Marine Stewardship Council Assessment

Public Comment Draft Report

For the:

US Acadian Redfish, Pollock and Haddock Otter Trawl Fishery

On behalf of:

Sustainable Groundfish Association, Inc.

Report Assessors: Ivan Mateo (Team Leader)
John Musick
Don Aldous

Client Name: Sustainable Groundfish Association, Inc.
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Contents

Glossary

ABC	Acceptable Biological Catch
ACE	Annual Catch Entitlements
ASAP	Age Structured Assessment Program
B	Bycatch
B_{MSY}	Biomass calculated for Maximum Sustainable Yield
CAB	Conformity Assessment Body
DFO	Fisheries and Oceans Canada
F	Fishing Mortality
FG	Fixed Gear
F_{LIM}	Limit Reference Point for Fishing Mortality
F_{REF}	Fishing Mortality reference Point
GARM	Groundfish Assessment Review Meeting
GB	Georges Bank
GOM	Gulf of Maine
GOMAC	Gulf of Maine Advisory Committee
GN	Gillnet
HL	Handline
IFMP	Integrated Fisheries Management Plan
LL	Longline
LMOT	Large Mesh Otter Trawl
MG	Mobile Gear
MSC	Marine Stewardship Council
MSP	Maximum Spawning Potential
NAFO	North Atlantic Fisheries Organization
NEMSFMP	Northeast Multispecies Fisheries Management Plan
NEFMC	Northeast Fisheries Management Council
NMFS	National Marine Fisheries Service
OTB	Otter Trawl, Bottom
P1, P2, P3	MSC's Guiding Principles
PA	Precautionary Approach
PI	Performance Indicator
RAP	Regional Advisory Process
RV	Research Vessel
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SFF	Sustainable Fisheries Framework
SSB	Spawning Stock Biomass
SSB_{MSY}	Spawning Stock Biomass for Maximum Sustainable Yield
SSR	Special Science Response
TAC	Total Allowable Catch
TMGC	Trans-boundary Management Guidance Committee
TRAC	Trans-boundary Resources Assessment Committee
USR	Upper Stock Reference Point
VPA	Virtual Population Analysis
VMS	Vessel Monitoring System

1. MSC Fishery Assessment Report

Units of Certification

<table>
<tr><td>Fishery Unit</td><td colspan="2">There are 4 Units of Certification:
UOC 1. US Northeast Acadian Redfish otter trawl fishery
<table>
<tr><td>Species</td><td>Acadian Redfish (Sebastes fasciatus)</td></tr>
<tr><td>Gear Types</td><td>Otter Trawl</td></tr>
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UOC 3 and UOC 4. US Northeast Haddock otter trawl fishery (2 units of certification)
<table>
<tr><td>Species</td><td>Haddock (Melanogrammus aeglefinus)</td></tr>
<tr><td>Gear Types</td><td>Otter Trawl</td></tr>
<tr><td>Geographical Area</td><td>NW Atlantic, US EEZ
UOC 3 Gulf of Maine
UOC 4 Georges Bank</td></tr>
<tr><td>Management System</td><td>NMFS/NEFMC</td></tr>
</table></td></tr>
<tr><td rowspan="5">Report Issue</td><td>30th January 2016</td><td>Client Report (revised)</td></tr>
<tr><td>16th February 2016</td><td>Peer Review</td></tr>
<tr><td>16th March 2016</td><td>Public Comment Draft Report</td></tr>
<tr><td></td><td>Final Report and Determination</td></tr>
<tr><td></td><td>Public Certification Report</td></tr>
<tr><td>Correspondence to:</td><td colspan="2">SAI Global
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Website: www.saiglobal.com
Programme Administrator:
Jean Ragg
Jean.Ragg@saiglobal.com</td></tr>
</table>

The aim of this assessment is to determine the degree of compliance of the fishery with the Marine Stewardship Council's (MSC) Principles and Criteria for Sustainable Fishing.
The assessment is conducted in accordance with the following MSC Standard and Certification Requirements (CR) versions:

- MSC Fishery Standard - Principles and Criteria for Sustainable Fishing v1.1
- MSC CR v1.3

The scores, weighting and certification outcome are documented in Section 6.

Performance indicators that received conditional scores are documented in Appendix 1.3

'Conditions set out the requirements for improvement in the fishery in order to achieve unconditional pass scores (min. 80%) and provide the milestones that must be achieved at each subsequent surveillance audit for the fishery to meet in order to demonstrate progression toward achieving an unconditional pass score. Conditions for a major basis for subsequent audit investigation

The assessment team certification recommendation:

On completion of the assessment and scoring process, the assessment team has recommended that the US Acadian Redfish/Pollock/Haddock otter trawl fisheries is eligible to be certified according to the MSC Principles and Criteria for Sustainable Fishing.

Information sources used are provided within the main body of the report and full references for published, unpublished data and main websites accessed are documented at the end of this report in the reference section.

Stakeholder submissions and the assessment team's responses are provided in Appendix 3.

2. Executive Summary

This report sets out the details of the MSC full assessment for the US Acadian Redfish, Haddock, and Pollock fisheries against the MSC Principles and Criteria for Sustainable Fishing. The report details the background, results of the assessment, the rationales that substantiate the scores for each performance indicator, conditions and milestones for conditional scores and on the completion of the process, the outcome of the assessment with regard to the award of certification to the fisheries.

The assessment process began in December 2014 with the announcement of the client's intention to have these fisheries assessed. As a requirement of the assessment process (CR 27.9.1), the site visit announcement was advertised in the local newspaper 'Gloucester Times' as it was considered an appropriate publication for wider circulation of the announcement to potential stakeholders of these fisheries.

The MSC Guidelines specify that the definition of a Unit of Certification (UOC) is; *"The fisheries or fish stock (biologically distinct unit) combined with the fishing method/gear and practice (vessel(s) pursuing the fish of that stock) and management framework"*. Accordingly, the Acadian Redfish, Haddock and Pollock OTB fisheries proposed for certification have been defined under separate units of certification for the purpose of facilitating the assessment process as follows:

UOC 1 Acadian Redfish

Species	**Acadian Redfish** (*Sebastes fasciatus)*
Geographical Area	NW Atlantic, US EEZ (Gulf of Maine, Georges Bank)
Stock	NW Atlantic, US EEZ (Gulf of Maine, Georges Bank)
Method of capture	Otter Trawl
Management system	NMFS/NEFMC
Client Group	**Sustainable Groundfish Association, Inc.**

UOC 2 Pollock

Species	**Pollock** (*Pollachius virens)*
Geographical Area	NW Atlantic, US EEZ (Gulf of Maine, Georges Bank)
Stock	NW Atlantic, US EEZ (Gulf of Maine, Georges Bank)
Method of capture	Otter Trawl
Management system	NMFS/NEFMC
Client Group	**Sustainable Groundfish Association, Inc.**

UOC 3 GOM Haddock

Species	**Haddock** (*Melanogrammus aeglefinus)*
Geographical Area	NW Atlantic, US EEZ (Gulf of Maine)
Stock	**Haddock** NW Atlantic, US EEZ (i) Gulf of Maine
Method of capture	Otter Trawl
Management system	NMFS/NEFMC
Client Group	**Sustainable Groundfish Association, Inc.**

UOC 4 GB Haddock

Species	**Haddock** *(Melanogrammus aeglefinus)*
Geographical Area	NW Atlantic, US EEZ (Gulf of Maine)
Stock	**Haddock** NW Atlantic, US EEZ (i) Georges Bank
Method of capture	Otter Trawl
Management system	NMFS/NEFMC
Client Group	**Sustainable Groundfish Association, Inc.**

These fisheries are not currently MSC certified and have not previously been assessed against the MSC Principles and Criteria for Sustainable Fishing. However, during the assessment of the Otter Trawl US Acadian redfish/pollock/haddock fisheries, the Assessment Team found that there are existing overlapping fisheries within certain units of certification from a previously certified fishery; the US Atlantic Spiny Dogfish fisheries. These overlapping fisheries consist of the US Acadian redfish/pollock/haddock otter trawl fisheries and the US Spiny Dogfish trawl State and Federal fisheries.

The US Atlantic Spiny Dogfish fishery has been certified previously and had its 3rd surveillance site visit on February 2016 by another SAI Global Assessment Team.

The SAI Global Assessment Team in charge of this assessment of the US Acadian redfish/Pollock/haddock OTB fishery followed MSC 1.3 guidelines on harmonization procedures (See Section 5.1).

The geographic range of Acadian Redfish, Haddock and Pollock OTB fisheries under assessment includes the NW Atlantic, US EEZ (Gulf of Maine, Georges Bank) (Figure 1).

As required by MSC procedure (CR 27.23.1) a, certificate sharing commitment must be made by applicant fisheries. A letter to this effect has been provided by the Client and can be found at:

http://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-west-atlantic/us-acadian-redfish-haddock/assessment-downloads-1/20150428_CERT_SHARE_RED493.pdf

2.1. Acadian Redfish/Haddock/Pollock fishery key strengths and weaknesses

Strengths	Weaknesses
• Redfish/Pollock/ (GOM/GB) Haddock have high abundance based on Long Term Fishery independent based CPUE and Biomass. • Redfish/Pollock/ (GOM/GB) Haddock have experienced strong recruitment to the fishery in the last years. • Redfish/Pollock/ (GOM/GB) Haddock exhibit healthy spawner biomass stock. • Well-defined reference points and harvest control rules are in place for each fishery. • Robust governance and policy is demonstrated.	Strategies to reduce bycatch have not demonstrated that they can be effective in raising some identified retained and bycatch species abundance limits to healthy biological limits (GOM/GB cod, GOM/GB yellowtail flounder, GB winter flounder, and witch flounder).

2.2. Assessment Results

Fully referenced scoring rationales are provided in Appendix 1 of this report. A summary our scoring outcomes are provided below.

All UOC's achieved the minimum required cumulative scores of 80 or above for each of the individual three MSC Principles and no UOC scored less than 60 (fail) against any Performance Indicator (PI).Overall scores for each of the MSC Principles are shown in the table below for each UOC (Table 1).

Table 1. Overall Scores for each Principle for each of the 4 UOC's.

Acadian Redfish UOC 1		
Principle	**Score**	**PASS/FAIL**
Principle 1 – Target Species	97.5	PASS
Principle 2 – Ecosystem	86	PASS*
Principle 3 – Management System	96.9	PASS
Pollock UOC 2		
Principle	**Score**	**PASS/FAIL**
Principle 1 – Target Species	97.5	PASS
Principle 2 – Ecosystem	86	PASS*
Principle 3 – Management System	96.9	PASS
GOM Haddock UOC 3		
Principle	**Score**	**PASS/FAIL**
Principle 1 – Target Species	97.5	PASS
Principle 2 – Ecosystem	86	PASS*
Principle 3 – Management System	96.9	PASS
GB Haddock UOC 4		
Principle	**Score**	**PASS/FAIL**
Principle 1 – Target Species	97.5	PASS
Principle 2 – Ecosystem	86	PASS*
Principle 3 – Management System	96.9	PASS

*Although the assessment team determine that, overall each UoC achieves pass scores and is therefore, in compliance with the MSC Standard, the performance of the fisheries against two performance indicators (PI 2.1.1, 2.1.2) were below the pass mark (Score of 80) and achieved conditional pass scores. Full explanation of the circumstances of these conditional scores is provided in Appendix 1.3 and in summary, below.

2.3. Conditions for continued certification

Two PIs, which contribute to the overall assessment score, were assessed as scoring less than the unconditional pass mark and therefore, four conditions were attached to the fishery. Conditions must be addressed within a specified timeframe (Table 2) in order to re-score the fishery against these PI's at an unconditional pass score. The conditions are applied to allow the fishery to identify corrective actions to improve the performance to at least the 80 level within a period set by the certification body, in accordance with MSC procedure but no longer than the term of the certification. A full explanation provided by the Client of the actions that will be implemented to meet fulfil the requirements of the conditions is provided in the client action plan in Appendix 1.3 of the report.

As a requirement of the MSC CR, the fishery shall be subject to (as a minimum) annual surveillance audits that will form part of the assessment of progress in meeting the requirements of the conditions. These audits shall be publicised and reports made publicly available on the MSC website.

Table 2. Summary of Conditions for all UOCs.

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y,N,N/A)
1, 2	The client must provide evidence that there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding of the retained species, GOM/GB Atlantic Cod, GOM GB yellowtail flounder, GB Winter flounder, and Witch flounder)	**2.1.1, 2.1.2**	**Y**

2.4. Certification Recommendation

On completion of the assessment and scoring process, the assessment team has ***provisionally*** recommended that the *US Acadian Redfish, Haddock and Pollock Otter Trawl Fisheries* are eligible to be certified according to the MSC Principles and Criteria for Sustainable Fishing subject to the conditions and client action plan outlined in the report

2.5. Assessment Process

The assessment followed set procedures as described in the MSC CR v1.3. Key stages of the assessment were:

Stage 1: Fishery Announcement and Assessment Team Formation	
Stakeholder Notification: Fishery enters full reassessment	11 December 2014
Stakeholder Notification: Reassessment team nominated	11 December 2014
Stakeholder Notification: Reassessment team confirmation	22 January 2015
Stage 2: Building the Assessment Tree	
Stakeholder Notification: Use of the default reassessment tree	22 January 2015
Stage 3: Information gathering, stakeholder meetings and scoring	
Stakeholder Notification: Site Visit scheduled	22nd January 2015
Stage 4: Client and peer review	
Stakeholder Notification: Revised timeline	23 June 2015
Revised timeline	23 June 2015
Stakeholder Notification: Revised timeline	18 August 2015
Revised timeline	18 August 2015
Variation request: Delayed PCDR	3 December 2015
Variation response: Delayed PCDR	3 December 2015
Stakeholder Notification: Additional stakeholder information submission period	3 December 2015
Revised timeline announcement	22 December 2015
Revised timeline	22 December 2015
Stage 5: Public Review of Draft Assessment Report	
Public comment draft report	16 March 2016
Stage 6: Final Report and Determination and peer review	

3. Authorship and Peer Reviewers

3.1. Assessment team

Dr. Ivan Mateo (Lead Assessor, Responsibilities on Principle 1)
Dr. 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. Dr. Mateo 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 bioenergetics modelling for Atlantic cod. He also has been working as environmental consultant in the Caribbean doing field work 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 Dr. Mateo worked as National Research Council postdoctoral research associate at the NOAA National Marine Fisheries Services Ted Stevens Marine Research Institute on population dynamic modelling of Alaska sablefish

Dr. John A. Musick (Assessor, Responsibilities on Principle 2)
John A. (Jack) Musick, Ph.D. is the Marshall Acuff Professor Emeritus in Marine Science at the Virginia Institute of Marine Science (VIMS), College of William and Mary, where he has served on the faculty since 1967. He earned his B.A. in Biology from Rutgers University in 1962 and his M.A. and Ph.D. in Biology from Harvard University in 1964 and 1969, respectively. While at VIMS he has successfully mentored 37 masters and 49 Ph.D. students. Dr. Musick has been awarded the Thomas Ashley Graves Award for Sustained Excellence in Teaching from the College of William and Mary, the Outstanding Faculty Award from the State Council on Higher Education in Virginia, and the Excellence in Fisheries Education Award by the American Fisheries Society. In 2008 Dr. Musick was awarded The Lifetime Achievement Award in Science by the State of Virginia. He has published more than 150 scientific papers and co-authored or edited 21 books focused on the ecology and conservation of sharks, marine fisheries management, and sea turtle ecology. In 1985 he was elected a Fellow by the American Association for the Advancement of Science. He has received Distinguished Service Awards from both the American Fisheries Society and the American Elasmobranch Society (AES), for which he has served as president. In 2009 the AES recognized him as a Distinguished Fellow. Dr. Musick also has served as president of the Annual Sea Turtle Symposium (now the International Sea Turtle Society), and as a member of the World Conservation Union (IUCN) Marine Turtle Specialist Group for which he currently serves on the Red List Authority. Dr. Musick served as co-chair of the IUCN Shark Specialist Group for nine years, and is currently the Vice Chair for Science. Since 1979 Dr Musick has served on numerous Stock Assessment, and Scientific and Statistics committees for the Atlantic States Marine Fisheries Commission, the Mid-Atlantic Fisheries Management Council, the National Marine Fisheries Service, and the Chesapeake Bay Stock Assessment Program. He has chaired the ASMFC Shark Management Technical Committee and ASMFC Summer Flounder Scientific and Statistics Committee. His recent consultancies have included analyses of sea turtle/ long-line interactions in the Canadian and US Atlantic swordfish and tuna long-line fisheries, certification assessments for various fisheries for the Marine Stewardship Council, assessment of a species recovery plans for the Australian Fisheries Authority, Fishery status reviews for FAO, and oil spill impact reviews for NOAA.

Don Aldous (Assessor, Responsibilities on Principle 3)
Don Aldous has been involved in fisheries management issues in Canada and the Pacific Islands since 1977. He has experience at all levels of fisheries management from Fishery Officer to Commissioner of a Regional Fisheries Management Organization. In Canada, he achieved a Senior Advisor position in matters dealing with foreign and domestic fisheries management. He led teams of consultants preparing fisheries management plans for Fiji, Solomon Islands and Marshall Islands and has returned to conduct follow-up work in all three. On a regional scale, he has provided advice to FFA on issues related to fisheries management, development and MCS. Don is considered

a P3 expert for Marine Stewardship Council (MSC) assessments and has been involved with Intertek Moody Marine as an Associate Auditor since 2009 as an editor, project coordinator, P3 expert and team leader.

3.2. Peer Reviewers

Rick Stanley

Rick Stanley received a M.Sc. in Zoology from the University of British Columbia in 1977. Following work on overseas fisheries projects in Indonesia (1978) and El Salvador (1979), he worked for the Department of Fisheries and Oceans Canada (DFO) as a research biologist at the Pacific Biological Station in Nanaimo Canada until August 2013. During those years with DFO, he was senior author or co-author of 19 peer-reviewed stock assessments on British Columbia populations of various species of rockfishes (Sebastes spp.). He also served on the working groups and review committees of assessment on many other species of groundfish and invertebrates. In addition to stock assessment activity, he has published primary papers on the general biology of rockfishes including papers on ageing, parasites and reproductive biology, as well acoustic biomass estimation. An additional focus of Mr. Stanley's work at DFO was the development of fishery catch monitoring programs and bottom trawl surveys for groundfish. Following his retirement from DFO in August 2013, Mr. Stanley began work as a self-employed fisheries consultant.

Dr. Robert Leaf

Dr. Robert Leaf has ten years of experience working in the field of natural resource management of fin and shellfish. He specializes in the evaluation of management strategies of harvested species and the identification of environmental drivers that impact their population dynamics. Dr. Leaf received his Master's Degree in Marine Science at Moss Landing Marine Laboratories and his PhD in Fisheries and Wildlife Sciences from Virginia Polytechnic and State Institute. His last professional post was as a post-doc under Dr. Kevin Friedland at the Northeast Fishery Science Center's Narragansett Laboratory. There, he worked on understanding the impact of environmental conditions on fish stock productivity and recruitment. He has worked in the Gulf of Mexico for the last three years working on fish stock assessment of commercially and recreationally important species in that area. Dr. Leaf is a member of the Gulf of Mexico Fishery Management Council's Red Drum working group and NOAA's Marine Fisheries and Climate Taskforce. He currently supervises four masters level students working on various state and federally managed fish stocks.

4. Description of the Fishery

4.1. Unit of Certification and scope of certification sought

The MSC Guidelines to CABs specify that the UoC is:

"The fisheries or fish stock (biologically distinct unit) combined with the fishing method/gear and practice (vessel(s) pursuing the fish of that stock) and management framework".

Accordingly, the US Acadian Redfish/Pollock/Haddock otter trawl fisheries proposed for certification is defined according the UoCs:

UOC 1 Acadian Redfish

Species	**Acadian Redfish** (*Sebastes fasciatus)*
Geographical Area	NW Atlantic, US EEZ (Gulf of Maine, Georges Bank)
Stock	NW Atlantic, US EEZ (Gulf of Maine, Georges Bank)
Method of capture	Otter Trawl
Management system	NMFS/NEFMC
Client Group	**Sustainable Groundfish Association, Inc.**

UOC 2 Pollock

Species	**Pollock** (*Pollachius virens)*
Geographical Area	NW Atlantic, US EEZ (Gulf of Maine, Georges Bank)
Stock	NW Atlantic, US EEZ (Gulf of Maine, Georges Bank)
Method of capture	Otter Trawl
Management system	NMFS/NEFMC
Client Group	**Sustainable Groundfish Association, Inc.**

UOC 3 GOM Haddock

Species	**Haddock** (*Melanogrammus aeglefinus*)
Geographical Area	NW Atlantic, US EEZ (Gulf of Maine)
Stock	**Haddock** NW Atlantic, US EEZ (i) Gulf of Maine
Method of capture	Otter Trawl
Management system	NMFS/NEFMC
Client Group	**Sustainable Groundfish Association, Inc.**

UOC 4 GB Haddock

Species	**Haddock** (*Melanogrammus aeglefinus*)
Geographical Area	NW Atlantic, US EEZ (Gulf of Maine)
Stock	**Haddock** NW Atlantic, US EEZ (i) Georges Bank
Method of capture	Otter Trawl
Management system	NMFS/NEFMC
Client Group	**Sustainable Groundfish Association, Inc.**

4.1.1. Eligibility for Certification against the MSC Standard

The fishery is eligible for certification and able to be assessed within the scope of the MSC Principles and Criteria for Sustainable Fishing as:

- The fishery is not conducted under a controversial unilateral exemption to an international agreement;
- Fishing operations do not use destructive fishing practices such as fishing with poisons or explosives;
- The fishery applying for certification is not the subject of controversy and/or dispute;
- The fishery has not previously failed an assessment or had a certificate withdrawn;
- The Client Group is prepared to consider how other eligible fishers may share the certificate;
- There are no catches of non-target stocks that are inseparable or practicably inseparable (IPI) from the target stock; and
- The assessment of the *Acadian Redfish/Haddock/Pollock Otter Trawl* Fishery will result in an overlapping assessment with the US Atlantic Spiny Dogfish Otter Trawl Fishery (See section 5.1).

4.1.2. Eligible fishers

The Client Group comprises all licensed and permitted vessels within the definition of the Unit of Certification landing product to Sustainable Groundfish Association, Inc.

The sale of certified Acadian redfish/haddock/pollock is limited to members of the client group.

4.1.3. Scope of Assessment in Relation to Enhanced Fisheries

The fishery under assessment is not an enhanced fishery.

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

The fishery under assessment is not an Introduced Species Based Fishery.

4.2. Overview of the fishery

4.2.1. Biology of the target species

UOC (1) Redfish

Figure 1. Acadian redfish (*Sebastes fasciatus*, Storer 1856). Source: FAO Fact Sheet[1].

Taxonomy and geographic range

The Northwest Atlantic redfish consists of a complex of three species identified *as Sebastes mentella*, *S. fasciatus* and S. *marinus*. The redfish distribution ranges from the Gulf of Maine, northwards off Nova Scotia and southern Newfoundland Banks, in the Gulf of St. Lawrence and along the continental slope and deep channels from the southwestern Grand Bank to areas as far north as Baffin Island. Redfish are also present in the area of Flemish Cap and west of Greenland. The Acadian redfish is the species most common along the coast of New England and in the Gulf of Maine (Pentilla *et al*., 1998, Klein-MacPhee and Collette, 2002)

Stock structure

Redfish species are currently managed under nine management areas in the Northwest Atlantic. They are based on NAFO Divisions: West Greenland (Subarea 1), Labrador Shelf(2GHJ-3K), Flemish Cap (3M), North and East Grand Banks (3LN), South Western Grand Bank(3O), Gulf of St. Lawrence ("*Management Unit 1" consisting of 4RST, 3Pn4Vn [Jan. to May]), Laurentian Channel ("Management Unit 2" consisting of 3Ps4Vs4Wfgj, 3Pn4Vn [June to Dec.]), Scotian Shelf ("Management Unit 3"consisting of 4WdehklX) and Gulf of Maine (Subarea 5).

(Please note that Management Unit refers to the fishery management system and not the MSC Unit of Certification definitions provided by the assessment team).

The overall population structure of *S. fasciatus* is complex. The population structure of *S. fasciatus* appears to be characterized by the presence of 3 broad groups corresponding to three geographic areas). The first group comprises the Gulf of St. Lawrence – Laurentian Channel. However, there are indications of genetic heterogeneity within this area. The second group is distributed from the slope of the Grand Banks (3LNO) to the southern margin of Unit 2 (southern tip of St. Pierre Bank). The third group the Gulf of Maine and Nova Scotia Shelf. Overall, this southern group tends to be genetically differentiated from the northern group and from that of the Gulf of St. Lawrence – Laurentian Channel.

Early Life History

The newly born redfish larvae can swim well at birth and are soon able to forage for plankton. Their survival rate is relatively high compared with that of egg-laying fish. Young redfish stay in the upper waters feeding on small crustaceans until they are about 2 inches long and they settle to the bottom in the fall. Older redfish feed on larger invertebrates and small fish

[1] http://www.fao.org/fi/common/format/popUpImage.jsp?xp_imageid=731935&xp_showpos=1

Maturity and Reproduction
Redfish mature at a late age (5 to 6 years) and have low reproductive rates. Redfish mate in late autumn and early winter. Redfish give birth to live young, an unusual feature for fish, and fertilization, incubation, and hatching of eggs all occur within the female's body. Eggs are not fertilized until spring and then incubate for 45 to 60 days. Females release their hatched larvae in late spring through July and August. Females generally produce between 15,000 and 20,000 larvae per spawning cycle.

Age and Growth
Acadian redfish is long-lived (the oldest recorded age is 58 years, Penttila *et al*., 1989), slow growing and believed to have a 50% maturity rate at five years old when it is about eight inches long (O'Brien *et al*. 1993). Females typically grow larger and live longer than males (Penttila *et al*., 1989).

Mortality
Natural Mortality is about 0.125.

Recruitment
Recruitment is sporadic and difficult to predict and a strong new cohort may be introduced to the population as infrequently as every 5-10 years (Klein-MacPhee and Collette, 2002).

UOC (2) Pollock

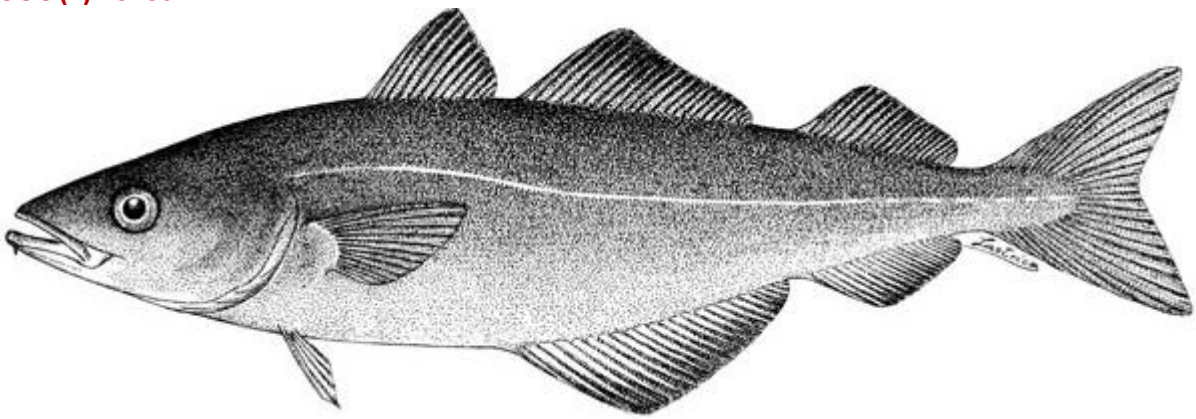


Figure 2. Pollock (*Pollachius virens,* Linneaues 1758). Source: FAO Fact Sheet[2].

Taxonomy and geographic range
Pollock is closely related to both cod and haddock and is part of the gadid family of fish. It is found throughout a similar range to both cod and haddock, occurring throughout the coastal and continental shelf region of the North Atlantic. In the Northwest Atlantic, it ranges from Greenland to North Carolina, in both inshore and offshore areas, typically forming shoals (Froese and Pauly, 2012).

Stock structure
There is considerable movement of the species between the Scotian Shelf, Georges Bank and the Gulf of Maine. Thus, although some differences in meristic and morphometric characters have been shown, there are no significant genetic differences among areas (Mayo *et al.,* 1989). As a result, the Scotian Shelf, Georges Bank and the Gulf of Maine pollock (NAFO divisions 4V, 4W, 4X and subareas 5, 6) are assessed as a single unit.

Early Life History
Pollock eggs and larvae are found in the water column. Juveniles are found inshore and move offshore as they grow older. When in inshore waters, juvenile pollock school in the open water at low tide, then scatter at high tide and hide in intertidal seaweed beds.

[2] http://www.fao.org/fi/common/format/popUpImage.jsp?xp_imageid=704042&xp_showpos=1

Maturity and Reproduction
Average fecundity is 220,000 eggs per female, but large fish may lay up to 4,000,000 eggs (Cohen *et al*., 1990). Pollock typically reach complete sexual maturity by age six. Spawning occurs from November through February with a peak in December. There is a major spawning area in the western Gulf of Maine and on Georges Bank, and several areas on the Scotian Shelf (Mayo, 2006).

Age and Growth
The von Bertalanffy growth coefficient (k) for Atlantic pollock ranges between 0.07 and 0.17 (Fishbase, 2007). Pollock can grow to over 3-1/2 feet long and 35 pounds and can live a long time, up to 23 years.

Mortality
Instantaneous annual natural mortality rate of 0.2 was used in previous assessments, and corresponds to approximately 1% survival to age 24.

Recruitment
Pollock like Haddock has highly variable recruitment episodes, characterized by periods of low recruitment punctuated by exceptionally high years

UOC (3) GOM Haddock and UoC (4) GB Haddock

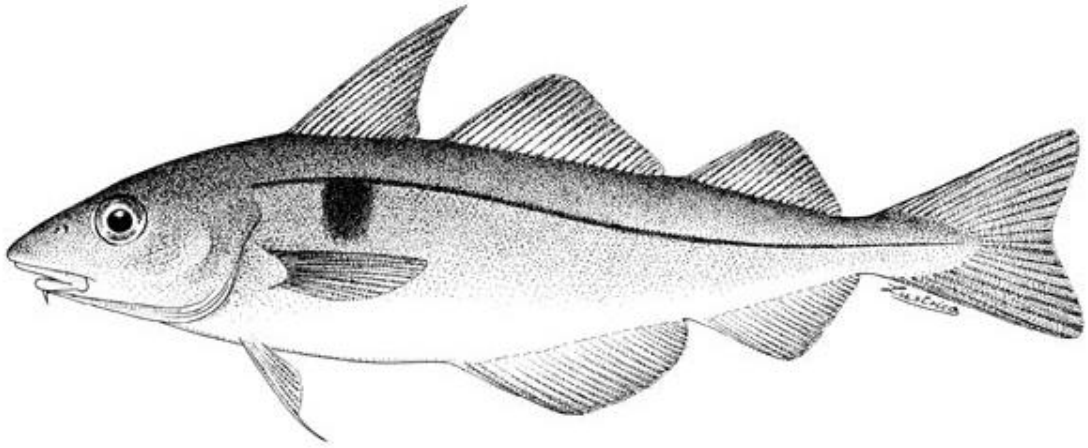


Figure 3. Haddock (*Melanogrammus aeglefinus,* Linnaeus 1758). Source: FAO Fact Sheet[3].

Taxonomy and geographic range
Atlantic haddock (*Melanogrammus aeglefinus*) is part of the family Gadidae that consists of cod, and pollock, among other species. They are considered one of the most important families of commercial fishes (FishBase, 2010). In the western north Atlantic, haddock occur from Cape Hatteras, North Carolina in the south to the Strait of Belle Isle, Newfoundland in the north (Needler, 1931; Bigelow, H.B. and W.C. Schroeder, 1953; NOAA, 1999). Haddock stocks are most abundant in the areas off Cape Cod, the Gulf of Maine and Nova Scotia.

Stock structure
Combined information from demographic, recruitment, meristic, parasitic, and genetic studies as well as tagging studies provide documentation of discrete haddock stocks, with major population divisions occurring between New England, Nova Scotia, and Newfoundland waters.

Early Life History
After fertilization occurs, eggs become buoyant, and float on the surface where subsequent development occurs. Haddock eggs have a wide range of salinity tolerance. Early stage eggs concentrate near the surface, whereas later

[3] http://www.fao.org/fi/common/format/popUpImage.jsp?xp_imageid=699543&xp_showpos=1

stages are distributed either uniformly over depth or with a sub-surface maximum. Larvae are generally pelagic at 10 m to 50 m depth over a period of three months or more. Juvenile haddock occupy bottom habitats following the larval phase, but are found in shallower water on bank and shoal areas compared to larger adults that typically occur in deeper water. Both juvenile and adult haddock rarely occur near ledges, rocks, kelp or soft oozy mud.

Maturity and Reproduction

Although haddock may mature earlier than <3 years, 100 % of females are mature by age 3 in Eastern Georges Bank (5Zjm). Major spawning grounds for haddock in the Northwest Atlantic are Georges Bank, and on the Scotian Shelf, Browns Bank, Western, and Sable Island Banks. Haddock form spawning aggregations at various times of the year, although a seasonal peak of spawning occurs on Georges Bank in late-March through April (Brodziak, 2005, DFO, 2002b, 2005a). (Bigelow and Schroeder, 1953; NOAA, 1999). Spawning occurs on rocks, gravel, smooth sand and mud (Klein-MacPhee, 2002). Haddock have high reproductive capacity. Annual egg production for a mature female is approximately 850,000 eggs with the potential of producing up to 3 million. A female will spawn batches of eggs near the bottom over rocks, gravel, smooth sand and mud at 1 to 2 day intervals over a period of 2 to 3 weeks.

Age and Growth

Age and size at maturity of haddock vary slightly among stocks, but in all stocks 50% of females are mature by age three (Mohn and Simon, 2002; DFO, 2005a). It has been suggested that selective fishing pressure may have reduced size at maturity of in Georges Bank haddock (Brodziak, 2005; Mohn and Simon, 2002). The growth rate or von Bertalanffy growth coefficient (K) for haddock is 0.12–0.23. The maximum known age for haddock is 14 years (Stevens, 2004), but only a small proportion of haddock survive past age 9 (Brodziak, 2005).

Mortality

Stock assessments for haddock currently assume a natural mortality rate of M = 0.20 (Hurley *et al*., 2005; Van Eeckhaute *et al*., 2008).

Recruitment

Larval retention in suitable nursery habitats is an important determinant of the strength of haddock recruitment (i.e. the number of individuals surviving until the size of entry into the fishery) (Brodziak, 2005). Georges Bank distributions of haddock larvae are associated with gyres that tend to concentrate and maintain offspring over relatively shallow banks of the shelf, hereby playing a functional role in maintenance of stock integrity (O'Boyle *et al*., 1984; Smith, 1989). Smith and Morse (1985) found that haddock eggs and larvae originating on Georges Bank, Gulf of Maine, and Scotian Shelf spawning grounds do not intermix, and hence, are geographically isolated and constitute separate stocks. Haddock recruitment on Georges Bank is highly variable, characterized by periods of low recruitment that are punctuated by exceptionally high years. For example, low recruitment on Georges Bank for the past 40 years has been punctuated by extremely high years in 1963, 2000 and 2003.

4.2.2. Fishing area

Off the eastern seaboard of the U.S., fish species are managed by defined management areas (Figure 4 below). Individual stocks of the same species may be managed by area (e.g. cod in GB and cod in GOM) or over the full range of the species (e.g. redfish). The Northern most areas are shared with Canada and since 1998 the Transboundary Resources Assessment Committee (TRAC) has reviewed stock assessments and projections necessary to support management activities for shared resources across the USA Canada boundary in the GOM-GB sea areas.

Today, the Northeast Multispecies Fishery Management Plan (FMP) specifies management measures for thirteen groundfish species (cod, haddock, yellowtail flounder, pollock, plaice, witch flounder, white hake, windowpane flounder, Atlantic halibut, winter flounder, redfish, Atlantic wolffish, and ocean pout) off the New England and Mid-Atlantic coasts.

Most recently, Framework Adjustment 48 was partially implemented on May 1, 2014. The action revised the status determination criteria for several stocks, modified the sub-annual catch limit system, adjusted monitoring measures for the overall groundfish fishery, and changed several accountability measures.

Framework Adjustment 50 was implemented on September 30, 2013 and set specifications for many groundfish stocks and modified the rebuilding program for Southern New England/Mid-Atlantic winter flounder. Framework Adjustment 51 was primarily intended to meet regulatory requirements by modifying the rebuilding programs and setting specifications for some of the groundfish stocks, and continue to improve management of the fishery. It incorporates the results of new stock assessments into the specification- setting process, including catch limits governed by the U.S./Canada Resource Sharing Understanding and the distribution of ACLs to various components of the fishery. Framework 51 also established additional management measures related to U.S./Canada shared stocks and yellowtail flounder in the groundfish and scallop fisheries.

Groups of fishing vessels (sectors) are each allotted a share (quota) of the total annual groundfish TACs based on the historical fishing of individual member boats in each sector. Each sector received quota for 9 of 14 groundfish species in the FMP and became exempt from many of the effort controls such as multispecies DAS limitations. Fishermen who chose not to belong to a sector operate under a common pool that maintains the traditional management tools of DAS and trip limits.

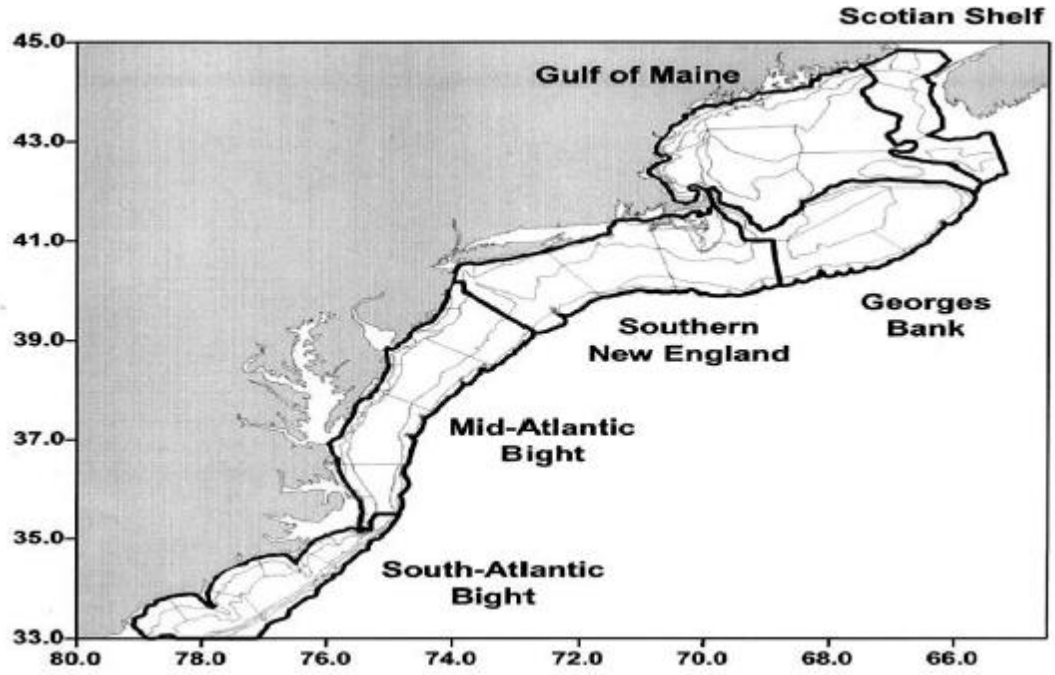


Figure 4. Distribution of US Northeast Fisheries Management Areas.

4.2.3. History of the Acadian Redfish/Haddock/Pollock Otter Trawl Fishery

There have been groundfish fisheries in NE Atlantic for over 200 years, commencing with sail boats. A Boston trawler fleet started in the 1920's and this was followed by greater mechanisation, and freezing technology that led to greater commercialisation into the 1960s. Interest grew and distant water fishing fleets from European countries further added to fishing effort on groundfish species found in waters off the U.S until 1976 when US claimed 200 mile jurisdiction and implemented the MSA (Magnusson Stevens Fishery Conservation and Management Act – (MSA).

This led to the establishment of the NEFMC to manage the fisheries in this US exclusive economic zone (EEZ) and in 1977 NEFMC produced its first fisheries management plan (FMP) covering cod, haddock and yellowtail flounder.

Management measures included annual quotas, trip limits, minimum sizes and gear restrictions. Because of the new opportunities afforded by the EEZ, between 1975 and 1980 the size of the groundfish fleet almost doubled and overfishing and significant depletion of ground-fish stocks ensued.

Since this time, the fishery has advanced and amended its management system progressively under the objectives of rebuilding stocks and developing sustainable fishing. In 1986, the FMP was implemented to reduce the fishing mortality (F) of heavily fished groundfish stocks and promote their rebuilding to sustainable biomass (B) levels. Management measures were applied to gears, areas (seasonal and permanent closures), minimum landing sizes, trip limits, access limits, and days at sea restrictions. Since that time, there have been a number of amendments to the FMP. The original FMP has been changed through a series of amendments (11 since 1994) and framework adjustments (40 since 1994). Amendments were introduced to limit permits, effort, increase mesh size and establish biomass targets for rebuilding groundfish stocks under the Sustainable Fisheries Act (SFA) and the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA) to include annual catch levels and a limited access privilege program.

In 2008, NEFSC conducted benchmark assessments for the 19 groundfish stocks managed under the NEMSFMP. On 1 May 2010, a new management program, Amendment 16 to the NEMSFMP was implemented to comply with the requirements of the MSRA. This amendment introduced two main changes. Firstly, "hard quota" annual limits on the total allowable catch (TAC) for all of the 20 stocks in the groundfish complex were introduced. Secondly, the use of fishing sectors was extended, strengthening the concept of improved management through the introduction of quasi- property rights.

4.2.4. Catches

Table 3. Most recently available combined New England Region State landings by all gears (source NOAA). Demersal otter trawl landings represent >70% of the total landings by all gears. Please see Stock Assessment section for a detailed description.

NE Region (Tonnes)	2010	2011	2012	2013	2014
Acadian Redfish	1,642.10	2,010.70	3,834.50	3,570.9	4,571.2
Haddock	9,811.00	5,709.00	1,969.60	1,869.0	4,553.9
Pollock	5,156.90	7,192.30	6,733.70	5,057.8	4,544.3

4.2.5. Fishing season

Fishermen are authorized to use otter trawl or fixed gears (e.g. baited hook and line, gillnets) to fish for redfish/haddock/pollock in GOM and GB during the season which commences on May 1st and concludes on April 31st.

4.2.6. Fishing methods and fleet description

US fishing for redfish, haddock, and pollock is primarily done by otter trawls (MG). Mesh sizes and net construction are regulated by license conditions to meet individual fisheries conservation objectives such as minimum fish size and escapement of incidental catch.

Otter Trawl

The otter trawl is a large, usually cone-shaped net, which is towed across the seabed and referred to as a mobile gear (MG). The forward part of the net – the 'wings' – is kept open laterally by otter boards or doors. Fish are herded between the boards and along the spreader wires or sweeps, into the mouth of the trawl where they swim until exhausted. They then drift back through the funnel of the net, along the extension or lengthening piece and into the cod-end, where they are retained.

The selectivity of trawl fisheries may be increased by the use of devices known as separator trawls. Separator trawls exploit behavioural differences between fish species and can be used, for example, to segregate cod and plaice into the lower compartment of the net, whilst haddock are taken in the upper part. The mesh size for the two compartments can be altered according to the size of the adult fish being targeted. Insertion of square mesh panels also improves selectivity of the net because square meshes, unlike the traditional diamond shape meshes, do not close under strain when the net is towed.

Rubber-covered bridles 45.7 m - 54.9 m in length are between the doors and trawl, depending on the trawl design. The only parts of the gear that touch the bottom are the trawl door keels, bottom bridles between the net and doors and the rock skipper gear that bounces off the bottom as the gear is towed.

Gear Management Measures

Otter trawls can impact habitat and incidentally catch other fish and marine mammals. Fishermen follow a number of measures to reduce any impacts:

- Restrictions on the size of fishing gear in certain areas to reduce habitat impacts.
- Areas closed to fishing, either permanent or seasonally to protect habitat and spawning groundfish species.
- Requirement that the mesh on trawl nets be large enough to allow small fish to escape.
- A cap on the amount of groundfish bycatch that fishing vessels can take.
- Use of trawl gear that is more selective for the target fish must be used in certain areas.
- Voluntary measures to reduce the chance of interacting with marine mammals, including reducing the amount of turns made by the fishing vessel and tow times while fishing at night, and increasing communication between vessels about the presence of marine mammals in an area.

4.2.7. Market information

The majority of groundfish, including those under this assessment are sold fresh through registered buyers and auction houses and then onwards to local and distant markets. The market channels are diverse from processors, retailers to food service outlets and restaurants.

The 2013 commercial harvest of redfish, a firm, white-fleshed fish, was valued at $4.36 million. However, there is limited market demand for redfish and much of what is landed from the Gulf of Maine is used as lobster bait. The ex-vessel price for redfish is typically around $0.50/pound, so many fishermen do not target the species.

Atlantic pollock have higher oil content than many gadoids and are a different species to Alaska pollock (FishChoice, 2012). Atlantic pollock is sold whole, as fillets, and as fresh, frozen, or smoked steaks. (FishChoice, 2012). The commercial harvest was valued at more than $11.4 million in 2013. Historically, pollock has been a relatively low-value fish, with annual average price never exceeding $1 per pound from 1996 to 2012.

Haddock has a slightly sweet taste. The lean meat is firm yet tender, and its delicate flake is finer than that of cod. Raw haddock is white and becomes even whiter when cooked. The flesh should be firm and resilient and has a thin layer of connective tissue, which helps differentiate it from cod. Canada, Iceland, Norway, Russia, the United Kingdom, and the United States are the main suppliers of haddock. The majority of haddock eaten in the United States is caught in U.S. or Canadian fisheries. Haddock is sold fresh (whole; both head-on and headed and gutted; skin-on fillets; or loins), frozen (whole headed and gutted, skin-on fillets, or blocks), and value-added (breaded or smoked). Haddock is a valuable whitefish – the 2013 commercial harvest was valued at approximately $6 million.

4.3. Principle One: Target Species Background

4.3.1. Stock assessment

UOC (1) Acadian Redfish

Introduction

The most recent full stock assessment of Gulf of Maine-Georges Bank Acadian redfish was completed at the 2008 Groundfish Assessment Review Meeting (GARM III) (NEFSC 2008).

The assessment was based on an ASAP (ASAP 2008) model which incorporates information on the age composition of the landings, size and age composition of the population, and trends in relative abundance derived from research vessel survey biomass indices. Based on the 2008 GARM, estimates of redfish population biomass have been increasing in recent years. That increase in biomass estimates was attributed to corresponding increases in both the NEFSC spring and autumn survey biomass indices which increased significantly during the mid-1990s and remained relatively high through 2007. The rapid increase in abundance and biomass was attributed to strong recruitment for some year classes in the early-1990s along with extremely lower fishing mortality. The assessment concluded that the stock was not overfished and overfishing was not occurring. Estimated spawning biomass in 2007 (172,342 mt) was approximately 64% of the spawning biomass reference point, $SSB_{50\%MSP}$ = 271,000 mt. The estimated fishing mortality in 2007 (0.007) was approximately 18% of overfishing reference point, $F_{50\% MSP}$ = 0.0377.

Abundance Indices

Based on the latest updated 2015 assessment(NEFSC 2015), the NEFSC fall and spring survey indices for years 2000 2010 continued to increase steadily (Figure 5). However, fall bottom trawl index values for 2013 and 2014 are lower than in previous years.

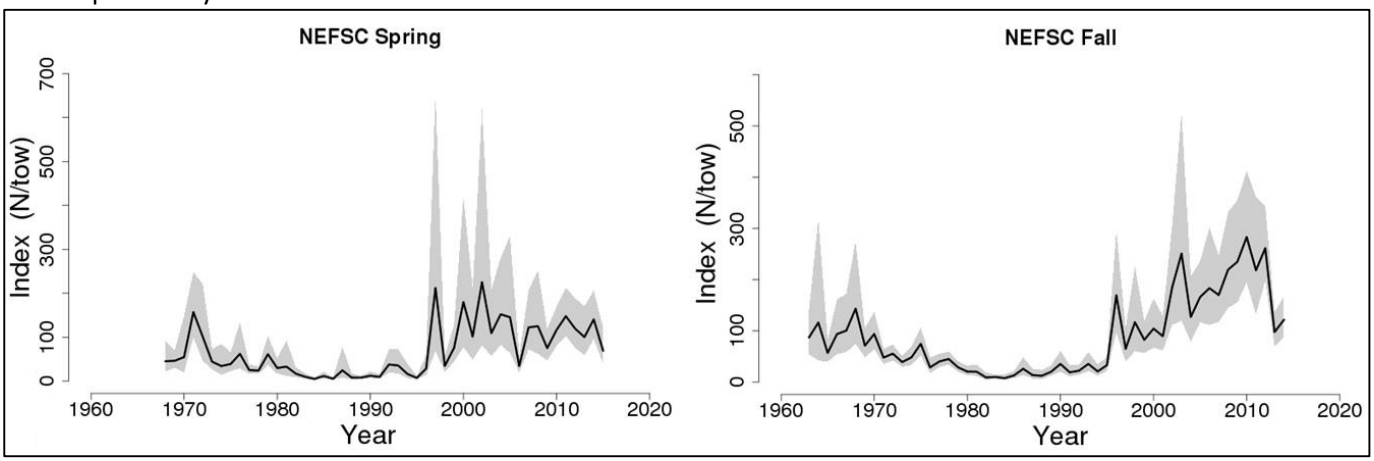


Figure 5. Indices of abundance for Acadian redfish between 1963 and 2015 for the Northeast Fisheries Science Center (NEFSC) spring (left) and fall (right) bottom trawl surveys. The approximate 90% lognormal confidence intervals are shown.

UOC (2) US Atlantic Pollock

Introduction

Prior to the 2015 update, the US Atlantic pollock stock was last assessed as part of the 50th Stock Assessment Review Committee in 2010 (SARC 50; NEFSC 2010). That assessment was a benchmark, and all methods that were accepted by the SARC 50 review panel were used in the 2014 update. Four additional years of catch and index data were used. The final SARC 50 base model for pollock was performed with the NOAA Fisheries Toolbox (NFT) ASAP version 2.0.20. That input file was then run in ASAP version 3.0.17 to confirm that the results were identical. The

additional data were then added and run with the same configuration as for SARC 50. Ages 1 through 9 were modelled, with age class nine serving as a plus-group. The first year in the catch at age was 1970.

Abundance Indices

The 2015 update identified that the NEFSC spring and fall surveys have large inter-annual variation (Figure 6) (NEFSC 2015). The NEFSC fall survey data series have similar patterns with the exploitation history: the survey index declines from high abundance in the late 1970s to extremely low abundance in the mid-1990s, consistent with total annual catches exceeding 20,000 mt during the same period; abundance increased in the late 1990s when catches were less than 6,000 mt; survey abundance decreased again in the late 2000s as catches approached 10,000 mt; with the exception of a spike in 2011, survey abundance has remained relatively constant since 2010 as catches have remained around 8,500 mt.

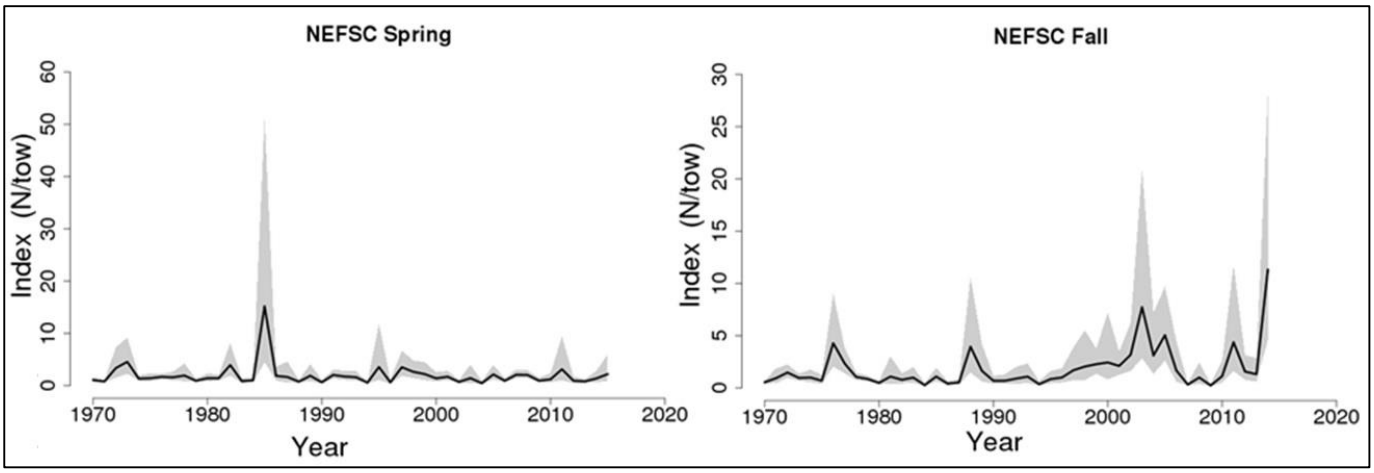


Figure 6. Indices of biomass for pollock between 1970 and 2015 for the Northeast Fisheries Science Center (NEFSC) spring (left) and fall (right) bottom trawl surveys. The approximate 90% lognormal confidence intervals are shown.

UOC (3) Gulf of Maine Haddock

Introduction

Prior to the 2015 assessment update, the previous stock assessment (NEFSC 2008) of Gulf of Maine haddock was conducted using a virtual population analysis model (ADAPT-VPA) that incorporated commercial landings and discards as well as recreational landings but not recreational discards. For the updated 2014 assessment, catch-at-age was re-estimated owing to minor changes to the commercial and recreational catch estimation methodologies. The updates had only minor impacts on the estimated catch-at-age.

For SAW/SARC59, the assessment was conducted using the statistical catch-at-age model, ASAP. The catch inputs included landings and discards from both the commercial and recreational fleets. Trawl gear is the dominant gear in the commercial fishery. As a consequence, commercial discards assumed 100% mortality. The recreational discard mortality assumed a 50% mortality (model results were relatively insensitive to alternate assumptions). Fishery removals were modelled as a single fleet (model sensitivities which explored separate commercial and recreational fleets indicated that the model results were robust to this configuration).

Estimates of abundance from the NEFSC spring and autumn surveys (1977-2015) were used in the ASAP model along with associated estimates of uncertainty and annual age composition. Current survey abundance indices are at, or near the highest of the time series (Figure 7) owing to the presence of several strong year classes. The updated model used three fishery selectivity time blocks and allowed fishery selectivity to be freely estimated at age.

Abundance Indices

The Northeast Fisheries Science Center (NEFSC) spring and fall bottom trawl surveys started in 1968 and 1963 respectively, providing a long time series of fishery independent indices. It has been documented that the Gulf of

Maine Haddock abundance indices (numbers/tow) and biomass (weight/tow) have fluctuated over time, primarily in response to episodic recruitment events. The time series shows an early period of high abundance followed by a decline to time series lows in the late-1980s and early 1990s that also coincided with truncation in the population structure. Since the late 1990s the population increased in response to the contribution of the 1998 year class, and most recently due to several moderate to strong recruitment events since 2010. These recent large year classes contributed to increases in survey indices that are at, or near, time series highs.

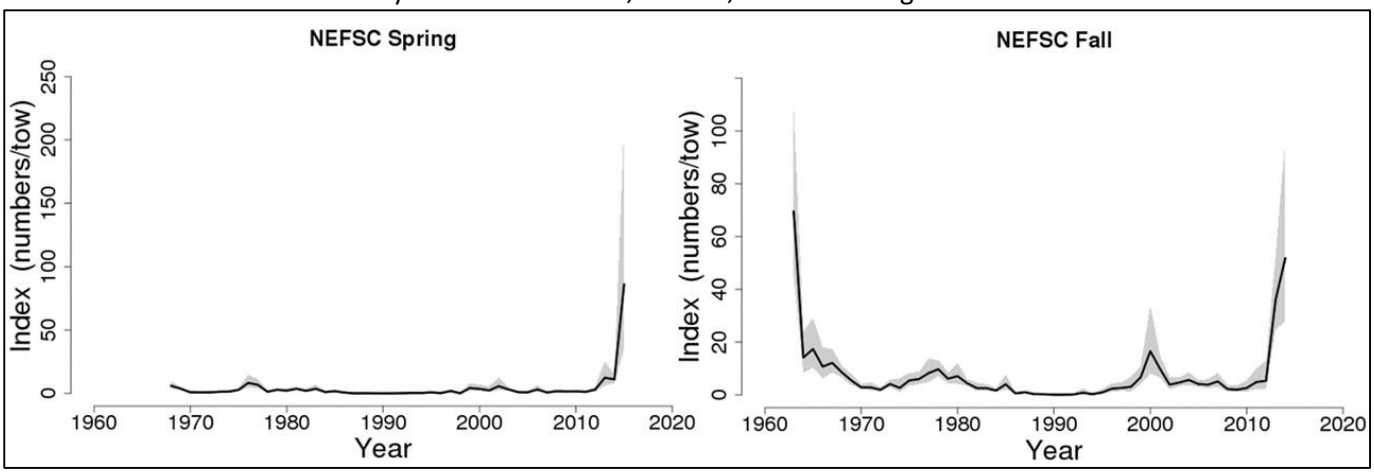


Figure 7. Indices of biomass for the Gulf of Maine haddock between 1963 and 2015 for the Northeast Fisheries Science Center (NEFSC) spring (left) and fall (right) bottom trawl surveys. The approximate 90% lognormal confidence intervals are shown.

