

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

PRINCIPLE 3: Effective management

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principle 1 and 2, appropriate to the size and scale of the fishery.

Regarding the Operational Criteria that affects direct and indirectly the three principles, the fishing operations shall:

- make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimize mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive.
- implement appropriate fishing methods designed to minimize adverse impacts on habitat, especially in critical and sensitive zones such as spawning and nursery areas.
- not use destructive fishing practices such as fishing with poisons or explosives.
- minimize operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.
- be conducted in compliance with the fishery management system and all legal and administrative requirements.
- assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

4.3.1. MSC Scheme Documents

This assessment followed the current version of MSC procedures implemented by SAI Global’s accredited MSC Procedures (QP) using the MSC scheme documents outlined in Table 19.

Table 19. MSC scheme documents used during assessment activities.

MSC Scheme Document	Version	Issue Date	Implementation
MSC Fisheries Certification Requirements (FCR)	2.0	January 14 th , 2013	Standard
MSC FCR and Guidance	2.0	October 1 st , 2014	Process
General Certification Requirements	2.1	February 20 th , 2015	Process
Full Assessment Reporting Template*	2.0	October 8 th , 2014	Process

* The Full Assessment Reporting Template was modified to reflect that the fishery was being assessed against the MSC requirements for key-LTL species.

4.3.2. Applicability of the Default Assessment Tree

There are no particular characteristics of the fishery that would necessitate any revisions to the default assessment tree. This assessment of the U.S. ATL menhaden fishery uses the default assessment tree (FCR v2.0) without adjustments.

4.4. Evaluation Processes and Techniques

4.4.1. Stakeholder Consultations

In order to become aware of the concerns of relevant stakeholders, SAI Global followed the Consultation requirements laid out in the MSC FCR v2.0. In addition to posting information on the MSC website and MSC email announcements, stakeholders were made aware of the assessment process, and of opportunities for them to contribute/comment, via direct emails. Where additional stakeholders were identified these were added to the list of registered stakeholders. Instances where the progress of the assessment was communicated to stakeholders, including through public announcements, are outlined in Table 20.

Table 20. Stakeholder consultation process

Date	Purpose	Media
07/05/2017	Fishery announcement including: <ul style="list-style-type: none"> ▪ Confirmation of Assessment Team ▪ Confirmation of Assessment Tree ▪ Site Visit scheduled ▪ Client sharing agreement Indicative timeline Assessment Team CVs	Notification on MSC website. Direct email.
09/25/2017	Notification of Revised Timeline Revised Indicative timeline	Notification on MSC website. Direct email.
03/05/2018	Notification of Revised Timeline Revised Indicative timeline Notification of additional stakeholder comment period	Notification on MSC website. Direct email.
09/11/2018	Notification of Revised Timeline, Change to AT, Accepted VR and Update. Revised Indicative timeline	Notification on MSC website. Direct email.

4.4.2. Site Visits

Initial consultation meetings were held in July 2017. The objectives of the consultation meetings were to provide information and understanding of the activities of the CAB and to discuss the fishery management organizational roles in the management of menhaden. Due to the large number of entities involved in the management of menhaden, the consultation meetings were not designed to be inclusive of all organizations and representatives of the menhaden fisheries; however, the consultation plan was designed to strategically capture sufficient information to ensure understanding and confidence with respect to full assessment scoring. In addition, all identified stakeholders were contacted directly and invited to participate in the Assessment process.

The on-site consultation also served other important functions. These included:

- Responding to questions and comments raised by participants in the fishery at this initial stage in the assessment.
- The client group provided information, documents, and a list of stakeholders as required by SAI Global. This served to allow the Assessment Team to collect general information on the fisheries, identify information gaps and identify key stakeholders for the information gathering exercise.
- Following the collation of general information on the fishery, a number of meetings with key stakeholders who expressed an interest to meet were scheduled by the team to fill in information gaps and to explore and discuss areas of concern.

Meetings were held in various locations as recorded in Table 21.

Table 21. Summary of consultation meetings during the July 2017 site visit.

Date	Location	Organization	Attendees	Topics discussed
07/10/2017 09:00 EDT	NOAA Fisheries Beaufort Lab, Beaufort, NC	National Marine Fisheries Service (NMFS)	NMFS Amy Schueller (Research Fish Biologist) Ray Mroch (Research Fish Biologist) SAIG Assessment Team Ivan Mateo Sam Dignan Bob Allain	<ul style="list-style-type: none"> ▪ Stock assessment model, sources of uncertainty, internal and external peer review, progress on multi-species stock assessment models. ▪ Research programs on the abundance, biology and ecology of Menhaden. ▪ Stock status of the Menhaden relative to its ecological role in the ecosystem ▪ Current reference points and need for ERPs? ▪ Fishery-dependent and independent data collection, accounting for all removals, ecological monitoring. ▪ Review and evaluation of harvest strategy ▪ Catches of non-target species (bycatch), levels, impacts, mitigation measures ▪ Fishery’s impacts on ETPs ▪ Ecosystem role of menhaden, Potential ecosystem impacts of the menhaden fishery. ▪ Decision-making Processes, use of scientific recommendations by managers.
07/11/2017	Virginia Beach, VA	Chesapeake Bay Defenders	Chesapeake Bay Defenders Steven Epstein SAIG Assessment Team Ivan Mateo Sam Dignan Bob Allain	<ul style="list-style-type: none"> ▪ Intro to MSC Program, accredited certification, SAI Global’s role, use of confidential data in assessments etc. ▪ Gentleman’s agreement not to fish within 3nm from lighthouse to fishing pier. ▪ Good recreational fishing season when boats didn’t fish right off the beach in Virginia Beach. ▪ Bycatch counted in hold, not in net. ▪ Goldsborough’s ecosystem paper CBF, CBF’s proposed cap based on historical catch. ▪ Hard to participate in process, information vacuum, rules difficult to understand. ▪ Status of osprey’s and striped bass.
07/12/2017 10:00 CDT	Omega Protein, Reedville, VA	Omega Protein Inc.	Omega Protein Joan Kasprzycki-Strauss (Director of QA and Regulatory Affairs)	<ul style="list-style-type: none"> ▪ Intro to MSC Program, accredited certification, SAI Global’s role, use of confidential data in assessments etc. ▪ Intro to Omega Protein Inc. (Slideshow). ▪ Examples of Captain’s Daily Fishing Report (CDFRs).

Date	Location	Organization	Attendees	Topics discussed
			<p>Tom Pietz (Corporate QA Manager) Gary Caldwell (QA Manager) Nick Sterrett (Sales Manager) Peter Himchak (Senior Fisheries Scientist) Ben Landry (Director of Public Affairs)</p> <p>Marine Stewardship Council (MSC) (Observer only) Marin Hawk (Fishery Manager)</p> <p>SAIG Assessment Team Ivan Mateo Sam Dignan Bob Allain</p>	<ul style="list-style-type: none"> ▪ Observers, no. of observers allocated to each observed fishery (NMFS have not allocated observers since 2012). ▪ VMRC officers come to inspect at the plant; “a few times a week”. ▪ Chesapeake Bay cap – ASMFC Technical Committee recommended removal, only applies to Omega boats. ▪ Sampling protocol for aging menhaden – study to re-examine process as suggestion that reduction data might be skewing the overall size @ age data? ▪ Studies on diets of predatory fish from recreational catches. Also, study showing menhaden not in top 10 prey items for “stripers”. ▪ Larval survival of menhaden good but juvenile survival poor – related to poor water quality? ▪ Paper: “The Fate of an Atlantic Menhaden Year Class”. ▪ Tour of processing facility and Omega menhaden vessel.
07/18/2017 09:00 EDT	Conference Call	Menhaden Conservation Project	<p>Menhaden Conservation Project Benson Chiles Prof. Jerry Ault (Prof. University of Miami)</p> <p>SAIG Assessment Team Ivan Mateo Sam Dignan</p>	<ul style="list-style-type: none"> ▪ Intro to MSC Program, accredited certification, SAI Global’s role, use of confidential data in assessments etc. ▪ Intro to Menhaden Conservation Project, funded by the Sustainable Markets Foundation a network of recreational fishers on the U.S. East coast. ▪ SE Fisheries Science Center, bycatch studies on Gulf menhaden fishery. ▪ Menhaden as LTL species. ▪ 40% of allocation of Spanish mackerel taken as bycatch in the menhaden fishery. ▪ Issues with error and uncertainty in current menhaden assessments. ▪ Appropriateness of model inputs, new inputs for m and selectivity, reduced maximum age, higher natural mortality.

Date	Location	Organization	Attendees	Topics discussed
				<ul style="list-style-type: none"> ▪ Enormous variation in model with extremely high M reducing the impact of the fishery. ▪ Assessments do not include all the data, truncated age data. ▪ Socio-economic value of the menhaden fishery versus that of the recreational fishery menhaden “supports”.
07/20/2017 & continued 08/04/2017	Conference Call	Atlantic States Marine Fisheries Commission (ASMFC)	<p>ASMFC Jeff Kaelin (Chair – Menhaden Advisory Panel) Jason McNamee (Chair – Technical Committee) Bob Ballou (Chair – Menhaden Management Board)</p> <p>SAIG Assessment Team Ivan Mateo Sam Dignan Bob Allain</p>	<ul style="list-style-type: none"> ▪ Intro to MSC Program, accredited certification, SAI Global’s role, use of confidential data in assessments etc. ▪ Stock assessment model. Alternative models, stock synthesis, spatial components in assessment. ▪ BERP committee testing suite of models, multi-species Catch at Age, EwE model etc. ▪ Fishery is very conservatively managed (to target rather than limit levels). ▪ M highest on younger menhaden, accounting for predation to a certain extent within SA model, Lorenzen catch curve. ▪ Industry opposed to ‘rule of thumb’ approaches a not appropriate for menhaden. ▪ Calculation of interim reference points for draft Amendment III. ▪ Compliance reports ensure individual States’ legislation is compatible with management framework. Consequences if jurisdictions found to be out of compliance. ACFMCA – Atlantic Coastal Fisheries Cooperative Management Act. ▪ Dispute resolution mechanisms, provision for states to bring forward alternative analyses. ▪ Opportunities for stakeholder involvement in Commission process. ▪ Inclusion of native rights in management framework. ▪ Legal and Customary Frameworks and Consultation, Roles and Responsibilities ▪ Objectives, long-term and fishery-specific ▪ Management Performance Evaluation – priority in Draft Amendment III. ▪ Management system reviews, annual FMP review, external reviews of SA and State Commissions and Boards also do reviews. ▪ Available diet databases, MSVPA working group, Chesmap, NEMAP.

Date	Location	Organization	Attendees	Topics discussed
08/04/2017	Conference Call	Atlantic States Marine Fisheries Commission (ASMFC)	<p>ASMFC staff Megan Ware (Menhaden FMP Coordinator) Toni Kerns (Director – Interstate Management) Katie Drew (ASMFC in-house SA scientist)</p> <p>SAIG Assessment Team Ivan Mateo Sam Dignan Bob Allain</p>	<ul style="list-style-type: none"> ▪ MSVPA database. ▪ Review 2017 SA update. ▪ Draft Amendment III, considering adoption of interim ERPs and changes to allocations. Public comment draft of Amendment presents all options. ▪ Specific objectives on bycatch and ETPs within the FMP. ▪ New fecundity study incorporating new and old data. ▪ Weakest point in available data at the moment is recreational landings. ▪ Board are conscious of ecosystem role of menhaden when setting TACs. TACs set based on probability of meeting F_{target} (i.e. with a low probability of meeting $F_{threshold}$). ▪ Evaluation of HCRs through Peer Review and Update processes. ▪ Non-confidential compliance reports are available.
08/04/2017	Conference Call	Omega Protein Inc.	<p>Omega Protein Tabitha Lindley (Public Affairs Manager) Peter Himchak (Senior Fisheries Scientist) Ben Landry (Director of Public Affairs)</p> <p>Marine Stewardship Council (MSC) (Observer only) Marin Hawk (Fishery Manager)</p> <p>SAIG Assessment Team Ivan Mateo Sam Dignan Bob Allain</p>	<ul style="list-style-type: none"> ▪ Closing Meeting ▪ Wrap up. ▪ Data needs (enforcement data, blank CDFRs, trip tickets etc.) ▪ Next steps. ▪ Close of site visit portion of assessment.

4.4.3. Evaluation Techniques

After the site visit the Assessment Team compiled and analysed all relevant information before proceeding to score the UoA against the Performance Indicator Scoring Guideposts (PISGs) in Default Assessment Tree. In scoring the UoA the Assessment Team, using the methodology set out in requirements 7.10 CR (v2.0), discussed the evidence together, weighed up the balance of evidence and used their expert judgement to agree a final score. While individual team members led on the scoring of a principle (P1, P2 or P3 Assessor), their conclusions were discussed in detail and agreed upon by the Assessment Team as a whole; therefore, the score for each PISG reflects the group consensus for that PI.

Note: the outcomes of stakeholder engagement and their supporting rationale are documented in the Evaluation Results section, while the specific content of stakeholder written or verbal submissions or information generated in meetings or workshops are provided in Appendix 3 of this report.

4.4.3.1. Rationale for choosing the media for public announcements

Public announcements relating to the fishery were posted on the MSC website as this was felt to be the most appropriate media for such announcements. In addition, all identified stakeholders were contacted directly via email informing them of the substance of any announcements and advising where the announcements themselves could be accessed. All identified stakeholders were also furnished with copies of consultation announcements including the “MSC Template for Stakeholder Input into Fishery Assessments” no longer than 4 days after the start of each consultation period.

4.4.3.2. The scoring process

In the MSC Assessment Process there are 4 distinct elements that contribute to a fishery’s score and ultimately determine whether or not a fishery is eligible for Certification, in descending order these are:

- Principles
 - Performance Indicators (PIs)
 - Performance Indicator Scoring Guideposts (PISGs)/Scoring Guideposts (PISGs)
 - Scoring Issues (SIs)

In order to be eligible for certification a fishery must achieve an overall weighted average score of 80 for each of the three Principles and scores of at least 60 for each and every PI.

Scoring Performance Indicators (PIs)

At the PI level, the performance of the fishery is assessed as a ‘score’ taking into account whether or not each Scoring Guidepost (SG60, SG80, SG100) was met for each Scoring Issue.

In order for the fishery to be eligible for certification, each PI must score 60 or more. If any PI scores 60 or more but less than 80 a Condition is raised for that PI. Any Conditions must be addressed by an agreed upon Client Action Plan (CAP). Any PI that scores 80 or more is awarded an unconditional pass.

PIs are normally scored to the nearest five units (60, 65, 70, etc.).

Performance Indicator Scoring Guideposts (PISGs)/Scoring Guideposts (PISGs)

Scoring Guideposts identify the level of performance necessary to achieve 60, 80 (a pass score), and 100 scores for each Scoring Issue under each Performance Indicator; note some PIs only have a single Scoring Issue.

PISGs are the benchmark level for a fisheries performance.

Scoring Issues

Scoring Issues are different parts of a PI covering related but different topics. Each PI has one or more SIs against which the fishery is assessed at the SG60, 80 and 100 levels; note there may not be a SI at every SG level.

If a Performance Indicator has multiple SIs some of which a particular Scoring Guidepost and some of which do not then an intermediate score may be awarded (e.g. 75, 85, 90).

Scoring Principles

Once each individual PI has been scored, the weighted score for each PI under each Principle is summed together in order to calculate the Principle level score for that Principle. Scoring at the Principle level is pass/fail and in order for the fishery to be eligible for certification, a fishery is required to achieve a score of 80 or more as the weighted average score of all PIs within that Principle. If any Principle scores less than 80 the fishery fails.

Principle level scores are reported to the nearest 0.1 units.

Scoring methodology

The scoring methodology is fully explained in the MSC Fisheries Assessment Methodology. It can be summarized as follows:

- Scoring is a qualitative process, involving discussion between team members and arrival at a joint agreed score. Scores should be normally assigned in divisions of 5 points
- The only narrative guidance that is available is at 60, 80 and 100 SGs. Intermediate scores must therefore reflect;
 - A failure to meet all the scoring issues specified in a SG.
- The following system should then be used to determine the overall score for the PI from the scores of the different scoring issues. This system combines a primary approach based on the combination of scores achieved by the individual scoring issues (the a) to i) list below):
 - a) Score = 60: all issues meet SG60, and only SG60. Any scoring issues within a PI which fails to reach SG60, represents a failure against the MSC standard and no score shall be assigned.
 - b) 65: all issues meet SG60; a few achieve higher performance, at or exceeding SG80, but most do not meet SG80.
 - c) 70: all issues meet SG60; some achieve higher performance, at or exceeding SG80, but some do not meet SG80 and require intervention action to ensure they get there.
 - d) 75: all issues meet SG60; most achieve higher performance, at or exceeding SG80; only a few fail to achieve SG80 and require intervention action.
 - e) 80: all issues meet SG80.
 - f) 85: all issues meet SG80; a few achieve higher performance, but most do not meet SG100.
 - g) 90: all issues meet SG80; some achieve higher performance at SG100, but some do not.
 - h) 95: all issues meet SG80; most achieve higher performance, at SG100; only a few fail to achieve SG100.
 - i) 100: all issues meet SG100

4.4.3.3. Scoring elements considered in each outcome PI in Principles 1 and 2

Table 22 below describes the set of scoring elements (e.g. species or habitats) that have been considered in each outcome PI in Principles 1 and 2. The Table also describes under which component each scoring element was assessed and whether any scoring elements were data-deficient.

Table 22. Scoring elements considered in each outcome PI in Principles 1 and 2.

Component	Scoring elements	Main/Not main	Data-deficient?
P1 (PI 1.1.1)	Atlantic menhaden (<i>Brevoortia tyrannus</i>)	Not main	No
Primary (PI 2.1.1)	American butterfish (<i>Poronotus triacanthus</i>)	Not main	No
	Atlantic croaker (<i>Micropogonias undulates</i>)	Not main	No
	Atlantic striped bass (<i>Morone saxatilis</i>)	Not main	No
	Black drum (<i>Pogonias cromis</i>)	Not main	No
	Blue crab (<i>Callinectes sapidus</i>)	Not main	No
	Bluefish (<i>Pomatomus saltatrix</i>)	Not main	No
	Red drum (<i>Sciaenops ocellatus</i>)	Not main	No
	Sandbar shark (Brown shark) (<i>Carcharhinus plumbeus</i>)	Not main	No
	Spanish mackerel (<i>Scomberomorus maculatus</i>)	Not main	No
	Spot (<i>Leiostomus xanthurus</i>)	Not main	No
	Summer flounder (Fluke) (<i>Paralichthys dentatus</i>)	Not main	No
Secondary (PI 2.2.1)	Weakfish (<i>Cynoscion regalis</i>)	Not main	No
	American harvestfish (<i>Peprilus paru</i>)	Not main	No
	Atlantic thread herring (<i>Opisthonema oglinum</i>)	Not main	No
	Bullnose ray (<i>Myliobatis freminvillii</i>)	Not main	No
	Cownose ray (<i>Rhinoptera bonasus</i>)	Not main	No
	Hogchoker (<i>Trinectes maculatus</i>)	Not main	No
	Ladycrab (<i>Ovalipes ocellatus</i>)	Not main	No
	Silverperch (<i>Bairdiella chrysoura</i>)	Not main	No
	Spidercrab (<i>Libinia emarginata</i>)	Not main	No
	Spiny butterfly ray (<i>Gymnura altavela</i>)	Not main	No
	Vermillion snapper (<i>Rhomboplites aurorubens</i>)	Not main	No
ETP (PI 2.3.1)	Witch flounder (<i>Glyptocephalus cynoglossus</i>)	Not main	No
	Bottlenose Dolphin (<i>Tursiops truncatus</i>)	ETP	No
	Green sea turtle (<i>Chelonia mydas</i>)	ETP	No
	Hawksbill sea turtle (<i>Eretmochelys imbricata</i>)	ETP	No
	Kemp's ridley sea turtle (<i>Lepidochelys kempii</i>)	ETP	No
	Leatherback sea turtle (<i>Dermochelys coriacea</i>)	ETP	No
Habitats (PI 2.4.1)	Loggerhead sea turtle (<i>Caretta caretta</i>)	ETP	No
	Silt/mud/sand in coastal waters	Main	No
Ecosystem (PI 2.5.1)	Loggerhead turtle Northwest Atlantic critical habitat	VME	No
	Mid-Atlantic/Southern New England nearshore marine ecosystem		No

4.4.3.4. Use of the Risk-Based Framework (RBF)

The criteria set in Table 3 of MSC FCR 7.7.6 are used by Assessment Teams to make a decision on whether a fishery may or may not be data-deficient with respect to one or more PI (Table 23).

Table 23. MSC criteria for triggering the use of RBF.

Performance Indicator	Criteria	Consideration	Notes
1.1.1 Stock status	Stock status reference points are available, derived either from analytical stock assessment or using empirical approaches	Yes	Use default PISGs within Annex SA for this PI
		No	Use Annex PF (RBF) for this PI
2.1.1 Primary species outcome & 2.2.1 Secondary species outcome	Stock status reference points are available, derived either from analytical stock assessment or using empirical approaches	Yes	Use default PISGs within Annex SA for this PI
		No	Use Annex PF (RBF) for this PI
2.3.1 ETP species outcome (where there are no national requirements for protection and rebuilding)	Can the impact of the fishery in assessment on ETP species be analytically determined?	Yes	Use default PISGs within Annex SA for this PI
		No	Use Annex PF (RBF) for this PI
2.4.1 Habitats outcome	Are both of the following applicable: 1 Information on habitats encountered is available 2 Information of impact of fishery on habitats encountered is available	Yes	Use default PISGs within Annex SA for this PI
		No	Use Annex PF (RBF) for this PI
2.5.1 Ecosystem outcome	Is information available to support an analysis of the impact of the fishery on the ecosystem?	Yes	Use default PISGs within Annex SA for this PI
		No	Use Annex PF (RBF) for this PI

A pre-assessment of ATL menhaden found that there was sufficient information available to estimate the status of the menhaden stock and the impacts of the menhaden fishery on ETP species, habitats and ecosystem components. However, in preparing to announce the fishery the Assessment Team identified a lack of information surrounding the status of Secondary species with respect to stock status reference points. In normal circumstances, this would trigger the use of the RBF to score the outcome PI for Secondary species; however, this was not done in this case and the Assessment Team instead followed the process outlined below.

As previously discussed, no species met the respective thresholds for Main Secondary species. According to FCR v2.0 PF 4.1.4, an Assessment Team may elect to conduct a PSA on “main” species only when evaluating the UoA’s impacts on non-target species; however, if the team elects to consider “main” species only, final PI scores for outcome PIs shall be capped at 80 (FCR PF 4.1.4.1 and PF 5.3.2).

As there are no Main Secondary species the Assessment Team elected not to use the RBF solely for the purposes of scoring Minor species under PI 2.2.1 and as a result the final PI score for PI 2.2.1 cannot exceed 80.

While a full RBF has not been conducted the Assessment Team elected to broadly follow the Productivity Susceptibility Analysis (PSA) approach when evaluating the UoA’s impacts on non-target species.

5. Traceability

5.1. Eligibility Date

In accordance with FCR 7.6.1 the CAB shall nominate a date from which product from a certified fishery is eligible to be sold as MSC certified or bear the MSC ecolabel (the eligibility date) which may be either the date of the certification of the fishery; or the publication date of the first Public Comment Draft Report.

The client has indicated their desire to have product become eligible on the date of publication of the first PCDR; this product may become eligible for identification with an MSC claim on eventual certification of the fishery.

The expected date of publication of the first Public Certification Report (PCDR) was December, 4th 2018. The eligibility date will be the date of the publication of the first PCDR. Following FCR 7.8.3.2 an indicative assessment timeline has been uploaded to the MSC website.

As the eligibility date has been set before the certification date, the Client has been informed that any fish harvested after the eligibility date and sold or stored as under-assessment fish shall be handled in conformity with relevant under-assessment product requirements in the MSC Chain of Custody standard.

Traceability and segregation systems in the fishery will be implemented by this date as they are already in place for other Certification Schemes. There is no risk of loss in the traceability, segregation and identification systems and these systems can differentiate product from before or after the eligibility date.

5.2. Traceability within the Fishery

Traceability of product from the sea to the consumer is important so as to ensure that the MSC standard is maintained. There are several aspects to traceability that the MSC require to be evaluated: Traceability within the fishery; at-sea processing; at the point of landing; and subsequently the eligibility of product to enter the chain of custody. These requirements are assessed here.

Traceability up to the point of first landing has been scrutinized as part of this assessment and the results reflect the fact that there are systems in place that are adequate to ensure fish is caught in a legal manner and is accurately recorded. Risk factors for traceability within the fishery under assessment are identified in Table 24.

Monitoring of landings is mandatory through logbooks (trip tickets) and sales declaration forms. The fishery is generally prosecuted by only two companies, one of which owns and operates processing plants and the other fishing vessels. There is no use of carrier vessels in the Atlantic menhaden fishery. No issues have been identified regarding the traceability system for the Atlantic menhaden fishery.

It is considered that there is no opportunity for the vessels currently engaged in the ATL menhaden fishery to fish outside the UoC. While vessels may be transferred between the Gulf of Mexico and Atlantic menhaden fisheries these are spatially segregated to the extent that there is no chance of vessels fishing in one area and landing in another.

Transshipment does occur but only between vessels operated by Harvester; all run boats handle 100% catch from the menhaden fishery and are included in the UoC.

Menhaden boats are highly specialized and there is no possibility of other fishing gears not covered by the UoCs being used by any of the vessels operating in the fishery.

Table 24. Traceability Factors within the Fishery.

Risk Factor	Description of risk if applicable
The possibility of non-certified gear used within the fishery	Not applicable. Purse seine is the only gear currently used in the ATL menhaden fishery.
The possibility of vessels from the UoC fishing outside the UoC or in different geographical areas (on the same trip or on different trips)	Not applicable. The entire range of gears and geographical areas used by the fishery are included in the UoC.
The possibility of vessels from outside the UoC or client group fishing the same stock	Vessels from outside the UoC or client group do fish the same stock
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)	Not applicable. All Alpha VesselCo Holdings, Inc. vessels and any non-Omega vessels landing menhaden to Omega processing facilities are included in the UoC.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	Not applicable. All Omega Protein Corporation processing facilities are included in the UoC.
Risks of mixing between certified and non-certified catch during transshipment	Not applicable. Transshipment does occur but again all vessels engaged in this practice are operated by Alpha VesselCo Holdings, Inc. and are included in the UoC.
Any other risks of substitution between fish from the UoC (certified catch) and fish from outside this unit (non-certified catch) before subsequent Chain of Custody is required	Not applicable. All Alpha VesselCo Holdings, Inc. vessels and any non-Omega vessels landing menhaden to Omega processing facilities are included in the UoC.

Given the systems in place the Assessment Team are confident that the fishery has adequate tracking and tracing systems to be confident that any fish sold as ‘MSC Certified’ came from the correct Unit of Certification.

5.3. Eligibility to Enter Further Chains of Custody

Chain of Custody commences at the point of first sale for any party not included in the fishery certificate and for parties within the fishery certificate. Omega Protein Corporation is the sole company involved in processing Atlantic menhaden for reduction purposes. At the outset of this assessment, Omega Protein was vertically integrated, owning and operating its own vessels, which in turn landed only to Omega processing facilities. However, following the acquisition of Omega Protein Corporation by Cooke Inc. in late-2017, Omega Protein Corporation facilities now primarily process catch landed to them by vessels operated by Alpha VesselCo Holdings, Inc. These vessels are those vessels previously owned and operated by Omega Protein Corporation but whose operation was transferred to Alpha VesselCo Holdings, Inc. following the acquisition.

Therefore, the Client Group for this fishery incorporates all Alpha VesselCo Holdings, Inc. vessels (28 active catcher vessels and 4 currently inactive catcher vessels plus 1 carry vessel in the Gulf of Mexico and Atlantic combined) plus two named bait vessels that occasionally sell to Omega Protein Corporation when conditions in the bait market dictate.

Product will only be eligible for Certification if it is landed to an Omega Protein Corporation processing facility. An active list of eligible entities who are part of the client group has been provided (Table 25). Going forward this will be updated as appropriate and maintained on the fishery’s page on the MSC website where it will be available to buyers. The system for recording the transfer of product to buyers is sufficient to identify that all product is eligible for MSC CoC.

Table 25. Client group list (as of October 17th 2017).

Client group entity (CGE)		Activity	Will the CGE handle 100% certified fish from this fishery?	Will the CGE only supply certified fish from this fishery to other CGEs that are also part of the certificate?	COC Required
1	Omega Protein Corporation	Processor	Yes	No	Yes
2	Alpha VesselCo Holdings, Inc.	Harvester	–	–	No
3	F.V. Mosquito Point (Kellum Maritime)	Harvester*	–	–	No
4	F.V. Carter’s Creek (Kellum Maritime)	Harvester*	–	–	No

*Entities involved solely in harvesting do not require Chain of Custody certification.

5.4. Eligibility of IPI stock(s) to Enter Further Chains of Custody

The U.S. Atlantic menhaden fishery harvests exclusively Atlantic menhaden, (*Brevoortia tyrannus*); however, there is the potential for some mixing with yellowfin menhaden (*Brevoortia smithi*), in the extreme south of Atlantic menhaden’s range and the extreme north of Yellowfin menhaden’s range.

Incidental catches of yellowfin menhaden would be practicably indistinguishable from the target species during normal fishing operations. While some catches of IPI stocks may have occurred historically when the range of the menhaden fisheries was much greater than it is today the current distribution of menhaden fishing activity makes it extremely unlikely that there is any catches of potentially IPI stocks; this will need to be reviewed if the range of the menhaden fishery again expands southwards.

6. Evaluation Results

The U.S. ATL menhaden fishery achieved a score of 80 or higher on each of the three MSC Principles independently and did not score less than 60 against any Performance Indicator. Score achieved in each Principle and for each Performance Indicator are shown in Table 26 and Table 27, respectively.

Although the Assessment Team found the fishery to be in overall compliance, the performance of the fishery on three Performance Indicators (PIs 1.2.1, 1.2.2, and 2.3.2) was found to be below the established compliance mark (Table 27). Therefore, three conditions were attached to the fishery, which must be addressed within a specific timeframe. Full explanation of these conditions is provided in Appendix 1.3 along with a full explanation of how the Client intends to meet these conditions.

6.1. Principle Level Scores

Final Principle level scores are shown in Table 26.

Table 26. Final Principle scores.

Principle	Score
Principle 1 – Target Species	82.5
Principle 2 – Ecosystem	87.4
Principle 3 – Management System	92.2

6.2. Summary of PI Level Scores

Final scores for each Performance Indicator are shown in Table 27 below.

Table 27. Performance Indicators scores.

Principle	Component	Wt	Performance Indicator (PI)		Wt	Score
One	Outcome	0.333	1.1.1	Stock status	0.5	80
			1.1.2	Stock rebuilding	0.5	
	Management	0.667	1.2.1	Harvest strategy	0.25	70
			1.2.2	Harvest control rules & tools	0.25	75
			1.2.3	Information & monitoring	0.25	90
1.2.4			Assessment of stock status	0.25	100	
Two	Primary species	0.2	2.1.1	Outcome	0.333	95
			2.1.2	Management strategy	0.333	85
			2.1.3	Information/Monitoring	0.333	80
	Secondary species	0.2	2.2.1	Outcome	0.333	80
			2.2.2	Management strategy	0.333	85
			2.2.3	Information/Monitoring	0.333	80
	ETP species	0.2	2.3.1	Outcome	0.333	90
			2.3.2	Management strategy	0.333	75
			2.3.3	Information strategy	0.333	80
	Habitats	0.2	2.4.1	Outcome	0.333	100
			2.4.2	Management strategy	0.333	90
			2.4.3	Information	0.333	95
	Ecosystem	0.2	2.5.1	Outcome	0.333	100
			2.5.2	Management	0.333	80
			2.5.3	Information	0.333	95
Three	Governance and policy	0.5	3.1.1	Legal &/or customary framework	0.333	95
			3.1.2	Consultation, roles & responsibilities	0.333	85
			3.1.3	Long term objectives	0.333	100
	Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.25	100
			3.2.2	Decision making processes	0.25	95
			3.2.3	Compliance & enforcement	0.25	80
			3.2.4	Monitoring & management performance evaluation	0.25	90

6.3. Summary of Conditions

Three PIs were assessed as scoring less than the unconditional pass mark, and therefore three conditions have been attached to the fishery. Table 28 below presents a summary of the conditions raised during the assessment. Note: This table is for summary purposes only and a complete listing of Conditions, rationales and their associated corrective actions are presented in [Appendix 1.3](#).

Table 28. Summary of Conditions

Condition number	Condition	Performance Indicator	Related to previously raised condition?
1	The Client Group must provide evidence of the implementation of a harvest strategy that is designed to take into consideration the ecological role of Atlantic menhaden and is responsive to the state of the stock with respect to its role in the U.S. Northwest Atlantic ecosystem.	1.2.1	NA
2	The client must provide evidence of implementation of well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden as key low trophic level in the U.S. Northwest Atlantic and that;	1.2.2	NA

Condition number	Condition	Performance Indicator	Related to previously raised condition?
	1. ensure the exploitation rate is reduced as the point where serious ecosystem impacts could occur and; 2. are expected to keep the stock fluctuating around a target level consistent with ecosystem needs.		
3	There shall be a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate. "Regular review" in this context meaning at least once every 5 years. The 'regular review' at SG80 may be met if at least one review of alternative measures has been undertaken, that measures are implemented as appropriate, and there is a commitment from the client or the management body to have another review within the 5-year window.	2.3.2	NA

6.4. Recommendations

In addition to the above Conditions the Assessment Team also made a number of additional recommendation. Recommendations are not obligatory and while they do not require actions on the part of the fishery the client is encouraged to act upon them within the spirit of the MSC certification.

Recommendation 1

The Assessment Team strongly recommends that bycatch studies be undertaken on an ongoing basis and that, in order to ensure comparability between studies, these future bycatch studies should be conducted in a more cohesive and standardized manner than has historically been the case. In addition, every effort should be made to ensure that studies are designed in such a way that the composition of catches by weight can be estimated.

Recommendation 2

The Assessment Team was somewhat constrained in reporting on the roles and responsibilities of all established ASMFC committees and sub-committees owing to the absence of publicly-available information regarding their mission, objectives, and consultation/engagement processes. The team recommends that this information be compiled and posted on the Commission's website.

Recommendation 3

Scoring Issue C of Performance Indicator 3.1.1 - Legal and/or Customary Framework - focuses on "whether a suitable framework exists or does not exist to address the legal rights created explicitly or established by customs of people dependent on fishing for food or livelihood." Where any legal rights have been recognized by legislatures or the courts, the Assessment Team recommends that the FMP be amended to reflect the nature and scope of the legal rights held by Native American Tribes.

Recommendation 4

The Assessment Team noted that State and Federally-reported enforcement and compliance information and data on the operations of the client's purse seine fleet are generally not recorded and/or reported. While we acknowledge the existence and importance of confidentiality rules regarding the reporting of enforcement and compliance information, we also believe that transparency and accountability requisites are not well served when the outcomes of enforcement and compliance activities are not available publicly. The Team recommends that the client and the Commission's Law Enforcement community collaborate in designing and implementing a reporting format that captures each agency's annual enforcement inputs and outcomes while respecting any confidentiality provisions.

6.5. Determination, Formal Conclusion and Agreement

[REQUIRED FOR FINAL REPORT AND PCR]

If the Assessment progress to the Final Report and/or the Public Certification Report stages, the Final Report and/or PCR will include:

- a. A formal statement as to the certification determination recommendation reached by the Assessment Team about whether or not the fishery should be certified.

[REQUIRED FOR PCR]

If the Assessment progress to the Public Certification Report stage, the PCR will include:

- a. The report shall include a formal statement as to the certification action taken by the CAB's official decision-makers in response to the Determination recommendation.

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7.1. Relevant MSC interpretations and Clauses

The MSC requires that the use in an assessment report of an interpretation from the interpretation log must be properly referenced in a separate Appendix of the report with the date, title and web link of the interpretation being provided. In addition to relevant interpretations, SAI Global has also decided to include in full any references from the MSC FCR and Guidance or the MSC GCR that have been referenced in this report.

Relevant Interpretation 1	
Title:	Key LTL reference points (FCR v2.0, - Annex SA, PI 1.1.1A)
Date:	29 th November 2018*
Weblink:	https://mscportal.force.com/interpret/s/article/Key-LTL-reference-points-FCR-v2-0-Annex-SA-PI-1-1-1A
Question:	SAI Global would like to ask MSC to clarify the intent of the key-LTL requirements as to whether the use of reference points predicated on total biomass (as recommended in Smith et al. (2011) and Pikitch et al. (2012) (the studies on which the MSC key-LTL requirements are ostensibly based) rather than spawning stock level (as stipulated in the MSC FCR v2.0) would be permissible?
Answer:	Either indicator can be used, total stock biomass (B) or spawning stock biomass (SSB) (in the absence of fishing), so long as the intent remains that the default target level would be 75% of the respective indicator used (i.e. B or SSB). In the event a higher or lower target biomass level is to be used (i.e. less than or greater than the default 75%), SA2.2.13b shall be adhered to.

* This interpretation was originally sought and received much earlier in the assessment process but following an MSC update that all interpretation had to be on the official log this interpretation was re-requested.

Relevant Interpretation 1	
Title:	P2 species outcome PIs - scoring when no main or no minor (or both) (FCR v2.0 - Annex SA PI 2.1.1, 2.2.1)
Date:	30 th August 2018*
Weblink:	https://mscportal.force.com/interpret/s/article/P2-species-outcome-PIs-scoring-when-no-main-or-no-minor-or-both-PI-2-1-1-1527262009344
Question:	When using the scoring element approach for 2.1.1 and 2.2.1 (version 2.0), what scores would you achieve in the following scenario: Scenario 1: no main species, minor species meet Sib SG100. Here I think we can agree the score is 100 Scenario 2: no main species, minor species do not meet Sib SG100. Here it's confusing because the score is different whether you consider that Sla is 'not applicable' or scores 100. So the score here is either 80 or 90. So in essence my question is, in the absence of main species, do you score Sla as not applicable or SG100 met? The same would need to be true for Sib (in the absence of minor species). I'm hoping it's not applicable as that would make a lot more sense from a practical scoring perspective, particularly if you're dealing with multiple scoring elements (it makes no sense for example to score a main species against Sib). On the other hand, if a fishery has no primary or secondary species, you would want to score both S1's as 100 being met.
Answer:	<p>Basically you only score the main species in the 'main' (S1a) scoring issue and the minor in the 'minor' (Sib) for 2.1.1 and 2.2.1.</p> <p>So in your scenario 1, if the fishery has no main species, scoring issue (a) is not applicable, and scoring issue (b) is scored at the 100 level. If it meets it for all species, then score is 100.</p> <p>In scenario 2, if the fishery has no main species, scoring issue (a) is still not applicable. In scoring issue (b) each species will score either 80 or 100 depending on whether the SG100 is met or not (noting previous interpretation on grouping these, see hyperlink).</p> <p>Clause SA3.2.1 applies when there are no species within a component at all ('If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI'). If no main or minor primary species, for example, then the automatic 2.1.1 score is 100.</p>

Process requirements

Requirements are presented in order of their appearance in the MSC FCR v2.0.

<p>7.4.2</p> <p>7.4.12.2</p>	<p>A fishery shall not be eligible for certification if there is no mechanism for resolving disputes, or if the disputes overwhelm the fishery.</p> <p>If there are other eligible fishers or other potential client group members within the UoA, the CAB shall require the client to:</p> <ol style="list-style-type: none"> a. Prepare and publish a statement of their understanding and willingness for reasonable certificate sharing arrangements. b. Inform other eligible fishers and/or other entities of the public statement and of the opportunity to share the certificate during relevant interactions with the eligible fishers and other entities as is practicable.
<p>7.4.16</p> <p>7.4.16.1</p>	<p>The CAB shall determine if the assessment of the applicant fishery will result in an assessment of overlapping fisheries.</p> <p>If the assessment is based on overlapping fisheries, the CAB shall follow the necessary steps for harmonisation in Annex PB.</p>
<p>7.6.1</p> <p>7.6.1.1</p> <p>7.6.1.2</p>	<p>The CAB shall nominate a date from which product from a certified fishery is eligible to be sold as MSC certified or bear the MSC ecolabel (the eligibility date). This shall be either:</p> <ol style="list-style-type: none"> The date of the certification of the fishery; or The publication date of the first Public Comment Draft Report.
<p>7.7.6</p>	<p>The CAB shall use the criteria in Table 3 to make a decision on whether a fishery may or may not be data-deficient with respect to one or more PI.</p>
<p>7.8.3</p> <p>7.8.3.2</p> <p>7.8.3.3</p>	<p>The announcement shall contain the following information:</p> <ol style="list-style-type: none"> An indicative timetable. The statement on certificate sharing described in 7.4.12.2.a, if applicable.
<p>7.10.5.2</p>	<p>If all of the SG60 scoring issues are met, the PI must achieve at least a 60 score, and the team shall assess each of the scoring issues at the SG80 level.</p> <ol style="list-style-type: none"> c. If not all of the SG80 scoring issues are met, the PI shall be given an intermediate score (65, 70 or 75) reflecting overall performance against the different SG80 scoring issues: <ol style="list-style-type: none"> i. Award 70 where performance against the scoring issues is mid-way between SG60 and SG80 (some scoring issues are fully met, and some are not fully met); and ii. Award 75 when performance against the scoring issues is almost at SG80 (most scoring issues are fully met, but a few are not fully met); and iii. Award 65 when performance against the scoring issues is slightly above SG60 (a few scoring issues are fully met, but most are not fully met). b. If one or more of the SG80 scoring issues is not met, the PI shall be assigned a condition (or conditions).
<p>7.10.5.3</p>	<p>If all of the SG80 scoring issues are met, the PI must achieve at least an 80 score, and the team shall assess each of the scoring issues at the SG100 level.</p> <ol style="list-style-type: none"> a. If not all of the SG100 scoring issues are met, the PI shall be given an intermediate score (85, 90 or 95) reflecting overall performance against the different SG100 scoring issues. <ol style="list-style-type: none"> i. Award 90 where performance against the scoring issues is mid-way between SG80 and SG100 (some scoring issues are fully met, and some are not fully met); and ii. Award 95 when performance against the scoring issues is almost at SG100 (most scoring issues are fully met, but a few are not fully met); and iii. Award 85 when performance against the scoring issues is slightly above SG80 (a few scoring issues are fully met, but most are not fully met). iv. If all of the SG100 scoring issues are met, the PI shall be given a 100 score.
<p>7.11.1</p>	<p>The CAB shall set one or more auditable and verifiable conditions for continuing certification if the UoA achieves a score of less than 80 but equal to or greater than 60 for any individual PI.</p>
<p>7.11.3</p>	<p>The CAB shall not accept a client action plan if the client is relying upon the involvement, funding and/or resources of other entities (fisheries management or research agencies, authorities or regulating bodies that</p>

	might have authority, power or control over management arrangements, research budgets and/or priorities) without:
7.11.3.1	Consulting with those entities when setting conditions, if those conditions are likely to require any or all of the following: <ul style="list-style-type: none"> a. Investment of time or money by these entities. b. Changes to management arrangements or regulations. c. Re-arrangement of research priorities by these entities.
7.11.3.2	Being satisfied that the conditions are both achievable by the client and realistic in the period specified.
7.11.3.3	Interpreting the word 'entities' in 7.11.3.1 to mean all fisheries management or research agencies, authorities or regulating bodies that might have authority, power or control over management arrangements, research budgets and/or priorities.

Annex SA – The Default Assessment Tree requirements and Guidance

Requirements:

SA2.2.8	The team shall consider the trophic position of target stocks to ensure precaution in relation to their ecological role, in particular for species low in the food chain.
SA2.2.9	Teams shall treat a stock under assessment against Principle 1 as a key LTL stock if: <ul style="list-style-type: none"> a. It is one of the species types listed in Box SA1 and in its adult life cycle phase the stock holds a key role in the ecosystem, such that it meets at least two of the following sub-criteria i, ii and iii. <ul style="list-style-type: none"> i. A large proportion of the trophic connections in the ecosystem involve this stock, leading to significant predator dependency; ii. A large volume of energy passing between lower and higher trophic levels passes through this stock; iii. There are few other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, such that a high proportion of the total energy passing between lower and higher trophic levels passes through this stock (i.e., the ecosystem is 'wasp-waisted'). b. It is not one of the species types listed in Box SA1, but in its adult life cycle phase it meets at least two of the sub criteria in SA2.2.9a. I – iii, and additionally meets the following criteria: <ul style="list-style-type: none"> i. The species feeds predominantly on plankton; has a trophic level of about 3 (but potentially ranging from 2 to 4); is characterised by small body size, early maturity, high fecundity and short life span (default values: <30cm long as adults, mean age at maturity ≤ 2, >10,000 eggs/spawning, maximum age <10 years respectively); and forms dense schools.
SA2.2.13	When scoring PI 1.1.1A scoring issue (b), the expectations for key LTL species shall be as given below: <ul style="list-style-type: none"> a. The default biomass target level consistent with ecosystem needs shall be 75% of the spawning stock level that would be expected in the absence of fishing. b. A higher or lower target level, down to a minimum allowed 40% of the spawning stock level that would be expected in the absence of fishing, may still achieve an 80 level score if it can be demonstrated, through the use of credible ecosystem models or robust empirical data for the UoA/ecosystem being assessed, that the level adopted: <ul style="list-style-type: none"> i. Does not impact the abundance levels of more than 15% of the other species and trophic groups by more than 40% (compared to their state in the absence of fishing on the target LTL species); and ii. Does not reduce the abundance level of any other species or trophic group by more than 70%.
SA2.2.15	Where proxy indicators and reference points are used to score key LTL species at PI 1.1.1A, the team shall justify their use as reasonable proxies of stock biomass for the points where serious ecosystem impacts could occur and the level consistent with ecosystem needs. <ul style="list-style-type: none"> a. Where fishing mortality rate is used to score stock status, the default fishing mortality required to maintain a stock fluctuating around the level consistent with ecosystem needs shall take the value of 0.5M or 0.5 F_{MSY}, where F_{MSY} has been determined in a single species context.
SA3.2.1	If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI.

Guidance:

GSA2.2.15	<p><u>Scoring key LTL stocks based on fishing mortality rate (F)</u></p> <p>In the absence of robust estimates for B_0, target fishing mortality rates that would achieve the appropriate target biomass levels can be adopted. Smith et al (2011) and the Lenfest task force found that exploitation rates about half MSY rates were required to limit the ecosystem impacts to the same levels obtained at the default $75\%B_0$.</p> <p>For key LTL species, the default expectations provided in GSA2.2.4 (for non-key LTL species) should be modified to reflect the higher biomass levels expected and the lower fishing mortality rates needed.</p> <ul style="list-style-type: none"> ▪ At least a 60 score is justified if F is likely to have been somewhat below F_{MSY} but not as low as $50\%F_{MSY}$ for at least one generation time of the species (or for at least two years, if greater). ▪ At least an 80 score is justified if F is likely to have been at $0.5F_{MSY}$ or $0.5M$ for at least two generation times (or for at least four years, if greater). ▪ A 100 score is justified if F is highly likely to have been below $0.5F_{MSY}$ or $0.5M$ for at least two generation times (or for at least four years, if greater).
GSA3.5.1	<p><u>Scoring issue (d) Shark finning</u></p> <p>Scoring issue (d) is only scored where the primary species is a shark, regardless of whether it is wanted or unwanted catch. See GSA2.4, guidance on PI 1.2.1 to score SI (e) related to shark finning.</p>
GSA4.10.1	<p><u>External review</u></p> <p>At SG80 and 100, “external review” means external to the fisheries management system, but not necessarily international. Depending on the scale and intensity of the fishery, it could be by:</p> <ul style="list-style-type: none"> ▪ Another department within an agency; ▪ Another agency or organisation within the country; ▪ A government audit that is external to the fisheries management agency; ▪ A peer organisation nationally or internationally, and ▪ External expert reviewers.

Annex PF – Risk-Based Framework requirements

PF4.1.4	<p>The team may elect to conduct a PSA on “main” species only when evaluating PI 2.1.1 or 2.2.1.</p>
PF4.1.4.1	<p>If the team decides to consider “main” species only, final PI score shall be adjusted downward according to clause PF5.3.2.</p>
PF4.4.3	<p>When scoring susceptibility, the team shall take into account the impacts of fisheries other than the UoA according to the following requirements:</p>
PF4.4.3.3	<p>When scoring PI 2.2.1, if the UoA has main species with catches at 10% or more of the total catch by weight of the UoA, all MSC UoAs having a catch of the same species that is 10% or more of the total catch of the UoAs shall be identified and listed separately.</p> <p>a. If the UoA does not have main species with catches at 10% or more of the total catch by weight of the UoA, the team may elect to conduct the PSA on the UoA only.</p>
PF5.3.2	<p>The final PI score shall be capped by the team in cases where only a subset of the total number of species has been evaluated.</p>
PF5.3.2.1	<p>If the team has only considered “main” species in the PSA analysis, the final PI score shall not be greater than 80.</p>

8. Appendices

8.1. Appendix 1 Scoring and Rationales

8.1.1. Appendix 1.1 Performance Indicator Scores and Rationale – Evaluation Tables

8.1.1.1. Principle 1 – Sustainable Target Fish Stocks – Evaluation Tables

PI 1.1.1A – Stock Status (key LTL)

As it has been determined by the Assessment Team that the Atlantic menhaden stock represents a key LTL stock for the purpose of this assessment, the status of the stock will be assessed under PI 1.1.1A rather than PI 1.1.1.

PI 1.1.1 A		The stock is at a level which has a low probability of serious ecosystem impacts		
Scoring Issue		SG 60	SG 80	SG 100
a	Stock status relative to ecosystem impairment			
	Guidepost	It is likely that the stock is above the point where serious ecosystem impacts could occur.	It is highly likely that the stock is above the point where serious ecosystem impacts could occur.	There is a high degree of certainty that the stock is above the point where serious ecosystem impacts could occur.
	Met?	Y	Y	N
	Justification	<p>It is highly likely that the stock is above the point where serious ecosystem impacts could occur.</p> <p>As discussed in detail in Section 3.3.3.6 and 3.3.3.7 of this report, Atlantic menhaden is currently managed in a single species context using single species reference points as interim values while appropriate ecological reference points (ERPs) are developed. Therefore, as ERPs do not currently exist for this stock, the status of the stock with respect to the point where serious ecosystem impacts could occur is assessed using a suite of candidate ‘rule of thumb’ reference points (for extensive discussion of this topic see Section 3.3.3.6 and 3.3.3.7).</p> <p><u>Biomass with respect to B₀</u> Based on the 2017 Assessment the BERP committee estimated B₂₀₁₇ to be 46.7% of the total biomass that would be expected in the absence of fishing (i.e. B₂₀₁₇/B₀ = 0.467); therefore, the stock is above the default biomass threshold for a key-LTL recommended in Pikitch et al., (2012) (B = 40%B₀).</p> <p><u>Fishing mortality with respect to 0.5M</u> Based on the 2017 Assessment the BERP committee estimated the biomass-weighted F that would result in F = 0.5M to be 0.367. Biomass-weighted Full-F₂₀₁₆ = 0.204. In addition, biomass-weighted Full-F has been below F = 0.5M (0.367) for the last 12 years (Figure 26).</p> <p><u>Fishing mortality with respect to F_{40%B₀}</u> Based on the 2017 Assessment the BERP committee estimated the biomass-weighted F that would be expected to result in biomass = 40%B₀ to be 1.493. Estimated F₂₀₁₆ = 0.204 or in other words F₂₀₁₆/F_{40%B₀} = 0.14. Therefore, fishing mortality has been below the level expected to result in B = 40%B₀ for almost the entire time series.</p> <p>Given the above the Assessment Team have determined that it is highly likely that the stock is above the point where serious ecosystem impacts could occur; SG60 and SG80 are met.</p> <p>However, given that these ecological reference points are deterministic in nature and estimates of uncertainty have not yet been estimated for these ecological reference points, it cannot be said that there is a high degree of certainty that the stock is above the point where serious ecosystem impacts could occur; SG100 is not met.</p>		

PI 1.1.1 A	The stock is at a level which has a low probability of serious ecosystem impacts		
b	Stock status in relation to ecosystem needs		
Guidepost		The stock is at or fluctuating around a level consistent with ecosystem needs.	There is a high degree of certainty that the stock has been fluctuating around a level consistent with ecosystem needs or has been above this level over recent years.
Met?		Y	N
Justification	<p>The stock is at or fluctuating around a level consistent with ecosystem needs.</p> <p>As discussed in detail in Section 3.3.3.6 and 3.3.3.7 of this report, Atlantic menhaden is currently managed in a single species context using single species reference points as interim values while appropriate ecological reference points (ERPs) are developed. Therefore, as ERPs do not currently exist for this stock, the status of the stock with respect to the point where serious ecosystem impacts could occur is assessed using a suite of candidate ‘rule of thumb’ reference points (for extensive discussion of this topic see Section 3.3.3.6 and 3.3.3.7).</p> <p><u>Biomass with respect to B₀</u> Based on the 2017 Assessment the BERP committee estimated B₂₀₁₇ to be 46.7% of the total biomass that would be expected in the absence of fishing (i.e. B₂₀₁₇/B₀ = 0.467); therefore, the stock is below the default biomass threshold for a key-LTL (B = 75%B₀).</p> <p>However, evidence exists from a “credible ecosystem model” (Buchheister et al., 2017)) that suggests that having the stock at its current level is not expected to reduce the abundance levels of more than 15% of the other species and trophic groups by more than 40% (compared to their state in the absence of fishing on the target LTL species) or reduce the abundance level of any other species or trophic group by more than 70% (see 3.3.3.7 for extensive discussion of this topic).</p> <p>A case can in fact be made for a biomass target level of as low as 40%B₀ which is the minimum allowable according to the MSC FCR. However, the number of assumptions involved, whether or not this would in fact be a prudent approach is not clear.</p> <p><u>Fishing mortality with respect to 0.5M</u> Based on the 2017 Assessment the BERP committee estimated the biomass-weighted F that would result in F = 0.5M to be 0.367. Biomass-weighted Full-F has been below this level for the last 12 years (i.e. 3 generation times) (Figure 26).</p> <p><u>Fishing mortality with respect to F_{75%B₀}</u> Based on the 2017 Assessment the BERP committee estimated the biomass-weighted F that would be expected to result in biomass = 75%B₀ to be 0.16. Estimated F₂₀₁₆ = 0.204 or in other words F₂₀₁₆/F_{75%B₀} = 1.28. Therefore, fishing mortality has been close to the level expected to result in B = 75%B₀ for the last 9 years (i.e. 2.25 generation times) (Figure 26).</p> <p>Given the above, the Assessment Team have determined that the stock is at or fluctuating around a level consistent with ecosystem needs; SG80 is met.</p> <p>While SG80 is met, given the number of assumptions and level of uncertainty involved and without robust menhaden-specific ERPs against which to measure the status of the stock, it cannot be said that there is a high degree of certainty that the stock has been fluctuating around a level consistent with ecosystem needs or has been above this level over recent years; SG100 is not met.</p>		

PI 1.1.1 A	The stock is at a level which has a low probability of serious ecosystem impacts		
References	<p>Buchheister, A, Miller, T.J., & E.D. Houde (2017). Evaluating ecosystem-based reference points for Atlantic menhaden (<i>Brevoortia tyrannus</i>). Marine and Coastal Fisheries, DOI: 10.1080/19425120.2017.1360420.</p> <p>Pikitch, et. al., (2012). Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.</p> <p>Smith et al. (2011). Impacts of fishing low-trophic level species on marine ecosystems. Science 333, 1147–1150.</p>		
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 ecosystem impairment (SIa)	B = 40%B ₀	0.4	B ₂₀₁₇ /B ₀ = 0.467
	F = 0.5M	0.367	F ₂₀₁₆ = 0.204
	F = F _{40%B₀}	1.493	F ₂₀₁₆ = 0.204
Reference point used in scoring stock relative to ecosystem needs (SIb)	B = 75%B ₀	0.75	Current biomass B ₂₀₁₇ /B ₀ = 0.467
	F = 0.5M	0.367	F ₂₀₁₆ = 0.204
	F = F _{75%B₀}	0.16	F ₂₀₁₆ = 0.204
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 1 of 1, SG80 – 2 of 2, SG100 – 0 of 2)			80
CONDITION NUMBER (if relevant):			

PI 1.1.2 – Stock rebuilding

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?	Not Applicable		Not Applicable
	Justification	The menhaden stock is not currently below the point where serious ecosystem impacts could occur; therefore, PI 1.1.2 is not applicable.		
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?	Not Applicable	Not Applicable	Not Applicable
	Justification	The menhaden stock is not currently below the point where serious ecosystem impacts could occur; therefore, PI 1.1.2 is not applicable.		
References		Not Applicable		
OVERALL PERFORMANCE INDICATOR SCORE:				NA
CONDITION NUMBER (if relevant):				

PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guidepost	The harvest strategy is expected to achieve stock management objectives reflected in PI 1.1.1a 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 1.1.1a SG80.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in PI 1.1.1a SG80.
	Met?	Y	N	Not scored
	Justification	<p>The harvest strategy is expected to achieve stock management objectives reflected in PI 1.1.1 SG80.</p> <p>Atlantic menhaden are currently managed under Amendment 3 to the Interstate Fishery Management Plan (FMP) for Atlantic Menhaden. Approved in November 2017, the Amendment maintains the management program’s current single-species biological reference points until the review and adoption of menhaden-specific ecological reference points as part of the 2019 benchmark stock assessment process. It also addresses a suite of commercial management measures including allocation, quota transfers, quota rollovers, incidental catch, the episodic events set aside program, and the Chesapeake Bay reduction fishery cap. In addition to its Amendment 3 deliberations, the Board set the total allowable catch for the 2018 and 2019 fishing seasons at 216,000 mt with the expectation that the setting of the TAC for subsequent years will be guided by menhaden-specific ecological reference points. States are required to close their fisheries when the state-specific portion of the TAC has been reached; any overages must be paid back the following year. Under the Amendment, 1% of the overall TAC is set aside for episodic events in the States of New York through Maine.</p> <p>Assessments indicate that the mechanisms in place have been effective at keeping fishing pressure below, and SSB (measured as fecundity) above, defined thresholds. Given the above, the fishery meets 60a.</p> <p>However, given that Atlantic menhaden is considered as a key low trophic level species, the current biological reference points that were calculated from a single species context may not be appropriate (Please see PI 1.1.a) for management for a species with a strong ecological role. Thus, it cannot be said the harvest strategy contained within the Amendment 3 of the FMP is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving stock management objectives from an ecological role viewpoint preventing the fishery from meeting SG80; SG80 is not met.</p> <p>According to FCR 7.10.5.3, if SG80 is not met for all SIs then no SI can be scored at SG100; therefore, as SG80 for SIa was not met, SG100 was not scored.</p>		
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?	Y	Y	Not scored

PI 1.2.1	There is a robust and precautionary harvest strategy in place		
Justification	<p>The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.</p> <p>Atlantic menhaden are currently managed under Amendment 3 to the Interstate Fishery Management Plan (FMP) for Atlantic Menhaden. Approved in November 2017, the Amendment maintains the management program's current single-species biological reference points until the review and adoption of menhaden-specific ecological reference points as part of the 2019 benchmark stock assessment process. It also addresses a suite of commercial management measures including allocation, quota transfers, quota rollovers, incidental catch, the episodic events set aside program, and the Chesapeake Bay reduction fishery cap. In addition to its Amendment 3 deliberations, the Board set the total allowable catch for the 2018 and 2019 fishing seasons at 216,000 mt with the expectation that the setting of the TAC for subsequent years will be guided by menhaden-specific ecological reference points. States are required to close their fisheries when the state-specific portion of the TAC has been reached; any overages must be paid back the following year. Under the Amendment, 1% of the overall TAC is set aside for episodic events in the States of New York through Maine.</p> <p>Assessments indicate that the mechanisms in place have been effective at keeping fishing pressure below, and SSB (measured as fecundity) above, defined thresholds. Given the above, SG60 is met.</p> <p>Atlantic menhaden is considered as a key low trophic level species, the current biological reference points that were calculated from a single species context may not be appropriate (Please see PI 1.1.a) for management for a species with a strong ecological role. However, when the status of menhaden stock are explored based on the ecological role it shows that the current stock is highly likely is above the point where serious ecosystem impacts could occur. Thus, it can be said the harvest strategy may not have been fully tested but evidence exists that it is achieving the proposed objectives of Amendment 3; SG80 is met.</p> <p>According to FCR 7.10.5.3, if SG80 is not met for all SIs then no SI can be scored at SG100; therefore, as SG80 for SIa was not met, SG100 was not scored.</p>		
c	Harvest strategy monitoring		
Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
Met?	Y		
Justification	<p>Monitoring is in place that is expected to determine whether the harvest strategy is working.</p> <p>There is a fishery management plan in place, where it is supported by an operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews.</p> <p>There is a high level of scientific research and monitoring associated with Atlantic menhaden fisheries, including regular stock assessments. Much of the scientific research and monitoring is carried out by the Southeast Fisheries Science Center (SEFSC) in Beaufort North Carolina which provides the ASMFC with scientific advice, including stock assessments, to guide the management of the fishery. A number of independent and academic institutions also conduct research in the region including life history studies and conducting tagging experiments to monitor fish populations. Stock assessments account for all sources of fishing mortality. There is therefore a wealth of both fishery dependent and fishery independent data available to ASMFC in order to ensure the fishery is managed effectively.</p>		

PI 1.2.1	There is a robust and precautionary harvest strategy in place		
	Status of the stock and the fishery is based on results from a catch-at-age model that uses fishery catch statistics and sampling for size and age composition of the catch. The model is calibrated to trends in abundance from state agencies. This monitoring is carried out annually. Given the above monitoring is in place that is expected to determine whether the harvest strategy is working; SG60 is met.		
d	Harvest strategy review		
Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
Met?			Not Scored
Justification	According to FCR 7.10.5.3, if SG80 is not met for all SIs then no SI can be scored at SG100; therefore, as SG80 for SIa was not met, SG100 was not scored.		
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	The target species (Atlantic menhaden) is not a species of shark; SIe is not relevant.		
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 biennial 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?	Not relevant	Not relevant	Not relevant
Justification	There are no unwanted catches from the target stock (Atlantic menhaden). All catches of Atlantic menhaden are retained and utilised; SIe is not relevant.		
References	ASMFC 2012 ASMFC 2017		
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 3 of 3, SG80 – 1 of 2, SG100 – Not scored)			70
CONDITION NUMBER (if relevant):			1

PI 1.2.2 – Harvest control rules and tools

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?	Y	N	Not scored
	Justification	<p>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.</p> <p>Specifically, the Atlantic menhaden fishery management plan requires management action to rebuild stock if it is depleted (overfished) as well as action to reduce exploitation if overfishing is occurring. The ASMFC adopted harvest control rules for the fishery to avoid overfishing under Addendum V and Amendment 2.</p> <p>Addendum V states that when overfishing is occurring the Board will take steps to reduce F to the target level. In order to end overfishing and reduce F to the target, the Board needs to consider changes in the management tools used to regulate the fishery. Amendment 2 also adopted new biological reference points for biomass which are based on maximum spawning potential, with the goal of increasing abundance, spawning stock biomass, and menhaden availability as a forage species</p> <p>The harvest control rules under Amendment 2 are as follows:</p> <p>2.6. Maintenance of Stock Structure</p> <p>2.6.1. Stock Targets</p> <p>The Management Board will evaluate the current estimates of F with respect to its reference points (Section 2.5) before proposing any additional management measures. If the current F exceeds the threshold level, the Board will take steps to reduce F to the target level; if current F exceeds the target, but is below the threshold, the Board should consider steps to reduce F to the target level. If current F is below the target F, then no action would be necessary to reduce F.</p> <p>The Management Board will evaluate the current estimates of SSB with respect to its reference points (Section 2.5) before proposing any additional management measures. If the current SSB is below the threshold level, the Board will take steps to increase SSB to the target level; if current SSB is below the target, but above the threshold, the Board should consider steps to increase SSB to the target level. If current SSB is above the target SSB, then no action would be necessary to increase SSB.</p> <p>Abundance and exploitation reference points are in place to guide management decision making, however, predetermined management actions that would constitute well-defined harvest control rules from an ecological view considering menhaden as a key low trophic level species have not been adopted for the Atlantic menhaden fishery. A score of 60, but not 80, can be justified for Sla.</p> <p>According to FCR 7.10.5.3, if SG80 is not met for all SIs then no SI can be scored at SG100; therefore, as SG80 for Sla was not met, SG100 was not scored.</p>		

PI 1.2.2	There are well defined and effective harvest control rules (HCRs) in place		
b	HCRs robustness to uncertainty		
	Guidepost		The HCRs are likely to be robust to the main uncertainties.
	Met?	Y	Not scored
	Justification	<p>The HCRs are likely to be robust to the main uncertainties.</p> <p>Abundance and exploitation reference points are in place and the model used to assess stock status incorporates a comprehensive treatment of estimation uncertainty. Furthermore, predetermined management actions that would constitute well-defined harvest control rules have been adopted for the Atlantic menhaden fishery. There is also risk analysis associated with the reference points to guide management decision making.</p> <p>However, it cannot be said that 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; SG80 is met.</p> <p>According to FCR 7.10.5.3, if SG80 is not met for all SIs then no SI can be scored at SG100; therefore, as SG80 for SIa was not met, SG100 was not scored.</p>	
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.
	Met?	Y	Not scored
	Justification	<p>Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.</p> <p>The tools to control effort (e.g. temporal and spatial closures and other technical measures) are appropriate and have the potential to effectively reduce exploitation as evidenced by the low levels of fishing mortality over the past 20-plus years; SG80 is met.</p> <p>According to FCR 7.10.5.3, if SG80 is not met for all SIs then no SI can be scored at SG100; therefore, as SG80 for SIa was not met, SG100 was not scored.</p>	
References	[List any references here]		
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 2 of 2, SG80 – 2 of 3, SG100 – Not scored)			75
CONDITION NUMBER (if relevant):			2

PI 1.2.3 – Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue	SG 60	SG 80	SG 100	
a	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?	Y	Y	Y
	Justification	<p>Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.</p> <p>Research studies over a protracted period have provided considerable knowledge of all aspects of Atlantic menhaden life history, population biology, ecology and stock structure throughout the Chesapeake Bay and Mid-Atlantic region. Stock productivity and abundance are monitored by independent state agency surveys, which provide ongoing, fishery-independent indices of abundance and biomass at age as well as detailed information on size, age and maturity composition. In addition to the foregoing, the whole Chesapeake Bay and Middle Atlantic region has been the focus of extensive ecosystem research for many years. Detailed information on number and type of vessels in the fishery is collected. The temporal and spatial patterns of the fishery, gear usage, etc. are well known. The Atlantic menhaden reduction fishery can be considered a single species fishery with the gear used to prosecute the fishery (purse seine) being very selective.</p> <p>When fishing for menhaden, all vessels in the reduction commercial fleet are required to carry Vessel Monitoring Systems (VMS) on board when on a fishing trip. The VMS units transmit positional information to a communication service provider who, in turn, makes the information available. Landings are monitored at the dockside point of offloading. Monitors verify the weight and the species of fish offloaded and take biological samples that feeds on the stock assessment. Given the above, it can be said that 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; SG60, SG80 and SG100 are met.</p>		
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?	Y	Y	N

PI 1.2.3	Relevant information is collected to support the harvest strategy		
Justification	<p>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.</p> <p>The most recent stock assessment incorporates information on the age composition of the landings, discards size and age composition of the population, and trends in relative abundance derived from state agency independent survey biomass indices. The latest assessment covered the period 1940 – 2016 and incorporated a number of datasets including reduction, bait fisheries landings data, fishery-dependent age compositions, a coastwide juvenile abundance index based on seine surveys, an adult abundance index based on gillnet surveys and updated biological parameters such as estimates of mean weight at age and natural mortality. There is good information on all removals from menhaden stock which feed into assessments of the stock. In addition to the foregoing, the whole Chesapeake Bay and Mid-Atlantic region has been the focus of extensive ecosystem research for many years. However there is no ongoing observer coverage for this fishery</p> <p>Given the above, it can be said that 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; SG60 and SG80 are met.</p> <p>However, it cannot be said that 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; SG100 is not met.</p>		
c	Comprehensiveness of information		
Guidepost		There is good information on all other fishery removals from the stock.	
Met?		Y	
Justification	<p>There is good information on all other fishery removals from the stock.</p> <p>There is good information on all removals from menhaden stock which feed into assessments of the stock. Harvest comes from directed fisheries, primarily purse seines, pound nets, cast nets and gill nets, and bycatch in various food-fish fisheries, such as pound nets, haul seines, and trawls.</p> <p>The reduction fishery comprises 80% of the landings for Atlantic menhaden. Atlantic menhaden is a key harvested species on Chesapeake Bay and in the coastal waters of the Atlantic Ocean.</p> <p>Gears used to prosecute the fishery (i.e. purse seine) tend to be selective in nature and rarely catches other species. State and Federal management agencies are responsible for accounting for all fishing. Landings are monitored at the dockside point of offloading. Monitors verify the weight and the species of fish offloaded. A variety of information must also be reported to State and Federal agencies in charge in fishery monitoring documents completed by the captain for each trip; Menhaden are taken for bait in almost all Atlantic coast states and are used for bait in crab pots, lobster pots, and hook and line fisheries (both sport and commercial). Through ACCSP, quantifiable data is available to evaluate the extent of bycatch in menhaden fisheries, as well as the bycatch of menhaden in other fisheries. Thus total information on commercial Atlantic menhaden landings includes reduction, bait, bycatch, and episodic event set aside (EESA) landings. In addition to the foregoing, the whole Chesapeake Bay and Mid-Atlantic region has been the focus of extensive ecosystem research for many years. However there is no ongoing observer coverage for this fishery; SG80 is met.</p>		

PI 1.2.3	Relevant information is collected to support the harvest strategy	
References	[List any references here]	
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 2 of 2, SG80 – 3 of 3, SG100 – 1 of 2)		90
CONDITION NUMBER (if relevant):		

PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	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?		Y	Y
	Justification	<p>The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.</p> <p>The use of a statistical catch-at-age model for Atlantic Menhaden was explored. The BAM model is a catch at age model that uses forward computations assuming separability of fishing mortality into year and age components to estimate population sizes given observed catches, catch-at-age, and indices of abundance. Recruitment of menhaden is highly episodic and not well described by traditional stock recruitment relationships. Given this, an MSY proxy was used for reference points based on spawning potential ratio and estimates of fecundity. $F_{21\%}$ is the proxy used for the overfishing threshold (F_{MSY}). This is consistent with the choice of proxy in the previous assessment. The BAM model is calibrated to trends in abundance from gillnet and seine survey series. A score of 100 is justified for issue a.</p>		
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?	Y	Y	
	Justification	<p>The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.</p> <p>The biological reference points (benchmarks) in place for the Atlantic menhaden stock are spawning potential ratio (SPR) based and are appropriate to the menhaden stock. A score of 100 is justified for issue b.</p>		
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?	Y	Y	Y
	Justification	<p>The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.</p> <p>Evaluation of stock status is based on results from a catch at age model that uses fishery catch statistics and sampling for size and age composition of the catch (including discards). The model is calibrated to trends in abundance from survey series: Robustness testing includes model fit diagnostics and retrospective analyses are conducted to detect any tendency to consistently overestimate or underestimate fishing mortality, biomass and recruitment relative to the terminal year estimates. Model projections provide a basis for determining probability of exceeding F% for a range of catch options. A score of 100 is justified for issue c.</p>		

PI 1.2.4	There is an adequate assessment of the stock status		
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?		Y
	Justification	<p>The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.</p> <p>The model used to assess status of Atlantic Menhaden is subject to ongoing rigorous review and evaluation. Adjustments are made as necessary to correct for any bias or other uncertainty that is detected. Latest stock assessment showed no problems with retrospective patterns. There was also good model fitting. A score of 100 is justified for issue d.</p>	
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?	Y	Y
	Justification	<p>The assessment has been internally and externally peer reviewed.</p> <p>Atlantic menhaden stock assessment is subject to peer review conducted through the South East Data, Assessment, and Review (SEDAR) process with the Atlantic menhaden FMP requiring that a benchmark assessment be conducted every 5 years. A score of 100 is justified for issue e.</p>	
References	[List any references here]		
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 2 of 2, SG80 – 4 of 4, SG100 – 4 of 4)			100
CONDITION NUMBER (if relevant):			

8.1.1.2. Principle 2 – Environmental Impact of Fishing – Evaluation Tables
PI 2.1.1 – Primary species outcome

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 categories 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?	Not Applicable	Not Applicable	Not Applicable
Justification	<p>The menhaden purse seine fishery is highly targeted and exploits highly homogeneous shoals of menhaden. As a consequence of the highly targeted nature of the fishery, yields are generally comprised of high proportions of the target species. As such, there is very little mixing of non-target species in the fishery's catches. In general, the menhaden purse fishery is considered to be an extremely clean fishery. No species meets the respective thresholds for main species; there are no Main Primary species.</p> <p>FCR v2.0 Clause SA3.2.1 only applies at the PI level when there are no species within a component at all (i.e. if there were no Main OR Minor Primary species). In accordance with Relevant Interpretation 2, if a fishery has no main species SIa is not applicable.</p> <p>For the reasons outlined above PI 2.1.1 is scored as Not Applicable.</p>		
b	Minor primary species stock status		
Guidepost			Minor primary species are highly likely to be above the PRI OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species
Met?			Y (11 species) N Sandbar shark
Justification	<p>The analysis outlined in Section 3.4.1. Primary and Secondary species identified 12 Minor Primary species. Of these 12 species, 7 are not overfished according to the most current assessments (i.e. are highly likely to be above the PRI) (for further details see Table 13).</p> <p>For 4 of the other 5 species, while it cannot be said that stocks are highly likely to be above the PRI, there is evidence to suggest that the menhaden fishery is not hindering their recovery and rebuilding. For the final species sandbar shark, it cannot be said that either the species is highly likely to be above the PRI or that there is evidence that the menhaden fishery does not hinder the recovery and rebuilding of the species.</p>		

<p>PI 2.1.1</p>	<p>The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.</p>
	<p>Minor primary species highly likely to be above the PRI With latest stock assessments showing stocks not to be overfished (implying very little chance of recruitment being impaired) (Table 14); American butterfish, black drum, blue crab, bluefish, Spanish mackerel, striped bass and summer flounder are highly likely to be above the PRI; SG100 is met for these species.</p> <p>Minor primary species not highly likely to be above the PRI The latest assessments of Atlantic croaker, red drum, sandbar/brown shark, spot and weakfish stocks show stocks to be either overfished (sandbar/brown shark and weakfish) or the overfished status to be undetermined (Atlantic croaker, red drum and spot).</p> <p>In the cases of all three stocks it cannot be said that the stocks are highly likely to be above their respective PRIs; however, there is evidence (outlined below) to suggest that the menhaden fishery does not hinder the recovery and rebuilding of these species.</p> <p>Atlantic croaker In 2014, the last year for which these data were available at the time of this assessment, total Atlantic croaker landings from New Jersey through the east coast of Florida were approx. 4,572 mt. In the same year the menhaden fishery, based on the two data sources examined (Kirkley, 1995; NOAA data) and total menhaden landings for the year (131,100 mt), could have been expected to retain between 2.6 mt (Kirkley, 1995) and 10.5 mt (NOAA data) of Atlantic croaker.</p> <p>Based on the above analysis the menhaden fishery accounted for between 0.06% and 0.23% of total Atlantic croaker landings in 2014. Furthermore the vast majority of Atlantic croaker removals occur as a result of discards in the shrimp trawl fishery (ASMFC, 2017). Therefore, it is highly unlikely that the menhaden fishery is hindering the recovery and rebuilding of Atlantic croaker (if in fact Atlantic croaker is overfished); SG100 is met for Atlantic croaker.</p> <p>Red Drum A 2017 benchmark assessment (ASMFC 2017a) of red drum determined that overfishing was not occurring for either the northern or the southern stocks; note, given the spatial range of the fishery it is only likely to impact the northern stock. The assessment also suggested that both stocks are above their management targets and limits; however, due to the high degree of uncertainty associated with these assessments, they could not determine whether the stocks were overfished.</p> <p>Based on the two data sources examined (Kirkley, 1995; NOAA data) and total menhaden landings for the year (137,400 mt), catches of red drum in the menhaden fishery in 2016 could have been approx. 1.37 mt (Note this is based on NOAA data as Kirkley (1995) did not record red drum). In the northern stock, commercial removals (harvest plus dead discards) have fluctuated around an average of 63,638 fish per year, mostly from gillnets, with recreational harvests regularly two or more times the commercial harvest (i.e. >120,000 fish per year) (ASMFC, 2017a).</p> <p>Given that; 1) the menhaden fishery likely accounts for only a very small proportion of overall red drum mortality and 2) the latest stock assessment stock suggests (albeit with a lot of uncertainty) that the stock is in fact above its management targets and limits; it is highly unlikely that the menhaden fishery is hindering the recovery and rebuilding of red drum; SG100 is met for red drum.</p>

<p>PI 2.1.1</p>	<p>The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.</p>
	<p>Sandbar/brown shark</p> <p>A 2011 benchmark assessment (SEDAR 21) of sandbar shark (<i>Carcharhinus plumbeus</i>) indicated that sandbar sharks continued to be overfished ($B/B_{MSY} = 0.66$) but are not experiencing overfishing. As a result of the overfished status of the stock the species is in year 13 of a 66 year rebuilding plan with a rebuilding date of 2070.</p> <p>Based on the two data sources examined (Kirkley, 1995; NOAA data) and total menhaden landings for the year (137,400 mt), catches of sandbar in the menhaden fishery in 2016 could have been between 1 mt (NOAA data) and 27 mt (Kirkley, 1995). It is important to note here that the NOAA data recorded only a single haul where sandbar was captured but unfortunately only a weight and not the number of individual sharks involved were recorded. In addition, while the NOAA data reports the sandbar shark(s) being discarded it does not give any indication as to the status of the released individual(s).</p> <p>Given that the retention of sandbar sharks is prohibited and the only quota issued in 2016 was a scientific quota of 90.7 mt, were sandbar shark catches in the menhaden fishery (assuming all captures resulted in mortalities) towards the upper region of the figures outlined above it cannot be said that there is evidence that the menhaden fishery does not hinder the recovery and rebuilding of sandbar shark; SG100 is not met for sandbar shark.</p> <p>Spot</p> <p>Assessment of stock trends and initiation of management responses for spot are conducted according to the traffic light approach. While the current condition of the spot stock is unknown, the 2016 Traffic Light Analysis (TLA) showed red proportions of greater than the 30% threshold for the harvest metric and 0% for the abundance metric, indicative of relatively low harvest and high abundance in 2016. Since thresholds were not exceeded for both metrics over the last two years, no management response is necessary for spot. Based on the two data sources examined (Kirkley, 1995; NOAA data) and total menhaden landings for the year (137,400 mt), catches of spot in the menhaden fishery in 2016 could have been between 1 mt (NOAA data) and 11 mt (Kirkley, 1995). From 1989 – 2014, total annual removals of spot from all fishery sources (landings and discards) have ranged from between 4,637 and 57,287 metric tons (ASMFC, 2017b).</p> <p>Given that; 1) the menhaden fishery likely accounts for only a very small proportion of overall spot mortality and 2) the latest TLA suggests that the stock is in fact within its management thresholds; it is highly unlikely that the menhaden fishery is hindering the recovery and rebuilding of spot; SG100 is met for spot.</p> <p>Weakfish</p> <p>In 2015, the last year for which these data were available at the time of this assessment, total weakfish landings were approx. 117 mt. In the same year the menhaden fishery, based purely on NOAA data as the species was not recorded in Kirkley (1995), total menhaden landings for the year (143,500 mt), could have been expected to retain 1.44 mt of weakfish meaning the menhaden fishery represented approx. 1.2% of total fisheries removals of weakfish in 2015.</p> <p>The latest assessment of weakfish indicated that the stock is depleted ($SSB_{2014}/SSB_{Threshold} = 0.37$). The assessment did show some signs of recovery in the weakfish stock in the most recent years, with a slight increase in SSB and total abundance; however, the stock is still well below the $SSB_{Threshold}$. The same assessment indicated that natural mortality has been increasing since the mid-1990s meaning that even though fishing mortality has been at low levels in recent years, the weakfish population has been experiencing very high levels of total mortality.</p>

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.	
	Given that; 1) the menhaden fishery likely accounts for only a very small proportion of overall weakfish mortality; 2) the slow recovery of the stock is likely a result of increased natural mortality rather than fishing mortality (which has fallen steadily); and 3) the stock has been exhibiting signs of recovery in recent years; it is highly unlikely that the menhaden fishery is hindering the recovery and rebuilding of weakfish; SG100 is met for weakfish.	
References	<ul style="list-style-type: none"> ▪ ASMFC 2017a. Red Drum Benchmark Stock Assessment & Peer Review Report. ▪ ASMFC 2017b. 2017 Spot Stock Assessment Peer Review. ▪ ASMFC 2016. Weakfish Benchmark Stock Assessment and Peer Review Report. ▪ ASMFC 2017. ASMFC Stock Status Overview. ▪ Various species pages @ http://www.asmf.org/fisheries-management/program-overview ▪ NOAA 2017. Forecast for the 2017 Gulf and Atlantic Menhaden Purse-Seine Fisheries And Review of the 2016 Fishing Season. ▪ NMFS (2016) 2016 Stock Status Updates (Status as of December 31, 2016) FSSI and Non-FSSI Stock Status Table. ▪ Terceiro M. (2016). Stock Assessment of Summer Flounder for 2016. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 16-15; 117 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at: http://www.nefsc.noaa.gov/publications/ ▪ Kirkley, J. (1995) Bycatch in the Virginia Menhaden Fishery: A Re-examination of the Data <i>in</i> Virginia Marine Resources Bulletin Spring/Summer 1995, Vol. 27, No. 1 & 2: http://www.vims.edu/GreyLit/SeaGrant/vmr27-1-2.pdf 	
Scoring element 1	American butterfish (<i>Paranotus triacanthus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 2	Atlantic croaker (<i>Micropogonias undulates</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 3	Black drum (<i>Pogonias cromis</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 4	Blue crab (<i>Callinectes sapidus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 5	Bluefish (<i>Pomatomus saltatrix</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 6	Red drum (<i>Sciaenops ocellatus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 7	Sandbar shark (Brown shark) (<i>Carcharhinus plumbeus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 0 of 1)	80
Scoring element 8	Spanish mackerel (<i>Scomberomorus maculatus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 9	Spot (<i>Leiostomus xanthurus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 10	Striped bass (<i>Morone saxatilis</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 11	Summer flounder (Fluke) (<i>Paralichthys dentatus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1))	100
Scoring element 12	Weakfish (<i>Cynoscion regalis</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
OVERALL PERFORMANCE INDICATOR SCORE: (11 of 12 scoring elements = 100 and 1 of 12 scoring elements = 80)		95
CONDITION NUMBER (if relevant):		

PI 2.1.2 – Primary species management strategy

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?	Y	Y	N
Justification	<p>According to FCR v2.0 GSA3.5.1, if the UoA has no (or negligible) impact on this component, scoring issue (a) does not need to be scored for SG60 and SG80. As previously discussed, there are no Main Primary species but there are Minor Primary species meaning that the UoA does impact this component and SG60 and SG80 must be scored.</p> <p>As there are no Main Primary species, a partial strategy that is expected to maintain or to not hinder rebuilding of the Main Primary species is not required; SG60 and SG80 are met.</p> <p>In the case of the menhaden fishery the primary driver of the extremely low levels of bycatch is the way in which the fishery operates. The specific targeting of generally homogeneous shoals of menhaden represents a partial strategy that effectively limits the fishery’s impacts on non-target species.</p> <p>Bycatch reduction devices such as hose catches and sorting grids (large fish excluders) also act to further reduce levels of particularly large non-target species in catches. However, these devices were not designed specifically to release non-target species alive but rather to reduce the potential for large specimens in the catch to slow the pumping operation and/or damage machinery aboard the vessel or at processing facilities.</p> <p>While not being specifically designed to do so these bycatch reduction devices do mitigate (by releasing alive) the fishery’s impacts on non-target species with high post-release survivability; however, the converse is also true and these bycatch reduction devices may have little or no positive impacts on non-target species that exhibit poor post-release survivability.</p> <p>In the context of this PI a “strategy” represents: “a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically” (FCR v2.0 Table SA8)..</p> <p>The reduction in non-target catches as a consequence of the way in which the menhaden fishery operates is a fortunate coincidence rather than being specifically designed to achieve that outcome.</p> <p>There is no strategy in place, due in part at least to the extremely low levels of bycatch in the fishery, that is designed specifically to manage the impacts of the menhaden fishery on both Main and Minor Primary species (of which there are 15 in this assessment); therefore SG100 is not met.</p>		

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.		
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.
Met?	Y	Y	N
Justification	<p>Evidence of low levels of bycatch in the menhaden fishery (as discussed extensively in Section 3.4.1) is in and of itself evidence of the partial strategy (i.e. the way in which the fishery operates) working to reduce the fishery's impacts on non-target species and provides some objective basis for confidence that the measures/partial strategy will work; SG60 and SG 80 are met.</p> <p>The partial strategy (i.e. the way in which the fishery operates) has been in effect tested throughout the history of the fishery. Evidence of the partial strategy having worked historically includes the fact that at present Primary species are either highly likely to be above PRI or, where evidence suggests they might not be, there is evidence that the menhaden fishery is not hindering their recovery and rebuilding.</p> <p>The demonstrably low levels of non-target catches in the menhaden fishery coupled with the fact that the majority of non-target species are either above PRI or the menhaden fishery is not hindering their recovery supports high confidence that the partial strategy has worked and will continue to do so into the future for the majority of recorded bycatch species.</p> <p>Despite this it cannot be said that sandbar shark are either above PRI or the menhaden fishery is not hindering their recovery; therefore, this coupled with the fact that a comprehensive bycatch study of this fishery has not been conducted in the recent past, means that it cannot be said that testing supports high confidence that the partial strategy has worked and will continue to do so into the future for sandbar shark; SG100 is not met.</p>		
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?		Y	N
Justification	<p>The fishery under assessment is a clean fishery, as evidenced by numerous studies the results of which are summarised in Section 3.4.1. The percentage of catches comprised of non-target species is very low.</p> <p>Evidence of the partial strategy (i.e. the way in which the fishery operates) consistently returning extremely low levels of bycatch includes the fact that at present Primary species are either highly likely to be above PRI or, where evidence suggests they might not be, for the most part there is evidence that the menhaden fishery is not hindering their recovery and rebuilding; SG80 is met.</p> <p>The demonstrably low levels of non-target catches in the menhaden fishery coupled with the fact that non-target species are either above PRI or, for the most part, the menhaden fishery is not hindering</p>		

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.		
	their recovery represents clear evidence that the partial strategy is being implemented successfully and is achieving the overall objective of maintaining non-target catches at extremely low levels. However, as it cannot be said for sure that the menhaden fishery is not hindering the recovery and rebuilding of sandbar shark; SG100 is not met.		
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?	Y	Y	Y
Justification	<p>Of the 15 Primary species considered in this assessment only 1, sandbar/brown shark (<i>Carcharhinus plumbeus</i>) is a species of shark.</p> <p>Section 3 of the “Shark Finning Prohibition Act” (2000) amended the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) to prohibit (i) the finning of sharks; (ii) possessing shark fins aboard a fishing vessel without the corresponding carcass; and (iii) landing shark fins without the corresponding carcass within U.S. jurisdictions.</p> <p>The provisions prohibiting shark finning were further strengthened by the Shark Conservation Act (2010), which amended the High Seas Driftnet Fishing Moratorium Protection Act and the Shark Finning Prohibition Act provisions of the MSA to further improve domestic and international shark conservation measures, including even stronger prohibitions against shark finning. According to the most recent Shark Finning Report to Congress (NMFS, 2015) there have been no recorded prosecutions of menhaden vessels for breaches of shark finning legislation.</p> <p>Non-target catches of sharks in the menhaden fishery are not processed onboard but are instead usually segregated from the catch either by the hose cage or large fish excluder and returned to the sea.</p> <p>As a result of the way in which the fishery operates and the lack of any reported incidences of shark finning in the fishery there is a high degree of certainty that finning of non-target catches of sharks in the menhaden fishery is not taking place; SG100 is met.</p>		
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?	Y	Y	N
Justification	<p>In this context the term ‘unwanted catch’ refers to the part of the catch that a fisher did not intend to catch but could not avoid, and did not want or chose not to use.</p> <p>In the case of the menhaden fishery all large bycatch specimens that have the potential to slow the pumping operation and/or damage plant either aboard or at processing facilities meet the definition of unwanted catch as fishers choose not to use them and exclude them using technical measures (i.e. hose cages and large fish excluders).</p>		

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.	
		<p>As there are no Main Primary species, regular review of the potential effectiveness and practicality of alternative measures to minimise the mortality of unwanted catch of Main Primary species related to the menhaden fishery is not required; SG60 and SG80 are met.</p> <p>However, there is no biennial review of the potential effectiveness and practicality of alternative measures to minimise the mortality of unwanted catch of all Primary species (including Minor Primary species of which there are 15 in this assessment) related to the menhaden fishery; as a consequence SG100 is not met.</p>
References	<p>NMFS (2015). 2015 Shark Finning Report to Congress: http://www.nmfs.noaa.gov/sfa/laws_policies/sca/documents/shark-finning-report-2015.pdf and Appendix: http://www.nmfs.noaa.gov/sfa/laws_policies/sca/documents/2015-combined-appendix.pdf.</p>	
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 4 of 4, SG80 – 5 of 5, SG100 – 1 of 5)		85
CONDITION NUMBER (if relevant):		

PI 2.1.3 – Primary species information

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 primary species		
Guidepost	Qualitative information is adequate to estimate the impact of the UoA on the main primary species with respect to status.	Some quantitative information is available and is adequate to assess the impact of the UoA on the main primary species with respect to status.	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?	Not relevant	Not relevant	Not relevant
Justification	As previously discussed, no species meets the respective thresholds for main species; there are no Main Primary species. As there are no Main Primary species this SI is Not relevant and as such is not scored.		
b	Information adequacy for assessment of impact on minor primary species		
Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
Met?			N
Justification	Sufficient qualitative information to estimate the impact of the menhaden fishery on Minor Primary species with respect to status is available. Some quantitative information relating to the levels of catches of non-target species is also available but there is little quantitative information relating to the stock status of some minor primary species. The quantitative information is not therefore adequate to estimate the impact of the menhaden fishery on minor primary species with respect to status; SG100 is not met.		
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?	Y	Y	N
Justification	As there are no Main Primary species a partial strategy to manage Main Primary species is not necessary and therefore information adequate to support such a strategy is not required; SG60 and SG80 are met. Current information is somewhat adequate to support the evaluation of the fishery's impacts on all Primary species, and evaluate with a high degree of certainty whether the partial strategy (i.e. the way in which the fishery operates) has historically succeeded in maintaining the low levels of non-target catches characteristic of the menhaden fishery. However, it's unclear how, given the <i>ad hoc</i> nature of bycatch studies and the inconsistencies in methods applied, adequate information will continue to be collected into the future to assess any changes to risk levels that might arise as a result of changes in the spatial distributions and/or relative abundances of the species involved; SG100 is not met.		

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	
		<p>Recommendation</p> <p>The assessment team recommends that formal bycatch studies, conducted in a more standardized manner than has previously been the case and making every effort to assess the composition of catches by weight, be conducted at intervals deemed appropriate to detect any changes in the levels of risk posed to non-target species as a result of the menhaden fishery.</p>
References	[List any references here]	
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 1 of 1, SG80 – 1 of 1, SG100 – 0 of 2)		80
CONDITION NUMBER (if relevant):		NA

PI 2.2.1 – Secondary species outcome

PI 2.2.1	The UoA aims to maintain secondary species above a biologically 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	<p>Main Secondary species are likely to be within biologically based limits.</p> <p>OR</p> <p>If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.</p>	<p>Main secondary species are highly likely to be above biologically based limits</p> <p>OR</p> <p>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.</p> <p>AND</p> <p>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.</p>	<p>There is a high degree of certainty that main secondary species are within biologically based limits.</p>
Met?	Not Applicable	Not Applicable	Not Applicable
Justification	<p>The menhaden purse seines fishery is highly targeted and exploits highly homogeneous shoals of menhaden. As a consequence of the highly targeted nature of the fishery, yields are generally comprise of high proportions of the target species. As such, there is very little mixing of non-target species in the fishery’s catches. In general the menhaden purse fishery is considered to be an extremely clean fishery. No species meets the respective thresholds for main species; there are no Main Secondary species.</p> <p>FCR v2.0 Clause SA3.2.1 only applies at the PI level when there are no species within a component at all (i.e. if there were no Main OR Minor Secondary species). In accordance with Relevant Interpretation 2, if a fishery has no main species Sla is not applicable. For the reasons outlined above PI 2.2.1 is scored as Not Applicable.</p>		
b	Minor secondary species stock status		
Guidepost			<p>Minor secondary species are highly likely to be above biologically based limits.</p> <p>OR</p> <p>If below biologically based limits’, there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species</p>
Met?			Y (8 species)

<p>PI 2.2.1</p>	<p>The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit.</p>
<p>Justification</p>	<p>In preparing to announce the fishery the Assessment Team identified a lack of information surrounding the status of Secondary species with respect to stock status reference points. In normal circumstances, this would trigger the use of the RBF to score the outcome PI for Secondary species; however, this was not done in this case and the Assessment Team instead followed the process outlined below.</p> <p>As previously discussed, no species met the respective thresholds for Main Secondary species. According to FCR v2.0 PF 4.1.4, an Assessment Team may elect to conduct a PSA on “main” species only when evaluating the UoA’s impacts on non-target species; however, if the team elects to consider “main” species only, final PI scores for outcome PIs shall be capped at 80 (FCR PF 4.1.4.1 and PF 5.3.2).</p> <p>As there are no Main Secondary species the Assessment Team elected not to conduct a full RBF (including on-site visit) solely for the purposes of scoring Secondary Minor species under PI 2.2.1 and as a result the final PI score for PI 2.2.1 cannot exceed 80.</p> <p>While a full RBF has not been conducted the Assessment Team elected to broadly follow the Productivity Susceptibility Analysis (PSA) approach when evaluating the UoA’s impacts on non-target species.</p> <p>There are no biologically based limits against which to measure the status of Minor secondary species; therefore, it cannot be said that Minor secondary species are highly likely to be above biologically based limits.</p> <p>In order to assess whether the menhaden fishery might be hindering the recovery and rebuilding of secondary species (if they are in fact depleted) the Assessment Team elected to conduct a desktop PSA for each Secondary Minor species (i.e. the RBF approach minus the need for an on-site RBF meeting).</p> <p>Susceptibility</p> <p>The susceptibility of all 11 Minor Secondary species to the menhaden fishery is likely to be extremely low based on the low catches of each species in the fishery. With this being the case the Availability, Encounterability and Selectivity components of the PSA were scored as low risk. While there is evidence to show that there is at least some post-release survival for many of the species, the Assessment Team elected to take a more precautionary approach and score each species as if post-capture mortality is 100% in all instances.</p> <p>Productivity</p> <p>Scores for the productivity component of the PSA ranged from 1.14 (for silverperch) to 2.43 (for bullnose ray); the team was not able to obtain sufficient information to fully score ladycrab or spidercrab.</p> <p>The desktop PSA conducted by the Assessment Team on the 9 Minor Secondary species for which full information was available (American harvestfish, Atlantic thread herring, Bullnose ray, Cownose ray, Hogchoker, Silverperch, Spiny butterfly ray, Vermillion snapper and Witch flounder) resulted in an MSC score of 95. The preliminary PSA scores for these species are evidence that the menhaden fishery does not hinder their recovery and rebuilding (if in fact they are depleted); SG100 is met for these 9 species.</p> <p>The remaining species, ladycrab and spidercrab, each make up an estimated 0.001% of menhaden catches by weight, based on Kirkley (1995). Therefore, based on total landings in the Atlantic menhaden purse seine fishery in 2016 (137,400 mt), the menhaden purse seine fishery would have retained approx. 1.37 mt of each species in the same year. Catches of this magnitude mean that the menhaden fishery is extremely unlikely to hinder the recovery and rebuilding of either ladycrab or spidercrab (if in fact the species are even depleted); SG100 is met for these species.</p>

PI 2.2.1	The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit.	
	All 11 Minor Secondary species are likely meet the second part of SG 100, in that the available evidence supports the assertion that the menhaden fishery does not hinder their recovery (if they are indeed depleted); however, as previously discussed, the Assessment Team elected not to conduct a full RBF (including on-site visit) meaning the final PI score for PI 2.2.1 cannot exceed 80. Therefore, the PI is scored at the 80 level.	
References	See 8.1.2. Appendix 1.2 Risk Based Framework (RBF) Outputs for further information on each species.	
Scoring element 1	American harvestfish (<i>Peprilus paru</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 2	Atlantic thread herring (<i>Opisthonema oglinum</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 3	Bullnose ray (<i>Myliobatis freminvillii</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 4	Cownose ray (<i>Rhinoptera bonasus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 5	Hogchoker (<i>Trinectes maculatus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 6	Ladycrab (<i>Ovalipes ocellatus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 7	Silverperch (<i>Bairdiella chrysoura</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 8	Spidercrab (<i>Libinia emarginata</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 9	Spiny butterfly ray (<i>Gymnura altavela</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 10	Vermillion snapper (<i>Rhomboplites aurorubens</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
Scoring element 11	Witch flounder (<i>Glyptocephalus cynoglossus</i>) (Applicable SGs met: SG60 – 0 of 0, SG80 – 0 of 0, SG100 – 1 of 1)	100
OVERALL PERFORMANCE INDICATOR SCORE: (11 of 11 scoring elements = 100 BUT PI 2.2.1 capped at the 80 level)*		80
CONDITION NUMBER (if relevant):		

*(see supporting rationale for explanation)

PI 2.2.2 – Secondary species management strategy

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.
	Met?	Y	Y
	Justification	<p>As previously discussed, there are no Main Secondary species but there are 11 Minor Secondary species.</p> <p>As there are no Main Secondary species, a partial strategy that is expected to maintain or to not hinder rebuilding of the Main Secondary species is not required; SG60 and SG80 are met.</p> <p>In the case of the menhaden fishery the primary driver of the extremely low levels of bycatch is the way in which the fishery operates. The specific targeting of generally homogeneous shoals of menhaden represents a partial strategy that effectively limits the fishery’s impacts on non-target species.</p> <p>Bycatch reduction devices such as hose catches and sorting grids (large fish excluders) also act to further reduce levels of particularly large non-target species in catches. However, these devices were not designed specifically to release non-target species alive but rather to reduce the potential for large specimens in the catch to slow the pumping operation and/or damage machinery aboard the vessel or at processing facilities.</p> <p>While not being specifically designed to do so these bycatch reduction devices do mitigate (by releasing alive) the fishery’s impacts on non-target species with high post-release survivability; however, the converse is also true and these bycatch reduction devices may have little or no positive impacts on non-target species that exhibit poor post-release survivability.</p> <p>In the context of this PI a “strategy” represents: “a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically” (FCR v2.0 Table SA8).</p> <p>The reduction in non-target catches as a consequence of the way in which the menhaden fishery operates is a fortunate coincidence rather than being specifically designed to achieve that outcome.</p> <p>There is no strategy in place, due in part at least to the extremely low levels of bycatch in the fishery, that is designed specifically to manage the impacts of the menhaden fishery on both Main Secondary and Minor Secondary species (of which there are 14 in this assessment); therefore SG100 is not met.</p>	

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.			
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.
	Met?	Y	Y	Y
	Justification	<p>Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.</p> <p>Evidence of low levels of bycatch in the menhaden fishery (as discussed extensively in Section 3.4.1) is in and of itself evidence of the partial strategy (i.e. the way in which the fishery operates) working to reduce the fishery's impacts on non-target species and provides some objective basis for confidence that the measures/partial strategy will work; SG60 and SG 80 are met.</p> <p>The partial strategy (i.e. the way in which the fishery operates) has been in effect tested throughout the history of the fishery. Evidence of the partial strategy having worked historically includes the fact that at present Secondary species are either highly likely to be above PRI or, where evidence suggests they might not be, there is evidence that the menhaden fishery is not hindering their recovery and rebuilding.</p> <p>The demonstrably low levels of non-target catches in the menhaden fishery coupled with the fact that non-target species are either above PRI or the menhaden fishery is not hindering their recovery supports high confidence that the partial strategy has worked and will continue to do so into the future; SG100 is met.</p>		
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?		Y	N
	Justification	<p>There is some evidence that the measures/partial strategy is being implemented successfully.</p> <p>The fishery under assessment is a clean fishery, as evidenced by numerous studies the results of which are summarised in Section 3.4.1. The percentage of catches comprised of non-target species is very low.</p> <p>Evidence of the partial strategy (i.e. the way in which the fishery operates) consistently returning extremely low levels of bycatch includes the fact that at present Secondary species are either highly likely to be above PRI or, where evidence suggests they might not be, there is evidence that the menhaden fishery is not hindering their recovery and rebuilding.</p> <p>The demonstrably low levels of non-target catches in the menhaden fishery coupled with the fact that non-target species are either above PRI or the menhaden fishery is not hindering their recovery represents some evidence that the partial strategy is being implemented successfully; SG80 is met.</p>		

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.		
		However, the lack of more recent bycatch data from the fishery means that the Assessment Team cannot be confident that there is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving the overall objective of maintaining non-target catches at extremely low levels; SG100 is not met.		
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	Of the 11 Secondary species considered in this assessment none are species of shark; therefore this SI is Not relevant and as such is not scored.		
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?	Y	Y	N
	Guidepost	<p>In this context the term ‘unwanted catch’ refers to the part of the catch that a fisher did not intend to catch but could not avoid, and did not want or chose not to use. In the case of the menhaden fishery all large bycatch specimens that have the potential to slow the pumping operation and/or damage plant either aboard or at processing facilities meet the definition of unwanted catch as fishers choose not to use them and exclude them using technical measures (i.e. hose cages and large fish excluders).</p> <p>As there are no Main Secondary species, regular review of the potential effectiveness and practicality of alternative measures to minimise the mortality of unwanted catch of Main Secondary species related to the menhaden fishery is not required; SG60 and SG80 are met.</p> <p>However, there is no biennial review of the potential effectiveness and practicality of alternative measures to minimise the mortality of unwanted catch of all Secondary species (including Minor Secondary species of which there are 8 in this assessment) related to the menhaden fishery; as a consequence SG100 is not met.</p>		
References	[List any references here]			
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 3 of 3, SG80 – 4 of 4, SG100 – 1 of 4)				85
CONDITION NUMBER (if relevant):				

PI 2.2.3 – Secondary species information

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.	Some quantitative information is available and adequate to assess the impact of the UoA on main secondary species with respect to status.	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?	Not relevant	Not relevant	Not relevant
Justification	As previously discussed, no species meets the respective thresholds for main species; there are no Main Secondary species. As there are no Main Secondary species this SI is Not relevant and as such is not scored.		
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?			N
Justification	Sufficient qualitative information to estimate the impact of the menhaden fishery on Minor Secondary species with respect to status is available. Some quantitative information relating to the levels of catches of non-target species is also available but there is little quantitative information relating to the stock status of Minor Secondary species. The quantitative information is not therefore adequate to estimate the impact of the menhaden fishery on Minor Secondary species with respect to status; SG100 is not met.		
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?	Y	Y	N
Justification	As there are no Main Secondary species a partial strategy to manage Main Secondary species is not necessary and therefore information adequate to support such a strategy is not required; SG60 and SG80 are met. Current information is adequate to support the evaluation of the fishery's impacts on all Secondary species, and evaluate with a high degree of certainty whether the partial strategy (i.e. the way in which the fishery operates) has historically succeeded in maintaining the low levels of non-target catches characteristic of the menhaden fishery. However, it's unclear how, given the <i>ad hoc</i> nature of bycatch studies and the inconsistencies in methods applied, adequate information will continue to be collected into the future to assess any changes to risk levels that might arise as a result of changes in the spatial distributions and/or relative abundances of the species involved; SG100 is not met.		

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.	
		<p>Recommendation</p> <p>The assessment team recommends that formal bycatch studies, conducted in a more standardized manner than has previously been the case and making every effort to assess the composition of catches by weight, be conducted at intervals deemed appropriate to detect any changes in the levels of risk posed to non-target species as a result of the menhaden fishery.</p>
References	[List any references here]	
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 1 of 1, SG80 – 1 of 1, SG100 – 0 of 2)		80
CONDITION NUMBER (if relevant):		NA

PI 2.3.1 – ETP species outcome

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?	Y Bottlenose dolphins Y Sea turtles (4 species)	Y Bottlenose dolphins Y Sea turtles (4 species)	Y Bottlenose dolphins N Sea turtles (4 species)
Justification	<p>The Marine Mammal Protection Act (MMPA) sets Potential Biological Removal (PBR) limits for marine mammal stocks while the Endangered Species Act (ESA) and its implementing regulations, prohibits the taking of sea turtles, even incidentally, implying a zero take limit; although fisheries known to impact endangered species may apply for an Incidental Take Permit (ITP) to authorize the incidental taking of a listed species, incidental to the operation of the fishery. As national requirements set limits for both bottlenose dolphins and sea turtles, strategies for managing fishery-related impacts on both are assessed under Sla.</p> <p>Bottlenose dolphins</p> <p>PBR limits have been estimated for the two bottlenose dolphin stocks known to be impacted by the menhaden fishery the Northern migratory stock and the Southern migratory stock. Interactions with bottlenose dolphins have been recorded and the fishery is classified as a Category II fishery under the MMPA. However, this classification is not specific to the Atlantic menhaden fishery but is based on analogy to other purse seine fisheries such as the Gulf of Mexico menhaden purse seine fishery, and potential interactions with bottlenose dolphins (Northern Migratory coastal and Southern Migratory coastal stocks).</p> <p>Since the classification, the number of vessels involved in the fishery has decreased and the use of hose cages has become ubiquitous across the menhaden fleet, meaning levels of incidental take have likely decreased. Additionally, estimated PBRs for Atlantic dolphins stocks have increased since the fishery was designated a category II fishery. At the time the fishery was designated estimated PBR for the northern migratory coastal stock was 73 and cumulative estimated PBR for all coastal stocks was unknown. The most current estimate of PBR for the 2 coastal stocks is 71 (NMCS = 48, SMCS = 23)).</p> <p>Given the estimated PBRs for coastal stocks and an absence of any evidence of increases in incidences of bottlenose dolphin mortality related to the menhaden fishery, the Assessment Team is confident that the combined effects of Atlantic menhaden MSC UoAs on coastal stocks of bottlenose dolphins are known and highly likely to be within specified PBR limits; SG60 and SG80 are met.</p> <p>The best estimate of abundance for the Northern Migratory Coastal Stock is 6,639, with a minimum of 4,759, a PBR of 48 and a zero mortality rate goal (10% of PBR) of 4.8. The documented mean annual human-caused mortality (2011 – 2015) for this stock was between 6.1 and 13.2. The corresponding values for the Southern Migratory Coastal Stock are a best estimate of abundance of 3,751, with a minimum of 2,353, a PBR of 23, a zero mortality rate goal of 2.3 and a documented mean annual human-caused mortality (2011 – 2015) of between 0 and 14.3. In both cases these documented mortalities must be considered minimum estimates of total fishery-related mortality.</p>		

<p>PI 2.3.1</p>	<p>The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species</p>
	<p>Given the fact that documented mean annual human-caused mortality rates for both bottlenose dolphin stock are within PBR limits and that no takes have been observed or reported in the menhaden purse seine fishery in recent years, there is a high degree of certainty that the combined effects of MSC UoAs are within national requirements (i.e. PBR limits) for both of the stocks that are potentially impacted by the menhaden fishery; SG100 is met.</p> <p>Sea turtles</p> <p>Levels of interactions between the menhaden fishery are likely to be extremely low. NMFS has determined that the level of risk posed by the Atlantic menhaden fishery to sea turtle populations is sufficient to warrant inclusion on the current list of fisheries that are systematically observed for incidental takes of sea turtles.</p> <p>The NOAA National Bycatch Report database contains bycatch data (including sea turtles) for U.S. Fisheries and contains data related to fishery takes of sea turtles from 1995 to 2013. Within the Northeast reporting area takes of sea turtles are reported in the mid-Atlantic gillnet, otter trawl and scallop dredge fisheries as well as the Atlantic and Gulf of Mexico Highly Migratory Species Pelagic Longline Fishery but not in the menhaden fishery.</p> <p>Where incidental takes of sea turtles do occur in the menhaden fishery, they are not likely to result in mortality or serious injury as the risk of forced submergence is low compared to other gear types. If they are entrapped in the purse seine turtles, being air breathers, should be able to reach the surface and survive. In the studies in the Gulf of Mexico in the early-1990s all incidentally caught individuals were released alive and unharmed while the same was reported for both entrapped individuals recorded in NOAA observer program data (2007 to 2012) representing 260 sets from the Atlantic menhaden fishery. The effects of the menhaden fishery on sea turtle populations are known and likely to be within national limits; SG60 is met.</p> <p>While the ESA prohibits the taking of sea turtles, even incidentally, implying a zero take limit, fisheries known to impact endangered species may apply for an Incidental Take Permit (ITP) to authorize the incidental taking of a listed species; examples of where this has taken place include the inshore gillnet fishery in North Carolina inshore state waters and the US Atlantic sea scallop fishery. As an example the mid-Atlantic sea scallop fishery, as of the latest biological opinion, is expected to result in the incidental take of sea turtles as follows:</p> <ul style="list-style-type: none"> ▪ Loggerhead sea turtles (NWA DPS) – annual average take of up to 161 individuals in dredge gear (of which up to 129 and 46 per year may be lethal in 2012 and 2013 and beyond respectively) and an annual average take of up to 140 individuals in trawl gear (of which up to 66 per year may be lethal). ▪ Leatherback sea turtles – annual lethal take of up to two in dredge and trawl gear combined. ▪ Kemp’s ridley sea turtles – annual take of up to three individuals in dredge and trawl gear combined (for 2012, up to three takes are anticipated to be lethal, while for 2013 and beyond, up to two takes are anticipated to be lethal) ▪ Green sea turtles – annual lethal take of up to two in dredge and trawl gear combined. <p>In the case of the North Carolina inshore gillnet fishery the anticipated annual lethal take level for each of these species will not have a significant effect on the rate of recruitment into the breeding population (that is, the population’s ability to reproduce at a level sufficient enough to replace each individual taken) while in the scallop fishery NMFS has concluded that the continued operation of the scallop fishery may adversely affect, but is not likely to jeopardize, impacted populations of sea turtles. Incidental take statements for the Atlantic pelagic longline fishery have also previously established incidental take levels of 438 leatherback and 402 loggerhead sea turtles, respectively, on an annual basis.</p>

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		
	<p>The ESA's prohibition on the taking of sea turtles is evidence of managers desire to maintain human-related mortality at as low a level as possible. The fact that ITPs may be issued for fisheries known to impact populations of endangered species implies a more pragmatic approach and an acknowledgement that populations may still continue to recover despite some human-related mortality. Annual estimated mortality in the U.S. sea scallop dredge fishery has declined from between 22 and 46 individuals in 2009 to a single individual in 2014 as result of modifications to dredge gear specifically designed to reduce the fishery-related mortality of sea turtles (Murray, 2015).</p> <p>With respect to the combined effects of MSC UoAs on sea turtle populations, these stocks are widely distributed and overlap with a large number of MSC UoAs including the US Atlantic sea scallop, U.S. North Atlantic swordfish fishery</p> <p>Where fisheries are known to interact significantly with sea turtles the impacts of those fisheries have generally been assessed by NMFS and the risks posed have been evaluated. Therefore, the combined effects of all MSC UoAs on the population/stock are known and highly likely to be within national limits (i.e. either the zero take implied by the ESA or the levels of incidental takes allowed for under ITPs); SG80 is met for sea turtles.</p> <p>Without more robust monitoring regimes to establish more accurate levels of fishery-related takes of sea turtles and more up to date Biological Opinions for some of the fisheries known to impact sea turtle populations it cannot be said that there is a high degree of certainty that the combined effects of MSC UoAs are within set limits for sea turtles; SG100 is not met.</p>		
b	Direct effects		
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?	Y Bottlenose dolphins Y Sea turtles (4 species)	Y Bottlenose dolphins Y Sea turtles (4 species)	N Bottlenose dolphins N Sea turtles (4 species)
Justification	<p>Known direct effects of the UoA are highly likely to not hinder recovery of ETP species.</p> <p>As discussed in detail in Section 3.4.2 and above the scoring elements evaluated under this PI are coastal bottlenose dolphin stocks and green, hawksbill, Kemp's ridley and loggerhead sea turtles.</p> <p>Bottlenose dolphin The common bottlenose dolphin is not listed as threatened or endangered under the ESA but the northern and southern migratory coastal stocks are considered strategic under the MMPA due to their depleted listing. With respect to Northern North Carolina Estuarine stock (NNCES), NMFS considers it to be strategic because the total human-caused mortality and serious injury is equal to or greater than 10% of PBR and may exceed PBR.</p> <p>The menhaden fishery is known to interact with the northern and southern coastal migratory stocks and the NNCES stocks of bottlenose dolphins. As previously discussed, classifications are based on analogy with the Gulf of Mexico Menhaden Fishery which itself is based on data which is more than 20 years old having been recorded in the period 1992 – 1995. Since then the number of vessels involved in the fishery has decreased and the use of hose cages has become ubiquitous across the menhaden fleet. As a result levels of incidental take have likely decreased.</p>		

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		
	<p>There is limited power to detect a significant changes in individual dolphin populations given the high CV of estimates, interannual variability in spatial distribution and stock abundance and the availability of only one recent survey (Garrison et al. 2017a). However, the coast-wide inverse-variance weighted average estimate for coastal common bottlenose dolphins during 2011 was 41,456 (CV=0.30) while the estimate during 2016 was 19,470 (CV=0.23; Garrison <i>et al.</i> 2017a); this change was statistically significant indicating a decline in population size. The apparent decline in common bottlenose dolphin abundance in coastal waters along the eastern seaboard is likely the result of a large unusual mortality events (UMEs) in 2013 – 2015 which has been attributed to a morbillivirus epidemic (Morris <i>et al.</i> 2015). Bottlenose dolphins in the region were also impacted by a previous UME caused by morbillivirus in 1987 – 1988 (Lipscomb <i>et al.</i> 1994).</p> <p>Given the fact that no bottlenose dolphin deaths/serious injuries have been recorded/observed in the menhaden purse seine fishery in recent years it is likely that the recovery of these stocks is not in any way impaired by the fishery under assessment; SG60 and SG80 are met for these stocks.</p> <p>Without verified information on incidental take and mortality rates and spatial information on incidental takes sufficient so as to allow them to be attributable to particular stocks it is not possible to conclude that there is a high degree of confidence that there are no significant detrimental direct effects of the menhaden fishery on bottlenose dolphins; SG100 is not met for bottlenose dolphins.</p> <p>Sea turtles Levels of interactions between the menhaden fishery are likely to be extremely low. NMFS has determined that the level of risk posed by the Atlantic menhaden fishery to sea turtle populations is not sufficient to warrant inclusion on the current list of fisheries that are systematically observed for incidental takes of sea turtles.</p> <p>In addition, where incidental takes of sea turtles do occur in the menhaden fishery, they are not likely to result in mortality or serious injury as the risk of forced submergence is low compared to other gear types. If they are entrapped in the purse seine turtles, being air breathers, should be able to reach the surface and survive. In the studies by Condrey at LSU in the early-1990s all incidentally caught individuals were released alive and unharmed. Known direct effects of the menhaden fishery on sea turtles are highly likely to not hinder the recovery of these species; SG60 and SG80 are met.</p> <p>However, without a more formalized determination of the levels of sea turtle bycatch and mortality in the menhaden fishery the Assessment Team has determined that there is insufficient evidence to justify a high degree of confidence that the menhaden fishery does not have any significant detrimental direct effects on populations of sea turtles; SG100 is not met.</p>		
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?		Y Bottlenose dolphins Y Sea turtles (4 species)	Y Bottlenose dolphins Y Sea turtles (4 species)
Justification	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.		