UoC (4) Georges Bank Haddock

Introduction

The Georges Bank haddock stock has been commercially exploited since the 1880s. Fishing intensity on the stock increased during the 20th century as harvest technology improved and fishing effort increased (Murawski *et al*., 2002). Prior to the mid-1990s, Georges Bank haddock had been overfished by modern standards for several decades (Brodziak and Link, 2002). The stock experienced significant long-term declines in spawning biomass and recruitment since the 1960s and collapsed in the early 1990s (NEFSC 1994). Fishery management measures implemented since 1994 have included large year-round closed areas, restrictions on fishing effort, and increases in trawl mesh size (Fogarty and Murawski, 1998) and have decreased fishing mortality and led to marked increases in stock size (Brodziak *et al*., 2002).

The Georges Bank haddock stock is a transboundary resource shared by the US and Canada since implementation of the Hague Line in October 1984. The eastern Georges Bank haddock management unit is jointly managed by the two countries (Figure 8) while the US manages the western Georges Bank unit. In May 2004, a formal quota sharing agreement between Canada and the US was implemented for the eastern Georges Bank haddock management unit. This agreement includes total allowable catch allocations for each country as well as in-season monitoring of the catch of haddock. The Georges Bank haddock stock was last assessed as part of the GARM-III (Brooks et al. 2008). Based on that assessment of the combined western and eastern Georges Bank management units the stock was overfished but not experiencing overfishing. That assessment was a benchmark, and all methods that were accepted by the GARM-III review panel were used in the latest stock assessment. Three additional years of catch and index data are incorporated.

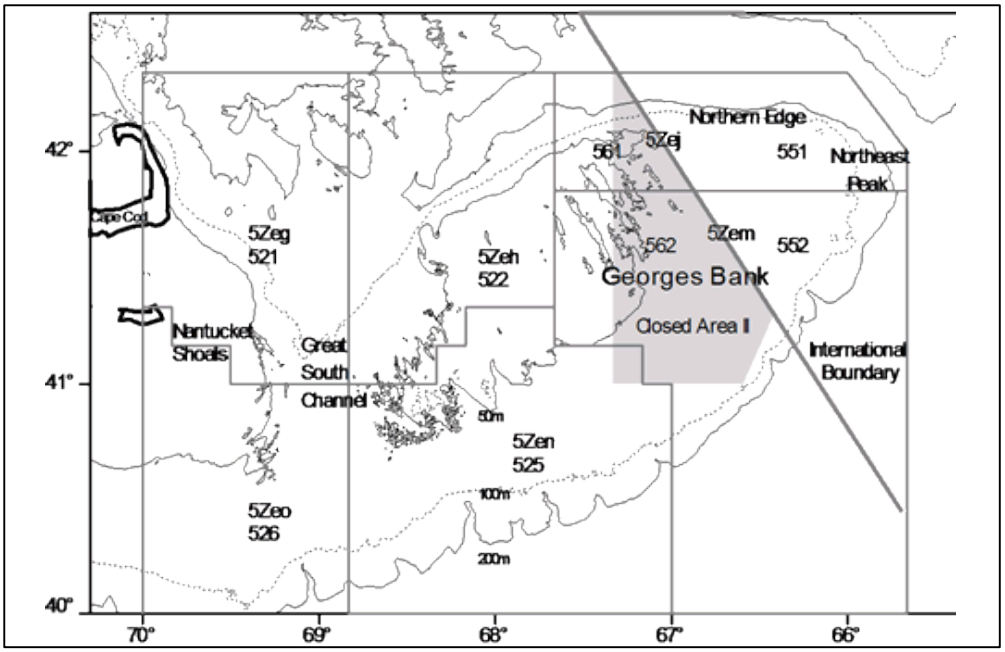


Figure 8. Map of haddock fishing areas on Georges Bank, showing the NAFO Division eastern 5Zjm, the international boundary of Canada and the US, as well as a closed area for fishing on spawning fish.

Abundance Indices

For the NEFSC spring and fall groundfish surveys, the trends in mean number per tow and mean kg per tow for the last decade have tracked the 2003 year class (Figure 9) (NEFSC 2015). Both the spring and fall surveys peaked in 2004; mean number per tow declined sharply through 2010 while mean kg/tow declined more gradually as declines in numbers was somewhat offset by gains in weight with age. The fall 2010 mean number/tow and the spring 2011 mean number per tow are quite large. These two observations provide the first glimpse of the incoming 2010 year class, which may be the first strong year class since 2003.

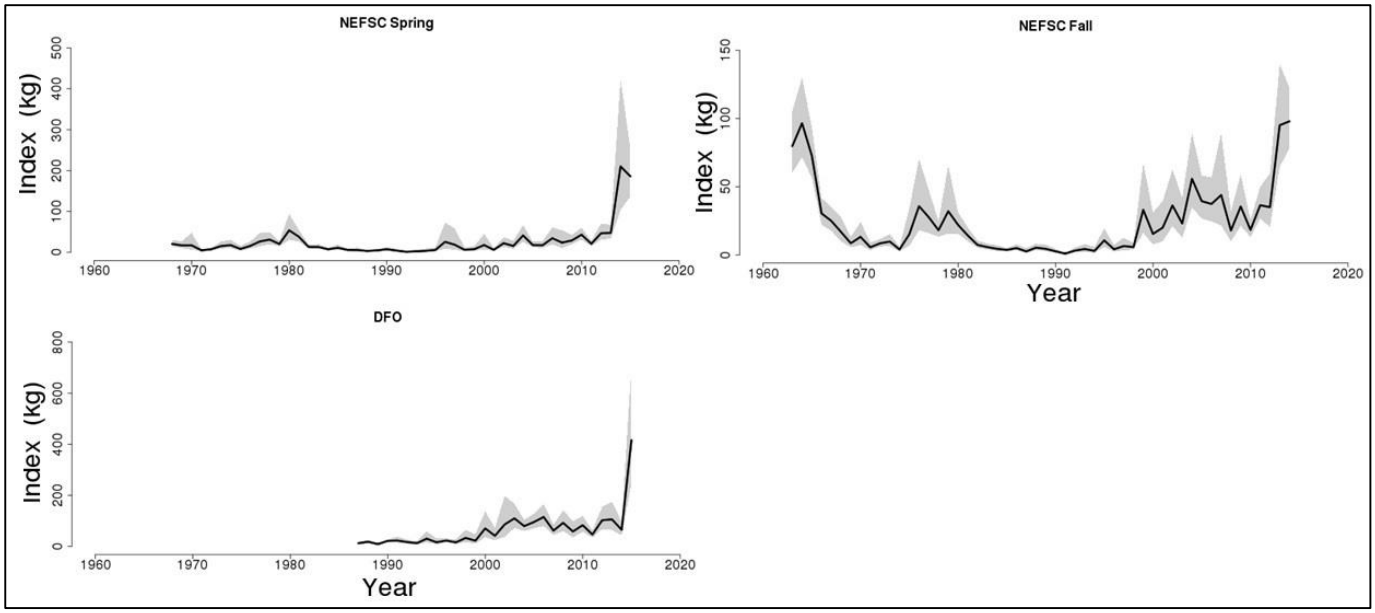


Figure 9. Indices of biomass (Mean kg/tow) for the Georges Bank haddock stock between 1963 and 2015 for the Northeast Fisheries Science Center (NEFSC) spring (top left) and fall (top right) bottom trawl surveys and the DFO winter bottom trawl survey (bottom). The approximate 90% lognormal confidence intervals are shown.

4.3.2. Stock status

UOC (1) Acadian Redfish

Catch

The 2015 update, on catch, discard and survey data from 2008-2010 found that landings have continued to rise gradually since 2007 and 2010 landings were the largest since 1987 (Figure 10) (NEFSC 2015). Between 1964 and the early 1990s nearly all redfish were landed by trawl gear. Since then trawl gear has been the most dominant gear followed by gillnet.

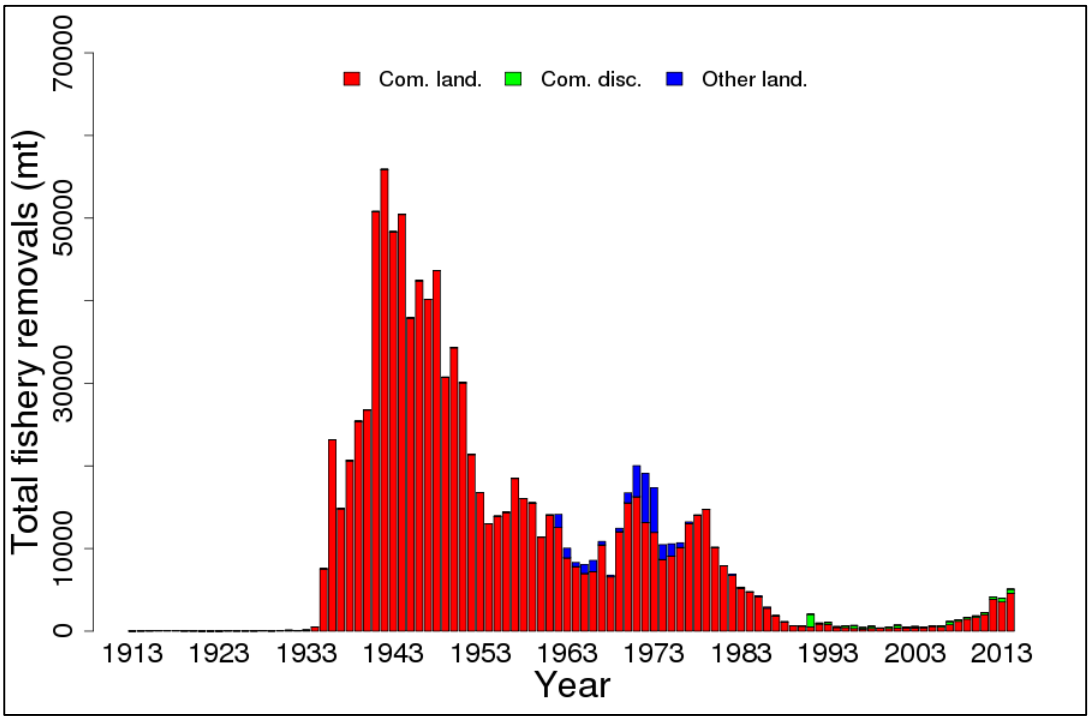


Figure 10. Total catch of Acadian redfish between 1913 and 2014 by fleet (commercial and other) and disposition (landings and discards).

Spawning stock biomass

The estimated spawning biomass for 2014 adjusted for retrospective pattern are within the 80% confidence intervals of the unadjusted values (Figure 11). Using the rational at GARM III, the retrospective pattern is not severe enough to consider for stock status and projections.

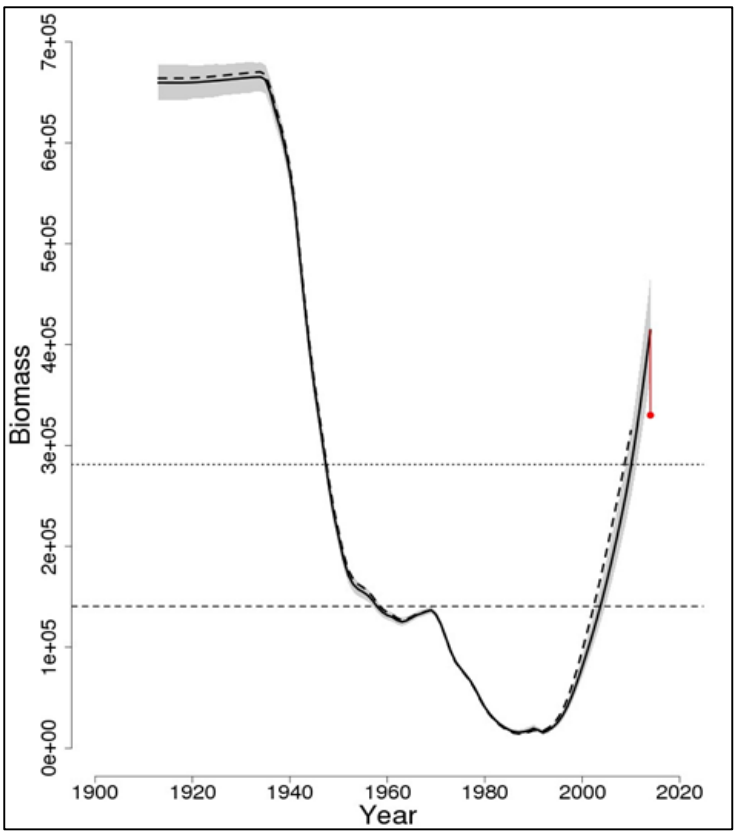


Figure 11. Trends in spawning stock biomass of Acadian redfish between 1913 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ (0.5 * SSB_{MSY} proxy; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY} proxy; horizontal dotted line) based on the 2015 assessment. Biomass was adjusted for a retrospective pattern and the adjustment is shown in red. The approximate 90% lognormal confidence intervals are shown.

Recruitment

Estimated annual recruitment, numbers at age, and fishing mortality at age were used as input data for both the base and alternative models. Results show a rapid increase in abundance attributed to strong recruitment for some year classes in the early-1990s along with extremely low fishing mortality (Figure 12).

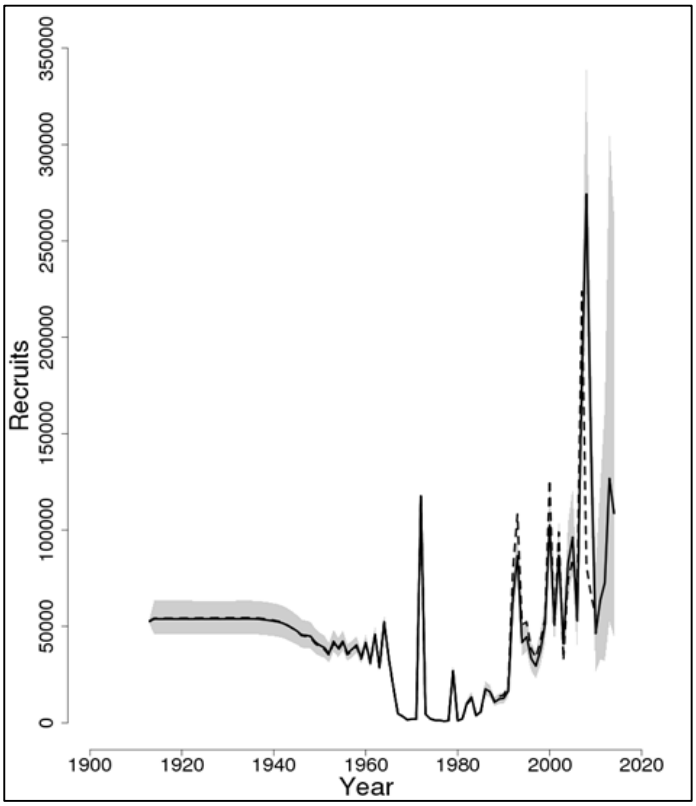


Figure 12. Trends in Recruits (age 1) (000s) of Acadian redfish between 1913 and 2014 from the current (solid line) and previous (dashed line) assessment. The approximate 90% lognormal confidence intervals are shown

UOC (2) US Atlantic Pollock

Catch

Total catches of pollock have increased since the mid-1990s peaking with 12,000 mt in 2008 (Figure 13). Total catches have remained relatively constant since 2009 at about 8,500 mt. US commercial landings have decreased from around 7,500 mt in 2009 to around 5,000 mt in 2013, but still accounted for the majority (61%) of total catches in 2013. US commercial discards have remained relatively constant since 2009 at about 170 mt, and accounted for 2% of total catches in 2013. Recreational landings have increased from around 600 mt in 2009 to around 1,600 mt in 2013, and accounted for 20% of total catches in 2013. Recreational discards have increased from around 400 mt in 2009 to around 1,500 mt in 2013, and accounted for 17% of total catches in 2013.

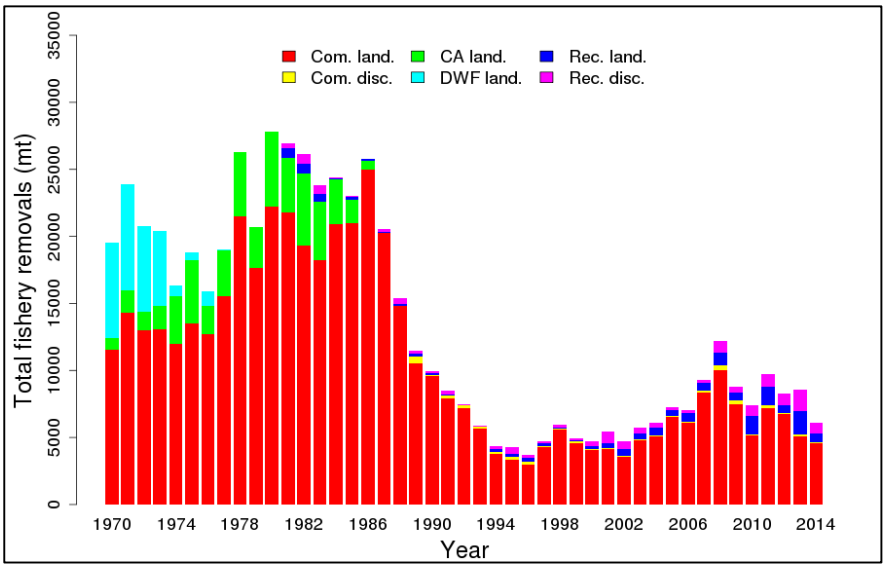


Figure 13. Total catch of pollock between 1970 and 2014 by fleet (commercial, Canadian, distant water fleet, and recreational) and disposition (landings and discards).

Spawning stock biomass

The base model of the 2014 update estimates a starting spawning stock biomass (SSB) in 1970 of about 262,000 mt, which is approximately 33% above the unexploited spawning biomass (197,000 mt). Spawning biomass decreased to the time series low (56,900 mt) in 1990 (Figure 14). Since the 1990 low, spawning biomass increased steadily through 2006, with a decline to the present. The current estimate of spawning biomass is about 126,000 mt.

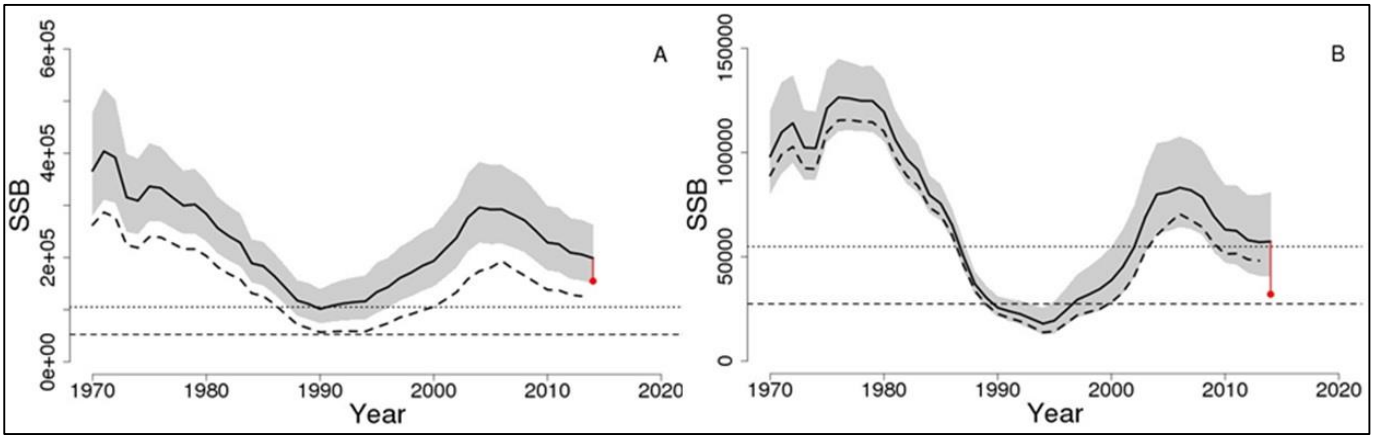


Figure 14. Estimated trends in the spawning stock biomass of pollock between 1970 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ (0.5 * SSB_{MSY} ; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY} ; horizontal dotted line) based on the 2015 assessment models base (A) and flat sel (B). Biomass was adjusted for a retrospective pattern and the adjustment is shown in red. The approximate 90% lognormal confidence intervals are shown.

Recruitment

Mean recruitment was around 19 million age 1 recruits. Several abundant year-classes were produced in 1971, 1979, 1997, 1998, 1999, 2001, and 2011, with the estimated number at age ranging from 27 to 53 million (Figure 15).

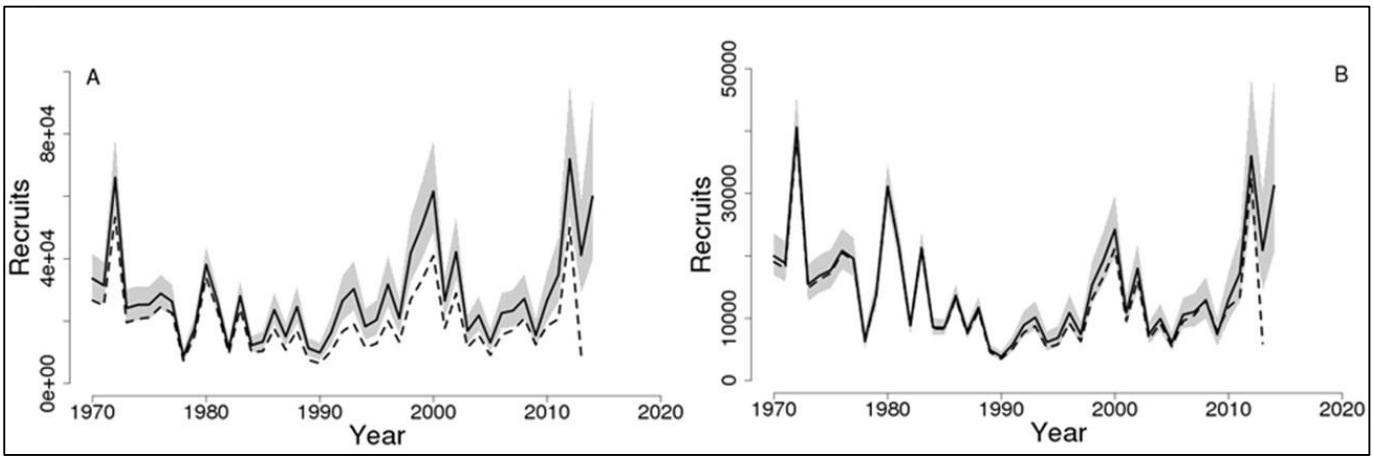


Figure 15. Estimated trends in age 1 recruitment (000s) of pollock between 1970 and 2014 from the current (solid line) and previous (dashed line) assessment for the assessment models base (A) and flat sel (B). The approximate 90% lognormal confidence intervals are shown.

UOC 3 Gulf of Maine Haddock

Catch

Since the late seventies, Gulf of Maine haddock removals ranged from 187 mt to 7,656 mt. Fishery removals over the past five years ranged from 692 mt to 958 mt. Over the assessment time series, commercial landings have been the dominant source of fishery removals, constituting 30-100% of the total catch. Commercial discards have been a small component of fishery removals with the exception of a period between 1993 and 1997 when trip limits were 1,000 lb or less. Recreational catch (landings plus discards) has varied annually from a low of 39 mt in 1981 to a high of 618 mt in 2007. Recreational catches have constituted between <1% and 65% of total annual removals, averaging 17% over the 1977-2013 period (Figure 16). The recreational proportion of the total catch has increased in recent years.

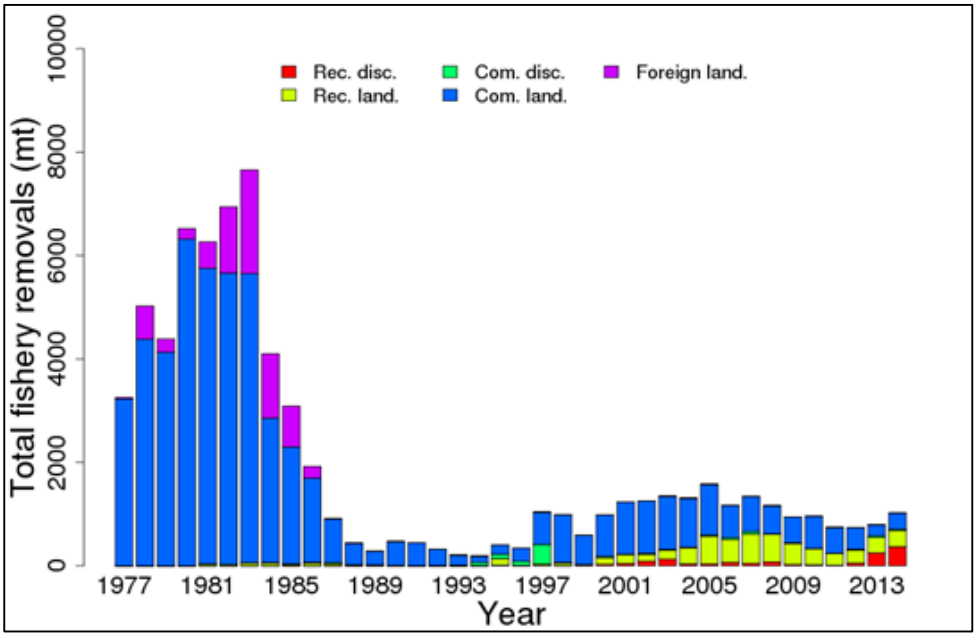


Figure 16. Total catch of Gulf of Maine haddock between 1977 and 2014 by fleet (commercial, recreational, or foreign) and disposition (landings and discards).

Spawning stock biomass

The estimate of 2013 spawning stock biomass (SSB_{2013}) is 4,153 mt (90% posterior probability interval 2,960 – 6,043 mt). The point estimate of 2013 spawning stock biomass is above the SSB_{MSY} proxy of 4,108 mt (Figure 17).

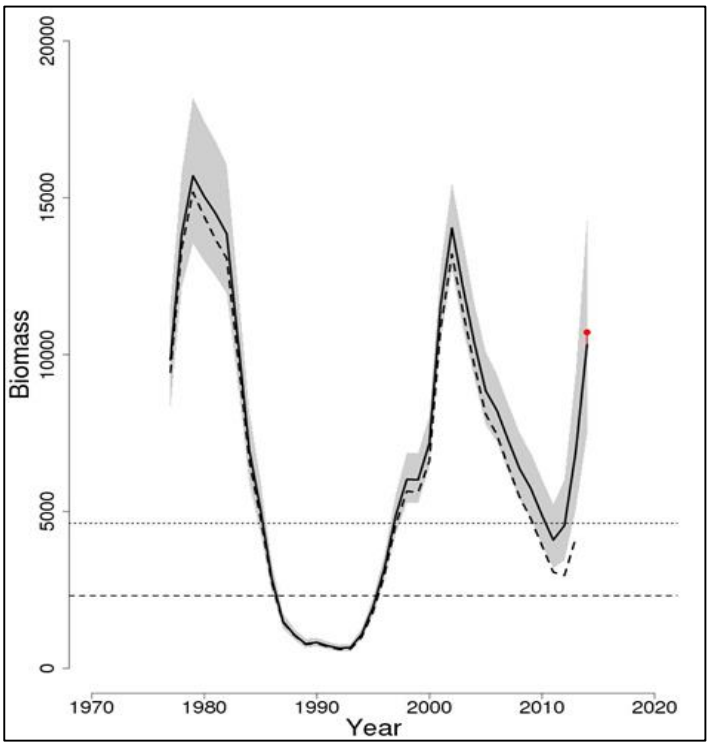


Figure 17. Trends in spawning stock biomass of Gulf of Maine haddock between 1977 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ (1/2 SSB_{MSY} proxy; horizontal dashed line) as well as SSB_{TARGET} (SS_{BMSY} proxy; horizontal dotted line) based on the 2015 assessment. Biomass was adjusted for a retrospective pattern and the adjustment is shown in red. The approximate 90% lognormal confidence intervals are shown.

Recruitment

Gulf of Maine haddock recruitment patterns are highly variable, a feature common among many haddock stocks. Several moderate to strong year classes have been spawned in the last fifteen years, including the 1998, 2003, 2010 and most recently, the 2012 year class (Figure 18). The absolute size of the 2012 year class is highly uncertain as the estimate is based on only two surveys.

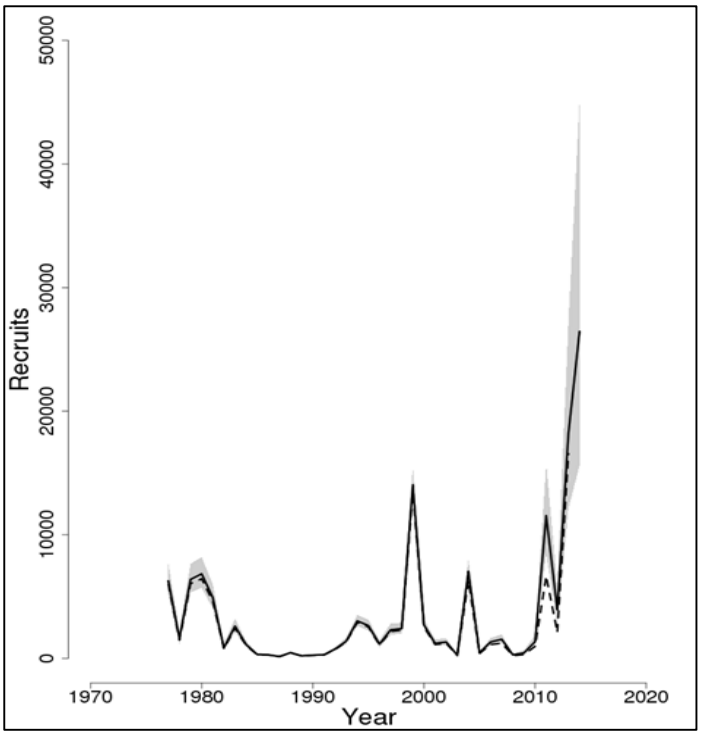


Figure 18. Trends in Recruits (age 1) (000s) of Gulf of Maine haddock between 1977 and 2014 from the current (solid line) and previous (dashed line) assessment. The approximate 90% lognormal condence intervals are shown.

UoC 4 Georges Bank Haddock

Catch

Total catches of Georges Bank haddock have steadily increased in the past decade, from 8711 mt in 2000 to 25903 mt in 2010 (Fig. 19). Catch exceeded 20000 mt for the last three years (2008-2010). On average, the US fraction of recent catch has been 30% with Canada accounting for the remaining catch. US catch has been dominated by trawl gear with over 90% of the landings.

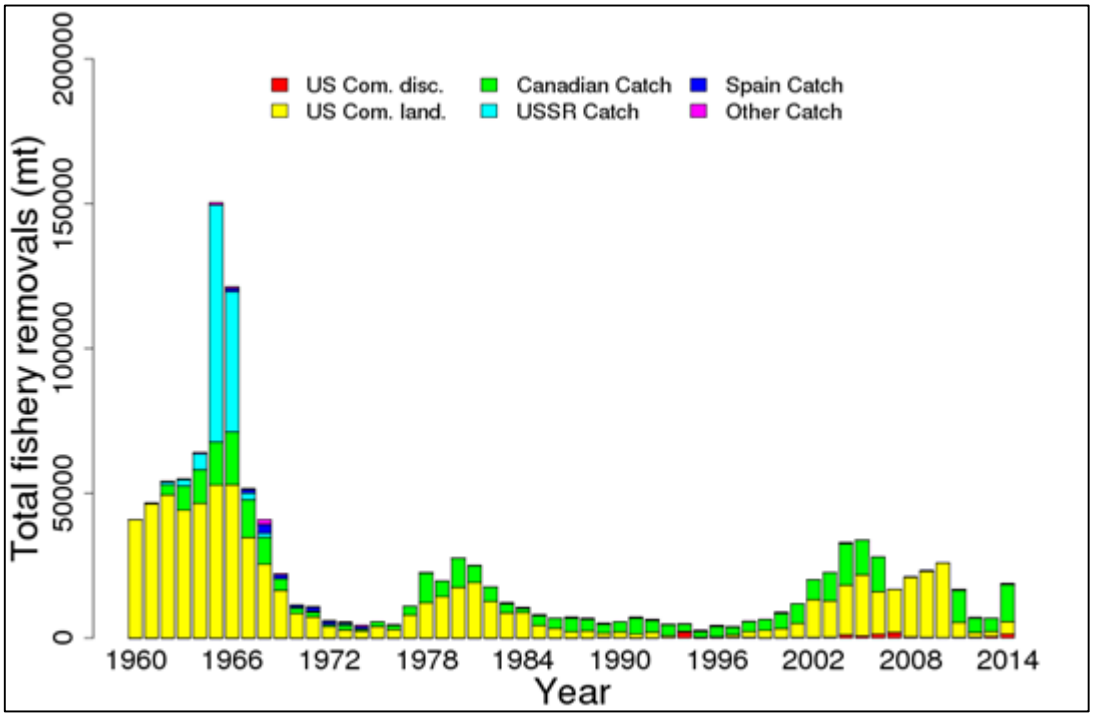


Figure 19 Total catch of Georges Bank haddock between 1931 and 2014 by fleet (US Commercial, Canadian, or foreign fleet) and disposition (landings and discards).

Spawning Stock Biomass

The model estimated a steady increase in SSB from 15,000 mt in the early 1990s, to 252,000 mt in 2007 (Figure 20). The dramatic increase in SSB from 2005 – 2007 is due to the exceptionally large 2003 year class reaching maturity. From 2007 to 2010, SSB decreased 35% as that 2003 year class decreased in number from both natural and fishing mortality.

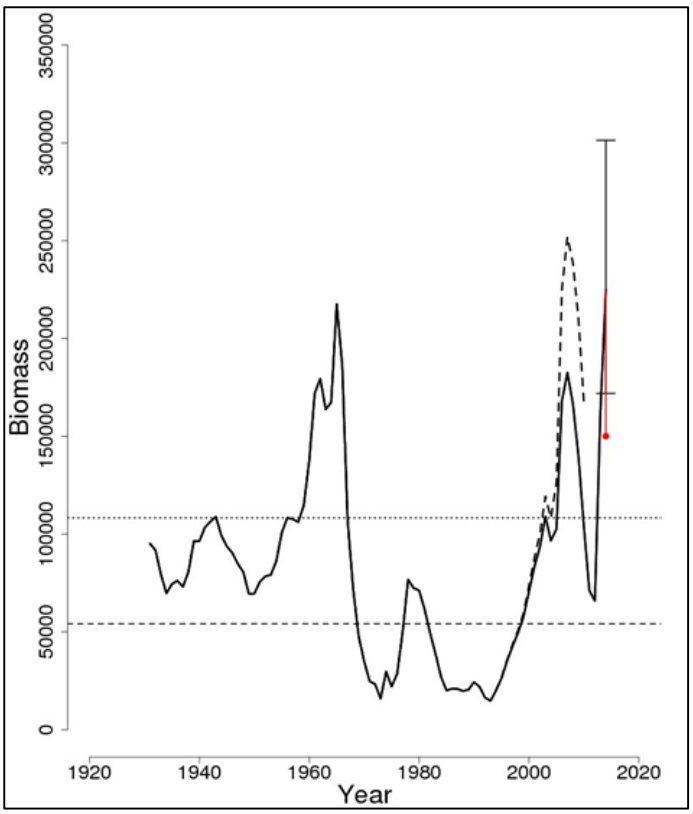


Figure 20. Trends in spawning stock biomass of Georges Bank haddock between 1931 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ (1/2 SSB_{MSY} proxy; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY} proxy; horizontal dotted line) based on the 2015 assessment. Biomass was adjusted for a retrospective pattern and the adjustment is shown in red**.** The 90% bootstrap probability intervals are shown.

Recruitment

Georges Bank haddock recruitment patterns showed some strong pulses followed by periods of low recruitment events similar such as the ones from Gulf of Maine. Over the last years, there have been strong year classes like the 2010 and the 2003 year classes (Figure 21). The absolute size of the 2012 year class is highly uncertain as the estimate is based on only two surveys

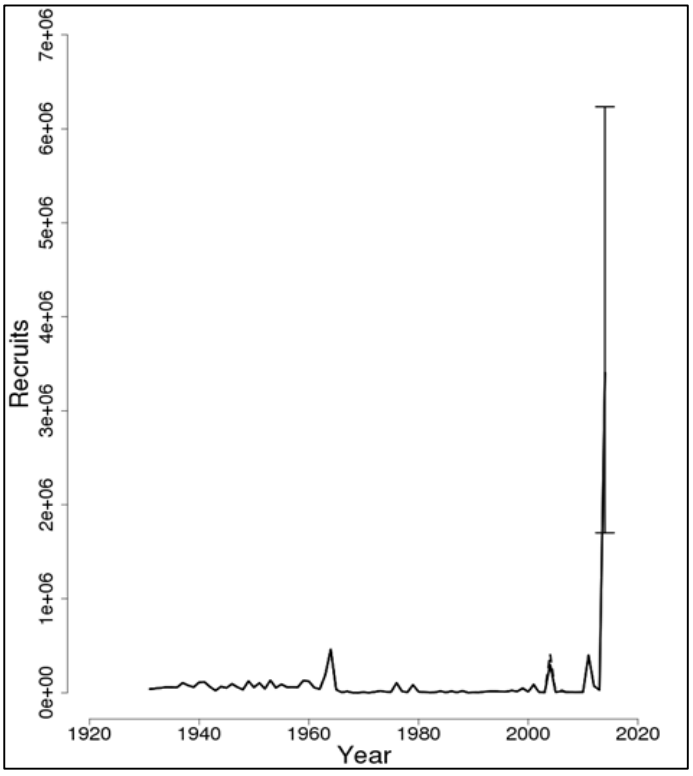


Figure 21. Trends in Recruits (age 1) (000s) of Georges Bank haddock between 1931 and 2014 from the current (solid line) and previous (dashed line) assessment. The 90% bootstrap probability intervals are shown.

4.3.3a. Uncertainties

UOC 1 Acadian Redfish

The largest source of uncertainty in the Acadian redfish assessment is the lack of age data, particularly from the commercial fishery (NEFSC 2015). Age measurements from landings halted after 1985, due to relatively low landings. Current landings have increased to levels seen in the mid-1980s. If landings continue to increase, then age data from the fishery will become increasingly important. Dimorphic growth is another source of uncertainty in this assessment, with females growing faster than males. The use of female weights at age in the stock projections may lead to overestimation of stock productivity, as well as having an unknown effect on biological reference points. This assessment has a major retrospective pattern in SSB and F. Retrospective adjusted SSB (Mohn's rho = 0.256) and fully selected F (Mohn's rho = -0.190) in 2014 fell outside the 90% confidence intervals of the unadjusted 2014 values.

Only one major change was made to the Acadian redfish assessment as part of the 2015 Assessment update Likelihood constants were excluded from likelihood calculations to avoid potential bias caused by one of the recruitment likelihood constants, which is the sum of the log-scale predicted recruitments, and therefore not a constant. Inclusion of this likelihood constant allows the assessment model to minimize the negative log likelihood by estimating lower recruitments. Exclusion of the likelihood constants led to slightly higher estimates of SSB in recent years.

The Acadian redfish assessment could be improved by 1) including additional age data, particularly from the commercial fishery, and 2) investigating the sensitivity of biological reference points and stock projections to the weights at age.

UOC 2 US Atlantic Pollock

The largest source of uncertainty in the pollock assessment is selectivity, as the base model with dome-shaped survey and fishery selectivity implies the existence of a large cryptic biomass that neither current surveys nor the fishery can confirm (NEFSC 2015). Assuming flat-topped survey selectivity leads to lower estimates of SSB and higher estimates of F. Stock status is insensitive to the shape of the survey selectivity pattern at older ages.

The base model has a major retrospective pattern in F. Retrospective adjusted age 5 to 7 average F (Mohn's rho = -0.276) in 2014 fell outside the 90% confidence intervals of the unadjusted 2014 value. The at sel sensitivity model has a major retrospective pattern in SSB and F. Retrospective adjusted SSB (Mohn's rho = 0.789) and age 5 to 7 average F (Mohn's rho = -0.430) in 2014 fell outside the 90% confidence intervals of the unadjusted 2014 values.

The pollock assessment could be improved with additional studies on gear selectivity. These studies could cover topics such as physical selectivity (e.g., multi-mesh gillnet), behavior (e.g., swimming endurance, escape behavior), geographic and vertical distribution by size and age, tag-recovery at size and age, and evaluating information on length-specific selectivity at older ages.

UOC 3 Gulf of Maine Haddock

The largest source of uncertainty in the assessment is the estimated size of the 2012 and 2013 year classes (NEFSC 2015). Based on the estimated selectivity patterns, these year classes are projected to be 30% selected to the fishery in 2016 and 2017 respectively. However, recent changes to the commercial and recreational minimum retention size may result in these year classes recruiting to the fishery sooner than projected.

This assessment does not exhibit a retrospective pattern. Mohn's rho values on SSB (-0.04) and F (0.03) are small. Currently the assessment assumes 50% survival of haddock discarded in the recreational Fishery. Directed Field research would improve this estimate.

UoC 4 Georges Bank Haddock

The largest source of uncertainty is the estimate of 2013 recruitment, which accounts fora substantial portion of catch and SSB in projections (NEFSC 2015). The rho adjusted projections reduce all starting numbers at age by 50%. Based on previous exceptionally large year classes, this adjustment is likely to be sufficient to account for trends in subsequent re-estimates of this year class. In addition, the median recruitment in the projections (the proxy for recruitment at MSY) is 53.4 million, which is greater than 7 of the last 10 recruitments even though SSB is above the SSB_{MSY} proxy. While projections of catch and SSB in the near-term are mostly driven by the 2013 year class, it is worth noting the magnitude of median projected recruitment relative to recent recruitment observations (NEFSC 2015).

This assessment has a moderate retrospective pattern, with a Mohn's rho of 0.5 for SSB and -0.34 for F (average F on ages 5 to 7) (NEFSC 2015).

Projection advice and reference points for Georges Bank haddock are strongly dependent on recruitment (NEFSC 2015). A decade ago, extremely large year classes were considered anomalies (e.g., 1963 and 2003). However, since 2003, there have been two more extremely large (2010 and 2013) and one very large (2012) year classes. Future work could focus on recruitment forecasting and providing robust catch advice.

4.3.4a. Reference points

UoC 1 Acadian Redfish

Based on the 2015 updated assessment, the Acadian redfish (Sebastes fasciatus) stock is not overfished and overfishing is not occurring (Figures 11, 22) (NEFSC 2015). SSB_{2014} was estimated to be 414,544 (mt) which is 147% of the biomass target (SSB_{MSY} proxy of SSB at F50% = 281,112; Figure 12). The 2014 fully selected fishing mortality (F) was estimated to be 0.012 which is 32% of the overfishing threshold (F_{MSY} proxy of F50% = 0.038; Figure 22).

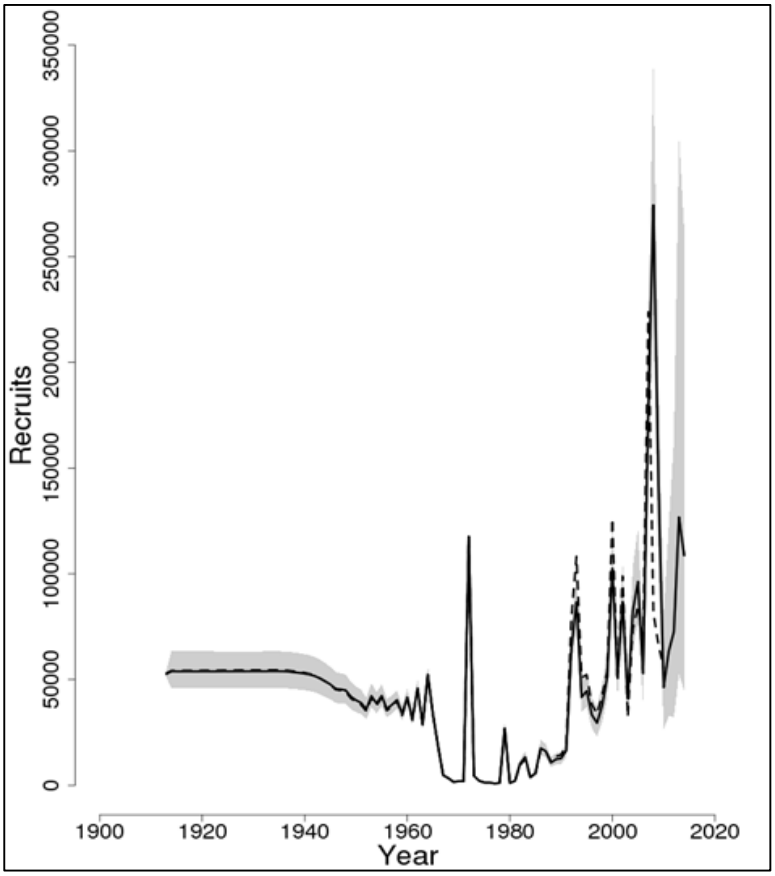


Figure 22. Trends in the fully selected fishing mortality (F_{Full}) of Acadian redfish between 1913 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $F_{THRESHOLD}$ (F_{MSY} proxy=0.038; horizontal dashed line) based on the 2015 assessment. F_{Full} was adjusted for a retrospective pattern and the adjustment is shown in red. The approximate 90% lognormal confidence intervals are shown.

UoC 2 US Atlantic Pollock

The pollock (*Pollachius virens)* stock is not overfished and overfishing is not occurring (Figures 14, 23) (NEFSC 2015). SSB_{2014} was estimated to be 198,847 (mt) under the base model and 57,327 (mt) under the flatsel sensitivity model which is 189 and 104% (respectively) of the biomass target, an SSB_{MSY} proxy of SSB at $F_{40\%}$ (105,226 and 54,900 (mt); Figure 15). The 2014 age 5 to 7 average fishing mortality (F) was estimated to be 0.051 and 0.133 which is 18 and 53% of the overfishing threshold, an F_{MSY} proxy of $F_{40\%}$ (0.277 and 0.252; Figure 23).

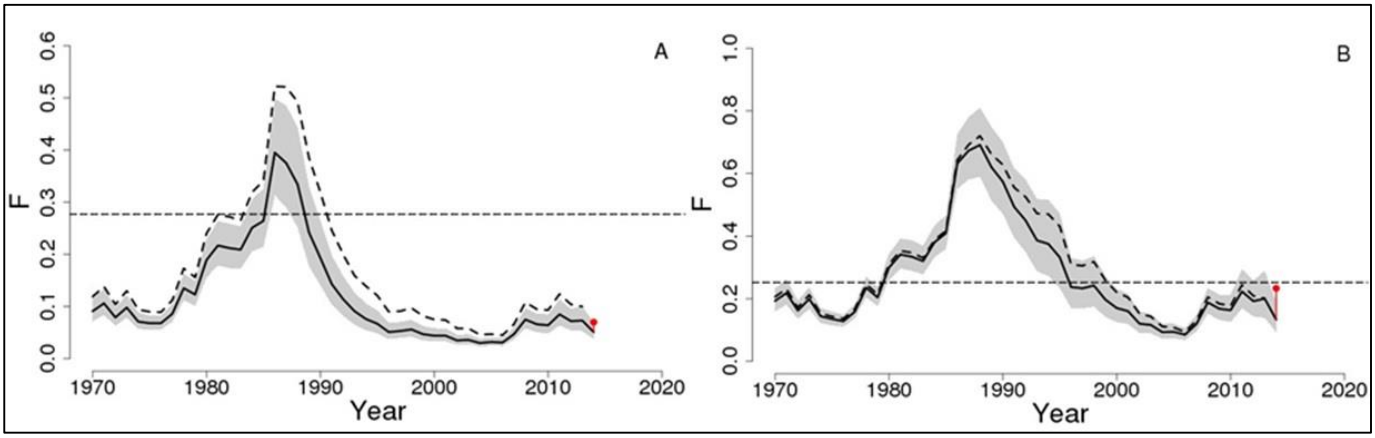


Figure 23. Trends in the fully selected Fishing mortality (F_{Full}) of Acadian redfish between 1913 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $F_{THRESHOLD}$ (F_{MSY} proxy = 0.038; horizontal dashed line) based on the 2015 assessment. F_{Full} was adjusted for a retrospective pattern and the adjustment is shown in red. The approximate 90% lognormal confidence intervals are shown.

UoC 3 Gulf of Maine Haddock

State of Stock: Based on this updated assessment, the Gulf of Maine haddock (*Melanogrammus aeglefinus*) stock is not overfished and overfishing is not occurring (Figures 17, 24) (NEFSC 2015). Spawning stock biomass (SSB) in 2014 was estimated to be 10,325 (mt) which is 223% of the biomass target (SSB_{MSY} proxy = 4,623; Figure 18). The 2014 fully selected fishing mortality was estimated to be 0.257 which is 55% of the overfishing threshold proxy (F_{MSY} proxy = 0.468; Figure 26).

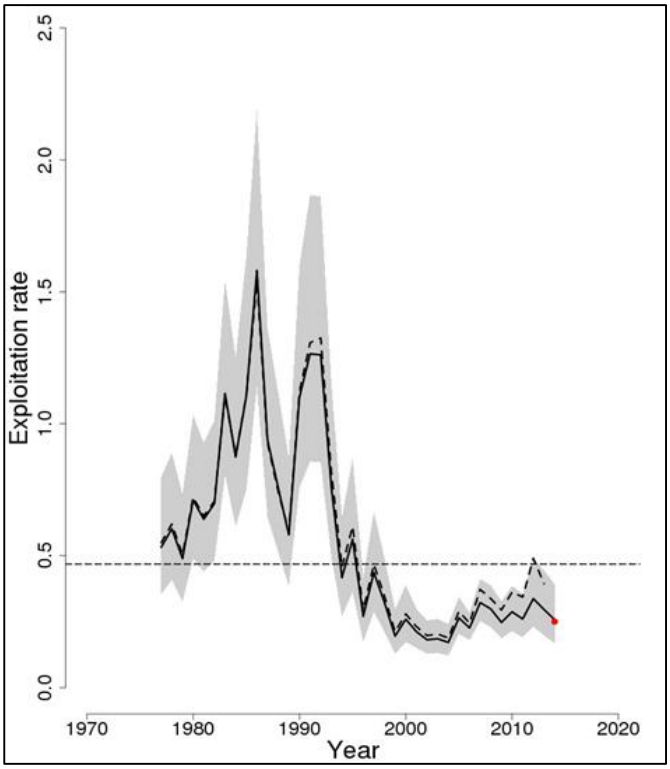


Figure 24. Trends in the fully selected fishing mortality (F_{Full}) of Gulf of Maine haddock between 1977 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $F_{THRESHOLD}$ (F_{MSY} proxy = 0.468; horizontal dashed line) from the 2015 assessment model. F_{Full} was adjusted for a retrospective pattern and the adjustment is shown in red. The approximate 90% lognormal confidence intervals are shown.

UoC 4 Georges Bank Haddock

State of Stock: Based on the 2015 updated assessment, the Georges Bank haddock (*Melanogrammus aeglefinus*) stock is not overfished and overfishing is not occurring (Figures 20-25) (NEFSC 2015). Spawning stock biomass (SSB) in 2014 was estimated to be 225,080 mt, which is 208% of the biomass target (SSB_{MSY} proxy = 108,300 mt; Figure 21). The 2014 fishing mortality (average for ages 5-7) was estimated to be 0.159, which is 41% of the overfishing threshold proxy (F_{MSY} proxy = 0.39; Figure 27).

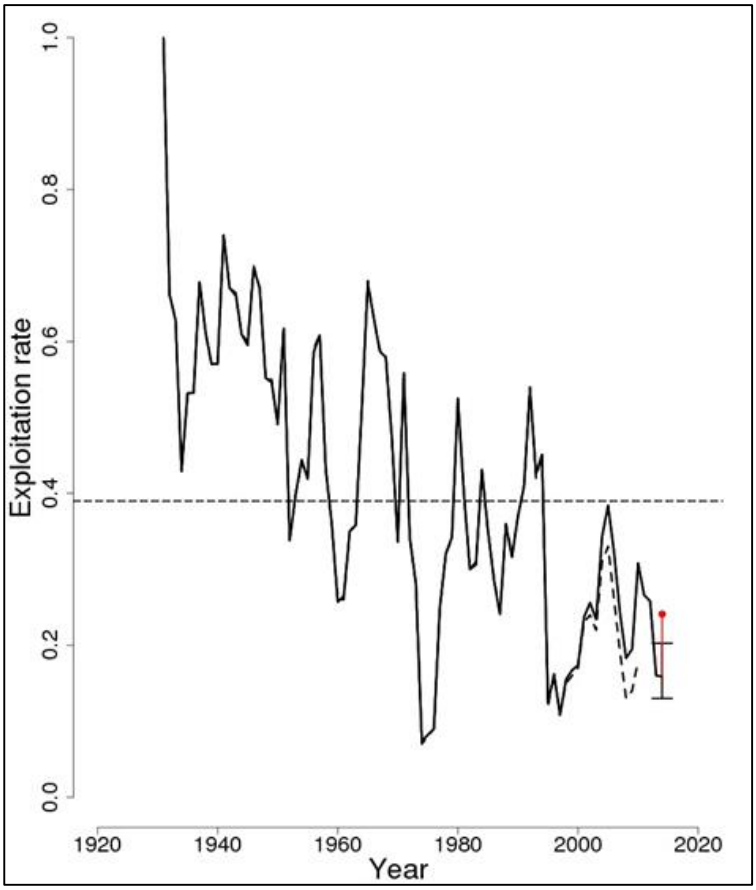


Figure 25. Trends in the fully selected fishing mortality (F_{Full}) of Georges Bank haddock between 1931 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $F_{THRESHOLD}$ (F_{MSY} proxy = 0.39; horizontal dashed line). F_{Full} was adjusted for a retrospective pattern and the adjustment is shown in red based on the 2015 assessment. The 90% bootstrap probability intervals are shown.

4.3.5a. Harvest Strategy, Harvest Control Rules and Tools

The New England fisheries for redfish, haddock, and pollock are managed by the New England Fisheries Management Council (NEFMC) through the Northeast Multispecies Fishery Management Plan (NE Multispecies FMP). Originally enacted in 1985, the NE Multispecies FMP has been amended a number of times to improve the management of the relevant fisheries, including the introduction of gear restrictions (e.g. mesh size, number of nets/hooks etc.), seasonal closures, spatial closures, minimum landing sizes, trip limits on poundage of fish landed, limited access (a restriction on the number of vessels able to work within the fishery), effort limits based on a days at sea (DAS) system, and most recently a system based on transferable quotas set against a hard annual catch limit (ACL). In 2010, Amendment 16 to the NE Multispecies FMP greatly expanded catch share, or sector-based, management. The sectors function essentially as cooperatives, as they are self-selecting and largely self-regulating; albeit within a framework designated and closely monitored by federal agencies. The sectors are exempt from many of the effort controls previously used to manage the fishery; instead, they adhere to an overall hard quota known as an ACL, which is subdivided into Annual Catch Entitlements (ACE) allocated to each sector. The shift to output management instead of effort management enables efficiency gains by allowing increased operational efficiency. While the sectors are optional to join, the majority of fishers have chosen to participate: sector vessels made 65% of all NE Multispecies landings in 2010, including 98% of groundfish and 54% of non-groundfish ((Kitts *et al.* 2011), (Labaree 2012), (Federal Register 2012)).

Under the Magnuson-Stevens Act, the Annual Catch Limit (ACL) must be set less than or equal to the Acceptable Biological Catch (ABC) (to account for management uncertainty), which must be set less than or equal to the Overfishing Level (OFL) (to account for any scientific uncertainty in the stock assessment) (Federal Register 2009a) (Figure 26). Fishing mortality targets are set for each stock independently based on achieving MSY in the long term, therefore for stocks which are overfished (and may also be subject to overfishing) the target fishing mortality is set at a level which will have a reasonable probability (>50%) of ensuring rebuilding of the stock within the timeline set within the relevant rebuilding program. However, should a sector approach the ACE for one of the target stocks, then the area inhabited by that stock is closed to all gears capable of catching that stock, resulting in a potential 'under-harvest' of more abundant stocks. The sector system allows fishermen to share trade or lease quota within a fishery, reducing the chance of overfishing depleted stocks while targeting more abundant stocks; and if a sector is nearing its quota for a particular species, it may be possible to lease it from another sector. There have been some concerns with the management strategy in the past, particularly with respect to depleted stocks. In addition, in many cases target TACs have been set too high, due to errors in stock assessments, and there has been a need for increased precaution. The management system, however, has substantially changed under Amendment 16, which is expected to reduce the race to fish and improve conservation outcomes. For example, discarding appears to have been reduced, and the fishery now relies on hard ACLs (which include discards) rather than target TACs, all of which helps reduce the likelihood of exceeding sustainable fishing mortality rates for targeted stocks. In addition, sectors have not exceeded their ACEs, while in the past it was possible for target TACs to be exceeded, as the regulations were based on effort control (DAS) rather than output control (Kitts *et al.* 2011). The new management regime has not been in place long enough to fully assess its impact.