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	
	<p>Under this PI the Assessment Team have identified a number of potentially significant detrimental indirect effects of the menhaden fishery on ETP species including the potential disruption to predator-prey dynamics resulting (directly and/or indirectly) from the menhaden fishery and the likelihood of gear being lost and allowed to potentially ghost fish.</p> <p>Potential for adverse impacts on ETPs’ prey availability The role of menhaden in the ecosystem has been discussed extensively in Section 3.3.4. Based on the available evidence the Assessment Team has concluded that menhaden represent a key LTL species.</p> <p>There is no evidence of any species being critically dependent on menhaden. Therefore, neither menhaden themselves (through direct removal) or any other potential prey species (through either direct removal or indirectly through knock on effects of the removal of menhaden) is likely to be reduced to such an extent as to adversely impact any of the ETP species identified in this assessment.</p> <p>Potential for gear loss and ghost fishing Menhaden purse seines are large expensive pieces of equipment that are attached at all times at both ends to either the purse boats or carrier vessels. In addition fishing menhaden purse seines involves only minimal bottom contact with soft sandy/muddy bottoms reducing the potential for catastrophic snagging. The way in which the fishery operates means it is extremely unlikely that fishing gear would become lost and the cost of the gear makes it virtually impossible that, were such an event to occur, the gear would not be immediately retrieved.</p> <p>The lack of any evidence of either ETPs’ dependency on menhaden as a food source or of wider disruption to foodwebs resulting from the menhaden fishery coupled with the extreme unlikelihood of ghost fishing of ETPs imparts a high degree of confidence that there are no significant detrimental indirect effects of the menhaden fishery on ETP species; SG80 and SG100 are met for sea turtles and bottlenose dolphins.</p>	
References	<p>Waring, G. T., Josephson, E., Maze-Foley, K. and Rosel, P. E., (2015). US Atlantic and Gulf of Mexico marine mammal stock assessments – 2015. NOAA Tech Memo NMFS NE, 238, pp. 512: http://www.nmfs.noaa.gov/pr/sars/pdf/atlantic2015_final.pdf</p>	
Scoring element 1	<p>Bottlenose dolphins Applicable SGs met: SG60 – 3 of 3, SG80 – 3 of 3, SG100 – 2 of 3)</p>	95
Scoring element 2	<p>Sea turtles (4 species) Applicable SGs met: SG60 – 3 of 3, SG80 – 3 of 3, SG100 – 1 of 3)</p>	85
OVERALL PERFORMANCE INDICATOR SCORE: (1 of 2 scoring elements = 95 and 1 of 2 scoring elements = 85)		90
CONDITION NUMBER (if relevant):		

PI 2.3.2 – ETP species management strategy

PI 2.3.2	<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • meet national and international requirements; • ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.</p>		
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?	Y Bottlenose dolphin Y Sea turtles	Y Bottlenose dolphin Y Sea turtles	Not scored Bottlenose dolphin Not scored Sea turtles
Justification	<p>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.</p> <p>The Marine Mammal Protection Act (MMPA) sets Potential Biological Removal (PBR) limits for marine mammal stocks while the Endangered Species Act (ESA) and its implementing regulations, prohibits the taking of sea turtles, even incidentally, implying a zero take limit; as national requirements set limits for both bottlenose dolphins and sea turtles, strategies for managing fishery-related impacts on both are assessed under Sla.</p> <p>There are strategies in place for managing the impacts of fisheries (including the menhaden fishery) on bottlenose dolphins and sea turtles, including measures to minimise mortality, which are designed to be highly likely to achieve national and international requirements in place for the protection of the species. In the U.S. the primary management strategies for the protection of marine mammal species are provided by the Marine Mammal Protection Act (MMPA) while sea turtles are protected under the Endangered Species Act.</p> <p>Bottlenose dolphins</p> <p>As a result of their protection under the MMPA, NMFS are required to implement monitoring programs to estimate the human-caused mortality and serious injury of marine mammals from interactions with commercial fisheries, and to estimate the PBR for marine mammal stocks. The PBR for a stock is the maximum number of individuals that may be removed from that stock while allowing that stock to reach or maintain its optimum sustainable population level. A stock is defined as a “strategic stock” under the MMPA if either: 1) the cumulative level of direct human-caused mortality for a marine mammal stock exceeds PBR; 2) the stock is declining and likely to be listed as a threatened species under the ESA; or 3) the stock is designated as a depleted species under the MMPA.</p> <p>Section 118 of the MMPA requires NMFS to establish Take Reduction Teams (TRTs) to develop and implement TRPs designed to reduce incidental mortality and serious injury to strategic stocks of marine mammals interacting with Category I or Category II fisheries (i.e. those with frequent or occasional accidental mortality and serious injury of marine mammals, respectively).</p>		

<p>PI 2.3.2</p>	<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • meet national and international requirements; • ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.</p>
	<p>As previously discussed, the Atlantic menhaden fishery is classified as a Category II fishery and as a consequence all fishers are required to accommodate an onboard observer upon request and must report all incidental mortalities and injuries of marine mammals that occur during fishing operations to NMFS within 48 hours of the end of a fishing trip.</p> <p>The MMPA requires TRPs to meet short--term goals of reducing, within six months of implementation, the accidental commercial fishing-related mortality or serious injury of the relevant ETP stock below the PBR for the stock. The MMPA also requires TRPs to meet long-term goals of reducing, within five years of implementation, the accidental commercial fishing-related mortality or serious injury of relevant ETP stock to insignificant levels. The long-term goal is commonly referred to as the zero mortality rate goal (ZMRG), which is 10% of PBR for a marine mammal stock. NMFS are required to amend TRPs and implement regulations as needed to meet these requirements and goals.</p> <p>The Atlantic dolphin stocks that have the potential to be impacted by the menhaden fishery have been designated as strategic stocks and as a result a Bottlenose Dolphin Take Reduction Plan (BDTRP) has been in place since 2006, following the convening of the Bottlenose Dolphin Take Reduction Team (BDTRT) in October 2001. The BDTRP contains both regulatory and non-regulatory conservation measures designed to reduce serious injury and mortality of 13 strategic stocks of bottlenose dolphins in Category I and II fisheries operating in the same area as the dolphin stocks and meet the BDTRP's short-term goal while providing a framework for meeting the long-term goal. The regulatory measures in the BDTRP are primarily targeted at gillnet fisheries which pose the greatest risk to bottlenose dolphins and include seasonal gillnet restrictions, gear proximity requirements, and gear length restrictions. The non-regulatory measures include continued research and monitoring, enforcement, outreach, and partnership efforts.</p> <p>In the case of the menhaden fishery the primary driver of the extremely low levels of bycatch is the way in which the fishery operates with the specific targeting of generally homogeneous shoals of menhaden effectively limiting the fishery's impacts on ETP species. Despite this there also additional measures in place that minimise the menhaden fishery-related mortality of ETP species, including the use of hose cages and large bycatch excluders.</p> <p>There is a strategy in place for managing the impacts of fisheries (including the menhaden fishery) on marine mammal species protected under the MMPA, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements in place for the protection of the species; SG60 and SG80 are met for bottlenose dolphins.</p> <p>Sea turtles</p> <p>The ESA lists endangered and threatened species. An endangered species is <i>"any species which is in danger of extinction throughout all or a significant portion of its range"</i>. A threatened species is defined as <i>"any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range"</i>.</p> <p>All sea turtle species that occur in U.S. waters are listed as either endangered or threatened under the ESA with Kemp's ridley, leatherback, and hawksbill turtles being listed as endangered and the Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead sea turtles and green turtles being listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific Coast of Mexico, which are listed as endangered.</p>

<p>PI 2.3.2</p>	<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • meet national and international requirements; • ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.</p>
	<p>Under the ESA and its implementing regulations, taking sea turtles, even incidentally, is prohibited. Section 3 of the ESA defines take as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct”. The term incidental take refers to takings of endangered and threatened species that result from, but are not the purpose of, an otherwise lawful activity. The incidental take of endangered and threatened species may legally be exempted by an incidental take statement or permit issued under Section 7 or 10 of the ESA, respectively.</p> <p>Incidental take, or bycatch, in fishing gear is the primary anthropogenic source of sea turtle injury and mortality in U.S. waters. Section 11 of the ESA provides for civil and criminal penalties for anyone who violates a regulation issued pursuant to the ESA, including regulations that implement the take prohibition, as well as for the issuance of regulations to enforce the take prohibitions. NMFS may grant exceptions to the take prohibitions for activities that are covered by an incidental take statement or an incidental take permit issued pursuant to ESA section 7 or 10, respectively. To do so, NMFS must determine the activity that will result in incidental take is not likely to jeopardize the continued existence of the affected listed species. In 2007, NMFS established procedures to annually identify those fisheries in which the agency intends to place observers based on the extent to which:</p> <ul style="list-style-type: none"> ▪ The fishery operates in the same waters and at the same time as sea turtles are present; ▪ The fishery operates at the same time or prior to elevated sea turtle strandings; or ▪ The fishery uses a gear or technique that is known or likely to result in incidental take of sea turtles based on documented or reported takes in the same or similar fisheries; and ▪ NMFS intends to monitor the fishery and anticipates that it will have the funds to do so. <p>The 2017 Annual Determination identifies 14 fisheries, including the Atlantic menhaden fishery, which are included on the list for a 5-year period and are therefore required to carry observers upon NMFS' request until December 31st, 2019. The menhaden fishery is included based on the nature of the gear and fishing methodology in addition to effort overlapping with sea turtle distribution. NMFS has observed the menhaden fishery at low levels, with nine trips observed in 2010, and three in 2012.</p> <p>In the case of the menhaden fishery the primary driver of the extremely low levels of bycatch is the way in which the fishery operates with the specific targeting of generally homogeneous shoals of menhaden effectively limiting the fishery's impacts on ETP species. Despite this there also additional measures in place that minimise the menhaden fishery-related mortality of ETP species, including the use of hose cages and large bycatch excluders. In addition where sea turtles do become entrapped in menhaden pure seines these events are unlikely to result in mortality or serious injuries due to the fact that in general, purse seines are not left underwater for extended periods of time, meaning the risk of sea turtle mortality from forced submergence is low compared to other gear types.</p> <p>There are strategies in place including prohibition on takes, reporting requirements, penalties for infringements etc. for managing the impacts of fisheries (including the menhaden fishery) on sea turtle populations protected under the ESA, including measures to minimise mortality, which are designed to be highly likely to achieve national and international requirements in place for the protection of the species; SG60 and SG80 are met for sea turtles.</p> <p>According to FCR 7.10.5.2 and 7.10.5.3, a species which does not meet SG80 for all SIs cannot be scored at SG100; therefore neither bottlenose dolphins nor sea turtles (due to not meeting SG80 under S1e) were not scored at SG100 for S1a.</p>

PI 2.3.2	<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • meet national and international requirements; • ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.</p>		
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?	NA Bottlenose dolphin NA Sea turtles	NA Bottlenose dolphin NA Sea turtles	NA Bottlenose dolphin NA Sea turtles
Justification	The Marine Mammal Protection Act (MMPA) sets Potential Biological Removal (PBR) limits for marine mammal stocks while the Endangered Species Act (ESA) and its implementing regulations, prohibits the taking, even incidentally, of sea turtles implying a zero take limit. As national requirements set limits for both bottlenose dolphins and sea turtles, SIb is Not Applicable and strategies for managing fishery-related impacts on both bottlenose dolphins and sea turtles are instead assessed under SIa.		
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?	Y Bottlenose dolphin Y Sea turtles	Y Bottlenose dolphin Y Sea turtles	Not scored Bottlenose dolphin Not scored Sea turtles
Justification	<p>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.</p> <p>Measures in place that minimise the mortality of ETP species related to the menhaden fishery, include the use of hose cages and large bycatch excluders. However, in the case of the menhaden fishery the primary driver of the extremely low levels of bycatch (including ETPs) is the way in which the fishery operates (i.e. the specific targeting of generally homogeneous shoals of menhaden).</p> <p>The measures in place combined with the low levels of entrapment incidences are sufficient to justify an objective basis for confidence that the measures in place combined with the fishing strategy will work, based on information directly about the menhaden fishery and its impacts on the ETP species involved; SG60 and SG80 are met for both bottlenose dolphins and sea turtles.</p> <p>According to FCR 7.10.5.2 and 7.10.5.3, a species which does not meet SG80 for all SIs cannot be scored at SG100; therefore neither bottlenose dolphins nor sea turtles (due to not meeting SG80 under SIe) were scored at SG100 for SIc.</p>		

PI 2.3.2	<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • meet national and international requirements; • ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.</p>			
d	Management strategy implementation			
	Guidepost	<p>There is some evidence that the measures/strategy is being implemented successfully.</p>	<p>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).</p>	
	Met?	<p>Y Bottlenose dolphin Y Sea turtles</p>	<p>Not scored Bottlenose dolphin Not scored Sea turtles</p>	
	Justification	<p>There is some evidence that the measures/strategy is being implemented successfully.</p> <p>As previously discussed, the primary driver of low bycatch levels (including ETPs) in the menhaden fishery is the way in which the fishery operates which in combination with measures in place, including the use of hose cages and large bycatch excluders, act to minimise mortality of ETP species related to the menhaden fishery.</p> <p>The low recoded levels of entrapment incidences coupled with evidence of high survivability of entrapped individuals, including both bottlenose dolphins and sea turtle species, constitute evidence that the strategies in place are being implemented successfully; SG60 and SG80 are met for both bottlenose dolphins and sea turtles.</p> <p>According to FCR 7.10.5.2 and 7.10.5.3, a species which does not meet SG80 for all SIs cannot be scored at SG100; therefore neither bottlenose dolphins nor sea turtles (due to not meeting SG80 under S1e) were scored at SG100 for S1d.</p>		
e	Review of alternative measures to minimize mortality of ETP species			
	Guidepost	<p>There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.</p>	<p>There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.</p>	<p>There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.</p>
	Met?	<p>Y Bottlenose dolphin Y Sea turtles</p>	<p>N Bottlenose dolphin N Sea turtles</p>	<p>Not scored Bottlenose dolphin Not scored Sea turtles</p>
	Justification	<p>There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.</p> <p>Rester and Condrey (1999) evaluated bycatch reduction devices in the Gulf menhaden fishery and recommended some changes to the structure of these devices to optimize pumping efficiency while also reducing the potential for large bycatch and/or ETP species to become entrained in the pumping apparatus. While this study took place in the Gulf of Mexico it is analogous to the Atlantic fishery and as such the findings of study may also be applied to the Atlantic fishery. Therefore there is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species; SG60 is met.</p>		

PI 2.3.2	<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • meet national and international requirements; • ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.</p>	
		<p>The Endangered Species Act lists the species that are threatened or endangered. Once listed, a species may not be taken, possessed, harassed, or otherwise molested. It also provides for a review process to ensure that projects authorized, funded, or carried out by federal agencies do not jeopardize the existence of these species.</p> <p>However, there is no regular review of the potential effectiveness and practicality of alternative measures to minimise the mortality of ETP species related to the menhaden fishery; as a consequence SG80 is not met.</p> <p>According to FCR 7.10.5.2 and 7.10.5.3, a species which does not meet SG80 for all SIs cannot be scored at SG100; therefore neither bottlenose dolphins nor sea turtles (due to their not meeting SG80 under Sle) were scored at SG100 for Sle.</p>
References	[List any references here]	
Scoring element 1	Bottlenose dolphins (Applicable SGs met: SG60 – 3 of 3, SG80 – 3 of 4, SG100 – Not scored)	75
Scoring element 2	Sea turtles (4 species) (Applicable SGs met: SG60 – 3 of 3, SG80 – 3 of 4, SG100 – Not scored)	75
OVERALL PERFORMANCE INDICATOR SCORE: (2 of 2 scoring elements = 75)		75
CONDITION NUMBER (if relevant):		3

PI 2.3.3 – ETP species information

PI 2.3.3	<p>Relevant information is collected to support the management of UoA impacts on ETP species, including:</p> <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. 		
Scoring Issue	SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts		
Guidepost	Qualitative information is adequate to estimate the UoA related mortality on ETP species.	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.	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.
Met?	Y	Y	N
Justification	<p>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.</p> <p>The Atlantic menhaden fishery’s impacts on marine mammals were observed in 1978-80, 1992; however, there has been very limited observer coverage since 2008. NMFS Office of Protected Resources uses stranding and self-reporting by fishers, which are mandatory, to assess the impact of fisheries on marine mammals and turtles in the Atlantic.</p> <p>There is a requirement that fishers self-report mortalities or fishing related injuries of marine mammals. The mid-Atlantic menhaden purse seine fishery historically reported an annual incidental take of 1 to 5 common bottlenose dolphins (NMFS 1991, pp. 5-73). This information has not been updated for some time. There has been very limited observer coverage since 2008, but no takes have been observed.</p> <p>There is sufficient information available to allow the fishery, related mortality, to be quantitatively assessed for all affected species reported in this assessment. Although, the fishery must be proactive to collect quantitative data, the information from different sources shows that the mortality of ETPs species caused by the Atlantic menhaden fishery is negligible. Catch data are routinely reported whilst, reporting of interactions with ETPs is mandatory. Also, there is sufficient understanding of the species involved, their distribution, population status and susceptibility to bycatch in purse seine and midwater trawl gears to make a quantitative estimation of mortality within Atlantic menhaden fishery.</p> <p>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; SG60 and SG80 are met.</p> <p>However, sufficient quantitative information is not 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; SG 100 is not met.</p>		

PI 2.3.3	Relevant information is collected to support the management of UoA impacts on ETP species, including: <ul style="list-style-type: none"> • 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. 		
b	Information adequacy for management strategy		
Guidepost	Information is adequate to support measures to manage the impacts on ETP species.	Information is adequate to measure trends and support a strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
Met?	Y	Y	N
Justification	<p>Information is adequate to measure trends and support a strategy to manage impacts on ETP species.</p> <p>The population status of some ETP species are monitored and periodic abundance estimates are made by NMFS and NOAA and reported including the annual US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments and the 5-year reviews of species (including turtles) to ensure their listing is accurate. Research on population structure and behavior by the aid of photo identification and skin biopsy sampling is ongoing. There is mandatory reporting of bycatch of ETP species.</p> <p>Information is scarce on feeding ecology of most of the species regularly occurring in the northwest Atlantic, information on biomass and residence time gives indications of total consumption by cetaceans and seabirds in the northwest Atlantic, and possible effects on the yield of commercially important fish species.</p> <p>The obligation to report all bycatch of ETP species and the other measures and studies detailed above are adequate to measure trends and support a strategy to manage impacts on ETP species; SG60 and SG80 are met.</p> <p>The assessment team can confirm that there is information available for ETPs species reported in this assessment, although more quantitative information is needed regarding predation models and the role of Atlantic menhaden in populations of seabirds and marine mammals, for that reason the assessment team determines that SG 100 is not met.</p>		
References	NMFS 2015. Kemp's Ridley Sea Turtle (<i>Lepidochelys Kempii</i>) 5-Year Review: Summary and Evaluation: http://www.nmfs.noaa.gov/pr/listing/final_july_2015_kemp_s_5_year_review.pdf		
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 2 of 2, SG80 – 2 of 2, SG100 – 0 of 2)			80
CONDITION NUMBER (if relevant):			

PI 2.4.1 – Habitats outcome

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 covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.		
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?	Y	Y	Y
Justification	<p>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.</p> <p>Purse seine gears are widely recognised to have minimal impact on the physical environment; however, the Atlantic menhaden purse seine fishery is different in that it is sometimes prosecuted in shallow waters and in these instances the benthos may be contacted by the gear during fishing operations. However, due to the expense of the purse seine net and the adverse publicity that follows fish spills resulting from net tears, every effort is made to ensure fishery operations are conducted over smooth muddy/sandy bottoms such that any contact will likely result in minimal damage to the benthos and/or the fishing gear.</p> <p>Adult and juvenile menhaden form large, near-surface schools, primarily in estuaries and nearshore ocean waters from early spring through early winter. By summer, menhaden schools stratify by size and age along the coast, with older and larger menhaden found farther north. During fall-early winter, menhaden of all sizes and ages migrate south around the North Carolina capes to spawn.</p> <p>Atlantic menhaden is a pelagic-neritic species in areas with benthic composition of tidal marshes, mud flats, and sandy bottoms. Atlantic menhaden is most efficiently caught using purse seines, which are used to fish the upper layers of the water column. Then, there is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm; SG60, SG80 and SG100 are met.</p>		
b	VME habitat status		
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?	Y	Y	Y
Justification	<p>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.</p> <p>Although the major nesting concentrations of loggerhead turtles in the U.S. are found from North Carolina through southwest Florida, minimal nesting occurs outside of this range westward to Texas and northward to Virginia. Adult loggerheads are known to make extensive migrations between foraging areas and nesting beaches. During non-nesting years, adult females from U.S. beaches are distributed in waters off the eastern U.S. and throughout the Gulf of Mexico, Bahamas, Greater Antilles, and Yucatán.</p>		

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 covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.		
	There is a small amount of overlap between the fishery and the critical habitat however the nature of the critical habitat for loggerheads (sandy beaches, sargassum habitat) means there is very little effect from the purse seines. Therefore, 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; SG60, SG80 and SG100 are met.		
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?		Y
	Justification	<p>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.</p> <p>As explained above no VMEs or no minor habitats are damaged.</p> <p>Purse seine fisheries, operate in the water column and many studies show how the pelagic fisheries do not hinder the habitat. Some studies, detailed in the reference list below, conclude that the impact of the gears in the habitat depends on the time of contact with the bottom surface and at the same time it might vary depends the substrate and characteristics of the sea bed. SG 100 is met.</p>	
References	<p>NMFS 2013 Biological Report on the Designation of Marine Critical Habitat for the Loggerhead Sea Turtle, Caretta caretta 2013: http://www.nmfs.noaa.gov/pr/pdfs/criticalhabitat/loggerhead_criticalhabitat_biological.pdf</p> <p>NOAA Chesapeake bay website https://chesapeakebay.noaa.gov/fish-facts/menhaden</p>		
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 2 of 2, SG80 – 2 of 2, SG100 – 3 of 3)		100	
CONDITION NUMBER (if relevant):			

PI 2.4.2 – Habitats management strategy

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?	Y	Y	Y
Justification	<p>There is a strategy in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.</p> <p>Atlantic menhaden is pelagic neritic during its whole lifecycle. Fishing operations target the discrete shoals in mid-water, normally above the seabed. The purse seine fishery seeks to actively avoid contact with the seabed in order not to damage expensive fishing gear. In fact, many measures that minimise fishing gear/seabed interaction are in place such as: the use of electronics devices depth sounders, sonar and net position monitoring systems to control the position of the gear and how is operating during the set.</p> <p>There is information on and mapping of closed areas and the kind of substrate in each grounds to allow fishing activities to occur without damage to the gears. Another measure is the prohibition of fishing within MPAs in many areas of the U. S Atlantic coast where the most vulnerable areas of seabed (deep sea coral reefs) are.</p> <p>There are different types of closed areas to fishing activity, some of them are closed to avoid juveniles or because the habitat might be damaged or both. The information is review by NMFS and the updates on the mapping are shared with the fishermen and they are monitored by the Coast Guard, then they have enough information to prevent harm to habitats. Therefore, there is a strategy in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats; SG60, SG80 and SG100 are met.</p>		
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?	Y	Y	N
Justification	<p>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.</p> <p>The gear evaluated under this report is well defined by FAO and is well-known, some studies show how the pelagic fisheries have less effect on habitat than other gears. Regarding the habitats, the assessment team has information directly from the fishery to evaluate that the UoAs do not hinder the habitat. According to the management plan, every vessels fills out a Captains Daily Fishing Reports (CDFR) which are emailed daily to NMFS.</p> <p>The NMFS and the Coast Guard can monitor the track record of every fishing activity, then it is well known where and how the fleet is working. Then there is accurate information on the spatial location and timing of the fishery. Further information regarding benthic habitats is available through on-going research in U.S Atlantic waters carried out by state research agencies as well as through NMFS. Therefore, 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 and SG60 and SG80 are met.</p>		

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.		
	However, the assessment team found no evidence of any testing carried out by the UoAs or if they are developed by national or international bodies and SG 100 is not met.		
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?	Y	Y
	Justification 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). The purse seine gear employed in the UoAs is well defined pelagic gear. The fishing gear may touch the bottom due to the shallow area fished; however, this fishery is not suitable for situations where the gear would routinely damage the seabed so therefore it is almost negligible that the fishery would affect the habitats. Quantitative data are available with the Captains Daily Fishing Report. Every set from the Atlantic menhaden fishery might be checked by NMFS and as the CAB explained above, the coast guard is in charge of controlling the fleet so as no violations of the law or fishing activity in a vulnerable or closed area occurs. Therefore, there is clear quantitative evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in Sla; SG80 and SG100 are met.		
d	Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs		
	Guidepost	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?	Y	N
	Justification 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. The Atlantic menhaden fishery has no impact in VMEs because as it was explained above is a pelagic fishery with minimal contact with the seabed and there are measures to control the fishing grounds and the vessels activities; SG60 and SG80 are met. Whilst there is full VMS coverage of all gear types under assessment, there is no clear quantitative evidence that the menhaden fishery fully complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant; therefore SG 100 is not met.		

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.	
References	http://coralreef.noaa.gov/issues/resources/final_crco_fishing_impacts_implementation_plan.pdf http://www.fao.org/fishery/geartype/search/en	
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 3 of 3, SG80 – 4 of 4, SG100 – 2 of 4)		90
CONDITION NUMBER (if relevant):		

PI 2.4.3 – Habitats information

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 .	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.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
Met?	Y	Y	Y
Justification	<p>The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.</p> <p>The distribution of habitat types is available from various surveys and studies (USGS and NMFS) - and the information is improved upon with on-going research (The Marine Fisheries Habitat Assessment Improvement Plan (HAIP) 2010).</p> <p>Mapping for the area in which the fishery operates is available from the USGS (Figure 30) and NMFS. Different habitats and critical habitat areas are classified and identified in maps produced by the NMFS; see for example Figure 30, Figure 32, Figure 33 and Figure 34.</p> <p>Therefore, the distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats; SG60, SG80 and SG100 are met.</p>		
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.	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.	The physical impacts of the gear on all habitats have been quantified fully.
Met?	Y	Y	Y
Justification	<p>The physical impacts of the gear on all habitats have been quantified fully.</p> <p>As explained above, the pelagic gears have very little physical impact in the habitats, the gears operate in the water column and while interactions with the bottom surface do occur they have little to no effect on the habitat, therefore, physical impacts are not identified in these UoAs. There are no known impacts of the fishing gear on the pelagic- neritic habitat.</p> <p>Further, the vessels have different devices to avoid interactions with the seabed because it would involve a high cost to repair the gears. Therefore, the physical impacts of the gear on all habitats have been quantified fully; SG60, SG80 and SG100 are met.</p>		
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?		Y	N

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.	
	Justification	<p>Adequate information continues to be collected to detect any increase in risk to the main habitats.</p> <p>The information is reviewed by NMFS and some surveys that the NMFS carried out but they are not led at the benthic habitat level. Therefore, the information is not specific enough to identify the changes.</p> <p>OSPAR carried out studies to improve the knowledge and the distribution of sensitive areas but more studies aimed at habitat and environmental factor that could affect the grounds fishing should be carried out. However, sufficient data continue to be collected to detect any increase in risk to habitat, through ongoing stock status monitoring, catch recording and spatial and temporal operation of the fishery and SG 80 is met.</p>
References	NOAA 2010, National Marine Fisheries Service. Habitat Assessment Improvement Plan.	
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 2 of 2, SG80 – 3 of 3, SG100 – 2 of 3)		95
CONDITION NUMBER (if relevant):		

PI 2.5.1 – Ecosystem outcome

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?	Y	Y	Y
Justification	<p>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.</p> <p>There is a good level of knowledge regarding the ecosystems in U.S Atlantic coast. The area where the Atlantic menhaden fishery takes place is well defined and many studies are in place (Luo et.al 2005, EPA 2012, NEFSC Ecosystem Status Report). The Environmental Protection Agency (EPA) developed the Ecosystem Services Research Program (ESRP) to identify, map, model, and quantify ecosystem services. These studies show the main environmental characteristics of the area where the menhaden fishery takes place. The ecological importance of menhaden and the large menhaden fishery that has taken place in this area since purse seine landings reached a high point in the 1950s has generated intensive research and monitoring of the state of menhaden stocks since the mid-1960s.</p> <p>Healthy Atlantic menhaden populations contribute to a balanced marine ecosystem as a forage fish and by providing valuable ecosystem services. One of the most important interaction that the fishery has in the ecosystems is the removal of menhaden as a LTL species which serves as a prey for a wide range of fish, mammals and birds. As some studies confirm, menhaden is important in the diet of Bluefish, Striped bass and Weakfish as well as a number of other fish stocks, marine mammals, and seabirds. A 2009 Ecosystem model of Chesapeake Bay evaluates the impact of the menhaden fishery on Striped bass, and found them to be moderately sensitive to changes in menhaden fishing pressure.</p> <p>Amendment 3 to the Atlantic Menhaden FMP was initiated in 2015 to consider the development of ecological reference points (ERPs) and revisit allocation methods. Given the role of menhaden as forage fish, ERPs are intended to account for changes in the abundance of prey and predator species when setting overfished/overfishing thresholds and targets for menhaden. This work was noted as a high priority by the 2015 Peer Review Panel and is expected to be complete in 2019 in conjunction with the 2019 benchmark stock assessment.</p> <p>The Technical Committee also noted during the 2015 assessment that density dependent effects and unpredictable recruitment could negate the benefits of setting aside more fish for predators.</p> <p>Abundance of YOY juvenile menhaden is strongly and positively correlated with <i>chl-a</i> and primary production in Chesapeake Bay, at least during the most recent two decades (Houde and Harding 2009). Furthermore, the relationship between <i>chl-a</i> and abundance of YOY recruits is principally generated in spring months during the period larvae are transitioning to the filter-feeding juvenile stage when menhaden become dependent on phytoplankton for food. Numerous fish and avian predators are major consumers of young menhaden in Chesapeake Bay but there are no estimates of predation rates or of variability in natural mortality rates of YOY menhaden. Bioenergetics and predation models indicate potential for predators to control abundances of YOY menhaden in Chesapeake Bay (Annis et al. 2011).</p>		

PI 2.5.1	<p>The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.</p>	
	<p>More effort to know how the marine mammals and seabirds prey on menhaden are also needed and should be included in the predation models. However, no study consulted provides evidence that the fishery causes irreversible harm. In the late 1990s when menhaden had a low biomass, the populations of species which prey on menhaden had good stock status and high biomass values. Populations of birds that prey on menhaden such as osprey and bald eagles have been steadily increasing but this could have more to do with the elimination of pesticides and other factors than menhaden population levels.</p> <p>Therefore, there is evidence that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function; SG60, SG80 and SG100 are met.</p>	
References	<p>Annis, E. A., E. D. Houde, L. W. Harding, Jr., M.E. Mallonee, and M. J. Wilberg. 2011. Calibration of a bioenergetics model linking primary production to Atlantic Menhaden, <i>Brevoortia tyrannus</i>, growth in Chesapeake Bay. Mar. Ecol. Prog. Ser. Vol. 437: 253-267.</p> <p>Houde, E. D. and L. W. Harding, Jr. 2009. Menhaden abundance and productivity in Chesapeake Bay: linking the environment and primary production to variability in fish recruitment. Final Report to NOAA Chesapeake Bay Office, Annapolis, MD. Grant No. NA04NMF4570359. Ref. No.</p> <p>Luo, J, J.S. Ault, D.B. Olson, K. Hartman, A. McCrea, L. Kline, G. White and P. Kilduff 2005. Atlantic Coast Spatial Ecosystem Model for Multispecies Fisheries Assessments NOAA/CMER Award #NA17FE2747 http://www.asmf.org/uploads/file/52b09106ASMFC_SpatialEcosystemModel_2005.pdf</p> <p>EPA National Coastal Condition Report IV September 2012 https://www.epa.gov/sites/production/files/2014-10/documents/0_nccr_4_report_508_bookmarks.pdf</p> <p>NEFSC Ecosystem Status Report. https://www.nefsc.noaa.gov/ecosys/ecosystem-status-report/executive-summary.html</p> <p>Christensen, Villy, and Alasdair Beattie, Claire Buchanan, Hongguang Ma, Steven J. D. Martell, Robert J. Latour, Dave Preikshot, Madeline B. Sigrist, James H. Uphoff, Carl J. Walters, Robert J. Wood, and Howard Townsend. 2009. Fisheries Ecosystem Model of the Chesapeake Bay: Methodology, Parameterization, and Model Explanation. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO106, 146 p. https://www.pifsc.noaa.gov/library/pubs/NOAA_TM_NMFS_F-SPO_106.pdf</p>	
<p>OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 1 of 1, SG80 – 1 of 1, SG100 – 1 of 1)</p>		<p>100</p>
<p>CONDITION NUMBER (if relevant):</p>		

PI 2.5.2 – Ecosystem management strategy

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?	Y	Y	N
Justification	<p>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.</p> <p>NOAA Fisheries has adopted a policy of EBFM to more efficiently and effectively fulfil its mandates and promote consideration of not only cumulative effects, but also tradeoffs across various management regimes and human uses, as well as the impacts of these management decisions on human systems (Executive Order 13547 of July 19th 2010; Ocean Research Advisory Panel 2013).</p> <p>A broad range of regulatory measures are in place within U.S coastal waters which aim to limit adverse effects of fishing on the marine ecosystem. This strategy includes all the measures the assessment team has cited in the rationale above such as; quota systems, monitoring programme and surveillance, obligations of landing, control size, closed areas, surveys to monitor the stock status, collaboration of the industry with research projects, scientific advice, etc. There is therefore a partial strategy in place 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; SG60 and SG80 are met.</p> <p>In the context of this PI a “strategy” represents: “a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically” (FCR v2.0 Table SA8).</p> <p>Due to the continuing use of single-species references points, it cannot be said that there is a strategy that consists of a plan in place that is designed specifically to address all main impacts of the UoA on the ecosystem; therefore SG100 is not met.</p>		
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?	Y	Y	N
Justification	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		

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.		
		<p>The partial strategy in place has relevant information regarding the stock status, fleet composition, catch composition, fishing areas and all this data is available and many research studies (cited above PI 2.5.1) are carried out to improve the knowledge about the role of menhaden in the U.S Atlantic coastal ecosystems. In addition, while the reference target is currently set based on a single species stock assessment that does not considered other species, beyond including their influence as a component of natural mortality, the fact that fishing mortality has been below the reference target level since the early-2000s provides some objective basis for confidence that the technical measures in place have worked and will continue to work, based on some information directly about the menhaden fishery and the mid-Atlantic ecosystem; SG60 and SG80 are met.</p> <p>Current calculations of acceptable exploitation levels for menhaden are single species in nature and do not explicitly consider menhaden’s role in the ecosystem, although work is under way through the ASMFC BERP committee to rectify this. In addition there is no specific strategy in place to address the impacts of the menhaden fishery on the ecosystem. As there is no strategy in place, there has not been any testing that might support high confidence that such a strategy will work, based on information directly about the menhaden fishery and the mid-Atlantic ecosystem; SG100 is not met.</p>	
c	Management strategy implementation		
	Guidepost		<p>There is some evidence that the measures/partial strategy is being implemented successfully.</p> <p>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).</p>
	Met?	Y	N
	Justification	<p>There is some evidence that the measures/partial strategy is being implemented successfully.</p> <p>The principal potential risk or impact of the fishery is the depletion of the menhaden stock, due to their being an important prey species. At present reference threshold and target levels are set based on a single species stock assessment that does not considered other species, beyond including their influence as a component of natural mortality, the fact that fishing mortality has been below the reference target level since the early-2000s provides some evidence that the technical measures used to manage the fishery are being implemented successfully; SG80 is met.</p> <p>As previously discussed, there is currently no strategy in place to address the impacts of the menhaden fishery on the ecosystem. As there is no strategy in place, there is not clear evidence that the strategy is being implemented successfully; SG 100 is not met.</p>	
References	<p>Ecosystem-Based Fisheries Management Underlies the NOAA Fisheries Mission http://www.st.nmfs.noaa.gov/ecosystems/ebfm/ebfm-mission</p> <p>ASMFC 2017, Atlantic Menhaden Stock Assessment Update 2017 http://www.asmfc.org/uploads/file/59832ee0MenhadenStockAssessmentUpdate_Aug2017.pdf</p>		
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 2 of 2, SG80 – 3 of 3, SG100 – 0 of 3)		80	
CONDITION NUMBER (if relevant):			

PI 2.5.3 – Ecosystem information

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?	Y	Y	
	Justification	<p>Information is adequate to broadly understand the key elements of the ecosystem.</p> <p>There is adequate information available that allows for a broad understanding of the key elements of the marine ecosystem (including phytoplankton, zooplankton fish, seabirds, marine mammals and environmental elements such as ocean temperature, currents, salinity) in the study area as the assessment team has described above.</p> <p>The information cited is generally open access and can be consulted by any stakeholder. Even though work is still underway to produce the ecological reference points as described previously, the available information is adequate to broadly understand the key elements of the ecosystem; SG60 and SG80 are met.</p>		
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?	Y	Y	Y
	Justification	<p>Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and have been investigated in detail.</p> <p>The impacts of the fishery on the ecosystems are well defined when referring to environmental factors or physical harm. Research is underway to develop ecosystem monitoring and modelling approaches to support multispecies management.</p> <p>Therefore, the main interactions between the menhaden fishery and the key elements of the ecosystem can be inferred from existing information and have been investigated, and indeed continue to be investigated, in great detail (including the use of sophisticated ecosystem models; SG60, SG80 and SG100 are met.</p>		
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?		Y	N
	Justification	<p>The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are known.</p>		

PI 2.5.3	There is adequate knowledge of the impacts of the UoA on the ecosystem.		
	<p>The biology of Atlantic menhaden is well defined, with stock assessment carried out since the 1960s. Indices of abundance are produced from the fishery dependent and independent data collected. The distribution of habitat types is available from various surveys and studies (USGS and NMFS) - and the information is improved upon with on-going research (The Marine Fisheries Habitat Assessment Improvement Plan (HAIP) 2010.</p> <p>There is enough information readily available in the literature to support the assertion that the main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are known; SG80 is met.</p> <p>However, for some components such as some ETPs and bycatch up to date information is somewhat lacking. There is a requirement that fishers self-report mortalities or fishing related injuries of marine mammals. The mid-Atlantic menhaden purse seine fishery historically reported an annual incidental take of 1 to 5 common bottlenose dolphins (NMFS 1991, pp. 5-73). This information has not been updated for some time. There has been very limited observer coverage since 2008, but no takes have been observed. The lack of current information on some components of the ecosystem means that while the main functions of all components are known they are not yet fully understood; therefore, SG 100 is not met.</p>		
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?		Y	Y
Justification	<p>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.</p> <p>As mentioned above comprehensive research on menhaden is available and there is adequate information relating to the impacts of the fishery on the key elements of the ecosystem. Most information sources are easily accessible with many being open access.</p> <p>Therefore, adequate information is available on the ecosystem impacts of menhaden fishery to allow the main consequences for the ecosystem to be inferred; SG80 and SG100 are met.</p>		
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?		Y	Y
Justification	<p>Information is adequate to support the development of strategies to manage ecosystem impacts.</p> <p>Various monitoring programme collect relevant information regarding the Atlantic menhaden fishery itself and other components of U.S Atlantic coast ecosystems. Data are regularly presented, reviewed and considered in a variety of ASFMC working groups, as well as within more specific research projects.</p>		

PI 2.5.3	There is adequate knowledge of the impacts of the UoA on the ecosystem.	
	Therefore, information is adequate to support the development of strategies to manage ecosystem impacts; SG80 and SG100 are met.	
References	ASMFC 2012, Amendment 2 to the Interstate Fishery Management Plan for Atlantic Menhaden http://www.asmfc.org/uploads/file/atlanticMenhadenAmendment2_Dec2012.pdf	
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 2 of 2, SG80 – 5 of 5, SG100 – 3 of 4)		95
CONDITION NUMBER (if relevant):		

8.1.1.3. Principle 3 – Effective Management – Evaluation Tables

PI 3.1.1 – Legal and/or customary framework

PI 3.1.1	<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • 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 organized 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	<p>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.</p> <p>The Atlantic commercial menhaden fishery is managed by a suite of federal (i.e. NOAA-NMFS; NWS; EPA; USCG) and state laws, and supporting measures and policies which collectively establish an <u>effective</u> federal-state legal framework capable of delivery management outcomes consistent with MSC Principles 1 and 2 (SG 60 is met).</p> <p>Management responsibilities are shared across federal-state and inter-state jurisdictions, and are discharged within a legal and policy framework that emphasizes the importance of cooperation and collaboration between and amongst government departments/agencies and commissions, local civil society, stakeholders and community group. The <i>Interjurisdictional Fisheries Act</i> (IFA, 1986) and the <i>Atlantic Coastal Fisheries Cooperative Management Act</i> (ACFCMA, 1993) are examples of longstanding national statutes whose provisions include promoting cooperation across jurisdictions in an <u>organized</u> and <u>effective</u> manner to deliver management outcomes consistent with MSC Principles 1 and 2 (SG 80 is met).</p> <p>Cooperation between jurisdictions is formalized through various mechanisms, including <u>binding procedures</u> administered by the Atlantic States Marine Fisheries Commission and ratified by States (i.e. inter-agency protocols for fisheries data collection and analysis; stock assessment; enforcement and compliance; program reviews, and ecosystem approach under the <i>Endangered Species Act</i>), <u>administrative codes</u> (i.e. inter-agency committee deliberations; stakeholder and public engagement), and <u>compacts</u> (i.e. Public Law creating the Atlantic States Fisheries Management Commission) (SG 100 is met).</p>		
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

PI 3.1.1	<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • 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. 			
	Justification	<p>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.</p> <p>Legal disputes arising within the management system for the Atlantic commercial fishery are subject by US Federal and State laws to a <u>mechanism</u> for the resolution of legal disputes. Aggrieved parties can petition the Courts to have their concerns adjudicated (SG 60 is met). During the site visit, representatives engaged by the Assessment Team confirmed that the Atlantic menhaden commercial fishery is not subjected to ongoing legal disputes through the judicial system. (Understandably, disagreements between various participating groups do arise; however, they do not regularly translate into disputes requiring formal judicial attention). The US legal system at all levels is acknowledged to be <u>transparent</u> and <u>considered to be effective</u> in dealing with most issues as appropriate for the context of the UoA (SG 80 is met). Where the judicial system has been triggered in the matter of a dispute, there is no evidence to suggest that it has not been proven to be effective (SG 100 is met).</p> <p>Note: There is evidence to indicate that the management system provides for an administrative mechanism for the resolution of disputes (see ASFMC’s Rules and Regulations).</p>		
c	Respect for rights			
	Guidepost	<p>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.</p>	<p>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.</p>	
	Met?	<p>Y</p>	<p>Y</p>	
	Justification	<p>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.</p> <p>An examination of the extensive body of decisions by the US Supreme Court has consistently determined that Native Americans hold legal rights to hunt and fish wildlife for food and livelihood purposes both within and, in some cases, beyond their reservations. Many tribes have developed their own harvest plans and accompanying regulations based on resource sustainability principles.</p> <p>The Assessment Team did not specifically focus its attention on whether the management system for the Atlantic menhaden fishery generally <u>respected</u> or <u>observed</u> the legal rights in question. However, given the repeated findings by the US Supreme Court of the existence of the legal rights, it is logical to conclude that the management system’s customary framework would both respect and observe the rights as established (SG 60 and SG 80 are met).</p>		

PI 3.1.1	<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • 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.
	<p>No evidence was found as to whether the management system <u>formally commits</u> to the legal rights in a manner consistent with the objectives of MSC Principles 1 and 2 (SG 100 is not met).</p> <p>Note: It might be possible to award a higher score for this Scoring Issue if there was evidence of Native American participation in the Atlantic menhaden fishery either through officially-reported catch statistics, or through a provision of a State's Fishing Plan.</p>
References	<p>Refer to footnoted references in Section 3.5.1.1. Charlton, G., <u>The Law of Native American Hunting, Fishing and Gathering Outside of Reservation Boundaries in the United States and Canada</u>, 39 Can.-U.S. L.J. 69 (2015); available at: http://scholarlycommons.law.case.edu/cuslj/vol39/iss/5</p>
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 3 of 3, SG80 – 3 of 3, SG100 – 2 of 3)	95
CONDITION NUMBER (if relevant):	NA

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	N
Justification	<p>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.</p> <p>A significant number of federal and state formal consultation and engagement mechanisms are in place which support the full range of activities of the management system for the Atlantic menhaden fishery, consistent with the scale, intensity, and cultural context of the UoA (i.e. broad policy development, research planning, enforcement and compliance planning and implementation, stock assessment, and, to a degree, ecological considerations). The ASMFC's many committees are well established with clear administrative processes supported by policies and guidelines, all of which are easily accessible to stakeholders and the general public. Many of the committees and sub-committees have been active over an extended period of time, and associated governance and administrative rules are explicitly defined. The terms of office of elected or appointed committee representatives often span several years, thus ensuring that their responsibilities, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction. A similar tenure applies to the representatives of stakeholder groups (SG60 and SG80 are met).</p> <p>Moreover, at the federal level, there is sufficient evidence to indicate that the aforementioned functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction. However, based on available information, the Assessment team cannot conclude that state management processes were explicitly defined and well understood for all areas of responsibility and interactions (SG 100 is not met).</p>		
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	N

<p>PI 3.1.2</p>	<p>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</p>		
	<p>Justification</p>	<p>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.</p> <p>The main affected parties associated with the Atlantic commercial menhaden fishery include mandated stakeholders representing recreational and commercial bait fishers, charter boat operators, conservation and environmental groups/NGO coalitions, academia, and individual citizens. The main point of this scoring issue is that the management system is open to stakeholders and that any information that is viewed as important by those parties can be fed into and be considered by the process in a way that is transparent and effective to the interested stakeholders.</p> <p>The committees and sub-committees considered in this assessment regularly seek and accept relevant information, including local knowledge. This is evidenced by participants being able to propose discussion topics at the time a meeting notice is publicized; alternatively, most consultation bodies provide opportunities for non-members to raise local issues or comments from the floor. The frequency of committee and sub-committee meetings is generally set out in their associated terms of reference, and follows a monthly, quarterly and/or annual schedule.</p> <p>The content and outcomes of the consultation and engagement processes are routinely posted on the host organization’s website, thus ensuring a level of transparency (SG60 and SG80 are met).</p> <p>The requirement at the SG 100 level requires that the management system demonstrates consideration of the information (including local knowledge) and explains how it is used or not used. While there is little doubt that the required explanations are offered, the assortment of meeting reports reviewed by the assessors did not reveal evidence that this practice was common to all consultation and engagement processes in every situation (therefore, SG 100 is not met).</p>	
<p>c</p>	<p>Participation</p>		
	<p>Guidepost</p>	<p>The consultation process provides opportunity for all interested and affected parties to be involved.</p>	<p>The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.</p>
	<p>Met?</p>	<p>Y</p>	<p>Y</p>
	<p>Justification</p>	<p>The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.</p> <p>The established federal and state consultation processes are deemed to be transparent and effective. They are inclusive by providing opportunities to all affected stakeholders and organizations by design (SG80 is met).</p> <p>Administrative rules are formally defined; there is no evidence to indicate that the rules are not followed. All interested and affected parties are known, and their participation encouraged and recognized. Opportunities are also provided to the parties to contribute to the formulation of meeting agendas, and to raise questions and comments either as committee members or members of the general public. Effective engagement is further facilitated through easily accessible website-based</p>	

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	
		applications which allow parties to comment of the various initiatives that inform the fishery's management system (SG100 is met).
References	Examples: ASMFC's Public Comment Guidelines; available at: http://www.asmfc.org/home/2016-annual-meeting Maryland's Tidal Fisheries Advisory Commission: April 2017 meeting minutes; available at: http://dnrweb.dnr.state.md.us/fisheries/calendar/events/1479/K_TFAC_meeting_transcript_4_27_17.pdf Virginia's Marine Resources Commission; available at: http://www.mrc.virginia.gov/commission_agendas/commagendaindex.shtm	
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 2 of 2, SG80 – 2 of 2, SG100 – 1 of 3)		85
CONDITION NUMBER (if relevant):		NA

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 and required by management policy.
Met?	Y	Y	Y
Justification	<p>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.</p> <p>Long-term objectives at the broader management level to guide decision-making are implicit within management policy for the Atlantic menhaden fishery, consistent with the MSC Standard and the precautionary approach (SG 60 is met). The goal of Amendment 2 to the Interstate Fishery Management Plan (1981) is “to manage the Atlantic menhaden fishery in a manner that is biologically, economically, socially and ecologically sound, while protecting the resource and those who benefit from it.’ This goal is further defined by clear biological, socio-economic and ecological objectives that are explicit within and required by management policy and which serve to inform the decision-making processes associated with the full geographical range of the fishery. The Commission’s 2017 Action Plan contains a full suite of strategies that are designed to inform and achieve the objectives associated with P1 and P2 (SG 80 and SG 100 are met).</p> <p>Note: Given the ASMFC’s governance parameters and decision-making authorities (in contrast to the Gulf of Mexico’s Commission), the menhaden fisheries operating in State waters are managed in accordance with the same long-term objectives, and decision-making processes are guided by these objectives.</p>		
References	Amendment 2 of the Atlantic menhaden IFMP.		
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 1 of 1, SG80 – 1 of 1, SG100 – 1 of 1)			100
CONDITION NUMBER (if relevant):			

PI 3.2.1 – Fishery-specific objectives

PI 3.2.1	The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.		
Scoring Issue	SG 60	SG 80	SG 100
a	Objectives		
Guidepost	Objectives , which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery-specific management system.	Short and long-term objectives , which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.	Well defined and measurable short and long-term objectives , which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.
Met?	Y	Y	Y
Justification	<p>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.</p> <p>The aforementioned objectives for PI 3.1.3 are both short and long-term objectives that guide decision-making processes of the Atlantic menhaden fishery operating in both federal and state waters. The Commission's IFMP is an "evergreen" plan i.e. it is multi-year and applies to all 15 member states of the Commission. The objectives support the outcomes required by MSC's Principles 1 and 2 and are explicit within the fishery's management system (SG 80 is met).</p> <p>SG 100 further requires that the objectives be well-defined, measurable, and demonstrably consistent with the MSC's Principles. The Commission and its subordinate committees conduct in-season and formal annual reviews of the fishery's management measures against all objectives; when required, adjustments to the IFMP's management measures are undertaken on a continuous basis in order to remain consistent with the MSC's Principles. The reviews are supported by measurable outputs (metrics) such as for stock performance, catch reporting and quota management, and ecological impacts. Moreover, the Commission's 2017 Action Plan contains a full suite of strategies that are designed to inform and achieve the objectives associated with P1 and P2 (SG 100 is met).</p>		
References	<p>Examples: Committee deliberations overseen by the ISFMP Policy Board; Committees include (i) Menhaden Management Board, (ii) Menhaden Plan Review Team, (iii) Menhaden Advisory Panel, (iv) Habitat Committee, (v) Menhaden Technical Committee. ASFMC's Action Plan for 2017. State-level reviews: Virginia's Commercial Fishing Advisory Board, Maryland's Tidal Fisheries Advisory Commission, Delaware's Tidal Fin Fish Advisory Council, North Carolina's Fisheries Commission. External reviews: PEW Charitable Trusts.</p>		
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 1 of 1, SG80 – 1 of 1, SG100 – 1 of 1)			100
CONDITION NUMBER (if relevant):			

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	<p>There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>“Established” decision-making processes are understood to mean that there is a process that can be immediately triggered for fisheries-related issues, the process has been triggered in the past and has led to decisions about sustainability in the fishery. Documentation examined by the Assessment Team shows that the activities of the ASMFC, member States and their supporting sub-structures have been actively engaged in a variety of fisheries-related issues over an extended period of time, including stock parameters, ecosystem interactions, catch reporting and data interpretations, enforcement, and the identification of strategic goals and objectives for the management system. The processes themselves are recognized by stakeholders and the general public</p> <p>Moreover, the ASMFC has adopted a number of administrative rules and regulations (February 4, 2016) that inform its established decision-making process in support of its measures and strategies. They have been amended some 15 times since originally adopted in 1942, and were, in fact, completely revised in 1996. The particulars provisions of Article V that guide the Commission’s decision-making process include:</p> <ul style="list-style-type: none"> • Article I, Section 1 (b) – Code of Conduct; Section 2 – Powers and Duties • Article II, Section 1 – Meetings • Article III, Section 1 – Quorum; Section 2 – Voting; Section 3 – Proxies <p>The Commission has augmented its rules and regulations by incorporating an “appeals process” whereby States can contest certain plan provisions and policies (SG60 and SG80 are met).</p>		
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	N
Justification	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.		