Rationale:

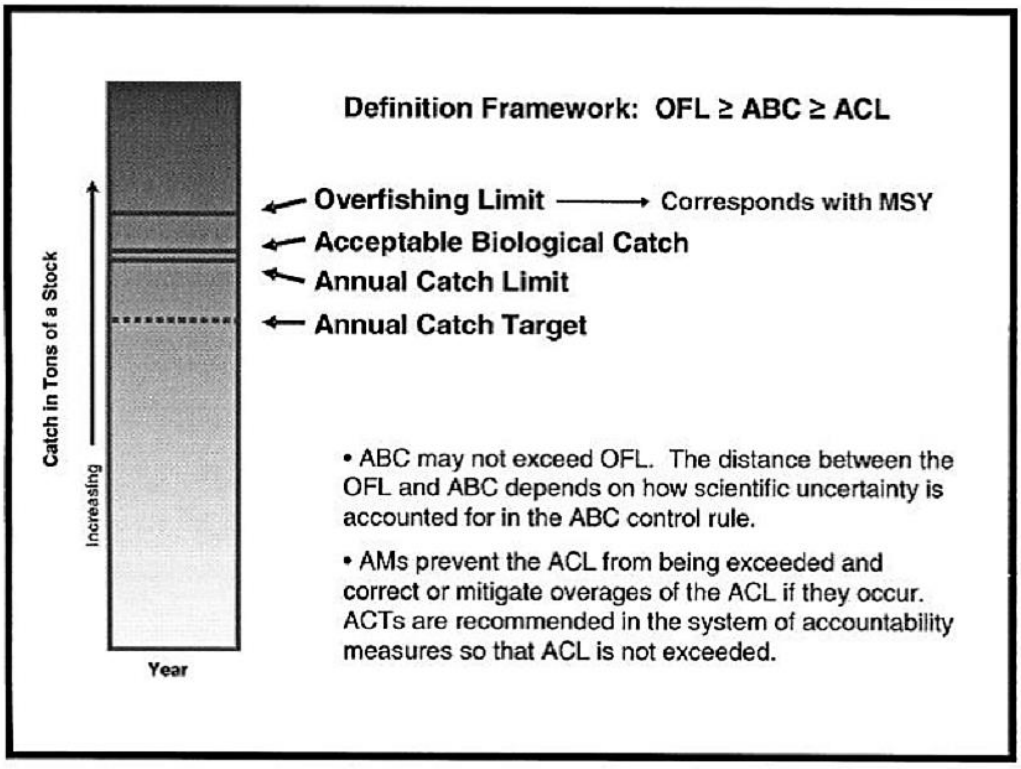


Figure 26. Relationship between OFL, ABC, ACL, and ACT as described by the National Marine Fisheries Service (NOAA 2009).

4.4. Principle Two: Ecosystem Background

4.4.1 Physical Environment

Gulf of Maine (GOM)

The GOM is an enclosed coastal sea bounded on the west by the New England States, on the north by New Brunswick and Nova Scotia, on the east by Browns Bank and on the south by Cape Cod and Georges Bank. The GOM is a boreal habitat with relatively cold waters, and diverse bottom topography including deep basins and shallow ridges with several sediment types. The maximum depth is 350 m in Georges Basin, and the minimum is 9 m on ridges such as Cashes Ledge (NEFMC 2015). As in most cold temperate marine habitats shallow sea water temperatures undergo strong seasonal changes, warming in spring and summer and cooling in late fall and winter. Deep waters are cold and relatively stable year round, below a strong thermocline in summer and bathed by water from the Labrador Current (Bigelow 1927). Oceanographic frontal systems separate the water masses of the Gulf of Maine and Georges Bank from coastal waters south of Georges Bank. These water masses differ in temperature, salinity, nutrient concentration, and planktonic communities. These differences influence productivity and may influence fish abundance and distribution (NEFMC 2015).

Georges Bank (GB)

Georges Bank is a shallow (3 – 150 m) extension of the continental shelf some 160 km wide by 329 km long. It forms the southern rim along a steep slope with the GOM, extends to the open North Atlantic Ocean to the east, and gently slopes to the continental shelf to the south. Its western boundary is the Great South Channel (NEFMC 2015). Sediments on GB range from course gravels and boulders on the Northeast Peak to shifting medium-grained sands on the extensive Central Bank, to fine-grained sands along the southern flank. The southeastern edge of GB is incised with steep rocky submarine canyons. This shallow bank has strong seasonal temperature changes, and strong currents which lead to nutrient mixing and high primary production (Bigelow 1927, Saba *et al.* 2015).

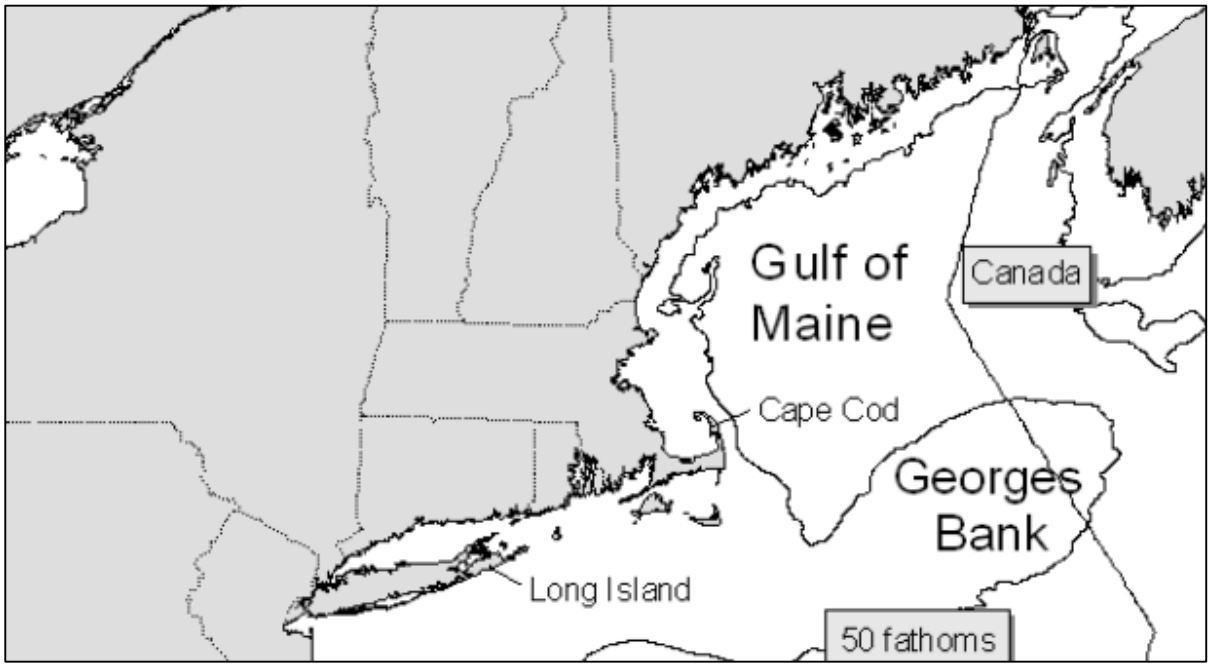


Figure 27. Gulf of Maine and Georges Bank showing US/Canada jurisdictional line.

Biological Communities

Benthic invertebrate communities in the GOM and GB are structured by temperature and sediment type (Stevenson et al. 2004). Hard bottom (rocky) habitats are dominated by attached benthos such as sponges, tunicates, bryozoans, hydroids, and other coelenterates. Sandy (high energy) habitats are dominated by megabenthic

echinoderms and crustaceans, and smaller burrowing crustaceans and polychaetes. Finer bottom sediments (silty sand to clay and silt) are characterized by small infaunal polychaetes and amphipods, and larger epibenthic echinoderms and crustaceans (Theroux and Grosslein 1987, Theroux and Wigley 1998, Watling 1998). Both biomass and diversity are highest at shallow and intermediate depths and decline to low levels in the deep central GOM.

Fish assemblages in the GOM are boreal (cold-temperate) and have both resident and seasonally migratory components. Seasonal migration patterns may be on/offshore and/or northeast/ southwest (NE/SW). Resident species become more dominant with depth and thermal stability (Collette and Klein-MacPhee 2002, Gabriel 1992). The same may be said for GB except that a number of warm-temperate species more typical of the Mid-Atlantic Bight occurs there in summer. Cape Cod and GB have been recognized to form a faunal barrier in summer to northward-migrating warm temperate fishes (Colvocoresses and Musick 1984, Gabriel 1992).

4.4.2 Role of Acadian Redfish, Haddock, and Pollock in the Ecosystem

Acadian Redfish

Within the GOM and GB, Acadian redfish are most common in the deep waters of the GOM, on the northern and eastern slope of GB to 400m, and Browns Bank. They may move into shallower water in winter (Collette and Klein-MacPhee 2002). Most of the diet of Acadian redfish (90%) is composed of free swimming euphausiids (mostly *Meganyctiphanes norvegica*) and pandalid shrimps (Bowman and Michaels 1984, Bowman et al. 2000). Acadian redfish have been reported to rise off the bottom to feed at night (Scott and Scott 1988). Given their diet and habits, Acadian redfish function primarily at trophic level three in both demersal and pelagic ecosystems. Major predators are cod and white hake, but also skates, pollock, silver hake, and monkfish (Maurer and Bowman 1975, Bowman and Michaels 1984).

Haddock

Haddock are found throughout the GOM and GB usually at temperatures from 2 – 10°C, and prefer course sand, gravel and shell bottoms. They are primarily benthic feeders taking a wide variety of both infaunal and epifaunal invertebrates, including polychaetes, amphipods, decapods, bivalves, and echinoderms, depending on local abundance (Bowman *et al*. 2000). On GB they have been recorded to gorge on herring eggs when available. Haddock also will feed on small fishes such as sand lance, capelin and the young of many ground fishes (including haddock) (Collette and Klein-MacPhee 2002). Given their diet, haddock function mostly at trophic level three in demersal ecosystems. Juvenile haddock are consumed by a wide variety of predators including spiny dogfish and skates, and cod, pollock, cusk, white and silver hake, monkfish and halibut (Bowman 1980, Collette and Klein-MacPhee 2002). Adult haddock may be preyed upon by seals (Benoit and Bowen 1990).

Pollock

Pollock are schooling fishes that range widely in the water column in the GOM and GB primarily at temperatures of 5 – 12°C (Collette and Klein-MacPhee 2002). Pollock are primarily piscivorous, but also consume large amounts of cephalopods and euphausiids (Bowman et al. 2000). Included among fish prey are both pelagic species such as herring and smelt, and juveniles of several species of groundfish (including cod, haddock, hakes, and redfish). Pollock function primarily at trophic level four in both pelagic and demersal ecosystems. Juvenile pollock are consumed by spiny dogfish and a large variety of demersal fishes such as monkfish, cod and other pollock (Collette and Klein-MacPhee 2002). Adult pollock may be eaten by seals (Benoit and Bowen 1990, Bowen and Harrison 1996).

4.4.2 Retained Species

Introduction: Species Composition of the New England Large Mesh Bottom Trawl Fishery in the GOM and GB

Information on the total species composition of the NE Large Mesh Bottom Trawl Fishery (LMBT) has not been readily available from the plethora of documents examined from the NEFMC or the NEFSC, or from site visit interviews with personnel from those agencies. Lists of retained, discarded and ETP species are provided in the NEFMC Northeast Multispecies FMP (NEFMC 2015). Information on retained species is given in Table 4. Main

Species which make up > 5% of the catch based on table 47 in NEFMC (2015) are indicated with an asterisk (*). However, other species have to be considered as main species due to its current state of vulnerability as well as of high value to the fishermen. Additional information on the composition of the bycatch, and ETP species is given below in the appropriate section).

Table 4. New England Bottom Trawl Fishery: Non-UOC Retained Species. Total includes catches of Acadian redfish, Haddock and Pollock.

	N.E. Bottom Trawl Fishery Retained Species Catch, 2013		Metric Tons, Live Wt.
	Retained Species	* major (> 5% of catch)	**Catch, M.T.**
*	Cod	*Gadus morhua*	2953.0
*	White Hake -	*Urophycis tenuis*	2045.6
*	American Plaice	*Hippoglossoides platessoides*	1395.2
	Winter Flounder	*Pseudopleuronrctes americanus*	1891.3
	Witch Flounder	*Glyptocephalus cynoglossus*	642.3
	Yellowtail Flounder	*Limanda ferruginia*	435.8
	Atlantic Halibut	*Hippoglossus hippoglosus*	54.7
	Windowpane Flounder	*Scophthalmus aquosus*	237.5
	Atlantic Wolfish	*Anarhichas lupas*	17.1
	Ocean Pout	*Zoarces americanus*	33.2
	Total GOM and GB retained species catch		22,002.20
	Data from Table 47 in NEFMC 2015		

* Main Species (> 5% of catch)

Outcomes: Main Retained Species

Cod

The Atlantic cod, *Gadus morhua*, is a demersal gadoid species found on both sides of the North Atlantic. In the western North Atlantic cod occur from Greenland to North Carolina. In U.S. waters, cod are assessed and managed by the NEFMC as two stocks: GOM and GB (NEFMC 2015).

GOM Cod

The GOM Atlantic cod stock is overfished and overfishing is occurring. Spawning stock biomass (SSB) in 2013 was estimated to be below 2,500 mt, the lowest ever estimated and is at 4% or 3% of the SSB_{MSY}. The 2013 fully selected fishing mortality was estimated to be greater than 1.2, which is more than 6 times greater than the F_{MSY} proxy (0.18). Fishing mortality is near all-time highs despite fishery catches that are at the lowest levels in the time series. Gulf of Maine cod survey indices are at time series lows. The 2011-14 NEFSC spring survey abundance indices are the four lowest in the time series (NEFSC 2014). Declining spawning stock biomass and truncation of the age-structure could compromise the future recruitment success of this stock. Recruitment over the last five years before the assessment (2009-2013) was well below the long-term recruitment levels. The Gulf of Maine cod stock is in poor condition (NEFSC 2014). In the latest stock assessment (NEFSC 2015) it was found that GOM current spawning stock biomass (SSB) is 4% of the biomass target for this stock and there is overfishing $F > F_{MSY}$ occurring with fishing mortality in 2014 reported as 0.932 which is 498% of the overfishing threshold proxy (F_{MSY} proxy = 0.187). Recruitment failure in GOM Cod may be mitigated by climate change and unprecedented warming in the GOM over the last several years (Mills *et al*. 2013). Larval cod prey selectively on *Pseudocalanus* copepods, a boreal zooplankter, which has become rare concurrent with the recent warming trend in the GOM (Friedland *et al*. 2008).

GB Cod

GB cod are a trans-boundary stock harvested by both the U.S. and Canadian fishing fleets. The GB cod stock underwent a benchmark assessment in 2012, which indicated that the stock is overfished and overfishing is

occurring. Productivity of the stock is low with two decades of poor recruitment and a truncated age structure (NEFSC 2013). Cod have been shown to have low hatching rate for 1st and 2nd time spawners (13% and 62%), suggesting that an age structure of older repeat spawners would likely be more productive, under favorable environmental conditions. Given the uncertainty in the magnitude of M and the overfished state of the stock, at 7% of SSB_{MSY} the stock is vulnerable to an allowable biological catch (ABC) quota that is too high (NEFSC 2013a). On the latest stock assessment update it was found that GB Cod current SSB is 1% of the biomass target for this stock and there is overfishing $F > F_{MSY}$ occurring with fishing mortality in 2014 reported as 1.69 which is 994% of the overfishing threshold (F_{MSY} proxy = 0.169) (NEFSC 2015).

Winter Flounder

The winter flounder is a demersal flatfish distributed in the western North Atlantic from Labrador to Georgia. Important U.S. commercial and recreational fisheries exist from the Gulf of Maine to the Mid-Atlantic Bight. NEFMC manages and assesses winter flounder in U.S. waters as three stocks: Gulf of Maine, Georges Bank, and southern New England/Mid-Atlantic (SNE/MAB), (NEFMC 2015). The SNE/MAB stock is beyond the geographic limits of the present certification assessment and will not be discussed further.

GOM Winter Flounder

The assessment of GOM winter flounder stock was based on an empirical swept-area model utilizing data from the 2010 NEFSC fall survey, the Mass. Div. Mar. Fish. (MADMF) fall survey, and the Maine/New Hampshire survey. The estimated stock biomass in 2010 was 6,341 mt. However, the overfished status remains unknown because a biomass reference point or proxy could not be determined. The biomass estimate for 2010 was 16% lower than that for 2009 using the same survey methods, but this difference was not statistically significant. In 2010, overfishing was not occurring for the stock. This conclusion was robust to the range of uncertainty in the biomass estimate (NEFSC 2011a). On the last stock assessment update it was determined that GOM winter flounder status is unknown but overfishing is not occurring (NEFSC 2015).

GB Winter Flounder

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

On the last stock assessment update it was determined GB winter flounder is overfished and overfishing is occurring (NEFSC 2015). SSB_{2014} was estimated to be 5,275 (mt) which is 79% of the biomass target for an overfished stock (SSB_{MSY} = 6,700 with a threshold of 50% of SSB_{MSY}). The 2014 fully selected Fishing mortality (F) was estimated to be 0.379 which is 71% of the overfishing threshold (F_{MSY} = 0.536). However, SSB_{2014} and F_{2014}, when adjusted for retrospective error (83% for SSB and -51% for F), is outside the 90% confidence interval of the unadjusted 2014 point estimate. Therefore, the SSB_{2014} and F_{2014} values used in the stock status determination were the retrospective-adjusted values of 0.778 and 2,883 mt, respectively.

Witch Flounder

The witch flounder is a demersal flatfish distributed on both sides of the North Atlantic. In U.S. waters witch flounder are common in deeper areas throughout the Gulf of Maine and adjacent to Georges Bank, and along the shelf edge as far south as Cape Hatteras, North Carolina (NEFMC 2015). The most recent stock assessment for witch flounder (NEFSC 2012) determined that the 2010 spawning stock biomass was 4,099 mt, 41% below SSB_{MSY} (10,051 mt) and 2010 fishing mortality was 0.47, 173% above F_{MSY} (F=0.27); therefore, witch flounder was overfished and overfishing occurred in 2010 (Figure 19). This assessment found there was little change in the stock status since the previous assessment in 2007, but the SSB was higher than the lowest values in the time series and the F was substantially lower than the highest F value. However, on the latest stock assessment update, it was found that witch flounder

continues to be overfished and overfishing continues to occur. SSB_{2014} was estimated to be 3,129 (mt) which is 33% of the SSB_{MSY} proxy (9,473; Figure 1). The 2014 fully selected fishing mortality was estimated to be 0.428 which is 153% of the F_{MSY} proxy (0.279).

Yellowtail Flounder

The yellowtail flounder is a demersal flatfish that occurs from Labrador to Chesapeake Bay. It generally inhabits depths between 40 and 70 m. NEFMC manages three stocks off the U.S. coast including the Cape Cod/GOM, GB, and SNE/MA stocks. The latter stock is beyond the geographic limits of the present certification assessment and will not be discussed further.

GOM Yellowtail Flounder

The Cape Cod/GOM yellowtail flounder stock continues to be overfished and overfishing is continuing. SSB_{2010} was estimated to be 1,680 mt (with retrospective adjustment). F in 2010 was estimated to be 0.36 (with retrospective adjustment). Revised estimates of the biological reference points are: SSB_{MSY} proxy= 7,080 mt, F_{MSY} proxy = 0.26, and MSY proxy = 1,600 mt. Based on these results, the stock of Cape Cod-Gulf of Maine yellowtail flounder was overfished and overfishing was occurring. However, fishing mortality had been declining since 2004 and was at the lowest level observed in the time series in 2009. Spawning stock biomass was increasing the few years previous to the assessment (NEFSC 2012).

On the 2015 updated assessment, Cape Cod-Gulf of Maine Yellowtail founder stock was found to be overfished and overfishing is occurring. SSB_{2014} was estimated to be 1,695 (mt) which is 32% of the biomass target for an overfished stock (SSB_{MSY} proxy = 5,259). F_{2014} (average for ages 4-5) was estimated to be 0.35 which is 125% of the overfishing threshold proxy (F_{MSY} proxy = 0.28).

GB Yellowtail Flounder

The exact status determination for GB yellowtail flounder is unknown. Overfishing is unknown. Stock assessment scientists at the NEFSC have had problems fitting population models that performed satisfactorily to this stock (NEFSC 2012). Therefor because a stock assessment model is lacking for this stock, no historical estimates of biomass, fishing mortality rate, or recruitment can be calculated. The NEFMC has proposed to adopt an empirical approach for GB yellowtail flounder based on resource survey catches as the basis of catch advice (NEFMC 2015). On the latest stock assessment update, despite that reference points cannot be calculated by the new empirical approach, it was found that the abundance is in the lowest levels of the time series. Stock condition is poor for this stock (NEFSC 2015).

White Hake

The white hake occurs from Iceland and along the continental slope, to Florida (Musick 1973). It is most abundant from Newfoundland to southern New England and is common on muddy bottom throughout the Gulf of Maine. The white hake stock is not overfished and overfishing is not occurring. This favorable determination of stock status is a change from the previous stock assessment in which white hake was judged to be overfished and subject to overfishing in 2007 (NEFSC 2013b). Fishing mortality has varied over a wide range since the 1970s but presently is well below the F_{MSY} proxy. The improving condition of the stock is indicated by the more than threefold increase in spawning stock biomass from a time series low in 1997 (NEFSC 2013b). On the last stock assessment update it was determined White hake is not overfished and overfishing is not occurring (NEFSC 2015).

American Plaice

The American plaice is an arctic-boreal to temperate- marine pleuronectidae (righteye) flounder that inhabits both sides of the North Atlantic. Along the Northwest Atlantic continental shelf American plaice are distributed from southern Labrador to Rhode Island in relatively deep waters (Collette and Klein-MacPhee 2002). Off the U.S. coast, American plaice is managed as a single stock in the Gulf of Maine-Georges Bank region where the greatest commercial concentrations exist between 90 and 182 m (NEFMC 2015). The most recent stock assessment determined that the American plaice stock is not overfished and overfishing is not occurring (NEFSC 2012).

Commercial catch has declined since 2003. Fishing mortality in 2010 (0.09) was among the lowest estimates in the time series. Biomass has been increasing since 2004 and SSB_{2010} was 59% of SSB_{MSY}. The stock assessment also indicated that the stock would not rebuild by 2014, the specified rebuilding target date. Because of this inadequate rebuilding progress, a revised 10 year rebuilding strategy with a 50% probability of success has been developed (NEFMC 2015). On the last stock assessment update it was determined American plaice is not overfished and overfishing is not occurring (NEFSC 2015).

Outcomes: Minor Retained Species

Atlantic Halibut

Atlantic halibut is the largest species of flatfish found in the northwest Atlantic Ocean. This long-lived, late-maturing flatfish is distributed from Labrador to southern New England (Collette and Klein-MacPhee 2002). Halibut prefer sand, gravel, or clay substrates at depths up to 1000 m (Scott and Scott 1988; Miller *et al*. 1991, NEFMC 2015). Historically Atlantic halibut were subject to severe overfishing (Musick *et al*. 2000). Recent survey indices are highly variable because the NEFSC trawl surveys catch low numbers of halibut. Based on the results of a 2012 assessment update, Atlantic halibut is overfished but overfishing is not occurring (NEFSC 2012). However, the latest stock assessment update concluded determined that the overfishing and overfished status of Atlantic halibut cannot be determined using the current assessment (NEFSC 2015). This occurred because diagnostics showed the model was unreliable.

Windowpane Flounder

Windowpane flounder is a left-eyed, flatfish species that occurs in the northwest Atlantic from Gulf of St. Lawrence to Florida (Collette and Klein-MacPhee 2002). In US waters windowpane flounder are managed as two stocks, SNE/MAB and GOM/GB. Only the latter is of concern here. Indices from NEFSC fall surveys are used as an indicator of stock abundance and biomass. These biomass indices have fluctuated above and below the time series median as fishing mortality rates have fluctuated below and above the point where the stock could replenish itself. Windowpane flounder is a non-allocated stock that is predominately discarded at-sea, and total catch estimates in the groundfish fishery are extrapolated based on observer data. Biomass indices increased to levels at or slightly above the median during 1998-2003, but then fell below the median from 2004 – 2010 and were 29% of B_{MSY} in 2010 (NEFSC 2012). According to a 2015 assessment update, the stock continues to be overfished but overfishing was not occurring in 2014 (NEFMC 2015).

Atlantic Wolffish

Atlantic wolffish is a benthic fish distributed on both sides of the North Atlantic Ocean. In the northwest Atlantic the species occurs from Davis Straits off of Greenland to Cape Cod and sometimes straying to southern New England and New Jersey (Collette and Klein-MacPhee 2002). In GOM/GB abundance is highest in the southwestern portion at depths of 80 – 120 m on benthic habitats with large stones and rocks (Pavlov and Novikov 1993). NEFSC spring and fall bottom trawl survey indices show abundance and biomass of Atlantic wolfish generally has declined over the last two to three decades. However, Atlantic wolffish are encountered infrequently on NEFSC bottom trawl surveys and there is uncertainty as to whether the NEFSC surveys adequately sample this species (NDPSWG, 2009). Atlantic wolffish continues to be considered a data poor species. An assessment update in 2015 determined that the stock is overfished, but overfishing is not occurring (NEFSC 2015).

Ocean Pout

Ocean pout is a demersal eel-like species found in the northwest Atlantic from Labrador to Delaware. Ocean pout are most common on sand and gravel bottom (Orach-Meza 1975) at an average depth of 49 – 262 ft. (15-80 m) (Clark and Livingstone 1982) and temperatures of 43° – 48°F (6° – 9°C) (Scott 1982). In U.S. waters, ocean pout are assessed and managed as a unit stock from the Gulf of Maine to Delaware (NEFMC 2015). Between 1975 and 1985, NEFSC spring trawl survey biomass indices increased to record high levels, peaking in 1981 and 1985. Since 1985, survey catch per tow indices have generally declined, and the 2010 index was the lowest value in the time series.

Catch and exploitation rates have also been low, but stock size has not increased. A 2015 assessment update determined that in 2010 ocean pout was overfished, but overfishing was not occurring (NEFSC 2015).

Retained Species: Management Strategy

The New England Fishery Management Council (NEFMC) is charged with developing management plans that meet the requirements of the Magnuson-Stevens Act (M-S Act). The Northeast Multispecies Fishery Management Plan (FMP) specifies the management measures for thirteen groundfish species (cod, haddock, yellowtail flounder, pollock, plaice, witch flounder, white hake, windowpane flounder, Atlantic halibut, winter flounder, redfish, Atlantic wolffish, and ocean pout) off the New England and Mid-Atlantic coasts. The FMPs have been updated through a series of amendments and framework adjustments. Amendment 16, which became effective on May 1, 2010, was the most recent amendment to adopt a broad suite of management measures in order to achieve the fishing mortality targets necessary to rebuild overfished stocks and meet other requirements of the Magnuson-Stevens Act. Amendment 16 made major changes to the FMP.

Non-UOC retained species in the fishery are managed under the same system as the UOC species (NEFMC 2015). Under the Magnuson-Stevens Act, the Annual Catch Limit (ACL) must be set less than or equal to the Acceptable Biological Catch (ABC) (to account for management uncertainty), which must be set less than or equal to the Overfishing Level (OFL) (to account for any scientific uncertainty in the stock assessment) (Federal Register 2009a). Fishing mortality targets are set for each stock independently based on achieving MSY in the long term, therefore for stocks which are overfished (and may also be subject to overfishing) the target fishing mortality is set at a level which will have a reasonable probability (>50%) of ensuring rebuilding of the stock within the timeline set within the relevant rebuilding program. However, should a sector approach the Annual Catch Entitlement (ACE) for one of the target stocks, then the area inhabited by that stock is closed to all gears capable of catching that stock, resulting in a potential 'under-harvest' of more abundant stocks.

The sector system allows fishermen to share trade or lease quota within a fishery, reducing the chance of overfishing depleted stocks while targeting more abundant stocks; and if a sector is nearing its quota for a particular species, it may be possible to lease it from another sector. There have been some concerns with the management strategy in the past, particularly with respect to depleted stocks. In addition, in many cases target TACs have been set too high, due to errors in stock assessments, and there has been a need for increased precaution. The management system, however, has substantially changed under Amendment 16, which is expected to reduce the race to fish and improve conservation outcomes. For example, discarding appears to have been reduced, and the fishery now relies on hard ACLs (which include discards) rather than target TACs, all of which helps reduce the likelihood of exceeding sustainable fishing mortality rates for targeted stocks (Table 5). In addition, sectors have not exceeded their ACEs, while in the past it was possible for target TACs to be exceeded, as the regulations were based on effort control (DAS) rather than output control (Kitts *et al*. 2011). The new management regime has not been in operation long enough to fully assess its impact.

Table 6. Fishing Year 2015 OFLs, US ABC ACLs (mt, live weight).

Stock	OFL	U.S. ABC	Total ACL
GB Cod	4191	1980	1886
GOM Cod	514	386	366
GB Yellowtail Flounder	unknown	248	240
GOM Yellowtail Flounder	1194	548	524
American Plaice	2021	1544	1470
Witch Flounder	1846	783	751
GB Winter Flounder	3242	2010	1952
GOM Winter Flounder	688	510	375
White Hake	6237	4713	4484
Northern Windowpane Flounder	202	151	144
Ocean Pout	313	235	220
Atlantic Halibut	180	109	97
Atlantic Wolffish	94	70	65
Adapted from Tables 4 and 5,Federal Register/ Vol.80, No. 84, ,25112- 25114			

Additional Management Measures

GOM Cod

In November 2014 NOAA implemented emergency regulations to further protect GOM cod (NOAA 2014). These included additional fishing area closures, a 200lb trip limit on commercial vessels and a prohibition of cod possession by recreational anglers. These regulations expired on in May 1, 2015. In addition, on May 1, 2015 NMFS approved NEFMC proposed increased protection for GOM cod that continues the emergency NOAA prohibition possession of GOM cod for recreational anglers, and modifies the suite of existing rolling closures in the GOM for vessels in the commercial fishery. The intent of this measure is to increase protection for GOM cod in winter months by adding the winter closures, and to create more economic opportunities for the commercial fishery in the spring by opening up the April closure (NEFMC 2015). After considering public comment, supporting analysis, and the best scientific information available, NMFS determined that an ABC of 386 mt is appropriate and consistent with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and the National Standards. As described below, this ABC balances other Magnuson-Stevens Act objectives, including achieving optimum yield and taking into account the needs of fishing communities, without compromising conservation objectives to prevent overfishing and rebuild the stock. In light of current stock conditions, this ABC is a 75-percent reduction compared to 2014, which is in addition to the 80- percent reduction implemented for fishing years 2013–2014. In total, the GOM cod catch limit has been reduced by 95 percent over the last 5 years. NMFS is approving an ABC of 386 mt with the expectation that the catch limits implemented in this final rule will be reviewed following the September 2015 assessment for GOM cod. This assessment is intended to be incorporated for fishing year 2016. Fishing years 2016–2018 catch limits for GOM cod would be set based on the September 2015 assessment.

Windowpane Flounder

In fall 2013, final catch information became available for FY 2012. These final catch estimates indicated that the northern windowpane flounder ACL was exceeded by 28%, and the southern windowpane flounder ACL was exceeded by 36%. In addition, preliminary catch information for FY 2013 indicated that the commercial groundfish fishery catch of ~235 mt exceeded the overfishing limit for northern windowpane flounder (202 mt). These overages automatically triggered Accountability Measures (AMs) beginning in FY 2014 that required selective trawl gear to be used in certain parts of the stock areas for both windowpane flounder stocks. For the entire 2014 fishing year, common pool and sector vessels fishing on a groundfish trip with trawl gear are required to use one of the following selective trawl gears when fishing in the AM areas: (1) Haddock separator trawl; (2) Ruhle trawl; (3) mini-

Ruhle trawl; or (4) rope separator trawl. There are no restrictions on longline or gillnet gear. These gear restrictions will apply in the large AM areas for both northern and southern windowpane flounder because the overages were more than 20 percent of the ACL for both stocks (maps and coordinates of the AM areas can be found here: http://www.nero.noaa.gov/regs/infodocs/windowpaneaminfosheet.pdf). Possession of Windowpane Flounder is prohibited in this fishery (NEFMC 2015).

Ocean Pout and Wolffish

Possession of Ocean Pout and wolffish is prohibited in the fishery (NEFMC 2015). There are a number of measures in place:

- Areas closed to fishing year-round or seasonally to protect habitat and spawning groundfish species.
- Requirement that the mesh on trawl nets be large enough to allow small fish to escape.
- A cap on the amount of groundfish bycatch that fishing vessels can take.
- Use of trawl gear that is more selective for the target fish that can be landed must be used in certain areas. Some trawls are made with upper and lower cod ends which are designed to retain haddock in the upper bag and release cod in the lower. This design is predicated on behavioral differences between cod and haddock which occur higher off the bottom than cod.

Retained Species: Information/Monitoring

Fishery Independent data

Northeast Annual abundance estimates of all NMFS managed species in the Northeast, including those in the LMOT and the Spiny Dogfish, Skate, and Monkfish fisheries are provided by spring and fall Groundfish Survey Cruises from the NEFSC, supplemented by state surveys conducted by Massachusetts and New Hampshire/Maine. NEFSC surveys began in 1964, and have been continuous. This survey is based on a depth stratified random sampling design (Politis *et al.* 2014). Important biological data (length frequencies, age/growth, reproduction, food habits etc.) are derived from material collected during the NEFSC survey cruises.

Fishery Dependent Data

Catch and discard data in the fishery are collected by onboard NMFS Fisheries Observers, and coverage is >25% of all large mesh bottom trawl trips (Wigley *et al.* 2014). The primary responsibility for the collection of fishery dependent information from commercial fishery operations for most federally managed species from Maine through Virginia lies with The Fisheries Data Services Division (FDSD) in the Northeast Region of NMFS. For some species this responsibility extends throughout the entire range of the commercial fisheries on the Atlantic and Gulf coasts of the United States. In addition, the FDSD has responsibility for establishing quality standards for fisheries dependent data collections that are managed by the Northeast Regional Office, improving the quality of fishery dependent data and the collection of biological information from commercial catches. The FDSD acquires data through mandatory reporting programs to provide timely and accurate landings and effort data on the federally regulated fisheries in the northeast for in-season management and analysis. Tasks include dockside collection of catch data, biological samples from commercial fishing trips, and producing finished data products to support fisheries management and scientific analyses (NMFS FDSD 2015).

4.4.3 Bycatch Species

Discarded bycatch makes up about 48% of the catch in the NE Large Mesh OT Fishery (Figure 28).

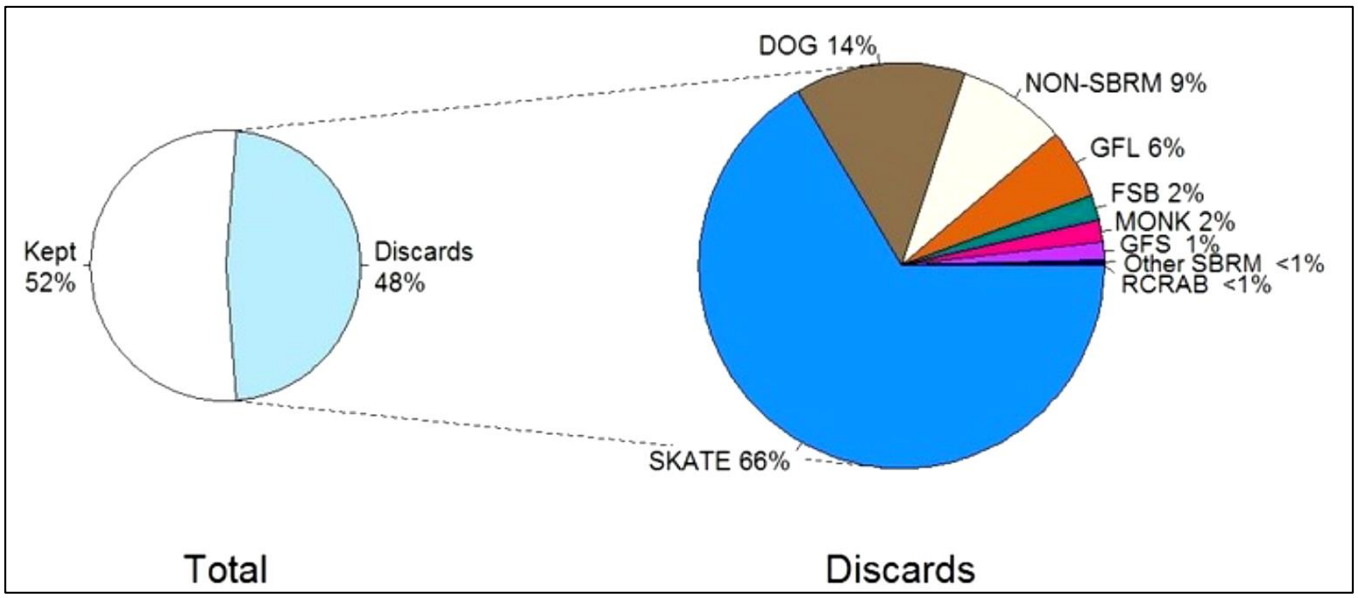


Figure 28. Composition of discards in the NE Large Mesh OT Fishery (after Wigley *et al*., 2015) (Key to FMP Abbreviations: GFL, NE Large Mesh OT; MONK, Monkfish; FSB Summer Flounder, Scup, Black Sea Bass; GFS, Small Mesh OT; RCRAB, Red Crab).

Converting discard percentages to percent of the catch, discards are dominated by skates (32%), and spiny dogfish (7%) (Figure 26). Species from the LMOT make up about 4% of the catch. These discards are charged against species' quotas. Species that are not included in any FMP make up about 4% of the catch. This category in the NMFS data base includes some 100 invertebrate and fish species for all managed fisheries in New England and the MAB (S. Wigley, NEFSC unpublished table). Most are small species with no commercial or recreational value. All the other discarded species are included, and managed in other FMPs. Of these, the monkfish and small mesh otter trawl fishery (red, silver, and offshore hakes) are germane to this assessment. The other two are focused primarily in the MAB. Monkfish are fished sustainably as well as red hakes (NEFMC 2015). None makes up more than a fraction of one percent of the catch. Therefore it is reasonable to assume that the NE LMOT Fishery does not pose a risk of serious or irreversible harm to minor bycatch species.

Outcome

Bycatch Species

Skates

Skates are rarely targeted but taken incidentally in the LMOT fishery and are usually discarded. However they may be landed depending on catch of target groundfish and market prices. Fishers in the LMOT fishery that wish to land skates are subject to all the restrictions mandated in the Skate FMP (see below) The seven species in the Northeast Region skate complex are; little skate (*Leucoraja erinacea*), winter skate (*L. ocellata*), barndoor skate (*Dipturus laevis)*, thorny skate (*Amblyraja radiata*), smooth skate (*Malacoraja senta*), clearnose skate (*Raja eglanteria*), and rosette skate (*L. garmani*). The barndoor skate is the most common skate in the Gulf of Maine. Georges Bank and southern New England is the center of distribution for the little and winter skates. The thorny and smooth skates typically occur in the Gulf of Maine. The clearnose and rosette skates have a more southern distribution, and occur primarily in southern New England and the Chesapeake Bight, and will not be discussed further here.

Skate landings have two components, one focused on larger skates to cut wings, and the other focused on small skates for bait in other fisheries. Based upon NMFS port sampling data, over 98 percent of skate wing fishery landings are composed of winter skate. Similarly, approximately 90 percent of skate bait landings are composed of little skate, with the remainder being largely comprised of juvenile winter skates. While in most circumstances it is unlawful to retain, land, or possess barndoor, thorny, and smooth skates, vessels and fish dealers must still report the unauthorized landing of these (NOAA 2014). Due to insufficient information about the population dynamics of skates, there remains some uncertainty about the status of skate stocks. Benchmark assessment results from SAW 44 are given in NEFSC 2007a and 2007b. Because the analytic models that were attempted did not produce reliable results, the status of skate overfishing is determined based on a rate of change in the three year moving average for survey biomass. These thresholds vary by species due to normal inter-annual survey variability. Details about the overfishing reference points and how they were chosen are given in (NEFSC 2000). Based on the 2013 survey, overfishing was occurring on thorny and winter skates, one skate species was overfished (thorny) and, overfishing was not occurring in any of the other species (NEFMC 2003, 2009a, 2015). Based on the landings data, barndoor, and smooth skates are considered minor bycatch species, whereas winter and little skate are considered major bycatch species. Based on the status of a species being vulnerable, thorny skate was considered a major bycatch species.

Major Bycatch Species

Little Skate
Little Skate are not overfished nor is overfishing occurring (NEFMC 2015).

Winter Skate
Based on the 2014 NEFSC Survey, winter skate are not overfished and overfishing is not occurring (NEFMC 2015).

Thorny Skate
Based on the 2014 NEFSC Survey, thorny skate are overfished and overfishing is not occurring (NEFMC 2015).

Spiny Dogfish
The spiny dogfish is considered a major bycatch species based on Figure 26. It is a cold-temperate species that occurs in all cold-temperate seas except the North Pacific (Ebert *et al*. 2013). In the western North Atlantic it occurs from Greenland to northern Florida (Castro 2011, Collette and Klein-MacPhee 2002)). Spiny dogfish are regulated by the Mid-Atlantic Fishery Management Council (MAFMC 2014). The Dogfish FMP considers spiny dogfish to be a unit stock off the coast of New England. In summer, dogfish migrate northward to the Gulf of Maine-Georges Bank region and into Canadian waters. They return southward in autumn and winter (Nammack *et al*. 1985).

Spawning stock biomass of spiny dogfish declined rapidly in response to a directed fishery during the 1990's. NMFS initially implemented management measures for spiny dogfish in 2001. These measures have been effective in reducing landings and fishing mortality. NMFS declared the spiny dogfish stock rebuilt for the purposes of U.S. management in May 2010. The B_{MSY} reference point defines when the stock is rebuilt (above B_{MSY}) and overfished (below½ B_{MSY}). For spiny dogfish, B_{MSY} (proxy) is the spawning stock biomass that maximizes recruitment (SSB_{MAX}) in a Ricker type (dome-shaped) stock-recruitment model. SSB_{MAX} is estimated to be 159,288 mt (351 Mlb) with ½ of that target corresponding to the biomass threshold (79,644 mt; 175.5 Mlb). In September 2011, the NEFSC updated their assessment of the spiny dogfish stock using catch data (2010), and results from the 2011 trawl survey. The updated estimate of SSB_{2011} was 169,415 mt (373.496 Mlb), about 6% above SSB_{MAX} (159,288 mt). In updating the assessment, the NEFSC estimated a *100% probability that the stock is not overfished.*

A review by the NEFMC's Statistics and Scientific Committee (SSC) in 2011 was conducted to establish its endorsement of a fishing mortality reference point that defines when overfishing is occurring (F_{MSY}). The updated fishing mortality reference point provided by the NEFSC is F_{MSY} = 0.2439. All accountable sources of removals contribute to the estimate of fishing mortality (F) under the current assessment. For the most recent assessment

year (2010), these include U.S. commercial landings (12.346 Mlb), Canadian commercial landings (6 mt), U.S. dead discards (8.997 Mlb), and U.S. recreational landings (46,297 lb). Total removals in 2010 were approximately 21.330 Mlb corresponding to an F estimate of 0.09, well below F_{MSY} = 0.2439. In updating the assessment, the NEFSC estimated a 100% probability that overfishing was not occurring ($F_{2010} < F_{THRESHOLD}$) (MAFMC 2014).

Minor Bycatch Species

Barndoor skate
Barndoor skate is managed by the NEFMC under the Skate FMP (see above). It is neither overfished nor is overfishing occurring (NEFMC 2015).

Smooth skate
Smooth skate is managed by the NEFMC under the Skate FMP (see above). It is neither overfished nor is overfishing occurring (NEFMC 2015).

Northern Monkfish
Monkfish is managed by the NEFMC under its own (Monkfish) FMP, and Is not overfished nor is over fishing occurring (NEFMC 2015, NEFSC 2010).Monkfish make up < 0.01% of the catch in the LMOT.

Northern Red hake
Red hake is managed by the NEFMC under the Small Mesh Otter Trawl Fishery FMP. Overfishing is not occurring but the biomass estimate was slightly below the Target in the last (2010) assessment (NEFMC 2013). Red hake make up < 0.01% of the catch in the LMOT.

Northern Silver hake
Silver hake is managed by the NEFMC under the Small Mesh Otter Trawl Fishery FMP. It is neither overfished nor is overfishing occurring (NEFMC 2013). Silver hake make up < 0.01% of the catch in the LMOT.

Offshore hake
Offshore hake is managed by the NEFMC under the Small Mesh Otter Trawl Fishery FMP. It is neither overfished nor is overfishing occurring (NEFMC 2013). Offshore hake make up < 0.01% of the catch in the LMOT.

Bycatch Management Strategy

Skates
Skates are taken primarily as bycatch in the LMOT fishery. Should fishers choose to land skates they come under the management regulations of the Skate FMP.

NMFS implemented the Northeast Skate Complex Fishery Management Plan (Skate FMP) in September 2003. The FMP required both dealers and vessels to report skate landings by species (NEFMC 2003). Possession prohibitions of barndoor, thorny, and smooth skates in the Gulf of Maine were also provisions of the FMP. The FMP implemented a trip limit of 10,000 lbs (4,536 kg) for winter skate, and required fishermen to obtain a Letter of Authorization to exceed trip limits for the little skate bait fishery.

In 2010 Amendment 3 to the Skate FMP implemented a rebuilding plan for smooth skate and established an ACL and annual catch target (ACT) for the skate complex, total allowable landings for the skate wing and bait fisheries, and seasonal quotas for the bait fishery. Amendment 3 also reduced possession limits, in-season possession limit triggers, and other measures to improve management of the skate fisheries (NEFMC 2010). The Amendment 3 ACL framework allows the Council to set an aggregate skate ACL that is the product of a three-year average stratified mean biomass and the median exploitation ratio (catch/biomass) through 2007. These parameters were chosen to be somewhat conservative and hence take into account scientific uncertainty. From this ACL value, the FMP

specification process deducts a 25% buffer to account for management uncertainty to set an ACT, and then deducts an assumed discard rate (updated to the 2008 – 2010 dead discards) to set a Total Allowable Landings (TAL) allocated between the skate bait and wing fisheries according to historic share established by Amendment 3. The Skate fishery caught 56% of the overall ACL in FY 2012; this was a decrease from FY 2011 landings. No Accountability Measures (AMs) were triggered in FY 2012 as there was no overage. The wing fishery caught 70.5% of the wing TAL; the bait fishery caught 76.2% of the bait TAL (2014b). Skate biomass estimates have generally increased since 2000. The landings and catch limits proposed by Amendment 3, and Framework 2 have an acceptable probability of promoting biomass growth, and achieving the rebuilding (biomass) target for thorny skate. Acceptable Fs for both thorny and winter skates have been adopted. In 2014 NMFS approved a 30% reduction in Skate ABC and associated catch limits to try and eliminate overfishing in winter and thorny skates (NEFMC 2014c).

Spiny Dogfish

NEFMC and MAFMC jointly develop the spiny dogfish FMP for federal waters (MAFMC 2014). The Atlantic States Marine Fisheries Commission (ASMFC) concurrently develops a plan for state waters (ASMFC 2013). The plans are coordinated, and are based on quotas established by stock assessments by the NEFSC. Fishers in the LMOT must adhere to all restrictions in the Spiny Dogfish FMP. In addition, in most instances fishers purposely avoid setting on dogfish because they are of low value and are awkward to clear overboard because of their weight and size.

Bycatch Information/Monitoring

Fishery Independent data

Annual abundance estimates of all NMFS managed species in the Northeast, including those in the Northeast Large Mesh Trawl Fishery and the Spiny Dogfish, Skate, Small Mesh Otter Trawl, and Monkfish fisheries are provided by spring and fall Groundfish Survey Cruises from the NEFSC, supplemented by state surveys conducted by Massachusetts and New Hampshire/ Maine. NEFSC surveys began in 1964, and have been continuous. This survey is based on a depth stratified random sampling design (Politis *et al*. 2014). Important biological data (length frequencies, age/growth, reproduction, food habits etc.) are derived from material collected during the NEFSC survey cruises.

Fishery Dependent Data

Discard data in the fishery are collected by onboard NMFS Fisheries Observers, and coverage is >25% of all large mesh bottom trawl trips (Wigley *et al*. 2014). The primary responsibility for the collection of fishery dependent information from commercial fishery operations for most federally managed species from Maine through Virginia lies with The Fisheries Data Services Division (FDSD) in the Northeast Region of NMFS. For some species this responsibility extends throughout the entire range of the commercial fisheries on the Atlantic and Gulf coasts of the United States. In addition, the FDSD has responsibility for establishing quality standards for fisheries dependent data collections that are managed by the Northeast Regional Office, improving the quality of fishery dependent data and the collection of biological information from commercial catches. The FDSD acquires data through mandatory reporting programs to provide timely and accurate landings and effort data on the federally regulated fisheries in the northeast for in-season management and analysis. Tasks include dockside collection of biological samples from commercial fishing trips, and finished data products to support fisheries management and scientific analyses (NMFS FDSD 2015).

4.4.4. Endangered, Threatened, or Protected (ETP) Species

Outcome

Numerous protected species inhabit the environment within the Northeast Multispecies FMP management unit. These species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act of 1973 (ESA) and/or the Marine Mammal Protection Act of 1972 (MMPA). A detailed analysis of impacts on ETP species is presented in Framework 53 of the Northeast Multispecies FMP, which includes southern New England as well as GB and GOM, and also includes several gear types as well as large mesh otter trawls. The following discussion has

been excerpted from that document to include only large mesh otter trawl impacts in the GOM and GB. The LMOT may affect multiple protected species of cetaceans, sea turtles, pinnipeds, and fishes. Of primary concern is the potential for the fishery to interact (e.g., bycatch) with these species. To understand the potential risk of an interaction, it is necessary to consider (1) species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and (2) records of protected species interaction with particular fishing gear types (NEFMC 2015).

Sea Turtles

Table 6 includes the four ESA listed species of sea turtles that occur in the affected environment of the large mesh OT fisheries. Three of the four species are considered hard-shelled turtles (i.e., green (*Chelonia mydas*) loggerhead (*Caretta carreta*) and Kemp's ridley (*Lepidochelys kempi*). The other is the leatherback (*Dermochelys coriacia*) (NEFMC 2015). All are migratory and occur in New England only during the warmer months of the year (Musick 2003).

Table 6. Sea turtle species found in the affected environment of the multispecies fishery (after NEFMC 2015).

Species	Listed At	Status	Trends
Green	Species Level	Endangered: Breeding populations in Florida and on the Pacific coast of Mexico Threatened: Other populations	Based on nesting data for four nesting sites, green sea turtle abundance is increasing.[1]
Kemp's ridley	Species Level	Endangered	Total annual number of nest at Rancho Nuevo, Tamaulipas, Mexico, the primary stretch of nesting beach, showed gradual increases in 1990s. Since 2009, nesting has not shown a notable increase.[2]
Loggerhead	Distinct Population Segment (DPS)	Northwest Atlantic DPS: Threatened	• Nesting data from 2008-2012 shows a positive nesting trend since 2007.[3] • In-water studies show an increasing trend in abundance from 3 of the 4 in-water sites in the southeast U.S.(the other site showed no discernable trend, and a decreasing trend at 2 sites in the Mid-Atlantic.[4]
Leatherback	Species Level	Endangered	Nesting counts in many areas show an increasing trend, while the largest nesting area (Suriname and French Guiana) show a stable trend.[5]

In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, MA, although their presence varies with the seasons due to changes in water temperature (Shoop and Kenney 1992, Epperly *et al.* 1995, Braun and Epperly 2004, TEWG 2009). While green and Kemps ridley turtles are most common south of Cape Cod, MA, loggerhead sea turtles are known to occur in the Gulf of Maine (GOM), feeding as far north as southern Canada. Leatherback sea turtles also engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992, James *et al.* 2005, Dodge *et al.* 2014). Leatherbacks, a pelagic species, are also known to use coastal waters of the U.S. continental shelf (James *et al.* 2005, Eckert *et al.* 2006; Murray 2006, Dodge *et al.* 2014). Leatherbacks have a greater tolerance for colder water in comparison to hard-shelled sea turtles. They are also found in more northern waters later in the year, with most leaving the Northwest Atlantic shelves by mid-November (James *et al.* 2005, Dodge *et al.* 2014).

Where special requirements to reduce sea turtle interactions and mortalities have been imposed on the Summer Flounder Trawl Fishery and the Scallop Fishery no such requirement has been imposed on the NE LMOT because few sea turtle interactions have been observed in the fishery. There is insufficient data available to conduct a robust

model-based analysis on sea turtle interactions with trawl gear in these regions and therefore, produce a bycatch estimate for these regions (NEFMC 2015). Given the small number of observed interactions between sea turtles and trawl gear in the GOM and GB, it is highly unlikely that the large mesh OT fishery is causing unacceptable direct or indirect impacts on sea turtles.

Marine Mammals

Pursuant to the Marine Mammal Protection Act (MMPA) (define acronym), NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery. The categorization in the LOF determines whether participants in that fishery are subject to certain provisions of the MMPA such as registration, observer coverage, and take reduction plan requirements. Individuals fishing in Category I or II fisheries must comply with requirements of any applicable take reduction plan. The Potential Biological Removal (PBR) is the product of minimum population size, one-half the maximum productivity rate, and a recovery factor (Waring *et al*. 2014), and is used as a standard metric against which mortalities in a stock may be assessed.

Categorization of fisheries is based on the following two-tiered, stock-specific approach (Table 7)

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

Tier 2 - Considers fishery-specific mortality and serious injury for a particular stock. Specifically, this analysis compares fishery-specific annual mortality and serious injury rates to a stock's PBR to designate the fishery as a Category I, II, or III fishery

Table 7. Description of Tier 2 categories.

Category	Interaction level	Mortality or serious injury is:
Category I	frequent	≥50% of the PBR level
Category II	occasional	between 1% and 50% of the PBR level
Category III	Remote or no interactions	≤1%

Large Whales

Five species of large whales occur in the GOM and GB that potentially might interact with the LMOT. These species include: North Atlantic right whale (Eubalaena *glacialis),* humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), and sei whale (*Balaenoptera borealis*) all of which are also listed as Endangered under the ESA (NEFMC 2015). None of these have been recorded interacting with the GOM/GB large mesh otter trawl fishery (Waring *et al*. 2014). The fifth species is the minke whale (*Balaenoptera acutorostrata*), not listed under the ESA but listed in Appendix 1 of the CITES and protected under the MMPA. Annual average estimated minke whale mortality and serious injury from the Northeast bottom trawl fishery during 2007 to 2011 was 1.8 (CV=0.42) (Waring et al. 2014), well below the PBR of 162. There is a high degree of confidence that the GOM/GB OT fishery is not causing direct or indirect detrimental effects on large whales.

Small Cetaceans and Pinnipeds

Three species of pinnipeds have documented interactions with the LMOT Fishery; harbor seal (*Phoca vitulina*), gray seal (*Halichoerus grypus*), and harp seal (*Phoca groenlandicus*). Seven species of small cetaceans have recorded interactions with the LMOT Fishery. The two species of pilot whales have been treated together as *Globicephala spp.* because they are virtually impossible to distinguish in the water (NEFMC 2015). Small cetaceans which interact with the fishery are; pilot whale (*Globicephala spp.*). Short-beaked common dolphin (*Delphinus delphis*), harbor

porpoise (*Phocoena phocena*), bottlenose dolphin (*Tursiops truncates*), Risso's dolphin (*Grampus griseus*), and white-sided dolphin (*Lageorhynchus acutus*).

Table 8 shows the current list of small cetaceans recorded killed or injured in the LMOT. Only the white sided dolphin had a mean annual mortality greater than 1% and less than 50% of the stock's PBR, thus leading the fishery to be classified under Category II. PBR for the western North Atlantic stock of white-sided dolphin is 304. The best estimate of abundance for the western North Atlantic stock of white-sided dolphins is 48,819 (CV = 0.61) (Waring *et al*. 2014). Thus, the bycatch of white-sided dolphins in the NE Bottom OT Fishery is highly unlikely to create unacceptable impacts to the species. In addition, there is a high degree of confidence that there are no significant detrimental effects on small cetaceans and pinnipeds encountered by the fishery.

Table 8. Small cetacean and pinniped species observed seriously injured and/or killed by the Cat. II NE Bottom Trawl Fishery, (1) indicates those species driving the fisheries classification (After Waring et al. 2014).