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.	
		<p>The decision-making processes attributed to the ASMFC's committees and those at the state level are sufficiently well-developed as to include the study and evaluation of a wide range of serious and other important issues identified in relevant research (i.e. government and academic sources), monitoring, evaluation and consultation (i.e. public meetings, webinars, outreach activities). These processes have already been determined to be transparent and adaptive (see PI 3.1.2).</p> <p>Furthermore, the frequency of the deliberations of the ASMFC's committees and those at the state level is indicative of processes that are designed to respond in a timely and adaptive fashion (SG60 and SG80 are met).</p> <p>There is insufficient evidence to conclude that the decision-making processes respond to all identified issues (SG100 is not met).</p>	
c	Use of precautionary approach		
	Guidepost	Decision-making processes use the precautionary approach and are based on best available information.	
	Met?	Y	
	Justification	<p>Decision-making processes use the precautionary approach and are based on best available information.</p> <p>Various federal statutes require that the precautionary approach be relied upon when decisions are made regarding the management system for a fishery. Examples of decisions taken that reflect the use of the precautionary approach for the Atlantic commercial menhaden fishery include: (i) the definition and scope of conservation and sustainability principles, (ii) the setting of a conservative Total Allowable Catch and associated Harvest Strategy (measures) that do not contribute to overfishing; (iii) the incorporation of science-based Reference Points and associated targets for single species, and (iv) the consideration of ecosystem interactions (SG80 is met).</p>	
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.	<p>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.</p> <p>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.</p>
	Met?	Y	Y
	Justification	<p>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.</p>	

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.		
		<p>All ASFMC and State agencies reviewed for this report (departments, commissions, councils, committees) regularly provide and post information on the fishery's performance through a variety of public venues, reports, publications, and internet sites; stakeholder-requested information is generally provided except if the information is of a confidential nature (SG60 is met).</p> <p>As reported previously, there is an extensive network of consultation and engagement processes in play across all key states and at the federal level where contributing and affected stakeholders and the public have the opportunity to interact with officials and receive explanations for actions taken and not taken (SG80 is met).</p> <p>The accountability and transparency of the management system are well established, resulting in a system of formal reporting capable of providing comprehensive information on the fishery's performance, management actions, and how the management system responds to findings and recommendations (SG100 is met).</p>		
e	Approach to disputes			
	Guidepost	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Y	Y	Y
	Justification	<p>The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.</p> <p>There is no evidence to indicate that the management authority or fishery are subject to continuing court challenges (SG60 is met).</p> <p>During the Assessment Team's site visit meetings in July 2017, Management authorities reported that there have been very few legal challenges to the management system and fishery. It is reasonable to assume that the management system and fishery would comply with decisions in a timely manner after all legal avenues of appeal have been exhausted (SG80 is met).</p> <p>The potential for legal disputes to arise is quite low; authorities and the client have both reported that efforts are made to avoid legal actions through administrative dispute resolution mechanisms, mutual agreements, and compromise (SG 100 is met).</p>		
	References	<p>Examples: Officials minutes from a variety of Commission and State committee meetings; NOAA Beaufort stock assessments; annual reports of agencies; federal and state multi-year strategic and operational plans. Site visit contributions by client and management representatives. ASMFC's Appeal Process; available at: http://www.asmfc.org/uploads/file/ASMFCAppealsProcess.pdf ASMFC's Rules and Regulations; available at: https://www.asmfc.org/files/pub/CompactRulesRegs_Feb2016.pdf</p>		
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 4 of 4, SG80 – 5 of 5, SG100 – 2 of 3)				95
CONDITION NUMBER (if relevant):				

PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.		
Scoring Issue		SG 60	SG 80	SG 100
a	MCS implementation			
	Guidepost	Monitoring, control and surveillance mechanisms exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Y	Y	N
	Justification	<p>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.</p> <p>NOAA’s Law Enforcement Division and those of the key States reported in this assessment have comprehensive monitoring, control and surveillance systems in place for the commercial and recreational fisheries within their respective jurisdictions. Federal-State agencies (except North Carolina) are active law enforcement partners through formal Joint Force Agreements (JFAs). In most cases, the systems are informed by strategic goals and action plans. The current system is capable of controlling and implementing relevant management measures, strategies and/or rules as adopted for the commercial reduction fishery, such as they are, namely closed areas and times, catch reporting, and gear configuration (SG60 and SG80 are met).</p> <p>Information and comments provided to the Assessment Team by federal and state officials do not indicate that the current MCS system in place is somehow deficient and that non-compliance issues are going undetected. That said, the team is unable to determine whether the current MCS while comprehensive has been implemented specifically for the menhaden fishery. The collection and availability of fishery-specific MCS data might result in a higher score for this SI (SG100 is not met).</p>		
b	Sanctions			
	Guidepost	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	Met?	Y	Y	N
	Justification	<p>Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.</p> <p>Punitive measures, including sanctions, are defined in relevant federal and state statutes and administrative codes that serve to guide law enforcement officers and prosecutors in their duties when non-compliance situations and subsequent legal proceedings arise. Several states publish the names of individuals whose recreational or commercial fishing privileges have been suspended for a specific period of time. This approach is generally recognized to have a deterrent effect (SG60 and SG80 are met)</p> <p>Given that no instances of non-compliance with fisheries regulations by the reduction purse seine fleet were registered and resulted in legal proceedings over the past few years, applicable sanctions would</p>		

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.		
		not have been levied nor evaluated for effectiveness. The Assessment Team is therefore unable to determine whether sanctions demonstrably provided effective deterrence (SG 100 is not met).		
c	Compliance			
	Guidepost	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Y	Y	N
	Justification	<p>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.</p> <p>Information presented during the July site visit and information subsequently acquired or provided to the Assessment Team indicates that some evidence exists to demonstrate that the Omega purse seine fleet complies with the requirements of the fishery, including providing catch and effort data to authorities and facilitating access to its vessels for inspection purposes; therefore (SG60 and SG80 are met).</p> <p>The Assessment Team cannot conclude with a high degree of confidence that compliance with the requirements of the fishery's management measures has been established, given the limited amount of available enforcement and compliance data (SG100 is not met).</p>		
d	Systematic non-compliance			
	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		Y	
	Justification	<p>There is no evidence of systematic non-compliance.</p> <p>The Assessment Team is satisfied that systematic non-compliance by the Omega purse seine fleet with federal and state regulations for the Atlantic menhaden reduction fishery does not exist. Stakeholder submissions received by the team during and following the July site visit do not allege systematic non-compliance by the fleet. No evidence was found to indicate that federal and state law enforcement authorities had flagged persistent or repetitive enforcement issues with the fleet's fishing practices (SG80 is met).</p>		
References	<p>Examples:</p> <p>2017 State Compliance Reports (2016 fishery) for Atlantic menhaden – NJ, VA and MD</p> <p>Enforcement and compliance data and emails provided by law enforcement authorities.</p> <p>Comments from NOAA regarding federal enforcement activities in Atlantic federal waters.</p>			
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 3 of 3, SG80 – 4 of 4, SG100 – 0 of 3)				80
CONDITION NUMBER (if relevant):				NA

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	<p>There are mechanisms in place to evaluate all parts of the fishery-specific management system.</p> <p>For the Atlantic menhaden fishery, evaluations are carried out by a Program Review Team (PRT) and, when completed, are forwarded to the Atlantic Menhaden Management Board for appropriate action. Compliance review shall be consistent with the requirements of Sections Six and Seven of the ISFMP Charter and the respective FMP requirements. In carrying out its activities, the PRT seeks advice from the appropriate technical committee, stock assessment sub-committee, advisory panel, Committee on Economics and Social Sciences, and the Assessment Science, Habitat, Artificial Reef, Law Enforcement, and Management and Science Committees.</p> <p>The key components of the fishery-specific management system for Atlantic menhaden include: (i) stock status indices, (ii) ecosystem interactions, (iii) compliance and enforcement, (iv) socio-economic outcomes, and (v) management measures. In addition to the aforementioned Commission’s plan review mechanisms, other contributors include:</p> <ul style="list-style-type: none"> ▪ Independent and joint academic research and published studies; ▪ Commission and State Annual Reports; ▪ Mandatory State Annual Compliance Reports; ▪ Official meetings of various State-Federal and State-specific Commissions, Committees, and Advisory Groups with input from affected stakeholder organizations and the general public. <p>The Assessment Team is satisfied that the established review mechanisms have demonstrated the capacity to evaluate <u>all</u> parts of the fishery-specific management system. (SG60, SG80 and SG100 are met).</p> <p>Note: The Commission’s Law Enforcement Committee has prepared a document entitled <i>Guidelines for Resource Managers on the Enforceability of Fishery Management Measures</i> (November 2002) which can be used to evaluate the effectiveness of future measures.</p>		
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	<p>The fishery-specific management system is subject to regular internal and occasional external review.</p> <p>According to the MSC’s FCRs (GSA4.10.1), external review means “external to the fisheries management system.” Examples given include, <i>inter alia</i>, another department within an agency, another agency or organization within the country, and a government audit that is external to the fisheries management agency.</p>		

PI 3.2.4	<p>There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives.</p> <p>There is effective and timely review of the fishery-specific management system.</p>
	<p>The justification provided for Sla indicates that <u>all</u> parts of the fishery-specific management system are subject to regular internal and occasional external review (SG80 is met).</p> <p>While there is some evidence that some aspects of the management system are reviewed externally on a regular basis (e.g. peer-reviewed stock assessments), there is insufficient evidence to indicate that the entire system is subject to regular external review (SG100 is not met).</p>
References	<p>Examples:</p> <p>Proceedings of the Atlantic States Marine Fisheries Commission: Atlantic Menhaden Board, 1st February, 2017 i.e. socio-economic considerations, stock status reference points, quota management, episodic events set-aside program, Chesapeake Bay reduction fishery cap; available at: http://www.asmfc.org/uploads/file/5915cfb0AtlMenhadenBoardProceedingsFeb2017.pdf</p> <p>Whitehead, J.C., J. Harrison. Socioeconomic Analysis of the Atlantic Menhaden Commercial Bait and Reduction Fishery: A Report to the Atlantic States Marine Fisheries Commission, May 2017; available at: www.asmfc.org/uploads/file/5952c923ASMFC_MenhadenSocioeconomicReport_June2017.pdf</p> <p>North Carolina Division of Marine Fisheries; available at: http://portal.ncdenr.org/c/document_library/get_file?p_l_id=1169848&folderId=30207658&name=D_LFE-133943.pdf</p> <p>PEW Charitable Trusts – Fact Sheet; available at: www.pewtrusts.org/en/research-and-analysis/fact-sheets/2014/05/15/atlantic-menhaden-conservation-and-management</p> <p>Haddon, Malcolm. Review Research on Atlantic menhaden, CSIRO Marine and Atmospheric Research, Hobart, Tasmania, Australia, 2009 pp 1-30; available at: https://www.st.nmfs.noaa.gov/Assets/Quality-Assurance/documents/peer-review-reports/2009/2009_05_08%20Haddon%20Chesapeake%20Bay%20menhaden%20program%20review%20report.pdf</p> <p>Maguire, Jean-Jacques, Report on the evaluation of the Chesapeake Bay Fisheries Science Program: Atlantic Menhaden Research Program, Laurel, MD, April 22-24, 2009. Prepared for the Center for Independent Experts, May 2009.</p> <p>Hilborn, R., Amoroso, R., Bogazzi, E., Jensen, O.P., Parma, A., Szuwalski, C., and C.J. Walters. (2017). <i>When does fishing forage species affect their predators?</i> Fisheries Research. 191 (2017) 211–221; available at: http://scemfis.org/Reports/fishing_forage_fish.pdf</p>
OVERALL PERFORMANCE INDICATOR SCORE: (Applicable SGs met: SG60 – 2 of 2, SG80 – 2 of 2, SG100 – 1 of 2)	90
CONDITION NUMBER (if relevant):	NA

8.1.2. Appendix 1.2 Risk Based Framework (RBF) Outputs

8.1.2.1. Appendix 1.2.1 Consequence Analysis (CA) for Principle 1

Not applicable. There were no data-deficient species identified under PI 1.1.1.

8.1.2.2. Appendix 1.2.2 Productivity-Susceptibility Analysis (PSA)

In normal circumstances this section is reserved for PIs where the PSA has been used as part of the RBF assessment of that PI. As previously discussed, there are no Main Secondary species and the Assessment Team elected not to use the RBF solely for the purposes of scoring Minor species under PI 2.2.1. Therefore while a full RBF has not been conducted the Assessment Team elected to broadly follow the Productivity Susceptibility Analysis (PSA) approach when evaluating the UoA's impacts on non-target species as it was felt that this was a sensible way of assessing the risk posed by the fishery to the Minor Secondary Species identified.

Table 8.1.2.2.a. PSA Table – Scoring element 1. American harvestfish (*Peprilus paru*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 1. American harvestfish (<i>Peprilus paru</i>)	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	1 – 2 (based on similar species <i>in</i> Snyder and Burgess, 2016)	1
Average maximum age	3 – 6 years (based on similar species <i>in</i> Snyder and Burgess, 2016)	1
Fecundity	Unknown but likely >20,000 eggs per year	1
Average maximum size	30 cm (Fishbase)	1
Average size at maturity	12 – 13 cm (Fishbase)	1
Reproductive strategy	Broadcast spawner	1
Trophic level	4.5 (Fishbase)	3
Total Productivity (Average)		1.29
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		1.66
MSC PSA-derived score		100
References	<ul style="list-style-type: none"> ▪ FishBase: http://www.fishbase.org/summary/28143 ▪ Snyder, D.B. and Burgess, G.H., (2016). Marine fishes of Florida. JHU Press (based on similar species Atlantic butterfish (<i>P. triacanthus</i>) and Gulf butterfish (<i>P. bruit</i>)). 	

Table 8.1.2.2.b. PSA Table – Scoring element 2. Atlantic thread herring (*Opisthonema oglinum*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 2. Atlantic thread herring (<i>Opisthonema oglinum</i>).	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	1.9 – 2.4 (Fishbase)	1
Average maximum age	9 years (Fishbase)	2
Fecundity	1,000,000 (Fishbase)	1
Average maximum size	130 cm (Fishbase)	2
Average size at maturity	30 cm (Fishbase)	1
Reproductive strategy	Broadcast spawner (Fishbase)	1
Trophic level	4.5 (Fishbase)	3
Total Productivity (Average)		1.57
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		1.89
MSC PSA-derived score		97.0
References	<ul style="list-style-type: none"> ▪ FishBase: http://www.fishbase.org/summary/1486 	

Table 8.1.2.2.c. PSA Table – Scoring element 3. Bullnose ray (*Myliobatis freminvillii*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 3. Bullnose ray (<i>Myliobatis freminvillii</i>)	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	0.6 ¹	2
Average maximum age	13 – 25 (from <i>M. goodie</i>) ³	2
Fecundity	4 – 8 embryos per reproductive season ²	3
Average maximum size	30 cm ¹	2
Average size at maturity	9.3 cm ¹	2
Reproductive strategy	Live bearer	3
Trophic level	3.2 ¹	3
Total Productivity (Average)		2.43
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		2.65
MSC PSA-derived score		83
References	<ul style="list-style-type: none"> ▪ FishBase: http://www.fishbase.org/summary/1165 ▪ Florida Museum: https://www.floridamuseum.ufl.edu/fish/discover/species-profiles/myliobatis-freminvillii/ ▪ Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP): http://www.sidalc.net/cgi-bin/wxis.exe/?IsisScript=tesisdp.xis&method=post&formato=2&cantidad=1&expresion=mfn=000540 	

Table 8.1.2.2.d. PSA Table – Scoring element 4. Cownose ray (*Rhinoptera bonasus*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 4. Cownose ray (<i>Rhinoptera bonasus</i>)	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	~6 – 7 males and ~7 – 8 females (Fisher, Call and Grubbs, 2013).	2
Average maximum age	8 – 21 (Fisher, Call, and Grubbs, 2013)	2
Fecundity	4 – 8 embryos per reproductive season (Florida Museum)	3
Average maximum size	DW∞ 95.7 cm males; 106.3 cm females (Fisher, Call and Grubbs, 2013)	2
Average size at maturity	85 – 86 cm Disc Width (Fisher, Call and Grubbs, 2013).	2
Reproductive strategy	Live bearer	3
Trophic level	3.2 (FishBase)	2
Total Productivity (Average)		2.29
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		2.52
MSC PSA-derived score		86
References	<ul style="list-style-type: none"> ▪ Fisher, R.A., Call, G.C. and Grubbs, R.D., 2013. Age, growth, and reproductive biology of cownose rays in Chesapeake Bay. <i>Marine and Coastal Fisheries</i>, 5(1), pp.224-235: https://onlinelibrary.wiley.com/doi/pdf/10.1080/19425120.2013.812587 ▪ FishBase: http://www.fishbase.org/summary/28143 ▪ Florida Museum: https://www.floridamuseum.ufl.edu/fish/discover/species-profiles/rhinoptera-bonasus 	

Table 8.1.2.2.e. PSA Table – Scoring element 5. Hogchoker (*Trinectes maculatus*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 5. Hogchoker (<i>Trinectes maculatus</i>).	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	2 – 4 years (Koski 1978; Mansueti and Pa 1956).	1
Average maximum age	7 years (FishBase)	2
Fecundity	10,000 – 34,000 eggs (Hildebrand & Schroeder 1928; Castagna 1955).	2
Average maximum size	20 cm (FishBase)	1
Average size at maturity	<40 cm (based on max size)	1
Reproductive strategy	Broadcast spawner	1
Trophic level	3.4 ¹	3
Total Productivity (Average)		1.57
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		1.89
MSC PSA-derived score		97
References	<ul style="list-style-type: none"> ▪ FishBase: https://www.fishbase.de/summary/Trinectes-maculatus ▪ Koski, R. T. 1978. Age, growth, and maturity of the hogchoker, <i>Trinectes maculates</i>, in the Hudson River, New Trans. Amer. Fish. Soc. 107(3):449-453. ▪ Mansueti, R., and R. Pauly. 1956. Age and Growth of the northern hogchoker, <i>Trinectes maculates maculates</i> Patuxent River, Maryland. Copeia 1956(1):60-62. ▪ Hildebrand, S. F., and W. S. Schroeder. 1928. Fishes of Chesapeake Bay. Bull. U.S. Bur. Fish. 43(1):1-336. ▪ Castagna, M. 1955. A study of the hogchoker, <i>Trinectes maculates</i> (Bloch and Schneider) in the Wakulla Rive Master's Thesis, Florida State Univ., Tallahassee. 	

Table 8.1.2.2.f. PSA Table – Scoring element 6. Ladycrab (*Ovalipes ocellatus*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 6. Ladycrab (<i>Ovalipes ocellatus</i>).	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	No information available.	
Average maximum age	No information available.	
Fecundity	No information available.	
Average maximum size	Carapace 8.9 cm wide x 7.5 cm long (Pollock, 1998; Kaplan, 1999).	1
Average size at maturity	<40 cm (based on max size)	1
Reproductive strategy	Females incubate eggs on underside of carapace.	3
Trophic level	No information available.	
Density Dependence	No information available.	
Total Productivity (Average)		1.67
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		1.97
MSC PSA-derived score		96.0
References	<ul style="list-style-type: none"> ▪ Pollock, L. W. (1998). A practical guide to the marine animals of northeastern North America. Rutgers University Press. ISBN 978-0-8135-2399-6. ▪ Kaplan, E. H. (1999). "Lady crab <i>Ovalipes ocellatus</i>". In Roger Tory Peterson. A Field Guide to Southeastern and Caribbean Seashores: Cape Hatteras to the Gulf Coast, Florida, and the Caribbean. Peterson Field Guides (2nd ed.). Houghton Mifflin Harcourt. p. 322. ISBN 978-0-395-97516-9. 	

Table 8.1.2.2.g. PSA Table – Scoring element 7. Silverperch (*Bairdiella chrysoura*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 7. Silverperch (<i>Bairdiella chrysoura</i>).	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	2 (Welsh and Breder, 1924).	1
Average maximum age	6 ¹	1
Fecundity	56,000 – 158,000 (Based on 1,249 ± 130 eggs/g from Schmidt, (1993) and $W=aLb$ where $a = 0.01072$, $b=3.08$ and $L = 15 - 21$ cm).	1
Average maximum size	30 cm ²	1
Average size at maturity	15 – 21 cm ¹	1
Reproductive strategy	Broadcast spawner	1
Trophic level	3.2 ²	2
Total Productivity (Average)		1.14
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		1.55
MSC PSA-derived score		100
References	<ul style="list-style-type: none"> ▪ Welsh, W. W., and C. M. Breder, Jr. (1924). Contributions to life histories of Sciaenidae of the eastern United States coast. Bull. U.S. Bur. Fish. 39:141–201. ▪ FishBase: http://www.fishbase.org/summary/1165 ▪ Schmidt, T. W. 1993. Community characteristics of dominant forage fishes and decapods in the Whitewater Bay–Shark River estuary, Everglades National Park. U.S. Dept. Int. Nat. Park Serv., Southeast Regional Technical Report NPS/SER/EVER/NRTR-93/12, South Florida Research Center, Homestead, FL. 178 p. 	

Table 8.1.2.2.h. PSA Table – Scoring element 8. Spidercrab (*Libinia emarginata*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 8. Spidercrab (<i>Libinia emarginata</i>).	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	No information available.	
Average maximum age	No information available.	
Fecundity	No information available.	
Average maximum size	Average carapace diameter 6 cm – 10 cm (Corrington 1927; Ruppert & Fox 1988).	1
Average size at maturity	<40 cm (based on max size)	1
Reproductive strategy	Females incubate eggs on underside of carapace.	3
Trophic level	No information available.	
Density Dependence	No information available.	
Total Productivity (Average)		1.67
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		1.97
MSC PSA-derived score		96.0
References	<ul style="list-style-type: none"> ▪ Corrington, J., D. (1927). Commensal association of a spider crab and a medusa. Biol. Bull. 53: 346-350. ▪ Ruppert, E., E. and Fox, R. S., (1988). Seashore animals of the Southeast: A guide to common shallow-water invertebrates of the southeastern Atlantic coast. Univ. South Carolina Press. Columbia, SC, USA. 429 pp. 	

Table 8.1.2.2.i. PSA Table – Scoring element 9. Spiny butterfly ray (*Gymnura altavela*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 9. Spiny butterfly ray (<i>Gymnura altavela</i>)	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	<5 years (Est. based on disk width-at-age data from Parsons et al., 2018 and average size at maturity from Daiber and Booth, 1960).	1
Average maximum age	11 (male) – 18 (female) years (Parsons et al., 2018)	2
Fecundity	4 – 7 (Fishbase)	2
Average maximum size	200 cm DW (Fishbase)	3
Average size at maturity	55 cm DW (males) – 102 cm DW (females) (Daiber and Booth, 1960).	
Reproductive strategy	Live bearer	3
Trophic level	4.5 (Fishbase)	3
Total Productivity (Average)		2.29
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		2.52
MSC PSA-derived score		86.0
References	<ul style="list-style-type: none"> ▪ Fishbase: http://fishbase.org/summary/2577 ▪ Daiber, F. C. and Booth, R. A. (1960). Notes on the biology of the butterfly rays, <i>Gymnura altavela</i> and <i>Gymnura micrura</i>. <i>Copeia</i> 1960(2): 137-139. ▪ Parsons, K. T., Maisano, J., Gregg, J., Cotton, C.F. and Latour, R. J., (2018). Age and growth assessment of western North Atlantic spiny butterfly ray <i>Gymnura altavela</i> (L. 1758) using computed tomography of vertebral centra. <i>Environmental Biology of Fishes</i>, 101(1), pp.137-151. 	

Table 8.1.2.2.j. PSA Table – Scoring element 10. Vermillion snapper (*Rhomboplites aurorubens*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 10. Vermillion snapper (<i>Rhomboplites aurorubens</i>)	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	3 years (Fishbase)	1
Average maximum age	10 years (Fishbase)	2
Fecundity	140,175 to 3.2 million eggs annually (Cuellae, Sedberry and Wyanski, 1996).	1
Average maximum size	60 cm (Fishbase)	1
Average size at maturity	15 – 23 cm Fishbase)	1
Reproductive strategy	Broadcast spawner	1
Trophic level	4.4 (Fishbase)	3
Total Productivity (Average)		1.43
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		1.77
MSC PSA-derived score		99.0
References	<ul style="list-style-type: none"> ▪ FishBase: https://www.fishbase.de/summary/213 ▪ Cuellae, N., Sedberry, G. R. and Wyanski, D. M., (1996). Reproductive seasonality, maturation, fecundity, and spawning frequency of the vermilion snapper, <i>Rhomboplites aurorubens</i>, off the south-eastern United States. South Carolina State Documents Depository. 	

Table 8.1.2.2.k. PSA Table – Scoring element 11. Witch flounder (*Glyptocephalus cynoglossus*).

PI number	2.2.1.	
Scoring element (species)	Scoring element 11. Witch flounder (<i>Glyptocephalus cynoglossus</i>)	
Productivity		
Attribute	Rationale	Score
Average age at maturity.	4 – 7 years (Fishbase)	2
Average maximum age	25 years (max. reported age) (Fishbase)	2
Fecundity	>100,000 eggs annually (Bowering, 1978)	1
Average maximum size	60 cm(Fishbase)	1
Average size at maturity	30.4 cm(Fishbase)	1
Reproductive strategy	Broadcast spawner	1
Trophic level	3.2 (Fishbase)	2
Total Productivity (Average)		1.43
Susceptibility		
Fishery only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Attribute	Rationale	Score
Areal Overlap	<10% overlap (Fishbase)	1
Encounterability	Low overlap with fishing gear (low encounterability) – based on low catches in the menhaden fishery.	1
Selectivity of gear type	Low risk based on low catches in the menhaden fishery.	1
Post capture mortality	No evidence – default high risk based on team adopting a precautionary approach.	3
Catch (weight) only where the scoring element is scored cumulatively	Not Applicable (FCR v2.0 PF4.4.3.3)	
Total Susceptibility (multiplicative)		1.05
PSA Score		1.77
MSC PSA-derived score		99.0
References	<ul style="list-style-type: none"> ▪ Fishbase: http://www.fishbase.org/summary/26 ▪ Bowering, W. R., (1978). Fecundity of witch flounder (<i>Glyptocephalus cynoglossus</i>) from St. Pierre Bank and the Grand Bank of Newfoundland. Journal of the Fisheries Board of Canada, 35(9), pp.1199-1206. 	

8.1.2.3. Appendix 1.2.3 Consequence Spatial Analysis (CSA)

Not applicable. The RBF was not used to assess PI 2.4.1.

8.1.2.4. Appendix 1.2.4 Scale Intensity Consequence Analysis (SICA)

Not applicable. The RBF was not used to assess PI 2.5.1.

8.1.3. Appendix 1.3 Conditions
Table 29. Condition 1 – PI 1.2.1. Harvest Strategy.

Performance Indicator	PI 1.2.1. There is a robust and precautionary harvest strategy in place
Score	70
Rationale	<p>SG80 for SIa requires that the harvest strategy be responsive to the state of the stock and the elements of the harvest strategy work together towards achieving stock management objectives reflected in PI 1.1.1a SG80 (i.e. It is highly likely that the stock is above the point where serious ecosystem impacts could occur and the stock is at or fluctuating around a level consistent with ecosystem needs).</p> <p>Evidence is lacking that the current harvest strategy design takes into consideration the ecological role of Atlantic Menhaden as key low trophic level in the US Northwest Atlantic and is responsive to the state of the stock with respect to its role in the ecosystem. Evidence is also lacking that the elements of the harvest strategy work together towards achieving stock management objectives reflected in PI 1.1.1a SG80 which is to maintain the Atlantic Menhaden stock above the point where serious ecosystem impacts could occur and the stock; 1) above the point where serious ecosystem impacts could occur, and; 2) fluctuating around a level consistent with ecosystem needs; as a consequence, SG80 is not met.</p>
Condition	The Client Group must provide evidence of the implementation of a harvest strategy that is designed to take into consideration the ecological role of Atlantic menhaden and is responsive to the state of the stock with respect to its role in the U.S. Northwest Atlantic ecosystem.
Milestones	<p><u>Year 1 (progress to be examined at Surveillance 1)</u> The Assessment Team shall be provided with documentary evidence that the Client group has worked actively, through ASMFC and NMFS, to promote the development of an appropriate harvest strategy, where the ecological role of Atlantic menhaden as key low trophic species is considered. Score: 70.</p> <p><u>Year 2 (progress to be examined at Surveillance 2):</u> The Assessment Team shall be provided with documentary evidence that the Client group has actively contributed, through ASMFC and NMFS, to the development of an appropriate harvest strategy, where the ecological role of Atlantic menhaden as a key low trophic species is considered. Score: 70.</p> <p><u>Year 3 (progress to be examined at Surveillance 3):</u> The Assessment Team shall be provided with documentary evidence that the Client group has continued to actively contribute to the development of and worked, through ASMFC and NMFS, to promote the adoption of an appropriate harvest strategy, where the ecological role of Atlantic menhaden as a key low trophic species is considered. Score: 70.</p> <p><u>Year 4 (progress to be examined at Surveillance 4):</u> The Assessment Team shall be provided with documentary evidence that an appropriate harvest strategy, where the ecological role of Atlantic menhaden as key low trophic species is considered, has been adopted* by the ASFMC (or their designated bodies). Score: 80 (Condition closed).</p> <p>*As PI 1.2.1 requires that a robust and precautionary harvest strategy be in place, “adopted” in this instance is analogous to “in place”; therefore, there should not be a delay between adoption and implementation.</p>

Performance Indicator	PI 1.2.1. There is a robust and precautionary harvest strategy in place
Client action plan	<p><u>Year 1 (progress to be examined at Surveillance 1)</u> Omega Protein will provide documentary evidence that we worked actively, through ASMFC and NMFS, to promote the development of an appropriate harvest strategy, where the ecological role of Atlantic menhaden as key low trophic species is considered.</p> <p><u>Year 2 (progress to be examined at Surveillance 2):</u> Omega Protein will provide documentary evidence that we actively contributed, through ASMFC and NMFS, to the development of an appropriate harvest strategy, where the ecological role of Atlantic menhaden as a key low trophic species is considered.</p> <p><u>Year 3 (progress to be examined at Surveillance 3):</u> Omega Protein will provide documentary evidence that we continued to actively contribute to the development of and worked, through ASMFC and NMFS, to promote the adoption of an appropriate harvest strategy, where the ecological role of Atlantic menhaden as a key low trophic species is considered.</p> <p><u>Year 4 (progress to be examined at Surveillance 4):</u> Omega Protein will provide documentary evidence that an appropriate harvest strategy, where the ecological role of Atlantic menhaden as key low trophic species is considered, has been adopted by the ASFMC (or their designated bodies).</p>
Consultation on condition	<p>See 8.1.3.1. Letters of Support for Client Action Plan below for additional details.</p> <p>The Client Action Plan requires input from ASMFC and NMFS in developing appropriate HCRs and will require also the backing of relevant States during the implementation phase.</p> <p>Given the fact that the CAP for this Condition is aligned to the current work plan for ASMFC’s BERP working group, this CAP is unlikely to require any additional investments of time or money, changes to management arrangements or regulations and/or re-arrangement of research priorities by either ASMFC or NMFS over and above that which is already required to complete the current work plan.</p> <p>In addition, as ASMFC has the authority to implement any amendments to the FMP in state waters, additional letters of support are not required from each individual State; with this being said SAI Global did request that the Client solicit letters of support from the states from whose waters significant quantities of menhaden are harvested by the fishery (i.e. Virginia).</p> <p>The Assessment Team is therefore satisfied that the CAP for this Condition is both achievable by the Client and realistic in the period specified.</p>

Table 30. Condition 2 – PI 1.2.2. Harvest control rules & tools.

Performance Indicator	PI 1.2.2. There are well defined and effective harvest control rules (HCRs) in place
Score	75
Rationale	<p>For key LTL species, SG80 for SIa requires that well-defined HCRs are in place that are expected to keep the stock fluctuating around a target level consistent with ecosystem needs.</p> <p>There are no well-defined HCRs in place that are expected to keep the Atlantic Menhaden stock fluctuating around a target level consistent with ecosystem needs; as a consequence SG80 is not met.</p>
Condition	<p>The client must provide evidence of implementation of well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden as key low trophic level in the U.S. Northwest Atlantic and that;</p> <ol style="list-style-type: none"> ensure the exploitation rate is reduced as the point where serious ecosystem impacts could occur is approached and; are expected to keep the stock fluctuating around a target level consistent with ecosystem needs.
Milestones	<p><u>Year 1 (progress to be examined at Surveillance 1):</u> The Assessment team shall be provided with documentary evidence that the Client group has actively worked, through ASMFC and NMFS, to promote the development of well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden and that; 1) ensure the exploitation rate is reduced as the point where serious ecosystem impacts could occur and; 2) are expected to keep the stock fluctuating around a target level consistent with ecosystem needs. Score: 75.</p> <p><u>Year 2 (progress to be examined at Surveillance 2):</u> The Assessment team shall be provided with documentary evidence that the Client group has actively contributed, through ASMFC and NMFS, to the development of well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden and that; 1) ensure the exploitation rate is reduced as the point where serious ecosystem impacts could occur and; 2) are expected to keep the stock fluctuating around a target level consistent with ecosystem needs. Score: 75.</p> <p><u>Year 3 (progress to be examined at Surveillance 3):</u> The Assessment team shall be provided with documentary evidence that the Client group has continued to actively contribute to the development of and worked, through ASMFC and NMFS, to promote the adoption of well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden and that; 1) ensure the exploitation rate is reduced as the point where serious ecosystem impacts could occur and; 2) are expected to keep the stock fluctuating around a target level consistent with ecosystem needs. Score: 75.</p> <p><u>Year 4 (progress to be examined at Surveillance 4):</u> The Assessment team shall be provided with documentary evidence that well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden and that; 1) ensure the exploitation rate is reduced as the point where serious ecosystem impacts could occur and; 2) are expected to keep the stock fluctuating around a target level consistent with ecosystem needs, have been adopted by the ASFMC (or their designated bodies). Re-score: 80 (Condition closed).</p>

Performance Indicator	PI 1.2.2. There are well defined and effective harvest control rules (HCRs) in place
Client action plan	<p><u>Year 1 (progress to be examined at Surveillance 1):</u> Omega Protein will provide documentary evidence that we have actively worked, through ASMFC and NMFS, to promote the development of well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden and that; 1) ensure the exploitation rate does not reach the point where serious ecosystem impacts could occur and; 2) are expected to keep the stock fluctuating around a target level consistent with ecosystem needs.</p> <p><u>Year 2 (progress to be examined at Surveillance 2):</u> Omega Protein will provide documentary evidence that the we have actively contributed, through ASMFC and NMFS, to the development of well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden and that; 1) ensure the exploitation rate does not reach the point where serious ecosystem impacts could occur and; 2) are expected to keep the stock fluctuating around a target level consistent with ecosystem needs.</p> <p><u>Year 3 (progress to be examined at Surveillance 3):</u> Omega Protein will provide documentary evidence that we have continued to actively contribute to the development of and worked, through ASMFC and NMFS, to promote the adoption of well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden and that; 1) ensure the exploitation rate does not reach the point where serious ecosystem impacts could occur and; 2) are expected to keep the stock fluctuating around a target level consistent with ecosystem needs.</p> <p><u>Year 4 (progress to be examined at Surveillance 4):</u> Omega Protein will provide documentary evidence that well-defined harvest control rules that take into consideration the ecological role of Atlantic menhaden and that; 1) ensure the exploitation rate does not reach the point where serious ecosystem impacts could occur and; 2) are expected to keep the stock fluctuating around a target level consistent with ecosystem needs, have been adopted* by the ASFMC (or their designated bodies).</p>
Consultation on condition	<p>See 8.1.3.1. Letters of Support for Client Action Plan below for additional details.</p> <p>The Client Action Plan requires input from ASMFC and NMFS in developing appropriate HCRs and will require also the backing of relevant States during the implementation phase.</p> <p>Given the fact that the CAP for this Condition is aligned to the current work plan for ASMFC’s BERP working group, this CAP is unlikely to require any additional investments of time or money, changes to management arrangements or regulations and/or re-arrangement of research priorities by either ASMFC or NMFS over and above that which is already required to complete the current work plan.</p> <p>In addition, as ASMFC has the authority to implement any amendments to the FMP in state waters, additional letters of support are not required from each individual State; with this being said SAI Global did request that the Client solicit letters of support from the states from whose waters significant quantities of menhaden are harvested by the fishery (i.e. Virginia).</p> <p>The Assessment Team is therefore satisfied that the CAP for this Condition is both achievable by the Client and realistic in the period specified.</p>

Table 31. Condition 3 – PI 2.3.2. ETP species management strategy.

Performance Indicator	PI 2.3.2. The UoA has in place precautionary management strategies designed to: <ul style="list-style-type: none"> ▪ meet national and international requirements, and; ▪ 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.
Score	75
Rationale	<p>SG80 for Sle requires that there be a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and that any potentially effective and practicable alternative measures are implemented as appropriate.</p> <p>Rester and Condrey (1999) evaluated bycatch reduction devices in the Gulf menhaden fishery and recommended some changes to the structure of these devices to optimize pumping efficiency while also reducing the potential for large bycatch and/or ETP species to become entrained in the pumping apparatus. While this study took place in the Gulf of Mexico the menhaden fishery there is analogous to the Atlantic fishery and as such the findings of study may also be applied to the Atlantic fishery.</p> <p>The Endangered Species Act lists the species that are threatened or endangered. Once listed, a species may not be taken, possessed, harassed, or otherwise molested. It also provides for a review process to ensure that projects authorized, funded, or carried out by federal agencies do not jeopardize the existence of these species.</p> <p>However, there is no regular review of the potential effectiveness and practicality of alternative measures to minimise the mortality of ETP species related to the menhaden fishery; as a consequence, SG80 is not met.</p>
Condition	There shall be a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate. “Regular review” in this context meaning at least once every 5 years. The ‘regular review’ at SG80 may be met if at least one review of alternative measures has been undertaken, that measures are implemented as appropriate, and there is a commitment from the client or the management body to have another review within the 5-year window.
Milestones	<p><u>Year 1 (progress to be examined at Surveillance 1)</u> The Client shall initiate a review of potential alternative measures (i.e. alternative fishing gear and/or practices that have been shown to minimise the rate of incidental mortality of the impacted species or species type to the lowest achievable levels) that might possibly serve to reduce the mortality of ETP species related to the menhaden fishery. Score 75.</p> <p><u>Year 2 (progress to be examined at Surveillance 2)</u> The Client shall conduct a review of potential alternative measures (i.e. alternative fishing gear and/or practices that have been shown to minimise the rate of incidental mortality of the impacted species or species type to the lowest achievable levels) that might possibly serve to reduce the mortality of ETP species related to the menhaden fishery. Score 75.</p> <p><u>Year 3 (progress to be examined at Surveillance 3)</u> <i>Year 3 – Alternative milestone A:</i> If the review does not identify any effective and practical alternative measures, above and beyond those already in place, that might possibly serve to reduce the mortality of ETP species related to the menhaden fishery, the Client shall commit to conducting another review within 5 years, thereby fulfilling the “regular” part of SG80 for Sle. Score 80 (Condition closed).</p>

Performance Indicator	<p>PI 2.3.2. The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> ▪ meet national and international requirements, and; ▪ ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.</p>
	<p>OR</p> <p>Year 3 – Alternative milestone B: If the review identifies alternative measures that are likely to be both effective and practical to implement which might possibly serve to reduce the mortality of ETP species related to the menhaden fishery, the Client shall commit to implementing those alternative measures as appropriate. Score 75.</p> <p><u>Year 4 (progress to be examined at Surveillance 4)</u> If the Year 3 – Alternative milestone A has not been met and the Condition is still open, the Client shall demonstrate that they are actively implementing the alternative measures identified during the review process as appropriate. In addition, the Client shall commit to conducting another review (to include a review of the operational effectiveness of the new alternative measures) within 5 years, thereby fulfilling the “regular” part of SG80 for S1e. Score 80 (Condition closed).</p>
Client action plan	<p><u>Year 1 (progress to be examined at Surveillance 1)</u> Omega Protein, through ASMFC, will initiate a review of potential alternative measures (i.e. alternative fishing gear and/or practices that have been shown to minimise the rate of incidental mortality of the impacted species or species type to the lowest achievable levels) that might possibly serve to reduce the mortality of ETP species related to the menhaden fishery.</p> <p><u>Year 2 (progress to be examined at Surveillance 2)</u> Omega Protein, through ASMFC, will conduct a review of potential alternative measures (i.e. alternative fishing gear and/or practices that have been shown to minimise the rate of incidental mortality of the impacted species or species type to the lowest achievable levels) that might possibly serve to reduce the mortality of ETP species related to the menhaden fishery.</p> <p><u>Year 3 (progress to be examined at Surveillance 3)</u> Year 3 – Alternative milestone A: If the review does not identify any effective and practical alternative measures, above and beyond those already in place, that might possibly serve to reduce the mortality of ETP species related to the menhaden fishery, Omega Protein, through ASMFC, will commit to conducting another review within 5 years, thereby fulfilling the “regular” part of SG80 for S1e.</p> <p>OR</p> <p>Year 3 – Alternative milestone B: If the review identifies alternative measures that are likely to be both effective and practical to implement which might possibly serve to reduce the mortality of ETP species related to the menhaden fishery, Omega Protein, through ASMFC, will commit to implementing those alternative measures as appropriate.</p> <p><u>Year 4 (progress to be examined at Surveillance 4)</u> If the Year 3 – Alternative milestone A has not been met and the Condition is still open, Omega Protein, through ASMFC, will demonstrate that we are actively implementing the alternative measures identified during the review process as appropriate. In addition, Omega Protein, through ASMFC, will commit to conducting another review (to include a review of the operational effectiveness of the new alternative measures) within 5 years, thereby fulfilling the “regular” part of SG80 for S1e.</p>

Performance Indicator	<p>PI 2.3.2. The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> ▪ meet national and international requirements, and; ▪ ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.</p>
Consultation on condition	<p>See 8.1.3.1. Letters of Support for Client Action Plan below for additional details.</p> <p>While the Client Action Plan for this Condition requires input from the Client and ASMFC, this Condition could be satisfied solely by the Client without input from any external party.</p> <p>The Assessment Team is therefore satisfied that the CAP for this Condition is both achievable by the Client and realistic in the period specified.</p>

8.1.3.1. Letters of Support for Client Action Plan

In accordance with MSC FCR v2.0 7.11.3 (and sub-clauses), SAI Global cannot accept a Client Action Plan where the client is relying upon the involvement, funding and/or resources of other entities without consulting with those entities when setting conditions, if those conditions are likely to require investment of time or money, changes to management arrangements or regulations and/or re-arrangement of research priorities by these entities. With this in mind SAI Global consulted with NMFS and ASMFC when setting Conditions to ensure that the Conditions are both achievable and realistic in the period specified.

Upon receipt of the CAP, SAI Global requested that the Client solicit and provide letters of support from the relevant entities that would be involved in implementing the actions outlined in the CAP; these letters of support are presented below.

Commonwealth of Virginia



Commonwealth of Virginia

GENERAL ASSEMBLY
RICHMOND

September 14, 2018

Mr. Sam Dignan, Fisheries Scheme Manager
SAI Global/Global Trust
Block 3, Quayside Business Park, Mill Street
Dundalk, County Louth, Ireland

Dear Mr. Dignan:

We have reviewed the Draft Client Action Plan (CAP) submitted by Omega Protein and believe the actions outlined within the CAP are realistic and represent several items that provide us with comfort that this important resource, Atlantic menhaden, will be adequately protected. We support Omega in its effort to secure the rigorous MSC Sustainability Certification.

Virginia's General Assembly will decide how and when to take any necessary regulatory action, assuming that the action is a result of a scientifically-derived assessment, survey or peer-reviewed paper. However, the responsibility of satisfying the CAP requirements is totally with Omega. The Commonwealth will not bear any additional human or financial responsibilities concerning this certification, other than our normal investment in the management of the resource.

The two of us, and our colleagues in the General Assembly, have worked with Omega and we believe that they have the best interest of the health of the Atlantic menhaden population. We welcome the opportunity to work collaboratively with Omega and its representatives on issues related to Virginia's historic menhaden fishery.

As you well know, the peer-reviewed stock assessments continue to indicate that the Atlantic menhaden resource is healthy and sustainably harvested. Please do not hesitate to contact us should you require additional information.

Sincerely,



Richard H. Stuart
Chairman, Senate Agriculture,
Conservation and Natural Resources



Daniel W. Marshall, III
Chairman, House of Delegates
Agriculture, Conservation, and
Natural Resources

Atlantic States Marine Fisheries Commission (ASMFC)



Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201

703.842.0740 • 703.842.0741 (fax) • www.asmf.org

James J. Gilmore, Jr. (NY), Chair

Patrick C. Keliher (ME), Vice-Chair

Robert E. Beal, Executive Director

Vision: Sustainably Managing Atlantic Coastal Fisheries

September 12, 2018

Mr. Samuel Dignan
Fisheries Scheme Manager
SAI Global/Global Trust
Block 3, Quayside Business Park, Mill Street
Dundalk, County Louth, Ireland

Dear Mr. Dignan,

I am writing on behalf of the Atlantic States Marine Fisheries Commission (Commission) at the request of an Omega Protein Corporation (Client) representative. Based on the request, this letter provides additional information related to the Marine Stewardship Council's (MSC) certification process for the Atlantic menhaden fishery.

It is the Commission's understanding that the MSC Assessment Team made a determination on 27 Performance Indicators and found the fishery did not meet the established compliance mark of 80 for three of the Indicators. The Client has provided me with a copy of the Client Action Plan (CAP) which identifies milestones to meet each of these three conditions.

Regarding Condition 1 – PI 1.2.1 Harvest Strategy and Condition 2 – PI 1.2.2 Harvest Control Rules and Tools, the Commission is fully engaged in working with National Marine Fisheries Service (NMFS) to develop ecological reference points (ERPs) for Atlantic menhaden. The ERPs are scheduled to be developed and peer-reviewed by the end of 2019. Following approval of the ERPs for management use, the Commission would then begin the process of incorporating the ERPs and their resulting management measures into the management program. This process could take anywhere from three months to a year depending upon the extent of proposed changes.

The CAP states the ERPs will be "adopted by the ASMFC" as a final step for meeting Conditions 1 and 2. However, the Commission's "adoption" does not ensure the ERPs are fully implemented by all jurisdictions along the Atlantic coast. The final step in ensuring there is a robust and precautionary harvest strategy for lower trophic level species important to the ecosystem, such as Atlantic menhaden, requires the full implementation and enforcement of new management measures by all jurisdictions. As a primary harvester of the resource, the cooperation of the Client is an important step in achieving full implementation.

Regarding Condition 3 – PI 2.3.2 Endangered, Threatened, and Protected (ETP) Species Management Strategy, the Commission supports consistent observer coverage to monitor

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potential interactions with ETP, such as Atlantic sturgeon, which was listed as endangered under the Endangered Species Act in 2012. The Commission also supports the monitoring of the potential bycatch of non-target finfish species.

Atlantic menhaden is a critically important forage species along the Atlantic coast and an effective partnership between the Commission, NMFS, and the Omega Protein Corporation is essential for effective management of this species.

Please let me know if you need any additional information.

Sincerely,



Robert E. Beal

cc: Atlantic Menhaden Management Board

L18-89

National Marine Fisheries Service



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

Mr. Sam Dignan, Fisheries Scheme Manager
SAI Global/Global Trust
Block 3, Quayside Business Park, Mill Street
Dundalk, County Louth, Ireland

OCT 01 2018

Samuel.dignan@saiglobal.com

Dear Mr. Dignan;

Thank you for your questions regarding the Atlantic Menhaden fishery in support of a request to certify the fishery as sustainable by the Marine Stewardship Council.

As you know, the Atlantic menhaden fishery is managed under a Fishery Management Plan by the Atlantic States Marine Fisheries Commission (Commission). This fishery is not overfished and overfishing is not occurring, and its management under the fishery management plan and operation are consistent with the Magnuson-Stevens Fishery Conservation and Management Act, the Atlantic Coastal Fisheries Cooperative Management Act, the Marine Mammal Protection Act (MMPA), and other applicable laws. NOAA's National Marine Fisheries Service will continue to work closely and collaboratively with the Commission and members of the fishing industry, including Omega Protein Corporation, to ensure fishery management measures that promote sustainable fisheries, the stewardship of living marine resources, and the protection of threatened and endangered species, marine mammals, and essential fish habitat.

Specific to the client action plan developed by Omega Protein Corporation and the performance indicators related to harvest strategy and control rules, we will continue to work cooperatively with the Commission on Atlantic menhaden assessments and the development of ecological reference points (ERPs). We anticipate the development of ecological reference points to be completed and peer reviewed in 2019. Following the Commission's review of the ERPs, we will work with the Commission and stakeholders to identify and implement appropriate harvest strategies that incorporate the ecological role of menhaden as a key lower trophic level species.

For the performance indicator regarding endangered, threatened or protected species management, we will continue to monitor and analyze the catch from the menhaden fishery as described in your request. This information will help inform the annual List of Fisheries, which uses the best scientific information available to describe interactions between commercial fisheries and marine mammals. This annual list is required by the MMPA and determines whether participants in a fishery may be required to comply with certain provisions of the MMPA, such as observer coverage. The menhaden fishery is currently classified as a Category II fishery for potential interactions with bottlenose dolphins. A Category II fishery is classified as having occasional incidental mortality and serious injury of marine mammals. Vessels in a Category II fishery are required to accommodate an observer onboard the vessel upon request from NMFS. The menhaden fishery is also evaluated under the annual determination process through which we identify, pursuant to the Endangered Species Act, fisheries that would be required to take sea turtle observers upon request.

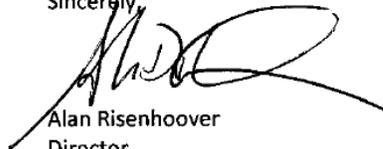


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If you have any further questions regarding NOAA Fisheries' participation in the cooperative management of the Atlantic menhaden fishery, please contact Kelly Denit in the Office of Sustainable Fisheries at 301-427-8517.

Sincerely,



Alan Risenhoover
Director
Office of Sustainable Fisheries

Cc: Peter Himchak

8.2. Appendix 2 Peer Review Reports

8.2.1. Peer Reviewer A

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	Yes/No Yes	CAB Response
<u>Justification:</u> The assessment report reads well and is well documented. Evidence is provided to support the conclusions of the Assessment Team. The Team has documented that this key-LTL species fishery is in transition from a single-species management approach to one incorporating ecological reference points in the future.		No response required.

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/No Yes	CAB Response
<u>Justification:</u> With the exception of Condition 2 (as noted below at 1.2.2), the conditions appear to be appropriately written.		Refer to the response for Condition 2 below at 1.2.2.

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/No Yes	CAB Response
<u>Justification:</u> The client action plans appear to be sufficient to close the conditions raised.		No response required.

Performance Indicator Review

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.	CAB Response
1.1.1a	Yes	Yes	NA	<p>Relevant information has been used and the rationale used to score this indicator support the given score.</p> <p>S1a: By default (as per SA2.2.10 Box SA1) Atlantic menhden is Key LTL stock. The team rightly scored the fishery using PI 1.1.1A. The Team used several "rule of thumb" methods from the literature to assess the stock, because ecological reference points have not yet been developed.</p> <p>S1b: The team used total biomass in lieu of spawning biomass as one of the metrics to assess the stock (and has reported clearing this approach with MSC). Scoring is consistent with the requirements of SA2.2.13b.i and ii (for biomass) and GSA2.2.15 (for fishing mortality).</p>	No response required
1.1.2	NA	NA		NA	No response required
1.2.1	Yes	Yes	Yes	<p>Relevant information has been used and the rationale used to score this indicator support the given score.</p> <p>Condition 1 is appropriate, as the stock is not yet managed to achieve objectives from an</p>	No response required

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.	CAB Response
				ecological-role viewpoint. The condition calls for implementation of a harvest strategy to achieve the stock management objectives reflected in PI 1.1.1a SG80. The milestones spell out measureable improvements for each year.	
1.2.2	Yes	Yes	No	<p>Relevant information has been used and the rationale used to score this indicator support the given score.</p> <p>Perhaps an unintended typo, but Condition 2 does not explicitly state wording to the effect that HCR's shall "...ensure that the exploitation rate is reduced as the PRI is approached..."; rather, it states "...ensure the exploitation rate is reduced as the point where serious ecosystem impacts could occur...". Perhaps reword to: "...ensure that the exploitation rate is reduced as the point where serious ecosystem impacts could occur is approached..."</p> <p>The milestones spell out measureable improvements for each year.</p>	Line " <i>ensure that the exploitation rate is reduced as the point where serious ecosystem impacts could occur is approached</i> " was added for Condition 2.
1.2.3	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required
1.2.4	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required

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.	CAB Response
2.1.1	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.1.2	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.1.3	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.2.1	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.2.2	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.2.3	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.3.1	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.3.2	Yes	Yes	Yes	Relevant information has been used and the rationale used to score this indicator support the given score. Condition 3. No measurable improvement is spelled out between the year one and year two milestones.	No response required. The Assessment Team respectfully disagree. By Year 1 the Client will have initiated a review whereas by Year 2 they will have conducted that same review.

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.	CAB Response
2.3.3	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.4.1	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.4.2	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.4.3	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.5.1	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.5.2	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
2.5.3	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
3.1.1	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
3.1.2	Yes	No	NA	The regularity (i.e. frequency) of the consultation processes is not explicitly stated in the justification. This should be provided for scoring at the SG80 level. (FCR SA4.4)	Additional information was added to the evaluation table for this PI (p. 220).

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.	CAB Response
3.1.3	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
3.2.1	Yes	No	NA	The justification does not provide examples of any explicit quantitative objectives (see example in GSA4.7.2). This is required for scoring at the SG100 level.	The Commission's 2017 Action Plan contains a full suite of objectives that inform and support achieving outcomes in P1 and P2, some of which are expressed quantitatively in the FMP. Additional information was added to the evaluation table for this PI (p.223).
3.2.2	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
3.2.3	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.
3.2.4	Yes	Yes	NA	Relevant information has been used and the rationale used to score this indicator support the given score.	No response required.

For reports using the Risk-Based Framework:

Performance Indicator	Does the report clearly explain how the process(es) applied to determine risk using the RBF has led to the stated outcome? Yes/No	Are the RBF risk scores well-referenced? Yes/No	Justification: Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	CAB Response:
1.1.1	NA			
2.1.1	NA			
2.2.1	Yes	Yes	The Assessment Team followed the procedures outlined in FCR7.7.6. No Main species were identified; however, the Team elected to use the PSA approach to score Minor Secondary species. Scores ranged from 83 to 100 for the 11 species identified, and are well referenced.	No response required.
2.3.1	NA			
2.4.1	NA			
2.5.1	NA			

Optional General Comments

In general, the report is well written. Some typographical errors need to be cleared up, notably in a number of places where “GOM” was substituted for “Atlantic” menhaden.

Any typographical errors identified have been corrected.

8.2.2. Peer Reviewer B

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	Yes/No Yes	CAB Response
<p><u>Justification:</u> Yes, overall the assessment team were correct in their evaluation of the Atlantic menhaden fishery and in general I agree with their scoring and use of evidence throughout. However, I did note several PIs (actually it was typically 1 or 2 SIs within a PI) that I felt needed more evidence. In particular, these were 1.2.3, 2.1.2, 2.2.1, 2.2.2, 2.3.3, 3.1.1, 3.2.3. I've noted these below in the column "Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)".</p>		<p>Issues raised by the Peer Reviewer have been addressed as outlined in the responses to each specific point below.</p>

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/No Yes	CAB Response
<p><u>Justification:</u> One of the key weaknesses noted by the assessment team is that the role of menhaden in the ecosystem is not considered when formulating harvest strategies or harvest control mechanisms and that there is no regular review of measures in place to minimize the fishery's impact on ETP species. The condition raised for PI 1.2.1 is that a harvest strategy that is implemented by year 4. The timeline of "promotion of the strategy in year 1, contribution to active development in years 2 and 3, promotion of adoption in year 3 and eventual adoption in year 4 is adequate to achieve the score of 80 on this condition.</p> <p>The condition raised for PI 1.2.2 is that there must be well-defined harvest control rules in place that take into consideration the ecological role of Atlantic menhaden as key low trophic level in the U.S. Northwest Atlantic. These HCRs must also ensure the exploitation rate is reduced as the point where serious ecosystem impacts could occur and are expected to keep the stock fluctuating around a target level consistent with ecosystem needs. The timeline for achieving this condition is 4 years, with year 1 focused on promotion of development of these HCRs (planning and strategic design?), year 2 focused on development, year 3 focused on development and promotion of adoption, and year 4 focused on adoption. While these seem like logical steps, it might be worthwhile to provide a bit more detail on what the immediate tasks might be for year 1. This would better inform the CAP and how the client will work with ASMFC and NMFS to develop these HCRs. For example are there specific meetings or other opportunities to help contribute to this development? Any research being done on key LTL species that could help this process? Providing this sort of information would help.</p> <p>The condition raised for PI 2.3.2 is that the UoA has in place precautionary management strategies designed to meet national and international requirements, ensure that the UoA doesn't hinder recovery of ETP species, and that the UoA regularly reviews and implements measures to minimize the mortality of ETP species. The assessment team</p>		<p>No response required.</p> <p>No response required. Note that when it comes to for example providing "a bit more detail on what the immediate tasks might be for year 1" the Assessment Team were deliberately non-prescriptive so as to allow flexibility in how the Client might ultimately choose to address them.</p> <p>No response required.</p>

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/No Yes	CAB Response
<p>noted that there was an evaluation (published in 1999, so may be outdated?) of bycatch reduction devices in the Gulf of Mexico menhaden fishery, and that there were suggested modifications to reduce potential for large bycatch or ETP species. However, it doesn't seem that these measures are implemented in the Atlantic (or at least the assessment team did not suggest this). Since there is no regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and that they are implemented as appropriate, it makes sense that this condition cannot be met. The suggestion in years 1 and 2 to undertake such a study is a good idea. If appropriate modifications are identified then these can be implemented and assessed in year 4. Whether or not alternatives are identified, the plan to reassess within 5 years is sufficient to 'regularly' assess these measures.</p>		

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/No Yes	CAB Response
<p><u>Justification:</u> For condition 1, if Omega Protein can, by year 4 provide documentary evidence that an appropriate harvest strategy, where the ecological role of Atlantic menhaden as key low trophic species is considered, has been adopted by the ASFMC (or their designated bodies) by the 4th surveillance, then this condition will be able to be closed. Meeting this goal will require that each year's progress in years 1-3 is met. The fact that there is a current work plan in place with ASMFC's BERP working group to work towards such a harvest strategy and that the state of Virginia has provided support for such a strategy, is a positive indication that these goals can be met.</p> <p>For condition 2, as noted above, provide a bit more detail on what the immediate tasks might be for year 1 would help inform the CAP. As with condition 1, the fact that this goal of developing an HCR for this key LTL is a current work plan in place with ASMFC's BERP working group is important and a good indicator that this condition can be met. Overall, the timeline of 4 years seems realistic to close this condition.</p> <p>For condition 3, this action timeline seems more than adequate to meet and close the condition by year 3 or 4 depending on whether alternative measures are identified. The fact that this plan relies almost solely on the client means that it can be started right away and should not be a problem to achieve.</p>		<p>No response required. Note the Assessment Team were deliberately non-prescriptive when writing the condition milestones so as to allow flexibility in how the Client might ultimately choose to address them.</p>

Performance Indicator Review

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.	CAB Response
1.1.1	Yes	Yes	NA	<p>The certifier gave a score of 80 for this PI. The 80 scoring guidepost requires that it is highly likely that the stock is above the point where serious ecosystem impacts could occur.</p> <p>The certifier notes that the stock is above the default biomass threshold for a key-LTL and that fishing mortality is below the level expected to result in $B = 40\%B_0$ for almost the entire time series. This is strong evidence that it's highly likely the stock is at a robust level above the point where serious ecosystem impacts could occur. Since Atl menhaden are managed as a single species, ERPs do not currently exist (but are being developed). Therefore, it is also likely that the stock is at or fluctuating around a level consistent with ecosystem needs (an 80 for PI 1.1.1a) but not that there is a high degree of certainty.</p>	No response required
1.1.2	NA	NA	NA	NA	No response required
1.2.1	Yes	Yes	Yes	<p>The certifier gave a score of 70 for this PI. The 80 scoring guidepost requires that (a) 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 1.1.1a SG80, (b) the harvest strategy may not have been fully tested but evidence exists that it is achieving its</p>	No response required

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				<p>objectives., and (c) that monitoring is in place that is expected to determine whether the harvest strategy is working.</p> <p>Alt menhaden can only score 60 for SI a because of its status as a key LTL and the fact that reference points should therefore be calculated taking into account its strong ecological role. As noted above the conditions raised and the timeline for the CAP are appropriate to work towards achieving SG80 for this PI. In terms of SI b, because there are explorations of menhaden stock status based on the ecological role, which show that the current stock is highly likely to be above the point where serious ecosystem impacts could occur, it can be said the harvest strategy may not have been fully tested but evidence exists that it is achieving the proposed objectives.</p> <p>It was appropriate that SI d was not scored as SI a only received a 60. Also, the reviewer agrees that SI e and f are not relevant for this fishery.</p>	
1.2.2	Yes	Yes	Yes	The certifier gave a score of 75 for this PI. The 80 scoring guidepost requires that (a) 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	No response required

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				<p>level consistent with ecosystem needs, (b) HCRs are likely to be robust to the main uncertainties, and that (c) available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.</p> <p>For SI a, based on the stock assessment referenced, abundance and exploitation reference points are in place to guide management decision making, but these are not specifically defined to account for the key-LTL status of menhaden and its ecological role. This is part of the plan of the ASFMC's BERP, but are not available yet. Therefore a 60 is justified.</p> <p>The fact that the ecological role of menhaden is not considered also precludes a score of 100 for SI b.</p> <p>For SI c, the evidence provided that the current HCRs are effective is the fact that F has been low over the past 20+ years. Therefore 80 is justified.</p>	
1.2.3	Yes	No (see SI c)	NA	<p>The certifier gave a score of 80 for this PI in Table 25, but a 90 in Appendix 8 table. I believe that this should be a 90, but please check.</p> <p>For SI a, there is a wealth of information collected on menhaden given its commercial</p>	<p>Response: Table 25 (now Table 27) was checked and corrected.</p>

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				<p>and ecological importance. The evidence on stock structure, productivity, fleet composition, environmental data etc. are all collected and most is used in the stock assessment. Therefore a score of 100 is justified.</p> <p>For SI b, there are relatively frequent assessments of the stock and there's ongoing collection of data from a number of sources, but since there is no observer coverage, it is hard to evaluate the degree of uncertainty in the FD data. I agree with the assignment of SG 80, but the authors (maybe a typo) have stated "Given the above, it can be said that 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", which is the SG100 requirement.</p> <p>For SI c, it would be helpful to note here whether menhaden are caught as bycatch in other fisheries. These would constitute 'other fishery removals'. In my opinion, the evidence provided doesn't fully address what this SI is asking.</p>	<p>SI b: Line was changed to <i>"Given the above, it cannot be said that 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"</i>.</p> <p>SI c additional information was provided documenting landings of menhaden in other non-target fisheries in the scoring tables and background.</p>

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.	CAB Response
1.2.4	Yes	Yes	NA	<p>The certifier gave a score of 100 for this PI.</p> <p>For SI a, the assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.</p> <p>For SI a, the fact that an MSY proxy was used for reference points based on spawning potential ratio and estimates of fecundity due to the episodic recruitment of menhaden is sensible. The use of a statistical catch-at-age model is appropriate given the data available for menhaden.</p> <p>For SI b, the SPR-based reference points are appropriate for menhaden.</p> <p>For SI c, the assessment model is calibrated to trends in survey abundance, tested for robustness and retrospective bias, and use a range of catch to explore the likelihood of exceeding F.</p> <p>For SI d and e, there is rigorous review and evaluation of the assessment model and it is internally and externally peer reviewed.</p> <p>Based on these findings, a score of 100 for this PI is justified.</p>	No response required

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2.1.1	Yes	Yes	NA	<p>The certifier gave a score of 95 for this PI. There are 2 SIs for this PI.</p> <p>SI a determines how likely it is that the main primary species above the PRI and for SG100, fluctuating around MSY. Since the menhaden fishery is a highly targeted fishery and there are no main primary species, this SI is NA, which is sensible.</p> <p>For SI b, it is necessary to determine whether all minor primary species are highly likely to be above the PRI and if below the PRI that the UoA does not hinder the recovery and rebuilding of minor primary species. There are 12 minor primary species. 7 American butterfish, black drum, blue crab, bluefish, Spanish mackerel, striped bass and summer flounder) are above the PRI and therefore meet SG100.</p> <p>For the other 5 (Atlantic croaker, red drum, sandbar/brown shark, spot and weakfish): 2 are overfished (sandbar/brown shark and weakfish) or the overfished status is undetermined (Atlantic croaker, red drum and spot).</p> <p>Key points of evidence supporting SG100:</p> <ul style="list-style-type: none"> ▪ Atlantic croaker: the vast majority of Atlantic croaker removals occur as a result 	<p>No response required.</p> <p>No response required.</p>

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				<p>of discards in the shrimp trawl fishery, not the menhaden fishery.</p> <ul style="list-style-type: none"> ▪ Red drum: not likely that overfishing is occurring, but not possible to determine whether the stock is overfished. Menhaden fishery only takes a small proportion of red drum incidental catch (1.37 mt) ▪ Spot: TLA (data-limited approach) indicates low harvest and high abundance likely; and spot incidental catch in menhaden fishery is 1-11 mt (of 4637-57287 mt) ▪ Weakfish: stock is overfished according to the SSB threshold and M is increasing; menhaden fishery represents ~1.2% of total removals of weakfish population <p>The evidence provided for these 4 stocks is adequate, especially given the relatively low bycatch/highly targeted nature of the menhaden fishery.</p> <p>SG100 not met: Sandbar/brown shark: overfished, but not experiencing overfishing; sandbar sharks are caught by the menhaden fishery, likely between 1-27 mt. Since retention is prohibited and quota is only 90.7 mt, it's not certain that the UoA is not having a significant impact on the sandbar shark stock in terms of recovery and rebuilding attempts. I agree that this SG is not met.</p>	

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2.1.2	Yes	Yes (but see SI b)	NA	<p>The certifier gave a score of 85 for this PI. There are 5 SIs for this PI.</p> <p>For SI a, as noted in PI 2.1.1, there are no main primary species, but there are minor primary species, so SG80 is met, but SG100 must be evaluated. While there is relatively little bycatch, perhaps because of this, there is no strategy in place to specifically manage the impacts of the menhaden fishery on the minor primary species, so SG100 cannot be met.</p> <p>For SI b, the low bycatch in the fishery is used as evidence that the 'partial strategy' (defined here as the natural targeted way that the fishery works) works. The certifiers note that the fact that it cannot be shown that the menhaden fishery is not adversely affecting sandbar shark means that this partial strategy has not been tested, but I think that noting that there hasn't been a real evaluation of the bycatch in the menhaden fishery (at least since Kirkley 1995) would be additional and maybe stronger evidence.</p> <p>For SI c, again the low bycatch in the fishery is used as evidence that the 'partial strategy' is being implemented successfully. However, I agree that it's probably not 'clear evidence' of success given the fact that it cannot be shown that the menhaden fishery is not adversely</p>	<p>No response required.</p> <p>No response required.</p> <p>Noted and added to the rationale as additional evidence as suggested.</p> <p>No response required.</p>

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.	CAB Response
				<p>affecting sandbar shark fishery in terms of recovery and rebuilding.</p> <p>For SI d, there is no evidence to support the existence of shark finning as well as a low incidental catch of sharks, so SG100 is met.</p> <p>For SI e, there are no main primary species, so SG80 is met. There is no biennial review of alternative measures to reduce bycatch for minor primary species, so SG100 is not met.</p>	<p>No response required.</p> <p>No response required.</p>
2.1.3	Yes	Yes	NA	<p>The certifier gave a score of 80 for this PI. There are 3 SIs for this PI.</p> <p>For SI a, as noted in PI 2.1.1, there are no main primary species and all SG refer to main primary species, so this SI is NA.</p> <p>For SI b, for some species there are quantitative data to estimate status, but for several there are only qualitative approaches, so SG100 is not met.</p> <p>For SI c, SG60 and SG80 only refer to main primary species, so they are met, but for SG100, the certifiers note the relative sparsity of bycatch studies and the fact that methodologies are not consistent as evidence that the available information is not adequate to support a strategy to manage all primary species. I agree that SG100 is not met.</p>	<p>No response required.</p>

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2.2.1	Yes, but is there any more recent data for ladycrab and spidercrab?	No, see SI b	NA	<p>The certifier gave a score of 80 for this PI. There are 2 SIs for this PI.</p> <p>For SI a, there are no main secondary species, so this SI is NA.</p> <p>For SI b, there are 11 minor secondary species. Although the certifiers were not required to and did not use the RBF, they did evaluate 9 of these species following a PSA and the results achieved an MSC score of 95. For ladycrab and spidercrab, there wasn't enough info to conduct a PSA, but each of these species makes a very minor contribution to the menhaden catches (according to Kirkley assessment from pre-1995). I would think that some more recent info would be necessary to ensure that these species are still such a minor proportion of the menhaden catch. I don't think I would say that SG100 is met for these species. That said, the fact that since the Assessment Team elected not to conduct a full RBF (including on-site visit) meaning the final PI score for PI 2.2.1 cannot exceed 80 is probably precautionary enough. How would this SI have been scored differently if these 2 species were not able to achieve SG100?</p>	<p>No response required.</p> <p>No response required.</p> <p>In response to the Peer Reviewer's question; "How would this SI have been scored differently if these 2 species were not able to achieve SG100?". In real terms there would not have been a material difference to the score in this case.</p> <p>Had those 2 species failed to meet SG100 then the situation would have been 9 species meet SG 100 and 2 do not. In normal circumstances, had the PI score not been capped at 80, this would likely have resulted in a score of 95. In any case the fact that the PI score is capped at 80 renders the argument moot.</p>
2.2.2	No	No (see SI b and c) Also please list references for this PI	NA	The certifier gave a score of 90 for this PI. There are 5 SIs for this PI.	

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		and cite them in your response. I see the reference to Section		<p>For SI a, to meet SG100 there needs to be a strategy in place for the UoA for managing main and minor secondary species. There are no main secondary species, but there are 11 minor. As for SI a for PI 2.1.2, while there is relatively little bycatch, perhaps because of this, there is no strategy in place to specifically manage the impacts of the menhaden fishery on the minor secondary species, so SG100 cannot be met.</p> <p>For SI b, the certifiers use the fact that there is very low levels of bycatch in the menhaden fishery as evidence that SG80 is met. I do not agree that there has been testing that supports high confidence of the partial strategy working. What testing and evidence is this? It's not clear from the certifier's response what this is. I would have assigned SG80 here based on the provided information.</p> <p>For SI c: Looking to section 3.4.1, Table 1 10, it seems that for some species there are NOAA observer program data (through 2012), to use to evaluate the % contribution to catches, but for many species the certifiers had to rely on Kirkley 1995, which could be quite out of date. While overall it's true that the menhaden fishery is quite targeted and generally low bycatch, changing species distributions or other factors could change the bycatch</p>	<p>No response required.</p> <p>The AT point out that the partial strategy (i.e. the way in which the fishery operates) has been tested throughout the history of the fishery and the fact that Secondary species are either highly likely to be above PRI or the fishery is not hindering their recovery and rebuilding is evidence of the success of that partial strategy.</p> <p>The AT accept the point being made here by the PR. The score for SIc has been reduced from 100 to 80. This had led to corresponding decreases in the PI 2.2.2 and P2 scores from 90 to 80 and from 88.0 to 87.7 respectively.</p>

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				<p>proportions. Based on the evidence provided I don't think that it can be justified to say that there is clear evidence that the partial strategy/strategy is being implemented successfully. I would recommend SG80 for this SI.</p> <p>For SI d: NA is adequate as none of the 11 Secondary species are sharks.</p> <p>For SI e: SG80 is met as there are no main secondary species. There is no biennial review for all secondary species, so SG100 is not met.</p>	<p>No response required.</p> <p>No response required.</p>
2.2.3	Yes	Yes	NA	<p>The certifier gave a score of 80 for this PI. There are 3 SIs for this PI.</p> <p>For SI a, there are [no] main secondary species, so this is NA.</p> <p>For SI b, but there is little quantitative information relating to the stock status of Minor Secondary species, so it is correct that SG100 cannot be met.</p> <p>For SI c, there are main secondary species, so SG80 is met, but I agree that there is not enough information to support a strategy to manage all secondary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective, so SG100 cannot be met.</p>	<p>No response required.</p> <p>No response required.</p> <p>No response required.</p>

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				I support the recommendation of the assessment team to conduct more standardized and frequent bycatch studies for the non-target bycatch in this fishery.	No response required.
2.3.1	Yes	Yes	NA	<p>The certifier gave a score of 90 for this PI. There are 3 SIs for this PI.</p> <p>For SI a, for bottlenose dolphins, SG100 seems to be met by the fact that the PBR is 23 and the a documented mean annual human-caused mortality (2011 – 2015) is between 0 and 14.3. For sea turtles, bycatch rates are also likely to be extremely low, either the zero take implied by the ESA or the levels of incidental takes allowed for under ITPs, and when incidental takes of sea turtles do occur in the menhaden purse seines, they are not likely to result in mortality or serious injury as the risk of forced submergence is low compared to other gear types. Therefore, SG80 is warranted. The lack of a robust monitoring regime precludes SG100.</p> <p>For SI c, there is a low potential for adverse impacts on ETP's prey availability due to the lack of any species being critically dependent on menhaden. There is also an extremely low probability that purse seine gear would become lost or if it did would not be recovered immediately. Therefore, there is a high degree of confidence that there are no significant</p>	<p>No response required.</p> <p>No response required.</p> <p>No response required.</p>

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				detrimental indirect effects of the menhaden fishery on ETP species, so SG100 is warranted.	
2.3.2	Yes	Yes	Yes	<p>The certifier gave a score of 75 for this PI. There are 5 SIs for this PI.</p> <p>For SI a, the key points here are that the MMPA sets PBR limits for marine mammal stocks and that the ESA prohibits taking of sea turtles and that there are strategies in place for managing the impacts of fisheries (including the menhaden fishery) on bottlenose dolphins and sea turtles, including measures to minimise mortality. With respect to bottlenose dolphins, NMFS monitors human-induced mortality and the menhaden purse seine fishery has extremely low bycatch due to the way that the fishery specifically targets homogeneous shoals of menhaden. Therefore, SG80 is met. With respect to sea turtles, the menhaden fishery is observed (at a low level) by NOAA observers and has been found to have low impact due again to the way that the purse seines operate. In case of entrapment, it is not likely that there will be mortality because purse seines are not underwater for long periods of time. SG80 is met. The rationale for not scoring SG100 is justified as well.</p> <p>SI b is NA.</p>	<p>No response required.</p> <p>No response required.</p>

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				<p>For SI c, the evidence provided for SI a was used to justify SG80, that there is an objective basis for confidence that the measures in place and the fishing strategy will work, which makes sense.</p> <p>For SI d, the evidence provided for SI a was used to justify SG80, that there is some evidence that the measures in place and the fishing strategy are being implemented successfully, which makes sense.</p> <p>For SI e, there is a review of the BRDs in the Gulf menhaden fishery, and the gear in the Atlantic fishery and these devices are analogous, so it seems that this will meet the requirement of 'a review'. However this review is from 1999, and there is no evidence of any subsequent reviews that are more recent, or that could meet the requirement of 'regular', so I agree with the assessment of SG60.</p>	<p>No response required.</p> <p>No response required.</p> <p>No response required.</p>
2.3.3	No	No (see SI b)	NA	<p>The certifier gave a score of 80 for this PI. There are 2 SIs for this PI.</p> <p>For SI a, there is some quantitative information available that is adequate to assess the UoA related mortality and impact of the UoA: required self-reporting by fishers on mortalities or injuries of marine mammals; the evidence that the mortality of ETPs is very low; also the understanding of the species involved,</p>	<p>No response required.</p>

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				<p>their distribution, population status and susceptibility to bycatch in purse seine and midwater trawl gears to make a quantitative estimation of mortality meet the requirements for SG80. I agree that this level of quantitative information is not complete or comprehensive enough to meet SG100.</p> <p>For SI b, there is periodic monitoring and periodic calculations of abundance for some ETP species and mandatory reporting of ETP bycatch represent measures to manage ETP species, so SG60 is warranted. However, I don't see how this information is used to support a strategy. The assessment team should clarify what the strategy is and specifically how it is supported.</p>	<p>SIc specifically addresses the adequacy of the available data not whether or not it is being used. The AT believe that with there being mandatory reporting of ETPs as well as populations the data are adequate to support the management of ETPs if required.</p>
2.4.1	Yes	Yes	NA	<p>The certifier gave a score of 100 for this PI. There are 3 SIs for this PI.</p> <p>For SI a, given the fact that menhaden are fished with purse seines that have minimal impact on the physical habitat, SG100 is warranted.</p> <p>For SI b, there is only minimal overlap between the fishery and critical habitat of loggerheads, and purse seines are unlikely to reduce the structure and function of the VME habitats beyond reversible harm, so SG100 is warranted.</p>	<p>No response required.</p> <p>No response required.</p>

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				For SI c, following the evidence provided for a and b, mainly the fact that purse seines operate in the water column is evidence that the UoA is not seriously or irreversibly harming the minor habitats, so SG100 is warranted.	No response required.
2.4.2	Yes	Yes	NA	<p>The certifier gave a score of 90 for this PI. There are 4 SIs for this PI.</p> <p>For SI a, the certifiers assigned SG100, which is warranted because of the extensive monitoring and measures in place to ensure that the gear doesn't interact with the seabed, and mapping and avoidance of closed areas and mapping of substrates that would harm the gear and the habitat. These efforts meet the criteria of a strategy in place for managing the impact of the UoAs on habitats.</p> <p>For SI b, the purse seine gear is used extensively and is evaluated as to its low impact on habitats. Since the fleet is monitored as to its activity (where, when and how much) there is some objective basis that the measures/strategy will work, so SG80 is met. Testing of these particular measures is a much higher bar that I agree is not met for SG100.</p> <p>For SI c, spatially explicitly quantitative data from the Captains Daily Fishing Report meets the criteria of clear quantitative evidence the strategy is working. Therefore SG100 is met.</p>	<p>No response required.</p> <p>No response required.</p> <p>No response required.</p>

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				For SI d, I agree with the more conservative criteria that some quantitative evidence exists that the UoA complies with both its management requirements, and with protection measures afforded to VMEs by other MCS UoAs/non-MSC fisheries, so SG80 is warranted. To meet SG100, there would have to be some assessment by the fishery perhaps via observers that the menhaden fishery fully complies with both its management requirements and with protection measures afforded to VMEs.	No response required.
2.4.3	Yes	Yes	NA	<p>The certifier gave a score of 95 for this PI. There are 3 SIs for this PI.</p> <p>For SI a, there are a wealth of surveys and studies of the bottom habitat in the area of the UoA, so I agree with SG100, the distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.</p> <p>For SI b, given the nature of the purse seine gear and its low or non-interaction with the bottom substrate, SG100 is warranted.</p> <p>For SI c, the surveys listed in a serve to provide the information needed to detect increased risks to main habitats, but I agree that these surveys are not synoptic in time, and cannot serve to measure changes over time (although</p>	<p>No response required.</p> <p>No response required.</p> <p>No response required.</p>

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.	CAB Response
				these sorts of data may exist within smaller regions within the area where the UoA operate from other projects (state surveys in nearshore waters, etc.). SG80 is warranted.	
2.5.1	Yes	Yes	NA	<p>The certifier gave a score of 100 for this PI. There is 1 SI for this PI.</p> <p>For SI a, although menhaden is a key LTL species and there are still questions around how removals of this species can affect other species in the ecosystem, US Atlantic coast ecosystem is one of the best studied in the world. The evidence provided to illustrate the fact that is highly unlikely that the UoA would disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm is adequate: striped bass are moderately sensitive to changes in menhaden; density dependent effects and unpredictable recruitment could negate the benefits of setting aside more fish for predators; and the fact that in the 1990s when menhaden biomass was low, predator biomass was high, seem adequate to support SG100.</p>	No response required.
2.5.2	Yes	Yes	NA	<p>The certifier gave a score of 85 for this PI. There are 3 SIs for this PI.</p> <p>For SI a, I was uncertain on this as, while I agree that NOAA has adopted a policy of EBFM, the assessment of this species is still single species-</p>	No response required.

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.	CAB Response
				<p>based, and does not considered other species, beyond including their influence as a component of natural mortality. It also does not include environmental data as far as I know, so I was leaning towards SG60. However, following the definition of strategy defined for this PI: "a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically", I think SG80 is warranted as there are, as the certifiers point out, a broad range of regulatory measures are in place within U.S coastal waters which aim to limit adverse effects of fishing on the marine ecosystem.</p> <p>For SI b, following the lines of evidence provided for SI a that are backed by information on stock status, fleet composition, catch composition, fishing areas and many research studies on the role of menhaden in the U.S Atlantic coastal ecosystems, SG80 is met. The single species nature of this fishery precludes SG100.</p> <p>For SI c, the certifiers note that the ecosystem role of menhaden is as a prey species. Given this, the fact that F has been below the reference target since the early 2000s is a good sign that the fishery is not being overfished and</p>	<p>No response required.</p> <p>No response required.</p>

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.	CAB Response
				that the technical measures used to constrain fishing mortality are working. SG80 is warranted, but I agree that there is no clear evidence available because there is no strategy in place to address the impacts of the menhaden fishery on the ecosystem.	
2.5.3	Yes	Yes	NA	<p>The certifier gave a score of 95 for this PI. There are 5 SIs for this PI.</p> <p>For SI a, a broad understanding of the key elements of the ecosystem is available from a number of surveys and studies that draw on the surveys and other assessments. This is a well-studied ecosystem, so SG80 is warranted.</p> <p>For SI b, there are detailed studies, including ecosystem models that have been used to understand the interactions between the UoA and the ecosystem and this area has been studied in detail, so SG100 is warranted.</p> <p>For SI c, I agree that the main functions of the components (P1 target, primary, secondary, ETP species and habitats) are known and I would say relatively well understood for most components, so SG80 is definitely met. I agree also that there needs to be more up to date info on ETPs, but also I would add on bycatch of some of these other species, which would preclude SG100.</p>	<p>No response required.</p> <p>No response required.</p> <p>SG100 was already not met but a lack of up-to-date bycatch data has been added as additional evidence in this regard.</p>

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.	CAB Response
				<p>For SI d, I would agree that there is adequate information on the impacts of the UoA on the components and key elements of the ecosystem, so SG100 is met.</p> <p>For SI e, there are strategies in place to manage ecosystem impacts and these strategies are backed up by regularly collected data that is evaluated by ASFMC and NMFS to support the development and maintenance of strategies to manage ecosystem impacts, so SG100 is met.</p>	<p>No response required.</p> <p>No response required.</p>
3.1.1	Yes	No (see SI B)	NA	<p>The certifier gave a score of 95 for this PI. There are 3 scoring SIs for this PI.</p> <p>For SI a to reach SG100, there must be an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2. For menhaden, there is comprehensive management at the federal and state level and these organizations work together within a legal and policy framework that emphasizes the importance of cooperation and collaboration between all groups. Because there are binding procedures administered by the ASMFC SG 100 is met.</p> <p>For SI b, there are transparent mechanisms for the resolution of legal disputes (e.g., the US legal system) and this system is considered to</p>	<p>No response required.</p> <p>In evaluating and scoring SI b, the assessment team consulted the guidance offered in v 2.0 of the FCRs,</p>

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.	CAB Response
				<p>be transparent and effective. I would argue that to meet SG100 for this SI, the legal system should be tested on the menhaden fishery. The fact that the system, when used, has been effective for other fisheries may not be sufficient? Perhaps SG80 would be more appropriate here?</p> <p>SG80 for SI c seems appropriate given that the US Supreme Court has upheld the right of Native Americans to hunt and fish and establish management plans and regulations outside of the general regulation for other fisheries. Since there is no evidence of a formal commitment, SG100 cannot be met.</p>	<p>specifically GSA 4.3. The interpretive guidance speaks not to the legal system as such but to whether there is an effective and transparent administrative process in place for the resolution of disputes. The team is satisfied that the ASMFC's dispute resolution process coupled with its appeals system are comprehensive, procedurally sound, and effective in reaching satisfactory outcomes based in part on the strength of the inter-jurisdictional cooperation commitment of participating agencies at the federal and state levels. The process has been tested on a few occasions, and is likely to be used again involving an Amendment 3 issue raised by the Commonwealth of Virginia. Accordingly, the team is satisfied that a SG 100 score is justified.</p> <p>The issue of whether the fishery's management system formally recognized the prescribed rights of Native Americans was discussed with ASMFC representatives via conference call on 4th August 2017. The assessment team was informed that the Commission is interested in</p>

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.	CAB Response
					exploring the matter further from a policy perspective. A recommendation is included in this report in support of the Commission's expressed interest. That said, the reviewer's suggested score and the score assigned by the team are identical for SIc.
3.1.2	Yes	Yes	NA	<p>The certifier gave a score of 85 for this PI. There are 3 SIs associated with this PI.</p> <p>For SI a, organizations and individuals involved in the management process have been identified. These are state and federal management bodies and FMCs. In terms of the federal agencies and the committees of the ASFMC that have processes that are clearly defined for all areas of responsibility and interaction. Since state management procedures differ and are not as clearly defined, SG100 was not met.</p> <p>For SI b, it is certain that all stakeholders are consulted and that there is a clearly defined process for obtaining this information and incorporating it into the process (e.g., regular and publicized meetings, transparently noted on the host organization's website). However, meeting SG100 is tricky because this would require clearly articulated formulas or processes for incorporating this information, which is not available. Therefore SG80 is</p>	<p>No response required.</p> <p>No response required.</p>

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.	CAB Response
				<p>appropriate.</p> <p>For SI c, building on SI b, it is certain that all stakeholders have the opportunity and are encouraged to participate in the management process. The facilitation of this participation is through the regular and publicized meetings that are noted on the host organization's website, and through web apps that allow comments on various initiatives. Therefore SG100 is appropriate.</p>	No response required.
3.1.3	Yes	Yes	NA	<p>The certifier gave a score of 100 for this PI. An SG100 for this PI requires that there are 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. Given that there are clear biological, socio-economic and ecological objectives that are explicitly defined and required by management policy and that serve to inform the decision-making processes associated with the full geographical range of the fishery in the Interstate Fishery Management Plan, SG100 is met.</p>	No response required.
3.2.1	Yes	Yes	NA	<p>The certifier gave a score of 100 for this PI. An SG100 for this PI requires that there are 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</p>	No response required.

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.	CAB Response
				fishery-specific management system. The evidence for having short and long-term objectives that are well-defined and measureable are the clear biological, socio-economic and ecological objectives that are explicitly defined and required by management policy and that serve to inform the decision-making processes associated with the full geographical range of the fishery in the Interstate Fishery Management Plan and that are formally reviewed in-season and annually against all objectives. Additionally, the assessors note that the reviews are supported by metrics that assess stock performance, catch reporting and quota assignment, and ecological impacts. Therefore, SG100 is warranted.	
3.2.2	Yes	Yes	NA	<p>The certifier gave a score of 90 for this PI. There are 5 SIs for this PI.</p> <p>For SI a, to meet the SG80 there must be established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. Clearly the processes of the federal and state agencies and the ASMFC meet this requirement.</p> <p>For SI b, I agree with SG80 because the fishery management decision-making processes account for many serious issues identified in the relevant research, monitoring, evaluation</p>	<p>No response required.</p> <p>The team agrees with the reviewer's comment regarding the implications of its' key-LTL determination in relation</p>

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.	CAB Response
				<p>and consultation in a transparent, timely and adaptive manner and take account of the wider implications of decisions. However, meeting <i>all</i> issues is a high bar and likely not met given the role of menhaden as a key-LTL.</p> <p>For SI c, menhaden is well-researched and this science is incorporated into the stock assessment and management process. The fact that conservative TACs are set, the use of science-based RPs, and consideration of ecosystem impacts are all sufficient evidence to meet SG80.</p> <p>For SI d, there is Formal reporting to all interested stakeholders that provides comprehensive information on the fishery's performance and management actions and describes how the management system responded to research, monitoring, evaluation and review activity. SG100 is appropriate.</p> <p>For SI e, the management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.</p>	<p>to the scope of the SI requirement at the SG 100 level.</p> <p>No response required.</p> <p>No response required.</p> <p>No response required.</p>

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.	CAB Response
3.2.3	Yes	No (See SI a and question about SI b SG100)	NA	<p>The certifier gave a score of 80 for this PI. There are 4 SIs for this PI.</p> <p>For SI a, I agree that the monitoring and enforcement of NOAA and the federal-state agencies is implemented and has demonstrated an ability to enforce relevant management measures, strategies and/or rules. However, I'm confused by the information that the assessors give to negate SG100. They state that "Information and comments provided to the Assessment by federal and state officials do not indicate that the current MCS system in place is somehow deficient and that non-compliance issues are going undetected"? They use this information to support the fact that the current MCS system is sufficient and comprehensive MCS system is not necessary. My question is: Can the current MCS system be considered comprehensive? What are the "additional rules" that would need to be enforced? I could not find information on this in the report.</p>	<p>The assessment team took particular interest in scrutinizing the enforcement-specific inputs and outcomes of federal and state enforcement agencies for the fishing zones accessed by the menhaden fleet. Agencies that responded to the team's request for data and information (while invoking confidentiality and data capture and formatting limitations) indicated that there were no systematic non-compliance issues associated with the fleet's harvesting operations.</p> <p>The team believes that the current MCS programs at the federal and state levels are sufficiently comprehensive and integrated in terms of available platforms and operational plans to be capable of detecting and prosecuting violations of laws and regulations. That said, the team cannot determine the degree to which the MCS programs have been implemented for this fishery.</p>

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.	CAB Response
				<p>For SI b, SG80 is warranted as there are sanctions to deal with noncompliance that exist and these are applied consistently. My question here is, although sanctions have not been applied over the last few years, is there any evidence (since sanctions have been in place) of their effectiveness?</p> <p>For SI c, SG80 is warranted since Omega complies with the requirements of the fishery, including providing catch and effort data to authorities and facilitating access to its vessels for inspection purposes, but there is limited enforcement and compliance data collected to ensure that there is a high degree of compliance.</p> <p>For SI d, the lack of stakeholder and federal and state authority complaints or citations on Omega is evidence that there's no evidence of</p>	<p>The team has provided revised language for Sla of PI 3.2.3.</p> <p>Commission staff and enforcement agencies at the federal and state levels have expressed the view that where sanctions have been applied to fisheries offenders, they have been effective in deterring recidivism. If applied to the menhaden fishery, it is reasonable to conclude that they would be similarly effective.</p> <p>Moreover, Omega's corporate code of conduct for vessel captains and crews is quite strict and sets a high standard of required compliance with prevailing laws and rules.</p> <p>No response required.</p> <p>During the site visit meetings, some stakeholders and individuals expressed a belief that the menhaden fleet</p>

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.	CAB Response
				<p>systematic non-compliance. SG80 is warranted.</p>	<p>frequently operated contrary to established laws and rules. An example is the contention that the fleet captures huge amounts of bycatch species that are not reported, and that endangered species are placed at greater risks.</p> <p>The assessment team found no evidence that would lend credence to these allegations, despite considerable probing with agency personnel.</p> <p>That said, the interviews the team conducted and the many letters/emails it received did expose what can be best described as a high level of mistrust directed at the agencies who manage the fishery by the various entities that participate in the fishery and/or who are engaged in broader environmental pursuits. This is not unique to this particular fishery – it occurs elsewhere in other fisheries and countries.</p>
3.2.4	Yes	Yes	NA	<p>The certifier gave a score of 90 for this PI. There are 2 SIs for this PI.</p> <p>For SI a, SG100 requires that there are</p>	<p>No response required.</p>

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.	CAB Response
				<p>mechanisms in place to evaluate all parts of the fishery-specific management system. All parts of the system include: (i) stock status indices, (ii) ecosystem interactions, (iii) compliance and enforcement, (iv) socio-economic outcomes, and (v) management measures. Each of these key components are evaluated by the Program Reivew Team with advice from a host of technical committees and advisory panels that meet the criteria of SG100.</p> <p>For SI b, SG100 requires that the fishery-specific management system is subject to regular internal and occasional external review. SG80 is warrented here because the review internally is regularly on <u>all</u> parts of the fishery-specific management system, but only occasionally externally reviewed (and not necessarily all parts of the management system).</p>	<p>No response required.</p>

8.3. Appendix 3 Stakeholder submissions

Note, to protect individuals' privacy, where submissions have been made by individuals, contact details have been redacted unless those submissions are by high profile individuals in a professional capacity (e.g. Academics etc.).

In addition because of there being some common stakeholders between fishery under assessment here and U.S. Gulf of Mexico menhaden purse seine some stakeholder comments may also be common to both; where this is the case that particular comment has been applied to both fisheries. Where relevant emails have also been included.

8.3.1.1. Comments received during initial consultation phase

Organisations

CCA Maryland

OFFICERS

Frank Bonanno, *Chairman*
Michael Wissel, *Vice-Chairman*
Chair, Management Committee
Larry Jennings, *Secretary*
Frank Bonanno, *Treasurer*
David Sikorski,
Executive Director



RECREATIONAL ANGLERS
WORKING TO CONSERVE, PROMOTE, AND ENHANCE MARYLAND'S
MARINE RESOURCES

July 28, 2017

Via email

RE: Comments to conformity assessment body (CAB) for the Marine Stewardship Council (MSC) Certification of the Omega Protein Menhaden Fishery

Introduction:

Coastal Conservation Association Maryland (CCA Maryland) has a long history of involvement in the management of Atlantic Menhaden in the Chesapeake Bay Region. As an active participant in the Atlantic States Marine Fisheries Commission process, we fully respect the challenges in managing menhaden. We appreciated that limited and inaccurate data as well as a number of highly diverse regional stakeholders increases the complexity of management. As a vital part of the estuarine and coastal ecosystem and a valuable commercial product, Atlantic menhaden, and the sustainable management of them, is of the utmost importance to many in the Chesapeake Bay region. As an organization of avid anglers and concerned citizens, we appreciate the opportunity to weigh in on the MSC certification process, and offer the following information and input to the conformity assessment body (CAB) at this time:

Current Management:

The Atlantic States Marine Fisheries Commission is currently managing the Atlantic Menhaden Fishery under Amendment 2 to the Atlantic Menhaden Fisheries Management Plan. When implemented in 2012, Amendment 2 placed the first coast-wide quota (Total Allowable Catch (TAC)) on Atlantic menhaden, and allocated that TAC amongst the states that have fisheries. Knowing that the managers had limited data to set the allocation, Amendment 2 included a provision in to revisit the overall plan after 3 years.

Amendment 2 allocation is as follows:

State	TAC Percentage (%)
Maine	0.04
New Hampshire	0
Massachusetts	0.84
Rhode Island	0.02
Connecticut	0.02
New York	0.06
New Jersey	11.19
Delaware	0.01
Maryland	1.37
PRFC	0.62
Virginia	85.32
North Carolina	0.49
South Carolina	0
Georgia	0
Florida	0.02

It is important to note that the large allocation to Virginia is due to Omega Protein's reduction fishery, the only reduction fishery still operating within ASMFC jurisdiction. The reduction fishery is a high volume fishery that utilizes purse seine gear for harvest.

In 2015, consistent with Amendment 2, the ASMFC Menhaden Management Board(MMB) initiated Amendment 3, to address re-allocation and the ecosystem based management of menhaden.

The need for ecosystem based management has been discussed at ASMFC since the early 2000's, and at next weeks August meeting, the MMB will release the options for allocation and ecosystem based management for public comment. A final decision on Amendment 3 should be made on November 14th, and management options should be implemented for 2018 coast wide.

Ecosystem Based Management and Regional Importance of Menhaden:

The most recent menhaden stock assessment has determined that the stock is not overfished and overfishing is not occurring. The assessment is a single species assessment, not ecosystem based.

Fisheries scientists, managers and advocates have long supported the idea of ecosystem based management for forage species like menhaden, but no specific menhaden based methodology has been determined at this time. Amendment 3 has a number of interim management options for menhaden, and the board will determine which to use at the completion of Amendment 3. This is important to note because the current management of menhaden does not directly address their role in the ecosystem.

As the "most important fish in the sea" menhaden fulfill an important role as forage throughout their life cycle and historic coastal range. Juvenile menhaden are important to estuarine predators, and support them during key points of their lives in the Chesapeake Bay, and coastal migrations. Striped bass, bluefish, flounder; weakfish, red drum, speckled trout and

cobia are all notable predatory finfish in the Chesapeake that directly benefit from a large abundance of menhaden.

Highly valuable, small-scale recreational and commercial fisheries in the Chesapeake rely on these predatory species, and therefore are supported by menhaden.

Localized Depletion and Chesapeake Bay Cap:

Unfortunately, it is the local value of menhaden that is often lost in the current coast wide management process. With Omega Protein being based in the Chesapeake Bay, and holding the largest share of allocation, the vast majority of coast wide catch is harvested in and around the Chesapeake. Because allocation is based on historical catch and the stock status is determined by a single species assessment, managers cannot ensure that localized depletion is not occurring in the Chesapeake.

The following maps show the concentration of catch from Omega vessels in 2013 and 2016 seasons:

Figure 4.1.3.4.3. Locations of all purse-seine sets by Omega Protein vessels (red) and last sets of trips that were sampled for age and size composition of the catch (= port samples; green) during 2013; data are from CDFR data base.





As you can see on the maps, between 70-80% of the coastwide TAC is harvested in the Chesapeake Bay and Mid-Atlantic near shore waters.

There is a Chesapeake Bay cap in place for Omega vessels, but the level of the cap was not based on any scientific guidance. The current cap is nearly twice what the recent harvest has been since it was implemented. With such potential for increase in Chesapeake Bay harvest, the cap does not provide any protections for the ecosystem or other users at this time. The value of the cap to the local ecosystem balance is very limited, and managers are considering changes to the cap in Amendment 3.

By Catch and User Conflicts:

While purse seine gear can have low levels of reported by-catch in deep ocean waters, the use of such gear in the shallow waters of the Chesapeake Bay can lead to increased and unreported by catch of predatory species like sharks, drum, bluefish, striped bass, and cobia. Only 100% observer coverage on Omega’s vessels would provide a clear picture of actual by catch levels in areas that by catch is assumed to be higher than reported.

Shallow water and near shore purse seining by Omega vessels often causes conflicts with various recreational and charter fishermen in the lower Chesapeake. These conflicts are based

on the removal of large schools of menhaden, and the effect such practices has on nearby fishermen targeting the predators that are feeding on the menhaden. The sheer size of Omega's vessels has also led to conflicts when a team of purse seiners concentrate on an area with high menhaden concentrations. When bait is concentrated in the lower Chesapeake, so are predators, and fishermen of all types are likely to be in the same areas.

Another common conflict is when nets are set in shallow water, and snag the bottom, spilling the catch into the bay. Spilled catch often floats on the tide for days, rots, and ends up fouling popular swimming and tourists beaches in the Virginia Beach, VA and Cape Charles, VA area. These occurrences are reported each year.

Maryland fishermen and managers decided to ban purse seines as a legal gear type in state waters, and chooses to utilize the majority of their harvest allocation through stationary pound nets. This decision was largely based on the impact that large-scale purse seine harvest of forage species can have on other species and other users when prosecuted in an estuary.

Conclusion:

Given the current efforts of ASMFC to initiate the ecosystem-based management for the Atlantic menhaden, the CAB should strongly consider whether the time is right to certify Omega's current fishing practices as sustainable. A Single species assessment does not properly manage the menhaden stock for it's holistic and coast wide value at this time.

CCA Maryland appreciates the opportunity to participate as a stakeholder in the certification process of Omega Protein's menhaden fishery, and respectfully urge your consideration of our input on this matter.

Regards,

David Sikorski
Executive Director

Assessment Team response:

Points raised by the stakeholder are in black below with Assessment Team responses in [blue](#).

Current Management:

The need for ecosystem based management has been discussed at ASMFC since the early 2000's, and at next week's August meeting, the MMB will release the options for allocation and ecosystem based management for public comment. A final decision on Amendment 3 should be made on November 14th, and management options should be implemented for 2018 coast wide.

[Following the ASMFC meeting the management of Atlantic menhaden moved to Amendment 3 to the Interstate Fishery Management Plan \(FMP\) for Atlantic Menhaden which maintained the single-species biological reference points until the review and adoption of menhaden-specific ecological reference points as part of the 2019 benchmark stock assessment process. The Amendment also addressed allocations, quota transfers, quota rollovers, incidental catches, the episodic events set aside program, the Chesapeake Bay reduction fishery cap and set the TAC for the 2018 and 2019 fishing seasons at 216,000 metric tons.](#)

Ecosystem Based Management and Regional Importance of Menhaden:

The most recent menhaden stock assessment has determined that the stock is not overfished and overfishing is not occurring. The assessment is a single species assessment, not ecosystem based.

Fisheries scientists, managers and advocates have long supported the idea of ecosystem based management for forage species like menhaden, but no specific menhaden based methodology has been determined at this time. Amendment 3 has a number of interim management options for menhaden, and the board will determine which to use at the completion of Amendment 3. This is important to note because the current management of menhaden does not directly address their role in the ecosystem.

As the "most important fish in the sea" menhaden fulfil an important role as forage throughout their life cycle and historic coastal range. Juvenile menhaden are important to estuarine predators, and support them during key points of their lives in the Chesapeake Bay, and coastal migrations. Striped bass, bluefish, flounder; weakfish, red drum, speckled trout and cobia are all notable predatory finfish in the Chesapeake that directly benefit from a large abundance of menhaden.

Highly valuable, small-scale recreational and commercial fisheries in the Chesapeake rely on these predatory species, and therefore are supported by menhaden.

[The Assessment Team have considered the ecosystem role of menhaden extensively throughout the report. The fact that the current harvest strategy is not designed to take into account the ecological role of Atlantic menhaden and is not responsive to the state of the menhaden stock with respect to its role in the U.S. Northwest Atlantic ecosystem has resulted in the Team raising two Conditions \(see \[Appendix 1.3 Conditions\]\(#\)\).](#)

Localized Depletion and the Chesapeake Bay Cap:

Unfortunately, it is the local value of menhaden that is often lost in the current coast wide management process. With Omega Protein being based in the Chesapeake Bay, and holding the largest share of allocation, the vast majority of coast wide catch is harvested in and around the Chesapeake. Because allocation is based on historical catch and the stock status is determined by a single species assessment, managers cannot ensure that localized depletion is not occurring in the Chesapeake.

There is a Chesapeake Bay cap in place for Omega vessels, but the level of the cap was not based on any scientific guidance. The current cap is nearly twice what the recent harvest has been since it was implemented. With such potential for increase in Chesapeake Bay harvest, the cap does not provide any protections for the ecosystem or other users at this time. The value of the cap to the local ecosystem balance is very limited, and managers are considering changes to the cap in Amendment 3.

Amendment 3 reduced the Chesapeake Bay cap, which was first implemented in 2006 to limit the amount of reduction harvest within the Bay, to 51,000 mt from 87,216 mt. According to the ASMFC, this recognizes the importance of the Chesapeake Bay as nursery grounds for many species by capping recent reduction landings from the Bay to current levels. While the level of the cap was not based on any scientific guidance, the current reduced cap is in line with recent harvests within the Bay. As the potential for large scale increases in harvests within the Bay has been removed.

By Catch and User Conflicts:

While purse seine gear can have low levels of reported by-catch in deep ocean waters, the use of such gear in the shallow waters of the Chesapeake Bay can lead to increased and unreported by catch of predatory species like sharks, drum, bluefish, striped bass, and cobia. Only 100% observer coverage on Omega's vessels would provide a clear picture of actual by catch levels in areas that by catch is assumed to be higher than reported.

One of the bycatch studies examined by the Assessment Team, Kirkley (1995), specifically examined bycatch in the Virginia Menhaden Fishery (including the Chesapeake Bay and Virginia coastal waters) and found total bycatch to be approx. 0.02% by weight of total catches (i.e. menhaden + bycatch). While old unfortunately this is the most current information available at this time.

Shallow water and near shore purse seining by Omega vessels often causes conflicts with various recreational and charter fishermen in the lower Chesapeake. These conflicts are based on the removal of large schools of menhaden, and the effect such practices has on nearby fishermen targeting the predators that are feeding on the menhaden. The sheer size of Omega's vessels has also lead to conflicts when a team of purse seiners concentrate on an area with high menhaden concentrations. When bait is concentrated in the lower Chesapeake, so are predators, and fishermen of all types are likely to be in the same areas.

Another common conflict is when nets are set in shallow water, and snag the bottom, spilling the catch into the bay. Spilled catch often floats on the tide for days, rots, and ends up fouling popular swimming and tourist beaches in the Virginia Beach, VA and Cape Charles, VA area. These occurrences are reported each year.

Maryland fishermen and managers decided to ban purse seines as a legal gear type in state waters, and chooses to utilize the majority of their harvest allocation through stationary pound nets. This decision was largely based on the impact that large-scale purse seine harvest of forage species can have on other species and other users when prosecuted in an estuary.

According to MSC FCR v2.0 7.4.2, a fishery shall not be eligible for certification if there is no mechanism for resolving disputes, or if the disputes overwhelm the fishery. Dispute resolution mechanisms are discussed in Principle 3 of this report. The Assessment Team have adjudged that U.S. State and Federal fisheries management systems include sufficient mechanisms for resolving disputes such that disputes do not overwhelm the fishery enough to prevent it from meeting the MSC's Fisheries Standard.

Conclusion:

Given the current efforts of ASMFC to initiate the ecosystem-based management for the Atlantic menhaden, the CAB should strongly consider whether the time is right to certify Omega's current fishing practices as sustainable. A Single species assessment does not properly manage the menhaden stock for its holistic and coast wide value at this time. CCA Maryland appreciates the opportunity to participate as a stakeholder in the certification process of Omega Protein's menhaden fishery, and respectfully urge your consideration of our input on this matter.

The Assessment Team appreciate the stakeholders concerns regarding the ecosystem role of menhaden and have considered at length the adequacy of the current single-species management regime. The results of this consideration are that the current harvest strategy is not designed to take into account the ecological role of Atlantic menhaden and is not responsive to the state of the menhaden stock with respect to its ecosystem role. Following careful consideration, the Assessment Team have raised two Conditions in this area (see [Appendix 1.3 Conditions](#)).

Chesapeake Bay Defenders

Email 1:

From: steven epstein [<mailto:chesapeakebaydefenders@gmail.com>]

↑ Next ↩ Last

Sent: 06 July 2017 22:05

To: Jean Ragg <Jean.Ragg@saiglobal.com>

Subject: MSC Omega Protein

Hi My name is Steven Epstein. I am the founder of Chesapeake Bay Defenders. I would like to put a group together to sit down and explain how Omega protein hurts the Chesapeake Bay and to show how they are not the stewards they make themselves out to be. Please get back to me with a time and a place to meet, preferably in Virginia Beach. I can provide a meeting space if needed.

I have spent the last two years researching this company and there are many things that stick out in my mind on why this certification should not be issued.

1. Environmental crimes they have plead guilty to.

<https://www.epa.gov/enforcement/2013-major-criminal-cases>

<http://www.katc.com/story/32720798/omega-protein-under-federal-environmental-investigation>

2. Pending lawsuits from stockholders for lying.

<http://www.prnewswire.com/news-releases/rm-law-announces-class-action-lawsuit-against-omega-protein-corporation-300417964.html>

3. By-catch has always been counted in the hold of the boat from the studies I have seen, not by what is caught in the net.

4. They have to make political contributions to keep the fishery open. (including to one of the the VA ASMFC reps who happens to be a senator)

5. They dump untested water that has come in contact with dead fish containing biological waste into 70+ degree water less than half a mile from tourist beaches. <https://www.youtube.com/watch?v=sUfmF2MPlq0>

6. They can not even reach the Chesapeake Bay Cap because the fish are not here anymore. They are forced to fish half a mile from populated beaches because that's where the fish are. If the population is fine in the bay why are they literally fishing in people's back yards...

I can keep on going but would like to save some info for the in person meeting.

Thanks,
Steven Epstein
Chesapeake Bay Defenders
757-724-1489

Click [here](#) to report this email as spam.

Email 1 (attachment):



Photo 1: Nets from purse seine vessels hold menhaden in place while a centrifugal pump from the main fishing vessel removes the fish from the water.



Photo 2: Located on top of the main vessel, a dewatering screen moves menhaden from the pump into a fish hold. Water from the Bay passes through the box and is diverted back into the Bay. This water does not come into contact with any foreign materials prior to its discharge.



Photo 3: Closely aligned metal bars within the dewatering screen filter menhaden into a fish hold while immediately diverting water from the Bay into a separate chute, which sends the water back into the Bay.



Photo 4: Turbulence from the diverted water's reentry can create significant foam as the water reenters the Bay. The rate at which this foam disperses and dissipates depends on how long the pumping process lasts.