Species	Observed 2007 – 2011	Mean Annual Mortality
Harp seal	Y	0.4
Harbor seal	Y	0.8
Gray seal	Y	9.2
Long and short-finned pilot whales	Y	10
Short-beaked common dolphin	Y	19
Harbor porpoise	Y	4.5
Bottlenose dolphin (offshore)	Y	20
Risso's dolphin	Y	2.5
White-sided dolphin (1)	Y	73

Fishes

Atlantic Sturgeon

Atlantic sturgeon is the only ESA listed fish likely to be encountered by the LMOT in the GOM/GB (NEFMC 2015). The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. The Atlantic sturgeon is managed under a Fishery Management Plan implemented by the Atlantic States Marine Fisheries Commission (ASMFC 1998, 2015a). In 1998, the ASFMC instituted a coast-wide moratorium on the harvest of Atlantic sturgeon, which is to remain in effect until there are at least 20 protected age classes in each spawning stock (anticipated to take up to 40 or more years). NMFS followed the ASMFC moratorium with a similar moratorium for Federal waters. Amendment 1 to ASMFC's Atlantic sturgeon Fishery Management Plan also includes measures for preservation of existing habitat, habitat restoration and improvement, monitoring of bycatch and stock recovery, and breeding/stocking protocols. The NMFS recognizes five Distinct Population Segments (DPSs) of Atlantic sturgeon, of which one, the Gulf of Maine DPS (ESA Threatened), may interact with the LMOT. Based on fishery- independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein *et al*. 2004 a,b, Erickson *et al*. 2011, Dunton *et al*. 2010). Within the marine range of Atlantic sturgeon, several marine aggregation areas have been identified adjacent to estuaries and/or coastal features formed by bay mouths and inlets along the U.S. eastern seaboard; depths in these areas are generally no greater than 25 meters (Stein *et al*. 2004a, Laney *et al*. 2007, Dunton *et al*. 2010, Erickson *et al*. 2011).

Despite the past impacts of exploitation, industrialization and human population expansion, this DPS has persisted and is now showing signs of potential recovery (e.g., increased abundance and/or expansion into its historical range). In addition, some of the impact from the threats which facilitated its decline such as directed fishing (ASMFC 1998) have been removed, or reduced (improvements in water quality since passage of the Clean Water Act (CWA), removal of dams, reductions in fishing effort in state and federal water (which may have resulted in a reduction in overall bycatch mortality), and the implementation of strict regulations on the use of fishing gear that incidentally catch sturgeon in Maine state waters (NMFS 2013).

Three documents, covering three time periods, that use data collected by the Northeast Fisheries Observer Program describe bycatch of Atlantic sturgeon: Stein *et al*. (2004b) for 1989-2000, ASMFC (2007) for 2001-2006, and Miller and Shepard (2011) for 2006-2010. None of these provides estimates of Atlantic sturgeon bycatch by DPS. Information provided in all three documents indicates that coast wide sturgeon bycatch occurs in gillnet and trawl gear, with the most recent document estimating, that annual bycatch of Atlantic sturgeon was 1,342 and 1,239, respectively (Miller and Shepard 2011). Although Atlantic sturgeon were observed to interact with trawl and gillnet gear with various mesh sizes, based on observer data, Miller and Shepard (2011) concluded that gillnet gear, in general, posed a greater risk of mortality to Atlantic sturgeon than did trawl gear. Estimated mortality rates in gillnet gear were 20%, while those in otter trawl gear were 5%. Similar conclusions were reached in Stein *et al*. 2004b and ASMFC 2007 reports, in which both studies also concluded, after review of observer data from 1989-2000 and 2001-2006, that observed mortality is much higher in gillnet gear than in trawl gear.

Dunton *et al*. (2010) analyzed the NEFSC bottom trawl survey data and CPUE data from four state trawl surveys for Atlantic sturgeon distribution and abundance; this analysis showed that Atlantic sturgeon were most abundant in state waters. The NMFS survey which covered the continental shelf supported these conclusions. CPUE of Atlantic sturgeon was highest for the 10-m depth stratum and decreased with each depth interval. A total of 71.30% of the Atlantic sturgeon were captured in 20 m or less and no individuals were captured in water deeper than 30 m. Also Atlantic Sturgeon were virtually absent on GB regardless of depth (Dunton *et al*. 2010). This suggests that Atlantic sturgeon favor coastal habitats and not just shallower depths. Given that Atlantic sturgeon distribution is mostly inshore of the LMOT, and low trawl bycatch mortality it is highly unlikely that the LMOT is causing direct or indirect impacts on Atlantic sturgeon.

Management

Endangered Species

Endangered and Threatened species are managed under the Endangered Species Act of 1973 (ESA). The Act was signed on December 28, 1973, and provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. The ESA replaced the Endangered Species Conservation Act of 1969. Congress has amended the ESA several times.

A "species" is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. A species is considered threatened if it is likely to become an endangered species within the foreseeable future.

Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. NMFS (2013) issued a Section 7 ruling for several NEFMC Fisheries that was primarily focused on the gillnet fisheries (where most ETP species' mortalities occur). The NEFMC has concluded, at this writing, that the proposed framework adjustment and the prosecution of the multispecies fishery is not likely to jeopardize any ESA-listed species or alter or modify any critical habitat, based on the discussion of impacts in this document and on the assessment of impacts in the Amendment 16 Environmental Impact Statement.

The NEFMC acknowledges that endangered and threatened species may be affected by the measures proposed in FW 53, but impacts should be minimal especially when compared to the prosecution of the fishery prior to implementation of Amendment 16. The NEFMC is now seeking the concurrence of the National Marine Fisheries Service with respect to Framework Adjustment 53. NMFS has Recovery Plans in place for Leatherback, Loggerhead, Green, Kemps Ridley and Hawksbill Sea Turtles (NMFS 2014).

Marine Mammals

All marine mammals are protected under the Marine Mammal Protection Act (MMPA). The MMPA was enacted on October 21, 1972. The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and

by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S.

Congress passed the Marine Mammal Protection Act of 1972 based on the following findings and policies:

- Some marine mammal species or stocks may be in danger of extinction or depletion as a result of human activities;
- These species or stocks must not be permitted to fall below their optimum sustainable population level ("depleted");
- Measures should be taken to replenish these species or stocks;
- There is inadequate knowledge of the ecology and population dynamics; and
- Marine mammals have proven to be resources of great international significance.

The MMPA was amended substantially in 1994 to provide a program to authorize and control the taking of marine mammal's incidental to commercial fishing operations.
Many fishers employ voluntary measures to reduce the chance of interacting with marine mammals, including reducing the amount of turns made by the fishing vessel and tow times while fishing at night, and increasing communication between vessels about the presence of marine mammals in an area.

Information/Monitoring
The NMFS Observer Program monitors bycatch of both ESA species and Marine Mammals (NOAA 2015). Observer coverage in this fishery is > 25% which is high for any fishery. NMFS Law Enforcement is also involved with both at sea and shore side enforcement of both the ESA and MMPA (NOAA 2015a). In addition, the status of species covered under the ESA is reviewed periodically by NMFS Status Review Teams comprised of scientists from NMFS, the States, and Academia (NOAA 2015b). Atlantic sturgeon is also assessed by the ASMFC (ASFMC 1998). The status of marine mammals is monitored by periodic NMFS stock assessments (Waring *et al*., 2014)

4.4.5 Habitats

Habitats provide living things with the basic life requirements of nourishment and shelter. This ultimately provides for both individual and population growth. The quantity and quality of available habitat influences the fishery resources of a region. Depth, temperature, substrate, circulation, salinity, light, dissolved oxygen, and nutrient supply are important parameters of a given habitat. These parameters determine the type and level of resource population that the habitat supports. The habitat requirements for each of the large-mesh groundfish species/stocks managed by the Northeast Multispecies FMP are briefly summarized in NEFMC Framework adjustment 53.

Outcomes
The Sustainable Fisheries Act defines Essential Fish Habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." In general, EFH for species and life stages that rely on the seafloor for shelter (e.g., from predators), reproduction, or food is vulnerable to disturbance by bottom tending gear. The most vulnerable habitat is more likely to be hard or rough bottom with attached epifauna.

Bottom otter trawls account for nearly all commercial bottom trawling activity. There is a wide range of otter trawl types used in the Northeast due to the diversity of fisheries and bottom types encountered in the region (Northeast Region Essential Fish Habitat Steering Committee 2002). The specific gear design used is often a result of the target species (whether found on or off the bottom) as well as the composition of the bottom (smooth versus rough and soft versus hard). A number of different types of bottom otter trawl used in the Northeast are specifically designed to catch certain species of fish, on specific bottom types, and at particular times of year. Fishermen tow bottom trawls at a variety of speeds, but average about 5.6 km/hour (3 knots). Several federal FMPs manage the use of this gear. Bottom trawling is also subject to a variety of state regulations throughout the region (NEFMC 2015).

The most recent Multispecies FMP action to include a comprehensive evaluation of gear effects on habitat was Amendment 13 (NEFMC 2003). Amendment 13 described the general effects of bottom trawls on benthic marine habitats. This analysis primarily used an advisory report prepared for the International Council for the Exploration of the Seas (ICES 2000). This report identified a number of possible effects of bottom otter trawls on benthic habitats and is based on scientific findings summarized in Lindeboom and de Groot (1998). The report focused on the Irish Sea and North Sea, but assessed effects in other areas.

The report generally concluded that:

- Low-energy environments are more affected by bottom trawling
- Bottom trawling affects the potential for habitat recovery (i.e., after trawling ceases, benthic communities and habitats may not always return to their original pre-impacted state)

The report also concluded the following about direct habitat effects:

- Loss or dispersal of physical features such as peat banks or boulder reefs results in changes that are always permanent and lead to an overall change in habitat diversity. This in turn leads to the local loss of species and species assemblages dependent on such features;
- Loss of structure-forming organisms such as bryozoans, tube-dwelling polychaetes, hydroids, sea pens, sponges, mussel beds, and oyster beds results in changes that may be permanent leading to an overall change in habitat diversity. This in turn leads to the local loss of species and species assemblages dependent on such biogenic features;
- Changes are not likely to be permanent due to a reduction in complexity caused by redistributing and mixing of surface sediments and the degradation of habitat and biogenic features, leading to a decrease in the physical patchiness of the seafloor; and
- Changes are not likely to be permanent due to alteration of the detailed physical features of the seafloor by reshaping seabed features such as sand ripples or damaging burrows and associated structures that provide important habitats for smaller animals and can be used by fish to reduce their energy requirements

The Committee on Ecosystem Effects of Fishing for the National Research Council's Ocean Studies Board (NRC 2002) also prepared evaluation of the habitat effects of trawling and dredging that was evaluated during Amendment 13. Trawl gears evaluated included bottom otter trawls.

This report identified four general conclusions regarding the types of habitat modifications caused by trawls:

- Trawling reduces habitat complexity;
- Repeated trawling results in discernible changes in benthic communities;
- Bottom trawling reduces the productivity of benthic habitats; and
- Fauna that live in low natural disturbance regimes are generally more vulnerable to fishing gear disturbance

The report from a "Workshop on the Effects of Fishing Gear on Marine Habitats off the Northeastern U.S." sponsored by the NEFMC and MAFMC (NEFSC 2002) provided additional information for various Northeast region gear types. The report provided additional information on the recovery times for each type of impact for each gear type in mud, sand, and gravel habitats ("gravel" includes other hard-bottom habitats). This information made it possible for the panel to rank these three substrates in terms of their vulnerability to the effects of bottom trawling. The report also noted that other factors such as frequency of disturbance from fishing and from natural events are also important. In general, the panel determined that impacts from trawling are greater in gravel/rock habitats with attached epifauna. The panel ranked impacts to biological structure higher than impacts to physical structure. Effects of trawls on major physical features in mud (deep water clay-bottom habitats) and gravel bottom were described as permanent. Impacts to biological and physical structure were given recovery times of months to years in mud and gravel. Impacts of trawling on physical structure in sand were of shorter duration (days to months) given the exposure of most continental shelf sand habitats to strong bottom currents and/or frequent storms (NEFMC 2015).

Amendment 13 also summarized the contents of a second expert panel report, produced by the Pew Charitable Trusts and entitled "Shifting Gears: Addressing the Collateral Impacts of Fishing Methods in U.S. Waters" (Morgan & Chuenpagdee 2003). This group evaluated the habitat effects of ten different commercial fishing gears used in U.S. waters. The report concluded that bottom trawls have relatively high habitat impacts.

Grabowski et al. (2014) developed a framework to quantify and assess benthic impacts of the six most common bottom-tending gears (>99% of bottom-tending fishing effort) in New England: otter trawls, scallop dredges, hydraulic clam dredges, gillnets, longlines, and traps. They first conducted a comprehensive review of the habitat impacts literature relevant to Northeast USA fishing gears and seabed types. Then, they used this information to develop a framework for generating and organizing quantitative susceptibility (based on percent loss of structural habitat from a single interaction with the gear) and recovery (i.e., the time required for recovery of lost structure) parameters for each biological (e.g., sponges, ascidians, mollusks) and geological (e.g., mud burrows, sand ripples, cobble, and boulder piles) features common to the following five substrates: mud, sand, granule–pebble, cobble, and boulder in low- and high-energy environments.

In general, they found that both susceptibility and recovery scores were highest for hydraulic dredges, slightly lower for otter trawls and scallop dredges, and much lower for fixed gears (i.e., gillnets, longlines, and traps). For bottom trawls and scallop dredges, geological features in mud, sand, and cobble-dominated substrates were more susceptible to gear impacts than features found in granule–pebble and boulder substrates. However, biological features were largely equally susceptible to impacts across the five substrate types. Average susceptibility scores for both biological and geological substrate features were not affected by energy level. Average recovery times for geological features affected by bottom trawls and dredges were much longer in low-energy granule–pebble, and low- and high-energy cobble and boulder than in mud and sand substrates. There was no difference among substrates or energy levels for biological feature recovery times.

These results collectively suggest that cobble and boulder substrates are the most vulnerable to impacts from mobile bottom-tending gear. Their findings highlight the importance of considering the resilience of specific components of habitat such as emergent epifauna or geological formations that serve as EFH by providing shelter and a source of food for fish. When coupled with the distribution of geological substrates and energy environments that exist in a particular region, their framework offers fisheries resource managers a tool to assess gear-specific spatial impacts on benthic substrates and identify benthic habitat vulnerability hotspots. The NEFMC has proposed to adopt this framework as a habitat management tool (see SASI Model below).

Trawling off New England began in 1906, and by 1930 there were 300 trawlers in the fishery (Collette and Klein-MacPhee 2002). The number of US trawlers working in New England increased but continued in the hundreds until 1961 when eastern European distant-water fleets arrived with factory ships thus increasing the trawling effort considerably. This intense fishery continued until 1977 when the Magnuson Act was originally implemented. The act eliminated most foreign trawling effort. In response the New England trawling effort doubled between 1976 and 1984 (Collette and Klein-MacPhee 2002). Given the history of bottom trawling off New England, it's obvious that the current fishery is fishing on bottom habitats that have been altered for over 100 years.

Management

Recognizing the vulnerability of certain habitats, Amendment 13 to the Northeast Multispecies FMP and Amendment 10 of the Atlantic Sea Scallop FMP established year-round habitat closed areas which are off-limits to all mobile, bottom-tending gear like trawls and dredges. These closures were designed to minimize the adverse effects of fishing on EFH for species managed by the NEFMC. In many cases, these closed areas overlap portions of the groundfish mortality closures. However, in other cases (Jeffrey's Bank in the Gulf of Maine and the area southeast of Nantucket Island) they do not. NEFMC Omnibus EFH Amendment 2 (OA2) is currently evaluating the closed habitat areas (NEFMC 2014). Therefore, these areas may be changed or eliminated in the future.

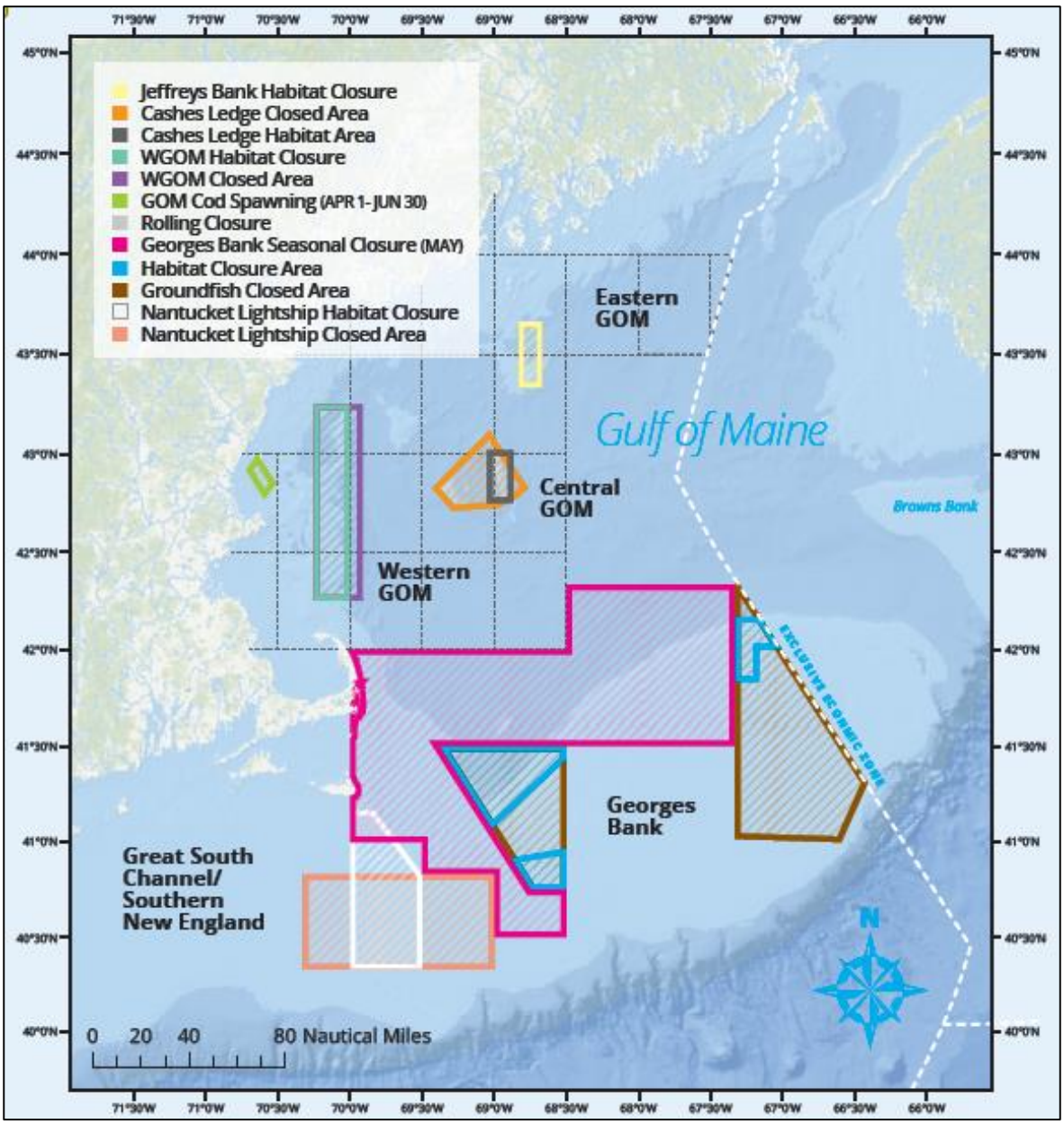


Figure 29. Northeast Multispecies Closed Areas and U.S./Canada Line

Currently, spatial management in the NEMSFMP region consists of two types of year-round closures: the habitat closure areas and groundfish closures. The habitat closure areas restrict mobile bottom-tending gears. The groundfish closures restrict all gears capable of catching groundfish. In addition, seasonal area closures are used to protect spawning fish, but concurrently may reduce overall impact on bottom habitats.

The ongoing Omnibus Essential Fish Habitat Amendment 2 (OA2) was developed to go beyond Amendment 13 to evaluate existing habitat management areas and develop new habitat management areas. To assist with this effort, the Habitat Plan Development Team (PDT) developed an analytical approach to characterize and map habitats and to assess the extent to which different habitat types are vulnerable to different types of fishing activities (Grabowski et al. 2014). This effort, termed the Swept Area Seabed Impact (SASI) approach, includes a quantitative, spatially-referenced model that overlays fishing activities on habitat through time to estimate both potential and realized adverse effects to EFH; the report may be found here. The spatial domain of the SASI model is US Federal waters (between 3-200 nm offshore) from Cape Hatteras to the US-Canada border.

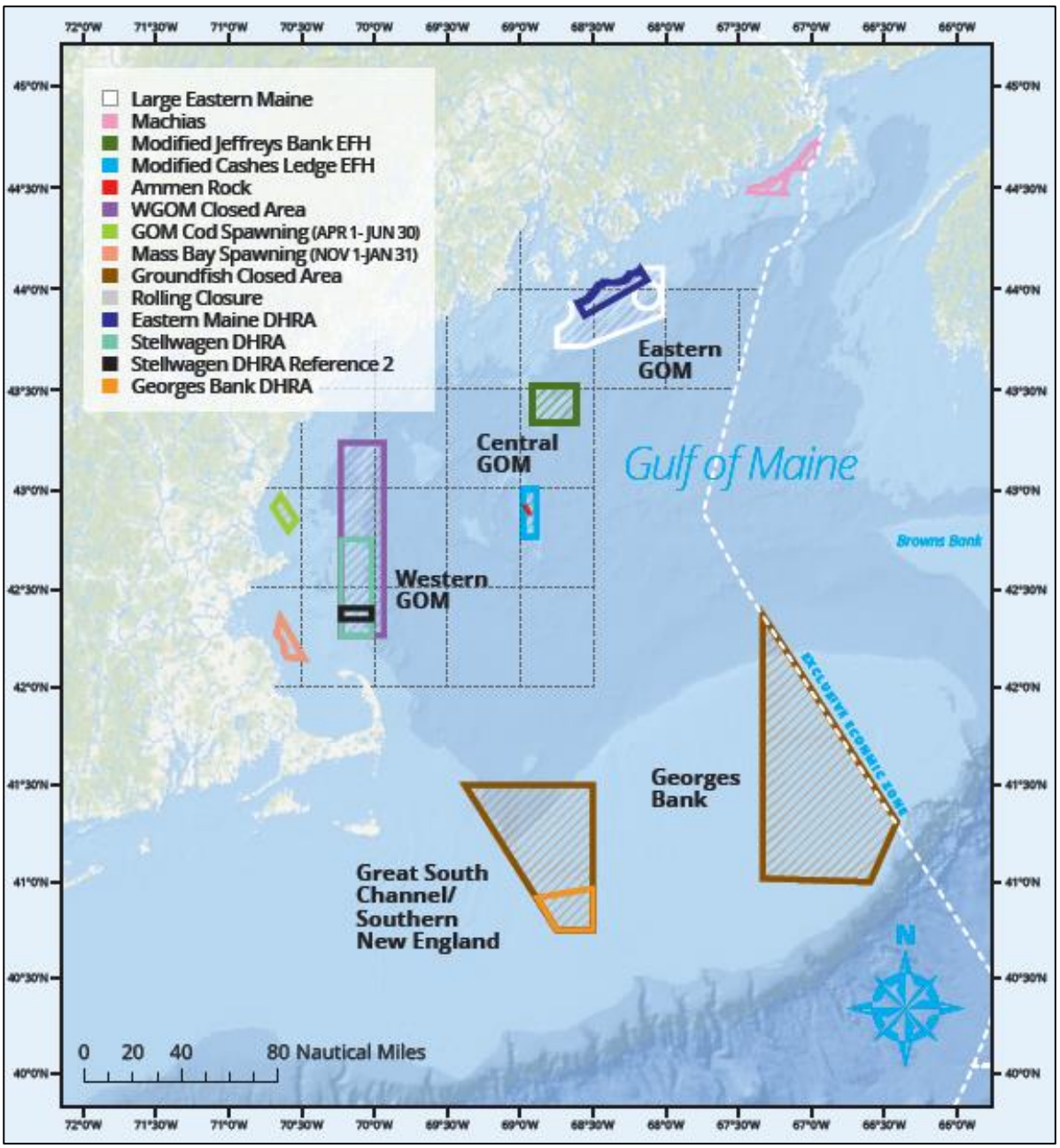


Figure 30. Preferred Alternative Northeast Multispecies Closed Areas in OA2.

The Council accepted public comments on OA2 from October 10, 2014 to January 8, 2015. After the comment period ended, the Council's Habitat Committee considered all of the comments and recommended its preferred alternatives to the Council. The Council then reviewed the Committee recommendations and the public comments and decided on some of the final preferred alternatives in April 2015, the remainder to be considered in June 2015. All must be submitted to NMFS for final approval (NEFMC 2015b). To better understand the Council's intent in developing the Habitat Amendment, it may be helpful to review an introductory paragraph in the draft amendment document that helps explain what types of areas are being considered and why (NEFMC 2015b).

Essential Fish Habitat and Habitat Area of Particular Concern (HAPC) designations are based on species-specific distributions and life-history information, and are used primarily for analytical approaches in impact analyses and agency consultations. Spatial management areas, on the other hand, contain habitats of importance to multiple species, are vulnerable to impacts from fishing, and as such, could be subject to gear restrictions for conservation purposes on the basis of gear type.

Three types of spatial management areas are being proposed in the Habitat Amendment, year-round *habitat management areas* and *dedicated habitat research areas*, both discussed below; and groundfish seasonal spawning areas. The latter will be discussed at the June Council meeting.

Essential Fish Habitat (EFH) Designations
EFH designations were specified for all managed species and life stages, including a small number of specific modifications discussed at the meeting. By definition, fishing restrictions are not associated with these areas.

Habitat Areas of Particular Concern
The approved HAPC designations involve six near shore/continental shelf areas, two seamounts, and eleven submarine canyons or groups of canyons. These areas are not subject to gear or other restrictions, but are singled out because they encompass important and sensitive habitats that should receive careful consideration for conservation purposes.

Habitat Management Areas (HMAs)

Eastern Gulf of Maine
The area defined as the Small Eastern Maine HMA would include a complete restriction on use of mobile bottom tending gears.

Central Gulf of Maine
Gear restrictions for the Cashes Ledge, Jeffreys Ledge, and Fippennies Ledge HMAs as mapped in the draft amendment. The Cashes Ledge and Jeffreys Ledge areas were modified from their previous configurations to focus more closely on shallow, hard bottom habitats. Each would prohibit the use of mobile bottom-tending gears.

In the case of Cashes Ledge Closure Area the area (Figure 31) would be maintained as is; specifically, it would continue to be off limits year round to all fishing activity except for the following:

- Charter and party vessels with a letter of authorization
- Vessels fishing with “exempted gears” that catch only small amounts of groundfish

In accordance with the current groundfish regulations, mid-water trawl gear, and also vessels transiting the area with gear that is properly stowed, would be allowed in the Cashes Ledge Closure Area.

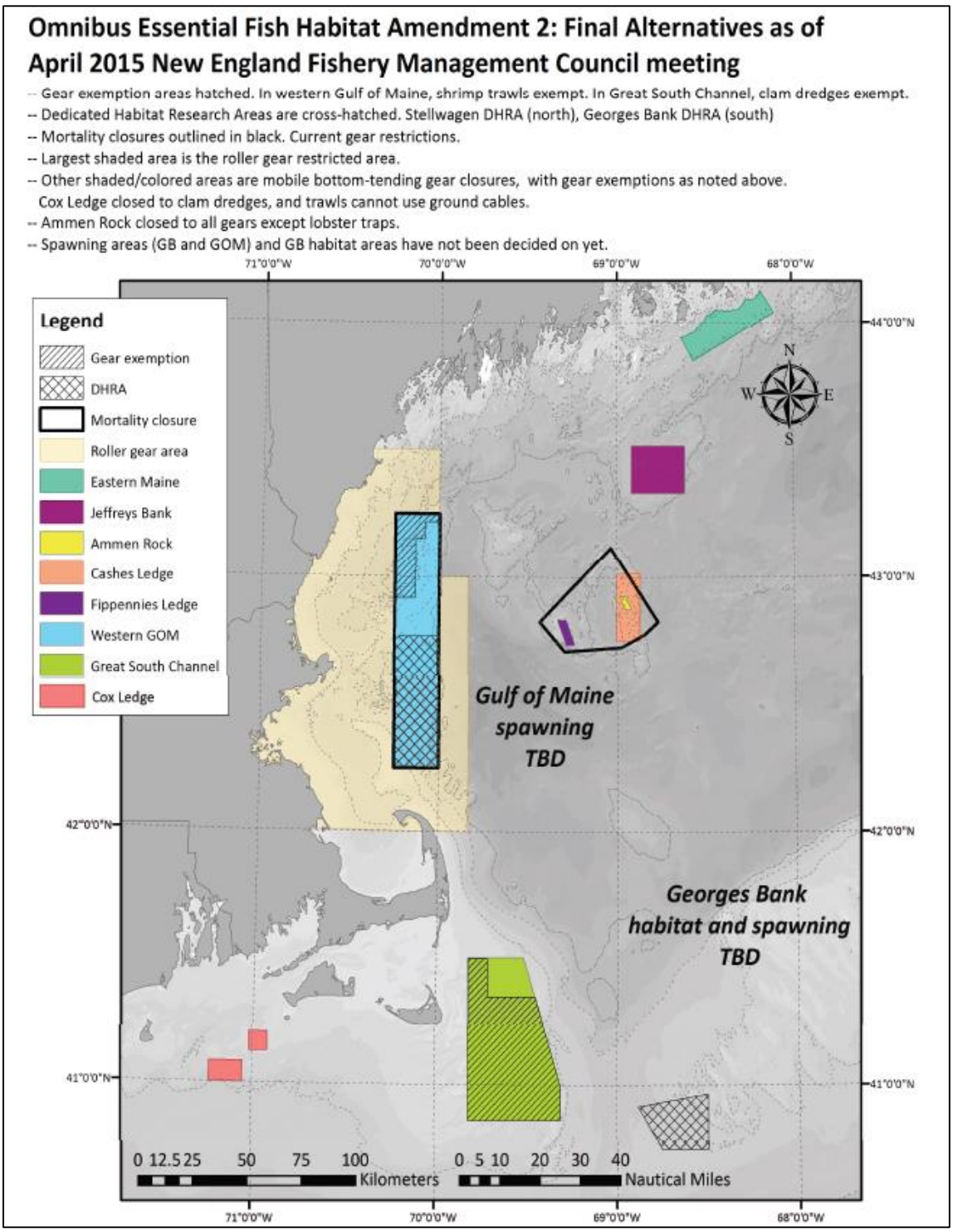


Figure 31. New England Gear Closure Area.

Western Gulf of Maine

The scenario adopted took into account the existing habitat and groundfish closures in the Western Gulf of Maine. The habitat closure would be maintained as-is, while the groundfish closure would have its eastern boundary shifted 5 minutes of longitude to match the habitat closure boundary. Within the habitat/groundfish area, current fishing restrictions would be maintained. The exception is an exemption for shrimp trawls from the mobile bottom-tending gear restrictions in the northwestern corner of the area, located in the deep waters west of Jeffreys Ledge. In addition, the Council would continue to limit trawl roller gear to 12 inches in diameter in the existing inshore roller gear area.

Dedicated Habitat Research Areas (DHRAs)
The Stellwagen DHRA in the Gulf of Maine, developed to facilitate fisheries research, was approved although a "no fishing" reference area component was not approved. If the research area is not used for scientific investigations within three years, a sunset provision would apply. The DHRA would be closed to mobile bottom-tending gear, demersal longlines, and sink gillnets, while recreational vessels, midwater gear and other pelagic gear would be allowed. All of these fishing restrictions are currently in place as a result of the existing Western Gulf of Maine habitat and groundfish closures, which overlap the proposed DHRA.

In addition to NMFS and NEFMC habitat initiatives, the ASMFC includes habitat provisions in its FMPs but has recognized that many forms of habitat conservation are beyond the operational jurisdiction of the federal and state fisheries agencies. Because ASMFC's jurisdiction is restricted to state waters within three miles of the coastline, its habitat initiatives are restricted relative to the wide distribution of the species managed in the LMOT. The obvious exceptions to this are species with estuarine juvenile stages (ASMFC 2015b).

The ASMFC in 2006 helped to initiate the Atlantic Coastal Fish Habitat Partnership (ACFHP), an assembly of state, federal, tribal, and non-governmental groups whose mission is to conserve habitat for Atlantic coast diadromous, estuarine-dependent, and coastal fish species. ACFHP's area of focus extends from the headwaters of coastally draining rivers to the edge of the continental shelf from Maine to the Florida Keys, with a particular emphasis on estuarine environments. ACFHP addresses habitat threats with a broad and coordinated approach, leveraging resources from many agencies and organizations to make a difference for fish habitat. Most of its projects have focused on coastal watersheds (ASMFC 2015b)

Information
Benthic habitats have been well-studied in the GOM and GB, and have been described in detail by Stevenson et al. (2004). The most common groups of benthic invertebrates reported by Theroux and Wigley (1998) in terms of numbers collected were annelid worms, bivalve mollusks, and amphipod crustaceans. Bivalves, sea cucumbers, sand dollars, annelids, and sea anemones dominated biomass. Watling (1998) identified seven different bottom assemblages that occur on the following habitat types:

1. Sandy offshore banks: fauna are characteristically sand dwellers with an abundant interstitial component;
2. Rocky offshore ledges: fauna are predominantly sponges, tunicates, bryozoans, hydroids, and other hard bottom dwellers;
3. Shallow [<197 ft. (60 m)] temperate bottoms with mixed substrate: fauna population is rich and diverse, primarily comprised of polychaetes and crustaceans;
4. Primarily fine muds at depths of 197 to 459 ft. (60 to 140 m) within cold Gulf of Maine Intermediate Water: fauna are dominated by polychaetes, shrimp, and cerianthid anemones;
5. Cold deep water, muddy bottom: fauna include species with wide temperature tolerances which are sparsely distributed, diversity low, dominated by a few polychaetes, with brittle stars, sea pens, shrimp, and cerianthids also present;
6. Deep basin, muddy bottom, overlaying water usually 45 to 46 °F (7 to 8°C): fauna densities are not high, dominated by brittle stars and sea pens, and sporadically by tube-making amphipods
7. Upper slope, mixed sediment of either fine muds or mixture of mud and gravel, water temperatures always greater than 46 °F (8°C): upper slope fauna extending into the Northeast Channel.

There is an extensive literature on habitat impacts by fishing gear. This has been recently reviewed along with a detailed analysis by Grabowski *et al*. (2014).

4.4.6 Ecosystem

The Northeast U.S. Continental Shelf Large Marine Ecosystem (NESLME) is a dynamic, highly productive, and intensively studied system providing a broad spectrum of ecosystem goods and services. This region, encompassing the continental shelf area between Cape Hatteras and the Gulf of Maine spans approximately 250,000 km^2 and supports some of the highest revenue fisheries in the nation. The system has historically undergone profound changes due to very heavy exploitation by distant-water and domestic fishing fleets. Further, the region has experienced changes in climate and physical forcing that have contributed to large-scale alteration in ecosystem structure and function. Projections of future climate change highlight the need to understand the effects of natural and anthropogenically driven perturbations to this system and to devise effective management and mitigation strategies in response to these changes (Link et al. 2012, NEFSC 2009b).

Outcome (adapted from NEFSC 2009b)

The Northeast U.S. Continental Shelf Large Marine Ecosystem (NESLME) (Sherman et al. 1996) has undergone sustained perturbations due to environmental and anthropogenic impacts over the last four decades, resulting in fundamental changes in system structure. In addition, thermal conditions in the NES LME are changing due to warming of coastal and shelf waters and cooling in the northern end of the range. Consequently, there has been a constriction of thermal habitats in the ecosystem, a northward shift in the distributions of some fish species and a shift to a warmer-water fish community. Zooplankton community structure has also changed in concert with climate and physical processes acting over the North Atlantic Basin indicating the importance of remote forcing to the function and structure of this ecosystem. Important changes in some components of benthic communities, notably increased abundance of sea scallops and lobster are evident, reflecting changes in fishery management and/or ecological conditions. The direct and indirect effects of species-selective harvesting patterns have also contributed to shifts in fish community composition, which had become dominated by small pelagic fishes and elasmobranch species (skates and small sharks) of low relative economic value (Fogarty and Murawski 1998, NEFSC 2009b). The Northeast U.S. Continental Shelf was classified as experiencing ecosystem overfishing (NEFSC 2009b) according to published criteria for this designation (Murawski, 2000).

Tudela et al. (2005) provided a meta-analysis of 49 ecosystems (including parts of the NESLME) to which these criteria could be applied and for which estimates of the percent of primary production (PBR) needed to sustain fisheries (PPR) and mean trophic level (TL) were available. The demarcation point between overfishing and sustainably fishing in the context of changes in primary production required and mean trophic level was identified using these *a priori* overfishing classifications. In this representation, losses incurred by fishing at low trophic levels affect the energy available to higher trophic levels and the interplay between the mean TL and the primary production required to support the observed fishery yield determines the ecosystem classification (NEFSC 2009b).

Classification of ecosystem status for the NESLME for the period 1960-2007 was provided. Only at the start of the series (1960-61) did the system meet the criteria of sustainable fishing at the ecosystem level according to the Tudela *et al*., criterion. At the height of distant water fleet activities, characterized by both high mean trophic level of the catch and high appropriation of available primary production, a steadily increasing level of ecosystem overfishing occurred. Despite the drop in PPR over the previous two decades and the improvement in condition of some components of the system, the concomitant drop in mean trophic level still resulted in a classification of ecosystem overfishing in 2007.

The overall biomass of the entire fish community as indexed by trawl surveys has increased over the last four decades as elasmobranchs and small pelagic fishes have increased in abundance even as other groups such as groundfish have undergone decreases. Some of these changes reflect apparent species replacements as heavily exploited species declined. The mean trophic level of fish in trawl surveys has fluctuated without trend. In contrast, the mean trophic level of the catch (invertebrates and vertebrates) has declined steadily since 1960, reflecting changes in the abundance of economically important species. Estimates of the primary production required to support observed catch levels indicate that recent fisheries are probably more sustainable than those in the 1960s and 1980s for all species and for small pelagic species specifically (Tudela *et al*. 2005).

Although marked improvement in the condition of some components of the NESLME is now evident under more effective management, the system remains classified as experiencing overfishing from an ecosystem perspective according to criteria of Murawski (2000) and Tudela *et al*. (2005).

Management

The National Environmental Policy Act (NEPA) provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions such as FMPs, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. As part of the NEPA process, the NEFMC (2015) has responded that the Preferred (now approved) Alternatives in FW 53 cannot reasonably be expected to cause substantial damage to the oceans and coastal habitats and/or essential fish habitat, and only minor impacts are expected. The NEFMC Essential Fish Habitat impacts analysis focuses on changes in the amount or location of fishing that might occur as a result of the implementation of the various alternatives in FW53 (NEFMC 2015). This approach to evaluating adverse effects to EFH is based on two principles: (1) seabed habitat vulnerability to fishing effects varies spatially, due to variations in seabed substrates, energy regimes, living and non-living seabed structural features, etc., between areas and (2) the magnitude of habitat impacts is based on the amount of time that fishing gear spends in contact with the seabed. This seabed area swept (seabed contact time) is grossly related to the amount of time spent fishing, although it will of course vary depending on catch efficiency, gear type used, and other factors.

The area that is potentially affected by the approved alternatives includes EFH for species managed under the following Fishery Management Plans: NE Multispecies; Atlantic Sea Scallop; Monkfish; Atlantic Herring; Summer Flounder, Scup and Black Sea Bass; Atlantic Mackerel, Squid, and Butterfish; Spiny Dogfish; Tilefish; Deep-Sea Red Crab; Atlantic surf clam and Ocean Quahog; Atlantic Bluefish; Northeast Skates; and Atlantic Highly Migratory Species. The Preferred Alternative action implements updated ACLs, which are lower in some cases relative to the status quo ACLs, as well as cod protection closures in the Gulf of Maine. Combined, these two alternatives will likely reduce fishing effort and thereby habitat and ecosystem impacts overall in the fishery relative to current conditions. Furthermore, the Preferred Alternatives do not allow for access to the existing habitat closed areas on GB that were implemented in Amendment 13 to the Multispecies FMP and Amendment 10 to the Scallop FMP and therefore they continue to minimize the adverse impacts of bottom trawling and dredging on EFH and the ecosystem.

The need for the adoption of an ecosystem approach to management of marine ecosystems is now broadly accepted (Fogarty 2014, NEFSC 2009a). A necessary corollary for its implementation is the specification of targets and limits to exploitation in an ecosystem context. Link (2005) discussed this issue in the context of a suite of ecosystem indicators.

Although some elements of the Ecosystem Overfishing criteria are presented in FW 53 of the NE Multi-fisheries FMP in the species stock assessments and habitat sections, the concept of Ecosystem Overfishing has not been addressed directly. In April 2015 (NEFMC 2015b) the council adopted an official approach that will be used to address ecosystem-based fisheries management (EBFM) “very soon”. The initiative, led by the NEFMC’s EBFM Committee and its Plan Development Team, calls for the development of a prototype or pilot fisheries ecosystem plan (FEP) that could be tested and verified, and also be used as a tool to engage with and seek comments from the public during the pilot period. The FEP would be used as a platform to assess, among other important elements, predator- prey relationships, trends in species groups, and climate change impacts, in the context of a specific ecosystem production unit, or management area that has not yet been identified.

Information/Monitoring

The Northeast U.S. Continental Shelf Large Marine Ecosystem (NESLME) (Sherman *et al*., 1996) is one of the most studied marine ecosystems in the world (NEFSC 2009b). In addition fisheries interactions with this ecosystem have been documented at several levels (Byron and Link, 2010; Garrison, 2000 a,b; Garrison and Link, 2000 a,b;

Grabowski *et al*., 2014; Link and Garrison, 2002; Nye *et al*., 2009; NEFSC, 2009b; Wiltschko and Wiltschko, 2010) and continue to be monitored at the NEFSC (Fogarty, 2014).

The NEFSC research priorities and ongoing programs include: Conducting integrated ecosystem assessments and supporting ecosystem–based management within the Northeast LME to meet emerging management needs and mandates, maintaining data and sample collection and processing, and analytical capabilities to support single-species, multispecies, and ecosystem assessments for fish, invertebrates, marine mammals, sea turtles, and human activities, and understanding ecological interactions within and between species.

4.5. Principle Three: Management System Background

4.5.1 The Legal Basis and Scope of the Management System

The Magnuson Fishery Conservation and Management Act of 1976, (renamed the Magnuson-Stevens Fishery Conservation and Management Act when amended on October 11, 1996) established a US exclusive economic zone (EEZ) between 3 and 200 miles offshore, and created eight regional fishery councils to manage the living marine resources within that area. The Act was passed principally to address heavy foreign fishing, promote the development of a domestic fleet and link the fishing community more directly to the management process.

The fishery is also subject to the legal framework other legislation including the National Environmental Policy Act (NEPA), the National Standards Act, the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), the Regulatory Flexibility Act (RFA), the Paperwork Reduction Act (PRA), the Coastal Zone Management Act (CZMA), Executive Orders (EOs) 12866 and 13132, the Administrative Procedure Act (APA), and the Information Quality Act (IQA, also known as the Data Quality Act, or DQA). These laws and directives help ensure that, in developing a fishery management action, the Councils and NOAA's National Marine Fisheries Service (NMFS) fully consider the expected impacts the action may have on the marine environment, living marine resources, and human communities.

The New England Fishery Management Council, one of eight regional councils established by federal legislation in 1976, is charged with conserving and managing fishery resources from three to 200 miles off the coasts of Maine, New Hampshire, Massachusetts, Rhode Island and Connecticut.

There is a re-authorization process underway for the MSA and consultations were on going at the time of the site visit. The proposed changes to legislation are designed to improve management of the fishery and if they are adopted will be evaluated, by a future MSC annual surveillance audit of the fishery.

4.5.2 Consultation Processes

The Magnuson-Stevens Act provides a mechanism for identifying and evaluating environmental issues associated with Federal actions and for considering a reasonable range of alternatives to avoid or minimize adverse impacts to the extent practicable. The scoping process includes opportunity for the public to raise issues and concerns for the Council to consider during the development of the amendment. The Council relies on input during scoping to both identify management measures and develop alternatives that meet the objectives of the Fisheries Management Plans (FMP). Adjustments to a management plan created under the Magnuson-Stevens Fishery Conservation and Management Act may be made via an Amendment, which is a full rule making process including extensive public consultations; or via an abbreviated rule-making process used in a Framework (FW) adjustment.

It is important that the MSA contains measures that are binding on managers to take action in response to environmental issues. Although there is no process to recognize the rights of people dependent on fishing for food or livelihood, representation may be made as part of the extensive public comment process during the development of management plans, amendments and frameworks.

4.5.3 Long Term Objectives

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) was reauthorized and amended through January 12, 2007. Section 104(a) (10) of the Act established new requirements to end and prevent overfishing, including annual catch limits (ACLs) and accountability measures (AMs).

Section 303(a) (15) was added to the MSA to read as follows:

> *"establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability."*

ACLs and AMs were required for all fisheries by fishing year 2010 if overfishing was occurring, and they were required for all other fisheries by fishing year 2011. The Council approved this action in
2010 so that measures establishing ACLs were implemented for the start of the 2011-fishing year, as required by the MSA.

4.5.4 Incentives for Sustainable Fishing

Amendment 16 introduced sector management to the groundfish fishery providing the opportunity for fishermen to take more responsibility for management. The penalty aspect of the mechanism effectively punishes all members of a sector for violation of a single member. This has the effect of making fishers responsible to each other in ensuring proper fishing and reporting practice. Managers have reported improved reporting practice since sector management was introduced with Amendment 16.

- Voluntary measures to reduce the chance of interacting with marine mammals, including reducing the amount of turns made by the fishing vessel and tow times while fishing at night, and increasing communication between vessels about the presence of marine mammals in an area.

4.5.5 Fishery Specific Objectives

The Northeast Multispecies Fishery Management Plan was released by the NEFMC in co-operation with the Atlantic States Fishery Management Council ASFMC in 1985. It specifies management measures for thirteen groundfish species (cod, haddock, yellowtail flounder, pollock, plaice, witch flounder, white hake, windowpane flounder, Atlantic halibut, winter flounder, redfish, Atlantic wolffish, and ocean pout) off the New England and Mid-Atlantic coasts. The management objectives Northeast Multispecies Fishery Management Plan are as follows.

Management and Policy from the original FMP

The policy contains two basic goals for management:

1. To allow the multispecies fishery to operate with minimum regulatory intervention
2. To adopt initial measures to prevent stocks from reaching minimum abundance levels, defined as those levels below which there is an unacceptably high risk of recruitment failure

The management objectives are to control fishing mortality on juveniles (primarily) and on adults (secondarily) of selected finfish stocks in order to maintain sufficient spawning potential so that year classes replace themselves on a long term average basis, to similarly reduce fishing mortality for the purpose of rebuilding those stocks which have insufficient spawning potential to maintain a viable fishery resource and to promote the collection of information about multispecies fishery and the effectiveness of the management program.

Initially, however, only cod, haddock and yellowtail flounder stocks were managed in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) beginning with the adoption of the first Groundfish Plan in 1977. It relied on hard quotas (total allowable catches, or TACs), and proved unworkable. The quota system was rejected in 1982 and replaced with the Interim Groundfish Plan, which relied on minimum fish sizes and codend mesh regulations for the Gulf of Maine and Georges Bank to control fishing mortality.

The original FMP has been adjusted through the process of amendments and frameworks since introduction in 1985. The highlights and management objectives affecting the stocks under assessment are reviewed here from information provided at nefmc.org.

Amendment 5 was a major revision to the FMP.
Adopted in 1994, the management objectives were as follows:

1. To reduce fishing mortality to a level that will increase the percent maximum spawning potential (%MSP) for cod and yellowtail to 20% in five years and to 30% for haddock in ten years.

2. To rebuild the haddock spawning stock biomass, in addition to reducing the rate at which haddock are fished, by preventing an increase in the fishing effort directed at haddock.
3. To improve and enhance enforcement and administration of management measures.
4. To protect concentrations of fish below the minimum legal size from capture and excessive discard mortality.
5. To reduce the annual take of harbour porpoise in the sink gillnet fishery by the end of year four after implementation to a level not to exceed two percent of the population based on the best available estimates of abundance and bycatch

Amendment 5 also implemented reductions in time allowed to engage in fishing (in the form of days-at-sea, or DAS) for some fleet sectors, and adopted year-round closures to control mortality. A more detailed discussion of the history of the management plan up to 1994 can be found in Amendment 5 (NEFMC 1994).

Amendment 7 (NEFMC 1996),
Adopted in 1996, the management objectives were as follows:
1. To reduce fishing mortality on Georges Bank cod, haddock and yellowtail flounder and Southern New England yellowtail flounder to as close to zero as practicable, and also to reduce fishing mortality for Gulf of Maine cod to rebuild the spawning stock biomass of the identified stocks
2. To increase the spawning stock of cod, haddock and yellowtail flounder stocks above minimum threshold levels
3. To reduce proportionately, consistent with the MFCMA and MMPA, the incidental mortality and serious injury of harbor porpoise in the Gulf of Maine sink gillnet fishery to the potential biological removal (PBR) level identified for this stock through the process described in Section 117 of the MMPA by April 1, 1997, the date required for compliance with Section 118(f)(5)(A) of the MMPA

Amendment 7 also expanded the DAS program and accelerated the reduction in DAS that was first adopted in Amendment 5. After the implementation of Amendment 7, there were a series of amendments containing smaller changes (framework adjustments).

Omnibus Essential Fish Habitat Amendment (NEFMC 1999)
"The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, known as the Sustainable Fisheries Act (SFA), emphasized the importance of habitat protection to healthy fisheries and strengthened the ability of the National Marine Fisheries Service (NMFS) and the Councils to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. This habitat is termed "essential fish habitat" (EFH) and is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

To improve fish habitat protection, the SFA requires or authorizes that the Councils, NMFS, and other federal agencies take new actions. The SFA required the Council, after receiving recommendations from NMFS, to amend its fishery management plans by October 1998 to:

1. Describe and identify the essential habitat for the species managed by the Council
2. Minimize to the extent practicable adverse effects on EFH caused by fishing
3. Identify other actions to encourage the conservation and enhancement of EFH

The purpose of the amendment is to identify and describe the EFH for Atlantic herring, sea scallops, Atlantic salmon, and fifteen species of groundfish managed by the Council to better protect, conserve, and enhance this habitat. This amendment also will identify the major threats to essential fish habitat from both fishing and non-fishing related activities and identify conservation and enhancement measures.

In support of the Council's habitat policy, the management objectives for the EFH amendment will be:
1. To the maximum extent possible, to identify and describe all essential fish habitat for those species of finfish and molluscs managed by the Council

2. To identify all major threats (fishing and non-fishing related) to the essential fish habitat of those species managed by the Council
3. To identify existing and potential mechanisms to protect, conserve and enhance the essential fish habitat of those species managed by the Council, to the extent practicable

Amendment 13 (NEFMC, 2003) was developed over a four-year period to meet the MSFCMA requirement to adopt rebuilding programs for stocks that are overfished and to end overfishing. The action also brought the FMP into compliance with other provisions of the Act. Notably, it incorporated the U.S. Canada Resource Sharing Understanding into the groundfish regulations by mandating the coordinated management of transboundary stocks of Eastern Georges Bank cod and haddock, and Georges Bank yellowtail flounder.

Subsequent to the implementation of Amendment 13, Framework Adjustment 40A provided opportunities for fishermen to target healthy stocks; Framework 40B improved the effectiveness of the effort control program; and Framework 41 expanded the number of vessels eligible to participate in a Special Access Program (SAP) that targeted Georges Bank haddock.

The goals and objectives of Amendment 13 to the Northeast Multispecies Fishery FMP are as follows:

Goal 1. Consistent with the National Standards and other required provisions of the Magnuson-Stevens Fishery Conservation and Management Act and other applicable law, manage the northeast multispecies complex at sustainable levels
Goal 2. Create a management system so that fleet capacity will be commensurate with resource status so as to achieve goals of economic efficiency and biological conservation and that encourages diversity within the fishery
Goal 3. Maintain a directed commercial and recreational fishery for northeast multispecies
Goal 4. Minimize, to the extent practicable, adverse impacts on fishing communities and shore side infrastructure
Goal 5. Provide reasonable and regulated access to the groundfish species covered in this plan to all members of the public of the United States for seafood consumption and recreational purposes during the stock rebuilding period without compromising the Amendment 13 objectives or timetable. If necessary, management measures could be modified in the future to insure that the overall plan objectives are met
Goal 6. To promote stewardship within the fishery

Objective 1. Achieve, on a continuing basis, optimum yield (OY) for the U.S. fishing industry
Objective 2. Clarify the status determination criteria (biological reference points and control rules) for groundfish stocks so they are consistent with the National Standard guidelines and applicable law
Objective 3. Adopt fishery management measures that constrain fishing mortality to levels that are compliant with the Sustainable Fisheries Act
Objective 4. Implement rebuilding schedules for overfished stocks, and prevent overfishing.
Objective 5. Adopt measures as appropriate to support international transboundary management of resources
Objective 6. Promote research and improve the collection of information to better understand groundfish population dynamics, biology and ecology, and to improve assessment procedures in cooperation with the industry
Objective 7. To the extent possible, maintain a diverse groundfish fishery, including different gear types, vessel sizes, geographic locations, and levels of participation
Objective 8. Develop biological, economic and social measures of success for the groundfish fishery and resource that insure accountability in achieving fishery management objectives
Objective 9. Adopt measures consistent with the habitat provisions of the M-S Act, including identification of EFH and minimizing impacts on habitat to the extent practicable
Objective 10. Identify and minimize bycatch, which include regulatory discards, to the extent practicable, and to the extent bycatch cannot be avoided, minimize the mortality of such bycatch

Framework 42(NEFMC 2006) management objectives were as follows:

1. To adopt management measures that are necessary to achieve the rebuilding fishing mortality targets required by Amendment 13.
2. To adopt formal rebuilding schedule for GB yellowtail flounder, a stock that was determined to be overfished and subject to overfishing in the summer of 2005.
3. To reduce haddock bycatch by requiring modifications to the cod end mesh when using a haddock separator trawl
4. To provide opportunities for fishing vessel operators to mitigate the effort reductions of Amendment 13 and framework 42.
5. To implement a requirement for all limited access DAS vessels to use a Vessel Monitoring System
6. To revise mesh requirements

Framework 42 included measures to implement the biennial adjustment to the FMP as well as a Georges Bank yellowtail flounder rebuilding strategy, several changes to the Category B (regular) DAS Program and two Special Access Programs, an extension of the DAS leasing program, and introduced the differential DAS system.

Framework 43 (NEFMC 2006) management objectives were to modify regulations for the multispecies fishery to address bycatch in the herring fishery by:

1. Establishing a haddock catch cap and monitoring program and a multispecies incidental catch allowance for the directed herring fishery
2. Modifying the current classification of herring fishing gear as exempted gear relative to the multispecies fishery.

Thus, this framework adopted haddock catch caps for the herring fishery and was implemented August 15, 2006.

Amendment 16 (NEFMC 2009) made major changes to the FMP. For several groundfish stocks, the mortality targets adopted by Amendment 16, and the resulting specifications in Framework 44, represented substantial reductions from existing harvest levels. For other stocks, the mortality targets were at or higher than existing levels and mortality could remain the same or even increase. However, because most fishing trips in this fishery catch a wide range of species, it was impossible to design effort control measures that would change mortality in a completely selective manner for individual species. The goals and management objectives of this amendment remained as described in Amendment 13:

The management measures implemented through Amendment 16 to reduce mortality where necessary were also expected to reduce fishing mortality unnecessarily on other, healthy stocks. Because of these lower fishing mortality rates, the Council acknowledged that the yield from healthy stocks would potentially be sacrificed and the management plan would not provide optimum yield - the amount of fish that will provide the greatest overall benefit to the nation.

To address this situation, Amendment 16 created opportunities to target the healthy stocks. The FMP allowed vessels with groundfish permits either to fish under the days-at-sea (DAS) effort control system or to join sectors, which are small groups of self-selected members who receive an allocation of annual catch entitlement (ACE) based upon the catch history accorded to each sector member. The amendment also adopted a system of annual catch limits (ACLs) and accountability measures (AMs) that are designed to ensure catches remain below desired target levels.

Framework 45 was approved by the Council in 2010 and it was implemented May 1, 2011. The main objectives are as follows:

1. To set specifications for ACLs in Fishing Years 2011-2012 consistent with best available science and the ABC control rules adopted in Amendment 16 to the Northeast Multispecies FMP by means of:

a. Revisions to status determination criteria, including updated Pollock assessment
b. Revision of rebuilding strategy for GB yellowtail flounder
c. Measures to adopt ACLs, including incidental catch TACs
d. Measures to adopt TACs for U.S./Canada area
e. Yellowtail flounder allocations for the scallop fishery

2. To update fishery program administration in order to enhance viability of the fishery since the implementation of Amendment 16 by means of:
a. Allow for implementation of additional sectors
b. Adjust monitoring requirements
c. Determine distribution of PSC from canceled permits into fishery
d. Modify date for submission of sector rosters

3. To modify management measures in order to ensure that overfishing does not occur consistent with the status of stocks, the National Standard guidelines, and the requirements of the MSA of 2006 by means of:
a. Spawning closure for cod in the Gulf of Maine
b. Adjust trip limits and access to closed areas for handgear vessels
c. Exemption for General Category scallop vessels from yellowtail flounder spawning closure

4. To minimize, to the extent practicable, the adverse effects of fishing on essential fish habitat to comply with section 303(a)(7) of the Magnuson-Stevens Act by means of:
a. Identify other actions to encourage the conservation and enhancement of EFH

Furthermore, Framework 45 adopts further modifications to the sector program and fishery specifications.

Framework 46 revised the allocation of haddock to be caught by the herring fishery and was implemented in August 2011. The management objectives were as follows:

1. To maximize the chance for Georges Bank (Area 3) herring TAC to be caught
2. To provide incentives to fish offshore
3. To provide incentives to fish in a manner, at times, and in areas when and where haddock bycatch is none to low
4. To reduce the impact of a haddock cap on the entire herring fishery

Amendment 17, which authorized the function of NOAA-sponsored state-operated permit bank, was implemented on April 23, 2012. The management objectives were as follows:

1. Define a NOAA-sponsored, state-operated permit bank and distinguish this type of entity from that of a groundfish sector; and
2. Clarify and streamline the administrative procedures and requirements to which NOAA sponsored, state-operated permit banks must comply in order to operate outside of the sector process (i.e., be allocated ACE and provide ACE and/or DAS to approved groundfish sectors)

Framework 47, implemented on May 1, 2012, revised common pool management measures, modified the Ruhle trawl definition and clarified regulations for charter/party and recreational groundfish vessels fishing in groundfish closed areas. The management objectives were as follows:

1. To set specifications for ACLs in Fishing Years 2012-2014 consistent with best available science, the ABC control rules adopted in Amendment 16 to the Northeast Multispecies FMP, the International Fisheries Agreement Clarification Act, and the most recent relevant law by means of:
a. Revisions to status determination criteria, including updated winter flounder assessments

b. Revision of rebuilding strategy for GB Yellowtail flounder
c. Measures to adopt ACLs, including relevant sub-ACLs and incidental catch TACs
d. Measures to adopt TACs for U.S./Canada area

2. Modify management measures in order to ensure that overfishing does not occur consistent with the status of stocks, the National Standard guidelines, and the requirements of the MSA of 2006 by means of:
a. Modification of management measures for SNE/MA winter flounder
b. Modification of restrictions on the catch of yellowtail flounder in Georges Bank access areas
c. Modification of accountability measures for certain stocks

Framework Adjustment 48 was partially implemented on May 1, 2014. The action revised the status determination criteria for several stocks, modified the sub-annual catch limit system, adjusted monitoring measures for the groundfish fishery, and changed several accountability measures. The management objectives were as follows:

1. To modify management measures in order to ensure that overfishing does not occur consistent with the status of stocks, the National Standard guidelines, and the requirements of the MSA of 2006 by means of:
a. Modification of restrictions on the catch of Georges Bank yellowtail flounder
b. Modification of accountability measures for certain stocks, including halibut
c. Modification of measures for the recreational fishery

2. To modify of observer coverage levels to improve documentation and reduce costs and modify management measures regulating the at sea monitoring program to be in compliance with Amendment 16 by means of:
a. Modifying management measures regulating the at sea monitoring program in compliance with Amendment 16
b. Modification of expenses industry is required to cover
c. Modification of management measures for dockside monitoring

3. Modify management measures to mitigate negative economic impacts for the fleet from projected low allocations by means of:
a. Allowance of sectors to request exemptions from year round closure system for groundfish vessels
b. Modification of management measures for minimum fish size requirements

Framework Adjustment 50 was implemented on September 30, 2013 and set specifications for many groundfish stocks and modified the rebuilding program for Southern New England/Mid-Atlantic winter flounder. The goals and objectives of this amendment remain as described in Amendment 16.

Framework Adjustment 53 was implemented in March 2015. The management objectives were as follows:
1. To ensure that stock are managed consistent with the status of stocks, the National Standard guidelines, and the requirements of the MSA by means of:
a. Measures to update status determination criteria

2. To ensure that levels of catch for Fishing Years 2015-2017 are consistent with best available science, the ABC control rules adopted in Amendment 16 to the Northeast Multispecies FMP, the International Fisheries Agreement Clarification Act, and the most recent relevant law by means of:
a. Measures to adopt ACLs, including relevant sub-ACLs and incidental catch TACs
b. Measures to adopt TACs for U.S./Canada area

3. To ensure that overfishing does not occur consistent with the status of stocks, and the requirements of MSA of 2006
4. To enhance mortality and spawning protection for GOM cod given the poor status of the stock
5. To minimize the economic impact of current rolling closures by providing access to healthy groundfish stocks by

means of:

- **a.** Measures to establish GOM cod protection
- **b.** Measures to establish default groundfish specifications
- **c.** Measures to revise sector ACE carryover provision

Management measures for the fishing year beginning May 1, 2015. The catch limits for most groundfish stocks remain the same as 2014 but there are large reductions in catch limits for Gulf of Maine (GOM) cod, which are decreased by 75%; Georges Bank (GB) winter flounder decreased by 44%; and GOM winter flounder decreased by 53%. Framework 53 modifies the existing GOM rolling closures for the commercial groundfish fishery to help protect GOM cod. This action adds closures in the winter while opening other areas in the spring to provide increased fishing opportunities on healthy groundfish stocks like haddock.

4.5.6 Decision-Making Process

The decision making process in management of the multi-species fishery follows the terms of the Magnuson-Stevens Act (2007), which requires managers to follow a process of assessment every two years of scientific information, evaluation of alternatives, public consultation, public documentation and decision according to a prescribed schedule.

Fishery management decisions are prepared though a public process of consultation through the Plan Development Team with final consideration by the Groundfish Oversight Committee. Frameworks are prepared with full consideration of alternatives to proposed actions and impacts are fully explained and evaluated providing the reason for decisions that are being made. The process is transparent providing stakeholder's opportunity to comment throughout the consultation process. Draft plans, proposals and minutes of all meetings are available at NEFMC.org. The process of making decisions in this fishery is open, transparent and inclusive involving full opportunity for stakeholder involvement.

4.5.7. Monitoring, Control and Surveillance

NMFS has the primary responsibility for monitoring, control and surveillance in this fishery. Inspections by NMFS agents are supported by Observers, VMS and catch monitoring. OLE Special Agents and Enforcement Officers conduct complex criminal and civil investigations, board vessels fishing at sea, inspect fish processing plants, review sales of wildlife products on the internet and conduct patrols on land, in the air and at sea. NOAA Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation, which can then assess a civil penalty or they can refer the case to the US Attorney's Office for criminal proceedings.

Sector managers are responsible for ensuring accurate reporting by vessels within the sector.
Fishers are generally thought to abide by regulations and sector managers' improved catch reporting practices.

There is a relatively high degree of certainty regarding the catch from fishing trips since reporting from these trips is subject to high penalties for noncompliance.

Observer coverage is high in this fishery relative to international standards with a target coverage level for the most recent year of 26%. During the May 1, 2014 to April 30, 2015 fishing year, the fishery had 2,292 trips, representing 4,325 sea days and, although final figures are not yet tabulated, the coverage will be about 25-28% (NOAA April 28, 2015).

4.5.8. Research Plan

The Council has developed, in conjunction with the Science and Statistical Committee (SSC), multiyear research priorities for fisheries, fisheries interactions, habitats, and other areas of research that are necessary for management purposes, for 5-year periods. These research priorities are updated as necessary and submitted to the Secretary and NMFS regional science centers for consideration in developing research priorities and budgets for the region of the Council (Reference: SSC at http://www.nefmc.org).

4.5.9. Monitoring and Evaluation of the Haddock Management System

The Science and Statistical Committee (SSC) of the NEFMC was established to assist it in the development, collection, evaluation, and peer review of such statistical, biological, economic, social, and other scientific information. The SSC provides the Council ongoing scientific advice for fishery management decisions, including recommendations for acceptable biological catch, preventing overfishing, maximum sustainable yield, and achieving rebuilding targets, and reports on stock status and health, bycatch, habitat status, social and economic impacts of management measures, and sustainability of fishing practices.

5. Evaluation Procedure

5.1. Harmonised 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. The CR requirements section Annex CI provides guidance for harmonisation where a fishery in assessment overlaps with an already certified fishery.

The MSC wishes to discourage overlapping assessments to avoid potential financial, consistency and credibility costs, including:

- fisheries managers, scientists and stakeholders receiving duplicate requests for information
- duplication of costs for a fishery's certification, including that expense incurred by fishery management agencies pre- and post-certification; and
- The possibility of different assessments placing different conditions upon the same fisheries managers and upon different fishery clients.

To this effect, the assessment team has considered that harmonization procedures should be required between the outcome of US Acadian Redfish/Haddock/Pollock Otter Trawl Fisheries, and the US Atlantic Spiny Dogfish fishery. This procedure will be followed during the assessments and certification of US Acadian Redfish/Haddock/Pollock Otter Trawl Fisheries, and the US Atlantic Spiny Dogfish fisheries to ensure consistency in outcome of performance indicators and conditions set on the fishery.

Consideration on harmonization between US Georges Bank Haddock Otter trawl fisheries with 5Zjm Canadian Georges Bank was evaluated on the MSC Reassessment of Scotia Fundy haddock. (MSC 2016) The assessment team concluded that harmonization should not be done for these fisheries. Among some of the reasons were: (1) assessments of the respective haddock and cod stocks are different in Canada and the USA, (2) management measures in Canada and the USA are different (e.g. USA has mandatory discarding provisions and Canada have mandatory landing provisions) (3) Canada and USA do not fish in the same waters (4) version 1.3 does not deal with cumulative impact of P2 species, (5) Eastern Georges Bank haddock and cod stocks are genetically and morphologically different (6) there are no other applicable P2 species under "joint" management. For more details please see MSC (2016)

Background:
During the assessment of the Otter Trawl US Acadian redfish/pollock/haddock fisheries, the CAB found that there are existing overlapping fisheries with the US Atlantic Spiny Dogfish fishery. The US Atlantic Spiny Dogfish fishery was certified in 2012. On that occasion, the assessment team set up 16 conditions for the client to meet in order for continuing certification.

During initial examination of all fisheries, it was found that these overlapping fisheries consist of the US Atlantic Spiny Dogfish Trawl State and Federal fisheries (UoC4, UoC7) and the US Acadian Redfish/Pollock/Otter Trawl fisheries. As consequence, SAI Global decided to do an evaluation of the amount of overlap from all fisheries within some of their units of certification.

Evaluation of species shared by US Acadian Redfish/Pollock/Haddock Otter Trawl Fisheries (UoC1), (UoC2), (UoC3), (UoC4) and US Atlantic Spiny dogfish Federal State trawl fisheries (UoC4) and (UoC7)

Principle 1

For principle 1, the target species Redfish, Pollock, Haddock and Spiny Dogfish are not in the overlapping target fisheries between: US Acadian Redfish/Pollock/Haddock Otter Trawl Fisheries (UoC1-4) and US Atlantic Federal Spiny dogfish trawl fisheries (UoC4), US Atlantic State Spiny dogfish trawl fisheries (UoC7).

Principle 2

During the evaluation process, it was found that there were differences on the sampling universe of the MSC CAB evaluation between both fisheries. Consequently, it is difficult to account for direct differences in major/minor species composition of retained catch and bycatch**.** For the US Spiny dogfish, the data came from positive trips where other species were retained or discarded when Spiny Dogfish was caught in a directed fishery or as a by-catch in a fishery directed at another species or group of fisheries. The US Acadian Redfish OTB data came from directly from the OTB fishery with no targeted species.

Table 9. Comparison of P2 performance indicators by the two overlapping fisheries. Rows highlighted in orange are PIs that conditions were set by the CABs evaluating this fishery. Numbers highlighted in red are scores that differed by 10 points or more.

PI	US Spiny dogfish OTB fishery	US Acadian Redfish OTB fishery
2.1.1	80	75
2.1.2	85	75
2.1.3	75	95
2.2.1	80	95
2.2.2	85	95
2.2.3	80	95
2.3.1	80	90
2.3.2	80	90
2.3.3	65	90
2.4.1	80	80
2.4.2	95	85
2.4.3	80	95
2.5.1	80	80
2.5.2	80	80
2.5.3	90	80

On Principle 2, there was a group of species that were shared among certification units US Spiny Dogfish OTB (UoC4, UoC7) and US Acadian Redfish/Pollock/Haddock OTB fisheries (UoCs 1 to 4).

Retained Catch Species: Cod

Bycatch Species: Winter Skate
Little skate
Barndoor Skate

Performance indicators (2.1.1., 2.1.2. and 2.1.3): Retained Species outcome management and information

PIs 2.1.1, 2.1.2

Herring and Mackerel were the main species in the Spiny dogfish (SD) trawl UoCs. These species were not to be found on the US Acadian Redfish OTB fisheries**.**

In the US Acadian Redfish OTB Fishery, Atlantic cod scored below 80 and conditions were set. The Gulf of Maine and Georges Bank cod status is overfished and overfishing is occurring. There were no conditions on the SD fishery because cod was not considered a major retained species in this assessment.

CAB decision: No changes in scoring

PI 2.1.3

The SD report states that the CAB found problems in tracing the origins of SD fishery retained catch or bycatch to federal or State waters. In the US Acadian redfish the retained unit of assessment is (US Northwest Atlantic EEZ zone) is well defined and encompasses Federal and State waters.

CAB decision: No changes in scoring

Performance indicators (2.2.1, 2.2.2 and 2.2.3): Bycatch outcome management and monitoring

PIs 2.2.1, 2.2.2

On the SD fishery there were no main species taken as targeted species/bycatch in fisheries where SD is caught in a directed fishery or as a bycatch in another fishery. While Atlantic cod (0.27%), winter skate (0.88 %) and barndoor skate (0.23%) are vulnerable species their low level of discard means that it is not taken into consideration.

In US Acadian Redfish OTB Fisheries, all of the major species and minor species except for thorny skate are not overfished. Overfishing is not occurring in these bycatch species. So they have higher score than the SD fishery.

CAB decision: No changes in scoring

PI 2.2.3

In the US SD fishery, none of the SG100 issues were met. On the contrary, the Acadian Redfish OTB Fishery scored on all SG100 items.

US Acadian Redfish OTB Fishery Rationale

Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations.

Catch and discard data in the fishery are collected by onboard NMFS Fisheries Observers, and coverage is >25% of all large mesh bottom trawl trips (Wigley et al. 2014). Landings and effort data are recorded by the NMFS Fisheries Data Services Division based on port sampling and vessel logbooks (NMFS FDSD 2015).

Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.

Spiny Dogfish

In updating the spiny dogfish assessment, the NEFSC estimated a 100% probability that overfishing was not occurring ($F_{2010} < F_{THRESHOLD}$) (MAFMC 2014), and a 100% probability that the stock is not overfished. This is a robust age structured assessment. Score 100.

Monkfish

Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty The 2013 assessment updated the biological reference points based on an updated yield-per-recruit analysis and the results of a length-tuned population model that incorporates multiple survey indices and catch data. Score 100.

Winter and Little Skates

Information is sufficient to estimate outcome status with respect to biologically based limits. The status of skate overfishing is determined based on a rate of change in the three year moving average for survey biomass. These thresholds vary by species due to normal inter-annual survey variability. Details about the overfishing reference points and how they were chosen are given in (NEFSC 2000, and NEFMC 2013).

Information is adequate to support a strategy to manage bycatch species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.

Information from groundfish surveys, observer coverage, dockside sampling, and logbooks is adequate to support a strategy to manage bycatch species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. Score 100.

CAB decision: No changes in scoring

Performance indicators (2.3.1, 2.3.2. and 2.3.3): ETP management and monitoring

PI 2.3.1
On the SD fishery all ETP species scored 80 and no ETP species scored 100. On the US Acadian Redfish OTB fishery 8 of the ETP species scored 80 and the other ones scored 100 providing a score of 90.

US Acadian Redfish/Pollock/Haddock OTB Fisheries Rationale
The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.

Five species of large whales occur in the GOM and GB that potentially might interact with the LMOT. These species include: North Atlantic right whale (Eubalaena *glacialis),* humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), and sei whale (*Balaenoptera borealis*) all of which are also listed as Endangered under the ESA (NEFMC 2015). None of these have been recorded interacting with the GOM/GB large mesh otter trawl fishery (Waring et al. 2014). The fifth species is the minke whale (*Balaenoptera acutorostrata acutorostrata*), not listed under the ESA but listed in Appendix 1 of the CITES and protected under the MMA.

Three species of pinnipeds have documented interactions with the LMOT Fishery: Harbor seal (*Phoca vitulina*), Gray Seal (*Halichoerus grypus*), and Harp Seal (*Phoca groenlandicus*). Seven species of small cetaceans have recorded interactions with the LMOT Fishery. The two species of pilot whales have been treated together as *Globicephala spp.* because they are virtually impossible to distinguish in the water (NEFMC 2015). Small cetaceans which interact with the fishery are: Pilot Whale (*Globicephala ssp*)., Short-beaked Common Dolphin (*Delphinus delphis*), Harbor Porpoise (*Phocoena phocena*), Bottlenose Dolphin (*Tursiops truncates*), Risso's Dolphin (*Grampus griseus*), and White-sided Dolphin (*Lageorhynchus acutus*). Only the white sided dolphin had a mean annual mortality (73) greater than 1% and less than 50% of the stock's PBR, thus leading the fishery to be classified under Category II.

Four ESA-listed Sea Turtles, Green (*Chelonia mydas*), Loggerhead (*Caretta carreta*), Kemp's ridley (*Lepidochelys kempi*), and the Leatherback (*Dermochelys coriacia*) (NEFMC 2015) may occur in the GOM and GB (NEFMC 2015). All are migratory and occur in New England mostly during the warmer months of the year (Musick 2003). Whereas green and Kemps ridley turtles are most common south of Cape Cod, MA, loggerhead sea turtles are known to occur in the Gulf of Maine (GOM), feeding as far north as southern Canada. Leatherback sea turtles also engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992, James *et al.* 2005, Dodge *et al.* 2014)

Atlantic sturgeon is the only ESA listed fish likely to be encountered by the LMOT in the GOM/GB (NEFMC 2015).

All of the above species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act of 1973 (ESA) and/or the Marine Mammal Protection Act of 1972 (MMPA).Both of these Acts meet or exceed the limits of national and international requirements for ETP species.and have stood as models for international conservation standards.

Direct effects are highly unlikely to create unacceptable impacts to ETP species.

Large Whales

There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on Large Whales. Five species of large whales occur in the GOM and GB that potentially might interact with the LMOT. These species include: North Atlantic right whale (Eubalaena *glacialis),* humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), and sei whale (*Balaenoptera borealis*) all of which are also listed as Endangered under the ESA (NEFMC 2015). None of these have been recorded interacting with the GOM/GB large mesh otter trawl fishery (Waring et al. 2014). The fifth species is the minke whale (*Balaenoptera acutorostrata acutorostrata*), not listed under the ESA but listed in Appendix 1 of the CITES and protected under the MMPA . Annual average estimated minke whale mortality and serious injury from the Northeast bottom trawl fishery during 2007 to 2011 was 1.8 (CV=0.42) (Waring et al. 2014), well below the PBR of 162.

Direct effects are highly unlikely to create unacceptable impacts on Sea Turtles, Small Cetaceans, Pinnipeds and Atlantic Sturgeon.

Small Cetaceans and Pinnipeds

Three species of pinnipeds have documented interactions with the LMOT Fishery: Harbor seal (*Phoca vitulina*), Gray Seal (*Halichoerus grypus*), and Harp Seal (*Phoca groenlandicus*). Seven species of small cetaceans have recorded interactions with the LMOT Fishery. The two species of pilot whales have been treated together as *Globicephala spp.* because they are virtually impossible to distinguish in the water (NEFMC 2015). Small cetaceans which interact with the fishery are: Pilot Whale (*Globicephala ssp*)., Short-beaked Common Dolphin (*Delphinus delphis*), Harbor Porpoise (*Phocoena phocena*), Bottlenose Dolphin (*Tursiops truncates*), Risso's Dolphin (*Grampus griseus*), and White-sided Dolphin (*Lageorhynchus acutus*). . Only the white sided dolphin had a mean annual mortality (73) greater than 1% and less than 50% of the stock's PBR, thus leading the fishery to be classified under Category II. PBR for the western North Atlantic stock of white-sided dolphin is 304. The best estimate of abundance for the western North Atlantic stock of white-sided dolphins is 48,819 (CV=0.61) (Waring et al. 2014). Thus the bycatch of white-sided dolphins in the NE Bottom OT Fishery is highly unlikely to create unacceptable impacts to the species

Sea Turtles

Four ESA-listed Sea Turtles, ,Green (*Chelonia mydas*), Loggerhead (*Caretta carreta*), , Kemp's ridley (*Lepidochelys kempi*), and the Leatherback (*Dermochelys coriacia*) (NEFMC 2015) may occur in the GOM and GB (NEFMC 2015). All are migratory and occur in New England mostly during the warmer months of the year (Musick 2003) . Whereas green and Kemps ridley turtles are most common south of Cape Cod, MA, loggerhead sea turtles are known to occur in the Gulf of Maine (GOM), feeding as far north as southern Canada. Leatherback sea turtles also engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992, James *et al.* 2005, Dodge *et al.* 2014). Leatherbacks, a pelagic species, are also known to use coastal waters of the U.S. continental shelf (James *et al.* 2005, Eckert *et al.* 2006; Murray 2006, Dodge *et al.* 2014). Leatherbacks have a greater tolerance for colder water in comparison to hard-shelled sea turtles. They are also found in more northern waters later in the year, with most leaving the Northwest Atlantic shelves by mid-November (James *et al.* 2005, Dodge *et al.* 2014).

Although sea turtle interactions with trawl gear have been observed in waters from the GOM to the Mid-Atlantic, most of the observed interactions have occurred in the Mid-Atlantic where special requirements to reduce sea turtle interactions and mortalities have been imposed on the Summer Flounder Trawl Fishery and the Scallop Fishery.. No such requirements have been imposed on the NE LMOT because few sea turtle interactions have been

observed in the fishery . Therefor. it is highly unlikely that the large mesh OT fishery is causing unacceptable direct or indirect impacts on sea turtles.

Atlantic Sturgeon

Atlantic sturgeon is the only ESA listed fish likely to be encountered by the LMOT in the GOM/GB (NEFMC 2015). The Atlantic sturgeon is managed under a Fishery Management Plan implemented by the Atlantic States Marine Fisheries Commission (ASMFC 1998, 2015a). In 1998, the ASFMC instituted a coast-wide moratorium on the harvest of Atlantic sturgeon, which is to remain in effect until there are at least 20 protected age classes in each spawning stock (anticipated to take up to 40 or more years). NMFS followed the ASMFC moratorium with a similar moratorium for Federal water. The NMFS recognizes five Distinct Population Segments (DPSs) of Atlantic sturgeon, of which one, the Gulf of Maine DPS (ESA Threatened), may interact with the LMOT. Based on fishery- independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeonappear to primarily occur inshore of the 50 meter depth contour (Stein *et al*. 2004 a,b, Erickson *et al*. 2011, Dunton *et al*. 2010). Within the marine range of Atlantic sturgeon, several marine aggregation areas have been identified adjacent to estuaries and/or coastal features formed by bay mouths and inlets along the U.S. eastern seaboard; depths in these areas are generally no greater than 25 meters (Stein *et al*. 2004a, Laney *et al*. 2007, Dunton *et al*. 2010, Erickson *et al*. 2011). Dunton etal (2010) analyzed the NEFSC bottom trawl survey data and CPUE data from four state trawl surveys for Atlantic sturgeon distribution and abundance. This analysis showed that Atlantic sturgeon were most abundant in state waters. The NMFS survey which covered the continental shelf supported these conclusions. CPUE of Atlantic sturgeon was highest for the 10-m depth stratum and decreased with each depth interval. A total of 71.30% of the Atlantic sturgeon were captured in 20 m or less and no individuals were captured in water deeper than 30 m. Also Atlantic Sturgeon were virtually absent on GB regardless of depth (Dunton et al. 2010). This suggests that Atlantic sturgeon favor coastal habitats and not just shallower depths. Given that Atlantic sturgeon distribution is mostly inshore of the LMOT, and low trawl bycatch mortality (5%) it is highly unlikely that the LMOT is causing direct or indirect impacts on Atlantic sturgeon.

Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.

Large whales - because only one species of large whale has been recorded to interact with this fishery, and at very low numbers (< 2/yr) there is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on large whales.

Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts in Small Cetaceans, Pinnipeds, Sea turtles and Atlantic Sturgeon. Interactions have been low in these groups, but indirect effects cannot be ruled out.

CAB decision: No changes in scoring

PI 2.3.2

SD Fisheries Rationale

The only species considered were turtle species. The score was 80 because:

The first scoring issue under SG100 is not met as the comprehensive strategy in place is designed and implemented to meet national standards (not to exceed them). The second scoring issue under SG100 is not met as the data available do not lead to quantitative analyses and high confidence. The third scoring issue is not met although there are signs of recovery from some of the ETP species.

However, in the US Acadian Redfish fishery 10 ETP species scored 80 and 10 species scored 100. Thus, the score was higher (90).

US Acadian Redfish/Pollock/Haddock OTB fisheries rationale

There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.

Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. The NEFMC has concluded, at this writing, that the proposed framework adjustment and the prosecution of the multispecies fishery is not likely to jeopardize any ESA- listed species or alter or modify any critical habitat, based on the discussion of impacts in this document and on the assessment of impacts in the Amendment 16 Environmental Impact Statement.

The NEFMC acknowledges that endangered and threatened species may be affected by the measures proposed, but impacts should be minimal especially when compared to the prosecution of the fishery prior to implementation of Amendment 16. The NEFMC is now seeking the concurrence of the National Marine Fisheries Service with respect to Framework Adjustment 53. Should any fishery be found to impose a significant impact on ETP species, NMFS is authorized to implement many different requirements on the fishery. These include: area or time closures, gear modifications, and mortality quotas (when reached the fishery must close). Such requirements have been implemented on other fisheries in New England and the MAB. These have included gill net fisheries (to protect marine mammals, sea turtles and sturgeon), anchored gear fisheries (to protect large whales), and the summer flounder, and scallop dredge fisheries (excluder devices to protect sea turtles).

There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved. ETP species interactions with the fishery are directly monitored at sea by NMFS Observers and Enforcement Agents. Whereas quantitative analyses are available for Cetaceans and Atlantic sturgeon, such analyses are lacking for sea turtles because they are rarely taken (NEFMC 2015).

There is clear evidence that the strategy is being implemented successfully as Loggerhead, Leatherback, Green turtles have been increasing in abundance in recent years (NMFS 2015). Kemps ridleys were showing a spectacular increase until the Gulf of Mexico oil spill in 2010.

Most cetacean and pinniped populations.have been stable or increasing in US Atlantic waters in recent years. Abundance estimates of the only small cetacean with a significant interaction with the fishery, White-sided Dolphin, increased from 17594 in 2006, to 24,422 in 2007, and 48,819 in 2011 (Waring et al. 2014).

Atlantic Sturgeon populations in the GOM and Mid-Atlantic are showing increasing abundance trends (ASMFC 2015).

There is evidence that the strategy is achieving its objectives. The Endangered Species Act of 1973 (ESA) has as an objective the recovery of ET species through management of sources of mortality (including fisheries).The Marine Mammal Protection Act of 1972 (MMPA).has as an objective the maintenance and recovery of marine mammal populations. There is also evidence that these strategies are achieving their objectives; turtles and cetaceans populations have increased lately in US Waters.

CAB decision: No changes in scoring

PI 2.3.3

SD OTB Fisheries Rationale:
Only turtles were considered. The three scoring issues of SG60 are met:

The information is adequate to broadly understand the impact of the fishery to support measures to manage the impacts; it is also sufficient to qualitatively estimate the fishery related mortality of the species.

The information is also sufficient to determine whether the fishery may be a threat to protection and recovery of the species, to measure trends and to support a full strategy to manage impacts, as demonstrated by the numerous reports on ETP species and by the FMPs and measures in place.

As such, the first scoring issue of SG 80 is met. While the 2010 BO provides estimates of incidental take, sufficient data are not available to allow fishery related mortality and the impact of fishing to be quantitatively estimated. As such, the second scoring issue of SG80 is not met. The issue is related to the difficulty in assigning interactions to a specific fishery or UoC. Given the nature of the information available, none of the scoring issues of SG100 are met.

The overall score was thus 65 and a condition was raised.

US Acadian Redfish/Pollock/Haddock Rationale:
All species scored 80. Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species The NMFS Observer Program monitors bycatch of both ESA species and Marine Mammals (NOAA 2015). Observer coverage in this fishery is >25% which is high for any fishery. NMFS Law Enforcement is also involved with both at sea and shore side enforcement of both the ESA and MMPA (NOAA 2015a). In addition the status of species covered under the ESA is reviewed periodically by NMFS Status Review Teams comprised of scientists from NMFS, the States, and Academia (NOAA 2015b). Atlantic sturgeon are also assessed by the ASMFC (ASFMC 1998). The status of marine mammals is monitored by periodic NMFS stock assessments (Waring *et al*. 2014). These assessments include all known sources of mortality as well as population trends. Regardless Information is insufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.

Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. The NMFS Observer Program monitors bycatch of both ESA species and Marine Mammals (NOAA 2015). Observer coverage in this fishery is >25% which is high for any fishery. NMFS Law Enforcement is also involved with both at sea and shoreside enforcement of both the ESA and MMPA (NOAA 2015a). In addition the status of species covered under the ESA is reviewed periodically by NMFS Status Review Teams comprised of scientists from NMFS, the States, and Academia (NOAA 2015b). Atlantic sturgeon are also assessed by the ASMFC (ASFMC 1998). The status of marine mammals is monitored by periodic NMFS stock assessments (Waring et al. 2014). These assessments include all known sources of mortality as well as population trends. However accurate and verifiable information is not available on the magnitude of all impacts, mortalities and injuries on ETP species.

Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species. Both the ESA, and MMPA require NMFS to assess all sources of mortality to both ESA and MM species (NOAA 2015a,b). In addition, the status of species covered under the ESA is reviewed periodically by NMFS Status Review Teams comprised of scientists from NMFS, the States ,and Academia (NOAA 2015b). Atlantic sturgeon are also assessed by the ASMFC (ASFMC 1998). The status of marine mammals is monitored by periodic NMFS stock assessments (Waring etal. 2014. NMFS has a strong record of imposing timely regulations to mitigate threatening interactions between specific fisheries and ETP species (NEFMC 2015). However to evaluate with a high degree of Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing or funding certainty whether a strategy is achieving its objectives is a high bar to meet.

In the US, activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. NMFS is authorized to implement many different requirements on the fishery.

These include: area or time closures, gear modifications, and mortality quotas (when reached the fishery must close). Such requirements have been implemented on other fisheries in New England and the MAB. These have included gill net fisheries (to protect marine mammals, sea turtles and sturgeon), anchored gear fisheries (to protect large whales), and the summer flounder, and scallop dredge fisheries (excluder devices to protect sea turtles). ETP species interactions with the fishery are directly monitored at sea by NMFS Observers and Enforcement Agents. There is clear evidence that the strategy is being implemented successfully Loggerhead, Leatherback, Green turtles have been increasing in abundance in recent years (NMFS 2015). Most cetacean and pinniped populations have been stable or increasing in US Atlantic waters in recent years. Abundance estimates of the only small cetacean with a significant interaction with the fishery, White-sided Dolphin, increased from 17594 in 2006, to 24,422 in 2007, and 48,819 in 2011 (Waring et al. 2014).

The Endangered Species Act of 1973 (ESA) has as an objective the recovery of ET species through management of sources of mortality (including fisheries).The Marine Mammal Protection Act of 1972 (MMPA) has as an objective the maintenance and recovery of marine mammal populations. There is sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species The NMFS Observer Program monitors bycatch of both ESA species and Marine Mammals (NOAA 2015). Observer coverage in this fishery is > 25% which is high for any fishery. NMFS Law Enforcement is also involved with both at sea and shore-side enforcement of both the ESA and MMPA (NOAA 2015a). In addition the status of species covered under the ESA is reviewed periodically by NMFS Status Review Teams comprised of scientists from NMFS, the States, and Academia (NOAA 2015b).

CAB decision: No changes in scoring

Performance Indicator 2.4.2: Habitat management

SD Fishery Rationale
Given the management measures and plans in place and that these are considered likely to work while there is some evidence in the reviews of EFH that the partial strategy is being implemented successfully all SG60 and SG80 issues are being met. The first issue of SG100 is met with the EFH process which applies to actions (such as fisheries) that could adversely impact the habitat and with the implementation of a program of MPAs. The second issue of SG100 is met through the Habitat Sections of the FMPs and by the reviews and evaluations that are an integral part of Amendments to the FMPs. The third issue is not met as the evidence is descriptive and circumstantial.

US Acadian Redfish/Pollock/Haddock Fishery Rationale

There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. Recognizing the vulnerability of certain habitats, Amendment 13 to the Northeast Multispecies FMP and Amendment 10 of the Atlantic Sea Scallop FMP established year-round habitat closed areas which are off-limits to all mobile, bottom-tending gear like trawls and dredges These closures were designed to minimize the adverse effects of fishing on Essential Fish Habitat (EFH) for species managed by the NEFMC. In many cases, these closed areas overlap portions of the groundfish mortality closures. However, in other cases (Jeffreys Bank in the Gulf of Maine and the area southeast of Nantucket Island) they do not.

The NEFMC developed the ongoing Omnibus Essential Fish Habitat Amendment 2 (OA2) to go beyond Amendment 13 to evaluate existing habitat management areas and develop new habitat management areas.(NEFMC 2014b). Included in the Habitat Amendment are several types of habitat management areas:

Essential Fish Habitat and Habitat Area of Particular Concern (HAPC) designations are based on species-specific distributions and life-history information, and are used primarily for analytical approaches in impact analyses and agency consultations.

Spatial management areas (HMAs) contain habitats of importance to multiple species, are vulnerable to impacts from fishing, and as such, could be subject to gear restrictions for conservation purposes on the basis of gear type. Three types of spatial management areas are being proposed in the Habitat Amendment, year-round habitat management areas and dedicated habitat research areas; and groundfish seasonal spawning areas.
Score 80

There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. The NEFMC has made progress toward final implementation of the Omnibus Habitat Amendment and in April 2015 approved the following:

- EFH designations were specified for all managed species and life stages
- HAPC designations were approved for six nearshore/continental shelf areas, two seamounts, and eleven submarine canyons or groups of canyons.
- Closed areas, or gear restrictions were approved for several HMAs in the Eastern and Central GOM.
- The remaining actions proposed in OA2 are to be reviewed for approval at the June NEFMC meeting.

There is some evidence that the partial strategy is being implemented successfully. Final approval for implementation of OA2 is pending further NEFMC and NMFS approval. Habitat conservation measures already in place include two types of year-round closures: the habitat closure areas and groundfish closures. The habitat closure areas restrict mobile bottom-tending gears. The groundfish closures restrict all gears capable of catching groundfish. In addition seasonal area closures are used to protect spawning fish, but concurrently may reduce overall impact on bottom habitats.
Score 80

There is some evidence that the strategy is achieving its objective. The NEFMC Habitat Plan Development Team (PDT) developed an analytical approach to characterize and map habitats and to assess the extent to which different habitat types are vulnerable to different types of fishing activities (Grabowski et al. 2014). This effort, termed the Swept Area Seabed Impact (SASI) approach, includes a quantitative, spatially-referenced model that overlays fishing activities on habitat through time to estimate both potential and realized adverse effects to EFH. (http://www.nefmc.org/habitat/sasi_info/110121_SASI_Document.pdf. Outputs from this model were incorporated into OA2 discussed above, and some areas designated for protection were recently approved by the Council. Others will be reviewed for approval in June. Some stakeholders have opined that OA2 should go further to protect some habitats (Kaufman et al. 2014). However The SASI modelling approach to quantify habitats and gear impacts is unique for the NEFMC and probably for the Fishery Management Councils as a whole, and potentially represents a major step forward in habitat protection.
Score 100
CAB decision: No changes in scoring

Performance indicator 2.43: Habitat Information Monitoring

SD OTB Fishery Rationale
Both scoring issues under SG 60 are met. The distribution of habitat types is known over their range and vulnerable habitat types are defined in the EFH process (SG80 first issue) while the EFH process satisfies the 2nd and 3rd issues under SG80. Through the EFH initiatives, the distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. As such, the first scoring issue of SG100 is met. More work needs to be done to fully characterize habitat distributions and changes over time as well as quantitatively evaluate impacts. Accordingly, the second and third issues under SG100 are not met.
Score: for all UoCs: 85

US Acadian Redfish/Pollock/Haddock Fishery Rationale
All 3 SG80 items scored and all but one SG100 item was scored for an overall scoring of 95.

Benthic habitats have been well-studied in the GOM and GB, and have been described in detail Stevenson et al. (2004). The most common groups of benthic invertebrates reported by Theroux and Wigley (1998) in terms of numbers collected were annelid worms, bivalve mollusks, and amphipod crustaceans. Bivalves, sea cucumbers, sand dollars, annelids, and sea anemones dominated biomass. Watling (1998) identified seven different bottom assemblages that occur on the following habitat types:
1. Sandy offshore banks: fauna are characteristically sand dwellers with an abundant interstitial component;
2. Rocky offshore ledges: fauna are predominantly sponges, tunicates, bryozoans, hydroids, and other hard bottom dwellers;
3. Shallow [<197 ft. (60 m)] temperate bottoms with mixed substrate: fauna population is rich and diverse, primarily comprised of polychaetes and crustaceans;
4. Primarily fine muds at depths of 197 to 459 ft. (60 to 140 m) within cold Gulf of Maine Intermediate Water: fauna are dominated by polychaetes, shrimp, and cerianthid anemones;
5. Cold deep water, muddy bottom: fauna include species with wide temperature tolerances which are sparsely distributed, diversity low, dominated by a few polychaetes, with brittle stars, sea pens, shrimp, and cerianthids also present;
6. Deep basin, muddy bottom, overlaying water usually 45 to 46 °F (7 to 8°C): fauna densities are not high, dominated by brittle stars and sea pens, and sporadically by tube-making amphipods
7. Upper slope, mixed sediment of either fine muds or mixture of mud and gravel, water temperatures always greater than 46 °F (8°C): upper slope fauna extending into the Northeast Channel.
Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.

The Swept Area Seabed Impact (SASI) approach, includes a quantitative, spatially-referenced model that overlays fishing activities on habitat through time to estimate both potential and realized adverse effects to EFH (Grabowski et al 2014). (http://www.nefmc.org/habitat/sasi_info/110121_SASI_Document.pdf). The spatial domain of the SASI model is US Federal waters (between 3-200 nm offshore) from Cape Hatteras to the US-Canada border Within this region, habitats were defined based on natural disturbance regime and dominant substrate. The dominant substrate map was composed of thousands of visual and grab sample observations , with grid size based on the spacing of the observations. One of the outputs of the model is habitat vulnerability, which is related in part to the characteristics of the habitat itself, and part to the quality of the impact. Because of a general need for attachment sites, epifauna that provided a sheltering function for managed species tend to be more diverse and abundant in habitats containing larger grain sized substrates. Structurally complex and/or long-lived epifaunal species are more susceptible to gear damage and slower to recover. Recovery rates were assumed to be retarded in low energy areas, such that overall vulnerability (susceptibility + recovery) of low energy areas is greater than high energy areas, other factors being equal. When combined with the underlying substrate and energy distribution, the susceptibility and recovery scores assigned to the inferred mix of epifaunal and geological features generated a highly patchy vulnerability map. Locations where high proportions by area map out as cobble-dominated or cobble- and boulder-dominated tended to show higher vulnerability scores.

Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).

Changes in habitat distributions over time are measured. The NEFSC research priorities and ongoing programs include:
Conducting ongoing integrated habitat assessments within the Northeast LME to meet emerging management needs and mandates. Maintaining data and sample collection and processing, and analytical capabilities to support habitat assessments for fish, invertebrates, marine mammals, and sea turtles (NEFSC 20009a,b).

CAB decision: No changes in scoring.

PIs 2.5.1, 2.5.2 and 2.5.3: Ecosystem Outcome, Management and Information

PI 2.5.1

SD OTB Fishery Rationale

Both issues of SG 60 are met as are the five issues of SG 80 and the first three issues of SG100. Information is adequate to broadly understand the key elements of the ecosystem, as illustrated by NOAA (2007a) which outlines SD's role as predator in the food web. The main interactions between the fishery and the ecosystem can be inferred from existing information and have been investigated (NOAA 2007a, Link 2002). The impacts of the fishery on target, bycatch, retained and ETP species are identified (see 2.1.1, 2.2.1, 2.3.1) and the main functions of these components in the ecosystem are understood (Link 2002; ICES 2010; see also 2.1.3, 2.2.3, 2.3.3). The fourth and fifth issues of SG100 are not met. Due to the complexity of the ecosystem elements at play, the information available is not sufficient to allow the main consequences for the ecosystem to be inferred. Accordingly, the information available is not sufficient to support the development of strategies to manage ecosystem impacts.

Score for all UoCs 90

US Acadian Redfish/Pollock/Haddock Rationale

Information is adequate to broadly understand the key elements of the ecosystem. The Northeast U.S. Continental Shelf Large Marine Ecosystem (NESLME) (Sherman et al. 1996) is one of the most studied marine ecosystems in the world (NEFSC 2009b). In addition bottom trawl fishery interactions with this ecosystem have been documented at several levels (Brown et al. 2010, Byron and Link 2010, Garrison 2000 a,b, Garrison and Link 2000 a,b, Grabowski et al. 2014, Link and Garrison 2002, Nye et al. 2009, NEFSC 2009b,) and continue to be monitored at the NEFSC (Fogarty 2014). **Score 80**

Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail. Fisheries interactions with this ecosystem have been documented at several levels and are well known (Brown et al. 2010, Byron and Link 2010, Garrison 2000a,b, Garrison and Link 200a,b, Grabowski et al. 2014, Link and Garrison 2002, Nye et al. 2009, NEFSC 2009b,) and continue to be monitored at the NEFSC (Fogarty 2014). However because of changing species composition and abundance associated with fisheries, and significant climate change effects on species distributions and recruitment, the ecosystem is ever-changing and dynamic (Friedland *et al*. 2008, Mills et al. 2013), and thus the fishery does not score 100.

The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. These elements must be addressed in FMPs under M/S (MAFMC 2014, NEFMC 2009a, NEFMC 2015) and ecosystem functions have been documented in NEFSC (2009b). . > 100c is not met because the ecosystem is dynamic and ever changing because of fishery and other effects on dominant species composition. For instance whereas earlier studies have suggested that spiny dogfiah are not a major competitor with cod, a very recent work (Morgan and Sulikowski 2015) has contradicted this notion. **Score 80.**

Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred. The Northeast U.S. Continental Shelf Large Marine Ecosystem (NESLME) (Sherman et al. 1996) is one of the most studied marine ecosystems in the world (NEFSC 2009b). In addition, trawl fisheries interactions with this ecosystem have been documented at several levels (Brown et al. 2010, Byron and Link 2010, Garrison 2000a,b, Garrison and Link 2000 a,b, Grabowski et al. 2014, Link and Garrison 2002, Nye et al. 2009, NEFSC 2009b,) and continue to be monitored at the NEFSC (Fogarty 2014). The fishery does not score 100 because the ecosystem is not static, but dynamic because of climate change (Friedland *et al*. 2008, Mills et al. 2013), and changing trophic interactions because of overfishing (Morgan and Sulikowski 2015). **Score 80**

Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). Ecosystem information for this fishery is collected by and resides in the NEFSC which continues to conduct integrated ecosystem assessments and supporting ecosystem–based management within the Northeast LME to meet emerging management needs and mandates including assessing ecosystem impacts by this fishery (NEFSC 2009b).

CAB decision: No changes in scoring

Principle 3

On principle 3 the performance indicators scores were comparable for both units of certification. There was a difference of 10 or more points on 3 performance indicators. There were no conditions found for these fisheries. There was no need to harmonize results.

Table 10. Comparison of P3 performance indicators by the two overlapping fisheries. Rows highlighted in orange are PIs that conditions were set by the CABs evaluating this fishery. Numbers highlighted in red are scores that differed by 10 points or more.

PI	US Atlantic Spiny Dogfish OTB Fisheries	US Acadian Redfish OTB Fisheries
3.1.1	90	95
3.1.2	100	100
3.1.3	100	100
3.1.4	80	100
3.2.1	100	100
3.2.2	90	100
3.2.3	80	85
3.2.4	100	100
3.2.5	100	90

PI 3.1.4: Incentives for sustainable fishing

SD OTB Fishery Rationale

The system provides for such elements as:

- reducing information gaps and uncertainties for fishers;
- strategic management planning that gives certainty about the rules and goals of management; mechanisms and opportunities, through the consultation procedures, to gain support for the management system from fishers;
- clarifies roles, rights and responsibilities of the various stakeholders; and a participatory approach to management, research and other relevant processes,

Consequently, it may be considered that the management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2. In the overall approach to fisheries management in the U.S.

It is considered that no perverse incentives exist that would cause fishermen to harvest stocks in an unsustainable way. At the same time, the auditors have not seen evidence that incentives have been considered explicitly; accordingly a score of 80 may only be awarded for this PI. This is applicable to all three federal UoCs.

In scoring this PI, one issue that the auditors considered was the meaning of the term “perverse incentives”. In the MSC FAM this is defined as “incentives for fishers to fish unsustainably, and that the system is seeking to ensure that perverse incentives do not arise. For instance, management systems should not include subsidies that obviously contribute to unsustainable fishing. Since there is not yet international agreement on what actions should be considered subsidies and which of these may be considered “good” or “bad” under different circumstances, certification bodies should not attempt to identify and classify all subsidies in the fishery under evaluation. Instead, they should only take note of any issues that are quite clearly and obviously perverse incentives that are contributing to, or have significant potential to contribute to unsustainable fishing”. The issue for consideration reflects the nature of the fishery i.e. market demand is for loins of a certain size and these are only available from individuals > 80 cm which is almost exclusively the females. As has been shown in the past, the targeting of females

led to unsustainable fishing, with a skewing of the sex ratio, reduced average sizes and lower reproduction. At one time also, the SD fishery was considered by some as an "exit" fishery i.e. an objective was to fish down the resource as a high population of SD was thought to be detrimental to the recovery in the populations of other ground fish species. These issues appear to be no longer applicable and thus have not been taken into consideration in scoring this PI.

US Acadian Redfish/Pollock/Haddock Rationale

The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.

Statutory management planning by the Council gives certainty about the rules and goals of management in accordance with principles of sustainability, meeting the SG60 and SG80 scoring issues.

Planning Development Team (PDT) of Council conducts a regular review of the management plan to determine if objectives are being met. Action is taken through amendments to the Multispecies Fishery Management Plan and the FW process and incentives for sustainable fishing are explicitly considered through Accountability Measures including reductions in fishing effort in subsequent years if the Annual Catch Limit is exceeded, meeting the requirements of the SG100 scoring issue.

CAB decision: No changes in scoring

PI 3.2.2 Fishery specific management system Decision making processes

SD Dogfish OTB Fishery Rationale

Federal
Within the MAMFC and NEFMC there are established decision making processes, through the Councils, advisory groups, teams and committees with the explicit need for public consultation. Membership of the councils extends to cross cutting issues with the USFWS and the coast guard. There is a specific committee for SD while others deal with such aspects as law enforcement, ecosystems, protected resources and research. Advisory Panels consist of recreational and commercial fishermen, charter boat operators, buyers, sellers, environmentalists and consumers who are knowledgeable about fishery issues. There are public meetings and written comments are allowed. All meetings are reported on the respective web sites. The output of this process is amendments to the fishery management framework as required and the definition of the annual management regulations. The use of the precautionary approach is implicit in the MSRA. One of the National Standards is that "Conservation and management measures shall be based upon the best scientific information available". Formal reporting is required.

State
Within the ASMFC, each State is represented. The SDCSMB is generally responsible for carrying out all activities under the FMP. It is supported by a range of committees, teams and advisory panels. There is wide consultation of the public. A draft FMP, an amendment and its approval, and an emergency action require a minimum of four public hearings, including at least one in each state that specifically requests a hearing. Public comments are evaluated and considered prior to deciding what modifications will be made to the draft FMP or amendment, or draft final FMP or amendment, and prior to approval of the FMP or amendment. The use of the precautionary approach is implicit in the ACFMA. One of the standards is "conservation programs and management measures shall be based on the best scientific information available". Formal reporting is required.

US Acadian Redfish/Pollock/Haddock OTB Fishery Rationale

There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.

The decision making process in management of the multi-species fishery follows the terms of the Magnuson-Stevens Act (2007), which requires managers to follow a process of assessment every two years of scientific information, evaluation of alternatives, public consultation, public documentation and decision according to a prescribed schedule.

There is a well-established decision-making process prescribed by legislation that follows specific objectives of F_{MAX} and F_{TARGET} guided by the precautionary approach, meeting the scoring issues of SG60 and SG80.

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.

The Council website provides formal reporting to all stakeholders of all meetings, background planning documents, analysis of alternatives, public comments and responses and decisions.

In addition to the process conducted every two years, if the Secretary of NMFS finds that an emergency or overfishing exists or that interim measures are needed to reduce overfishing for any fishery, he may promulgate emergency regulations or interim measures necessary to address the emergency or overfishing. Proposed emergency regulations are subject to a public comment period upon being published in the Federal Register.

The publication of Amendment 17 to the Multi-Species Fishery Management Plan (nefmc.org) provides evidence of a decision making process that responds 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, meeting the SG100 scoring issue.

Decision-making processes use the precautionary approach and are based on best available information.

Decisions are guided by a precautionary approach including F_{MAX} and F_{TARGET} and application of objectives to protect essential fish habitat and habitat of particular concern, consistent with MSC Principles 1 and 2, meeting this SG80 scoring issue.

Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

The process of evaluation of options in Amendment 17 and the record of all input, discussion and analysis indicates a system that responds to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. All information is reported to interested stakeholders through the comprehensive website of the NEFMC, meeting the SG100 scoring issue.

The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.

The management system is held accountable by law to the articles of the Magnuson Stevens Act (2007), meeting the SG60 scoring issue and works proactively through the NEFMC to ensure public comment is fully aired and considered in the development of fishery management actions of the Northeast Multispecies Management Plan. The system is tested through its public responses to stakeholders and actions are revised as a result of lawsuits, when needed, but Council works proactively to avoid court action by first addressing issues at public hearings, meeting the SG100 scoring issue.

CAB Decision: No changes in Scoring

Area of Assessment Considered	Outcome of Harmonization for USA Acadian Redfish/Haddock/Pollock OTB Fisheries and US Atlantic Spiny Dogfish OTB Fisheries
Assessment trees	The initial assessment for SFA and CASE followed MSC v. 1.3 procedure and utilized the Default Assessment Tree as described in MSC FAM and according to TAB D0-15. There is consistency in the general outcome of both initial assessments with respect to the award of certification and the areas where the fishery is performing below the required 80% pass requirement.
Conditional scores	No conditional scores
Conditions set	No conditions set
Conclusion	In evaluating the conditions, action plans and outcome of the reassessment for US Spiny Dogfish OTB fisheries and the assessment of US Acadian Redfish/Pollock/Haddock OTB fisheries, there are no changes to be made on the current assessment.

5.2. Previous assessments

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

5.3. 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 31 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.

Criteria

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within the specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

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.

Criteria

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at genetic, species or population levels and avoids or minimizes mortality of, or injuries to endangered, threatened or protected species.
3. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within the specified time frame.

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.

Management system criteria

1. The fishery shall not be conducted under controversial unilateral exemption to an international agreement.

The management system shall:

2. Demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishery-dependent communities shall be addressed as part of this process.
3. Appropriate to cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedure for implementation and a process for monitoring and evaluating performance and acting on findings;
4. Observe the legal and customary and long term interests of people dependent on fishing for food and livelihoods, in a manner consistent with ecological sustainability;
5. Incorporate an appropriate mechanism for the resolution of disputes arising within the system;
6. Provide economic and social incentives that contributes to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing;
7. Act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty;
8. Incorporate a research plan - appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interest parties in a timely fashion;
9. Require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted;

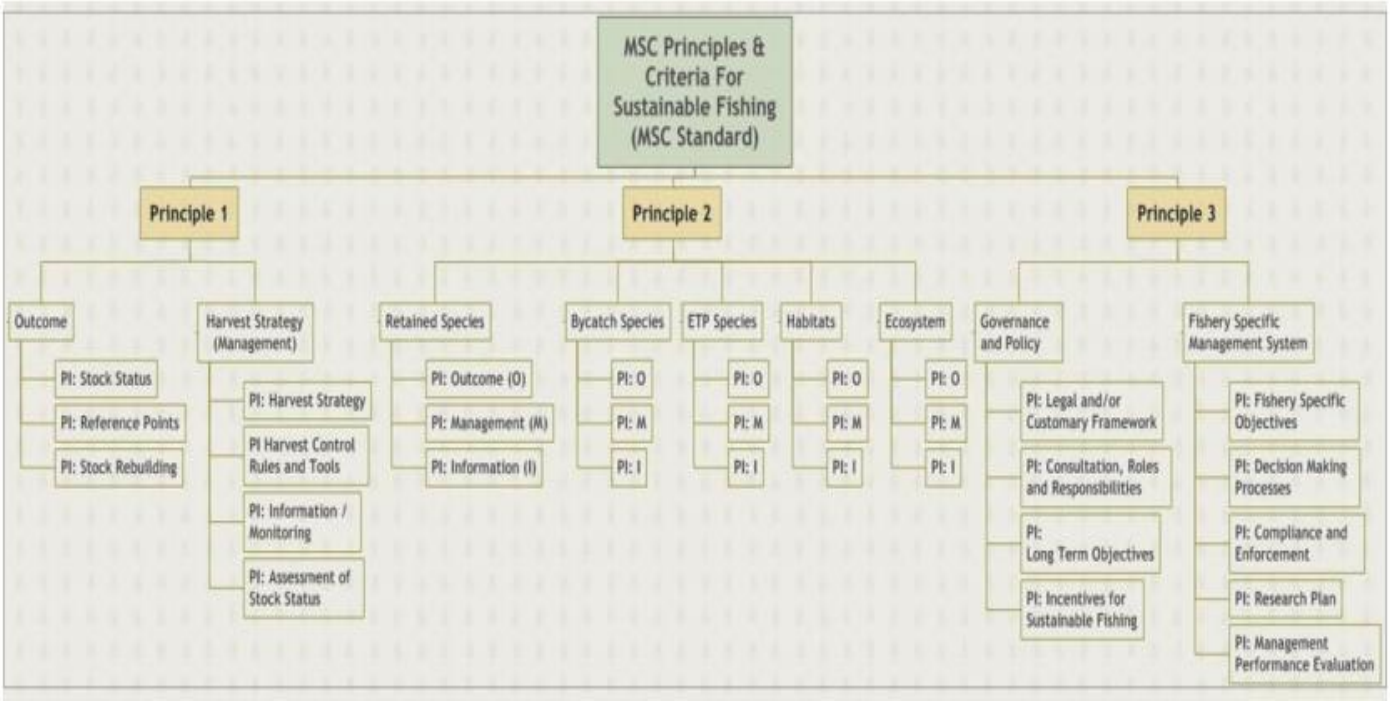
10. Specify measures and strategies that demonstrably control the degree of exploitation of the resource;
11. Contains appropriate procedures to effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

Operational criteria

Fishing operations shall:

12. 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;
13. implement appropriate fishing methods designed to minimize adverse impacts on habitat, especially in critical and sensitive zones such as spawning and nursery areas;
14. not use destructive fishing practices such as fishing with poisons or explosives;
15. minimize operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.;
16. be conducted in compliance with the fishery management system and all legal and administrative requirements; and,
17. 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.

MSC Current Scheme Documents	Version
MSC Fishery Standard - Principles and Criteria for Sustainable Fishing	1.1
MSC Certification Requirements	1.3
Guidance to MSC Certification Requirements	1.3
MSC Guidance to Certification Bodies on Stakeholder Consultation in Fishery Assessment	2
MSC Full Assessment Reporting Template	1.3
MSC PSA Worksheet	1.1



5.4. Evaluation Processes and Techniques

5.4.1. Site Visit

Initial consultation meetings were held in different towns in Massachusetts: Gloucester, Newburyport, Woods Hole, and Boston in February 2015. 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 the Acadian Redfish/Haddock/Pollock otter trawl fisheries resources. The consultation meetings were designed to be inclusive of all organizations and representatives of the Acadian Redfish/Haddock/Pollock otter trawl fisheries. However, the consultation plan was designed to strategically capture sufficient information to ensure understanding and confidence with respect to full assessment scoring.

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 Massachusetts are recorded in Table 11 and 12.

5.4.2. Consultations

Public announcements of the progression of the full assessment were made as follow:

Table 11. Stakeholder consultation process.

Date	Purpose	Media
12/11/2015	Fishery Enters assessment	Notification on MSC website Direct email/letter
12/11/2015	Assessment Team Nomination	Notification on MSC website
12/22/2015	Assessment Team Confirmation	Notification on MSC website
1/15/2015	Default assessment Tree	Notification on MSC website
1/22/2015	Site Visit Scheduled	Notification on MSC website Direct email/letter
4/16/ 2015	Stakeholder Notification: Peer reviewers proposed	Notification on MSC website Direct email/letter
6/23/2015	Stakeholder Notification: Peer reviewers confirmed	Notification on MSC website Direct email/letter
6/23/2015	Revised timeline announcement	Notification on MSC website Direct email/letter
8/18/2015	Revised timeline announcement	Notification on MSC website Direct email/letter
12/3/ 2015	Variation request: Delayed PCDR	Notification on MSC website Direct email/letter

12/3/ 2015	Variation response: Delayed PCDR	Notification on MSC website Direct email/letter
12/3/ 2015	Stakeholder Notification: Additional stakeholder information submission period	Notification on MSC website Direct email/letter
12/22/ 2015	Revised timeline announcement	Notification on MSC website Direct email/letter

Table 12. Meetings with the following management and scientific organizations of the Acadian Redfish/Haddock/Pollock Otter Trawl Fisheries during February 23-28, 2015.