Assessment Team response email 1:

Fri 07/07/2017 19:13

Samuel Dignan

FW: MSC Omega ProteinTo chesapeakebaydefenders@gmail.comCc Ivan Mateo; Robert Allain; Jean Ragg You replied to this message on 11/07/2017 13:35.

Hi Steven,

Thank you for your response. Jean forwarded your response on to me as I'm part of the assessment team. I can confirm that you have been added to our list of stakeholders and will receive any future notifications advising you of opportunities to participate in the assessment process.

It would be good if I could clear up a few things with you. As you have indicated that you wish to meet with the Assessment Team, we will be in the Reedville, VA area (possibly we could use Kilmarnock as this is where we will be staying) on the afternoon of Wednesday 12th July and in the Arlington, VA area the morning of Thursday 13th July.

Unfortunately we cannot make it as far South as Virginia Beach but if you could let us know if either of these work for you so that we can make arrangements that would be great.

In addition, as you intend to participate in the forthcoming assessment process it would be good if you could familiarise yourself with the Stakeholder's Guide to the Marine Stewardship Council. In order to maximise the impact of any contributions it would be best if you use the Stakeholder Input into MSC Fishery assessments template when submitting information.

We encourage you not to withhold any information you feel is relevant. However, you should be aware that any information that you submit will be made public through the reporting process and under the MSC Fisheries Certification Requirements v2.0 any information that is not made available to all stakeholders may not be used in determining the assessment outcome or as the basis for an objection to a certification. I'm sure this won't have any effect in the case of your organisation but we are required to inform you in any case.

Many thanks once again for getting back to us. If you could confirm whether you would be available to meet with us within the time slots above that would be great and we will find a venue that suits.

Just on some of your points below. The scope of the MSC Standard is limited to fishery issues. Therefore through the process we will not be addressing environmental/labour/legal issues etc. I know this may come as a disappointment but I feel it is best to be up front about this.

If you have further questions please don't hesitate to ask.

Kind regards,

Sam Dignan

Assessment Team response:

As noted in the above email from the Assessment Team, the scope of the MSC Standard is limited to fishery issues. Therefore the assessment process does not consider or address any environmental/labour/political/legal issues or any other issue not within the scope of the MSC FCR v2.0.

With the above in mind, the Assessment Team judges that the only issues raised by the stakeholder in this submission that are within the scope of the MSC FCR, and therefore of relevance to this assessment, are points 3 and 6 both of which are addressed below:

3. By-catch has always been counted in the hold of the boat from the studies I have seen, not by what is caught in the net.

Bycatch is generally counted based on what comes aboard the vessel as it is very difficult to quantify what is in the net. A Recommendation ([Recommendation 1](#)) has been raised in this area by the Assessment Team. This Recommendation encourages the Client to ensure that bycatch studies are undertaken in a standardized manner on an ongoing basis and studies are designed such that the composition of catches by weight can be estimated.

6. They cannot even reach the Chesapeake Bay Cap because the fish are not here anymore. They are forced to fish half a mile from populated beaches because that's where the fish are. If the population is fine in the bay why are they literally fishing in people's back yards?

The fact that the Chesapeake Bay Cap is not being reached in recent years is not necessarily evidence that there is not sufficient fish in the Bay. The fishery may elect to target menhaden elsewhere, despite the additional steaming distance, due to for example the increase oil content of menhaden in that area.

Chesapeake Bay Foundation

Submission 1:

Stakeholder Input into MSC Fishery Assessments

Contact Information Make sure you submit your full contact details at the first phase you participate in within a specific assessment process. Subsequent participation will only require your name unless these details change.				
Contact Name	First	Chris	Last	Moore
Title	Senior Regional Ecosystem Scientist			
On behalf of (organisation, company, government agency, etc.) – if applicable				
Organisation	Please enter the legal or registered name of your organisation or company. Chesapeake Bay Foundation			
Department	Environmental Protection and Restoration			
Position	Please indicate your position or function within your organisation or company. Manage the organization's efforts on important Bay species such as blue crab, oysters, striped bass, and Atlantic menhaden.			
Description	Please provide a short description of your organisation. Conservation organization dedicated to protecting and restoring the Chesapeake Bay			
Mailing Address, Country	3663 Marlin Bay Drive Virginia Beach, VA 23455			
Phone	Tel	+ (757) 622-1964	Mob	+ (757) 353-2687
Email	CMoore@cbf.org		Web	

Assessment Details	
Fishery	Atlantic Menhaden
CAB	Sam Dignan

Assessment Stage	Fishery	Date	Name of Individual/Organisation Providing Comments
<input checked="" type="checkbox"/> Information gathering and stakeholder meetings ¹ Opportunity to engage with and provide information to the CAB about the specific details and impacts of the fishery.	Atlantic Menhaden	8/7/2017	Chris Moore/ Chesapeake Bay Foundation

Nature of Comment (select all that apply)	Additional Information/Detail Please attach additional pages if necessary.
<input type="checkbox"/> I wish to request an in-person meeting with the site team during their assessment visit (meetings without the fishery client present may be requested at this phase of the process if desired).	See comments below.
<input checked="" type="checkbox"/> I wish to submit written information about the fishery and its performance against the default tree and/or RBF to the assessment team (please provide documents or references).	
<input type="checkbox"/> Other (please specify)	

On behalf of the Chesapeake Bay Foundation (CBF), I wish to provide the following comments on the Marine Stewardship Council's (MSC's) process for assessing Atlantic menhaden. CBF is the largest conservation organization dedicated solely to saving the Chesapeake Bay watershed. Our motto, **Save the Bay**, defines the organization's mission and commitment to reducing pollution, improving fisheries, and protecting and restoring natural resources such as wetlands, forests, and underwater grasses. CBF has more than 200,000 members who support the wise management of the region's living resources.

More conservative management of Atlantic menhaden (menhaden) in the Chesapeake Bay and along the entire Atlantic Coast has been an area of concern for CBF members and staff for more than 20 years. A restored menhaden population will benefit both ecological and economic interests in the Bay region and is an important component to restoring the overall productivity of

¹ MSC Fisheries Certification Requirements, v2.0, section 7.8.4

the estuary. Increases in the menhaden population will help restore the species' vitally important role as forage for a variety of fish, marine mammals, and birds. In addition, a healthy menhaden population will preserve current and allow for future increased harvest opportunities for the various commercial fisheries that depend on menhaden.

CBF appreciates MSC's decision to move forward with a review of the menhaden fishery. There have long been concerns about the industrial-scale harvest of menhaden in the Chesapeake Bay and in the coastal waters that surround the mouth of the Bay. The Chesapeake Bay serves not only as a primary nursery area for economically important species such as striped bass and menhaden, but also a fertile fishing ground for both commercial and recreational interests.² CBF hopes that a review of the menhaden fishery will provide additional metrics that can continue to move the various menhaden fisheries to models of ecosystem-based fisheries management.

To align as closely as possible with MSC's review process, the following comments will be specific to each principle for scoring.

One of the first considerations to be made by MSC during this process is a determination of the trophic level of menhaden. A review of the life history of menhaden should result in the species being treated as a Low Trophic Level (LTL) stock. First, as a member of the Family Clupeidae, menhaden are included in Box SA1 of MSC Fisheries Standard v2.0. Species type in this box are defined as "key LTL stocks" for the purposes of an MSC assessment."³ To be considered a LTL, a species must meet two additional sub-criteria in their adult life cycle phase. One of those sub-criteria indicates a large proportion of trophic connections should involve the stock undergoing assessment.

Menhaden are a quintessential LTL forage species that exhibit a large proportion of trophic connections. Fisheries managers, scientists, and conservationists have identified menhaden as an important connection between primary producers and higher trophic level piscivores.⁴ Not only are menhaden a primary forage for piscivorous fish species, they are also a primary food source for birds and marine mammals. Piscivorous birds such as osprey are particularly dependent upon menhaden, as menhaden comprise most ospreys' prey.⁵ Recent increases in menhaden abundance led to a resurgence of the osprey in various New England estuaries.⁶ Table 1 contains a list of species from various trophic levels that are known to prey upon menhaden.

² Anstead, Kristen A. The Impact of Multiple Nursery Areas on the Population Structure of Menhaden. 2014.

³ Marine Stewardship Council. Fisheries Certification Requirements and Guidance. Version 2.0. 2014.

⁴ ASMFC, Special Report No. 83. Atlantic Menhaden Workshop Report & Proceedings, 2004.

⁵ IBID

⁶ Spitzer et al. Osprey as Menhaden Biomonitors: Insights into the need for Ecological Management. Correspondence to ASMFC. 2017

Table 1. List of Species Utilizing Menhaden as a Food Source⁷

Piscivorous	Omnivorous
Osprey	Bluefish
Bald Eagle	Sandbar Shark
Brown Pelican	Striped Bass
Common Loon	Weakfish
Atlantic Bonito	Bluefin Tuna
Gannet	Humpback Whale
	Dolphin
	Summer Flounder
	Spiny Dogfish
	Cod
	Sea Trout

A recently completed study using an Ecopath model for the Northwest Atlantic Continental Shelf similarly showed the importance of menhaden as forage. The indicated menhaden were consumed by 35 of the model trophic groups and comprised at least 30 percent of the diets of striped bass and nearshore piscivorous birds. The model also noted the importance of adult menhaden to more than 18 different species assemblages.⁸

The second sub-criteria the assessed species must meet indicates that, “a large volume of energy passing between lower and higher trophic levels passes through this stock...”⁹ Menhaden meet this criterion as well. Menhaden are efficient low trophic level filter feeders and can assimilate approximately 80 percent of their plant and animal diet.¹⁰ Combining this assimilation capacity with “their tremendous numbers, individual growth rates, and seasonal movements, these fish

⁷ A) National Geographic. The Good and the Bad for Atlantic Menhaden. 2015. <https://voices.nationalgeographic.org/2015/05/13/the-good-and-the-bad-for-atlantic-menhaden/>

B) NOAA. Fish Facts: Menhaden. March 2017. <https://chesapeakebay.noaa.gov/fish-facts/menhaden>

C) Chesapeake Bay Program. Atlantic Menhaden, *Brevoortia tyrannus*. http://www.chesapeakebay.net/discover/field-guide/entry/atlantic_menhaden

D) Rogers, S. G., and M. J. Van Den Avyle. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (MidAtlantic)—Atlantic menhaden. U.S. Fish Wildl. Serv. Biol. Rep.82(11.108) U.S. Army Corps of Engineers TR EL-82-4. 23 pp;

5) Chesapeake Bay Program Scientific and Technical Advisory Committee. 2014

E) Ahrenholz, D. Population Biology and Life History of the North American Menhadens, *Brevoortia* spp. Marine Fisheries Review. 53(4), 1991.

F) Virginia Institute of Marine Science. Menhaden Background. <http://www.vims.edu/research/units/projects/menhaden/about/index.php>

G) National Wildlife Federation. 2017. Atlantic Menhaden: A Feast for Whales. <http://blog.nwf.org/2017/07/atlantic-menhaden-a-feast-for-whales/>; All Last Accessed August 4, 2017.

⁸ Buchheister, A., Miller, T. J., Houde, E. D. Evaluating Ecosystem Based Reference Points for Atlantic Menhaden (*Brevoortia tyrannus*). 2017. Spatial and temporal dynamics of Atlantic menhaden (*Brevoortia tyrannus*) recruitment in the Northwest Atlantic Ocean. January 2016. ICES Journal of Marine Science, 73: 1147–1159.

⁹ MSC. Fisheries Certification Requirements and Guidance. Version 2.0. 2014.

¹⁰ Durbin and Durbin. Assimilation Efficiency and Nitrogen Excretion of A Filter-Feeding Planktivore, the Atlantic Menhaden. 1981.

annually consume and redistribute large amounts of energy and materials” throughout their environment.¹¹

Principle 1: Health of Fish Stock

Principle 1 includes the use of stock status as a Performance Indicator. As discussed in the previous section, menhaden should be classified as a LTL species. Fortunately, MSC recently funded work that provides guidance on the management targets of LTL species, resulting in a paper titled, *The Impacts of Fishing Low-Trophic Level Species on Marine Ecosystems*. The paper includes a recommendation that managers strive for a target of 75 percent of unfished biomass for LTL in order to limit impacts on the broader food web.¹² At this time, the Atlantic States Marine Fisheries Commission (ASMFC) has estimated that the Atlantic coastal menhaden population is at only 46 percent of unfished biomass, a number extremely close to the threshold recommended by other scientific papers on forage fish and extremely far from the target provided in the guidance provided to MSC.¹³

Principle 1 identifies the use of reference points as an indicator for the sustainability of the target stock. At this time, the menhaden fishery is subject to interim single species reference points that ASMFC’s menhaden technical committee has not recommended for continued management use.¹⁴ In addition, ASMFC’s Atlantic Menhaden Management Board has indicated the current reference points, while accounting for natural mortality, may not adequately account for ecological services provided by menhaden. The Management Board has also indicated that changes in the menhaden population may impact the health and/or abundance of species that prey on menhaden.¹⁵ Due to ASMFC’s expressed concerns, new reference points are currently being considered for menhaden. One set of reference points currently under consideration are ecological reference points (ERPs), which are intended to account for the multiple roles that menhaden play, both in supporting fisheries for human use and the marine ecosystem. They are viewed as a tool that could improve overall ecosystem health in the management of menhaden.

Principle 1 also includes “Harvest Strategy” as a Performance Indicator. A significant portion of menhaden harvest takes place either in or around the mouth of the Chesapeake Bay. Figure 1 provides detailed information on the location of fishing operations during the most recent fishing season. As exhibited by Figure 1, there has long been a concern from conservationists and fishery managers that this harvest, in a relatively narrow geographic area, has negative implications for the ecology of the region. To address these concerns, ASMFC first adopted a

¹¹ Rogers, S.G. and M.J. Van Den Avyle. *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic)—Atlantic menhaden*. U.S. Fish & Wildlife Service Biological Report 82(11.108). 1989.

¹² Smith et al. *Impacts of fish Low-Trophic Level Species on Marine Ecosystems*. *Science* (New York, N.Y.). 333. 1147-50. 2011.

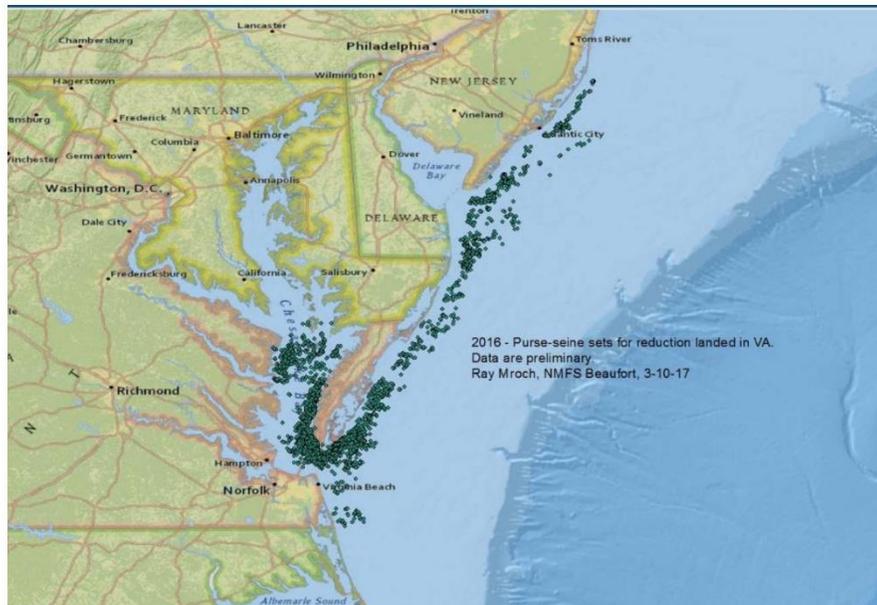
¹³ ASMFC. *Draft Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden*. 2017

¹⁴ Southeast Data Assessment Review (SEDAR). *SEDAR 40-Atlantic Menhaden Stock Assessment Report*. 2015

¹⁵ ASMFC. *Public Information Document for Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden*. 2016

harvest cap on the reduction fishery for the Chesapeake Bay in 2005.¹⁶ Due to ongoing concerns about harvest in the Chesapeake Bay, this cap remains in place today.

Figure 1. Menhaden Fishery Net Set Data



Principle 1 also includes “Assessment of Stock Status” as a Performance Indicator. CBF agrees with the most recent stock assessment that the menhaden stock is not overfished nor is overfishing occurring based on the current single species reference points.¹⁷ However, this coast-wide stock assessment cannot take into account regional population differences that may be occurring. The high rate of harvest from a narrowly defined geographic area can cause negative implications for the ecology of the region and has been a concern for conservationists and fishery managers. These concerns have been supported by researchers who have noted dietary shifts in resident Chesapeake Bay striped bass from pelagic to benthic prey items as principal forage species such as menhaden have declined.¹⁸

¹⁶ ASMFC, Addendum II to Amendment I to the Interstate Fishery Management Plan for Atlantic Menhaden. 2005

¹⁷ Southeast Data Assessment Review (SEDAR). SEDAR 40-Atlantic Menhaden Stock Assessment Report. 2015

¹⁸ Jacobs et al. Influence of nutritional state on the progression and severity of mycobacteriosis in striped bass *Morone saxatilis*. *Dis Aquat Org.* Vol. 87: 183–197: 2009.

Principle 2: Impact on Ecosystem

Forage species are imperative to sustaining an economically and ecologically productive Chesapeake Bay. Menhaden are filter feeders who are efficient at transforming primary productivity to fish biomass.¹⁹ Historically, menhaden were the dominant prey species in the Bay, though that distinction has diminished due to a decrease in population numbers.²⁰ However, the decrease in historic population numbers does not change the long recognition of menhaden as a key forage species in the Chesapeake Bay.²¹ Menhaden are key to Bay predator food chains and have cultural and economic importance within the Bay and coastal fisheries.²² As previously discussed, menhaden are important prey for predator fish like striped bass, bluefish, weakfish, sandbar sharks, summer flounder, and spiny dogfish (see Table 1).²³ Gut analysis studies have found that young of the year (YOY) Atlantic menhaden and bay anchovy account for up to 40 percent of total annual consumption for striped bass.²⁴ Peaks in the striped bass prey-to-predator ratios in 2005, 2009, and 2010 were linked to high abundances of YOY Atlantic menhaden.²⁵

Atlantic menhaden are currently managed on a coast-wide basis by the ASMFC. ASMFC is composed of 15 Atlantic coast states and two federal agencies that set the coast-wide framework for managing species that migrate along the near-shore waters of the Atlantic Coast. As previously stated, Amendment 3 to the Atlantic Menhaden Fishery Management Plan (FMP) is currently being developed to support the adoption of ERPs for management and to consider revision of allocation methods within the coast-wide fishery. ERPs are intended to account for the many unique roles menhaden play in the marine ecosystem, but the process to adopt these reference points is not complete.²⁶ A point of concern remains as “ERP models and reference points for menhaden are for the coast-wide population and are not specific to Chesapeake Bay.”²⁷ Little is known about specific factors controlling menhaden recruitment and stock size.²⁸ Although the most recent stock assessment finds the coast-wide population in good condition, the assessment lacks a localized assessment of stocks in the Bay. There is no annual menhaden specific Bay survey; however, Maryland’s Department of Natural Resources and the Virginia Institute of Marine Science conduct annual Bay trawl surveys. While these surveys do not specifically target menhaden populations, they do provide some information on population

¹⁹ Atlantic State Marine Fisheries Commission. Special Report No. 83 Atlantic Menhaden Workshop Report & Proceedings. December 2004. <http://www.asmfc.org/uploads/file/menhadenWorkshopReportDec04.pdf>. Accessed August 3, 2017.

²⁰ *IBID*

²¹ Baird, D., and R.E. Ulanowicz. 1989. The seasonal dynamics of the Chesapeake Bay ecosystem. *Ecological Monographs* 59(4): 329-364.

²² Chesapeake Bay Program Scientific and Technical Advisory Committee. Assessing the Chesapeake Bay Forage Base: Existing Data and Research Priorities STAC Workshop Report. November 2014. http://www.chesapeake.org/pubs/346_1hde2015.pdf. Accessed August 3, 2017.

²³ *IBID*

²⁴ Buchheister and Houde. Foage Indicators and Consumption Profiles for Chesapeake Bay Fishes Final Report. Submitted to Chesapeake Bay Trust. January 2016. <https://cbtrust.org/wp-content/uploads/FY14-Forage-fish-indicator-metric-development.pdf>. Accessed August 3, 2017.

²⁵ *IBID*

²⁶ ASMFC. Special Report No. 83 Atlantic Menhaden Workshop Report & Proceedings. December 2004.

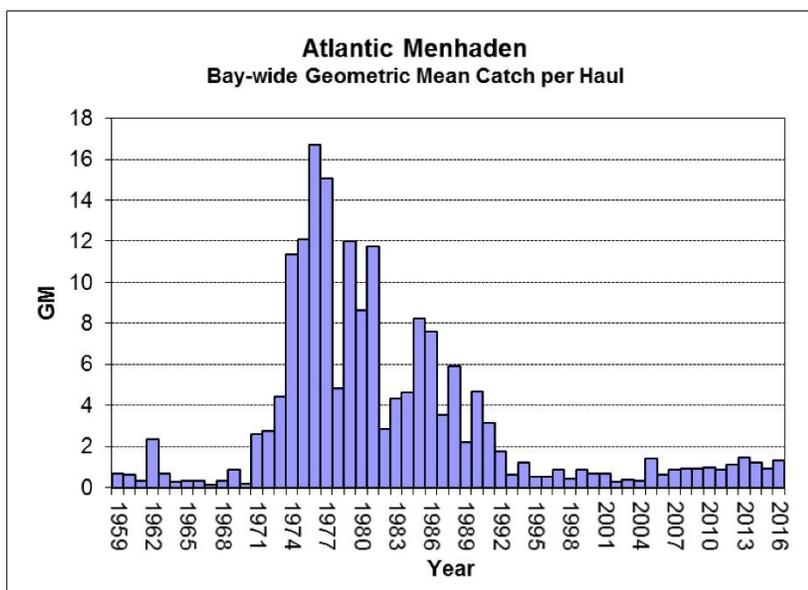
<http://www.asmfc.org/uploads/file/menhadenWorkshopReportDec04.pdf>. Accessed August 3, 2017.

²⁷ Chesapeake Bay Program Scientific and Technical Advisory Committee. Assessing the Chesapeake Bay Forage Base: Existing Data and Research Priorities STAC Workshop Report. November 2014. http://www.chesapeake.org/pubs/346_1hde2015.pdf. Accessed August 3, 2017.

²⁸ Buchheister, A., Miller, T. J., Houde, E. D., Secor, D. H., and Latour, R. J. Spatial and temporal dynamics of Atlantic menhaden (*Brevoortia tyrannus*) recruitment in the Northwest Atlantic Ocean. January 2016. *ICES Journal of Marine Science*, 73: 1147–1159.

numbers in the Bay. The Maryland survey data presents a trend of continual low Bay population levels for menhaden (see Figure 2). Their data supports the “ongoing concern of the decade-long decline in recruitment in Chesapeake Bay.”²⁹

Figure 2. Maryland’s Department of Natural Resources Atlantic Menhaden Bay-wide Geometric Mean Catch per Haul from the Annual Striped Bass Seine Survey³⁰



Total abundance of Bay menhaden and the proportion of age zeros and ones is unknown.³¹ In 2016 Buchheister et. al conducted a study on menhaden, producing results with key implications for menhaden management. Their findings suggest “a coast-wide assessment and management of a species like menhaden may be obscuring important processes occurring at regional scales.”³² The results of the Buchheister et. al paper support concerns of localized depletion of Bay menhaden and the importance of Bay-specific population measures. “Localized depletion occurs

²⁹ ASMFC. Special Report No. 83 Atlantic Menhaden Workshop Report & Proceedings. December 2004. <http://www.asmfc.org/uploads/file/menhadenWorkshopReportDec04.pdf>. Accessed August 3, 2017.

³⁰ Maryland Department of Natural Resources. Juvenile Striped Bass Survey. Atlantic Menhaden Abundance Data and Graphs [Excel]. <http://dnr.maryland.gov/fisheries/Pages/striped-bass/juvenile-index.aspx> Accessed August 3, 2017.

³¹ ASMFC. Special Report No. 83 Atlantic Menhaden Workshop Report & Proceedings. December 2004. <http://www.asmfc.org/uploads/file/menhadenWorkshopReportDec04.pdf>. Accessed August 3, 2017.

³² Buchheister, A., Miller, T. J., Houde, E. D., Secor, D. H., and Latour, R. J. Spatial and temporal dynamics of Atlantic menhaden (*Brevoortia tyrannus*) recruitment in the Northwest Atlantic Ocean. January 2016. *ICES Journal of Marine Science*, 73: 1147–1159.

when migratory immigration of menhaden is insufficient to replace removals.”³³ The data available to determine “localized depletion is catch per unit effort (CPUE), Rhode Island trap survey, Delaware trawl survey and the pound net survey.”³⁴ Not only is the data available to define localized depletion not specific to the Bay menhaden population, but with these measures, if overall abundance declines, purse seine landings will not decline simultaneously. This means that stocks could be found as stable and not experiencing overfishing while the Bay population is being depleted. This suggests that CPUE can only be utilized as a conservative indicator of menhaden abundance, thus limiting its ability to accurately define if localized depletion is occurring.³⁵ Localized depletion of menhaden is detrimental to the Bay ecosystem because of the importance of menhaden as forage species. Decreases in the Chesapeake Bay component of the coastal menhaden population could also lead to a depletion in the Bay’s predator fish that depend on menhaden as food.

The concern of the loss of this ecologically and economically important Bay species cannot be overstressed.

Principle 3: Management System

Principle 3 includes several performance indicators related to a Fishery Specific Management System.

As discussed in the comments for Principle 2, ASMFC, working through its partner states, has a long history of managing fisheries along the Atlantic Coast. When it comes to menhaden, there are several gaps that should be filled to ensure the fishery is better managed.

First, at this time, there is no fishery observer coverage for the reduction fleet. The National Marine Fishery Service fishery observers are considered one of the best sources of information on fisheries. Observers are used to ensure compliance with the appropriate fishery regulations and provide an additional avenue for data collection while fisheries are operating.³⁶ Although the size of most Chesapeake Bay fishery vessels preclude the use of observers, the size of the vessels involved in the menhaden reduction fishery could easily accommodate observers. Instituting a fishery observer program for the menhaden reduction fishery would provide additional information about the catch, by-catch, and biological parameters in order to benefit better management of the resource. This is one of the research recommendations currently offered by the ASMFC Atlantic Menhaden Stock Assessment Subcommittee.³⁷

³³ Atlantic State Marine Fisheries Commission. Special Report No. 83 Atlantic Menhaden Workshop Report & Proceedings. December 2004. <http://www.asmfc.org/uploads/file/menhadenWorkshopReportDec04.pdf>. Accessed August 3, 2017.

³⁴ IBID

³⁵ IBID

³⁶ NOAA Fisheries. Scientists to Observe Gulf Menhaden Fishery for Bycatch Impacts.

http://www.nmfs.noaa.gov/stories/2011/05/16_scientists_observe_gulf_menhaden_fishery_bycatch_impacts.html. Accessed August 4, 2017

³⁷ ASMFC Atlantic Menhaden Stock Assessment Subcommittee. 2017 Atlantic Menhaden Stock Assessment Update.

Second, a robust research plan could provide additional information about the stock both on a regional and coastal scale. Currently no such research plan exists for menhaden. Fortunately, the stock assessment subcommittee did recommend several initiatives for future research and modeling, but unfortunately, there is neither a plan nor funding to ensure completion of these recommendations.

Future research is especially critical to ensure the ecological health of the Chesapeake Bay region. With passage of Addendum II to Amendment 1 of the Interstate Fishery Management Plan for Atlantic Menhaden, the Atlantic Menhaden Management Board initiated a research program to help better understand population dynamics and forage availability in the Chesapeake Bay.³⁸ This research plan developed by the Atlantic Menhaden Technical Committee (TC) focused on removal estimates of predators, movements of fish between the Chesapeake Bay and Atlantic Ocean, and recruitment of YOY menhaden into the Bay.³⁹ Unfortunately, these studies were unable to provide specific answers to the questions posed by the TC. However, despite this particular research program being unable to produce sufficient evidence to determine if localized depletion (previously discussed in Principle 2) was occurring in the Chesapeake Bay, fishery researchers continue to believe that sufficient information exists regarding low abundance of menhaden. This issue warrants further evaluation.⁴⁰

Thank you for the opportunity to comment during this stage of the MSC review. Unfortunately, with the lack of Bay specific population data, local depletion concerns, and the current population estimate so far from an appropriate target for LTL species, CBF does not believe the certification of the menhaden reduction fishery along the Atlantic Coast is appropriate at this time.

Thank you for your consideration of these comments. If you have any questions, please contact me at (757) 622-1964 or cmoore@cbf.org.

Sincerely,



Chris Moore
Senior Regional Ecosystem Scientist
Chesapeake Bay Foundation

³⁸ ASMFC. Addendum II to Amendment 1 to the Interstate Fishery Management Plan for Atlantic Menhaden. 2005.

³⁹ IBID

⁴⁰ Virginia Institute of Marine Science. Menhaden Research FAQ.
http://www.vims.edu/research/units/projects/menhaden/faqs/#locally_depleted. Accessed August 4, 2017

Assessment Team response – Submission 1:

Salient points raised by the stakeholder are responded to below in blue.

Consideration of menhaden as a key-LTL species

Issues raised include the fact that menhaden should be treated as a key Low Trophic Level (LTL) stock.

The stakeholders concerns regarding the ecosystem role of menhaden and the information provided were considered in the Team’s evaluation of menhaden as a key-LTL species for the purpose of this assessment (see [3.3.5. Consideration of Atlantic menhaden as a Lower Trophic Level \(LTL\) species](#) for further details).

Ultimately, following careful consideration of the available evidence the Assessment Team determined that, for the purpose of this assessment, the Atlantic menhaden stock should be defined as a key-LTL stock; as a consequence PI 1.1.1a rather than PI1.1.1 was scored.

Principle 1: Health of Fish Stock

The most up to date estimates of the Atlantic menhaden stock in relation to the ‘rule of thumb’ reference points proposed in the paper cited by the stakeholder (Smith et al., 2011) are presented in detail in [3.3.3.7. Ecological Reference Points \(ERPs\)](#).

With respect to the continued use of single species reference points, the Assessment Team have considered this extensively throughout the report. As a result the Team have concluded that the current harvest strategy is not designed to take into account the ecological role of Atlantic menhaden and is not responsive to the state of the menhaden stock with respect to its role in the U.S. Northwest Atlantic ecosystem. In response to this finding the Team has raised two Conditions (see [Appendix 1.3 Conditions](#)).

Amendment 3 (November 2017) reduced the Chesapeake Bay cap from 87,216 mt to 51,000 mt. According to the ASMFC, this caps reduction landings from the Bay at recent levels.

The Chesapeake Bay Reduction Fishery Cap was originally implemented in 2005 to prevent localized depletion of menhaden. Given the concentrated harvest of menhaden within the Chesapeake Bay, there was concern that localized depletion could be occurring in the Bay. In 2005, the Board established the Atlantic Menhaden Research Program (AMRP) to evaluate the possibility of localized depletion. Results from the peer review report in 2009 were unable to conclude localized depletion is occurring in the Chesapeake Bay and noted that, given the high mobility of menhaden, the potential for localized depletion could only occur on a “relatively small scale for a relatively short time”.

Addendum II to Amendment 1 of the Atlantic Menhaden Management Plan instituted a harvest cap on Atlantic menhaden by the reduction fishery in Chesapeake Bay at the average landings from 1999 – 2004. Addendum III (2006) revised the cap to 109,020 mt, which was the average of landings from 2001 – 2005. Addendum IV (2009) extended the Chesapeake Bay harvest cap three additional years (2011 – 2013) at the same levels as established in Addendum III. Amendment 2 (December 2012) reduced the Chesapeake Bay cap to 87,216 mt. Finally, Amendment 3 (November 2017) reduced the Chesapeake Bay cap from 87,216 mt to 51,000 mt and removed the roll-over provision such that the Cap in a given year cannot exceed 51,000 mt.

According to Addendum 2 (2005), between 1985 – 1997 and 1998 – 2004 reduction catches inside Chesapeake Bay averaged 49% and 60% of the total coastwide landings respectively. Applying these figures to total reduction catches of menhaden would suggest that in the period 1985 – 2004 reduction catches inside Chesapeake Bay

averaged approx. 150,000 mt per annum. Setting the Chesapeake Bay cap at its current level (as of Amendment 3) should therefore mean that reduction landings from the Bay should be at most one third of historical levels (1985 – 2004).

Principle 2: Impact on Ecosystem

Issues raised include the ongoing concern regarding the decline in recruitment and localized depletion of menhaden in the Chesapeake Bay.

The Maryland survey data shows previously high indices for menhaden in the 1980s coinciding with a period where average menhaden reduction landings within the Bay were likely >3x the current Chesapeake Bay cap (see justification for this statement above). Therefore, the available evidence would indicate that in the past the Bay has sustained greater abundances of menhaden (as indicated by the Maryland survey data) against the backdrop of reduction landings far in excess of current values. In addition, the menhaden fishery does not land substantial amounts of age-0 menhaden and consequently is not likely to be a cause of low abundances of age-0 menhaden or a contributor to “localized depletion” of menhaden in Chesapeake Bay (ASMFC, 2012; MDSG, 2009).

It is likely therefore, that factors other than the menhaden reduction fishery are contributing to the continuing low numbers of menhaden being observed in the Maryland survey data for example offshore processes (SABRE, 1999; Lozano and Houde, 2013; Buchheister et al., 2016), primary production and phytoplankton biomass, and environmental conditions including decadal variability and potential two regime shifts (Wood, 2000; Austin, 2002; Wood et al., 2004; Kimmel et al., 2009; Wood and Austin, 2009; Buchheister et al., 2016).

Principle 3: Management System

Issues raised include the lack of observer coverage or a robust research plan.

The low level of observer coverage has been considered and addressed throughout this report. While Atlantic menhaden purse seine fishery is a Category II fishery requiring all participating fishers to accommodate an onboard observer upon request, NMFS has only observed the menhaden fishery at low levels.

With respect to the lack of a research plan, a research plan is no longer a requirement of the MSC process. With this being said research is considered elsewhere through the Information PIs which assess the availability and quality of data to assess the fishery’s on the various components of the fishery (i.e. target, bycatch and ETP species, habitats and ecosystems).

Submission 2:

Stakeholder Input into MSC Fishery Assessments

Contact Information				
Make sure you submit your full contact details at the first phase you participate in within a specific assessment process. Subsequent participation will only require your name unless these details change.				
Contact Name	First	Chris	Last	Moore
Title	Senior Regional Ecosystem Scientist			
On behalf of (organisation, company, government agency, etc.) – if applicable				
Organisation	Please enter the legal or registered name of your organisation or company. Chesapeake Bay Foundation			
Department	Environmental Protection and Restoration			
Position	Please indicate your position or function within your organisation or company. Manage the organization's efforts on important Bay species such as blue crab, oysters, striped bass, and Atlantic menhaden.			
Description	Please provide a short description of your organisation. Conservation organization dedicated to protecting and restoring the Chesapeake Bay			
Mailing Address, Country	3663 Marlin Bay Drive Virginia Beach, VA 23455			
Phone	Tel	+ (757) 622-1964	Mob	+ (757) 353-2687
Email	CMoore@cbf.org		Web	

Assessment Details	
Fishery	Atlantic Menhaden
CAB	Sam Dignan

Assessment Stage	Fishery	Date	Name of Individual/Organisation Providing Comments
<input checked="" type="checkbox"/> Information gathering and stakeholder meetings ¹ Opportunity to engage with and provide information to the CAB about the specific details and impacts of the fishery.	Atlantic Menhaden	4/5/18	Chris Moore/Chesapeake Bay Foundation

Nature of Comment (select all that apply)	Additional Information/Detail Please attach additional pages if necessary.
<input type="checkbox"/> I wish to request an in-person meeting with the site team during their assessment visit (meetings without the fishery client present may be requested at this phase of the process if desired).	See comments below.
<input checked="" type="checkbox"/> I wish to submit written information about the fishery and its performance against the default tree and/or RBF to the assessment team (please provide documents or references).	
<input type="checkbox"/> Other (please specify)	

On behalf of the Chesapeake Bay Foundation (CBF), I wish to provide the following comments during the Marine Stewardship Council's (MSC's) second public comment period for the assessment for Atlantic menhaden. CBF is the largest conservation organization dedicated solely to saving the Chesapeake Bay watershed. Our motto, **Save the Bay**, defines the organization's mission and commitment to reducing pollution, improving fisheries, and protecting and restoring natural resources such as wetlands, forests, and underwater grasses. CBF has more than 200,000 members who support the wise management of the region's living resources.

CBF members and staff have long worked for more conservative management of Atlantic menhaden (menhaden) in the Chesapeake Bay and along the entire Atlantic Coast due to several concerns that have long been identified about the population of menhaden in Chesapeake Bay and the impacts that the low numbers of menhaden have through the ecosystem. These concerns

¹ MSC Fisheries Certification Requirements, v2.0, section 7.8.4

are well documented and include the following:

- the Bay and its tributaries showing signs of low recruitment of menhaden for over 20 years;²
- the historical significance of menhaden as the dominant prey species in the Bay, though that distinction has diminished due to a decrease in population numbers;³ and
- indications of low striped bass survival in Chesapeake Bay (tag-based estimates and relative survival indices) were consistent with poor feeding success, nutritional condition, and forage availability.⁴

CBF strongly believes that a restored menhaden population will benefit both ecological and economic interests in the Bay region. A host of commercially and recreational important species such as striped bass (*Morone saxatilis*), bluefish (*Pomatomus saltatrix*), and weakfish (*Cynoscion regalis*) are dependent upon a healthy menhaden population for forage.

There have long been concerns about the industrial-scale harvest of menhaden in the Chesapeake Bay and in the coastal waters that surround the mouth of the Bay. The Chesapeake Bay serves not only as a primary nursery area for economically important species such as striped bass and menhaden, but also a fertile fishing ground for both commercial and recreational interests.⁵

Since CBF submitted its previous comments in August 2017, three important developments have taken place that should cause the certification process to pause until a clear path forward for how this fishery will operate under new ownership has become clear and the company ceases to oppose management decisions that have been adopted by the regional management organization to conservatively manage this shared resource thus protecting localized populations of menhaden and the various predators that are dependent upon them.

First, on October 6, 2017, Omega Protein, the original applicant announced the intended sale of the company to Cooke Seafood of New Brunswick, Canada.⁶ This sale raised significant questions for how the fishery may operate in the future as Omega Protein was a company that indicated it, "... develops, produces, and delivers essential nutrients like omega-3 fatty acids, dairy and botanical proteins, and antioxidant rich nutraceuticals to leading supplement and food manufacturers so people worldwide can lead healthier lives."⁷ The purchaser, Cooke Seafood is

² ASMFC, Special Report No. 83. Atlantic Menhaden Workshop Report & Proceedings, 2004

³ IBID

⁴ SEDAR. SEDAR 40 – Atlantic Menhaden Stock Assessment Report. SEDAR, North Charleston SC. 643 pp. available at: http://www.sefsc.noaa.gov/sedar/Sedar_Workshops.jsp?WorkshopNum=40. 2015.

⁵ Anstead, Kristen A. The Impact of Multiple Nursery Areas on the Population Structure of Menhaden. 2014.

⁶ Omega Protein. <https://omegaprotein.com/cooke-inc-agrees-acquire-omega-protein-corporation-22-00-per-share/>. Accessed 4/4/18.

⁷ Omega Protein. <https://omegaprotein.com/>. Accessed 4/4/18.

focused solely on aquaculture and wild harvest fisheries aquaculture.⁸ The sale closed on December 17, 2017.⁹

Next, in November 2017, the Atlantic States Marine Fisheries Commission (ASMFC) adopted Amendment 3 to the Fishery Management Plan for Atlantic Menhaden. After its passage, Robert Ballou chairman of ASMFC's Atlantic Menhaden Management Board stated, "Through adoption of Amendment 3 and the setting of the 2018 and 2019 TAC at a risk-averse level, the Board has demonstrated its continued commitment to manage the menhaden resource in a way that balances menhaden's ecological role with the needs of its stakeholders."¹⁰ Amendment 3 received overwhelming public support along the entire Atlantic Coast with over 158,000 comments being submitted.¹¹

Finally, due to opposition lead by Omega Protein (now Cooke Seafood), the Virginia General Assembly failed to adopt legislation necessary to implement changes in the Commonwealth's fishery management plan as required by Amendment 3. This will likely leave the state out of compliance with the coastwide management plan for Atlantic menhaden. This is especially concerning given that Virginia controls approximately 80% of the coastwide catch of menhaden and Omega Protein controls approximately 90% of the catch within the state.¹²

As indicated by Marine Stewardship Council (MSC), the Fisheries Standard is designed to assess if a fishery is well-managed and sustainable. Principle 3: Effective Management, is one of the core performance indicators for the MSC Fisheries Standard. For this standard, MSC indicates that "the fishery must comply with relevant laws and have a management system that is responsive to changing circumstances."¹³

On the coastwide scale, the menhaden fishery is managed by the ASMFC. This compact of the states serves as a deliberative body for Atlantic coastal states and two federal agencies to cooperatively coordinate the management of 27 nearshore fish species.¹⁴ As described above, ASMFC made changes to the coastwide management plan that sought to implement an improved balance between types and harvest jurisdictions while recognizing historic landings in the fishery. The amendment also updated the Chesapeake Bay Reduction Fishery Cap to reflect average landings over the last five years. This action was taken due to the importance of the

⁸ Cooke Seafood. <http://www.cookeseafood.com/about-cooke/>. Accessed 4/4/18.

⁹ Cooke Seafood. <http://www.cookeseafood.com/cms/wp-content/uploads/2017/12/Cooke-acquires-Omega-For-Immediate-Release-Dec-19-2017.pdf>. Accessed 4/4/18.

¹⁰ ASMFC. ASMFC Approves Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden. November 14, 2017.

¹¹ Ware, Megan. Atlantic Menhaden Draft Amendment 3 Presentation to the Menhaden Management Board. November 13, 2017

¹² Appelman, Max. Revised Preliminary Atlantic Menhaden 2018 Quota Allocations, Accounting for Redistributed Relinquished Quotas. ASMFC Memorandum. December 6, 2017.

¹³ MSC. <https://www.msc.org/about-us/standards/fisheries-standard/msc-environmental-standard-for-sustainable-fishing>. Accessed 4/4/18.

¹⁴ ASMFC. <http://www.asafc.org/about-us/program-overview>. Accessed 4/4/18.

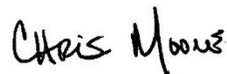
Chesapeake Bay as nursery grounds for many different species including menhaden and striped bass.

Instead of embracing these modest changes to the management plan which resulted in Omega Protein being able to harvest more fish on a coastwide basis and continue their harvest in the Chesapeake Bay at recent levels, the company strongly advocated for the rejection of the management changes adopted by ASMFC at the state level. By successful advocating against the adoption of legislation necessary to implement these changes and therefore being out of compliance with the coastwide fishery management plan, it is obvious this fishery does not meet Principle 3 of the MSC certification process.

During the first comment opportunity, CBF indicated that it does not believe certification is appropriate at this time due to a host of factors including the lack of Bay-specific population data, localized depletion concerns, and the current population estimate so far from an appropriate target for LTL species. With the additional uncertainty that has developed with the sale of Omega Protein to Cooke Seafood and its objection to changes in the management plan adopted by ASMFC in November 2017 that were overwhelmingly supported by the public and the states along the entire Atlantic Coast, CBF believes that MSC certification of the menhaden reduction fishery along the Atlantic Coast is inappropriate at this time and would set precedent that could jeopardize the value of the entire MSC process in the future.

Thank you for your consideration of these comments. If you have any questions, please contact me at (757) 644-4109 or cmoore@cbf.org.

Sincerely,



Chris Moore
Senior Regional Ecosystem Scientist
Chesapeake Bay Foundation

Assessment Team response – Submission 2:

The general points raised by the stakeholder have already been considered in the drafting of this report and in the respond to this stakeholder’s initial submission above. The three additional points raised by the stakeholder in this submission are responded to below in blue. The 3 additional points raised are:

1. The sale of Omega Protein to Cooke Seafood
2. The adoption of Amendment 3 to the Atlantic Menhaden FMP.
3. Virginia’s failure to implement changes as required by Amendment 3.

1. The sale of Omega Protein to Cooke Seafood

While the sale has been recorded for information purposes, and considered in relevant sections (e.g. Traceability, UoA/UoC etc.), the acquisition by Cooke Seafood of Omega Protein, including the perceived differences in visions (i.e. nutraceuticals V aquaculture), does not necessarily alter the fisheries conformance or non-conformance to any of the requirements of the MSC FCR v2.0.

2. The adoption of Amendment 3 to the Atlantic Menhaden FMP.

The adoption of Amendment 3 has been considered and addressed throughout this report.

3. Virginia’s failure to implement changes as required by Amendment 3

Despite two meetings of the ASMFC Menhaden Board, to date there has not been a finding of non-compliance against the Commonwealth of Virginia related to Amendment 3. Should a finding of non-compliance be made, the Assessment Team will consider the specifics of the finding and whether or not it impacts the fishery’s compliance with the MSC FCR v2.0; note most likely this would take place under Principle 3 PI 3.2.2 and PI 3.3.3.

Friends of the Wicomico River

Email 1:



Thu 08/02/2018 23:49

foragematters@aol.com

Omega Protein/ Cooke Industries certification process

To ■ Samuel Dignan

Cc □ notnedrc@gmail.com

i You replied to this message on 09/02/2018 17:33.

Mr Dignan ..I am a member of Friends of the Wicomico River , a group located near the Maryland Chesapeake Bay . We are about twenty miles north of the boundary line of the State of Virginia portion of the Chesapeake Bay. It is in the Virginia Bay and Atlantic coastal waters that Omega harvests over 150,000 mt of menhaden annually . We believe there is scientific proof that this overharvesting of menhaden has had, and continues to have dire consequences for our Bay fish and wildlife . The first proof is the State of Maryland seine surveys for juvenile menhaden which have been a rock bottom levels for more than fifteen years . The unrestricted harvest of the spawning stock by Omega (over 5,000 schools of adult menhaden) is creating a terrible loss of the eggs which should be hatching offshore and flowing in to the Bay .

The second reason the Omega catch is overfishing as far as the Maryland Chesapeake Bay is concerned is that very few of the adult menhaden schools are reaching Maryland . Studies of the decline in menhaden of the diet of our iconic rockfish have shown diet decreasing from 70% to 8% for menhaden.Source Chesapeake Bay Foundation . See Maryland DNR Performance Report for Federal Aid Grant F-63-R , Segment 6.

We believe landing data reported to the NOAA facility in Beaufort , North Carolina , by Omega Protein will show steadily decreasing catches in the Virginia Chesapeake Bay which would be an indicator of overfishing and declining stocks . However this information is kept on a confidential usa government site. The gatekeeper is Ray Mroch , an employee of NOAA. Ray.Mroch@noaa.gov . We belief release of this information is critical and would show overfishing is occurring . Of course Omega can authorize release of the information. There is a comprehensive article of the Virginia snapper rig fishery which has a lot of information on the reduction catch in the Virginia Bay through 2009 in a journal article The Bait Purse Seine fishery for Atlantic Menhadenpublished in the Marine Fisheries Review. We are told from a confidential source who would absolutely know the truth that 10-15 years ago Omega caught 80% of their quota in the Virginia Bay , now they are catching 20%, as the fish have disappeared . The Maryland Bay fish and wildlife are suffering from starvation because of the huge volume of menhaden being taken from the food chain..a terrible outcome which Marylanders have very little , if any , power to change.

I would like to document this information and supply more ...this is being done in a rush .. Thomas Lilly

Email 2:



Mon 12/02/2018 16:31

foragematters@aol.com

Re: Omega Protein/ Cooke Industries certification process

To ■ Samuel Dignan

Sam... I spoke to the ASMFC Policy Board at the midwinter meeting in Arlington Virginia last Thursday ,on the topic of protecting the Atlantic menhaden spawning stock and the importance of public access to Omega's past captain's logs reporting the daily factory fleet catch to the Beaufort NOAA lab .. I have received and will forward an email from Ray Moroc , the NOAA gatekeeper for these records , who explains in detail the record keeping and confidentiality aspect. Protection of the spawning stock has been employed for many years in the New England herring fishery under ASMFC Amendment 3 to that fishery, if this were used for the menhaden it could be very benifical to all . Did you get the email asking for a timetable of the certification process and the requirements for certification. Could you please send that material ? Tom Lilly

Forwarded email:

Mon 12/02/2018 16:33

 foragematters@aol.com

Re: access to menhaden fisheries information

o Samuel Dignan; notnedrc@gmail.com

-----Original Message-----

From: Ray Mroch - NOAA Federal <ray.mroch@noaa.gov>

To: foragematters <foragematters@aol.com>

Sent: Fri, Feb 9, 2018 3:30 pm

Subject: Re: access to menhaden fisheries information

Hi Mr. Lilly,

The most effective way for me to answer your questions regarding the details of our sampling program is to refer you to sections 3.1 and 3.5 of the Atlantic Menhaden stock assessment (http://www.asmf.org/uploads/file//5a4c02e1AtlanticMenhadenAmendment3_Nov2017.pdf). In it the basic description of the data collected and how it is used is available.

There are three sources of information: the Captain's Daily Fishing Reports (CDFR), reported landings, and our biostatistical database.

For the CDFRs, they record the date, time, location, and amount of harvest as well as some environmental factors. All of these data are confidential and no record is made of the proportion of the school caught nor the maturity state of the fish harvested. This is done on-board, with the best estimate of the weight of fish captured.

When the vessel returns to port, they unload and record the landings and make them available to me. The landings are used to corroborate the estimates of catch at the various locations and this combination is what goes into the quota monitoring efforts for the Chesapeake Bay cap and for the coastwide TAC.

In port, our port sampler selects a random vessel and takes a subsample from the hold for age estimation. Ten fish are selected per vessel, the plant, vessel, location and date of harvest are recorded (all of these data are confidential) and then the fish are measured by fork length to the nearest mm and weighed to the nearest g and their scales are removed and mounted. The scales are sent to me and a technician enters the data and estimates their age. I write a monthly report that includes the best estimates of the age structure of the harvest and is published on the Fishery Market News website if you're interested in keeping track of that. We do not record maturity or spawning stage of the samples. The appropriate data for use in quota monitoring is shared with ASMFC and the various states that request it for fisheries management purposes. They (ASMFC and the various states) publish summarized data in their reports that should maintain confidentiality.

Data confidentiality is quite important, and I get requests for confidential data from universities occasionally. The protocol for that is to discuss whether this can be done with public data or to request from the companies permission to share the data. Then it is up to the company's discretion to share or impose conditions on the sharing of the confidential data.

I do not receive officially any spotter pilot logs, so I have no way of ground-truthing their estimates. It can be a problem, since they're seeing a 2-dimensional representation of a 3-dimensional shape. That's part of the reason for our research effort I discussed with you. It's generally discussed, though, that rarely is a whole school caught with a purse seine because of the size of the school would make net damage more likely.

There were quite a few questions in there, so I hope I have adequately addressed them. Please let me know if you have more or need clarification.

Ray

Stakeholder’s original email to Ray Mroch (included for context)

On Fri, Feb 9, 2018 at 12:18 PM, <foragematters@aol.com> wrote:
 Ray.. Yesterday I had an opportunity to speak to the ASMFC Policy Review Board on the subject of protecting spawning menhaden in the Atlantic Ocean . It would be useful to the scientists and the public if they had access to the records from NOAA Beaufort as to where and when the schools of menhaden are caught and their condition as to spawn when caught . This information we believe could be helpful in proposing possible solutions to the chronic problem of low recruitment in the Chesapeake Bay.
 As the gatekeeper of this information could you please answer a few questions about it ? Can you describe what types of information is recorded from the reduction fleet and the snapper rig boats ? Please advise where this information is recorded and which information is considered confidential and which is not. For example the date of the catch , gps location , size and general age of the school caught , the condition or stage of spawn of the school caught , whether the entire school was caught or just a partial school , etc. ? In addition , the spotter pilot logs showing the dates and gps location of the various schools observed and their characteristics of size and age and whether the school observed was caught ? In addition , observations as to the accuracy of the spotters estimate of the size or weight of the school vs the actual weight of the school (or estimate) at the ship or dock ?
 On a different topic , can you either describe or give us a link to a description of the inspection process of the catch by your NOAA agent at the Reedville docks (or other landing points) ? Finally, can you describe, what agencies you send the compiled information to and whether any of the information is published and available to the Public . Are you aware of instances in the past where the information we have been referring to was released for scientific research purposes to either private or government researchers or to wildlife or conservation organizations ? Many thanks
Thomas Lilly for Friends of the Wicomico River

Email 3:



Mon 19/03/2018 13:55

foragematters@aol.com

Omegs

To ■ Samuel Dignan

Cc □ notnedrc@gmail.com

i You replied to this message on 22/03/2018 11:20.

Sam can you tell us when the public comment period expires here , the name of the Organization that does the certifying and a link to their standards , definitions and process . Is you company the agent for Omega in this process ?

Assessment Team response:

 Thu 22/03/2018 11:20
Samuel Dignan
RE: Omegs

To foragematters@aol.com
Cc notnedrc@gmail.com

Message  MSC Announcement of additional stakeholder comment period ATL menhaden (...pdf (232 KB))
 MSC_FCR_v2.0.pdf (6 MB)

Dear Thomas,

Firstly, I presume this email is from is Thomas so I will address it as such. if it's not I apologise. Can I just get you to confirm that you received the Stakeholder Notification of Revised Indicative Timeline and additional stakeholder comment period sent on March 7th that way we can be sure you are getting the necessary notifications and documents.

I've broken your email in 4 questions:

1. When does the public comment period expire?
2. The name of the Organization that does the certifying?
3. A link to their standards, definitions and process?
4. Is you company the agent for Omega in this process?

When does the public comment period expire?
As mentioned in the notification attached to that email (attached again here) this particular comment period ends on April 5th 2018. After that there will be further comments which we will keep you informed of.

The name of the Organization that does the certifying and Is you company the agent for Omega in this process?
We (SAI Global) are the Organization that does the certifying. We are not an "agent" for Omega but just to be completely up front Omega is paying for the assessment. I think it might also be helpful if I clarified our (SAI Global's) role in the MSC process.

SAI Global is an independent third party Certification Body whose role it is to assess applicant fisheries (in this instance the menhaden fishery) against MSC requirements. Our application of the MSC Requirements must follow a set of defined processes and our work is subject to rigorous review through MSC's internal technical oversight mechanisms and regular audits by MSC's accreditation body ASI. So basically what this means is that we have no role in developing the requirements with our role being limited to assessing the fishery against set criteria using set processes with our work then being subject to scrutiny from peer reviewers (for full assessment reports), stakeholders, MSC and ASI.

To familiarise yourself with the various roles of everyone in the MSC process I suggest you take a look around the MSC website: <https://www.msc.org/>

A link to their standards, definitions and process?
Pretty much everything you could ever want to know about the MSC is on their website. In terms of Standards and process the most important document is the FCR see attached. The first part is process requirements and there is also certification requirements and guidance in there (be warned it's not light reading).

Anyway hope this clarifies things a bit,

Sam Dignan
Fisheries Scheme Manager
SAI Global/Global Trust

Email 4:


Mon 02/04/2018 01:36
foragematters@aol.com
Re: Omega Protein

To  Samuel Dignan

 You replied to this message on 04/04/2018 17:40.

sam question... we have the " Template for Stakeholder Input into MSC Fishery Assessments " Is SAI GLOBAL the conformity assessment body CAB for this ? Is the form to be filled out and sent in on line ? If so , how do we do that ? If not how are we to fill out these forms and how do we get them to you ? Is it possible to get a two week stakeholder reply extension ? What is the time (EST USA) on April 5 that we would need to file these ? can it be done by fax? ...please let us have the fax number. Thanks Thomas Lilly

Email 5:


Mon 02/04/2018 16:10
foragematters@aol.com
Omega Protein two today...

To  Samuel Dignan

 You replied to this message on 04/04/2018 18:00.

Sam.... can you help me out with a few answers

the MSC website under " What is sustainable fishing? " item 2 " minimizing environmental impact" refers to managing the fishery to avoid impacts on other species " at the section " MSC Fisheries Standard " Principal 2 also refers to the function and diversity of the environment...it says " to determine if each and every principal is met , the MSC Fisheries Standard comprises 28 performance indicators ." Can you provide a link to these indicators ? Are there other standards or indicators that apply to protecting spawning fish or spawning locations , required information to be found and kept by the fishery about the spawn condition of the schools caught and knowledge of the number and location of schools caught before they spawn the first time ?

Does SAI Global interpret or apply the MSC requirements to work in conjunction with the guidelines or policy of the local regulator of Atlantic Menhaden, which in the case is the Atlantic States Marine Fisheries Commission (ASMFC) and the States of Maryland and Virginia . To be specific in the ASMFC section Fisheries Science 101 under "Integration into Management " it is said ; " Overfishing is said to be occurring if fishing is negatively affecting the stock through reduced growth and/or recruitment " Under " Life History Information " reference is made to protecting the spawning stock and not harvesting fish until they have spawned at least once ' Are these concepts and policy the same or similar to those of the MSC ? Where are they found in the MSC policy or guidelines ?

Finally , the significant fisheries dependent information relevant to the chronic low levels of menhaden recruitment in the Maryland Bay is the knowledge Omega Protein has after decades of catching these menhaden schools in the Atlantic of the percentage of the schools caught that are pre spawn , are spawning and/or have spawned and the date and location of these catches . Will Omega Protein release that knowledge and information ? Has Omega Protein being conducting laboratory studies over the years relevant to these issues ? Will Omega release that knowledge and information for the benefit of Bay science and the public ? Have or will they released it to SAI ? Has Omega released information on the number of schools of juvenile menhaden caught as they migrate from the Bay in the *Fall and information as to the schools of menhaden caught before they have spawned one time* ?

Can this email be made part of the record in this assessment , is so , please do so . Sincerely Thomas Lilly...Friends of the Wicomico River , Whitehaven, Maryland 21801 USA

Email 6:

 Wed 04/04/2018 02:33
foragematters@aol.com
Omega Protein

To  Donna Sweeney;  Samuel Dignan;  notnedrc@gmail.com

To Donna and Samuel

At this point I have become very concerned and frustrated due to lack of response I have had to my questions about how to participate in this process as a seeming deadline you set for stakeholder comment is said to be expiring on April 5 .

My first knowledge of the Omega Protein assessment for certification by MSC is your notice dated March 05, 2018 . Even though I attempted to get information about this process I have not been successful . Your Notice does not inform as to the stage of this proceeding , I do not know if there has been a Draft report , I do not know what issues are relevant at this time and I have not been able to determine from the MSC website what their requirements or standards are for certification. See my email of 4/02/2018 addressed to SIA which has not been responded to. I was referred to the Stakeholder Template which I found to be completely confusing with questions directed to assessment trees and other matters that had not been explained . This so called template had no instructions on how it functioned and we were not able to get it to function . I sought assistance in my email to SIA 4/01/2018 has also not been answered.

I am once again asking for assistance in this process and that my questions be answered so we can move on to having a reasonable opportunity to participate in this important process . Thomas Lilly

Assessment Team response:

Assessment Team (Sam Dignan) spoke to stakeholder on phone and advised how to make written submission.

Email 7:



Fri 06/04/2018 03:40

foragematters@aol.com

Omega Protein certification for sustainability

To ■ Samuel Dignan

 You replied to this message on 06/04/2018 09:18.

Message

 Scan_0003.pdf (2 MB)

Sam : Thank you for the discussion .This will confirm your agreement that this will be made part of the record without being in the template form..which we found was not functional. We oppose an Omega Certification .

It is our position that the chronically low menhaden recruitment in Chesapeake Bay is due to the intense fishing by Omega Protein . First , to the scientific evidence . We attach the 2017 Maryland Bay seine survey . Here we see consistently low recruitment for over twenty years.

The ASMFC Fisheries Science 101 states " Overfishing is said to be occurring if fishing is negatively affecting the stock through reduced growth and/or recruitment " . Please note the definition does not require fishing be the sole cause of the low recruitment to constitute overfishing .

A number of research papers have cautioned that the large scale taking of the new juveniles as well as the continued taking of the three year old menhaden in and near Virginia has caused a diminishing number of year three spawners directly and indirectly . These are the older more prolific spawners that are considered essential to a healthy spawning stock (Vaughn) This combination has been proven to have a negative effect on recruitment . (Vaughn-conclusion , p 56) The latest percentage by age charts of the reduction fishery from Beaufort NOAA show that only 5% of the Omega catch is age 3 plus fish .(NOAA 2017 report-age composition chart attached) What does this figure mean in real terms ? Omega catches 150,000mt of menhaden , year in and out . These schools average 25mt , that is 6,000 schools of menhaden , five percent is 300 schools of prime three year spawners . It is well known that the spotter pilots and factory ships try to target these large schools of valuable older oil rich fish . There are at least five of these ships and many spotter pilots hunting down these schools as they migrate from New Jersey or the Carolinas toward Virginia . They fish up to 150 days a year . There is no closed season for the menhaden , no restriction on catching the spawning fish,no restriction on catching fish before they spawn once .These are very large schools of fish that move only 20-30 miles a day as they migrate toward the Chesapeake Bay . The Omega pilots have no problem finding and pinpointing each and every one of these schools of age three menhaden for the factory ships to catch. We are very troubled by the fact that Omega could be catching 80% to 90% or more of these 300 schools of age three spawning fish . We submit this is a direct cause of the lack of juvenile menhaden in the Bay , year after year .

Where is the evidence this is happening , where is the truth ? Only Omega Protein knows in detail ,from their pilots and captains ,who have caught these schools of fish for decades , where , when and in what number these schools of age three menhaden are caught . Only Omega knows the stage of spawn of these caught schools . Even if you may not consider the requested information relevant , if you doubt a spawning stock- recruitment relationship, it is highly relevant to stakeholders , reviewing scientists and future peer reviewers who advocate for a spawning stock-recruitment relation and without it you would be depriving them of the opportunity to build a factual argument to support their views and perhaps to convince you that their position is correct . In short each side has the absolute right to a fair adjudication by SAI Global or other certifiers based on all the facts not just the facts selected by Omega Protein . That is the very foundation of equal justice and due process. We suggest that unless Omega produces this missing information and data the Certificate should be denied .No scientifically defensible decision can be made on the Certification issues or the question of spawning stock-recruitment or depletion of spawning stock without obtaining Omega's knowledge of these essential facts .

I realize that you may subscribe to the school of thought that denies the spawning stock-recruitment relationship . If that is the case we submit you still have an obligation under the MSC rules of full disclosure and transparency and your obligation to pursue this investigation with diligence and in good faith to obtain the Omega knowledge and data that we just we discussed .

In support of the spawning stock-recruitment relationship I attach a section of an interview with Dr. Ed Houde , from the University of Maryland Center for Environmental Science (UMCES) stating that there is a direct relationship between the spawning stock and recruitment and the fishing by Omega . He says that limiting the reduction fishery is the one parameter we can control (Chesapeake Quarterly) Dr, Houde is considered one of the most respected menhaden scientists on the Chesapeake Bay. Also the Comments of Ken Hinman at the ASMFC Board meeting in Alexandria Virginia August 2, 2011 . Ken is now the Executive Director of Wild Oceans , a national conservation group.

There is another element here which supports a spawning stock-recruitment nexus and discounts the lack of connection . If we return to the table on the Maryland juvenile menhaden indexes we see a very low consistent flat line for the last twenty years . The Vaughn article states one would expect to find large variations in numbers from year to year if the cause of low recruitment was environmentally driven . . Therefore , we submit that the consistent pattern of low recruitment in the Chesapeake is not due to environmental causes but is due to a consistent continuing cause .. the only factor that is in that category is Omega's consistent catching of the migrating schools of year one menhaden and three year old class fish--that is overfishing which severely limiting the food supply of the wildlife of the Chesapeake Bay .fish and other wildlife. Google . Dr. Brian Watts .Center for Conservation Biology , William and Mary , Osprey Watch.

Science and scientific formulas do not consider fairness and equity . Recently a majority, but not all , of our regulators refused to heed the calls for reform from over a hundred thousand concerned citizens and hundreds of conservation groups that wanted a fair share of the menhaden in Chesapeake Bay to be allocated to wildlife and not to the factory. They wanted ten years of foot dragging to end ... Many of the regulators are good highly qualified , sincere people . However there is an element that is only self interested that ignores the positive reforms that are sweeping many of the world fisheries when there can be transparency , where science and the public have access to the truth and the details of the catch , where industry accurately reports the catch and allows observers and where scientists are tasked to recommend solutions to problems that are acted upon in an unbiased way . We have a long way to go in the menhaden fishery to achieve change but I believe change will come if we can find a way.

Thank you for considering these comments.....please keep us advised whether Omega will or will not produce the requested data and knowledge we say is necessary . Please advise of the next step in this process .and when the record will be made public .
Thomas Lilly for Friends of the Wicomico River . 23489 Mezick Rd., Tyaskin , Maryland 21801 USA

Attached scanned document:

ASMFCA MENHADEN BOARD
MEETING ALEXANDRIA VA 8/02/11

The Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission convened in the Presidential Ballroom of the Crowne Plaza Hotel Old Town, Alexandria, Virginia, August 2, 2011, and was called to order at 4:15 o'clock p.m. by Chairman Louis Daniel.

recruitment over the past decades has likely been influenced by the condition of the menhaden spawning stock during that period; and (B), an increase in spawning stock with a more balanced age structure would substantially improve the chances for good recruitment events in the future.

CALL TO ORDER

CHAIRMAN LOUIS DANIEL: If I could have the Atlantic Menhaden Board to the table, we will begin in board deliberations. Good afternoon; I'm Louis Daniel. I am the chairman of the Atlantic Menhaden Board. I took over for an early departed George Lapointe who we all miss and wish well.

Now, I have submitted a paper, "Spawning Stock Recruitment and Rebuilding", that has been circulated and I hope you will all take a look at that at your leisure, but it cites the scientific basis for these assumptions. I do want to make a quick summary, though, for the purposes of this meeting.

APPROVAL OF AGENDA

CHAIRMAN LOUIS DANIEL: You've got an agenda. I'd like to try to stick to the agenda and try to go as quickly as we can. Are any board members aware of any other business that I need to be aware of at this time? Okay, if not, we have got an agenda.

The UN Food and Agricultural Organizations Manual for Stock Assessments advises that unless it is scientifically demonstrated that there is no stock-recruit relationship, such a relationship should be assumed to exist even if the data are ambiguous. The data for menhaden, if ambiguous, definitely do suggest a relationship. The paper points out that the current period of prolonged poor recruitment has coincided with both the steep decline in numbers of spawning-age fish and a change in the age structure; that the stock depends almost entirely on young, first-time spawners for reproduction; fish that have little chance for repeat spawning; that older, larger female menhaden produce more eggs than younger, smaller fish, perhaps as many as ten times more.

APPROVAL OF PROCEEDINGS

CHAIRMAN LOUIS DANIEL: The proceedings from your March 21, 2011, meeting, I would like to accept those by consensus if there is no objection. Seeing none, we will move on.

They have a longer spawning season and they distribute their eggs over a larger geographic area. Their larvae are more viable because they devote more energy to reproduction then to growth. Older spawners can outlive periods unfavorable to recruitment and take better advantage of more favorable conditions.

PUBLIC COMMENT

CHAIRMAN LOUIS DANIEL: At this point I'm going to ask for public comment, but I'm going to remind the public that at this public comment period we will be only taking comment on issues that are not on the agenda. I have a list of folks that would like to speak, and I'm assuming that those comments are going to be on issues not on the agenda. If you do want to speak about Addendum V, you will have that opportunity after the board deliberates on the discussions. With that said, the first person I have signed up to speak is Ken Hinman.

Not surprisingly, Quinlan et al, in looking at menhaden hypothesize that a healthy menhaden spawning stock with a well-balanced age structure under favorable environmental conditions for recruitment substantially increases the odds of higher recruitment events and stronger year classes. They also believe that age distribution of adults may influence the supply of larvae to particular estuaries.

MR. KEN HINMAN: Thank you, Mr. Chairman and Board. Following the 2010 Menhaden Stock Assessment, the SEDAR 22 Review Panel recommended that alternative reference points be considered to provide better protection for the spawning stock or population fecundity. After reviewing the stock assessment report and the scientific literature on menhaden and the stock-recruitment relationships in marine fishes, we find that there is strong support for assuming that (A), low

Menhaden larvae that enter Chesapeake Bay, for instance, the nursery for up to 40 percent of the east coast menhaden, are supplied primarily from spawning to the north of the Mid-Atlantic Bight;



United States Department of Commerce
 National Oceanic and Atmospheric Administration
 National Marine Fisheries Service
 NOAA Beaufort Laboratory
 101 Pivers Island Road
 Beaufort, NC 28516 USA
 December 6, 2017

MEMORANDUM FOR: Industry Members, State, and NOAA Fisheries Personnel with Special Interest in the Menhaden Fisheries

FROM: Ray Mroch

SUBJECT: Status Purse-Seine Landings of Gulf and Atlantic Menhaden for the 2017 Fishing Season

Preliminary landings for the 2017 gulf menhaden purse-seine fishing season and landings for the Atlantic menhaden purse-seine landings through November 30, 2017. All landings are for reduction and expressed in thousands of "standard fish"^{1,2} and metric tons (also for 2016 and 2012-2016 five-year average for equivalent time):

		<u>2017</u>	<u>2016</u>	<u>Change</u>	<u>5-year average³</u>	<u>Change</u>
<u>Gulf Menhaden</u>						
Moss Point, Empire, Abbeville combined:	Total Standard Fish:	1,515,983	1,598,741	-5.2%	1,638,212	-7.5%
	Total Metric Tons:	460,707	485,857		497,853	
<u>Atlantic Menhaden</u>						
Reedville	Total Standard Fish:	405,204	436,676	-7.2%	456,799	-11.3%
	Total Metric Tons:	123,141	132,706		138,875	

¹ To convert to pounds, multiply by 670

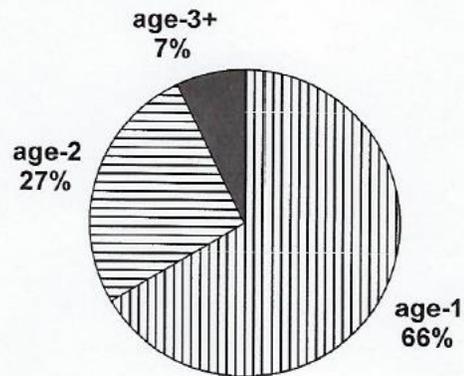
² To convert to metric tons, multiply by 0.3039

³ Gulf values include landings at the factory in Cameron, LA, which closed in December 2013

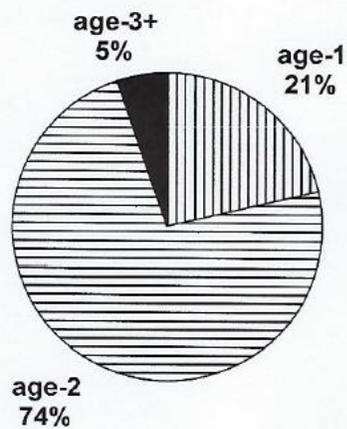
14

Age Composition of 2017 Menhaden Port Samples to Date

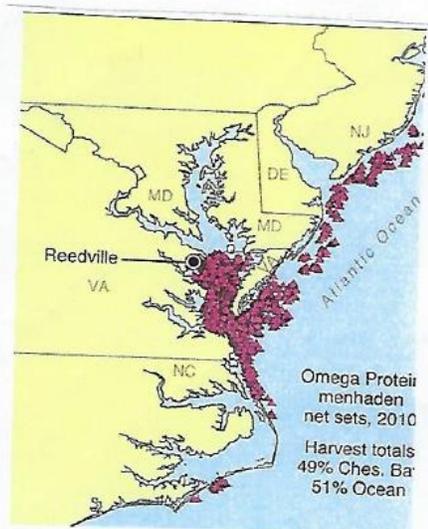
Gulf Menhaden (n = 2,635)



Atlantic Menhaden (n = 648)



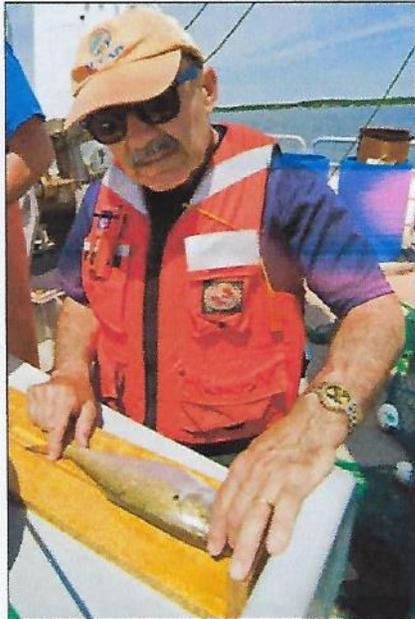
15



1/8/2018

Chesapeake Quarterly Volume 10 Numbers 2 & 3: Food Fish Fight: Where Have All the Menhaden Gone?

Azores Highs also help raise recruitment levels for spot and summer flounder, two other Bay species that spawn in coastal shelf waters during winter months.



Ed Houde measures one of the 9 adult menhaden found on the Choptank cruise. The Patuxent River cruise netted 45 juvenile and 280 adult menhaden. Photograph by Michael W. Fincham.

Which brings us to a paradox in the menhaden puzzle: A good year for menhaden arrivals may be a bad year for menhaden survivals. Warm, dry winter patterns created by Bermuda-Azores Highs bring more menhaden into the Bay, but cold, wet winters with high springtime runoff seem to supply the most food.

There's a second paradox. Good years for new menhaden are usually bad years for new stripers. And vice versa. Cold winters and wet springs often lead to a lot of new stripers, but they usually disrupt the influx of new menhaden. With this see-saw pattern at work, high populations of stripers will never match up for long with high populations of menhaden, their favorite food fish.

Surprisingly, this negative see-saw pattern that Wood discovered also holds true for other species: A year of high influx for shelf-spawning fish like spot and summer flounder is usually a year of low influx for other Bay-spawning fish like white perch, alewives, and blueback herrings.

So where have all the menhaden gone? There's no simple answer, but there are some emerging hypotheses, none of them very hopeful. Long-lasting trends in the Atlantic Multidecadal Oscillation have led to fewer Bermuda-Azores Highs, to fewer warm, dry, late winters, and to fewer large influxes of menhaden larvae into the Chesapeake. Those trends may be changing, but they shift slowly. Over decades.

An even less-hopeful hypothesis, according to Houde, suggests that the large-scale climate pattern called global warming may have encouraged menhaden to spawn in waters farther north from the Bay, making it less likely large numbers of larvae will make the trip down to the Chesapeake. Recent surveys show higher numbers of new menhaden arriving in estuaries north of the Bay.

For Chesapeake Bay larvae, offshore winter weather patterns seem to control their arrivals, and springtime runoff events seem to control their survivals. Global warming, offshore winter patterns, springtime runoff events — none of these forces can be controlled by changes in fishery management. But they can be mitigated or magnified.

There's no easy advice in Houde's work on how to improve menhaden recruitments into the Chesapeake. The only thing that can be controlled in the meantime is the commercial harvest, and that harvest probably does have an effect, according to Houde. "If not enough eggs are being produced now to get high recruitments," he says, "that could be a reason for the low recruitments we are seeing. It may play a role."

A cutback on commercial harvests could lead to more spawners setting more eggs and larvae adrift in the coastal ocean. Increasing spawning far out in the ocean seems a small step to take in the face of events as powerful as climate, weather, and freshwater flow. But Houde still stresses, "You want more eggs to ensure more recruits." In a boom year these extra eggs and larvae could magnify the size of a large year class. In low years, cutting back on harvest could help sustain a spawning stock until all those larger environmental forces line up.

These small steps become even more important, says Houde, just when all those large-scale forces are so out of sync. That may be the final paradox in the menhaden puzzle.



<http://www.chesapeakequarterly.net/V10N23/main1/>

6/7

Assessment Team response – Email 7:

Salient points raised by the stakeholder are responded to below in blue.

Many of the issues raised by the stakeholder have already been considered in the drafting of this report. The main raised by the stakeholder in this submission have been extracted and are responded to below in blue; those main points:

1. The chronically low menhaden recruitment in Chesapeake Bay is due to the intense fishing.
2. Non-disclosure of historical data by Omega Protein.
3. Whether or not there is a spawner-recruit relationship for Atlantic menhaden.
4. Non-adoption of ‘rule of thumb’ ERPs as part of Amendment 3 to the Atlantic menhaden FMP.

The chronically low menhaden recruitment in Chesapeake Bay is due to the intense fishing

Issues raised include the concern that fishing has caused diminishing numbers of Age 3 spawners.

The stakeholder uses publically available data and a number of assumptions to arrive at the conclusion that Omega catches 80% to 90% or more of 300 schools of age 3 menhaden annually thereby directly causing the lack of juvenile menhaden in the Chesapeake Bay. The Assessment Team is not disputing the fact that this might well be the case but it should be pointed out that the Atlantic menhaden stock is extremely large and any figures must be viewed in the context of the total biomass of menhaden.

Again using publically available data, the base run of the 2017 menhaden update stock assessment estimated the 2016 biomass of Age 3+ menhaden to be 255,000 mt (Age 3: 122,500 mt; Age 4: 45,500; Age 5: 34,400 mt; Age 6+: 52,600 mt). In addition, the 2017 menhaden forecast reports total reduction catches in 2016 as being 137,393 mt of which 24% (i.e. approx. 32,974 mt) was aged 3 or more. Therefore, according to those publically available data, approx. 12.9% of the total estimated biomass of Age 3+ menhaden was landed by the reduction fishery in 2016 (or looking at the reverse 87.1% was not landed and was left in the sea to reproduce and fulfil its wider ecosystem role).

In addition and as noted in response to other stakeholder submissions, the Maryland survey data shows previously high indices for menhaden in the 1980s coinciding with a period where average menhaden reduction landings within the Bay were likely >3x the current Chesapeake Bay cap. Therefore, the available evidence would indicate that in the past the Bay has sustained greater abundances of menhaden against the backdrop of reduction landings far in excess of current values. Additionally, the menhaden fishery does not land substantial amounts of age-0 menhaden and consequently is not likely to be a cause of low abundances of age-0 menhaden or a contributor to “localized depletion” of menhaden in Chesapeake Bay (ASMFC, 2012; MDSG, 2009).

It is likely therefore, that factors other than the menhaden reduction fishery are contributing to the continuing low numbers of menhaden being observed in the Bay such as offshore processes (SABRE, 1999; Lozano and Houde, 2013; Buchheister et al., 2016), primary production and phytoplankton biomass, and environmental conditions including decadal variability and potential two regime shifts (Wood, 2000; Austin, 2002; Wood et al., 2004; Kimmel et al., 2009; Wood and Austin, 2009; Buchheister et al., 2016).

Non-disclosure of historical data by Omega Protein

Sufficient information is already available to ASMFC and NMFS to assess the status of the menhaden stock on an on-going basis. In fact the level of fishery-dependent data available in relation to this fishery is one of its strengths. While any additional formation would of course be useful and desirable neither SAI Global nor its Assessment Team can compel Omega Protein to release data above and beyond their statutory reporting requirements

including the kind of data mentioned by the stakeholder in their submission. It should be noted that only publically available data have been used in the scoring of this fishery.

Whether or not there is a spawner-recruit relationship for Atlantic menhaden.

There continues to be much debate about the strength of any stock-recruit relationship for Atlantic menhaden. With that being said there is no doubt that there is at least some degree of inter-relatedness between spawning stock size and recruit. To put it simply, if there were no spawner then there could not be any recruits. The debate therefore is around whether or not there is enough of a relationship such that the stock should be managed on that basis or whether there other drivers that are more important determinants of recruitment? It is important to note that while it is not SAI Global's role to get involved in this debate we do, and will continue to, assess any decisions made by management in this regards against the relevant MSC requirements. Deyle et al., (2018), which is open source and available at the below address also represents a relatively recent addition to the evidence base for this issue: <https://onlinelibrary.wiley.com/doi/full/10.1111/faf.12287>

Non-adoption of 'rule of thumb' ERPs as part of Amendment 3 to the Atlantic menhaden FMP.

With respect to the continued use of single species reference points and the non-adoption of any of the 'rule of thumb' ERPs in Amendment 3, the Assessment Team have considered this extensively throughout the report. As a result the Team have concluded that the current harvest strategy is not designed to take into account the ecological role of Atlantic menhaden and is not responsive to the state of the menhaden stock with respect to its role in the U.S. Northwest Atlantic ecosystem. In response to this finding the Team has raised two Conditions and the Client has responded detailing how and when this deficiency in the fishery will be assessed (see [Appendix 1.3 Conditions](#)).

Menhaden Conservation Project

Email 1:

For context the below email was received following a joint conversation with Benson Chiles and Prof. Jerry Ault.



Tue 18/07/2017 22:01

Benson Chiles [REDACTED]

Re: MSC menhaden review

To Ault, Jerald Stephen

Cc Samuel Dignan; Ivan Mateo; Robert Allain

i You replied to this message on 19/07/2017 09:17.

Message  Fisheries_Standard_v2.0.pdf (3 MB)

Indeed, thank you Ivan and Sam for your time today. Good talking with you and I look forward to ongoing conversation about this assessment.

Sam, by way of follow-up, attached is the Fisheries Standard and Guidance Document v.2.0 which Marin Hawk of MSC shared with me last month. On page 16, Box SA1 lists MSC's default "key LTL stocks" (text excerpted below).

Since the list includes clupeidaes, mentioning menhaden by name, I was surprised to hear you say that the decision to assess menhaden as a key LTL stock had not yet been made. Can you clarify whether menhaden is in fact a key LTL species by default?

Thank you much. We intend to follow-up with written comment.

All the best,
Benson

Assessment Team Response:



Wed 19/07/2017 09:18

Samuel Dignan

RE: MSC menhaden review

To Benson Chiles; Ault, Jerald Stephen

Cc Ivan Mateo; Robert Allain

Hi Benson,

Yes you are correct in saying that menhaden is one of the species that are defined by default as "key LTL"; however I would draw your attention to the section immediately preceding those tables SA2.2.9:

"Teams shall treat a stock under assessment against Principle 1 as a key LTL stock if:

- a. *It is one of the species types listed in Box SA1 **AND** in its adult life cycle phase the stock holds a key role in the ecosystem, such that it meets at least two of the following sub-criteria i, ii and iii."*

I've highlighted the "and" for emphasis. In addition it's worth pointing out here that it is only its adult life cycle phase that is to be considered here. Therefore, a species defined as default key LTL must, in adult life cycle phase, also meet 2 of the 3 criteria under SA2.2.9a in order for it to be considered a key LTL.

From a precautionary approach standpoint we are required to provide a justified argument that at least two of the criteria are NOT met before we can assess any of the species that are defined by default as "key LTL" as non-key LTL. In cases such as this the ecosystem impacts of the fishery would still be considered under PI 2.5.1 (page 161 or thereabouts depending on your version of the doc).

Good to hear that you intend to follow up with written comment, this always helps ensure that we've captured everything.

Hope the above clarifies things a bit.

Cheers,
Sam

Email 2:

From: Benson Chiles [mailto: [REDACTED]]
Sent: 16 August 2018 16:50
To: Jerald S. Ault <jault@rsmas.miami.edu>
Cc: Samuel Dignan <Samuel.Dignan@saiglobal.com>; Ivan Mateo <Ivan.Mateo@saiglobal.com>; Robert Allain [REDACTED]
Subject: Re: Menhaden Fishery Sustainability Certification Process

Sam, Ivan and Robert,

This article may be of interest, particularly with regard to the probationary period on the Clean Water Act.

<https://www.institutionalinvestor.com/article/b19jfml80j817v/Swim-With-the-Fishes>

The link included is: <https://www.institutionalinvestor.com/article/b19jfml80j817v/Swim-With-the-Fishes>.

Assessment Team response:



Fri 24/08/2018 19:08
Samuel Dignan
RE: Menhaden Fishery Sustainability Certification Process

To 'Benson Chiles'; Jerald S. Ault
Cc Ivan Mateo; Robert Allain

Hi Benson,

Thank you for sending this on to us. However, the scope of the MSC Standard is limited to fishery issues. Therefore, through the assessment process there is no scope for us to consider environmental/labour/legal issues etc.

I know this may come as a disappointment but I feel it is best to be up front. With all this being said thank you for staying engaged and if your unsure of what is and isn't covered by the MSC Requirements feel free to ask.

Kind regards,

Sam Dignan
Fisheries Scheme Manager
SAI Global/Global Trust Certification

North Carolina Wildlife Federation



North Carolina Wildlife Federation

Affiliated with the National Wildlife Federation

1346 St. Julien St.
Charlotte, NC 28205
(704) 332-5696

1024 Washington St.
Raleigh, NC 27605
(919) 833-1923

ATTN: Jean Ragg
Fisheries & Aquaculture Administrator
SAI Global Assurance Services
Jean.ragg@saiglobal.com

July 19, 2017

Stakeholder Submission RE: Initial Assessment and Information Collection, Omega Protein, Atlantic Menhaden purse seine fisheries

During the initial site visits and assessment of Omega Protein and the Atlantic menhaden purse seine fisheries for the consideration of a Marine Stewardship Council (MSC) "blue ecolabel for sustainable fishing," the North Carolina Wildlife Federation would like to provide stakeholder input about the Atlantic menhaden fishery.

Menhaden are listed as key lower trophic level species in the MSC Fisheries Standard and Guidance v2.0 document due to their ecological value to the Atlantic ecosystem. Consequently, it is critical that Atlantic menhaden be managed by the suggested, precautionary reference points of 75% unexploited biomass or a 0.5M or 0.5FMSY exploitation rate. These management strategies are in congruence with Option 3D in the most recent draft of Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden. A Biological Ecological Reference Points (BERP) Workgroup is currently developing Atlantic menhaden-specific reference points tailored specifically to the Atlantic ecosystem with the best available data.

The North Carolina Wildlife Federation urges the assessment team to consider the ecosystem services Atlantic menhaden provide. Menhaden filter feed on phytoplankton and zooplankton which prevents eutrophication and anoxic conditions in the ecosystem, whilst acting as a food source for larger finfish and cetacean consumers. The extent of the ecological role of Atlantic menhaden has not been fully modelled and analyzed, yet it is already known that endangered species and species of concern depend on Atlantic menhaden for a portion of their diets. A precautionarily managed population of Atlantic menhaden would ensure the stability to the recreationally, commercially, and intrinsically valuable predators such as finfish like weakfish, striped bass, bluefish, cobia, red drum, mackerels, and cod. Further, marine mammals such as humpback whales, bottlenose dolphins and various sea birds are critically dependent on an abundant Atlantic menhaden resource. Anglers, commercial fishermen, and tourists, in turn, benefit from a healthy, stable ecosystem anchored by an abundant Atlantic menhaden population.

The health of the Atlantic ecosystem depends on the careful management of Atlantic menhaden. Although recent stock assessments have determined the stock of Atlantic menhaden as not overfished and that overfishing is not occurring, single species assessments

are not appropriate for a key LTL species. Stock status, however, depends on the selected biological reference points. The current, single species approach for Atlantic menhaden fails to take into account critical ecosystem needs and manages more for maximum yield than maximum abundance. Owing to the concerns related to the lack of consistent data on ecosystem impacts and minimal multispecies modelling, the continued increase in the coastwide Total Allowable Catch for Atlantic menhaden is extremely risk prone.

As forage fish, Atlantic menhaden display a very minimal stock recruit relationship and are primarily driven by environmental variability. In the SEDAR 40 Report, the Technical Committee emphasized the faults of the current single species assessment approach. They discussed how the stock recruit relationship and fecundity reference points were weak and should not be used to manage menhaden. The report revealed that "at this time the [Technical Committee] cannot reliably predict the magnitude of a recruitment response to increased biomass under any harvest scenario" (ASMFC 2014). Therefore, using SPR to determine fishing mortality reference points and to assess the overfished status of the stock may be risky.

Additionally, information on bycatch and discard mortality of known predators that associate with menhaden schools should be addressed. At present, these data are lacking. The potential implications of a "blue ecolabel for sustainable fishing" designation to increased fishing effort could be detrimental not only to Atlantic menhaden and their ecosystem function, but to the important predators taken incidentally to these massive fishing operations.

There is also significant amount of uncertainty in quantifying Atlantic menhaden bait landings. Other commercial fisheries collectively land and report Atlantic menhaden and other species of fish as "bait." Similarly, personal and unofficial catch of Atlantic menhaden for bait frequently goes unreported. Because of the scientific uncertainty, Atlantic menhaden should be managed for maximum abundance using the conservative management strategies suggested in Pikitch et. al and again in the MSC Fisheries Standard and Guidance v2.0 document.

As a result, we currently oppose a blue ecolabel for sustainable fishing designation for Omega Protein based on the MSC Guidelines. We do not believe, "These fisheries ensure that fish are caught at levels that allow fish populations and the ecosystems on which they depend to remain healthy and productive for the future." Secondly, there is no evidence that this fishing activity may continue at current levels indefinitely. Finally, managing Atlantic menhaden for maximum yield rather than maximum abundance does not allow for maximum productivity, function, and diversity of the ecosystem.

Thank you for consideration of our comments.

Sincerely,



Tim Gestwicki
CEO, North Carolina Wildlife Federation

Assessment Team response – Submission 1:

Salient points raised by the stakeholder are responded to below in [blue](#).

Consideration of menhaden as a key-LTL species

Issues raised include the fact that menhaden should be treated as a key Low Trophic Level (LTL) stock.

The stakeholders concerns regarding the ecosystem role of menhaden and the information provided were considered in the Team's evaluation of menhaden as a key-LTL species for the purpose of this assessment (see [3.3.5. Consideration of Atlantic menhaden as a Lower Trophic Level \(LTL\) species](#) for further details).

Ultimately, following careful consideration of the available evidence the Assessment Team determined that, for the purpose of this assessment, the Atlantic menhaden stock should be defined as a key-LTL stock; as a consequence PI 1.1.1a rather than PI1.1.1 was scored.

With respect to the continued use of single species reference points, the Assessment Team have considered this extensively throughout the report. As a result the Team have concluded that the current harvest strategy is not designed to take into account the ecological role of Atlantic menhaden and is not responsive to the state of the menhaden stock with respect to its role in the U.S. Northwest Atlantic ecosystem. In response to this finding the Team has raised two Conditions (see [Appendix 1.3 Conditions](#)).

Bycatch and discard mortality of predators known to associate with menhaden schools

As part of this assessment, the status of the various predators known menhaden (i.e. those recorded as bycatch in the studies examined) has been discussed in detail under the Principle 2 and specifically under [PI 2.1.1. Primary species outcome](#) and [PI 2.2.1. Secondary species outcome](#).

Uncertainty in quantifying Atlantic menhaden bait landings

Uncertainty in the available data for menhaden has been considered extensively including under PI 1.1.1 SIb, PI 1.2.3 SIb and PI 1.2.4 SIc and SId. In some instances the level of uncertainty has precluded the Assessment Team from awarding a higher score that which has been awarded. There also specific sections that address bait and non-target landings of Atlantic menhaden.

PEW



Tue 25/07/2017 17:39

Joseph Gordon <jgordon@pewtrusts.org>

RE: Interest in commenting on Atlantic menhaden MSC certification assessment

To  Samuel Dignan

Cc Aaron Kornbluth; David.agnew@msc.org; Megan.atcheson@msc.org

 You forwarded this message on 27/07/2017 17:27.

Sam,

I'm sorry we missed seeing you when you were here. Pew will submit formal written comments by your deadline, however since I understand that you are moving quickly toward a decision, I wanted to send you this quick note with critical information to help you in your decision making process. ...

The Marine Stewardship Council has an opportunity right now to advance its mission and make a difference in the world through its power in the market, or alternatively could take action that undermines its mission: "Our mission is to use our ecolabel and fishery certification program to contribute to the health of the world's oceans by recognising and rewarding sustainable fishing practices, influencing the choices people make when buying seafood and working with our partners to transform the seafood market to a sustainable basis." This is not a single-species mission, especially in the case of menhaden, but an ecosystem one that should define your certification decisions.

After decades of work by thousands of people, Atlantic menhaden management is at a moment when a historic transition can happen toward Ecosystem-Based Fishery Management (EFBM) with global implications. Menhaden are often called the most important fish in the sea because they play an essential role in the Atlantic food web transferring energy from the smallest organisms (phytoplankton, zooplankton) to nearly every predator that swims in or flies above the ocean. They are irreplaceable, and therefore require a different and stronger form of conservation management to continue to rebuild from their historic depletion and ensure ongoing abundance.

In your review process, we hope you will look beyond the obsolete and misguided debates about whether this forage species is somehow not impacted by large-scale fishing, or whether it is found in some particular percent in the diet of any one predator. Those debates lose sight of the many ways that menhaden are important, and fail to account for factors like the nutritional/caloric value of menhaden compared to other forage and the time-specific co-occurrence of menhaden with important life cycle phases of many of their predators. Under the current single-species reference points, the Commission is told that fishing can increase up to 40% (hundreds of millions more fish taken) with no chance of "overfishing." This demonstrates the need for change, because there is zero consideration of the cost of such an increase to declining predators like striped bass, bluefish, and weakfish. If there's ever a species that defines key low trophic level (LTL) and needs protection, and a time to put your forage stewardship standard into practice, it's now with menhaden. If menhaden crashes, the result would be a disaster for our ecosystems, and if they thrive, they will provide widespread benefits many other fisheries, wildlife, seafood, and our economy. That's why it's so important that the standard the MSC developed through peer-reviewed science (*Smith et al.* 2011) should not become a theoretical exercise, but instead be put into practice here and now.

With that information in mind, I have one question on which I would appreciate a response before you head into the assessment:

1. Will you make the MSC's Ecological Reference Point (ERP) standard (Section SA2.2.13 of the Fisheries Certification Requirements and Guidance) for exactly this type of LTL species (ERP with a 75% B0 target and 40% B0 threshold) a requirement for certification of the fishery?

If the answer is yes, you can help the MSC set a global standard for EBFM and advance conservation and science around the world. If you decide that this standard should not be a requirement for certification of the fishery, then you will effectively lower the bar for all forage fisheries worldwide and undermine decades of conservation work on forage species. It will also send a message that the MSC is unwilling to be a leader in conserving species and instead maintains a single-species focus, regardless of the impact to other fisheries and the broader ecosystem.

Hopefully the ASFMC will fulfill its commitment to manage menhaden using the MSC's ERP, but a public statement now of your commitment to hold to that standard would send a powerful message and help ensure that outcome at the ASFMC meeting on November 14, where they will take final action on Amendment 3.

Thank you for consideration of our concerns.

Best wishes,

Joseph

Joseph Gordon

Senior Manager, U.S. Oceans, Northeast | The Pew Charitable Trusts
o: 202-887-1347 | c: 240-672-2045 | e: jgordon@pewtrusts.org

Assessment Team response:

The Assessment Team responded directly to the above email on 07/31/2018. In the response email the Team thanked the stakeholder for the response and comments and advised the stakeholder that their comments would be considered in the assessment of the fishery. The Assessment Team also responded directly to a number of comments made by the stakeholder. The stakeholder's comments are italicized below while the Assessment Teams response to each is in blue.

"The Marine Stewardship Council has an opportunity right now to advance its mission and make a difference in the world through its power in the market, or alternatively could take action that undermines its mission: "Our mission is to use our ecolabel and fishery certification program to contribute to the health of the world's oceans by recognising and rewarding sustainable fishing practices, influencing the choices people make when buying seafood and working with our partners to transform the seafood market to a sustainable basis." This is not a single-species mission, especially in the case of menhaden, but an ecosystem one that should define your certification decisions."

At the outset it is important to bring clarity to SAI Global's role in the MSC assessment of the U.S Atlantic menhaden fishery. SAI Global is an independent third party Certification Body (CB) whose role it is to assess the menhaden fishery against requirements laid out in the MSC Fisheries Certification Requirements (FCR) v2.0 and other relevant scheme documents. SAI Global's application of the MSC FCR and adherence to defined processes is subject to rigorous review through MSC's internal technical oversight mechanisms and regular audits by MSC's accreditation body Accreditation Services International (ASI).

With the above in mind, any certification (or not) decisions made by SAI Global's Assessment Team will be defined purely by the MSC FCR v2.0 and other relevant scheme documents. As a CB it is not the place of SAI Global to comment on the MSC's mission or the wider perception of the MSC Programme.

"After decades of work by thousands of people, Atlantic menhaden management is at a moment when a historic transition can happen toward Ecosystem-Based Fishery Management (EBFM) with global implications. Menhaden are often called the most important fish in the sea because they play an essential role in the Atlantic food web

transferring energy from the smallest organisms (phytoplankton, zooplankton) to nearly every predator that swims in or flies above the ocean. They are irreplaceable, and therefore require a different and stronger form of conservation management to continue to rebuild from their historic depletion and ensure ongoing abundance.

In your review process, we hope you will look beyond the obsolete and misguided debates about whether this forage species is somehow not impacted by large-scale fishing, or whether it is found in some particular percent in the diet of any one predator. Those debates lose sight of the many ways that menhaden are important, and fail to account for factors like the nutritional/caloric value of menhaden compared to other forage and the time-specific co-occurrence of menhaden with important life cycle phases of many of their predators. Under the current single-species reference points, the Commission is told that fishing can increase up to 40% (hundreds of millions more fish taken) with no chance of “overfishing.” This demonstrates the need for change, because there is zero consideration of the cost of such an increase to declining predators like striped bass, bluefish, and weakfish. If there’s ever a species that defines key low trophic level (LTL) and needs protection, and a time to put your forage stewardship standard into practice, it’s now with menhaden. If menhaden crashes, the result would be a disaster for our ecosystems, and if they thrive, they will provide widespread benefits many other fisheries, wildlife, seafood, and our economy. That’s why it’s so important that the standard the MSC developed through peer-reviewed science (Smith et al. 2011) should not become a theoretical exercise, but instead be put into practice here and now.”

While reading your comments we noted a reference to “*your forage stewardship standard*”. Again it is important to dispel any misconceptions as to the role of SAI Global and reiterate that the standard holder here is MSC and not SAI Global. It is not SAI Global’s role to debate the minutiae of the MSC FCR; therefore, we will steer clear of the ongoing debate surrounding the impacts on predatory fishes resulting from fishing a portion of their prey resource.

Under the current MSC FCR the term “key low trophic level (LTL)” means a very specific thing. SA 2.2.9 defines when a species should be evaluated as a “key LTL species” with a species needing to meet at least 2 of the 3 criteria outlined therein before being considered key LTL for the purpose of assessment.

“With that information in mind, I have one question on which I would appreciate a response before you head into the assessment:

- 1. Will you make the MSC’s Ecological Reference Point (ERP) standard (Section SA2.2.13 of the Fisheries Certification Requirements and Guidance) for exactly this type of LTL species (ERP with a 75% BO target and 40% BO threshold) a requirement for certification of the fishery?”*

At this point the Assessment Team is gathering evidence (feeding studies, diet matrices, bioenergetics studies, trophic links through biological tracers, ecosystem models etc.) to evaluate the ecological role of Atlantic Menhaden; this will then feed into a determination of whether Atlantic menhaden will be assessed as a key LTL species, thereby triggering the additional requirements contained in PI 1.1.1A. The assessment team is also aware that ASMFC are currently committed to pursuing ERPs.

However, were menhaden to be evaluated as a key LTL species there are a number of additional considerations that may influence the evaluation including the fact that the current stock assessment for menhaden makes use of SSB proxies rather than SSB; this could preclude the use of the biomass based ERPs mentioned above. Were this the case the requirements in SA2.2.15 (and accompanying Guidance) would instead apply.

In short it is not yet clear as to whether the particular FCR requirement mentioned above and contained in SA2.2.13 will be applicable to the Atlantic menhaden fishery and as a consequence it is not possible to give a simple yes or no answer to your question at this time.

“If the answer is yes, you can help the MSC set a global standard for EBFM and advance conservation and science around the world. If you decide that this standard should not be a requirement for certification of the fishery, then you will effectively lower the bar for all forage fisheries worldwide and undermine decades of conservation work on forage species. It will also send a message that the MSC is unwilling to be a leader in conserving species and instead maintains a single-species focus, regardless of the impact to other fisheries and the broader ecosystem.”

As before it is not SAI Global’s role to get involved in the ongoing debate surrounding ERPs for forage fish species. With that being said were ERPs to be selected for the management of the menhaden fishery the Assessment Team would of course evaluate them against the MSC FCR.

“Hopefully the ASFMC will fulfill its commitment to manage menhaden using the MSC’s ERP, but a public statement now of your commitment to hold to that standard would send a powerful message and help ensure that outcome at the ASFMC meeting on November 14, where they will take final action on Amendment 3.”

Insofar as ASMFC committing to using MSC’s ERPs (which are actually those developed in Pikitch et al. 2012) for managing menhaden we were unaware that they had done so? We believe the ASMFC remain committed to developing more appropriate stock-specific ERPs of their own and may use the Pikitch et al. ERPs on an interim basis depending on the outcome of the ongoing consultation process (read Options C, D and E).

It is entirely up to MSC whether, in the face of recent debate (and more contemporary analysis that has taken place since Pikitch et al.), they continue to remain committed to the inclusion of the Pikitch et al. ERPs in the MSC FCR; as such it is to the MSC that such a request for a public statement of commitment to the continued use of these ERPs should be directed.

Save the Bay

Contact Information			
Make sure you submit your full contact details at the first phase you participate in within a specific assessment process. Subsequent participation will only require your name unless these details change.			
Contact Name	First	Michael	Last Jarbeau
Title			
On behalf of (organisation, company, government agency, etc.) – if applicable			
Organisation	Please enter the legal or registered name of your organisation or company. Save The Bay		
Department			
Position	Please indicate your position or function within your organisation or company. Narragansett Baykeeper		
Description	Please provide a short description of your organisation. Our mission is to protect and improve Narragansett Bay. Our vision is a fully swimmable, fishable, healthy Narragansett Bay, accessible to all and globally recognized as the natural treasure it is.		
Mailing Address, Country	100 Save The Bay Dr, Providence, RI 02905, United States		
Phone	Tel	+ 401-272-3540 ext. 116	Mob +
Email	miarbeau@savebay.org		Web www.savebay.org

Assessment Details	
Fishery	Omega Protein Corporation U.S. Atlantic Menhaden Purse Seine
CAB	SAI Global

• SECTION 3 • [Return to Page 4](#)

Assessment Stage	Fishery	Date	Name of Individual/Organisation Providing Comments
<input checked="" type="checkbox"/> Information gathering and stakeholder meetings- Opportunity to engage with and provide information to the CAB about the specific details and impacts of the fishery.	Omega Protein Corporation U.S. Atlantic Menhaden Purse Seine	30 June 2017	Michael Jarbeau Save The Bay 100 Save The Bay Drive Providence, RI 02905 (401) 272-3540 mjarbeau@savebay.org

Nature of Comment (select all that apply)	Additional Information/Detail Please attach additional pages if necessary.
<input type="checkbox"/> I wish to request an in-person meeting with the site team during their assessment visit (meetings without the fishery client present may be requested at this phase of the process if desired).	Please see attached comments.
<input checked="" type="checkbox"/> I wish to submit written information about the fishery and its performance against the default tree and/or RBF to the assessment team (please provide documents or references).	
<input type="checkbox"/> Other (please specify)	

⁴ MSC Fisheries Certification Requirements, v2.0, section 7.8.4



Save The Bay Center
100 Save The Bay Drive
Providence, RI 02905

P: 401-272-3540
F: 401-273-7153
SAVEBAY.ORG

June 30, 2017

Dr. Ivan Mateo
SAI Global/Global Trust Certification
Quayside Business Park, Mill Street
Dundalk County Louth, Ireland

Re: MSC Certification for Omega Protein U.S. Atlantic Menhaden Purse Seine Fishery

Dr. Mateo,

Save The Bay is committed to preserving, restoring, and protecting the ecological integrity of Narragansett Bay and coastal Rhode Island. Based on the immense value Atlantic Menhaden provide to the Narragansett Bay ecosystem, we offer the following comments on the Marine Stewardship Council (MSC) Fishery Assessment of Omega Protein Corporation's U.S. Atlantic Menhaden purse seine fishery.

The Atlantic States Marine Fisheries Commission is currently in the process of drafting Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden. A critical management measure being proposed under Amendment 3 is the adoption of Ecological Reference Points that will consider the value of Menhaden as a forage fish within the broader ecosystem. The Commission has established a Biological and Ecological Reference Points Workgroup to determine specific reference points for the fishery. The Workgroup's final report and recommendations will not be completed until 2019 at the earliest. In the meantime, there is considerable debate regarding what level of harvest should be considered appropriate under the ecological model. It is difficult to imagine MSC labelling the fishery as sustainable when the local management body is struggling with the very facts and figures necessary for the designation.

Principle 1 of the MSC Fisheries Standard requires fisheries to "be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably lead to their recovery." Atlantic Menhaden have been harvested along the eastern coast of the United States for hundreds of years. Historic fisheries existed from Maine to Florida. Despite demand in some of these states, including Rhode Island, the current biomass does not support these historic fisheries. When the first-ever Atlantic Menhaden total allowable catch (TAC) was put in place in 2012, it was set at 170,800 metric tons. Based on a short period of successful recruitment since, the TAC has been raised almost to pre-2012 levels. Several years of relatively conservative management have allowed the stock to grow. This should indicate that, if given the opportunity to recover, the population would continue to expand and provide harvest opportunities outside of mid-Atlantic states such as Virginia, which continues to harvest more than 85 percent of the TAC.

Under Principle 2 of the MSC Fisheries Standard, fishing operations must allow for the maintenance of the ecosystem on which the fishery depends. Omega Protein's purse seine fishery, including the use of spotter planes to locate huge schools of Menhaden, is devastatingly effective and efficient. Every state except Virginia, where Omega Protein operates, has banned the Menhaden reduction fishery. States have acknowledged the value of having Atlantic Menhaden in their waters to support sustainable bait fisheries, game fish, marine mammals, birds, and other species that rely on them. By fighting to maintain the management of Atlantic Menhaden in the Virginia state legislature rather than at the Virginia Marine Resources Commission, where all other fisheries are managed, Omega Protein is able to avoid regulatory action that might threaten their monopoly over the resource. As such, the fishing operations of Omega Protein single-handedly prevent the Atlantic Menhaden stock from recovering and reestablishing itself as a part of the Atlantic coastal ecosystem.

The Marine Stewardship Council is a trusted source for consumers looking to make sustainable choices when purchasing seafood. Certifying Omega Protein's U.S. Atlantic Menhaden purse seine fishery as sustainable, environmentally friendly, and effectively managed goes against the basic principles that MSC's reputation stands on. We urge SAI Global to look closely at the impact Omega Protein's operations have on the ability of Atlantic Menhaden to recover to a true coastwide, healthy population that can support the needs and interests of more than one company.

Thank you for the opportunity to comment.

Sincerely,



Michael Jarbeau
Narragansett Baykeeper

cc: Rhode Island Department of Environmental Management

Assessment Team response:

Ecological Reference Points and the activities of the Biological and Ecological Reference Points (BERP) Workgroup have been considered extensively in this report. In addition Corrective Action Plans provided by the Client to address the P1 conditions reflect the likely timescale of the BERP process.

Based on the current single species stock assessment fishing pressure on the menhaden stock is well below historical levels and in fact in the past menhaden biomass has been far higher in the face of much more intense fishing. In addition, the fact that Virginia currently harvests the majority of menhaden is not in and of itself an indication that there are no/insufficient menhaden available elsewhere for harvest.

The stakeholder is correct in that according to Principle 2, fishing operations must allow for the maintenance of the ecosystem on which the fishery depends. Again the fact that many states have banned menhaden purse seining from their waters is not necessarily a commentary on the ecosystem impacts of the fishery and may be due at least in part to differing priorities (i.e. recreational v commercial interests). There is no indication from the available evidence that the Atlantic Menhaden stock (at least on a coastwide basis) is in such a position that it needs to recover in order to re-establish itself as a part of the Atlantic coastal ecosystem.

As the CAB for this assessment, it is SAI Global's role to assess whether or not the menhaden fishery meets the requirements as laid out in the MSC FCR v2.0. With that in mind, and prior to arriving at the outcomes outlined in this report, the Assessment Team have examined all aspects of the fishery as required by the FCR and provided extensive rationale for the determination reached.

Individuals

Professor Ellen Pikitch

 Mon 25/09/2017 19:57
Ellen Pikitch <ellen.pikitch@stonybrook.edu>
Important letter in press re: Hilborn et al. 2017

To Jean Ragg; Samuel Dignan; Ivan Mateo

Message  2012 Pikitch et al. Little Fish Big Impact copy.pdf (12 MB)
 2012 Pikitch et al_lfftf_exec_summary copy.pdf (3 MB)
 Pikitch et al 2017_Strong Connection response to Hilborn copy.pdf (304 KB)

Dear Samuel Dignan, Jean Ragg and Ivan Mateo,

I understand that you are conducting an assessment of Gulf and Atlantic menhaden for the possible MSC certification, and further understand that a paper written by Hilborn et al published in Fisheries Research earlier this year may play a significant role in your assessment.

I therefore am bringing to your attention a letter that is now in press in the journal Fisheries Research entitled "The strong connection between forage fish and their predators: A response to Hilborn et al. (2017). The co-authors of the letter include all the original authors of the Lenfest Forage Fish Task Force report. The letter details serious technical concerns and unfounded allegations contained within the Hilborn paper. I hope you will seriously consider these concerns in your assessment.

For your convenience, I am also attaching copies of the Lenfest Forage Fish Task Force Report and it's Executive Summary.

Please feel free to contact me should you have any questions.

Sincerely yours,
Ellen K. Pikitch

Assessment Team response:

The attached papers/documents are:

- [Pikitch *et al.*, 2012. Full document.](#)
- [Pikitch *et al.*, 2012. Executive summary.](#)
- [Pikitch *et al.*, 2018.](#)

The paper referred to is:

- [Hilborn *et al.*, 2017.](#)

Full Details of each and links where they may be accessed are included in the references section; note, unfortunately some of these papers are not open access. The references section also contains an additional response by Hilborn *et al.*, and a corrigendum to Hilborn *et al.*, 2017:

- [Hilborn *et al.*, \(2018a\)](#)
- [Hilborn *et al.*, \(2018b\).](#)

All sources of information supplied by the stakeholder have been considered as part of this assessment.

Professor Jerry S. Ault

UNIVERSITY OF MIAMI
ROSENSTIEL
SCHOOL of MARINE &
ATMOSPHERIC SCIENCE



Marine Ecosystems and Society Ph: 305-421-4085
4600 Rickenbacker Causeway
Miami, Florida 33149-1031

#

August 8, 2017

TO: Marine Stewardship Council. Attention: Samuel Dignan
<Samuel.Dignan@sai-global.com>, Ivan Mateo <Ivan.Mateo@sai-global.com>,
Robert Allain <oceanic@rogers.com>

SJ: Menhaden Fishery Sustainability Certification Process

Dear Sam, Ivan, Robert et al. with interest in the Menhaden review process,

As an avid recreational fisherman working with the *Menhaden Conservation Project*, and a Professor of Fisheries Science and Chair of the Department of Marine Ecosystems and Society at the University of Miami, I am writing today to provide stakeholder input on the sustainability certification process currently underway for both Atlantic and Gulf menhaden. I appreciate the opportunity to engage in this process.