Organization	Attendees	Location	Date
MA/DMF/ NEFMC	David Pierce	Boston, MA	Feb 23, 2015
Sustainable Groundfish Association, Inc.	Kristian Kristensen Jerry McCarthy	Gloucester, MA	February 24, 2015
NMFS/GARFO Sustainable Fisheries Division	Sara Heil Greg Power	Gloucester, MA	February 24, 2015
NEFSC	Tom Nies Jamie Cournane	Newburyport, MA	February 25, 2015
SMAST	Pinguo He Michael Pol	Dartmouth, MA	February 25, 2015
NMFS NEFSC Population Dynamics Branch	Brian Linton Liz Brooks Mike Palmer	Newburyport, MA	February 26, 2015
Sustainable Groundfish Association, Inc.	Kristian Kristensen Jerry McCarthy	Gloucester, MA	February 27, 2015

5.4.3 Evaluation Techniques

Each PI under each Principle is weighted so that each of the three Principles is equal to one other.

At the Level of the Performance Indicator, the performance of the fishery is assessed as a 'score'. In order for the fishery to achieve certification, an overall weighted average score of 80 is necessary for each of the three Principles and no Indicator should score less than 60. Accordingly, 100 represents a theoretically ideal level of performance and 60 a measureable shortfall.

The Scoring Guideposts (SGs) identify the level of performance necessary to achieve 100, 80 (a pass score), and 60 scores for each Performance Indicator.

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

- 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[4] 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):

[4] Scoring issues: The different parts of a single scoring guidepost, where more than one part exist covering related but different topics.

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

Table 13. Weights assigned to each component and PI within the Assessment tree structure.

Principle	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle		
One	1	Outcome	0.5	1.1.1	Stock status	Either 0.5	0.25	Or 0.333	0.1667
				1.1.2	Reference points	0.5	0.25	0.333	0.1667
				1.1.3	Stock rebuilding			0.333	0.1667
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125		
				1.2.2	Harvest control rules & tools	0.25	0.125		
				1.2.3	Information & monitoring	0.25	0.125		
				1.2.4	Assessment of stock status	0.25	0.125		
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667		
				2.1.2	Management	0.333	0.0667		
				2.1.3	Information	0.333	0.0667		
		By-catch species	0.2	2.2.1	Outcome	0.333	0.0667		
				2.2.2	Management	0.333	0.0667		
				2.2.3	Information	0.333	0.0667		
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667		
				2.3.2	Management	0.333	0.0667		
				2.3.3	Information	0.333	0.0667		
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667		
				2.4.2	Management	0.333	0.0667		
				2.4.3	Information	0.333	0.0667		
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667		
				2.5.2	Management	0.333	0.0667		
				2.5.3	Information	0.333	0.0667		
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125		
				3.1.2	Consultation, roles & responsibilities	0.25	0.125		
				3.1.3	Long term objectives	0.25	0.125		
				3.1.4	Incentives for sustainable fishing	0.25	0.125		
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1		
				3.2.2	Decision making processes	0.2	0.1		
				3.2.3	Compliance & enforcement	0.2	0.1		
				3.2.4	Research plan	0.2	0.1		
				3.2.5	Management performance evaluation	0.2	0.1		

6. Traceability

6.1 Eligibility Date

In accordance with CR Requirements CR 27.6 MSC product eligibility date may be up to a maximum 6 months prior to the publication of the Public Comment Draft Report (PCDR). The client representative has indicated the client member group desires to have the opportunity, if they so wish, to take full advantage of this 6 month period. The initial proposed target eligibility date was February 2015 as the PCDR was initially scheduled to be published in August 2015. The most recent stakeholder announcement amended this due to revised assessment timelines, to a target eligibility date of September 2015. The PCDR is now published on March 17th 2016 and therefore the actual eligibility date will be September 17th 2015, 6 months prior to PCDR publication.

There is no risk of loss in the traceability, segregation and identification systems. There are operational controls that identify the fishery of origin for all landed US Acadian redfish/pollock/haddock. The regulatory requirements include mandatory logbook completion prior to catch landing (i.e. vessel name, CFV number, estimated catch on-board, location of catch, port of landing, date, and number of trawl nets fished), a daily trip limit. As purchase slips contain the date of purchase and harvester logbooks contain the date of catch, the fishery and trade system can differentiate product from that sold prior to September 17th 2015 and that sold from that date onwards. Therefore, the target eligibility date is for product sold from the client group from September 17th 2015 onwards.

6.2 Traceability within the Fishery

6.2.1 Introduction

This report deals only with the harvesting of US Acadian Redfish/Pollock/Haddock at the point of landing, and not beyond processing which constitutes the first step in the chain-of-custody process. All US Acadian redfish/pollock/haddock harvested by the registered fleet of approximately 50 vessels operating from Gulf of Maine, and Georges Bank will be eligible to display the MSC logo. However, only those companies that have a certificate sharing arrangement with the client group, the Sustainable Groundfish Association, Inc. may carry the MSC label and claim forward through the MSC chain of custody.

6.2.2 Traceability within the fishery

The unit of certification includes all US Acadian redfish, pollock and haddock landed by the US fishing fleet using trawl fishing gear. The catch and location of catch are monitored by logbook, VMS, fish dealer slips, sector managers, observers and fishery officers. Therefore, it is certain that Chain of Custody requirements in the fishery will extend to landing at the wharf. At that point, fish are sold to fish dealers and off loaders working on behalf of fish processors.

6.2.3. Findings

The findings of the Assessment Team are that a credible catch monitoring program takes place during harvesting and offloading operations to identify the fishery of origin for all landed US Acadian redfish/pollock/haddock. The regulatory requirements include mandatory logbook completion prior to catch landing (i.e. vessel name, CFV number, estimated catch on-board, location of catch, port of landing, date, and number of trawl nets fished), a daily trip limit. These requirements would be sufficient to allow a future Chain of Custody to be established from the point of landing forward.

At-sea Processing and Transhipment
Most of the US Acadian redfish is landed fresh whole round and pollock/haddock are landed fresh gutted. Some is landed frozen head-off gutted. There is no filleting at sea. There is also no at-sea processing per se. The identity of the species therefore can be easily established at point of landing. The catch must be logged by the receiving vessel in accordance with the regulatory requirements noted previously. There is no transhipment at sea.

Points of landing
The list of landing places is numerous and must be defined as any landing place in New England (from Maine to Connecticut) states covered by the certificate that are approved for landing by Federal and State authorities. The list of permitted dealers may be found at http://www.nero.noaa.gov/permits/data/ which shows the base port.
Products landed by any of the vessels listed and landed in the nominated states are eligible to enter further chain of custody. The sale of certified US Acadian redfish/pollock/haddock is limited to members of the client group.

6.3 Eligibility to Enter Further Chains of Custody

The fishery's management system is sufficient to allow a Chain of Custody to be established from the point of landing forward for all redfish, pollock and haddock harvested from the US Acadian redfish/pollock/haddock fisheries. MSC chain of custody certifications were not carried out in this assessment, and therefore, will need to be undertaken on a separate and individual basis for those entities that may wish to identify and/or label products derived from the fisheries.

The client group has determined that for chain of custody purposes, the point of landing at each designated port will also be the point of first sale. This is the point at which ownership passes from the licence holder to an onshore operator. The group has identified 2 types of onshore operators: (i) plants with their own buyers, and (ii) independent buyers under commission to deliver raw material to specific plants for processing.

All licence holders/harvesters in the New England region will be eligible to land MSC-certified US Acadian redfish/pollock/haddock and any onshore enterprise will be eligible to acquire US Acadian redfish/pollock/haddock as MSC-certified provided the enterprise is a named member of the client group and has successfully undergone a Chain of Custody assessment.

It is understood that beginning on September 1, 2015, any under-assessment product from the US Acadian redfish/pollock/haddock fisheries must be handled in accordance with section 5.6 of the MSC CoC Standard v4.0, which states:

- Under-assessment products shall be clearly identified and segregated from certified and non-certified products;
- The organization shall maintain full traceability records for all under-assessment product, demonstrating traceability back to the unit of certification and including the date of harvest; and
- Under-assessment products shall not be sold as certified or labelled with the eco-label, logo, or trademarks until the source fishery or farm is certified.

Main Risks to Chain-of-Custody at Landing

The fishery's management system, its supporting regulatory requirements and compliance program for US Acadian redfish/pollock/haddock is such that the risk associated with any mixing of certified and non-certified product before the point of landing is considered to be extremely low. Theoretically, there could be some risk associated with US Acadian redfish/pollock/haddock caught outside the units of certification, but the reporting and monitoring obligations described previously are considered to be sufficient to discern the origin of the fish caught. There are virtually no trips that fish for species other than groundfish stocks outside Gulf of Maine or Georges Bank (in US waters) during the same trip as they fish for within those areas. All vessels licensed to fish US Acadian redfish/pollock/haddock in the UoC are covered by the certification. US Acadian redfish/pollock/haddock catch of all vessels licensed to participate in the groundfish fishery in the areas of certification are covered by the fisheries' certificate. Only catch that is purchased by companies in the Client Group is covered by CoC certificates.

Entities included in the Fishery Certificate

When the Sustainable Groundfish Association, Inc. is granted successful MSC certification, the following members will be MSC-certified as a sustainable and well managed fishery, and products from this fishery would be eligible for the MSC eco-label.

- Cape Ann Seafood Exchange, Inc.

The sale of certified US Acadian redfish/haddock/pollock is limited to members of the client group "Sustainable Groundfish Association, Inc"

7. Evaluation Results

The Acadian Redfish/Haddock/Pollock 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 indicator. Scores achieved in each Principle and for each Performance Indicator are shown in Tables 13-16, respectively.

Although the assessment team found the UoC in overall compliance, it also found the performance of the US Acadian Redfish/Haddock/Pollock fishery on 2 PIs (PI 2.1.1 Retained species outcome, PI 2.1.2 Retained Species management) to be below the established compliance mark. Therefore, two 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. Also, a full explanation of how the client intends to meet these conditions is provided in the Client Action Plan in Appendix 1.3.

7.1. Principle level score

See below

7.2. Summary of Scores

Score assigned to PIs are shown below.

Acadian Redfish UoC 1

The performance of the US Acadian Redfish Otter Trawl Fisheries in relation to MSC Principles 1, 2 and 3 is shown in Table 13 and summarised below:

Principle 1 - Target species	97.5
Principle 2 - Ecosystem	86
Principle 3 – Management	96.9

This fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any PI.

This fishery attained a score below 80 against two of the PIs. This has led to conditions to certification being raised. Once these conditions have been satisfied these PIs will be re-scored.

Table 13. Performance Indicators scoring assigned to the UoC 1 Acadian Redfish Otter Trawl Fishery.

Principle	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle	Score
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	100
				1.1.2	Reference points	0.5	0.25	100
				1.1.3	Stock rebuilding	0.333	0.1667	
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125	95
				1.2.2	Harvest control rules & tools	0.25	0.125	95
				1.2.3	Information & monitoring	0.25	0.125	90
				1.2.4	Assessment of stock status	0.25	0.125	100
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667	75
				2.1.2	Management	0.333	0.0667	75
				2.1.3	Information	0.333	0.0667	95
		By-catch species	0.2	2.2.1	Outcome	0.333	0.0667	95
				2.2.2	Management	0.333	0.0667	95
				2.2.3	Information	0.333	0.0667	95
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667	90
				2.3.2	Management	0.333	0.0667	90
				2.3.3	Information	0.333	0.0667	80
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667	80
				2.4.2	Management	0.333	0.0667	85
				2.4.3	Information	0.333	0.0667	95
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667	80
				2.5.2	Management	0.333	0.0667	80
				2.5.3	Information	0.333	0.0667	80
Three	1	Governance And policy	0.5	3.1.1	Legal & customary framework	0.25	0.125	95
				3.1.2	Consultation, roles & responsibilities	0.25	0.125	100
				3.1.3	Long term objectives	0.25	0.125	100
				3.1.4	Incentives for sustainable fishing	0.25	0.125	100
		Fishery specific management System	0.5	3.2.1	Fishery specific objectives	0.2	0.1	100
				3.2.2	Decision making processes	0.2	0.1	100
				3.2.3	Compliance & enforcement	0.2	0.1	85
				3.2.4	Research plan	0.2	0.1	100
				3.2.5	Management performance evaluation	0.2	0.1	90

UoC 2 Pollock

The performance of the US Atlantic Pollock OTB fishery (UoC2) in relation to MSC Principles 1, 2 and 3 is shown in Table 14 and summarised below:

Principle 1 - Target species	97.5
Principle 2 - Ecosystem	86
Principle 3 – Management	96.9

This fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any PI.

Table 14. Performance Indicators scoring assigned to the UoC 2 Pollock Otter Trawl Fisheries

Principle	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle	Score
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	100
				1.1.2	Reference points	0.5	0.25	100
				1.1.3	Stock rebuilding	0.333	0.1667	
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125	95
				1.2.2	Harvest control rules & tools	0.25	0.125	95
				1.2.3	Information & monitoring	0.25	0.125	90
				1.2.4	Assessment of stock status	0.25	0.125	100
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667	75
				2.1.2	Management	0.333	0.0667	75
				2.1.3	Information	0.333	0.0667	95
		By-catch species	0.2	2.2.1	Outcome	0.333	0.0667	95
				2.2.2	Management	0.333	0.0667	95
				2.2.3	Information	0.333	0.0667	95
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667	90
				2.3.2	Management	0.333	0.0667	90
				2.3.3	Information	0.333	0.0667	80
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667	80
				2.4.2	Management	0.333	0.0667	85
				2.4.3	Information	0.333	0.0667	95
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667	80
				2.5.2	Management	0.333	0.0667	80
				2.5.3	Information	0.333	0.0667	80
Three	1	Governance And policy	0.5	3.1.1	Legal & customary framework	0.25	0.125	95
				3.1.2	Consultation, roles & responsibilities	0.25	0.125	100
				3.1.3	Long term objectives	0.25	0.125	100
				3.1.4	Incentives for sustainable fishing	0.25	0.125	100
		Fishery specific management System	0.5	3.2.1	Fishery specific objectives	0.2	0.1	100
				3.2.2	Decision making processes	0.2	0.1	100
				3.2.3	Compliance & enforcement	0.2	0.1	85
				3.2.4	Research plan	0.2	0.1	100
				3.2.5	Management performance evaluation	0.2	0.1	90

GOM Haddock UoC 3

The performance of the Gulf of Maine Haddock OTB Fishery in relation to MSC Principles 1, 2 and 3 is shown in Table 15 and summarised below:

Principle 1 - Target species	97.5
Principle 2 - Ecosystem	86
Principle 3 – Management	96.9

This fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any PI.

Table 15. Performance Indicators scoring assigned to UoC 3 the GOM Haddock Fishery.

Principle	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle	Score
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	100
				1.1.2	Reference points	0.5	0.25	100
				1.1.3	Stock rebuilding	0.333	0.1667	
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125	95
				1.2.2	Harvest control rules & tools	0.25	0.125	95
				1.2.3	Information & monitoring	0.25	0.125	90
				1.2.4	Assessment of stock status	0.25	0.125	100
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667	75
				2.1.2	Management	0.333	0.0667	75
				2.1.3	Information	0.333	0.0667	95
		By-catch species	0.2	2.2.1	Outcome	0.333	0.0667	95
				2.2.2	Management	0.333	0.0667	95
				2.2.3	Information	0.333	0.0667	95
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667	90
				2.3.2	Management	0.333	0.0667	90
				2.3.3	Information	0.333	0.0667	80
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667	80
				2.4.2	Management	0.333	0.0667	85
				2.4.3	Information	0.333	0.0667	95
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667	80
				2.5.2	Management	0.333	0.0667	80
				2.5.3	Information	0.333	0.0667	80
Three	1	Governance And policy	0.5	3.1.1	Legal & customary framework	0.25	0.125	95
				3.1.2	Consultation, roles & responsibilities	0.25	0.125	100
				3.1.3	Long term objectives	0.25	0.125	100
				3.1.4	Incentives for sustainable fishing	0.25	0.125	100
		Fishery specific management System	0.5	3.2.1	Fishery specific objectives	0.2	0.1	100
				3.2.2	Decision making processes	0.2	0.1	100
				3.2.3	Compliance & enforcement	0.2	0.1	85
				3.2.4	Research plan	0.2	0.1	100
				3.2.5	Management performance evaluation	0.2	0.1	90

GB Haddock Otter Trawl Fisheries UoC 4

The performance of the Georges Bank Haddock Otter Trawl fisheries in relation to MSC Principles 1, 2 and 3 is shown in Table 16 and summarised below:

Principle 1 - Target species	97.5
Principle 2 – Ecosystem	86
Principle 3 – Management	96.9

This fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any PI.

Table 16. Performance Indicators scoring assigned to UoC 4 the GB Haddock otter trawl fisheries

Principle	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle	Score
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	100
				1.1.2	Reference points	0.5	0.25	100
				1.1.3	Stock rebuilding	0.333	0.1667	
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125	95
				1.2.2	Harvest control rules & tools	0.25	0.125	95
				1.2.3	Information & monitoring	0.25	0.125	90
				1.2.4	Assessment of stock status	0.25	0.125	100
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667	75
				2.1.2	Management	0.333	0.0667	75
				2.1.3	Information	0.333	0.0667	95
		By-catch species	0.2	2.2.1	Outcome	0.333	0.0667	95
				2.2.2	Management	0.333	0.0667	95
				2.2.3	Information	0.333	0.0667	95
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667	90
				2.3.2	Management	0.333	0.0667	90
				2.3.3	Information	0.333	0.0667	80
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667	80
				2.4.2	Management	0.333	0.0667	85
				2.4.3	Information	0.333	0.0667	95
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667	80
				2.5.2	Management	0.333	0.0667	80
				2.5.3	Information	0.333	0.0667	80
Three	1	Governance And policy	0.5	3.1.1	Legal & customary framework	0.25	0.125	95
				3.1.2	Consultation, roles & responsibilities	0.25	0.125	100
				3.1.3	Long term objectives	0.25	0.125	100
				3.1.4	Incentives for sustainable fishing	0.25	0.125	100
		Fishery specific management System	0.5	3.2.1	Fishery specific objectives	0.2	0.1	100
				3.2.2	Decision making processes	0.2	0.1	100
				3.2.3	Compliance & enforcement	0.2	0.1	85
				3.2.4	Research plan	0.2	0.1	100
				3.2.5	Management performance evaluation	0.2	0.1	90

7.3. Summary of Conditions

Table 17. Summary of Conditions For all UoCs

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y,N,N/A)
1, 2	The client must provide evidence that there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding of the retained species, Atlantic Cod for each of the two fishery geographic locations; GOM and GB.	**2.1.1, 2.1.2**	**Y**

7.4. Certification Recommendation

On completion of the assessment and scoring process, the assessment team has ***provisionally*** recommended that the Acadian Redfish/Haddock/Pollock/ Otter Trawl Fisheries is eligible to be certified according to the MSC Principles and Criteria for Sustainable Fishing subject to the conditions and client action plan outlined in the report.

7.5. Determination, Formal Conclusion and Agreement

(REQUIRED FOR FR AND PCR)

(REQUIRED FOR PCR)

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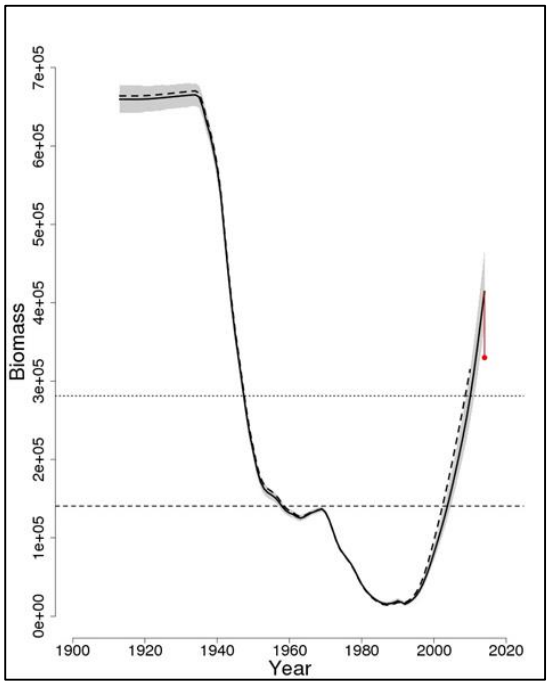
9. Appendix 1 Scoring and Rationales

9.1. Appendix 1.1. Evaluation Table for Pis

PRINCIPLE 1: Target Species

Evaluation Table for PI 1.1.1.

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
A	**Guidepost**	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	Met?	Y	Y	Y
	Justification	There is a high degree of certainty that the stock is above the point where recruitment would be impaired for all species. **Acadian Redfish** The target reference level is defined as Spawning Stock Biomass Target = 50% MSP (i.e., SSB that is 50% of an unfished stock). The Acadian redfish (*Sebastes fasciatus*) stock is not overfished and overfishing is not occurring. SSB_{2014} was estimated to be 414,544 (mt) which is 147% of the biomass target (SSB_{MSY} proxy of SSB at $F_{50\%}$ = 281,112). The 2014 fully selected fishing mortality (F) was estimated to be 0.012 which is 32% of the overfishing threshold (F_{MSY} proxy of $F_{50\%}$ = 0.038).  **Figure 11.** Trends in spawning stock biomass of Acadian redfish between 1913 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ (0.5 * SSB_{MSY} proxy; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY} proxy; horizontal dotted line) based on the 2015 assessment. Biomass was adjusted for a retrospective pattern and the adjustment is shown in red. The approximate 90% lognormal confidence intervals are shown. Thus it can be said there is a high degree of certainty that the stock is above the point where recruitment would be impaired justifying a score of 100a.

US Atlantic Pollock

The target reference level is defined as Spawning Stock Biomass Target = 40% MSP (i.e., SSB that is 40% of an unfished stock).

The pollock (*Pollachius virens*) stock is not overfished and overfishing is not occurring. SSB_{2014} was estimated to be 198,847 (mt) under the base model and 57,327 (mt) under the flat sel sensitivity model which is 189 and 104% (respectively) of the biomass target, an SSB_{MSY} proxy of SSB at $F_{40\%}$ (105,226 and 54,900 (mt); Figure 1). The 2014 age 5 to 7 average fishing mortality (F) was estimated to be 0.051 and 0.133 which is 18 and 53% of the overfishing threshold, an F_{MSY} proxy of $F_{40\%}$ (0.277 and 0.252).

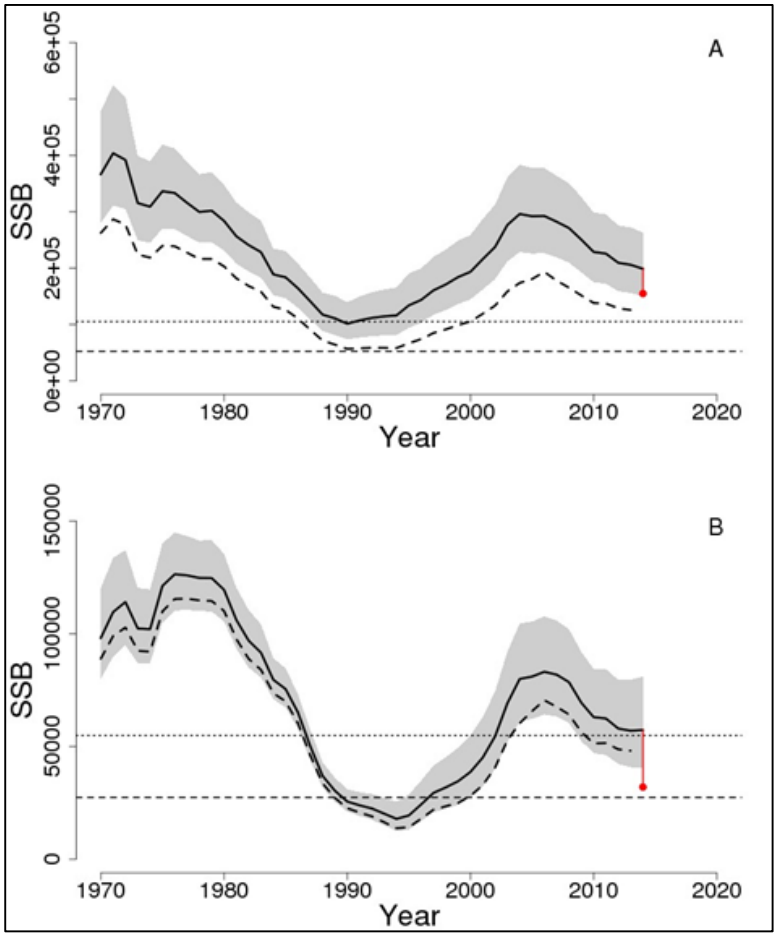


Figure 14. Estimated trends in the spawning stock biomass of pollock between 1970 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ ($0.5*SSB_{MSY}$; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY}; horizontal dotted line) based on the 2015 assessment models base (A) and flat sel (B). Biomass was adjusted for a retrospective pattern and the adjustment is shown in red.

Thus it can be said there is a high degree of certainty that the stock is above the point where recruitment would be impaired justifying a score of 100a.

Gulf of Maine Haddock

Spawning Stock Biomass Target = 40% MSP (i.e., SSB that is 40% of an unfished stock).

The Gulf of Maine haddock (*Melanogrammus aeglefinus*) stock is not overfished and overfishing is not occurring (Figures 1-2). SSB_{2014} was estimated to be 10,325 (mt) which is 223% of the biomass target (SSB_{MSY} proxy = 4,623). The 2014 fully selected fishing mortality was estimated to be 0.257 which is 55% of the overfishing threshold proxy (F_{MSY} proxy = 0.468).

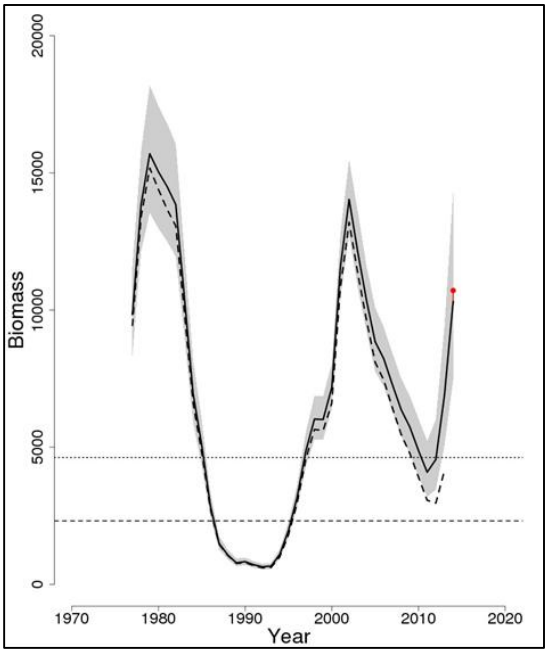


Figure 17. Trends in spawning stock biomass of Gulf of Maine haddock be-tween 1977 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ (1/2 SSB_{MSY} proxy; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY} proxy; horizontal dotted line) based on the 2015 assessment. Biomass was adjusted for a retrospective pattern and the adjustment is shown in red. The approximate 90% lognormal confidence intervals are shown.

Thus it can be said there is a high degree of certainty that the stock is above the point where recruitment would be impaired justifying a score of 100a.

Georges Bank Haddock

Spawning Stock Biomass Target = 40% MSP (i.e., SSB that is 40% of an unfished stock).

Georges Bank haddock (*Melanogrammus aeglefinus*) stock is not overfished and overfishing is not occurring. SSB_{2014} was estimated to be 225,080 mt, which is 208% of the biomass target (SSB_{MSY} proxy = 108,300 mt). The 2014 fishing mortality (average for ages 5-7) was estimated to be 0.159, which is 41% of the overfishing threshold proxy (F_{MSY} proxy = 0.39).

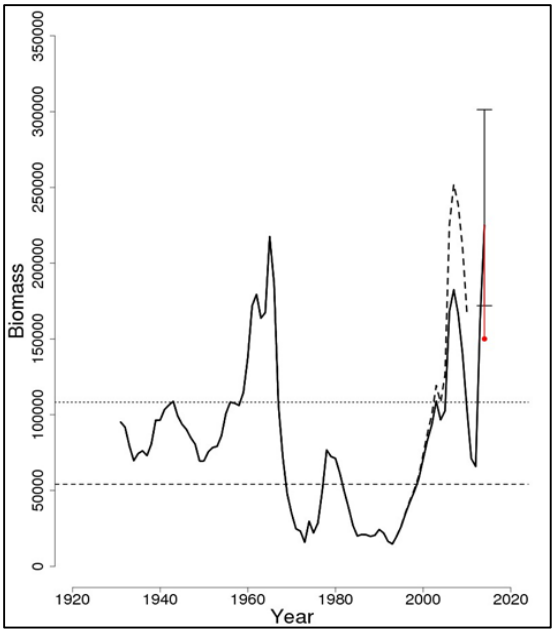
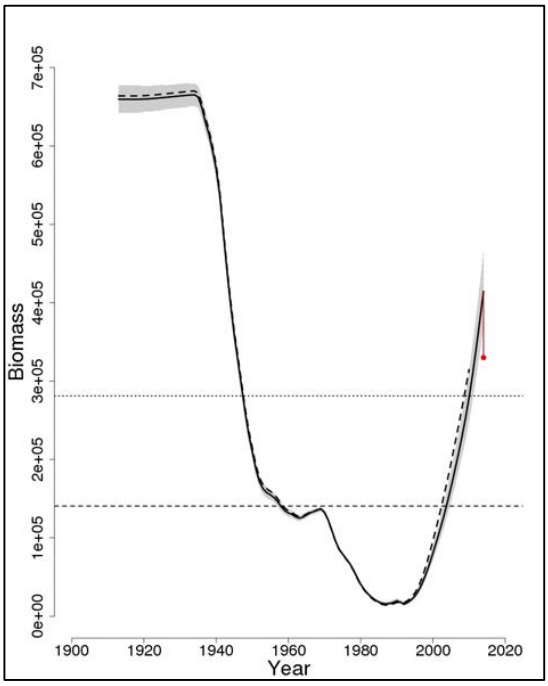


Figure 20. Trends in spawning stock biomass of Georges Bank haddock between 1931 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ (SSB_{MSY} proxy; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY} proxy; horizontal dotted line) based on the 2015 assessment. Biomass was adjusted for a retrospective pattern and the adjustment is shown in red. The 90% bootstrap probability intervals are shown.

Thus it can be said there is a high degree of certainty that the stock is above the point where recruitment would be impaired justifying a score of 100a.

b	**Guidepost**		The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.
	Met?		Y	Y Acadian Redfish Y US Atlantic Pollock Y GOM haddock Y GB Haddock
	Justification	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years for all main species except GOM haddock. **Acadian Redfish** The target reference level is defined as Spawning Stock Biomass Target = 50% MSP (i.e., SSB that is 50% of an unfished stock). The Acadian redfish (*Sebastes fasciatus*) stock is not overfished and overfishing is not occurring. SSB_{2014} was estimated to be 414,544 (mt) which is 147% of the biomass target (SSB_{MSY} proxy of SSB at $F_{50\%}$ = 281,112). The 2014 fully selected fishing mortality (F) was estimated to be 0.012 which is 32% of the overfishing threshold (F_{MSY} proxy of $F_{50\%}$ = 0.038).  **Figure 11.** Trends in spawning stock biomass of Acadian redfish between 1913 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ (0.5 * SSB_{MSY} proxy; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY} proxy; horizontal dotted line) based on the 2015 assessment. Biomass was adjusted for a retrospective pattern and the adjustment is shown in red. The approximate 90% lognormal confidence intervals are shown. There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years justifying a score of 100 for issue b. **US Atlantic Pollock** The target reference level is defined as Spawning Stock Biomass Target = 40% MSP (i.e., SSB that is 40% of an unfished stock).			

The pollock (Pollachius virens) stock is not overfished and overfishing is not occurring. SSB_{2014} was estimated to be 198,847 (mt) under the base model and 57,327 (mt) under the flat sel sensitivity model which is 189 and 104% (respectively) of the biomass target, an SSB_{MSY} proxy of SSB at F40% (105,226 and 54,900 (mt); Figure 1). The 2014 age 5 to 7 average fishing mortality (F) was estimated to be 0.051 and 0.133 which is 18 and 53% of the overfishing threshold, an F_{MSY} proxy of $F_{40\%}$ (0.277 and 0.252).

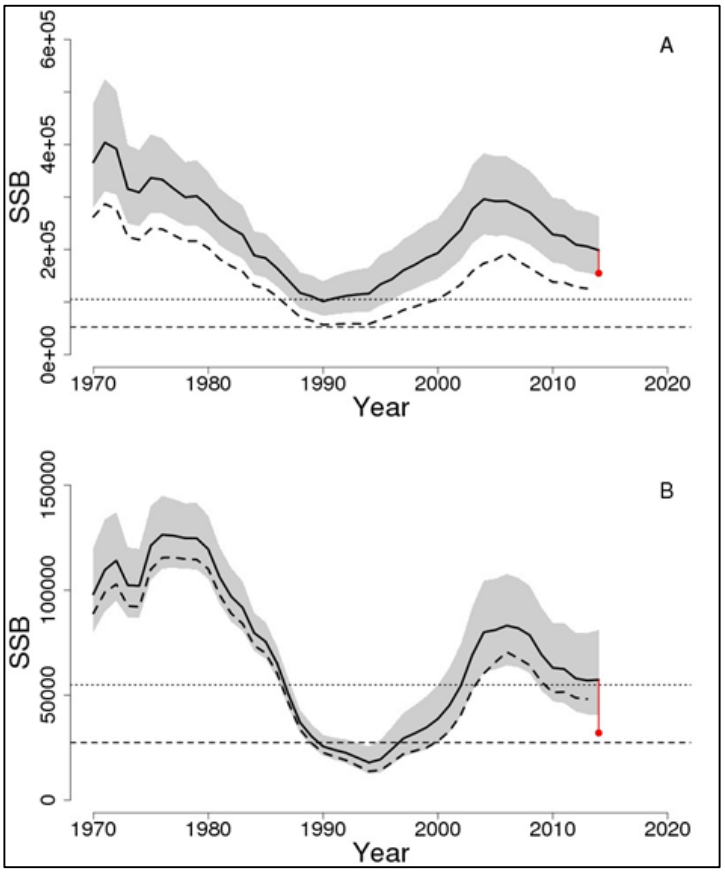


Figure 14. Estimated trends in the spawning stock biomass of pollock between 1970 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ ($0.5*SSB_{MSY}$; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY}; horizontal dotted line) based on the 2015 assessment models base (A) and flat sel (B). Biomass was adjusted for a retrospective pattern and the adjustment is shown in red.

There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years justifying a score of 100 for issue b.

Gulf of Maine Haddock

Spawning Stock Biomass Target = 40% MSP (i.e., SSB that is 40% of an unfished stock).

The Gulf of Maine haddock (*Melanogrammus aeglefinus*) stock is not overfished and overfishing is not occurring (Figures 1-2). SSB_{2014} was estimated to be 10,325 (mt) which is 223% of the biomass target (SSB_{MSY} proxy = 4,623). The 2014 fully selected fishing mortality was estimated to be 0.257 which is 55% of the overfishing threshold proxy (F_{MSY} proxy = 0.468.

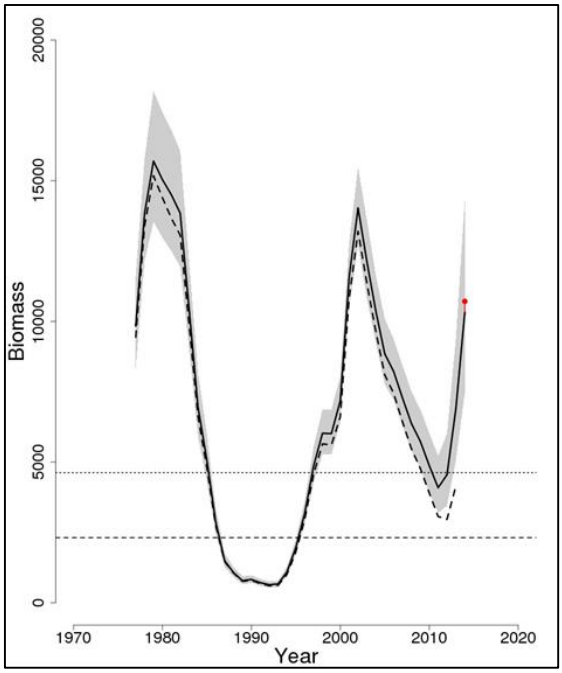


Figure 17. Trends in spawning stock biomass of Gulf of Maine haddock between 1977 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ (1/2 SSB_{MSY} proxy; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY} proxy; horizontal dotted line) based on the 2015 assessment. Biomass was adjusted for a retrospective pattern and the adjustment is shown in red. The approximate 90% lognormal confidence intervals are shown.

Thus the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years thus justifying a score of 100 for issue b.

Georges Bank Haddock

Spawning Stock Biomass Target = 40% MSP (i.e., SSB that is 40% of an unfished stock).

Georges Bank haddock (*Melanogrammus aeglfienus*) stock is not overfished and overfishing is not occurring. SSB_{2014} was estimated to be 225,080 mt, which is 208% of the biomass target (SSB_{MSY} proxy = 108,300 mt). The 2014 fishing mortality (average for ages 5-7) was estimated to be 0.159, which is 41% of the overfishing threshold proxy (F_{MSY} proxy = 0.39).

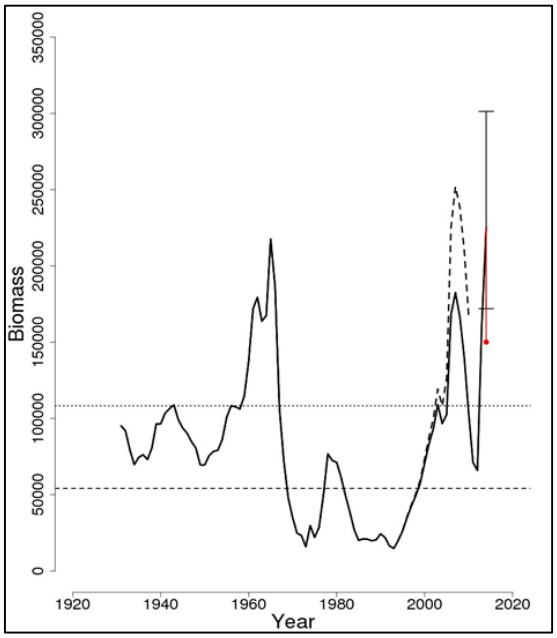


Figure 20. Trends in spawning stock biomass of Georges Bank haddock between 1931 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{THRESHOLD}$ (2 SSB_{MSY} proxy; horizontal dashed line) as well as SSB_{TARGET} (SSB_{MSY} proxy; horizontal dotted line) based on the 2015 assessment. Biomass was adjusted for a retrospective pattern and the adjustment is shown in red. The 90% bootstrap probability intervals are shown.

Thus the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years thus justifying a score of 100 for issue b.

<table>
<tr><td>References</td><td>2015 Acadian redfish update assessment report:
2015 GOM Haddock update assessment report
2015 GB Haddock update assessment report
2015 Atlantic Pollock update assessment report
Northeast Fisheries Science Center (NEFSC). 2008
Northeast Fisheries Science Center (NEFSC). 2010
http://www.nefsc.noaa.gov/saw/Op%20Assessment/index.html
Northeast Fisheries Science Center. 2014. 59th Northeast Regional Stock Assessment Workshop (59th SAW) Assessment Report.
Northeast Fisheries Science Center (NEFSC). 2012. Assessment or Data Updates of 13 Northeast Groundfish Stocks through 2010. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-06; 789 p.</td></tr>
<tr><td>Score</td><td><table><tr><td>Acadian Redfish</td><td>Pollock</td><td>GOM Haddock</td><td>GB Haddock</td></tr><tr><td>100</td><td>100</td><td>100</td><td>100</td></tr></table></td></tr>
<tr><td colspan="2">CONDITION NUMBER (if relevant): N/A</td></tr>
</table>

Evaluation Table for PI 1.1.2.

PI 1.1.2		Limit and target reference points are appropriate for the stock		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	
	Met?	Y	Y	
	Justification	Reference points are appropriate for the stock and can be estimated for all species. **Acadian Redfish** The assessment was based on an ASAP (ASAP 2008)model configuration which incorporates information on the age composition of the landings, size and age composition of the population, and trends in relative abundance derived from research vessel survey biomass indices. The $F_{(50\%MSP)}$ reference point was estimated using the yield-per-recruit software (YPR 2007) with the updated estimates of fishery selectivity from both the base and alternative model results. All other inputs remained the same as at the last assessment due to unavailable biological parameters. AgePro (AGEPRO 2005) was used to re-estimate the $SSB_{(50\%MSP)}$ reference point which included the information in the yield-per-recruit analysis along with updated recruitment estimates between 1969 and 2010 and 10 random draws of numbers-at-age in 2010 from both the base and alternative model results. The estimated fishing mortalities for 2010 from the base and alternative models 2010 were 84% less than the new (or GARM III) $F_{(50\%MSP)}$ reference point. The Acadian redfish (*Sebastes fasciatus*) stock is not overfished and overfishing is not occurring (Figures 1-2). SSB_{2014} was estimated to be 414,544 (mt) which is 147% of the biomass target (SSB_{MSY} proxy of SSB at $F_{50\%}$ = 281,112). The 2014 fully selected fishing mortality (F) was estimated to be 0.012 which is 32% of the overfishing threshold (F_{MSY} proxy of F50% = 0.038). This justifies a score of 80 for issue a. **US Atlantic Pollock** The use of a statistical catch-at-age model for the US Atlantic Pollock assessment was explored (statistical catch-at-age model, ASAP (Age Structured Assessment Program v2.0.20, Legault and Restrepo 1998). ASAP is an age-structured 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. The base model estimated a starting spawning stock biomass (SSB) in 1970 of about 262,000 mt, which is approximately 33% above the unexploited spawning biomass estimate (~197,000 mt). Spawning biomass decreased to the time series low (56,900 mt) in 1990. Since the 1990 low, spawning biomass increased steadily through 2006, with a decline to the present. The 2014 estimate of spawning biomass is about 198,847 For fishing mortality in 1970, F_{5-7} is estimated at 0.12, and mostly increased and peaked with 0.52 in 1986. Since then, F_{5-7} decreased to 2006, when it reached the time series low of 0.04. In the last three years, F_{5-7} was 0.12, 0.10, and 0.10, respectively. The updated estimate of the SSB_{MSY} proxy (76,900 mt) was considerably less than the SAW50 estimate, largely because of the recent		

decrease in weight-at-age. The estimate of steepness from the updated ASAP model (h=0.56) was lower than the SAW50 estimate (h=0.66), but the two estimates were not significantly different, because neither was precisely estimated. The large difference reflects both the uncertain estimate of steepness (justifying the use of a $F_{40\%}$ proxy for F_{MSY}) as well as the recent decrease in weight at age.

The pollock (*Pollachius virens)* stock is not overfished and overfishing is not occurring. SSB_{2014} was estimated to be 198,847 (mt) under the base model and 57,327 (mt) under the flat sel sensitivity model (Table 1) which is 189 and 104% (respectively) of the biomass target, an SSB_{MSY} proxy of SSB at F40% (105,226 and 54,900 (mt). The 2014 age 5 to 7 average fishing mortality (F) was estimated to be 0.051 and 0.133 which is 18 and 53% of the overfishing threshold, an F_{MSY} proxy of F40% (0.277 and 0.252).

This justifies a score of 80 for issue a.

Gulf of Maine Haddock

The use of a statistical catch-at-age model for the Gulf of Maine haddock assessment was explored with statistical catch-at-age model, ASAP (Age Structured Assessment Program v3.0.17, Legault and Restrepo 1998) ASAP is an age-structured 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 Gulf of Maine haddock is highly episodic and not well described by traditional stock recruitment relationships. Given this, an MSY proxy was used for reference points. $F_{40\%}$ is the proxy used for the overfishing threshold (F_{MSY}). This is consistent with the choice of proxy in the previous assessment. A deterministic value of $F_{40\%}$ was calculated from a spawner-per-recruit analysis using 2009 – 2014 average SSB weights, catch weights, selectivity and maturity. Expressed as a fully selected fishing mortality, $F_{40\%}$ is 0.468.

The Gulf of Maine haddock (*Melanogrammus aeglfienus*) stock is not overfished and overfishing is not occurring. SSB_{2014} was estimated to be 10,325 (mt) which is 223% of the biomass target (SSB_{MSY} proxy = 4,623). The 2014 fully selected fishing mortality was estimated to be 0.257 which is 55% of the overfishing threshold proxy (F_{MSY} proxy = 0.468)

This justifies a score of 80 for issue a.

Georges Bank Haddock

The GB stock assessment is conducted using an age structured VPA. For consistency, the age-disaggregated Sissenwine-Shepherd production model was used for derivation of SSB_{MSY}. SSB_{MSY} is determined by using a stock recruitment curve to derive equilibrium levels of catch and SSB for a range of fishing mortality rates. For the SSB and recruitment relationship analysis, the traditional parametric Beverton-Holt (BH) and Ricker (RK) stock-recruit models were fit to recruitment and SSB. Both models fit the data poorly, with strong time-series patterns in the residuals.

Georges Bank haddock (*Melanogrammus aeglfienus*) stock is not overfished and overfishing is not occurring SSB_{2014} was estimated to be 225,080 mt, which is 208% of the biomass target (SSB_{MSY} proxy = 108,300 mt). The 2014 fishing mortality (average for ages 5-7) was estimated to be 0.159, which is 41% of the overfishing threshold proxy (F_{MSY} proxy = 0.39).

This justifies a score of 80 for issue a.

b	**Guidepost**		The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.
	Met?		Y	Y
	Justification	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues for all species. **Acadian Redfish** In Federal Waters Overfished is defined as spawning stock biomass less than ½ B_{TARGET}; B_{TARGET} is defined as 50% MSP= 50% Maximum Spawning Potential (MSP; i.e., SSB that is 50% of an unfished stock. A score of 100 can be justified for issue b. **US Atlantic Pollock** In Federal Waters Overfished is defined as spawning stock biomass less than ½ B_{TARGET}; B_{TARGET} is defined as 40% MSP= 40% Maximum Spawning Potential (MSP; i.e., SSB that is 40% of an unfished stock. A score of 100 can be justified for issue b. **Gulf of Maine Haddock** In Federal Waters Overfished is defined as spawning stock biomass less than ½ B_{TARGET}; B_{TARGET} is defined as 40% MSP= 40% Maximum Spawning Potential (MSP; i.e., SSB that is 40% of an unfished stock. A score of 100 can be justified for issue b. **Georges Bank Haddock** In Federal Waters Overfished is defined as spawning stock biomass less than ½ B_{TARGET}; B_{TARGET} is defined as 40% MSP= 40% Maximum Spawning Potential (MSP; i.e., SSB that is 40% of an unfished stock. A score of 100 can be justified for issue b.		
c	**Guidepost**		The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.
	Met?		Y	Y

	Justification	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty for all species. **Acadian Redfish** B_{TARGET} is defined as 50% MSP= 40% Maximum Spawning Potential (MSP; i.e., SSB that is 50% of an unfished stock. A score of 100 can be justified for issue c. **US Atlantic Pollock** B_{TARGET} is defined as 40% MSP= 40% Maximum Spawning Potential (MSP; i.e., SSB that is 40% of an unfished stock. A score of 100 can be justified for issue c. **Gulf of Maine Haddock** B_{TARGET} is defined as 40% MSP= 40% Maximum Spawning Potential (MSP; i.e., SSB that is 40% of an unfished stock. A score of 100 can be justified for issue c. **Georges Bank** B_{TARGET} is defined as 40% MSP= 40% Maximum Spawning Potential (MSP; i.e., SSB that is 40% of an unfished stock. A score of 100 can be justified for issue c.

d	**Guidepost**		For key low trophic level stocks, the target reference point takes into account the ecological role of the stock.	
	Met?		Not relevant	
	Justification	The GB/GOM haddock, the US Atlantic Pollock and the Redfish stock are not considered to be a key lower trophic level stock.		

References	2012 Acadian redfish update assessment report: Northeast Fisheries Science Center (NEFSC). 2008 Northeast Fisheries Science Center (NEFSC). 2010 http://www.nefsc.noaa.gov/saw/Op%20Assessment/index.html Northeast Fisheries Science Center. 2014. 59th Northeast Regional Stock Assessment Workshop (59th SAW) Assessment Report. Northeast Fisheries Science Center (NEFSC). 2012. Assessment or Data Updates of 13 Northeast Groundfish Stocks through 2010. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-06; 789 p.,

Score	Acadian Redfish	Pollock	GOM Haddock	GB Haddock
	100	100	100	100

CONDITION NUMBER (if relevant):	**NA**

Evaluation Table for PI 1.1.3.

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

Evaluation Table for PI 1.2.1.

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.
	Met?	Y	Y	Y
	Justification	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points for all species. **Acadian Redfish** The New England fisheries for redfish, haddock, and pollock are managed by the New England Fisheries Management Council (NEFMC) through the Northeast Multispecies Fishery Management Plan (NE Multispecies FMP), alongside 9 other species of flatfish and groundfish. Originally enacted in 1985, the NE Multispecies FMP has been amended a number of times to improve the management of the relevant fisheries, including the introduction of gear restrictions (e.g. mesh size, number of nets/hooks etc.), seasonal closures, spatial closures, minimum landing sizes, trip limits on poundage of fish landed, limited access (a restriction on the number of vessels able to work within the fishery), effort limits based on a days at sea (DAS) system, and most recently a system based on transferable quotas set against a hard annual catch limit (ACL) (this replaced the previous effort based limitation of the DAS system in 2010). In 2010, Amendment 16 to the NE Multispecies FMP greatly expanded catch share, or sector-based, management. The sectors function essentially as cooperatives, as they are self-selecting and largely self-regulating; albeit within a framework designated and closely monitored by federal agencies. The sectors are exempt from many of the effort controls previously used to manage the fishery; instead, they adhere to an overall hard quota known as an ACL, which is subdivided into Annual Catch Entitlements (ACE) allocated to each sector. The shift to output management instead of effort management enables efficiency gains by allowing increased operational efficiency. While the sectors are optional to join, the majority of fishers have chosen to participate: sector vessels made 65% of all NE Multispecies landings in 2010, including 98% of groundfish and 54% of non-groundfish ((Kitts et al 2011), (Labaree 2012), (Federal Register 2012)). For example, discarding appears to have been reduced, and the fishery now relies on hard ACLs (which include discards) rather than target TACs, all of which helps reduce the likelihood of exceeding sustainable fishing mortality rates for targeted stocks. In addition, sectors have not exceeded their ACEs, while in the past it was possible for target TACs to be exceeded, as the regulations were based on effort control (DAS) rather than output control (Kitts et al 2011). The new management regime has not been in place long enough to fully assess its impact. Under the Magnuson-Stevens Act, the Annual Catch Limit (ACL) must be set less than or equal to the Acceptable Biological Catch (ABC) (to account for management uncertainty), which must be set less than or equal to the Overfishing Level (OFL) (to account for any scientific uncertainty in the stock assessment) (Figure 16) (Federal Register 2009a). Fishing mortality targets are set for each stock independently based on achieving MSY in the long-term, therefore for stocks which are overfished (and may also be subject to overfishing) the target fishing mortality is set at a level		

which will have a reasonable probability (>50%) of ensuring rebuilding of the stock within the timeline set within the relevant rebuilding program. However, should a sector approach the ACE for one of the target stocks, then the area inhabited by that stock is closed to all gears capable of catching that stock, resulting in a potential 'under-harvest' of more abundant stocks. The sector system allows fishermen to share, trade or lease quota within a fishery, reducing the chance of overfishing depleted stocks while targeting more abundant stocks; and if a sector is nearing its quota for a particular species, it may be possible to lease it from another sector. There have been some concerns with the management strategy in the past, particularly with respect to depleted stocks. In addition, in many cases target TACs have been set too high, due to errors in stock assessments, and there has been a need for increased precaution. The management system, however, has substantially changed under Amendment 16, which is expected to reduce the race to fish and improve conservation outcomes (Francis et al. 2015). For example, discarding appears to have been reduced, and the fishery now relies on hard ACLs (which include discards) rather than target TACs, all of which helps reduce the likelihood of exceeding sustainable fishing mortality rates for targeted stocks. In addition, sectors have not exceeded their ACEs, while in the past it was possible for target TACs to be exceeded, as the regulations were based on effort control (DAS) rather than output control (Kitts et al 2011). The new management regime has not been in place long enough to fully assess its impact.

Rationale:

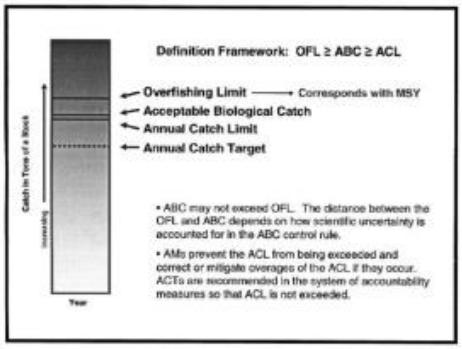


Figure 16: Relationship between OFL, ABC, ACL, and ACT as described by the National Marine Fisheries Service. (NOAA 2009)

A score of 100 is justified for issue a.

US Atlantic Pollock

The New England fisheries for redfish, haddock, and pollock are managed by the New England Fisheries Management Council (NEFMC) through the Northeast Multispecies Fishery Management Plan (NE Multispecies FMP), alongside 9 other species of flatfish and groundfish. Originally enacted in 1985, the NE Multispecies FMP has been amended a number of times to improve the management of the relevant fisheries, including the introduction of gear restrictions (e.g. mesh size, number of nets/hooks etc.), seasonal closures, spatial closures, minimum landing sizes, trip limits on poundage of fish landed, limited access (a restriction on the number of vessels able to work within the fishery), effort limits based on a days at sea (DAS) system, and most recently a system based on transferable quotas set against a hard annual catch limit (ACL) (this replaced the previous effort based limitation of the DAS system in 2010).In 2010, Amendment 16 to the NE Multispecies FMP greatly expanded catch share, or sector-based, management. The sectors function essentially as cooperatives, as they are self-selecting and largely self-regulating; albeit within a framework designated and closely monitored by federal agencies. The sectors are exempt from many of the effort controls previously used to manage the fishery; instead, they adhere to an overall hard quota known as an ACL, which is subdivided into Annual Catch Entitlements (ACE)

allocated to each sector. The shift to output management instead of effort management enables efficiency gains by allowing increased operational efficiency. While the sectors are optional to join, the majority of fishers have chosen to participate: sector vessels made 65% of all NE Multispecies landings in 2010, including 98% of groundfish and 54% of non-groundfish ((Kitts et al 2011), (Labaree 2012), (Federal Register 2012)). For example, discarding appears to have been reduced, and the fishery now relies on hard ACLs (which include discards) rather than target TACs, all of which helps reduce the likelihood of exceeding sustainable fishing mortality rates for targeted stocks. In addition, sectors have not exceeded their ACEs, while in the past it was possible for target TACs to be exceeded, as the regulations were based on effort control (DAS) rather than output control (Kitts et al 2011). The new management regime has not been in place long enough to fully assess its impact.

Under the Magnuson-Stevens Act, the Annual Catch Limit (ACL) must be set less than or equal to the Acceptable Biological Catch (ABC) (to account for management uncertainty), which must be set less than or equal to the Overfishing Level (OFL) (to account for any scientific uncertainty in the stock assessment) (Figure 16) (Federal Register 2009a).Fishing mortality targets are set for each stock independently based on achieving MSY in the long-term, therefore for stocks which are overfished (and may also be subject to overfishing) the target fishing mortality is set at a level which will have a reasonable probability (>50%) of ensuring rebuilding of the stock within the timeline set within the relevant rebuilding program. However, should a sector approach the ACE for one of the target stocks, then the area inhabited by that stock is closed to all gears capable of catching that stock, resulting in a potential 'under-harvest' of more abundant stocks. The sector system allows fishermen to share, trade or lease quota within a fishery, reducing the chance of overfishing depleted stocks while targeting more abundant stocks; and if a sector is nearing its quota for a particular species, it may be possible to lease it from another sector. There have been some concerns with the management strategy in the past, particularly with respect to depleted stocks. In addition, in many cases target TACs have been set too high, due to errors in stock assessments, and there has been a need for increased precaution. The management system, however, has substantially changed under Amendment 16, which is expected to reduce the race to fish and improve conservation outcomes. For example, discarding appears to have been reduced, and the fishery now relies on hard ACLs (which include discards) rather than target TACs, all of which helps reduce the likelihood of exceeding sustainable fishing mortality rates for targeted stocks. In addition, sectors have not exceeded their ACEs, while in the past it was possible for target TACs to be exceeded, as the regulations were based on effort control (DAS) rather than output control (Kitts et al 2011). The new management regime has not been in place long enough to fully assess its impact.

Rationale:

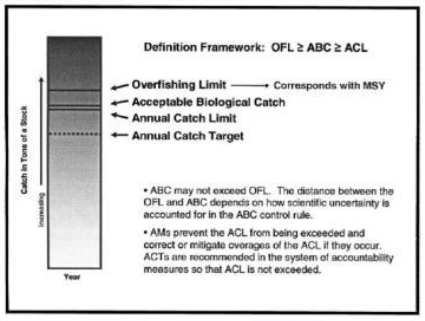


Figure 16: Relationship between OFL, ABC, ACL, and ACT as described by the National Marine Fisheries Service. (NOAA 2009)

A score of 100 is justified for issue a.