At various junctures throughout my distinguished career, I have participated in scientific research that directly relates to menhaden. The most pertinent was on behalf of the ASMFC where we developed a spatial ecosystem-based management model focused on the dynamic interactions in the Atlantic States (Nova Scotia to southeastern Florida) coastal ocean among and between the core multispecies fisheries complex of menhaden, bluefish, striped bass and weakfish. The spatial fishery ecosystem model was designed to allow evaluation of how fishery management actions may impact fishery yields and stock productivity goals for a particular target species when the species complex is directly coupled to spatial patterns of fishing intensity, other predator and prey populations, ocean physics, and environmental changes. Most recently, my satellite-tagging work has shown substantial seasonal migratory connectivity between feeding and spawning Atlantic tarpon that migrate great distances to forage on Atlantic and Gulf menhaden.

Atlantic and Gulf Menhaden play an essential role in the marine ecosystem and they are known by many as the "*most important fish in the sea.*" Menhaden (*Brevoortia tyrannus*) are vital to the ecological and economic sustainability of the US Atlantic and Gulf coastal ecosystems. In the coastal Atlantic ocean, menhaden range from Nova Scotia to Florida where they are the primary forage for a plethora of high-value predatory fishes (e.g., striped bass, bluefish, tarpon, bluefin tuna, tarpon, weakfish, cod, etc.), but also

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Comments on Atlantic & Gulf Menhaden Sustainability Certification Process
Jerald S. Ault, Ph.D., University of Miami

Page 2

birds (e.g., osprey, bald eagles), marine mammals (e.g., humpback whales, bottlenose dolphin), and a host of other marine wildlife. In addition, menhaden are a key ecological force that maintain regional water quality by filtering phytoplankton, thereby promoting water clarity and reducing harmful algae blooms. Because of they are such a key component of the marine ecosystem, it is critical that they be managed effectively, taking into account the needs of predators, water quality, and the changing ocean environment.

Both the juvenile and adult life stages of menhaden are obligate filter feeders. Many studies have shown that their diets consist primarily of plant materials, principally phytoplankton and detritus (Darnell 1958, Reintjes and Pacheco 1966, Durbin and Durbin 1975, Peters and Schaaf 1981, Lewis and Peters 1984, Friedland et al. 1984, Friedland 1985, Deegan et al. 1990, Lewis and Peters 1994, Castillo-Rivera et al. 1996). Only in the larval stage, when larval menhaden have short gill rakers, do they feed as selective carnivores on individual zooplankters. After metamorphosis from larvae to the juvenile life stage, their feeding changes from selective predation upon individual animals to indiscriminate filter-feeding, predominantly on diatoms and dinoflagellates, with some smaller zooplankters (Reintjes and Pacheco 1966). Darnell (1958) reported that the guts of adult gulf menhaden collected from the Lake Pontchartrain, LA, contained 99% "ground organic material and silt". Juvenile menhaden in this same study were reported to have consumed 82% phytoplankton with the rest a mix of zooplankton, detritus, and plant fragments. Atlantic menhaden feeding experiments have shown that vascular plant material, including cellulose, is easily digested with 75% efficiency (Lewis and Peters 1984, 1994). They also reported phytoplankton and detritus accounted for 99% of juvenile menhaden's diet. Castillo-Rivera et al. (1996) reported phytoplankton constitutes over 70% of the diet of adult menhaden in both freshwater- and marine-influenced habitats. Both juvenile and adult menhaden have a specialized extended pyloric stomachs, partially modified as a gizzard, which enables them to digest plant matter efficiently. Finally, Deegan et al. (1990) used stable isotopes in a study the Gulf menhaden diet and concluded that their "diet is primarily phytoplankton. A study on menhaden gill raker morphology by Friedland et al. (2006) indicated that gill raker length (filtering area) increased isometrically with fish length, while the branchiospinule spacing (particle size selection) increased allometrically relative to ontogenetic habitat changes (i.e., transition from estuarine to oceanic environments). The increased sieve spacing is hydrodynamically more efficient for feeding on larger phytoplankton species in the ocean.

As such, it is obvious that menhaden meet the MSC criteria for a Key Low Trophic Level (LTL) Species and, in fact, Box SA1 of Section SA 2.2.10 of the MSC Fisheries Standard V 2.0 specifically names menhaden as a default Key LTL stock. However, I

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Comments on Atlantic & Gulf Menhaden Sustainability Certification Process

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Jerald S. Ault, Ph.D., University of Miami

understand from my colleague's correspondence with Sam Dignon that some questions still exist as to whether or not menhaden are in fact a Key LTL.

I can fully appreciate the requirements and professional integrity of the MSC to thoroughly examine all aspects of both the species and the fishery; however, the answer to this question seems so obvious based on the plethora scientific evidence as to hardly need or justify response. In fact, if menhaden were not to be classified as a key LTL, then perhaps no other species should either? It's equivalent to classifying a cow as a meat eater (i.e., carnivore), because the cow had eaten crickets while grazing in the pasture.

To my knowledge, every peer-reviewed scientific publication and every regional management body in the U.S. Atlantic and Gulf of Mexico considers menhaden a Key LTL species. The only peer-reviewed science that argues otherwise is the recent paper by Hilborn et al. (2017), a study that was apparently funded by the industry member seeking certification.

However, to the extent that reviewers are required to evaluate the Key LTL stock based on the criteria outlined in section FCR SA2.2.9(a)(i-iii), please see my comments below:

SA2.2.9 Teams shall treat a stock under assessment against Principle 1 as a key LTL stock if:

(a.) It is one of the species types listed in Box SA1 and in its adult life (stage) cycle phase the stock holds a key role in the ecosystem, such that it meets at least two of the following three sub-criteria i, ii and iii:

- i. *A large proportion of the trophic connections in the ecosystem involve this stock, leading to significant predator dependency;*

A recently published paper in the *Journal of Marine and Coastal Fisheries* by Buchheister et al. (2017) provides some of the most comprehensive, quantitative ecosystem-wide analysis of the value of menhaden as a prey item that has been conducted. This paper is strongly supported by the meta-analysis of Sagarese et al. (2016). It is clear based on these studies that a large proportion of the trophic connections in the ecosystem involve adult menhaden, leading to significant predator dependency (**Fig. 1**). Also please see Table 9 in Buchheister et al. (2017). Diet compositions for the NWACS (Northwest Atlantic Continental Shelf) model trophic groups in the paper's supplemental materials, which lists 18 different species assemblages as having at least some diet composition composed of medium and large menhaden.

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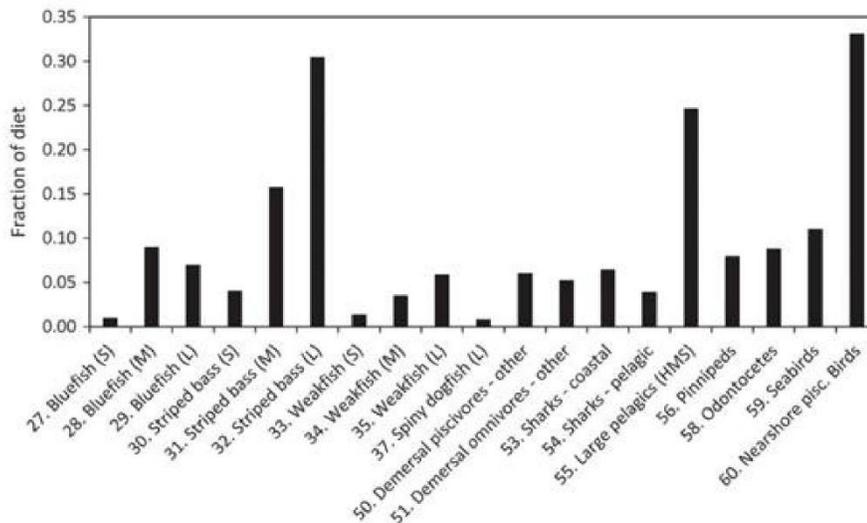


Figure 1.- Contributions of menhaden to the diets of predators in the balanced NWACS Ecopath Model. Source: Fig. 2 from Buchheister et al. (2017).

- ii. *A large volume of energy passing between lower and higher trophic levels passes through this stock;*

While the recent Buchheister et al. (2017) journal paper did not necessarily evaluate this concept directly, it is clear from the information I have provided above that all age classes of menhaden consume large quantities of primary production. It also well known that menhaden are calorically very rich, which underlies the critical importance in the regional ecosystem. High-value predators like Atlantic tarpon, bluefin and yellowfin tuna, blue marlin, king and Spanish mackerel, etc., depend energetically on menhaden to fatten the yolk of their developing eggs prior to spawning, and to fuel the soma after thousands of kilometer migrations to and from the menhaden forage areas. These fisheries support multi-billion dollar economies in coastal U.S. waters and depend on the seasonal abundance of menhaden.

- iii. *There are few other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, such that a high proportion of the total energy passing between lower and higher trophic levels passes through this stock (i.e., the ecosystem is 'wasp-waisted').*

This phenomenon has been highlighted in the scientific literature for some time:

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Lewis, V.P., Peters, D.S. 1984. Menhaden - a single step from vascular plant to fishery harvest. J. Exp. Mar. Biol. Ecol. 84(1): 95-100

Once MSC defines menhaden as a Key LTL it is especially essential that the MSC hold the industry to the default MSC standard of managing to 75% B0 (i.e., menhaden spawning stock biomass without fishing). Atlantic and Gulf Menhaden populations must be restored to levels of abundance that allows them to fully function in their historical ecological role, primarily as forage.

A couple of summary remarks are as follows:

Perhaps MSC/SAI should reconsider their decision process for determining Key LTL species? It is unfair to the industry and the public for MSC/SAI to have delayed in making such a fundamental determination as whether menhaden qualify as a Key LTL species, particularly with the plethora of scientific evidence at their disposal. It seems that standards for which a fishery will be evaluated should have been determined precertification, that is, before industry committed funds and notice of the certification process was released for public comment.

At the very least, SAI Global and the MSC should consider very carefully the obvious statement that will be made concerning the integrity and legitimacy of these entities and their certification processes if they chose to abandon their own LTL ERP standards, those that MSC funded and adopted. They should not hedge on objectivity in this first real world application of the methodology on the basis of a study funded in large part by the industry seeking certification. That one paper offers no alternative ERP, and the principal author is publicly advocating for an increased menhaden catches.

Thank you again for the opportunity to comment as a stakeholder. I look forward to ongoing dialogue as you consider certification of this most important species.

Sincerely,

Jerald Ault

Digitally signed by Jerald Ault
DN: cn=Jerald Ault, o=University
of Miami, ou=RSMAS,
email=jault@rsmas.miami.edu,
c=US
Date: 2017.08.08 18:35:06 -04'00'

Jerald S Ault, Ph.D.
Professor and Chair
Department of Marine Ecosystems & Society

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Assessment Team response:

The Assessment Team consider this submission in their determination as to whether or not Atlantic menhaden represent a key-LTL species for the purpose of conducting an MSC assessment.

Ultimately, the Assessment Team determined that Atlantic menhaden should be considered as a key-LTL species which is in agreement with the position outlined in this submission. For further details see: [Consideration of Atlantic menhaden as a Lower Trophic Level \(LTL\) species](#).

Andre Buchheister



Thu 10/08/2017 18:40

Andre Buchheister <ab4577@humboldt.edu>

Ecosystem modeling paper for Atlantic menhaden

To Samuel Dignan; Jean Ragg; Ivan Mateo

Cc Ben Shouse; peter.himchak@omegaprotein.com; Dana Rollison; miller@umces.edu; ehoude@umces.edu

 You replied to this message on 17/08/2017 09:30.

 Message  Buchheister et al. 2017 (MCF) - Evaluating ecosystem based reference points for Atlantic menhaden Brevoortia tyrannus.pdf (5 MB)

Dear Samuel, Jean, and Ivan,

I understand that you are in the process of evaluating the Gulf and Atlantic menhaden fisheries with SAI Global for the MSC certification. I wanted to share with you a paper I wrote that was recently accepted for publication in the journal *Marine and Coastal Fisheries*. The paper describes the development and application of an ecosystem model in the Northwest Atlantic Coastal Shelf to examine tradeoffs in different management strategies for Atlantic menhaden. I have CC'd my coauthors from the University of Maryland (Tom Miller and Ed Houde), associates from the Lenfest Ocean Program who funded the work, and Peter Himchak from Omega Protein who had previously inquired about the status of the paper for the purposes of the certification process. The accepted manuscript can be found here: <http://www.tandfonline.com/doi/abs/10.1080/19425120.2017.1360420>, but I have attached it for your convenience. Please let me know if you have any questions.

Thank you,
Andre

Andre Buchheister
Department of Fisheries Biology
Humboldt State University
Arcata, CA 95521
andre.buchheister@humboldt.edu
707-826-3447

Assessment Team response:

The attached paper is open access and can be found at:

<https://www.tandfonline.com/doi/abs/10.1080/19425120.2017.1360420>

The paper supplied by the stakeholder have been considered and referenced extensively as part of this assessment.

Byron Quinley

From: [Byron.Quinley](#) [REDACTED]
Sent: 24 July 2017 13:47
To: Jean Ragg <Jean.Ragg@saiglobal.com>
Subject: Atlantic Menhaden Fisheries Enter MSC Sustainability Assessment

Good morning,

I read about this over the weekend and wanted to voice my concern for the menhaden fishery in the Chesapeake Bay. My personal experience is see far fewer menhaden in the Bay over the years. The impact has been noticeable in that table fish catches which feed on menhaden continue to decline. My friends abroad who used to vacation here for the beach and fishing now go to North Carolina. We lose to them in eco-tourism. In addition, blue crab hauls are underperforming and I wonder if many of the predatory fish are feeding on them due to lack of menhaden. Lastly, Virginia has made great strides in promoting a cleaner bay by building oyster reefs and limiting the menhaden haul would be another crucial component to clean up the bay.

Commercial fishing is important should continue, but the amount being taken now is harmful to the Bay and the broader economy. I was a bit embarrassed when we were one of only three states to vote against the 20% reduction in menhaden harvest in 2012, and don't want to see that happen again.

Byron Quinley
[REDACTED]

Click [here](#) to report this email as spam.

Assessment Team response:

The Assessment Team considered the stakeholder's submission in their assessment of the fishery. The status of the menhaden stock with respect to its role in the ecosystem has been examined in detail in [3.3.3.7. Ecological Reference Points \(ERPs\)](#) while the the fact that the current harvest strategy is not designed to take into account the ecological role of Atlantic menhaden has resulted in the Team raising two Conditions (see [Appendix 1.3 Conditions](#)).

James Crowley

From: James Crowley [REDACTED]
Sent: 26 June 2017 18:22
To: Jean Ragg <Jean.Ragg@saiglobal.com>
Cc: 'James Crowley' [REDACTED]; Ellen Pikitch <ellen.pikitch@stonybrook.edu>; Benson Chiles [REDACTED]; 'Bill Michaelcheck' [REDACTED]; 'Jerald S. Ault' <jault@rsmas.miami.edu>
Subject: Stakeholder Submission for the Menhaden Sustainability Assessment
Importance: High

Greetings,

Please find attached two documents that are highly relevant to your upcoming sustainability assessment of the Menhaden Fishery . Please acknowledge receipt.

I am sending the attached as a private citizen, avid angler and conservationist. I am not employed by any organization in this regard.

My sole desire is to preserve and to help renew this essential resource for future generations. These fish belong to all Americans.

The data exists all the way back to the mid 1800's for you to accurately assess the virgin biomass of Menhaden. I would hope you perform that level of diligence in your deliberations.

If I can be of help in any way I would be happy to do so. Email is the best way to contact me.

Sincerely,

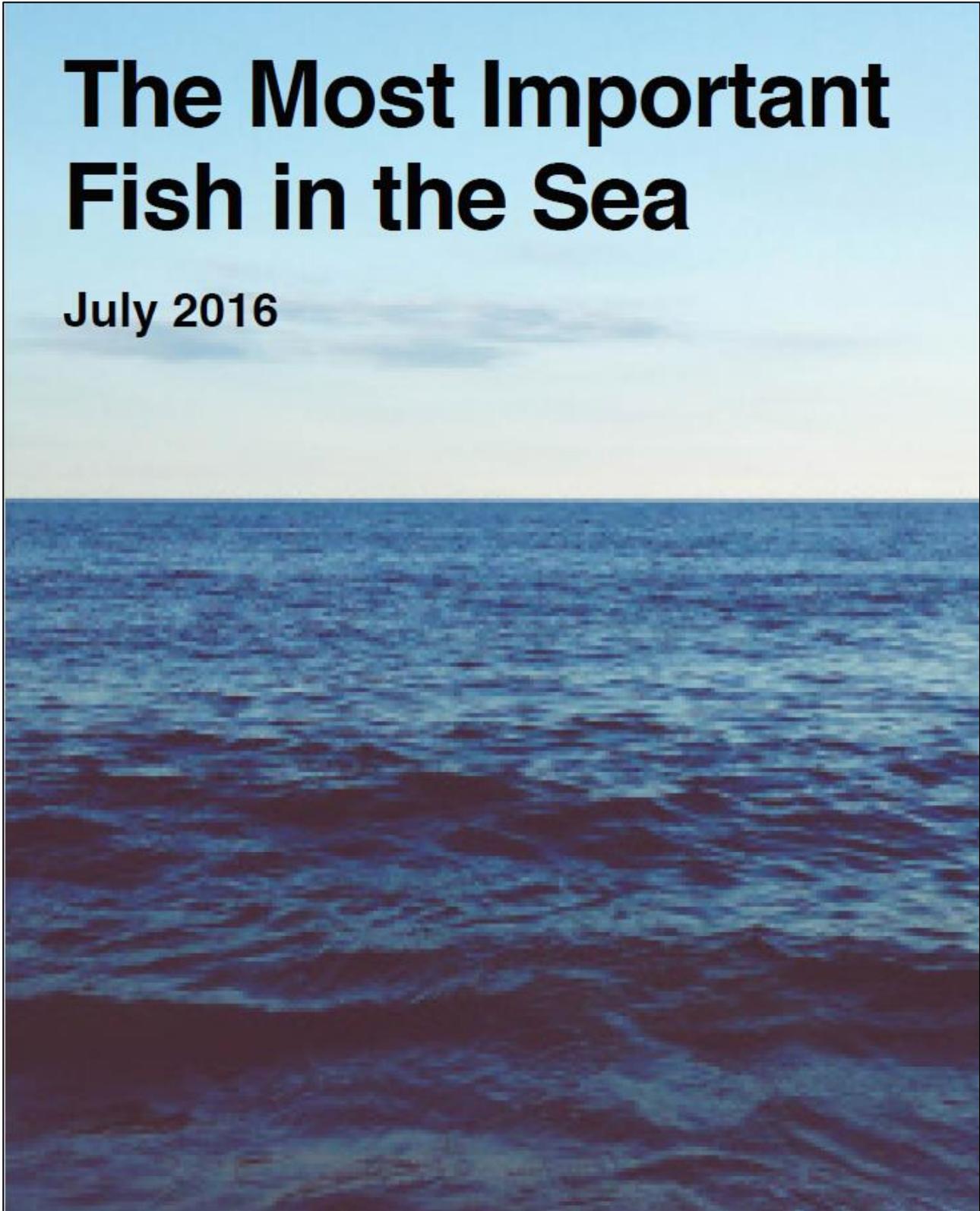
James Farrell Crowley
[REDACTED]

Click [here](#) to report this email as spam.

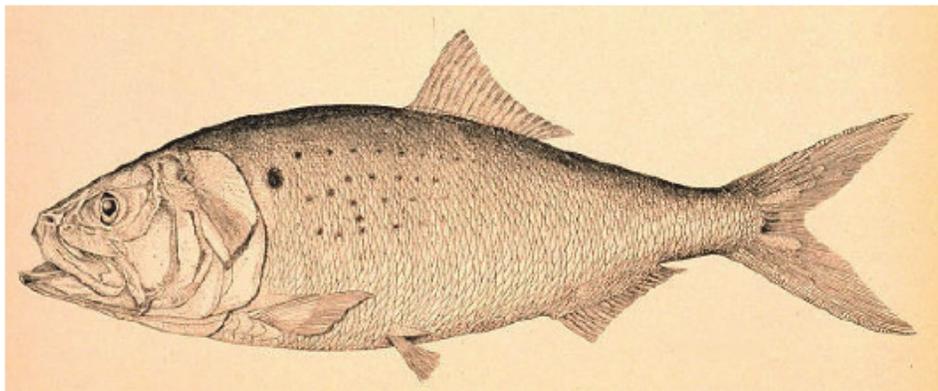
Attached document #1:

The Most Important Fish in the Sea

July 2016



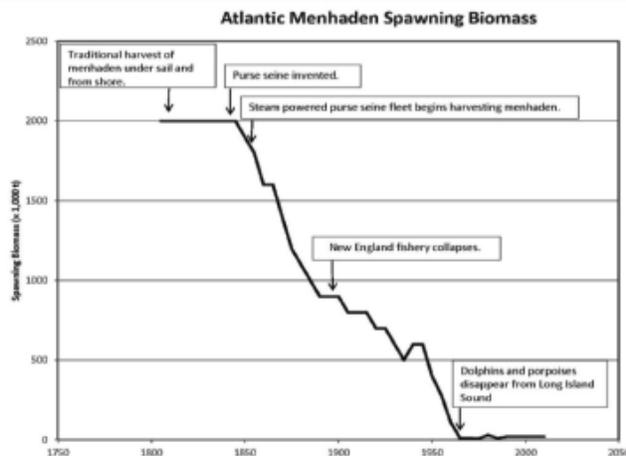
THE MOST IMPORTANT FISH IN THE SEA



An obscure company in Texas, with political power greater than its size, is in the process of destroying the marine ecology of the Atlantic and Gulf coasts, starting with the Chesapeake Bay. How can they do this? Why are they allowed to commit this ecocide? It all starts with a small, oily fish called Atlantic menhaden (*Brevoortia tyrannus*), and its Gulf of Mexico cousin, (*B. patronus*).

Menhaden are the keystone fish of the coastal Atlantic Ocean and Gulf of Mexico. They provide the primary food source for dozens of key predators such as striped bass, tarpon, weakfish, sharks, dolphins, bluefish, whales, harbor seals, ospreys, pelicans, loons, and more. They are also a filtering species, removing algae and zooplankton from the sea, and consequently playing a critical role in clarifying water and reducing algae blooms. As ecosystem engineers, menhaden have been called “the most important fish in the sea,” yet only a small fraction of their historic population survives today.¹

Centuries ago, menhaden schooled in massive groups that went on for miles, providing ample food for predators and passing nutrients to animals higher in the food web. But a virtually unregulated fishery coupled with 20th century advancements in fishing technology have shrunk the menhaden population and negatively impacted many important predators, as shown in the following graphic²:



Netted by the billions, menhaden are pulverized into meal, fertilizer, and fish oil, in a process known as “reduction.” The resulting products are sold for pennies and used in cosmetics and animal feeds worldwide. More pounds of menhaden are caught each year in the continental United States than any other fish. Excessive removals of these small filter-feeding fish, from the Atlantic Ocean in particular, is wreaking havoc on important U.S. coastal ecosystems and decimating the economically important fishing and tourism industries that depend on them.

Ending menhaden “reduction” fishing is the only way to avoid the collapse of this fish population and its predators in the Chesapeake Bay and other vital East Coast waters. The quality of our water, food supply, and coastal marine ecosystem depend on action being taken now. This paper highlights the science and context driving

1 For more information on “the most important fish in the sea,” see H. Bruce Franklin’s seminal book of the same title; ASM-FC Menhaden Benchmark Stock Assessment 2015, <http://bit.ly/StockAssessment>

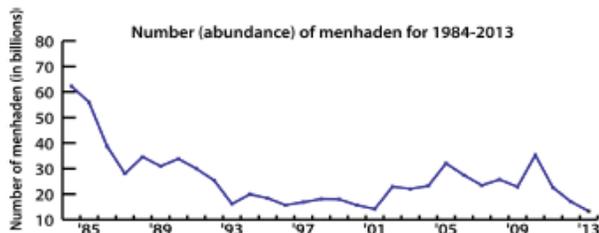
2 July, 2013 edition of Long Island Boating World, <http://bit.ly/BoatingWorld>

these politically charged conditions.

The Threat

The menhaden reduction fishery nets and processes more than one billion pounds of menhaden in the United States annually from the Atlantic Ocean and the Gulf of Mexico.

For decades, scientists, environmentalists and coastal residents have warned that the removal of this prodigious amount of menhaden from its native waters will have long-term devastating consequences on the productivity of our coastal ecosystems. In recent scientific assessments, scientists concluded that the Atlantic menhaden population is a small fraction of its historical stock size.³

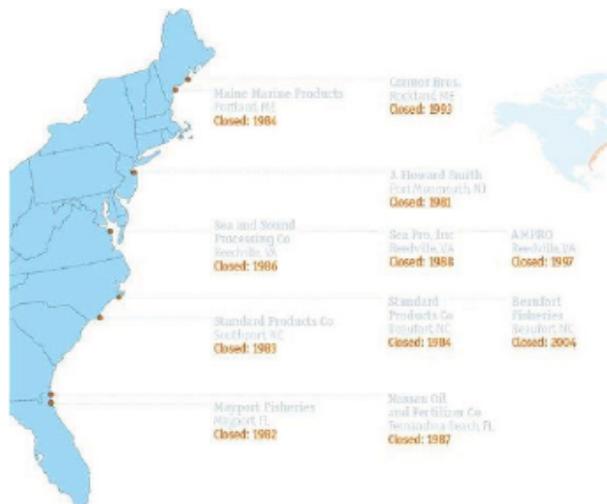


At one time there were 91 processing plants along the East Coast from Maine to Florida that “reduced” menhaden to fish oil and meal. By the 1950s that number had shrunk to 20 reduction factories. Today, all of these plants but one have closed principally due to the severe depletion of the menhaden population. The one remaining East Coast factory, located in Reedsville, Virginia, on the southwestern side of the Chesapeake Bay, processes about 80% of the Atlantic menhaden catches; the other 20% is harvested for use by recreational fishing and for commercial crab and lobster bait. Two reduction factories still process menhaden on the Gulf Coast from bases in Louisiana and Mississippi.⁴

For its Atlantic operation, the reduction fishery uses factory ships and spotter planes to find and net huge schools of menhaden. Menhaden’s natural form of protection from predators is to school in tight wads, which are easily located by spotter planes as a huge reddish shadow. Once spotted, reduction boats encircle entire schools with giant nets called “purse seines.” When the fish are surrounded, the net is cinched tight like a drawstring, and a hydraulic vacuum pump is used to transfer the fish to the ships. In this way, menhaden are literally

³ <http://bit.ly/StockAssessment>

⁴ <http://bit.ly/StockAssessment>, p. 162



vacuumed out of the ocean by the millions, along with any predators that happen to be feeding on the school.

Menhaden are no match for this armada; there are few survivors.

Furthermore, 10% or more of the reduction fishery’s catch is bycatch (unintended harvest) of key predators that school with menhaden. This bycatch is not a nominal amount: scientists estimate that 50% of the U.S. Spanish mackerel catch is taken incidentally by the menhaden fishery’s nets.⁵

Back at the factory, the reduction fishery grinds and cooks the menhaden, processing the fish into fish meal, fish oil and soluble products used in international aquaculture, livestock and pet foods, cosmetics, and fertilizers. The reduction fishery’s total revenues were \$309 million in 2014, but these revenues come at great ecological costs to consumers, fishermen, and the environment.

Why We Should Care

The word “reduction” is aptly used here since the fishery has greatly reduced the population of the most important forage fish in coastal Atlantic and Gulf seas. By reducing the primary source of protein for dozens of apex predators, the fishery also reduces populations of predator fish, marine mammals, and birds. Due to overfishing by the reduction industry, striped bass and others species no longer have the access to the abundant, nutrient-packed menhaden that they need. This overfishing

⁵ Senior NOAA scientist regarding Gulf Menhaden

has triggered a number of other problems for wildlife. In 1975, menhaden filled 75% of the osprey diet; today it's just 28%. Menhaden once represented 70% of the striped bass diet; today, it makes up a paltry 8%.⁶

Fishery researchers have estimated that up to 60% of the striped bass in the Chesapeake Bay are now infected with a fatal wasting disease called mycobacteriosis, which has been linked to malnutrition. Weakfish have also suffered significant depletion in the past decade, as whales and striped bass have out-competed young weakfish for the dwindling supply of menhaden. As these predators pursue other sources of protein, they reduce the populations available for the next predator in the food chain, cascading the problem down the food chain to species like lobsters, clams and oysters.

The menhaden fishing industry has pushed these valuable predator populations to their brink, destabilizing aquatic ecosystems by leaving far too few menhaden in the water to support its natural predators. Since menhaden are migratory fish and their predators closely follow their migrations, this has far-reaching impacts on industries like saltwater recreational and commercial fishing. Each of these industries contribute billions of dollars to the economies of all the Atlantic coast states as well as those in the Gulf of Mexico.

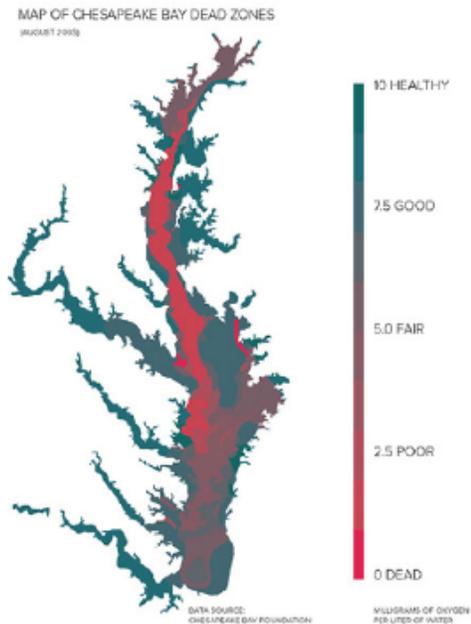
Menhaden and the Chesapeake Bay

The Chesapeake Bay is the largest and most important estuary in the United States. It hosts thousands of species of animals and plants, and nearly 17 million people live in its watershed. The Chesapeake also supports economically important resources including blue crabs, Eastern oysters, striped bass, and two of the five major commercial seaports in North America. Unfortunately, it is also home to the menhaden reduction fishery which harvests up to 240 million pounds of menhaden every year from the Chesapeake Bay alone,

6 <http://bit.ly/BayFoundation>

many of which are immature juveniles.

Historically the Chesapeake Bay supported massive populations of menhaden, striped bass, bluefish and other predators. Captain John Smith, upon arriving in the Chesapeake Bay in 1607, reported seeing schools of menhaden extending for miles and so thick he “could easily catch them with a frying pan.” But the pristine and balanced ecosystem he witnessed is a thing of the past. The menhaden reduction industry’s vacuuming operation is principally focused on the Virginia waters of the Chesapeake Bay. This has had devastating consequences for the ecosystem and key fishery resources, like for example, striped bass. Scientists estimate that the Chesapeake Bay spawning areas produce 70 to 90% of coastal migratory striped bass. Stripers then spend the first 4-6 years of their lives in the Chesapeake, feeding on immature menhaden and beginning the process of synchronizing their life-cycles to the migrations of menhaden, ultimately following them from Florida to Maine and back



again.⁷

Other predators also sync their life cycles to menhaden as they mature. Menhaden move north and south from the Bay, which produces incredible striper, bluefish, tuna, and tarpon fishing up and down the East Coast. The famous fall run of stripers around Montauk arrives when the menhaden are moving back south to spawn. Unfortunately, that’s where they again meet their apex predator in the main stem of the Chesapeake Bay – the menhaden reduction industry and its purse seine nets.

Menhaden are Efficient Filter Feeders

Menhaden use specialized gill-rakers to feed on microscopic phytoplankton and zooplankton throughout their lives – this represents one of their most significant ecological roles. Without menhaden to remove these tiny plants and animals from the water, plankton populations explode, resulting in harmful red tides and algal blooms, a primary cause of “dead zones”

7 <http://bit.ly/DNRStripedBass>

in the Chesapeake Bay. As the numbers of menhaden have declined, dead zones have become a significant and growing problem, not just in the Chesapeake Bay but along the entire Eastern seaboard.

The over-production of phytoplankton and zooplankton has other unintentional consequences: with the addition of more food, jelly fish populations have thrived, making many beaches and waterways uninhabitable during certain times of the year.

Scientific estimates reveal the tremendous filtering capacity of menhaden if restored to their native abundance. The average menhaden is about 8 inches long, weighs 0.3 pound, and is capable of filtering 2.4 gallons of ocean water each and every minute. Thus, the current average annual catch of 1.5 trillion menhaden by the reduction fishery leaves an astonishing 1.9 quadrillion gallons of seawater unfiltered. Left alone to serve their critical ecological role, the yearly menhaden catch could likely filter the entire Chesapeake Bay every 3.8 days. Given the severity of pollution along the Atlantic coast, these missing menhaden would significantly improve water quality by combating scourges like nutrient runoff and algal blooms.

The Value of Menhaden to the Economy

Recent estimates suggest that the menhaden reduction industry provides \$88 million to the local economy of Virginia. But this figure pales in comparison to the remarkable value those missing menhaden could provide in the form of environmental cleanup alone. By removing such an incredible number of water-filtering, protein-packed menhaden from the coastal ecosystem, the reduction fishery costs Eastern seaboard states hundreds of millions of dollars in vital ecosystem services. When you take into account the number of predators and people who depend on those predators, the total value of these missing fish is astonishing.

If the menhaden reduction fishery were a logging company cutting old growth trees from a Virginia State Park and hauling them to Asia, one would certainly not count the value of those trees as income to Virginia. Those trees would be a loss. Likewise, the value of the menhaden taken from the waters of Virginia is a loss to the people of Virginia as well as all of the Atlantic States from Maine to Florida.

Put simply, forage fish like menhaden are worth more in the water than they are in the nets and vacuum pumps

of the reduction industry. The Lenfest Forage Fish Task Force recently estimated that the value of leaving forage fish in the ocean as a food source for predators is \$11 billion—twice as much as the \$5.6 billion those fish generate when reduced into fish meal and fish oil for things like aquaculture, farming, human supplements, and pet food.⁸

“Political” Science – How the Ecocide has Occurred

Every state on the East Coast, with the exception of Virginia, has banned reduction fishing in their state waters. How and why has a single industry been allowed, with de minimis oversight, to decimate the menhaden population along the entire Eastern Seaboard? The answer lies squarely in the thorny politics of the Atlantic States Marine Fisheries Commission (ASMFC), a multi-state agency chartered by Congress with federal and state funding.

Fifteen Atlantic coastal states formed the ASMFC in 1942, recognizing that fish do not adhere to state boundaries. Since then, the ASMFC has coordinated the management of Atlantic fishery resources, regulating 24 migratory species that include striped bass, lobster, weakfish, eel, river herring and menhaden. Because most fishing takes place in the rich and diverse near-shore waters where many species tend to congregate, the ASMFC has a substantial amount of power and latitude over decisions concerning Atlantic commercial and recreational fisheries.

In 1981, the ASMFC took responsibility for regulating menhaden, and for more than thirty years the commission took no action to limit menhaden catches along the Eastern Seaboard, despite the fact that ASMFC’s scientists and external experts consistently recommended protecting the forage base that sustains the ecosystem. During those thirty years, every Atlantic Coast state except Virginia recognized the wonton ecological devastation associated with destroying massive amounts of menhaden, and banned reduction fishing in their state waters.

Over the years, the menhaden reduction fishery has worked several angles to guarantee its position as primary harvester of menhaden. Industry representatives sit on ASMFC governing committees that provide recommendations to fisheries regulators. They hire economists to prove the local economic value of the fishery.

8 <http://bit.ly/Lenfest>

They co-opt small business bait fishermen who catch small amounts of menhaden for use by recreational and other fishing. Finally, the industry spends hundreds of thousands of dollars annually in lobbying and PR to influence regulators and public opinion.

As a result, the industry has managed to convince the ASMFC and Virginia lawmakers to allow menhaden reduction fishing within Virginia state limits and in proximal federal waters (between three and 200 miles out to sea). This virtually exclusive access enables the company's continued exploitation of the sensitive nursery areas of the Chesapeake Bay and Federal waters along all coastal states.

In 2012 the ASMFC finally took a small step in the right direction. New science showed that just 8% of menhaden remained in the Atlantic compared to historic levels. Following this discovery, and under intense public pressure, the ASMFC implemented the first coastwise quota for the menhaden fishery (i.e., a hard limit on the number of pounds of menhaden that could be caught in a given fishing season). The reduction fishery's menhaden catch had to be reduced by 20%.

This was a start, but independent scientists have since argued that a 20% cut in menhaden fishery is not nearly enough to protect the menhaden population in the short or long term. In order to protect the Chesapeake Bay and the Atlantic predator populations, they are recommending even greater cuts as well as a ban on netting in the Chesapeake Bay.

Whose Science is it Anyway?

In February 2015, the ASMFC released new science that painted a rosier picture of the status of the menhaden population, claiming that menhaden were no longer subject to overfishing. The basis of the claim was the menhaden population biomass (i.e., pounds of fish) had significantly increased. Upon further analysis of the report, the perceived increase in stock biomass was the result of changes to the assumptions in the stock assessment model including inclusion of large "phantom" fish in New England waters, and the questionable rejection of a multi-species assessment model that explicitly considered predation by striped bass, bluefish and weakfish. Crucially, the number of menhaden did not increase, only the measurement of their individual weights showed an uptick. In fact, the menhaden population remains at its lowest abundance (numbers of fish) in the 60 year history of assessments. This is import-

ant because it's not the weight that's important per se, but the total numbers of fish of all sizes that matters to the dozens of predators along the Eastern seaboard that rely on menhaden for food. In addition, the fishery data used in the current science only accounts for the years between 1955 and the present. The historic importance and size of the menhaden population is not taken into account, despite the fact that menhaden numbers were far higher in the centuries before the advent of industrial fishing techniques in the mid 20th century.

In spite of these contradictions, the menhaden reduction industry set their regulatory and scientific machine in motion and immediately began calling for a "substantial quota increase." On the basis of this new "science," and pressure from the industry, regulators capitulated and allowed the fishery to take 10% more menhaden in 2016 than they had the previous year.

Furthermore, ASMFC's current stock assessment model is rigged against the ecosystem; it measures the health of menhaden population based only on whether the population can sustain itself for the needs of the reduction industry. Managing menhaden on the basis of one predator (man) is counter-intuitive since so many economically important predators also depend on the menhaden resource for survival. Exactly how many menhaden are needed to sustain species other than the reduction industry has never been accounted for in the official calculations.

For many years, scientists have recommended the development of "ecological reference points" (ERPs), or benchmarks that would quantify the important ecological roles that menhaden play in the coastal ecosystem. ERPs would allow reduction fishing only after those ecological roles have been fulfilled. Unfortunately, the ASMFC currently has no obligation, legal or otherwise, to leave any menhaden in the ocean for all the predators that depend on it.

The ASMFC began the process of developing ERPs for menhaden in 2015, creating a working group of ASMFC members and industry stakeholders who are tasked with holding a series of workshops to define how to proceed. The group has set a goal of establishing ERPs by 2017.

Alarming, the ASMFC has allowed the menhaden reduction fishery to be involved in the development and formulation of these critical reference points; in essence, allowing the industry to assist in setting the standards by which it will be regulated. It is a classic case of a fox

guarding the henhouse.

Conclusion

Over the years, the menhaden reduction industry has committed its ecocide by manipulating the data and the politics in their favor. It's time to change that formula with the truth about this special species of fish. Menhaden Defenders, Anglers Conservation Network, and conservation minded anglers up and down the East Coast are working to create a scenario whereby menhaden are allowed to perform their dual functions of improving water quality and serving as an abundant food source for a variety of fish and animals. Reduction fishing cannot be controlled under the ASMFC's current model of single species management. Only when the complex roles that menhaden play in the coastal ocean ecosystem are accounted for can the system change for the better and sustain this critical and keystone resource.

Your support is vital towards accomplishing the following near term goals:

- ASMFC adoption of ecological reference points for management of menhaden in 2017.
- Precautionary management of menhaden - i.e. no catch increases - until the implementation of ecological reference points.

Your support is also essential for meeting the long term goal of ending reduction fishing altogether. These fish are more valuable left in the water where they provide the greatest impact and utility to both man and nature.

For more information and to find out how you can help, please visit menhadendefenders.org.

Captain Paul Eidman

captpaul@anglersconservation.net

Menhaden Defenders

menhadendefenders.org

Anglers Conservation Network

anglersconservation.net

Attached document #2:



Assessment Team response:

The Assessment Team considered the documents submitted by the stakeholder in their assessment of the fishery. It is unclear where the Spawning Biomass figure in the document submitted is derived from as it differs substantially from the official records.

Jeffrey Lloyd

From: Jeffrey Lloyd [REDACTED]
Sent: 22 July 2017 21:27
To: Jean Ragg <Jean.Ragg@saiglobal.com>
Subject: Over harvesting of menhaden-Chesapeake Bay

Hello,

My name is Jeff and I simply wanted to express my concern for the growing issue of over-harvesting Menhaden. I have lived on and have been fishing in the Chesapeake Bay for 25 years now (since I was 6 years old with my grandfather). I simply cannot believe that we continuously allow these amounts of menhaden harvests annually while ignoring the decline of several fish species (the driving food source and foundation!). The profitable companies and politics are mainly to blame but I am officially engaged and determined to balance out this issue going forward. Just wanted to express my concern and introduce myself!

Jeff Lloyd

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Assessment Team response:

The Assessment Team considered the stakeholder's submission in their assessment of the fishery.

Westley Chesser

From: Chesser, Westley J. (wc4x) [REDACTED]
Sent: 19 July 2017 19:24
To: Jean Ragg <Jean.Ragg@saiglobal.com>
Subject: Virginia, Chesapeake Bay - Omega Protein

At a minimum Omega Protein should not be allowed to harvest menhaden inside the boundaries of the Chesapeake Bay waters, only allowed in Federal waters. Please make sure your study of the overfishing of juvenile menhaden and waste of bycatch by Omega protein in the Chesapeake Bay waters includes actual local information and catch data. The Chesapeake Bay is considered the nursery of the Atlantic coast and Omega protein has done major damage to the overall fishery of the bay.

Thank You!

Westley Chesser

Click [here](#) to report this email as spam.

Assessment Team response:

The Assessment Team considered the stakeholder's submission in their assessment of the fishery including fishing pressure on juvenile menhaden and as bycatch levels in the fishery.

William Bartlett

From: William Bartlett [REDACTED]
Sent: 22 September 2017 22:30
To: Ruth O'Connell
Subject: Menhaden

Thought you might like to read this.

Over 20 years ago I wrote my first article about menhaden. It was several years before that, that I realized the menhaden population was nowhere near what it had been in the past. It was easy to see the numbers of menhaden because they swim mostly near the surface, where their food is. Their food is algae: phytoplankton and zooplankton. I thought it was important that we have as many menhaden as possible because they filter the water and provide food for many other fish, birds and mammals. You may have read or heard about these things before.

There are several other concerns people have about the Chesapeake Bay. Some of the main concerns include water turbidity - how clear is the water, how much nitrogen and phosphorus are present, how the animals are doing - fish, crabs and oysters. How are the grasses doing and how much dissolved oxygen is in the water. These are all important things.

I was naive enough early on to think that all I had to do was to let a few of the right people and agencies know that the menhaden population was down in my area of the Potomac River and they would thank me for letting them know and take care of the situation. I wrote about it, spoke about it, and studied it for a number of years to no avail. I had hoped that the problem with menhaden would be corrected and allow me to move on to some other problem facing the Chesapeake Bay. It seemed to me to be an easy problem to fix. After so many years the problem still exists. All I hear is that the menhaden are not overfished and overfishing is not occurring. This statement feels like fingernails down a chalk board to me.

Now that we have some control over the amount of menhaden being fished because of quotas, we have seen a resurgence of whales in some areas. We know about the whales because we can see them when they blow or breach, but I contend that there are predatory fish that have also returned to the same areas due to the preponderance of menhaden. Menhaden are used for animal feed, omega 3 oil and raising farmed fish. We do not need to remove menhaden for the purposes they are used for. It is not natural to feed fish to cows, chickens or pigs. These animals never caught a fish. There is no need to secure omega 3 oil from menhaden because we can get omega 3 oil from other sources: namely, many types of seeds, marine algae, grass fed beef and, mainly, wild fish. Menhaden used for omega 3 oil may contain contaminants. Keep in mind that omega 3 oil is produced by plants. Menhaden get it from consuming marine algae. We can go right to the source by cultivating marine algae.

Lets look a little closer at why we need more menhaden. The turbidity of the water is such that it makes me wonder how a predatory fish can find a forage fish to eat. The forage fish would have to swim awfully close for the predatory fish to see it. There are places in the world called rookeries where birds like puffins and penguins like to congregate. The parents have to leave the young to go to sea to get fish for the young. In some cases today, the forage fish have become scarce and the birds have to fly further and for longer periods of time to get enough fish. While they are gone, other animals and birds attack their young.

Last year I watched as two eagles built a nest near the top of a large pine tree. Both seemed to be attentive to the the two eaglets that hatched. I could see the eaglets when they popped their heads up. One day the two eagles left the nest, I assume to look for food. The two eaglets disappeared. Could it have been that the eagles, in their quest for food for their young, failed to guard them? Could it be that if there had been more menhaden, both would not have left the nest to look for food?

A large portion of menhaden fish meal is used in raising farmed salmon. There are several problems raising these fish in an enclosed area. They are susceptible to sea lice. To combat the lice they are fed chemicals. These lice also escape and affect wild fish. A colorant is added to the fish meal to make the salmon pink. In the wild the salmon are pink due to what they eat. The salmon in cages bioaccumulate toxins such as PCBs and pesticides. Due to the fish being held in such confined areas, there is a preponderance of disease that must be dealt with by feeding them antibiotics. Farm raised fish have many problems. We are better off trying to protect our wild fish.

It seems that most people involved with fish management do not understand the intricacies of Mother Nature. Let's look at some examples on land. The mighty oak tree produces hundreds of acorns with the hope of only a few taking root. The same scenario plays out with most plants. The pollen count is incalculable, yet relatively few get to do their job. For the predatory animals, nature provides myriad animals for them. There are mice, rabbits, birds, and etc.

In the waters around the world, nature has provided forage fish. The most abundant in our area are the menhaden, although there are others such as bay anchovy, Atlantic silversides, blueback herring and alewife to name a few. Some of these fish are in a diminished state because they are anadromous and migrate from the sea to fresh water rivers and streams to spawn, only to find that some places have been dammed or the habitat has disappeared. When these fish come to spawn, they are easy to catch.

Now let's look at what Mother nature does in the water with the number of eggs the animals in the oceans and bays can produce. Some fish lay only a few eggs. Others can lay tens of thousands. Just as with land animals fertility depends partly on the age of the fish. Some menhaden that are caught have not reached a good spawning age. One crab may produce 700 thousand to 8 million eggs. Oysters can produce up to 100 million eggs annually. As you can see, these animals produce large numbers of eggs but only a few survive, just as nature intended. So the fish are there that we may harvest them by the tons, but they should be left in the water where we will benefit more than feeding them to farm animals or farmed fish. One advantage menhaden have is that they spawn in the ocean. They have not been decimated as some anadromous fish and have therefore been able to sustain themselves. But as we have seen in Nature, we need to provide many times more forage fish to keep things as Nature intended to make sure that all the other animals that rely on forage fish to always have enough food.

Can you imagine a whale trying to catch one fish at a time? Nature has provided fish like menhaden that swim in schools, thus whales and other predatory fish can swim through these schools and be sure of getting one fish or a whole mouth full.

I worry that one day something catastrophic may happen to the menhaden, and yet those left will still swim in schools near the surface and will still be seen by airplanes scouting for them. These might be the last few schools left to be caught.

We now have Draft Amendment 3 for menhaden. My hope is that one day I will see the return of many large schools of menhaden and an increased abundance of predatory fish, birds and mammals
Let's leave the menhaden in the water as Nature intended so that all the creatures that depend on them have plenty to eat.

William Bartlett



Assessment Team response:

The Assessment Team considered the stakeholder's submission in their assessment of the fishery. The status of the menhaden stock with respect to its role in the ecosystem has been examined in detail with the most up-to-date estimates of the Atlantic menhaden stock in relation to the 'rule of thumb' ecological reference points presented in detail in [3.3.3.7. Ecological Reference Points \(ERPs\)](#).

In addition the Assessment Team have considered the fact that the current harvest strategy is not designed to take into account the ecological role of Atlantic menhaden and is not responsive to the state of the menhaden stock with respect to its role in the U.S. Northwest Atlantic ecosystem. This finding has resulted in the Team raising two Conditions (see [Appendix 1.3 Conditions](#)).

Other stakeholders

Other stakeholders that registered their interest but that have not provided substantive information to date include.

Organizations

- Gotham Whale
- The Nature Conservancy
- Menhaden Defenders
- Marine Fish Conservation Network

Individuals

- Charles Denton
- Jack Kram
- Tony Friedrich

[REQUIRED FOR FINAL REPORT AND PCR]

If the Assessment progress to the Final Report and/or Public Certification Report stages, the Final Report and PCR will include:

1. All written submissions made by stakeholders about the PCDR in full, together with the explicit responses of the team to points raised in comments on the PCDR that identify:
 - a. Specifically what (if any) changes to scoring, rationales, or conditions have been made.
 - b. A substantiated justification for not making changes where stakeholders suggest changes but the team makes no change.

8.4. Appendix 4 Surveillance Frequency

During each full assessment the Assessment Team, with input from the client, shall determine the level at which subsequent surveillance of the fishery shall be undertaken. Surveillance audits shall take place according to the default surveillance level (requiring 4 on-site surveillance audits), unless the team decides on a reduced surveillance programme.

The surveillance level for the fishery shall be determined on the basis of the confidence of the CAB in its ability to verify information, and progress towards meeting conditions, remotely and surveillance level 1 may only be chosen if the fishery has no outstanding conditions. Where a reduced surveillance level is adopted rationale is required as to how the CAB can verify information remotely.

To assess fisheries against the verification of information criteria the Assessment Team elected to use Table G13 provided in the FCR v2.0 to determine the likelihood that future surveillance teams will be able to access the required information remotely and that they can confirm veracity of the information. For results of this assessment of the fishery against the verification of information criteria see Table 32 below.

Table 32. Assessment of the fishery under assessment against verification of information criteria.

	Ability to verify remotely is low	Ability to verify remotely is high	SAI Global evaluation
Client and stakeholder input	Electronic forms of communication and other mechanisms to engage with clients and stakeholders (such as video conferencing, phone conferencing, email, phone) are absent, limited or inefficient and ineffective in providing the information required for an audit in the particular circumstances of the fishery.	There are ample opportunities and mechanisms to engage with clients and stakeholders including electronic forms of communication, such as videoconferencing phone conferencing, email, phone. The mechanisms are effective in the particular circumstances of the fishery.	Electronic forms of communication are widely and readily available. SAI Global's ability to remotely verify information is determined to be High .
Fishery reports, government documents, stock assessment reports and/or other relevant reports	Fishery reports and other types of reports required for the surveillance, and to demonstrate fishery performance in relation to any relevant conditions and on-going performance against the MSC's standard are not available publicly and cannot be transmitted electronically. There is no remote access to the information and there are none, or very limited other sources available to triangulate and confirm status of the fishery with respect to the MSC standard	Fishery reports and other documented evidence that can be used to demonstrate progress against conditions and other issue relevant to the MSC Principles and criteria can be easily and transparently checked remotely, due to such information being available publically, such as being available on a website or having been widely distributed and made publically available to several stakeholders. The reports can be transmitted electronically and veracity easily confirmed.	All document relating to fisheries advice, research and management are available online or can be obtained electronically. SAI Global's ability to remotely verify information is determined to be High .
Information appropriate to determination of Principle 1 and 2 information requirements.	Information from electronic monitoring of position, observer data, logbooks, fisher interviews, dockside monitoring etc. is required for audits but cannot be easily transmitted to a remote auditor in a form that can be easily interpreted.	Where Information from electronic monitoring of position, observer data, logbooks, fisher interviews, dockside monitoring etc. is required to verify performance against MSC standard, this information is available to be transmitted electronically to auditors in a form that can be easily interpreted.	NMFS publishes data on landings online. Any other information that might be required can be transmitted in an electronic form. SAI Global's ability to remotely verify information is determined to be High .
Transparency of the management system	Level of transparency of information by management is low such that information about performance of	There is a high level of transparency in management, such that information on the fishery is widely and publically	Information on the fishery is transparent, widely available online. Information and can easily

	Ability to verify remotely is low	Ability to verify remotely is high	SAI Global evaluation
	the fishery is generally not easily and widely available.	available or known to the wider group of stakeholders. Any information provided on the fishery can be easily verified.	be verified by checking online sources or through direct contact with relevant officials. SAI Global's ability to remotely verify information is determined to be High .
Vessels, gear or other physical aspect of the fishery	There are milestones and conditions that require inspection of vessels or other physical aspects of the fishery during the audit and there are no reliable mechanisms for verifying these aspects of the fishery from a remote location.	There are no milestones that require investigation of physical aspects of the fishery or if there are, there are reliable mechanisms to enable verification of developments with respect to that milestone from a remote location.	There are Conditions no milestones that not require investigation of physical aspects of the fishery. SAI Global's ability to remotely verify information is determined to be High .

Following this assessment it was determined that the appropriate surveillance level for this fishery at this time is Surveillance Level 6 (the Default surveillance level); Note this may be revised at subsequent surveillance audits if appropriate. Rationale for 1) not recommending a reduction from the default surveillance level (Table 33) and 2) deviations from carrying out the surveillance audit before or after the anniversary date of certification (Table 34) are presented below as well as a completed fishery surveillance program (Table 35).

Table 33. Surveillance level rationale.

Year	Surveillance activity	Number of auditors	Rationale
Year 1 (2020)	On-site surveillance audit	2/3 auditors on-site	There are 3 Conditions. Given the level of stakeholder interest as well as the particular the issues on which Conditions 1 and 2 have been placed, the Assessment Team have determined that an on-site audit is appropriate.
Year 2 (2021)	On-site surveillance audit	2/3 auditors on-site	There are 3 Conditions. Given the level of stakeholder interest as well as the particular the issues on which Conditions 1 and 2 have been placed, the Assessment Team have determined that an on-site audit is appropriate.
Year 3 (2022)	On-site surveillance audit	2/3 auditors on-site	There are 3 Conditions. Given the level of stakeholder interest as well as the particular the issues on which Conditions 1 and 2 have been placed, the Assessment Team have determined that an on-site audit is appropriate.
Year 4 (2023)	On-site surveillance and re-assessment audit	2/3 auditors on-site	As this will potentially be both a 4 th surveillance and a re-assessment audit and as the Conditions on the fishery will be due for closure, SAI Global proposes to conduct an on-site audit with 2/3 auditors on-site.

Table 34. Timing of surveillance audits.

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
Year 1 (2020)	TBD	TBD	The commercial reduction fishery generally runs from mid-April to Nov/Dec so conducting audit towards the start of the calendar year would allow time for all information relating to the past fishing season to become available.
Year 2 (2021)	TBD	TBD	
Year 3 (2022)	TBD	TBD	
Year 4 (2023)	TBD	TBD	Allow sufficient time for re-assessment to be completed before cert expiry date.

Table 35. Fishery Surveillance Program.

Surveillance Level	Year 1	Year 2	Year 3	Year 4
Level 4	Off-site surveillance audit	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit and re-certification site visit

8.5. Appendix 5 Objections Process

[REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR]

The report shall include all written decisions arising from an objection.

(Reference: FCR 7.19.1)