Gulf of Maine Haddock

The New England fisheries for redfish, haddock, and pollock are managed by the New England Fisheries Management Council (NEFMC) through the Northeast Multispecies Fishery Management Plan (NE Multispecies FMP), alongside 9 other species of flatfish and groundfish. Originally enacted in 1985, the NE Multispecies FMP has been amended a number of times to improve the management of the relevant fisheries, including the introduction of gear restrictions (e.g. mesh size, number of nets/hooks etc.), seasonal closures, spatial closures, minimum landing sizes, trip limits on poundage of fish landed, limited access (a restriction on the number of vessels able to work within the fishery), effort limits based on a days at sea (DAS) system, and most recently a system based on transferable quotas set against a hard annual catch limit (ACL) (this replaced the previous effort based limitation of the DAS system in 2010).In 2010, Amendment 16 to the NE Multispecies FMP greatly expanded catch share, or sector-based, management. The sectors function essentially as cooperatives, as they are self-selecting and largely self-regulating; albeit within a framework designated and closely monitored by federal agencies. The sectors are exempt from many of the effort controls previously used to manage the fishery; instead, they adhere to an overall hard quota known as an ACL, which is subdivided into Annual Catch Entitlements (ACE) allocated to each sector. The shift to output management instead of effort management enables efficiency gains by allowing increased operational efficiency. While the sectors are optional to join, the majority of fishers have chosen to participate: sector vessels made 65% of all NE Multispecies landings in 2010, including 98% of groundfish and 54% of non-groundfish ((Kitts et al 2011), (Labaree 2012), (Federal Register 2012)). For example, discarding appears to have been reduced, and the fishery now relies on hard ACLs (which include discards) rather than target TACs, all of which helps reduce the likelihood of exceeding sustainable fishing mortality rates for targeted stocks. In addition, sectors have not exceeded their ACEs, while in the past it was possible for target TACs to be exceeded, as the regulations were based on effort control (DAS) rather than output control (Kitts et al 2011). The new management regime has not been in place long enough to fully assess its impact.

Under the Magnuson-Stevens Act, the Annual Catch Limit (ACL) must be set less than or equal to the Acceptable Biological Catch (ABC) (to account for management uncertainty), which must be set less than or equal to the Overfishing Level (OFL) (to account for any scientific uncertainty in the stock assessment) (Figure 16) (Federal Register 2009a).Fishing mortality targets are set for each stock independently based on achieving MSY in the long-term, therefore for stocks which are overfished (and may also be subject to overfishing) the target fishing mortality is set at a level which will have a reasonable probability (>50%) of ensuring rebuilding of the stock within the timeline set within the relevant rebuilding program (see “Recovery of Stocks of concern”, below). However, should a sector approach the ACE for one of the target stocks, then the area inhabited by that stock is closed to all gears capable of catching that stock, resulting in a potential ‘under-harvest’ of more abundant stocks. The sector system allows fishermen to share, trade or lease quota within a fishery, reducing the chance of overfishing depleted stocks while targeting more abundant stocks; and if a sector is nearing its quota for a particular species, it may be possible to lease it from another sector. There have been some concerns with the management strategy in the past, particularly with respect to depleted stocks (see “Recovery of Stocks of concern”, below). In addition, in many cases target TACs have been set too high, due to errors in stock assessments, and there has been a need for increased precaution (see “Scientific Advice”). The management system, however, has substantially changed under Amendment 16, which is expected to reduce the race to fish and improve conservation outcomes. For example, discarding appears to have been reduced, and the fishery now relies on hard ACLs (which include discards) rather than target TACs, all of which helps reduce the likelihood of exceeding sustainable fishing mortality rates for targeted stocks. In addition, sectors have not exceeded their ACEs, while in the past it was possible for target TACs to be exceeded, as the regulations were based on effort control (DAS) rather than

output control (Kitts et al 2011). The new management regime has not been in place long enough to fully assess its impact.

Rationale:

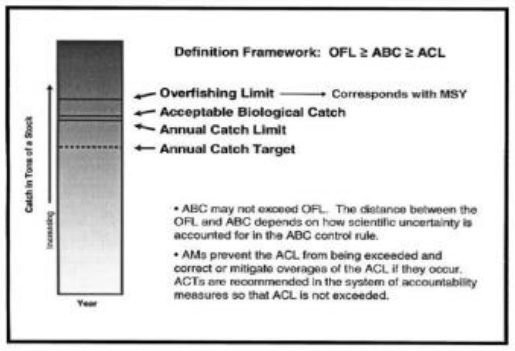


Figure 16: Relationship between OFL, ABC, ACL, and ACT as described by the National Marine Fisheries Service. (NOAA 2009)

A score of 100 is justified for issue a.

Georges Bank Haddock

The New England fisheries for redfish, haddock, and pollock are managed by the New England Fisheries Management Council (NEFMC) through the Northeast Multispecies Fishery Management Plan (NE Multispecies FMP), alongside 9 other species of flatfish and groundfish. Originally enacted in 1985, the NE Multispecies FMP has been amended a number of times to improve the management of the relevant fisheries, including the introduction of gear restrictions (e.g. mesh size, number of nets/hooks etc.), seasonal closures, spatial closures, minimum landing sizes, trip limits on poundage of fish landed, limited access (a restriction on the number of vessels able to work within the fishery), effort limits based on a days at sea (DAS) system, and most recently a system based on transferable quotas set against a hard annual catch limit (ACL) (this replaced the previous effort based limitation of the DAS system in 2010).In 2010, Amendment 16 to the NE Multispecies FMP greatly expanded catch share, or sector-based, management. The sectors function essentially as cooperatives, as they are self-selecting and largely self-regulating; albeit within a framework designated and closely monitored by federal agencies. The sectors are exempt from many of the effort controls previously used to manage the fishery; instead, they adhere to an overall hard quota known as an ACL, which is subdivided into Annual Catch Entitlements (ACE) allocated to each sector. The shift to output management instead of effort management enables efficiency gains by allowing increased operational efficiency. While the sectors are optional to join, the majority of fishers have chosen to participate: sector vessels made 65% of all NE Multispecies landings in 2010, including 98% of groundfish and 54% of non-groundfish ((Kitts et al 2011), (Labaree 2012), (Federal Register 2012)). For example, discarding appears to have been reduced, and the fishery now relies on hard ACLs (which include discards) rather than target TACs, all of which helps reduce the likelihood of exceeding sustainable fishing mortality rates for targeted stocks. In addition, sectors have not exceeded their ACEs, while in the past it was possible for target TACs to be exceeded, as the regulations were based on effort control (DAS) rather than output control (Kitts et al 2011). The new management regime has not been in place long enough to fully assess its impact.

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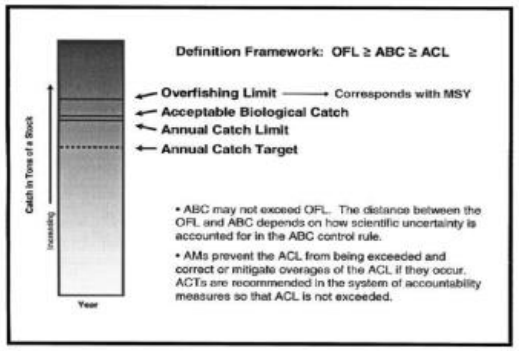
		overfished (and may also be subject to overfishing) the target fishing mortality is set at a level which will have a reasonable probability (>50%) of ensuring rebuilding of the stock within the timeline set within the relevant rebuilding program (see "Recovery of Stocks of concern", below). However, should a sector approach the ACE for one of the target stocks, then the area inhabited by that stock is closed to all gears capable of catching that stock, resulting in a potential 'under-harvest' of more abundant stocks. The sector system allows fishermen to share, trade or lease quota within a fishery, reducing the chance of overfishing depleted stocks while targeting more abundant stocks; and if a sector is nearing its quota for a particular species, it may be possible to lease it from another sector. There have been some concerns with the management strategy in the past, particularly with respect to depleted stocks (see "Recovery of Stocks of concern", below). In addition, in many cases target TACs have been set too high, due to errors in stock assessments, and there has been a need for increased precaution (see "Scientific Advice"). The management system, however, has substantially changed under Amendment 16, which is expected to reduce the race to fish and improve conservation outcomes. For example, discarding appears to have been reduced, and the fishery now relies on hard ACLs (which include discards) rather than target TACs, all of which helps reduce the likelihood of exceeding sustainable fishing mortality rates for targeted stocks. In addition, sectors have not exceeded their ACEs, while in the past it was possible for target TACs to be exceeded, as the regulations were based on effort control (DAS) rather than output control (Kitts et al 2011). The new management regime has not been in place long enough to fully assess its impact. **Rationale:**  **Figure 16: Relationship between OFL, ABC, ACL, and ACT as described by the National Marine Fisheries Service. (NOAA 2009)** A score of 100 is justified for issue a.		
b	**Guidepost**	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	Y	Y	N
	Justification	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives for all species. **Acadian Redfish** There is a management plan is in place, where it is supported by a operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive		

		assessments and peer reviews, the fishery has biologically based reference points, it does have control rules and management actions for catch and effort reduction. The 2012 Stock Assessment shows that productivity, abundance and recruitment have all increased to a high level. The reference trend points showed redfish abundance is above the target reference point, and exploitation rate is below the threshold. Based on this premise this management plan is therefore at present achieving a stock status consistent to the management objectives, taking into account the beneficial effects of the recruitment regime change. However there are some issues to be into taken into account on evaluating this management plan. The performance of the harvest strategy has not been fully evaluated using Management Strategy Evaluation (MSE). A score of 80 is justified for issue b but not 100 as there is no evidence of being tested by an MSE.
		US Atlantic Pollock There is a management plan is in place, where it is supported by a operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews, the fishery has based biologically based reference points, it does have control rules and management actions for catch and effort reduction. The 2014 Stock Assessment shows that productivity, abundance and recruitment have all increased to a high level. The reference trend points showed Pollock abundance is above the target reference point, and exploitation rate is below the threshold. Based on this premise this management plan is therefore at present achieving a stock status consistent to the management objectives, taking into account the beneficial effects of the recruitment regime change. However there are some issues to be into taken into account on evaluating this management plan. The performance of the harvest strategy has not been fully evaluated using Management Strategy Evaluation (MSE). A score of 80 is justified for issue b but not 100 as there is no evidence of being tested by an MSE.
		Gulf of Maine Haddock There is a management plan is in place, where it is supported by an operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews. The fishery has based biologically based reference points; it does have control rules and management actions for catch and effort reduction. The 2014 Stock Assessment shows that productivity, abundance and recruitment have all increased to a high level. The reference trend points showed haddock abundance is above the target reference point, and exploitation rate is below the threshold. Based on this premise this management plan is therefore at present achieving a stock status consistent to the management objectives, taking into account the beneficial effects of the recruitment regime change.

		However there are some issues to be into taken into account on evaluating this management plan. The performance of the harvest strategy has not been fully evaluated using Management Strategy Evaluation (MSE). A score of 80 is justified for issue b but not 100 as there is no evidence of being tested by an MSE.		
		Georges Bank Haddock There is a management plan is in place, where it is supported by an operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews. The fishery has based biologically based reference points, it does have control rules and management actions for catch and effort reduction. The 2012 Stock Assessment shows that productivity, abundance and recruitment have all increased to a high level. The reference trend points showed haddock abundance is above the target reference point, and exploitation rate is below the threshold. Based on this premise this management plan is therefore at present achieving a stock status consistent to the management objectives, taking into account the beneficial effects of the recruitment regime change. However there are some issues to be into taken into account on evaluating this management plan. The performance of the harvest strategy has not been fully evaluated using Management Strategy Evaluation (MSE). A score of 80 is justified for issue b but not 100 as there is no evidence of being tested by an MSE.		
c	**Guidepost**	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	Monitoring is in place that is expected to determine whether the harvest strategy is working for all species. **Acadian Redfish** Monitoring is in place that is expected to determine whether the harvest strategy is working. There is a management plan is in place, where it is supported by a operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews, Fishermen, officials and agencies on our meetings gave the impression that the regulations are properly enforced. All participants and elements of the program appear to be working towards the objective of maintaining stock above the threshold abundance and below the exploitation threshold. Status of the stock is based on results from an age structured analytical assessment (ASAP) that uses fishery catch statistics and sampling for size and age composition of the catch. The model is		

		calibrated to trends in abundance from two bottom trawl survey series: NMFS spring, NMFS fall. This monitoring is carried out annually. A score of 60 is justified for issue c.
		US Atlantic Pollock Monitoring is in place that is expected to determine whether the harvest strategy is working. There is a management plan is in place, where it is supported by a operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews, Fishermen, officials and agencies on our meetings gave the impression that the regulations are properly enforced. All participants and elements of the program appear to be working towards the objective of maintaining stock above the threshold abundance and below the exploitation threshold. Status of the stock is based on results from an age structured analytical assessment (ASAP) that uses fishery catch statistics and sampling for size and age composition of the catch. The model is calibrated to trends in abundance from two bottom trawl survey series: NMFS spring, NMFS fall and DFO winter. This monitoring is carried out annually. A score of 60 is justified for issue c.
		Gulf of Maine Haddock Monitoring is in place that is expected to determine whether the harvest strategy is working. There is a management plan is in place, where it is supported by a operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews, Fishermen, officials and agencies on our meetings gave the impression that the regulations are properly enforced. All participants and elements of the program appear to be working towards the objective of maintaining stock above the threshold abundance and below the exploitation threshold. Status of the stock is based on results from an age structured analytical assessment (ASAP) that uses fishery catch statistics and sampling for size and age composition of the catch. The model is calibrated to trends in abundance from two bottom trawl survey series: NMFS spring, NMFS fall. This monitoring is carried out annually. A score of 60 is justified for issue c.
		Georges Bank Haddock Monitoring is in place that is expected to determine whether the harvest strategy is working. There is a management plan is in place, where it is supported by a operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews, Fishermen, officials and agencies on our meetings gave the impression that the regulations are properly enforced. All participants and elements of the program appear to be working towards

		the objective of maintaining stock above the threshold abundance and below the exploitation threshold. Status of the stock is based on results from an age structured analytical assessment (Virtual Population Analysis, VPA) that uses fishery catch statistics and sampling for size and age composition of the catch. The VPA is calibrated to trends in abundance from three bottom trawl survey series: NMFS spring, NMFS fall and DFO winter. This monitoring is carried out annually. A score of 60 is justified for issue c.		
d	**Guidepost**			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Y
		The harvest strategy is periodically reviewed and improved as necessary. **Acadian Redfish** Monitoring is in place that is expected to determine whether the harvest strategy is working. There is a management plan is in place, where it is supported by a operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews, There is a high level of scientific research and monitoring associated with the Northeast U.S fisheries, including regular stock assessments and gear modification trials (NMFS 2011b). Much of the scientific research and monitoring is carried out by the Northeast Fisheries Science Center (NEFSC) which provides the NEFMC 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 testing gear modifications and conducting tagging experiments to monitor fish populations. Stock assessments account for all sources of fishing mortality, including commercial and recreational landings and discards (NEFSC 2008)(NEFSC 2012a), as well as environmental factors. There is therefore a wealth of both fishery dependent and fishery independent data available to NEFMC and NMFS in order to ensure the fishery is managed effectively. Fishermen, officials and agencies at our meetings gave the impression that the regulations are properly enforced. All participants and elements of the program appear to be working towards the objective of maintaining stock above the threshold abundance and below the exploitation threshold. A score of 100 for issue d is justified.		
		US Atlantic Pollock Monitoring is in place that is expected to determine whether the harvest strategy is working. There is a management plan is in place, where it is supported by a operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews, here is a high level of scientific research and monitoring associated with the Northeast U.S fisheries, including regular stock assessments and gear modification trials (NMFS 2011b). Much of the scientific research and monitoring is carried out by the Northeast Fisheries Science Center (NEFSC) which provides the NEFMC 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 testing gear modifications and		

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		Gulf of Maine Haddock Monitoring is in place that is expected to determine whether the harvest strategy is working. There is a management plan is in place, where it is supported by a operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews, There is a high level of scientific research and monitoring associated with the Northeast U.S fisheries, including regular stock assessments and gear modification trials (NMFS 2011b). Much of the scientific research and monitoring is carried out by the Northeast Fisheries Science Center (NEFSC) which provides the NEFMC 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 testing gear modifications and conducting tagging experiments to monitor fish populations. Stock assessments account for all sources of fishing mortality, including commercial and recreational landings and discards (NEFSC 2008)(NEFSC 2012a), as well as environmental factors. There is therefore a wealth of both fishery dependent and fishery independent data available to NEFMC and NMFS in order to ensure the fishery is managed effectively. Fishermen, officials and agencies at our meetings gave the impression that the regulations are properly enforced. All participants and elements of the program appear to be working towards the objective of maintaining stock above the threshold abundance and below the exploitation threshold. A score of 100 for issue d is justified.

	Justification	**Georges Bank Haddock** Monitoring is in place that is expected to determine whether the harvest strategy is working. There is a management plan is in place, where it is supported by a operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments and peer reviews, There is a high level of scientific research and monitoring associated with the Northeast U.S fisheries, including regular stock assessments and gear modification trials (NMFS 2011b). Much of the scientific research and monitoring is carried out by the Northeast Fisheries Science Center (NEFSC) which provides the NEFMC 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 testing gear modifications and conducting tagging experiments to monitor fish populations. Stock assessments account for all sources of fishing mortality, including commercial and recreational landings and discards (NEFSC 2008) (NEFSC 2012a), as well as environmental factors. There is therefore a wealth of both fishery dependent and fishery independent data available to NEFMC and NMFS in order to ensure the fishery is managed effectively. Fishermen, officials and agencies at our meetings gave the impression that the regulations are properly enforced. All participants and elements of the program appear to be working towards the objective of maintaining stock above the threshold abundance and below the exploitation threshold. A score of 100 for issue d is justified.

e	**Guidepost**	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification			

References	2012 Acadian redfish update assessment report: Northeast Fisheries Science Center (NEFSC). 2008 Northeast Fisheries Science Center (NEFSC). 2010 http://www.nefsc.noaa.gov/saw/Op%20Assessment/index.html Northeast Fisheries Science Center. 2014. 59th Northeast Regional Stock Assessment Workshop (59th SAW) Assessment Report. Northeast Fisheries Science Center (NEFSC). 2012. Assessment or Data Updates of 13 Northeast Groundfish Stocks through 2010. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-06; 789 p.,

Score	Acadian Redfish	Pollock	GOM Haddock	GB Haddock
	95	95	95	95

CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 1.2.2.

PI 1.2.2		There are well defined and effective harvest control rules in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Generally understood harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	
	Met?	Y	Y	
	Justification	For all species well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. **Acadian Redfish** The current regulations, which were implemented by Amendment 16 in 2010, implement new requirements under the Magnuson-Stevens Reauthorization Act (MSRA) of 2006. The MSRA requires the NEFMC to determine Annual Catch Limits (ACLs) and Accountability Measures (AMs) for all managed stocks. This action implements a process for calculating an ACL in addition to the Overfishing Level (OFL) and Acceptable Biological Catch (ABC) for each stock. Recommendations for these figures are developed by the Plan Development team (PDT). The Science and Statistical Committee (SSC) recommends ABC levels, and the NEFMC approves final ACLs, but cannot exceed the SSC's recommended levels. ACLs may be broken into subcomponents for different segments of the fishery, including state waters, commercial, recreational, sectors, and the common pool. Although the following stocks do have ACLs, possession is prohibited due to their overfished status: SNE/MA winter flounder, windowpane flounder, ocean pout, and wolffish. In addition, halibut catch is limited to one fish per trip. Northeast Multispecies permit holders are eligible to receive an allocation for the remaining 14 groundfish stocks. Acceptable Biological Catch (ABC) Recommendations for the Northeast Multispecies Fishery, MSY targets and ACL's are now subject to adjustment by Science and Statistics Committee (SSC) evaluation according to Magnusson Act. Acceptable Biological Catch (ABC) may be the rule for rebuilding stocks and are usually lower than currently established MSY targets or Annual Catch Limits (ACL)Management (i.e. landings) and scientific (i.e. model error) uncertainties are now identified and quantified and must be accounted for in setting ACL's. A score of 80 is justified for issue a.		

		US Atlantic Pollock The current regulations, which were implemented by Amendment 16 in 2010, implement new requirements under the Magnuson-Stevens Reauthorization Act (MSRA) of 2006. The MSRA requires the NEFMC to determine Annual Catch Limits (ACLs) and Accountability Measures (AMs) for all managed stocks. This action implements a process for calculating an ACL in addition to the Overfishing Level (OFL) and Acceptable Biological Catch (ABC) for each stock. Recommendations for these figures are developed by the Plan Development team (PDT). The Science and Statistical Committee (SSC) recommends ABC levels, and the NEFMC approves final ACLs, but cannot exceed the SSC's recommended levels. ACLs may be broken into subcomponents for different segments of the fishery, including state waters, commercial, recreational, sectors, and the common pool. Although the following stocks do have ACLs, possession is prohibited due to their overfished status: SNE/MA winter flounder, windowpane flounder, ocean pout, and wolffish. In addition, halibut catch is limited to one fish per trip. Northeast Multispecies permit holders are eligible to receive an allocation for the remaining 14 groundfish stocks. Acceptable Biological Catch (ABC) Recommendations for the Northeast Multispecies Fishery, MSY targets and ACL's are now subject to adjustment by Science and Statistics Committee (SSC) evaluation according to Magnusson Act. Acceptable Biological Catch (ABC) may be the rule for rebuilding stocks and are usually lower than currently established MSY targets or Annual Catch Limits (ACL)Management (i.e. landings) and scientific (i.e. model error) uncertainties are now identified and quantified and must be accounted for in setting ACL's. A score of 80 is justified for issue a.
		Gulf of Maine Haddock The current regulations, which were implemented by Amendment 16 in 2010, implement new requirements under the Magnuson-Stevens Reauthorization Act (MSRA) of 2006. The MSRA requires the NEFMC to determine Annual Catch Limits (ACLs) and Accountability Measures (AMs) for all managed stocks. This action implements a process for calculating an ACL in addition to the Overfishing Level (OFL) and Acceptable Biological Catch (ABC) for each stock. Recommendations for these figures are developed by the Plan Development team (PDT). The Science and Statistical Committee (SSC) recommends ABC levels, and the NEFMC approves final ACLs, but cannot exceed the SSC's recommended levels. ACLs may be broken into subcomponents for different segments of the fishery, including state waters, commercial, recreational, sectors, and the common pool. Although the following stocks do have ACLs, possession is prohibited due to their overfished status: SNE/MA winter flounder, windowpane flounder, ocean pout, and wolffish. In addition, halibut catch is limited to one fish per trip. Northeast Multispecies permit holders are eligible to receive an allocation for the remaining 14 groundfish stocks. Acceptable Biological Catch (ABC) Recommendations for the Northeast Multispecies Fishery, MSY targets and ACL's are now subject to adjustment by Science and Statistics Committee (SSC) evaluation according to Magnusson Act. Acceptable Biological Catch (ABC) may be the rule for rebuilding stocks and are usually lower than currently established MSY targets or Annual Catch Limits (ACL)Management (i.e. landings) and scientific (i.e. model error) uncertainties are now identified and quantified and must be accounted for in setting ACL's. A score of 80 is justified for issue a.

		Georges Bank Haddock The current regulations, which were implemented by Amendment 16 in 2010, implement new requirements under the Magnuson-Stevens Reauthorization Act (MSRA) of 2006. The MSRA requires the NEFMC to determine Annual Catch Limits (ACLs) and Accountability Measures (AMs) for all managed stocks. This action implements a process for calculating an ACL in addition to the Overfishing Level (OFL) and Acceptable Biological Catch (ABC) for each stock. Recommendations for these figures are developed by the Plan Development team (PDT). The Science and Statistical Committee (SSC) recommends ABC levels, and the NEFMC approves final ACLs, but cannot exceed the SSC's recommended levels. ACLs may be broken into subcomponents for different segments of the fishery, including state waters, commercial, recreational, sectors, and the common pool. Although the following stocks do have ACLs, possession is prohibited due to their overfished status: SNE/MA winter flounder, windowpane flounder, ocean pout, and wolffish. In addition, halibut catch is limited to one fish per trip. Northeast Multispecies permit holders are eligible to receive an allocation for the remaining 14 groundfish stocks. Acceptable Biological Catch (ABC) Recommendations for the Northeast Multispecies Fishery MSY targets and ACL's are now subject to adjustment by Science and Statistics Committee (SSC) evaluation according to Magnusson Act. Acceptable Biological Catch (ABC) may be the rule for rebuilding stocks and are usually lower than currently established MSY targets or Annual Catch Limits (ACL)Management (i.e. landings) and scientific (i.e. model error) uncertainties are now identified and quantified and must be accounted for in setting ACL's. A score of 80 is justified for issue a.		
b	**Guidepost**		The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules takes into account a wide range of uncertainties.
	Met?		Y	N
	Justification	The selection of the harvest control rules takes into account the main uncertainties for all species. **Acadian Redfish** The current regulations, which were implemented by Amendment 16 in 2010, implement new requirements under the Magnuson-Stevens Reauthorization Act (MSRA) of 2006. The MSRA requires the NEFMC to determine Annual Catch Limits (ACLs) and Accountability Measures (AMs) for all managed stocks. This action implements a process for calculating an ACL in addition to the Overfishing Level (OFL) and Acceptable Biological Catch (ABC) for each stock. Recommendations for these figures are developed by the Plan Development team (PDT). The Science and Statistical Committee (SSC) recommends ABC levels, and the NEFMC approves final ACLs, but cannot exceed the SSC's recommended levels. ACLs may be broken into subcomponents for different segments of the fishery, including state waters, commercial, recreational, sectors, and the common pool. Although the following stocks do have ACLs, possession is prohibited due to their overfished status: SNE/MA winter flounder, windowpane flounder, ocean pout, and wolffish. In addition, halibut catch is limited to one fish per trip. Northeast Multispecies permit holders are eligible to receive an allocation for the remaining 14 groundfish stocks.		

		Acceptable Biological Catch (ABC) Recommendations for the Northeast Multispecies Fishery, MSY targets and ACL's are now subject to adjustment by Science and Statistics Committee (SSC) evaluation according to Magnusson Act. Acceptable Biological Catch (ABC) may be the rule for rebuilding stocks and are usually lower than currently established MSY targets or Annual Catch Limits (ACL)Management (i.e. landings) and scientific (i.e. model error) uncertainties are now identified and quantified and must be accounted for in setting ACL's. There is no actual MSE work to evaluate harvest strategies. Harvest control rules take into account the main uncertainties, however, it cannot be said they take into account a wide range of uncertainties. A score of 80 but not 100 can be justified for issue b.
		US Atlantic Pollock The current regulations, which were implemented by Amendment 16 in 2010, address the requirements the Magnuson-Stevens Reauthorization Act (MSRA) of 2006. The MSRA requires the NEFMC to determine Annual Catch Limits (ACLs) and Accountability Measures (AMs) for all managed stocks. This action implements a process for calculating an ACL in addition to the Overfishing Level (OFL) and Acceptable Biological Catch (ABC) for each stock. Recommendations for these figures are developed by the PDT. The Science and Statistical Committee (SSC) recommends ABC levels, and the NEFMC approves final ACLs, but cannot exceed the SSC's recommended levels. ACLs may be broken into subcomponents for different segments of the fishery, including state waters, commercial, recreational, sectors, and the common pool. Acceptable Biological Catch (ABC) Recommendations for the Northeast Multispecies Fishery MSY targets and ACL's are now subject to adjustment by Science and Statistics Committee (SSC) evaluation according to Magnusson Act. Acceptable Biological Catch (ABC) may be the rule for rebuilding stocks and are usually lower than currently established MSY targets or Annual Catch Limits (ACL)Management (i.e. landings) and scientific (i.e. model error) uncertainties are now identified and quantified and must be accounted for in setting ACL's. There is no actual MSE work to evaluate harvest strategies Harvest control rules take into account the main uncertainties, however, it cannot be said they take into account a wide range of uncertainties. A score of 80 but not 100 can be justified for issue b.
		Gulf of Maine Haddock The current regulations, which were implemented by Amendment 16 in 2010, address the requirements the Magnuson-Stevens Reauthorization Act (MSRA) of 2006. The MSRA requires the NEFMC to determine Annual Catch Limits (ACLs) and Accountability Measures (AMs) for all managed stocks. This action implements a process for calculating an ACL in addition to the

		Overfishing Level (OFL) and Acceptable Biological Catch (ABC) for each stock. Recommendations for these figures are developed by the PDT. The Science and Statistical Committee (SSC) recommends ABC levels, and the NEFMC approves final ACLs, but cannot exceed the SSC's recommended levels. ACLs may be broken into subcomponents for different segments of the fishery, including state waters, commercial, recreational, sectors, and the common pool. Acceptable Biological Catch (ABC) Recommendations for the Northeast Multispecies Fishery MSY targets and ACL's are now subject to adjustment by Science and Statistics Committee (SSC) evaluation according to Magnusson Act. Acceptable Biological Catch (ABC) may be the rule for rebuilding stocks and are usually lower than currently established MSY targets or Annual Catch Limits (ACL)Management (i.e. landings) and scientific (i.e. model error) uncertainties are now identified and quantified and must be accounted for in setting ACL's. There is no actual MSE work to evaluate harvest strategies Harvest control rules take into account the main uncertainties, however, it cannot be said they take into account a wide range of uncertainties. A score of 80 but not 100 can be justified for issue b.
		Georges Bank Haddock The current regulations, which were implemented by Amendment 16 in 2010, address the requirements the Magnuson-Stevens Reauthorization Act (MSRA) of 2006. The MSRA requires the NEFMC to determine Annual Catch Limits (ACLs) and Accountability Measures (AMs) for all managed stocks. This action implements a process for calculating an ACL in addition to the Overfishing Level (OFL) and Acceptable Biological Catch (ABC) for each stock. Recommendations for these figures are developed by the PDT. The Science and Statistical Committee (SSC) recommends ABC levels, and the NEFMC approves final ACLs, but cannot exceed the SSC's recommended levels. ACLs may be broken into subcomponents for different segments of the fishery, including state waters, commercial, recreational, sectors, and the common pool. Acceptable Biological Catch (ABC) Recommendations for the Northeast Multispecies Fishery MSY targets and ACL's are now subject to adjustment by Science and Statistics Committee (SSC) evaluation according to Magnusson Act. Acceptable Biological Catch (ABC) may be the rule for rebuilding stocks and are usually lower than currently established MSY targets or Annual Catch Limits (ACL)Management (i.e. landings) and scientific (i.e. model error) uncertainties are now identified and quantified and must be accounted for in setting ACL's. There is no actual MSE work to evaluate harvest strategies Harvest control rules take into account the main uncertainties, however, it cannot be said they take into account a wide range of uncertainties. A score of 80 but not 100 can be justified for issue b.

c	**Guidepost**	There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
	Met?	Y	Y	Y
	Justification	For all species, evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules. **Acadian Redfish** The estimated fishing mortalities for 2010 from the base and alternative models 2010 were 84% less than the new (or GARM III) F (50%MSP) reference point. The estimated Groundfish Assessment Updates from 2012 show Acadian Redfish spawning biomasses in 2010 from the base and alternative models on a magnitude of 24% and 32% greater than the respective new $SSB_{(50\%MSP)}$ reference point. A score of 100 is justified for issue c.		
		US Atlantic Pollock The estimate of SSB_{2013} is 126,000 mt, which is greater than the median estimate of SSB_{MSY} (76,900 mt). Therefore, the pollock stock is not overfished. The estimate of average F on ages 5 to 7 in 2013 is 0.10, which is less than the F_{MSY} proxy (0.27), therefore overfishing is not occurring. A score of 100 is justified for issue c.		
		Gulf of Maine Haddock There has been reduction on the fishing mortality which resulted in an increased biomass. Fishing Mortality: The lowest estimate of fully selected fishing mortality (F_{full}) over the assessment time series is 0.19 (2004). The 2013 F_{full} is 0.39 (90% posterior probability interval 0.24 – 0.60) which is lower than the time series average of 0.59 and the current F_{MSY} proxy of 0.46. Biomass: SSB_{2013} is 4,153 mt (90% posterior probability interval 2,960 – 6,043 mt). The estimate of 2013 spawning stock biomass is above the SSB_{MSY} proxy of 4,108 mt A score of 100 is justified for issue c.		
		Georges Bank Haddock The estimate of SSB_{2010} is 167,278 mt, which is greater than the median estimate of SSB_{MSY} (124,900 mt). Therefore, the Georges Bank haddock stock is not overfished. The estimate of F on fully selected fish in 2010 is 0.24, which is less than the F_{MSY} proxy (0.39), therefore overfishing is not occurring. Applying Mohn's rho for 7 years did not cause the stocks status to differ from the calculated confidence interval, therefore the retrospective pattern was not considered for additional sensitivity configurations (Figure 19). A score of 100 is justified for issue c.		

<table>
<tr><td>References</td><td>2012 Acadian redfish update assessment report:
Northeast Fisheries Science Center (NEFSC). 2008
Northeast Fisheries Science Center (NEFSC). 2010
http://www.nefsc.noaa.gov/saw/Op%20Assessment/index.html
Northeast Fisheries Science Center. 2014. 59th Northeast Regional Stock Assessment Workshop (59th SAW) Assessment Report.
Northeast Fisheries Science Center (NEFSC). 2012. Assessment or Data Updates of 13 Northeast Groundfish Stocks through 2010. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-06; 789 p.,</td></tr>
<tr><td>Score</td><td><table><tr><td>Acadian Redfish</td><td>Pollock</td><td>GOM Haddock</td><td>GB Haddock</td></tr><tr><td>95</td><td>95</td><td>95</td><td>95</td></tr></table></td></tr>
<tr><td colspan="2">OVERALL PERFORMANCE INDICATOR SCORE:</td><td>95</td></tr>
<tr><td colspan="2">CONDITION NUMBER (if relevant):</td><td>NA</td></tr>
</table>

Evaluation Table for PI 1.2.3.

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Y	Y	Y
	Justification	For all species, a comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available. **Acadian Redfish** Research studies over a protracted period have provided considerable knowledge of all aspects of redfish life history, population biology, ecology and stock structure throughout the Gulf of Maine region. Stock productivity and abundance are monitored by way of two annual RV bottom trawl surveys (NMFS spring and fall), which provide ongoing, fishery-independent indices of abundance and biomass at age as well as detailed information on size, age and maturity composition. Detailed information on number and type of vessels in the fishery is collected through each country's licensing system. The temporal and spatial patterns of the fishery, gear usage, etc. are well known. Acadian Redfish is an important harvested species in the multi-species groundfish fishery on Gulf of Maine region. Gears used to prosecute the fishery tend to capture a variety of groundfish species, whether they are the target of the fishery or not. When fishing on Gulf of Maine, all vessels in the commercial groundfish 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 All landings are monitored at the dockside point of offloading. Monitors verify the weight and the species of fish offloaded. Observer coverage levels during the 2010-2013 period averaged 21% of the bottom trawl gear subtrips[1]. In addition to the foregoing, the whole Georges Bank-Gulf of Maine-Bay region has been the focus of extensive ecosystem research for many years. A score of 100 is justified for issue a. [1]http://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/Sectors/ASM/asmcvdata.html		
		US Atlantic Pollock Research studies over a protracted period have provided considerable knowledge of all aspects of haddock life history, population biology, ecology and stock structure throughout the Gulf of Maine/ Georges Bank region. Stock productivity and abundance are monitored by way of two annual RV bottom trawl surveys (NMFS spring and fall), which provide ongoing, fishery-independent indices of abundance and biomass at age as well as detailed information on size, age		

		and maturity composition. Detailed information on number and type of vessels in the fishery is collected through each country's licensing system. The temporal and spatial patterns of the fishery, gear usage, etc. are well known. US Atlantic Pollock is an important harvested species in the multi-species groundfish fishery on Gulf of Maine/ Georges Bank region. Gears used to prosecute the fishery tend to capture a variety of groundfish species, whether they are the target of the fishery or not. When fishing on Gulf of Maine and Georges Bank, all vessels in the commercial groundfish 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 All landings are monitored at the dockside point of offloading. Monitors verify the weight and the species of fish offloaded. Observer coverage levels during the 2010-2013 period averaged 21% of the bottom trawl gear subtrips1. In addition to the foregoing, the whole Georges Bank-Gulf of Maine-Bay region has been the focus of extensive ecosystem research for many years. A score of 100 is justified for issue a. [1]http://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/Sectors/ASM/asmcvdata.html
		Gulf of Maine Haddock Research studies over a protracted period have provided considerable knowledge of all aspects of haddock life history, population biology, ecology and stock structure throughout the Gulf of Maine region. Stock productivity and abundance are monitored by way of two annual RV bottom trawl surveys (NMFS spring and fall), which provide ongoing, fishery-independent indices of abundance and biomass at age as well as detailed information on size, age and maturity composition. Detailed information on number and type of vessels in the fishery is collected through each country's licensing system. The temporal and spatial patterns of the fishery, gear usage, etc. are well known. Haddock is the key harvested species in the multi-species groundfish fishery on Gulf of Maine. Gears used to prosecute the fishery tend to capture a variety of groundfish species, whether they are the target of the fishery or not. When fishing on Gulf of Maine, all vessels in the commercial groundfish 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 All landings are monitored at the dockside point of offloading. Monitors verify the weight and the species of fish offloaded. Observer coverage levels during the 2010-2013 period averaged 26% of the bottom trawl gear subtrips[1]. In addition to the foregoing, the whole Georges Bank-Gulf of Maine-Bay region has been the focus of extensive ecosystem research for many years. A score of 100 is justified for issue a. [1]http://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/Sectors/ASM/asmcvdata.html
		Georges Bank Haddock Research studies over a protracted period have provided considerable knowledge of all aspects of haddock life history, population biology, ecology and stock structure throughout the Georges Bank region. Stock productivity and abundance are monitored by way of three annual RV bottom trawl surveys (NMFS spring and fall and DFO winter), which provide ongoing, fishery-independent indices of abundance and biomass at age as well as detailed information on size, age and maturity composition.

		Detailed information on number and type of vessels in the fishery is collected through each country's licensing system. The temporal and spatial patterns of the fishery, gear usage, etc. are well known. Haddock is the key harvested species in the multi-species groundfish fishery on Georges Bank. Gears used to prosecute the fishery tend to capture a variety of groundfish species, whether they are the target of the fishery or not. Under the Canada – US Transboundary Resources Understanding for groundfish stocks, both countries are responsible for accounting for all fishing mortality under the respective country quota. All vessels are required to hail-out to the Department (DFO) prior to departing on a fishing trip and are also required to hail-in from sea prior to returning to port. The hail-in is captured by a third-party, independent dockside monitoring company who records information on the vessel as well as the catch on board. A variety of information must also be reported to the Department in fishery monitoring documents completed by the captain for each trip. When fishing on Georges Bank, all vessels in the commercial groundfish 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 to the Department. All landings are monitored at the dockside point of offloading. Monitors verify the weight and the species of fish offloaded. Observer coverage is high in this fishery, averaging 21% of the Eastern Georges Bank and 22.5% of the Western Georges Bank subtrips[1] for the bottom trawl fisheries catch over the 2010-2013 period. In addition to the foregoing, the whole Georges Bank-Gulf of Maine region has been the focus of extensive ecosystem research for many years. A score of 100 is justified for issue a. 1http://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/Sectors/ASM/asmcvdata.html		
b	**Guidepost**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Y	Y	N
	Justification	For all species, stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule. **Acadian Redfish** The most recent stock assessment of Gulf of Maine-Georges Bank Acadian redfish incorporates information on the age composition of the landings, discards size and age composition of the population, and trends in relative abundance derived from research vessel survey biomass indices. Stock abundance is monitored by way of two annual RV bottom trawl surveys (NMFS spring and fall), which provide ongoing, fishery-independent indices of abundance and biomass at age as well as detailed information on size, age and maturity composition. Observer coverage levels during the 2010-2013 period averaged 21% of the bottom trawl gear subtrips1. In addition to the foregoing, the whole Georges Bank-Gulf of Maine-Bay region has been the focus of extensive ecosystem research for many years.		

		While information monitoring is carried out with a high degree of certainty and there is a good understanding of inherent uncertainties, it cannot be said that there is good understanding of the robustness of assessment and management to the uncertainty. A score of 80, but not 100, is justified for issue b.
		US Atlantic Pollock 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 research vessel survey biomass indices. Stock abundance is monitored by way of two annual RV bottom trawl surveys (NMFS spring and fall), which provide ongoing, fishery-independent indices of abundance and biomass at age as well as detailed information on size, age and maturity composition. The update assessment report also documents several revisions from the SAW50 data: recreational catch estimates, precision of recreational discards and commercial discard-at-age estimates for 2001-2008. Estimates of recreational catch for 2004 to 2013 were derived from the newly developed Marine Recreational Information Program (MRIP), replacing the SAW50 estimates for 2004-2009, and previous estimates (1970-2003) were converted to be compatible with the new series using a conversion factor developed by NMFS (2012). The updated assessment used the average of annual precision estimates from SAW50 for recreational discards (average CV=0.68) and commercial discards (average CV=0.3) because the recreational precision estimates could not be replicated. Observer coverage levels during the 2010-2013 period averaged 21% of the bottom trawl gear subtrips1. In addition to the foregoing, the whole Georges Bank-Gulf of Maine-Bay region has been the focus of extensive ecosystem research for many years. While information monitoring is carried out with a high degree of certainty and there is a good understanding of inherent uncertainties, it cannot be said that there is good understanding of the robustness of assessment and management to the uncertainty. A score of 80, but not 100, is justified for issue b.
		Gulf of Maine Haddock 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 research vessel survey biomass indices. Stock abundance is monitored by way of two annual RV bottom trawl surveys (NMFS spring and fall), which provide ongoing, fishery-independent indices of abundance and biomass at age as well as detailed information on size, age and maturity composition. The catch inputs included landings and discards from both the commercial and recreational fleets. Observer coverage levels during the 2010-2013 period averaged 26% of the bottom trawl gear sub trips. In addition to the foregoing, the whole Georges Bank-Gulf of Maine-Bay region has been the focus of extensive ecosystem research for many years. While information monitoring is carried out with a high degree of certainty and there is a good understanding of inherent uncertainties, it cannot be said that there is good understanding of the robustness of assessment and management to the uncertainty. A score of 80, but not 100, is justified for issue b.

		Georges Bank Haddock Stock abundance is monitored by way of three annual RV bottom trawl surveys (NMFS spring and fall and DFO winter), which provide ongoing, fishery-independent indices of abundance and biomass at age as well as detailed information on size, age and maturity composition. Haddock is the key harvested species in the multi-species groundfish fishery on Georges Bank. Gears used to prosecute the fishery tend to capture a variety of groundfish species, whether they are the target of the fishery or not. Under the Canada – US Transboundary Resources Understanding for groundfish stocks, both countries are responsible for accounting for all fishing mortality under the respective country quota. All 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 the Department in fishery monitoring documents completed by the captain for each trip. Observer coverage is high in this fishery, averaging 36% of the mobile gear catch and 13.5% of the fixed gear catch over the 2004-2013 period. Coverage of the scallop fishery, which catches haddock incidentally, is sufficiently high to estimate how much haddock is discarded by the fleet throughout the entire season. However, there is inherent uncertainty associated with haddock in Eastern Georges Bank (5Zjm) being part of a transboundary stock on which there is a two-nation fishery. While information monitoring is carried out with a high degree of certainty and there is a good understanding of inherent uncertainties, it cannot be said that there is good understanding of the robustness of assessment and management to the uncertainty. A score of 80, but not 100, is justified for issue b.		
c	**Guidepost**		There is good information on all other fishery removals from the stock.	
	Met?		Y	
	Justification	For all species there is good information on all other fishery removals from the stock **Acadian Redfish** Redfish is a key harvested species in the multi-species groundfish fishery on Gulf of Maine/Georges Bank. Gears used to prosecute the fishery tend to capture a variety of groundfish species, whether they are the target of the fishery or not. 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 the Department in fishery monitoring documents completed by the captain for each trip. The catch inputs included landings and discards from both the commercial and recreational fleets. Observer coverage levels during the 2010-2013 period averaged 21% of the bottom trawl gear subtrips1. In addition to the foregoing, the whole Georges Bank-Gulf of Maine-Bay region has been the focus of extensive ecosystem research for many years. A score of 80 is justified for issue c.		

		US Atlantic Pollock Pollock is a key harvested species in the multi-species groundfish fishery on Gulf of Maine/Georges Bank. Gears used to prosecute the fishery tend to capture a variety of groundfish species, whether they are the target of the fishery or not. Federal management agencies are responsible for accounting for all fishing mortality. 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 the Department in fishery monitoring documents completed by the captain for each trip. The catch inputs include landings and discards from both the commercial and recreational fleets. Observer coverage levels during the 2010-2013 period averaged 21% of the bottom trawl gear subtrips1. In addition to the foregoing, the whole Georges Bank-Gulf of Maine-Bay region has been the focus of extensive ecosystem research for many years. A score of 80 is justified for issue c.
		Gulf of Maine Haddock Haddock is the key harvested species in the multi-species groundfish fishery on Gulf of Maine. Gears used to prosecute the fishery tend to capture a variety of groundfish species, whether they are the target of the fishery or not. Federal management agencies are responsible for accounting for all fishing mortality quota. 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 the Department in fishery monitoring documents completed by the captain for each trip. The catch inputs included landings and discards from both the commercial and recreational fleets. Observer coverage levels during the 2010-2013 period averaged 26% of the bottom trawl gear subtrips1. In addition to the foregoing, the whole Georges Bank-Gulf of Maine-Bay region has been the focus of extensive ecosystem research for many years. A score of 80 is justified for issue c.
		Georges Bank Haddock Haddock is the key harvested species in the multi-species groundfish fishery on Georges Bank. Gears used to prosecute the fishery tend to capture a variety of groundfish species, whether they are the target of the fishery or not. Under the Canada – US Transboundary Resources Understanding for groundfish stocks, both countries are responsible for accounting for all fishing mortality under the respective country quota. 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 the Department in fishery monitoring documents completed by the captain for each trip. Observer coverage is high in this fishery, averaging 36% of the mobile gear catch and 13.5% of the fixed gear catch over the period 2004 – 2013. Coverage of the scallop fishery, which catches haddock incidentally, is sufficiently high to estimate how much haddock is discarded by the fleet throughout the entire season. A score of 80 is justified for issue c.
References		2012 Acadian redfish update assessment report: Northeast Fisheries Science Center (NEFSC). 2008 Northeast Fisheries Science Center (NEFSC). 2010 http://www.nefsc.noaa.gov/saw/Op%20Assessment/index.html Northeast Fisheries Science Center. 2014. 59th Northeast Regional Stock Assessment Workshop (59th SAW) Assessment Report. Northeast Fisheries Science Center (NEFSC). 2012. Assessment or Data Updates of 13 Northeast Groundfish Stocks through 2010. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-06,
Score		Acadian Redfish 90 / Pollock 90 / GOM Haddock 90 / GB Haddock 90
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		**NA**

Evaluation Table for PI 1.2.4.

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**		The assessment is appropriate for the stock and for the harvest control rule.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
	Met?		Y	Y
	Justification	For all species, the assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery. **Acadian Redfish** Evaluation of stock status is based on results from an age structured analytical assessment (ASAP) that uses fishery catch statistics and sampling for size and age composition of the catch (including discards). The ASAP is calibrated to trends in abundance from three bottom trawl survey series: NMFS spring, NMFS fall and DFO winter. 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. A score of 100 is justified for issue a. **US Atlantic Pollock** Evaluation of stock status is based on results from an age structured analytical assessment (ASAP) that uses fishery catch statistics and sampling for size and age composition of the catch (including discards). The ASAP model is calibrated to trends in abundance from three bottom trawl survey series: NMFS spring, NMFS fall and DFO winter. 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. A score of 100 is justified for issue a. **Gulf of Maine Haddock** The use of a statistical catch-at-age model for the Gulf of Maine haddock assessment was explored(statistical catch-at-age model, ASAP (Age Structured Assessment Program v3.0.17, Legault and Restrepo 1998) ASAP is an age-structured 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 Gulf of Maine haddock is highly episodic and not well described by traditional stock recruitment relationships. Given this, an MSY proxy was used for reference points. F40% is the proxy used for the overfishing threshold (F_{MSY}). This is consistent with the choice of proxy in the previous assessment. The ASAP model is calibrated to trends in abundance from three bottom trawl survey series: NMFS spring, NMFS fall and DFO winter. 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. In the most recent assessment, retrospective analysis showed lower biomass, higher F and lower recruitment for several years of the analysis, however, differences were not considered sufficient to warrant a rho adjustment. A score of 100 is justified for issue a.		

		Georges Bank Haddock Evaluation of stock status is based on results from an age structured analytical assessment (Virtual Population Analysis, VPA) that uses fishery catch statistics and sampling for size and age composition of the catch (including discards). The VPA is calibrated to trends in abundance from three bottom trawl survey series: NMFS spring, NMFS fall and DFO winter. 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. A score of 100 is justified for issue a.		
b	**Guidepost**	The assessment estimates stock status relative to reference points.		
	Met?	Y		
	Justification	For all species the assessment estimates stock status relative to reference points. **Acadian Redfish** The assessment provides an estimate of stock status in relation to reference points established for the Acadian Redfish. A score of 60 is justified for issue b. **US Atlantic Pollock** The assessment provides an estimate of stock status in relation to reference points established for the US Atlantic Pollock stock. A score of 60 is justified for issue b. **Gulf of Maine Haddock** The assessment provides an estimate of stock status in relation to reference points established for the GOM haddock stock. A score of 60 is justified for issue b. **Georges Bank Haddock** The assessment provides an estimate of stock status in relation to reference points established for the GB haddock stock. A score of 60 is justified for issue b.		
c	**Guidepost**	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	Y	Y	Y
	Justification	For all species the assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way. **Acadian Redfish** Evaluation of stock status is based on results from a statistical catch-at-age model, ASAP (Age Structured Assessment Program v2.0.20, Legault and Restrepo 1998). ASAP is an age-structured 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. The ASAP is calibrated to trends in abundance from three bottom trawl survey series: NMFS spring, NMFS fall. 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_{ref} for a range of catch options. A score of 100 is justified for issue c. **US Atlantic Pollock** Evaluation of stock status is based on results from a statistical catch-at-age model, ASAP (Age Structured Assessment Program v2.0.20, Legault and Restrepo 1998). ASAP is an age-structured 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. The ASAP model is calibrated to trends in abundance from three bottom trawl survey series: NMFS spring, NMFS fall. 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_{ref} for a range of catch options. A score of 100 is justified for issue c. **Gulf of Maine Haddock** Evaluation of stock status is based on results from an age structured analytical assessment (Virtual Population Analysis, VPA) that uses fishery catch statistics and sampling for size and age composition of the catch (including discards). The VPA is calibrated to trends in abundance from three bottom trawl survey series: NMFS spring, NMFS fall and DFO winter. 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_{ref} for a range of catch options. A score of 100 is justified for issue c. **Georges Bank Haddock** Evaluation of stock status is based on results from an age structured analytical assessment (Virtual Population Analysis, VPA) that uses fishery catch statistics and sampling for size and age composition of the catch (including discards). The VPA is calibrated to trends in abundance from three bottom trawl survey series: NMFS spring, NMFS fall and DFO winter. 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_{REF} for a range of catch options. A score of 100 is justified for issue c.		
d	**Guidepost**			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Y
	Justification	For all species the assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored. **Acadian Red Fish** The model used to assess status of US Atlantic Redfish is subject to ongoing rigorous review and evaluation. Adjustments are made as necessary to correct for any bias or other uncertainty that is detected. A score of 100 is justified for issue d. **US Atlantic Pollock** The model used to assess status of US Atlantic Pollock is subject to ongoing rigorous review and evaluation. Adjustments are made as necessary to correct for any bias or other uncertainty that is detected. A score of 100 is justified for issue d.		

		Gulf of Maine Haddock The model used to assess status of GOM haddock is subject to ongoing rigorous review and evaluation. Adjustments are made as necessary to correct for any bias or other uncertainty that is detected. A score of 100 is justified for issue d. **Georges Bank Haddock** The model used to assess status of GB haddock is subject to ongoing rigorous review and evaluation. Adjustments are made as necessary to correct for any bias or other uncertainty that is detected. A score of 100 is justified for issue d.		
e	**Guidepost**		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		Y	Y
	Justification	For all species, the assessments have been internally and externally peer reviewed. **Acadian Red Fish** NMFS conduct internal reviews and occasionally a framework review/assessment is carried out that is subject to review by external experts. A score of 100 is justified for issue e. **US Atlantic Pollock** NMFS conduct internal reviews and occasionally a framework review/assessment is carried out that is subject to review by external experts. A score of 100 is justified for issue e. **Gulf of Maine Haddock** NMFS conduct internal reviews and occasionally a framework review/assessment is carried out that is subject to review by external experts. A score of 100 is justified for issue e. **Georges Bank Haddock** NMFS conduct internal reviews and occasionally a framework review/assessment is carried out that is subject to review by external experts. A score of 100 is justified for issue e.		
References		2012 Acadian redfish update assessment report: Northeast Fisheries Science Center (NEFSC). 2008 Northeast Fisheries Science Center (NEFSC). 2010 http://www.nefsc.noaa.gov/saw/Op%20Assessment/index.html Northeast Fisheries Science Center. 2014. 59th Northeast Regional Stock Assessment Workshop (59th SAW) Assessment Report. Northeast Fisheries Science Center (NEFSC). 2012. Assessment or Data Updates of 13 Northeast Groundfish Stocks through 2010. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-06; 789 p.,		
Score		Acadian Redfish 100	Pollock 100	GOM Haddock 100	GB Haddock 100
OVERALL PERFORMANCE INDICATOR SCORE:					**100**
CONDITION NUMBER (if relevant):					**N/A**

PRINCIPLE 2: Ecosystem

Evaluation Table for PI 2.1.1.

Overall Score is based on combined scoring of different elements (species). Each species had different individual score based on the guidelines of Table C2-MSC v1.3.

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).	There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.
	Met?	Y White hake Y American Plaice Y GOM Winter Flounder N GOM/GB Yellowtail Flounder (see c below) N Witch Flounder (see c below) N GB Winter Flounder (see c below) N GOM/GB Cod (see c below)	Y White hake Y American Plaice Y GOM Winter Flounder N GOM/GB Yellowtail Flounder (see c below) N Witch Flounder (see c below) N GB Winter Flounder (see c below) N GOM/GB Cod (see c below)	Major Species N White hake N American Plaice N GB/GOM Winter Flounder N GOM/GB Cod N GOM/GB Yellowtail Flounder N Witch Flounder Minor species N Atlantic Halibut N Windowpane Flounder N Atlantic Wolfish N Ocean Pout
	Justification	**Main retained species** are highly likely to be within biologically based limits except for GOM/GB cod, GB Winter flounder,Witch flounder **White Hake.** Fishing mortality has varied over a wide range since the 1970s but presently is well below the F_{MSY} proxy. The improving condition of the stock is indicated by the more than threefold increase in spawning stock biomass from a time series low in 1997 (NEFSC 2013b). White Hake is highly likely to be within biologically based limits and scores 80. **American Plaice.** The most recent stock assessment determined that the American plaice stock is not overfished and overfishing is not occurring (NEFSC 2012). Commercial catch has declined since 2003. Fishing mortality in 2010 (0.09) was among the lowest estimates in the time series. Biomass has been increasing since 2004 and SSB_{2010} was 59% of SSB_{MSY}. American Plaice is highly likely to be within biologically based limits and scores 80. **GOM Winter Flounder.** The overfished status remains unknown because a biomass reference point or proxy could not be determined. The biomass estimate for 2010 was 16% lower than that for 2009 using the same survey methods, but this difference was not statistically significant. In 2014 overfishing was not occurring for the stock. Please see section c		

GB Winter Flounder. In 2014, the stock was overfished and overfishing was occurring. SSB_{2014} was estimated to be 5,275 (mt) which is 79% of the biomass target for an overfished stock (SSB_{MSY} = 6,700 with a threshold of 50% of SSB_{MSY}. The 2014 fully selected fishing mortality (F) was estimated to be 0.379 which is 71% of the overfishing threshold (F_{MSY} = 0.536) . However, SSB_{2014} and F_{2014}, when adjusted for retrospective error (83% for SSB and -51% for F), is outside the 90% confidence interval of the unadjusted 2014 point estimate. Therefore, F_{2014} and SSB_{2014} values used in the stock status determination were the retrospective-adjusted values of 0.778 and 2,883 mt, respectively. It does not meet 80a . Please see section c.

GOM Cod. The GOM Atlantic cod stock is overfished and overfishing is occurring. SSB_{2015} was estimated to be below 2,500 mt, the lowest ever estimated and is at 4% of the SSB_{MSY}. It does not meet 80a. Please see section c.

GB Cod. Productivity of the stock is low with two decades of poor recruitment and a truncated age structure (NEFSC 2015). Given the uncertainty in the magnitude of M and the overfished state of the stock, at 1% of SSB_{MSY} the stock is vulnerable to an allowable biological catch (ABC) quota that is too high (NEFSC 2013a.) It does not meet 80a. Please see section c

Yellowtail Flounder. NEFMC manages three stocks off the U.S. coast including the Cape Cod/GOM, GB, and SNE/MA stocks. The latter stock is beyond the geographic limits of the present certification assessment and will not be discussed further.

GOM Yellowtail Flounder. The Cape Cod/GOM yellowtail flounder stock continues to be overfished and overfishing is continuing. SSB_{2010} was estimated to be 1,680 mt (with retrospective adjustment). F_{2010} was estimated to be 0.36 (with retrospective adjustment). Revised estimates of the biological reference points are: SSB_{MSY} proxy= 7,080 mt, F_{MSY} proxy = 0.26, and MSY proxy= 1,600 mt. Based on these results, the stock of Cape Cod-Gulf of Maine yellowtail flounder was overfished and overfishing was occurring. However, fishing mortality had been declining since 2004 and was at the lowest level observed in the time series in 2009. Spawning stock biomass was increasing the few years previous to the assessment (NEFSC 2012). On the latest stock assessment, it was found GOM yellowtail flounder is overfished and overfishing is ocurring(NEFSC 2015).It does not meet 80a. Please see section c.

GB Yellowtail Flounder. The exact status determination for GB yellowtail flounder is unknown. Overfishing is unknown. Stock assessment scientists at the NEFSC have had problems fitting population models that performed satisfactorily to this stock (NEFSC 2012,2015). Therefor because a stock assessment model is lacking for this stock, no historical estimates of biomass, fishing mortality rate, or recruitment canbe calculated. The NEFMC has proposed to adopt an empirical approach for GB yellowtail flounder based on resource survey catches as the basis of catch advice (NEFMC 2015). Current stock biomass are in the lowest levels of the time series. It is in poor condition. It does not meet 80a. Please see section c.

Witch Flounder. The most recent stock assessment for witch flounder (NEFSC 2015) determined that witch flounder is overfished and overfishing is occurring (SSB_{2014} was estimated to be 3,129 (mt) which is 33% of the SSB_{MSY} proxy (9,473). F_{2014} was estimated to be 0.428 which is 153% of the F_{MSY} proxy (0.279). It does not meet 80a. Please see section c.

		Minor Species **Atlantic Halibut.** Historically Atlantic halibut were subject to severe overfishing Musick et al. 2000). Recent survey indices are highly variable because the NEFSC trawl surveys catch low numbers of halibut. Based on the results of a 2015 assessment update, Atlantic halibut status is unknown (NEFSC 2015). It does not meet 100a **Windowpane Flounder.** In US waters windowpane flounder are managed as two stocks, SNE/MAB and GOM/GB. Only the latter is of concern here. Indices from NEFSC fall surveys are used as an indicator of stock abundance and biomass. These biomass indices have fluctuated above and below the time series median as fishing mortality rates have fluctuated below and above the point where the stock could replenish itself. Windowpane flounder is a non-allocated stock that is predominately discarded at-sea, and total catch estimates in the groundfish fishery are extrapolated based on observer data .Biomass indices increased to levels at or slightly above the median during 1998-2003, but then fell below the median from 2004-2010 and was 29% of B_{MSY} in 2010 (NEFSC 2012). According to a 2015 assessment update, the stock was overfished and overfishing is not occurring in 2014 (NEFSC 2015). It does not meet 100a. **Atlantic Wolfish.** NEFSC spring and fall bottom trawl survey indices show abundance and biomass of Atlantic wolffish generally has declined over the last two to three decades. However, Atlantic wolffish are encountered infrequently on NEFSC bottom trawl surveys and there is uncertainty as to whether the NEFSC surveys adequately sample this species (it prefers rocky bottoms) (NDPSWG, 2009). Atlantic wolffish continues to be considered a data poor species. An assessment update in 2015 determined that the stock is overfished, but overfishing is not occurring (NEFSC 2015). It does not meet 100a. **Ocean Pout.** In U.S. waters, ocean pout are assessed and managed as a unit stock from the Gulf of Maine to Delaware (NEFMC 2015). Between 1975 and 1985, NEFSC spring trawl survey biomass indices increased to record high levels, peaking in 1981 and 1985. Since 1985, survey catch per tow indices have generally declined, and the 2010 index was the lowest value in the time series. Catch and exploitation rates have also been low, but stock size has not increased. A 2015 assessment update determined that in 2014 ocean pout was overfished, but overfishing was not occurring (NEFSC 2015). It does not meet 100a.		
b	**Guidepost**			Target reference points are defined for retained species.
	Met?			Y All Retained Species
	Justification	Target reference points are defined for all retained species in the fishery. The Northeast Multispecies Fishery Management Plan (FMP) specifies the management measures for thirteen groundfish species. Target Reference Points must be identified for each managed stock under the law The most recent (April 2015) reference points for all species in this plan are given in table 6 above. These include: U.S. ABC, Total ACL, for all species, and OFL for all species except GB Yellowtail Flounder. The Total ACL is the most conservative and important for management. All retained species score 100.		

c	**Guidepost**	If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.	If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	Y GOM/GB Yellowtail Flounder Y Witch Flounder Y GB Winter Flounder Y GOM/GB Cod	N GOM/GB Yellowtail Flounder Y GOM Winter Flounder N Witch Flounder, N GB Winter Flounder N GOM/GB Cod	
	Justification	There is a partial strategy of management measures in place such that the fishery does not hinder recovery and rebuilding. The NE multispecies groundfish complex has been managed by seasonal and year-round area closures, gear restrictions (e.g., mesh size, number of nets/hooks, etc.), minimum fish size limits, trip limits on poundage of fish per trip, limited access (number of participants in the fishery) and restrictions on the yearly number of DAS when vessels are allowed to fish for groundfish (CFR Title 50 § 648). For species and stocks that are considered overfished, amendment 16 to the NE Multispecies FMP has implemented rebuilding plans by decreasing fishing pressure on these stocks as much as practicable. However it remains to be seen if these measures acting as a partial strategy are demonstrably effective given the mixed results on rebuilding stocks. **GOM Cod.** There is a partial strategy enacted to promote stock recovery including a prohibition against retention in the recreational fishery, rolling spawning closures and a Total ACL of 366 mt in the commercial fishery. However this partial strategy has been implemented recently and therefore it's not proven that it's effective, preventing the fishery from meeting SG80. **GB Cod.** The US ABC was cut from 2506 mt in 2014 to 1980 mt in 2015. In addition Haddock separator trawls are mandated on parts of GB to reduce the catch of cod. However this partial strategy has been implemented recently and therefore it's not proven that it's effective, preventing the fishery from meeting SG80. **GOM Yellowtail Flounder.** Current status is overfished and overfishing is ocurring. Thus, current partial strategy has not been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80. **GB Yellowtail flounder.** Current status is unknown and overfishing status is unknown. Thus, it difficult to say that the current partial strategy has been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80. **GOM Winter flounder.** Current status is unknown and overfishing is not ocurring . Thus, current partial strategy has been effective in stopping overfishing . It meets 80.	

		GB Winter flounder. Current status is overfished and overfishing is ocurring . Thus, current partial strategy has not been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80. **Witch Flounder.** Current status is overfished and overfishing is ocurring . Thus current partial startegy has not been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80.		
d	**Guidepost**	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.		
	Met?	Y		
	Justification	The status of retained species is known for most species . The fishery does not pose a risk of harm to retained species, and does not hinder recovery of depleted species.		
References		NEFMC 2015, NEFSC 2012, NEFSC 2013b		
OVERALL PERFORMANCE INDICATOR SCORE: 60 = 6; 80 = 1; 90 = 6				**75**
CONDITION NUMBER (if relevant):				**1**

Evaluation Table for PI 2.1.2.

PI 2.1.2		There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing retained species.
	Met?	Y White hake Y American Plaice Y GOM/GB Winter Flounder Y GOM/GB Yellowtail Flounder Y Witch Flounder Y GOM/GB Cod	Y White hake Y American Plaice Y GOM Winter Flounder N GOM/GB Yellowtail Flounder N Witch Flounder N GB Winter Flounder N GOM/GB Cod	Major Species Y White hake Y American Plaice N GB/GOM Winter Flounder N GOM/GB Cod N GOM/GB Yellowtail Flounder N Witch Flounder Minor species Y Atlantic Halibut Y Windowpane Flounder Y Atlantic Wolfish Y Ocean Pout
	Justification	There is a strategy in place for managing all retained species except for GOM/GB Cod, GOM/GB Yellowtail flounder, GOM/GB Winter flounder, and Witch Flounder. The New England Fishery Management Council (NEFMC) is charged with developing management plans that meet the requirements of the Magnuson-Stevens Act (M-S Act). The Northeast Multispecies Fishery Management Plan (FMP) specifies the management measures for thirteen groundfish species (cod, haddock, yellowtail flounder, pollock, plaice, witch flounder, white hake, windowpane flounder, Atlantic halibut, winter flounder, redfish, Atlantic wolffish, and ocean pout) off the New England and Mid-Atlantic coasts. FMP. Amendment 16, which became effective on May 1, 2010, adopted a system of Annual Catch Limits (ACLs) and Accountability Measures (AMs) that are designed to ensure catches remain below desired targets for each stock in the management complex. The National Standard Guidelines provide advisory guidance for the implementation of these requirements. AMs are management controls to prevent ACLs from being exceeded and to correct or mitigate overages of the ACL if they occur. AMs should address and minimize both the frequency and magnitude of overages and correct the problems that caused the overages in as short a time as possible. AMs can be either in season AMs or AMs for when the ACL is exceeded (NEFMC 2015). This strategy seems to be working for White Hake, American Plaice which score 100, but not for GOM/GB Cod, GOM/GB Yellowtail flounder, GOM/GB Winter flounder, and Witch Flounder.		

		GOM Winter flounder has been assigned a score of 80 because the overfished status remains unknown because a biomass reference point or proxy could not be determined. In the last assessment in 2015 overfishing was not occurring for the stock. Additional measures have been enacted to ensure the fishery does not hinder the recovery of GOM/GB cod: **GOM Cod.** There is a partial strategy enacted to promote stock recovery include a prohibition against retention in the recreational fishery, rolling spawning closures and a Total ACL of 366 mt in the commercial fishery. However this partial strategy has been implemented recently and therefore it's not proven that it's effective, preventing the fishery from meeting SG80. **GB Cod.** The US ABC was cut from 2506 mt in 2014 to 1980 mt in 2015. In addition Haddock separator trawls are mandated on parts of GB to reduce the catch of cod. However this partial strategy has been implemented recently and therefore it's not proven that it's effective, preventing the fishery from meeting SG80. **GOM Yellowtail Flounder.** Current status is overfished and overfishing is ocurring. Thus, current partial strategy has not been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80. **GB Yellowtail flounder.** Current status is unknown and overfishing status is unknown. Thus, it difficult to say that the current partial strategy has been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80. **GOM Winter flounder.** Current status is unknown and overfishing is not ocurring. Thus, current partial strategy has been effective in stopping overfishing . It meets SG80. **GB Winter flounder.** Current status is overfished and overfishing is ocurring. Thus, current partial strategy has not been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80. **Witch Flounder.** Current status is overfished and overfishing is ocurring. Thus current partial startegy has not been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y White hake Y American Plaice Y GOM/GB Winter Flounder Y GOM/GB Yellowtail Flounder Y Witch Flounder Y GOM/GB Cod	Y White hake Y American Plaice Y GOM Winter Flounder N GOM/GB Yellowtail Flounder N Witch Flounder N GB Winter Flounder N GOM/GB Cod	Major Species Y White hake, Y American Plaice, N GB/GOM Winter Flounder N GOM/GB Cod N GOM/GB Yellowtail Flounder, N Witch Flounder Minor species N Atlantic Halibut

				Y Windowpane Flounder,Atlantic Wolfish, Ocean Pout
	Justification	There is a high degree of certainty that White Hake, American Plaice as well as the other minor species , are within biologically based limits and fluctuating around their target reference point. Recent stoack assessments have indicated that these species are not overfished nor is overfishing occurring. Score 100 There is some objective basis for confidence that the partial strategy will work for the following species: **GOM Winter Flounder**. The overfished status remains unknown because a biomass reference point or proxy could not be determined. . In 2010 overfishing was not occurring for the stock. This conclusion was robust to the range of uncertainty in the biomass estimate (NEFSC 2011a). Score 80. Management measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species) for the following stocks: **GOM Cod.** The GOM Atlantic cod stock is overfished and overfishing is occurring and stock is in poor condition (NEFSC 2014). On May 1, 2015 NMFS approved NEFMC proposed increased protection for GOM cod that continues the emergency NOAA prohibition possession of GOM cod for recreational anglers, and modifies the suite of existing rolling closures in the GOM for vessels in the commercial fishery. The intent of this measure is to increase protection for GOM cod in winter months by adding the winter closures. NMFS also reduced the ABC to 386 mt, a 75-percent reduction compared to 2014, which is in addition to the 80- percent reduction implemented for fishing years 2013–2014. In total, the GOM cod catch limit has been reduced by 95 percent over the last 5 years. However given the most recent 2015 stock assessment update (September 2015) and the re-examination of strategies to reduce GOM codretained catch, there is no clear evidence at this time, that the current mitigation measures that act as a partial strategy are demonstrably effective in promoting recovery and rebuilding of GOM cod, preventing the fishery from meeting SG80. **GB Cod.** The stock is overfished and overfishing is occurring. The ABC for 2015 has been reduced from 2014. In addition gear restrictions are in place on parts of GB to allow haddock catches bur reduce retention of cod. However given the most recent 2015 stock assessment update (September 2015) and the re-examination of strategies to reduce GB Cod codretained catch, there is no clear evidence at this time, that the current mitigation measures that act as a partial strategy are demonstrably effective in promoting recovery and rebuilding of GB cod, preventing the fishery from meeting SG80. **GOM Yellowtail Flounder.** Current status is overfished and overfishing is ocurring. Thus, current partial strategy has not been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80. **GB Yellowtail flounder.** Current status is unknown and overfishing status is unknown. Thus, it difficult to say that the current partial strategy has been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80. **GOM Winter flounder.** Current status is unknown and overfishing is not ocurring. Thus, current partial strategy has been effective in stopping overfishing. It meets 80.		

		GB Winter flounder. Current status is overfished and overfishing is ocurring. Thus, current partial strategy has not been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80. **Witch Flounder.** Current status is overfished and overfishing is ocurring . Thus current partial startegy has not been effective in stopping overfishing and promoting recovery preventing the fishery from meeting SG80.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y White hake Y American Plaice Y GOM Winter Flounder N GOM/GB Yellowtail Flounder N Witch Flounder N GB Winter Flounder N GOM/GB Cod	Major Species Y White hake, Y American Plaice N GB/GOM Winter Flounder N GOM/GB Cod N GOM/GB Yellowtail Flounder N Witch Flounder Minor species N Atlantic Halibut, Y Windowpane Flounder Y Atlantic Wolfish Y Ocean Pout
	Justification	There is clear evidence that the strategy is being implemented successfully for White Hake, American Plaice, and minor species which are not overfished nor is overfishing occurring. Score 100.There is some evidence that the partial strategy is being implemented successfully for GOM Winter Flounder, In the latest stock assessment, it was found overfishing is not ocurring (NEFSC 2015) NEFMC and NMFS has been proactive in implementing new more restrictive regulations to try and stop overfishing. Score 80. On other hand given the most recent 2015 stock assessment update (September 2015) and the re-examination of strategies to reduce GOM/GB Cod,GOM/GB yellowtail flounder, witch flounder and GB winter flounder retained catch, there is no clear evidence at this time, that the current mitigation measures that act as a partial strategy are being implemented successfully in promoting recovery and rebuilding of GOM/GB cod as well the other species experiencing overfishing, preventing the fishery from meeting 80.		
d	**Guidepost**			There is some evidence that the strategy is achieving its overall objective.
	Met?			Y Major Species Y White hake Y American Plaice N GB/GOM Winter Flounder N GOM/GB Cod N GOM/GB Yellowtail Flounder N Witch Flounder

				Minor species N Atlantic Halibut Y Windowpane Flounder Y Atlantic Wolfish Y Ocean Pout
	Justification	There is some evidence that the strategy is achieving its overall objective for GOM Winter Flounder, White Hake, American Plaice and all of the minor species . Stock assessments are done on all retained species in the FMP periodically by the NEFSC to monitor stock status and provide advice to the Council on performance of the FMP. Whereas most stocks in the FMP were experiencing overfishing a decade ago, only 5 of 13 remain in that category presently. These are undergoing review and revised management under FWA 53 (NEFMC 2015). During the last 10 years, the NEFMC and NMFS has made steady progress in eliminating overfishing and restoring overfished stocks. Score 100. On other hand given the most recent 2015 stock assessment update (September 2015) and the re-examination of strategies to reduce GOM/GB Cod retained catch, there is no clear evidence at this time, that the current mitigation measures that act as a partial strategy that the strategy is achieving its overall objective in promoting recovery and rebuilding of GOM/GB cod,GOM/GB yellowtail flounder, GB Winter flounder, preventing the fishery from meeting 100 for these species.		
e	**Guidepost**	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification			
References		NEFMC 2015, NEFSC, 2011a, 2012, 2014		
OVERALL PERFORMANCE INDICATOR SCORE: 60 = 6; 80 = 2; 100 = 5				**75**
CONDITION NUMBER (if relevant):				**2**

Evaluation Table for PI 2.1.3.

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Qualitative information is available on the amount of main retained species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.
	Met?	Y	Y	Y All retained species
	Justification	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. Catch and discard data in the fishery are collected by onboard NMFS Fisheries Observers, and coverage is >25% of all large mesh bottom trawl trips (Wigley et al. 2014). The primary responsibility for the collection of fishery dependent information from commercial fishery operations for most federally managed species from Maine through Virginia lies with The Fisheries Data Services Division (FDSD) in the Northeast Region of NMFS. For some species this responsibility extends throughout the entire range of the commercial fisheries on the Atlantic and Gulf coasts of the United States. In addition, the FDSD has responsibility for establishing quality standards for fisheries dependent data collections that are managed by the Northeast Regional Office, improving the quality of fishery dependent data and the collection of biological information from commercial catches. The FDSD acquires data through mandatory reporting programs to provide timely and accurate landings and effort data on the federally regulated fisheries in the northeast for in-season management and analysis. Tasks include dockside collection of catch data, biological samples from commercial fishing trips, and producing finished data products to support fisheries management and scientific analyses (NMFSFDSD 2015). Score 100.		
b	**Guidepost**	Information is adequate to qualitatively assess outcome status with respect to biologically based limits.	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.
	Met?	Y	Y	Y All retained species except Atlantic Halibut
	Justification	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. Annual abundance estimates of all NMFS managed species in the Northeast, including those in the Large Mesh Trawl Fishery, are provided by spring and fall Groundfish Survey Cruises from the NEFSC, supplemented by state surveys conducted by Massachusetts and New Hampshire/ Maine. NEFSC surveys began in 1964, and have been continuous. This survey is based on a depth stratified random sampling design (Politis et al. 2014, Reid et al. 1999). Important biological data (length frequencies, age/growth, reproduction, food habits etc.) are derived from material collected during the NEFSC survey cruises.		

c	**Guidepost**	Information is adequate to support measures to manage main retained species.	Information is adequate to support a partial strategy to manage main retained species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	Y All retained species except Atlantic Halibut
	Justification	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. Spring and Fall NEFSC Trawl surveys track stock abundances, age structure and recruitment, data that are used in periodic stock assessments. These and abundance trends indicate whether the management strategy for a given stock is achieving its objective.		
d	**Guidepost**		Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
	Met?		Y White Hake Y American Plaice Y GOM/GB winter Flounder Y GOM/GB Cod	N
	Justification	Sufficient data continue to be collected to detect any increase in risk level. Despite abundant fishery dependent and independent data, dependable assessment models have been difficult to resolve by NEFSC biologists for some species (i e Yellowtail). In addition, Cod remain a major management problem and cod recovery may be hampered by climate change effects on larval survival (Friedland et al. 2008)		
References		Friedland et al. 2008, Politis et al. 2014, Reid et al. 1999		
OVERALL PERFORMANCE INDICATOR SCORE: 60 = 0; 80 = 7; 100 = 47				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.2.1.

PI 2.2.1		The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below).	Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below).	There is a high degree of certainty that bycatch species are within biologically based limits.
	Met?	Y Spiny Dogfish Y Little Skate Y Winter skate Y Thorny Skate	Y Spiny Dogfish Y Little Skate Y Winter skate N Thorny Skate (See section b)	Major species Y Spiny Dogfish Y Little Skate Y Winter skate N Thorny Skate Minor species Y Barndoor Skate Y Smooth Skate Y Monkfish Y Red Hake Y Silver Hake Y Offshore Hake
	Justification	There is a high degree of certainty that bycatch species are within biologically based limits except for thorny skate. Major bycatch species **Spiny Dogfish**; is within biologically based limits. It is not overfished, and overfishing is not occurring (MAFMC 2014). Score 100. **Little Skate**; is within biologically based limits. It is not overfished, and overfishing is not occurring (NEFMC 2014c):. Score 100. **Winter Skate**; is within biologically based limits. Winter Skate has been managed within its biomass and F targets for many years, It was found that no overfishing is ocurring and is not overfished in the most recent assessment (NEFMC 2015). Score 100. **Thorny Skate**; Thorny Skate are overfished and overfishing is not occurring (NEFMC 2015) (Scored below) Minor Bycatch Species **Barndoor skate**; is within biologically based limits. It is not overfished, and overfishing is not occurring (NEFMC 2015). Score 100. **Smooth Skate**; is within biologically based limits. It is not overfished, and overfishing is not occurring (NEFMC 2015). Score 100. **Monkfish**; Monkfish is managed by the NEFMC under its own (Monkfish) FMP, and Is not overfished nor is over fishing occurring (NEFMC 2015).Monkfish make up, <0.01% of the catch in the LMOT. Score 100.		

		Red hake; Red hake is managed by the NEFMC under the Small Mesh Otter Trawl Fishery FMP. Overfishing is not occurring but the biomass estimate was slightly below the Target in the last (2010) assessment(NEFMC 2013) (NEFMC 2013) . Red hake make up, <0.01% of the catch in the LMOT. Score 100. **Silver hake**; Silver hake is managed by the NEFMC under the Small Mesh Otter Trawl Fishery FMP. It is neither overfished nor is overfishing occurring (NEFMC 2013). Silver hake make up <0.01% of the catch in the LMOT. Score 100. **Offshore Hake;** Offshore hake is managed by the NEFMC under the Small Mesh Otter Trawl Fishery FMP. It is neither overfished nor is overfishing occurring (NEFMC 2013). Offshore hake make up <0.01% of the catch in the LMOT. Score 100.		
b	**Guidepost**	If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding.	If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	Y Thorny Skate	Y Thorny Skate	
	Justification	If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding Thorny Skate was outside biologically based limits in the latest stock assessment (NEFMC 2015); it was found that overfishing is not ocurring. It meets 80b.		
c	**Guidepost**	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.		
	Met?	Y		
	Justification	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery. Bycatch Species are being fished within their biomass and F targets with exception of one major species,Thorny Skate. Their status is overfished but overfishing is not ocurring(NEFMC 2015). It meets 60c.		
References		MAFMC 2014, NEFMC 2003, 2009, 2014c,NEFMC 2015		
OVERALL PERFORMANCE INDICATOR SCORE: 60 = 0; 80 = 1; 100 = 9				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.2.2.

PI 2.2.2		There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing and minimizing bycatch.
	Met?	Y	Y Spiny Dogfish Y Little Skate Y Winter skate Y Thorny Skate	Major Species Y Spiny Dogfish, Y Little Skate Y Winter skate N Thorny Skate Minor species Y barndoor Skate Y Smooth Skate Y Monkfish Y Red Hake Y Silver Hake Y Offshore Hake.
	Justification	There is a strategy in place for managing and minimizing bycatch of all bycatch species except for thorny skate. Spiny dogfish are jointly managed by the Mid-Atlantic and New England Fishery Management Councils, with the Mid-Atlantic Fishery Management Council as the lead (MAFMC 2014) which is charged with developing management plans that meet the requirements of the Magnuson-Stevens Act (M-S Act). The Dogfish FMP is updated through periodic stock assessments by the NEFSC. The NEFMC uses the advice from the NEFSC stock assessments to set annual catch limits and other measures on fisheries that take Spiny Dogfish. In addition fishers voluntarily avoid fishing on dogfish because of their low price and time and effort required to throw them overboard. Score 100 There is a strategy in place for managing and minimizing bycatch of Little Skate, Barndoor Skate, Smooth Skate. Skates are usually discarded but landed occasionally and are managed by the NEFMC in the Skate FMP.The status of skate stocks is determined based on a rate of change in the three year moving average for survey biomass. These thresholds vary by species due to normal inter-annual survey variability. Details about the overfishing reference points and how they are chosen are given in (NEFSC 2000). Information from the NEFSC assessments is used by the NEFMC to set annual catch limits and other regulations on the fishery. (NEFMC 2014b, NEFMC 2015). In addition the fishery usually actively tries to avoid aggregations of skates because of their low price. Score 100.		

<table>
<tr><td></td><td></td><td colspan="3">Winter Skate is not overfished and overfishing is not ocurring (NEFSC 2015). The implementation of a 35% reduction in ABC contributed to elimination of overfishing in Winter Skate and helped the stock returns to biologically based limits. Score 100.

Thorny Skate. In the latest stock assessment update (NEFSC 2015), it was found that overfishing is not ocurring but its status continue to be overfished. Thus, there is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. It meets score 80.

There is a strategy in place for managing Monkfish and the three Hake species.

Monkfish are are jointly managed by the Mid-Atlantic and New England Fishery Management Councils, with the New England Fishery Management Council as the lead manager in the Monkfish FMP which is framed by all the requirements of the Magnusson Act (MAFMC 2013). Score 100.

The three Hake species are managed by the NEFMC, Under the Small Mesh Otter Trawl FMP which is framed by all the requirements of the Magnusson Act (NEFMC 2015). Score 100.</td></tr>
<tr><td rowspan="3">b</td><td>Guidepost</td><td>The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).</td><td>There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.</td><td>Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.</td></tr>
<tr><td>Met?</td><td>Y Spiny Dogfish
Y Little Skate
Y Winter skate
Y Thorny Skate</td><td>Y Spiny Dogfish
Y Little Skate
Y Winter skate
Y Thorny Skate</td><td>Major species
Y Spiny Dogfish
Y Little Skate
Y Winter skate
Y Thorny skate
Minor species
Y Barndoor Skate
Y Smooth Skate
Y Monkfish
Y Red Hake
Y Silver Hake
Y Offshore Hake</td></tr>
<tr><td>Justification</td><td colspan="3">Testing supports high confidence that the strategy is working for all bycatch species except for thorny skates. The test is the status of the stocks. None are overfished except for thorny skate, and overfishing is not occurring on these stocks, all of which have recovered from overfishing under this strategy. Score 100.

On the latest stock assessment Thorny Skate was found to be overfished, but overfishing is not ocurring. Thus there is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. It meets 80.</td></tr>
</table>

c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y Spiny Dogfish Y Little skate Y Winter Skate Y Thorny skate	Major species Y Spiny Dogfish Y Little Skate Y Winter skate N Thorny skate Minor species Y Barndoor Skate, Y Smooth Skate Y Monkfish, Y Red Hake Y Silver Hake Y Offshore Hake
	Justification	There is clear evidence that the strategy is being implemented successfully for Spiny Dogfish, Little Skate, Barndoor Skate, Smooth Skate, Monkfish and Red, Silver and Offshore Hakes. All have recovered from severe overfishing and presently have robust stocks under their respective FMPs. Score 100. There is some evidence that the partial strategy is being implemented successfully for Winter Skate. Winter Skate was managed within its biomass and F targets for many years and it was found that is no longer subject to overfishing in the most recent skate assessment update (NEFMC 2015). Their recovery is attributed that NEFMC reduced the Skate ABC by 35%.(NEFMC 2014c). Management is responsive to stock status. Score 80. On the latest stock assessment update (NEFMC 2015), Thorny skate was found to be overfished and now overfishing is not ocurring. It meets 80.		
d	**Guidepost**			There is some evidence that the strategy is achieving its overall objective.
	Met?			Major species Y Spiny Dogfish, Y Little Skate, Y Winter skate, N Thorny Skate Minor species Y Barndoor Skate Y Smooth Skate Y Monkfish Y Red Hake Y Silver Hake Y Offshore Hake

	Justification	There is some evidence that the strategy is achieving its overall objective in all species except for thorny skates. Skates are being managed sustainably over most years with exception of thorny skate, (NEFMC 2014b, NEFMC 2015). It may not be sampled adequately by the NEFSC surveys and is currently under a moratorium. **Thorny skates** continue to be overfished even though overfishing is not ocurring suggesting the startegy is not achieving the objectives for this species. It does not meet 100. **Spiny dogfish** have undergone an extensive recovery under management, and are abundant, and fished sustainably (MAFMC 2014). Score 100. **Monkfish, RedHake, Silver Hake,** and **Offshore Hake** are all being fished sustainably, Red hake biomass has fluctuated around the Target and well above the threshold for several years. It was slightly below the Target in the last assessment. Score 100.
References		MAFMC 2014, NEFMC 2009, NEFMC 2014b, NEFMC 2015
OVERALL PERFORMANCE INDICATOR SCORE: 60 = 0; 80 = 1; 100 = 9		**95**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.2.3.

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Qualitative information is available on the amount of main bycatch species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery.	Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations.
	Met?	Y	Y	Y Spiny Dogfish Y Skates Y Monkfish Y Hakes (10 species)
	Justification	Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations. Catch and discard data in the fishery are collected by onboard NMFS Fisheries Observers, and coverage is >25% of all large mesh bottom trawl trips (Wigley et al. 2014). Landings and effort data are recorded by the NMFS Fisheries Data Services Division based on port sampling and vessel logbooks (NMFS FDSD 2015). Score 100.		
b	**Guidepost**	Information is adequate to broadly understand outcome status with respect to biologically based limits	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.
	Met?		Y Winter Skate, Y Little Skate	Y Spiny Dogfish Y Monkfish
	Justification	Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. **Spiny Dogfish**. In updating the spiny dogfish assessment, the NEFSC estimated a 100% probability that overfishing was not occurring (F2010 < $F_{THRESHOLD}$) (MAFMC 2014), and a 100% probability that the stock is not overfished. This is a robust age structured assessment. Score 100. **Monkfish**. Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty The 2010 assessment updated the biological reference points based on an updated yield-per-recruit analysis and the results of a length-tuned population model that incorporates multiple survey indices and catch data. Score 100. **Winter and Little Skates**. Information is sufficient to estimate outcome status with respect to biologically based limits. The status of skate overfishing is determined based on a rate of change in the three year moving average for survey biomass. These thresholds vary by species due to normal inter-annual survey variability. Details about the overfishing reference points and how they were chosen are given in (NEFSC 2000, and NEFMC 2013). This kind of assessment is less robust than that for Spiny Dogfish and Monkfish. Score 80.		

c	**Guidepost**	Information is adequate to support measures to manage bycatch.	Information is adequate to support a partial strategy to manage main bycatch species.	Information is adequate to support a strategy to manage bycatch species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?			Y Spiny Dogfish Y Skates Y Monkfish Y Hakes (10 species)
	Justification	Information is adequate to support a strategy to manage bycatch species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. Information from groundfish surveys, observer coverage, dockside sampling, and logbooks is adequate to support a strategy to manage bycatch species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. Score 100.		
d	**Guidepost**		Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectively of the strategy).	Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
	Met?		Y Spiny Dogfish Y Little Skate Y Winter Skate	N
	Justification	Sufficient data are collected by Fisheries Observers to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy). About 4% of the bycatch is composed of a number (ca. 100) of mostly small species which are not monitored (Wigley et al 2014). Score 80.		
References		MAFMC 2014, NEFMC 2014b, NEFMC 2015, NMFS FDSD 2015, Wigley et al 2014		
OVERALL PERFORMANCE INDICATOR SCORE: 60 = 0; 80 = 5; 100 = 22				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.3.1.

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.	There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.
	Met?	Y	Y	Y Large Whales Y Small Cetaceans Y Pinnipeds Y Sea Turtles Y Atlantic Sturgeon
	Justification	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. Five species of **large whales** occur in the GOM and GB that potentially might interact with the LMOT. These species include: North Atlantic right whale (Eubalaena *glacialis),* humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), and sei whale (*Balaenoptera borealis*) all of which are also listed as Endangered under the ESA (NEFMC 2015). None of these have been recorded interacting with the GOM/GB large mesh otter trawl fishery (Waring et al. 2014). The fifth species is the minke whale (*Balaenoptera acutorostrata acutorostrata*), not listed under the ESA but listed in Appendix 1 of the CITES and protected under the MMA. Three species of **pinnipeds** have documented interactions with the LMOT Fishery: Harbor seal (*Phoca vitulina*), Gray Seal (*Halichoerus grypus*), and Harp Seal (*Phoca groenlandicus*). Seven species of **small cetaceans** have recorded interactions with the LMOT Fishery. The two species of pilot whales have been treated together as *Globicephala spp.* because they are virtually impossible to distinguish in the water (NEFMC 2015). Small cetaceans which interact with the fishery are: Pilot Whale (*Globicephala ssp*)., Short-beaked Common Dolphin (*Delphinus delphis*), Harbor Porpoise (*Phocoena phocena*), Bottlenose Dolphin (*Tursiops truncates*), Risso's Dolphin (*Grampus griseus*), and White-sided Dolphin (*Lageorhynchus acutus*). . Only the white sided dolphin had a mean annual mortality (73) greater than 1% and less than 50% of the stock's PBR, thus leading the fishery to be classified under Category II Four ESA-listed **Sea Turtles**, Green (*Chelonia mydas*), Loggerhead (*Caretta carreta*), Kemp's ridley (*Lepidochelys kempi*), and the Leatherback (*Dermochelys coriacia*) (NEFMC 2015) may occur in the GOM and GB (NEFMC 2015). All are migratory and occur in New England mostly during the warmer months of the year (Musick 2003). Whereas green and Kemps ridley turtles are most common south of Cape Cod, MA, loggerhead sea turtles are known to occur in the Gulf of Maine (GOM), feeding as far north as southern Canada. Leatherback sea turtles also engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992, James *et al.* 2005, Dodge *et al.* 2014)		

		Atlantic sturgeon is the only ESA listed fish likely to be encountered by the LMOT in the GOM/GB (NEFMC 2015). All of the above species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act of 1973 (ESA) and/or the Marine Mammal Protection Act of 1972 (MMPA).Both of these Acts meet or exceed the limits of national and international requirements for ETP species.and have stood as models for international conservation standards.		
b	**Guidepost**	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	Met?	Y	Y Large Whales Y Small Cetaceans Y Pinnipeds Y Sea Turtles Y Atlantic Sturgeon	Y Large Whales N Small Cetaceans N Pinnipeds N Sea Turtles N Atlantic Sturgeon
	Justification	Direct effects are highly unlikely to create unacceptable impacts to ETP species. **Large Whales**: There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on Large Whales. Five species of large whales occur in the GOM and GB that potentially might interact with the LMOT. These species include: North Atlantic right whale (Eubalaena *glacialis),* humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), and sei whale (*Balaenoptera borealis*) all of which are also listed as Endangered under the ESA (NEFMC 2015). None of these have been recorded interacting with the GOM/GB large mesh otter trawl fishery (Waring et al. 2014). The fifth species is the minke whale (*Balaenoptera acutorostrata acutorostrata*), not listed under the ESA but listed in Appendix 1 of the CITES and protected under the MMPA . Annual average estimated minke whale mortality and serious injury from the Northeast bottom trawl fishery during 2007 to 2011 was 1.8 (CV=0.42) (Waring et al. 2014), well below the PBR of 162. Direct effects are highly unlikely to create unacceptable impacts on Sea Turtles, Small Cetaceans, Pinnipeds and Atlantic Sturgeon. **Small Cetaceans and Pinnipeds**: Three species of pinnipeds have documented interactions with the LMOT Fishery: Harbor seal (*Phoca vitulina*), Gray Seal (*Halichoerus grypus*), and Harp Seal (*Phoca groenlandicus*). Seven species of small cetaceans have recorded interactions with the LMOT Fishery. The two species of pilot whales have been treated together as *Globicephala spp.* because they are virtually impossible to distinguish in the water (NEFMC 2015). Small cetaceans which interact with the fishery are: Pilot Whale (*Globicephala ssp*)., Short-beaked Common Dolphin (*Delphinus delphis*), Harbor Porpoise (*Phocoena phocena*), Bottlenose Dolphin (*Tursiops truncates*), Risso's Dolphin (*Grampus griseus*), and White-sided Dolphin (*Lageorhynchus acutus*). . Only the white sided dolphin had a mean annual mortality (73) greater than 1% and less than 50% of the stock's PBR, thus leading the fishery to be classified under Category II. PBR for the western North Atlantic stock of white-sided dolphin is 304. The best estimate of abundance for the western North Atlantic stock of white-sided dolphins is 48,819 (CV=0.61) (Waring et al. 2014). Thus the bycatch of white-sided dolphins in the NE Bottom OT Fishery is highly unlikely to create unacceptable impacts to the species.		

		Sea Turtles: Four ESA-listed Sea Turtles, ,Green (*Chelonia mydas*), Loggerhead (*Caretta carreta*), Kemp's ridley (*Lepidochelys kempi*), and the Leatherback (*Dermochelys coriacia*) (NEFMC 2015) may occur in the GOM and GB (NEFMC 2015). All are migratory and occur in New England mostly during the warmer months of the year (Musick 2003) . Whereas green and Kemps ridley turtles are most common south of Cape Cod, MA, loggerhead sea turtles are known to occur in the Gulf of Maine (GOM), feeding as far north as southern Canada. Leatherback sea turtles also engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992, James *et al.* 2005, Dodge *et al.* 2014). Leatherbacks, a pelagic species, are also known to use coastal waters of the U.S. continental shelf (James *et al.* 2005, Eckert *et al.* 2006; Murray 2006, Dodge *et al.* 2014). Leatherbacks have a greater tolerance for colder water in comparison to hard-shelled sea turtles. They are also found in more northern waters later in the year, with most leaving the Northwest Atlantic shelves by mid-November (James *et al.* 2005, Dodge *et al.* 2014). Although sea turtle interactions with trawl gear have been observed in waters from the GOM to the Mid-Atlantic, most of the observed interactions have occurred in the Mid-Atlantic where special requirements to reduce sea turtle interactions and mortalities have been imposed on the Summer Flounder Trawl Fishery and the Scallop Fishery.. No such requirements have been imposed on the NE LMOT because few sea turtle interactions have been observed in the fishery; therefore it is highly unlikely that the large mesh OT fishery is causing unacceptable direct or indirect impacts on sea turtles. **Atlantic Sturgeon**. Atlantic sturgeon is the only ESA listed fish likely to be encountered by the LMOT in the GOM/GB (NEFMC 2015). The Atlantic sturgeon is managed under a Fishery Management Plan implemented by the Atlantic States Marine Fisheries Commission (ASMFC 1998, 2015a). In 1998, the ASFMC instituted a coast-wide moratorium on the harvest of Atlantic sturgeon, which is to remain in effect until there are at least 20 protected age classes in each spawning stock (anticipated to take up to 40 or more years). NMFS followed the ASMFC moratorium with a similar moratorium for Federal water. The NMFS recognizes five Distinct Population Segments (DPSs) of Atlantic sturgeon, of which one, the Gulf of Maine DPS (ESA Threatened), may interact with the LMOT. Based on fishery-independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein *et al*. 2004 a,b, Erickson *et al*. 2011, Dunton *et al*. 2010). Within the marine range of Atlantic sturgeon, several marine aggregation areas have been identified adjacent to estuaries and/or coastal features formed by bay mouths and inlets along the U.S. eastern seaboard; depths in these areas are generally no greater than 25 meters (Stein *et al*. 2004a, Laney *et al*. 2007, Dunton *et al*. 2010, Erickson *et al*. 2011). Dunton et al (2010) analyzed the NEFSC bottom trawl survey data and CPUE data from four state trawl surveys for Atlantic sturgeon distribution and abundance. This analysis showed that Atlantic sturgeon were most abundant in state waters. The NMFS survey which covered the continental shelf supported these conclusions. CPUE of Atlantic sturgeon was highest for the 10-m depth stratum and decreased with each depth interval. A total of 71.30% of the Atlantic sturgeon were captured in 20 m or less and no individuals were captured in water deeper than 30 m. Also Atlantic Sturgeon were virtually absent on GB regardless of depth (Dunton et al. 2010). This suggests that Atlantic sturgeon favor coastal habitats and not just shallower depths. Given that Atlantic sturgeon distribution is mostly inshore of the LMOT, and low trawl bycatch mortality (5%) it is highly unlikely that the LMOT is causing direct or indirect impacts on Atlantic sturgeon.

c	**Guidepost**		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	Met?		Y Large Whales Y Small Cetaceans Y Pinnipeds, Y Sea Turtles Y Atlantic Sturgeon	Y Large Whales N Small Cetaceans N Pinnipeds, N Sea Turtles N Atlantic Sturgeon
	Justification	Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts Large whales. Because only one species of Large whale has been recorded to interact with this fishery, and at very low numbers (< 2/yr). there is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on Large Whales. Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts in Small Cetaceans, Pinnipeds, Sea turtles and Atlantic Sturgeon. Interactions have been low in these groups, but indirect effects cannot be ruled out.		
References		ASMFC 2015,Dodge *et al.* 2014, Dunton et al. 2010, Eckert *et al.* 2006, Erickson *et al*. 2011, James *et al.* 2005, Laney *et al*. 2007, Murray 2006, NMFS 2015, , Stein *et al*. 2004a,, Waring et al. 2014		
OVERALL PERFORMANCE INDICATOR SCORE: 80 = 8; 100 = 7				**90**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.3.2.

PI 2.3.2		**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	Y	Y Large Whales Y Small Cetaceans Y Pinnipeds Y Sea Turtles Y Atlantic Sturgeon	N
	Justification	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species. Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. The NEFMC has concluded, at this writing, that the proposed framework adjustment and the prosecution of the multispecies fishery is not likely to jeopardize any ESA- listed species or alter or modify any critical habitat, based on the discussion of impacts in this document and on the assessment of impacts in the Amendment 16 Environmental Impact Statement. The NEFMC acknowledges that endangered and threatened species may be affected by the measures proposed, but impacts should be minimal especially when compared to the prosecution of the fishery prior to implementation of Amendment 16. The NEFMC is now seeking the concurrence of the National Marine Fisheries Service with respect to Framework Adjustment 53. Should any fishery be found to impose a significant impact on ETP species, NMFS is authorized to implement many different requirements on the fishery. These include: area or time closures, gear modifications, and mortality quotas (when reached the fishery must close). Such requirements have been implemented on other fisheries in New England and the MAB. These have included gill net fisheries (to protect marine mammals, sea turtles and sturgeon), anchored gear fisheries(to protect large whales), and the summer flounder, and scallop dredge fisheries (excluder devices to protect sea turtles).		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.

	Met?	Y	Y Large Whales Y Small Cetaceans Y Pinnipeds Y Sea Turtles Y Atlantic Sturgeon	N
	Justification	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved. ETP species interactions with the fishery are directly monitored at sea by NMFS Observers and Enforcement Agents. Whereas quantitative analyses are available for Cetaceans and Atlantic sturgeon, such analyses are lacking for sea turtles because they are rarely taken (NEFMC 2015).		
c	**Guidepost**		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y Large Whales, Small Cetaceans, Pinnipeds, Sea Turtles, and Atlantic Sturgeon
	Justification	There is clear evidence that the strategy is being implemented successfully. Loggerhead, Leatherback, Green turtles have been increasing in abundance in recent years (NMFS 2015). Kemps ridleys were showing a spectacular increase until the Gulf of Mexico oil spill in 2010. Most cetacean and pinniped populations.have been stable or increasing in US Atlantic waters in recent years. Abundance estimates of the only small cetacean with a significant interaction with the fishery, White-sided Dolphin, increased from 17594 in 2006, to 24,422 in 2007, and 48,819 in 2011 (Waring et al. 2014). Atlantic Sturgeon populations in the GOM and Mid-Atlantic are showing increasing abundance trends.(ASMFC 2015).		
d	**Guidepost**			There is evidence that the strategy is achieving its objective.
	Met?			Y Large Whales, Small Cetaceans, Pinnipeds, Sea Turtles, and Atlantic Sturgeon
	Justification	There is evidence that the strategy is achieving its objectives. The Endangered Species Act of 1973 (ESA) has as an objective the recovery of ET species through management of sources of mortality (including fisheries).The Marine Mammal Protection Act of 1972 (MMPA).has as an objective the maintenance and recovery of marine mammal populations. As documented in c above, there is evidence that these strategies are achieving their objectives.		
References		ASMFC 2015, Dunton *et al*. 2010, Erickson *et al*. 201 Laney *et al*. 2007, NMFS 2015, , Stein *et al*. 2004a, Waring et a.2014,		
OVERALL PERFORMANCE INDICATOR SCORE: 80 =10; 100 = 10				**90**
CONDITION NUMBER (if relevant):				**NA**

Evaluation Table for PI 2.3.3.

PI 2.3.3		**Relevant information is collected to support the management of fishery impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
	Met?	Y	Y Large Whales Y Small Cetaceans Y Pinnipeds Y Sea Turtles Y Atlantic Sturgeon	N
	Justification	Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species The NMFS Observer Program monitors bycatch of both ESA species and Marine Mammals (NOAA 2015). Observer coverage in this fishery is > 25% which is high for any fishery. NMFS Law Enforcement is also involved with both at sea and shoreside enforcement of both the ESA and MMPA (NOAA 2015a).In addition the status of species covered under the ESA is reviewed periodically by NMFS Status Review Teams comprised of scientists from NMFS, the States, and Academia (NOAA 2015b). Atlantic sturgeon are also assessed by the ASMFC (ASFMC 1998). The status of marine mammals is monitored by periodic NMFS stock assessments (Waring etal. 2014). These assessments include all known sources of mortality as well as population trends. Regardless Information is insufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty. Score 80.		
b	**Guidepost**	Information is adequate to broadly understand the impact of the fishery on ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.	Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Y	Y Large Whales Y Small Cetaceans Y Pinnipeds Y Sea Turtles Y Atlantic Sturgeon	N

	Justification	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. The NMFS Observer Program monitors bycatch of both ESA species and Marine Mammals (NOAA 2015). Observer coverage in this fishery is > 25% which is high for any fishery. NMFS Law Enforcement is also involved with both at sea and shoreside enforcement of both the ESA and MMPA (NOAA 2015a).In addition the status of species covered under the ESA is reviewed periodically by NMFS Status Review Teams comprised of scientists from NMFS, the States, and Academia (NOAA 2015b). Atlantic sturgeon are also assessed by the ASMFC (ASFMC 1998). The status of marine mammals is monitored by periodic NMFS stock assessments (Waring etal. 2014). These assessments include all known sources of mortality as well as population trends. However accurate and verifiable information is not available on the magnitude of all impacts, mortalities and injuries on ETP species. Score 80.		
c	**Guidepost**	Information is adequate to support measures to manage the impacts on ETP species.	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
	Met?	Y	Y Large Whales, Small Cetaceans, Pinnipeds, Sea Turtles, and Atlantic Sturgeon	N
	Justification	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species. Both the ESA, and MMPA require NMFS to assess all sources of mortality to both ESA and MM species (NOAA 2015a,b). In addition, the status of species covered under the ESA is reviewed periodically by NMFS Status Review Teams comprised of scientists from NMFS, the States ,and Academia (NOAA 2015b). Atlantic sturgeon are also assessed by the ASMFC (ASFMC 1998). The status of marine mammals is monitored by periodic NMFS stock assessments (Waring etal. 2014. NMFS has a strong record of imposing timely regulations to mitigate threatening interactions between specific fisheries and ETP species (NEFMC 2015). However to evaluate with a high degree of certainty whether a strategy is achieving its objectives is a high bar to meet. Score 80.		
References		ASFMC 1998, NEFMC 2015, NOAA 2015, Waring etal. 2014).		
OVERALL PERFORMANCE INDICATOR SCORE: 80 = 15				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.1.

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
	Met?	Y	Y	N
	Justification	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. Bottom trawls have relatively high habitat impacts (Morgan & Chuenpagdee 2003).. Trawling off New England began in 1906, and by 1930 there were 300 trawlers in the fishery (Collette and Klein-MacPhee 2002). The number of US trawlers working in New England increased but continued in the hundreds until 1961 when eastern European distant-water fleets arrived with factory ships thus increasing the trawling effort considerably. This intense fishery continued until 1977 when the Magnuson Act was originally implemented. The act eliminated most foreign trawling effort. In response the New England trawling effort doubled between 1976 and 1984 (Collette and Klein-MacPhee 2002). Given the history of bottom trawling off New England, it's obvious that the current fishery is operating on bottom habitats that have been altered for over 100 years. Given that history, It is unclear what habitats were like 100 yrs ago, and whether its even possible or desirable to recover all of them. Such an effort would be akin to attempting to restore a major agricultural area in the Midwest.to the virgin condition. Such an effort would be a major disaster for farming communities, the economy and the food supply.. The same may be said for the bottom trawl fishery in New England. Instead the NEFMC has developed a strategy to maintain existing habitats,by promoting fishing on more resilient habitats, and protecting vulnerable habitats (see below) (Grabowski et.al.2014, NEFMC 2014b). Score 80		
References		Collette and Klein-MacPhee 2002, Grabowski et.al.2014, Morgan & Chuenpagdee 2003, NEFMC 2014b		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.2.

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of the fishery on habitat types.
	Met?	Y	Y	N
	Justification	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. Recognizing the vulnerability of certain habitats, Amendment 13 to the Northeast Multispecies FMP and Amendment 10 of the Atlantic Sea Scallop FMP established year-round habitat closed areas which are off-limits to all mobile, bottom-tending gear like trawls and dredges These closures were designed to minimize the adverse effects of fishing on Essential Fish Habitat (EFH) for species managed by the NEFMC. In many cases, these closed areas overlap portions of the groundfish mortality closures. However, in other cases (Jeffreys Bank in the Gulf of Maine and the area southeast of Nantucket Island) they do not. The NEFMC developed the ongoing Omnibus Essential Fish Habitat Amendment 2 (OA2) to go beyond Amendment 13 to evaluate existing habitat management areas and develop new habitat management areas.(NEFMC 2014b). Included in the Habitat Amendment are several types of habitat management areas: Essential Fish Habitat and Habitat Area of Particular Concern (HAPC) designations are based on species-specific distributions and life-history information, and are used primarily for analytical approaches in impact analyses and agency consultations. Spatial management areas (HMAs) contain habitats of importance to multiple species, are vulnerable to impacts from fishing, and as such, could be subject to gear restrictions for conservation purposes on the basis of gear type. Three types of spatial management areas are being proposed in the Habitat Amendment, year-round *habitat management areas* and *dedicated habitat research areas*; and groundfish seasonal spawning areas. Score 80.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
	Met?	Y	Y	N
	Justification	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. The NEFMC has made progress toward final implementation of the Omnibus Habitat Amendment and in April 2015 approved the following: EFH designations were specified for all managed species and life stages HAPC designations were approved for six nearshore/continental shelf areas, two seamounts, and eleven submarine canyons or groups of canyons.		

		Closed areas, or gear restrictions were approved for several HMAs in the Eastern and Central GOM. The remaining actions proposed in OA@ are to be reviewed for approval at the June NEFMC meeting. Score 80.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N
	Justification	There is some evidence that the partial strategy is being implemented successfully. Final approval for implementation of OA2 is pending further NEFMC and NMFS approval. Habitat conservation measures already in place include two types of year-round closures: the habitat closure areas and groundfish closures. The habitat closure areas restrict mobile bottom-tending gears. The groundfish closures restrict all gears capable of catching groundfish. In addition seasonal area closures are used to protect spawning fish, but concurrently may reduce overall impact on bottom habitats. Score 80.		
d	**Guidepost**			There is some evidence that the strategy is achieving its objective.
	Met?			Y
	Justification	There is some evidence that the strategy is achieving its objective. The NEFMC. Habitat Plan Development Team (PDT) developed an analytical approach to characterize and map habitats and to assess the extent to which different habitat types are vulnerable to different types of fishing activities (Grabowski et al. 2014). This effort, termed the Swept Area Seabed Impact (SASI) approach, includes a quantitative, spatially-referenced model that overlays fishing activities on habitat through time to estimate both potential and realized adverse effects to EFH. (http://www.nefmc.org/habitat/sasi_info/110121_SASI_Document.pdf. Outputs from this model were incorporated into OA2 discussed above, and some areas designated for protection were recently approved by the Council. Others will be reviewed for approval in June. The SASI modelling approach to quantify habitats and gear impacts is unique for the NEFMC and for Fishery Management Councils as a whole, and represents a major step forward in habitat protection. Score 100		
References		Grabowski et al. 2014, Kaufman et.al. 2014, NEFMC 2014b		
OVERALL PERFORMANCE INDICATOR SCORE: 80 = 3; 100 = 1				**85**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.3.

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There is basic understanding of the types and distribution of main habitats in the area of the fishery.	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
	Met?	Y	Y	Y
	Justification	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. Benthic habitats have been well-studied in the GOM and GB, and have been described in detail Stevenson et al. (2004). The most common groups of benthic invertebrates reported by Theroux and Wigley (1998) in terms of numbers collected were annelid worms, bivalve mollusks, and amphipod crustaceans. Bivalves, sea cucumbers, sand dollars, annelids, and sea anemones dominated biomass. Watling (1998) identified seven different bottom assemblages that occur on the following habitat types: 1. Sandy offshore banks: fauna are characteristically sand dwellers with an abundant interstitial component; 2. Rocky offshore ledges: fauna are predominantly sponges, tunicates, bryozoans, hydroids, and other hard bottom dwellers; 3. Shallow [<197 ft. (60 m)] temperate bottoms with mixed substrate: fauna population is rich and diverse, primarily comprised of polychaetes and crustaceans; 4. Primarily fine muds at depths of 197 to 459 ft. (60 to 140 m) within cold Gulf of Maine Intermediate Water: fauna are dominated by polychaetes, shrimp, and cerianthid anemones; 5. Cold deep water, muddy bottom: fauna include species with wide temperature tolerances which are sparsely distributed, diversity low, dominated by a few polychaetes, with brittle stars, sea pens, shrimp, and cerianthids also present; 6. Deep basin, muddy bottom, overlaying water usually 45 to 46 °F (7 to 8°C): fauna densities are not high, dominated by brittle stars and sea pens, and sporadically by tube-making amphipods 7. Upper slope, mixed sediment of either fine muds or mixture of mud and gravel, water temperatures always greater than 46 °F (8°C): upper slope fauna extending into the Northeast Channel. Score 100.		
b	**Guidepost**	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.	The physical impacts of the gear on the habitat types have been quantified fully.
	Met?	Y	Y	N

	Justification	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.The Swept Area Seabed Impact (SASI) approach, includes a quantitative, spatially-referenced model that overlays fishing activities on habitat through time to estimate both potential and realized adverse effects to EFH (Grabowski et al 2014) (http://www.nefmc.org/habitat/sasi_info/110121_SASI_Document.pdf). The spatial domain of the SASI model is US Federal waters (between 3-200 nm offshore) from Cape Hatteras to the US-Canada border Within this region, habitats were defined based on natural disturbance regime and dominant substrate. The dominant substrate map was composed of thousands of visual and grab sample observations , with grid size based on the spacing of the observations. One of the outputs of the model is habitat vulnerability, which is related in part to the characteristics of the habitat itself, and part to the quality of the impact. Because of a general need for attachment sites, epifauna that provided a sheltering function for managed species tend to be more diverse and abundant in habitats containing larger grain sized substrates. Structurally complex and/or long-lived epifaunal species are more susceptible to gear damage and slower to recover. Recovery rates were assumed to be retarded in low energy areas, such that overall vulnerability (susceptibility + recovery) of low energy areas is greater than high energy areas, other factors being equal. When combined with the underlying substrate and energy distribution, the susceptibility and recovery scores assigned to the inferred mix of epifaunal and geological features generated a highly patchy vulnerability map. Locations where high proportions by area map out as cobble-dominated or cobble- and boulder-dominated tended to show higher vulnerability scores. Score 80.		
c	**Guidepost**		Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Changes in habitat distributions over time are measured.
	Met?		Y	Y
	Justification	Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). Changes in habitat distributions over time are measured.The NEFSC research priorities and ongoing programs include: Conducting ongoing integrated habitat assessments within the Northeast LME to meet emerging management needs and mandates. Maintaining data and sample collection and processing, and analytical capabilities to support habitat assessments for fish, invertebrates, marine mammals, and sea turtles (NEFSC 20009a,b). Score 100.		
References		Grabowski et al 2014, NEFSC 20009a,b,, Stevenson et al. 2004, Theroux and Wigley 1998, Watling 1998,		
OVERALL PERFORMANCE INDICATOR SCORE: 80 = 1; 100 = 2				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.5.1.

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Y	Y	N
	Justification	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. The National Environmental Policy Act (NEPA) provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions such as FMPs, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. As part of the NEPA process, the NEFMC (2015) has responded that the Preferred Alternatives in FW 53 cannot reasonably be expected to cause substantial damage to the oceans and coastal habitats and/or essential fish habitat, and only minor impacts are expected. The NEFMC Essential Fish Habitat impacts analysis focuses on changes in the amount or location of fishing that might occur as a result of the implementation of the various alternatives in FW53 (NEFMC 2015). This approach to evaluating adverse effects to EFH is based on two principles: (1) seabed habitat vulnerability to fishing effects varies spatially, due to variations in seabed substrates, energy regimes, living and non-living seabed structural features, etc., between areas and (2) the magnitude of habitat impacts is based on the amount of time that fishing gear spends in contact with the seabed. This seabed area swept (seabed contact time) is grossly related to the amount of time spent fishing, although it will of course vary depending on catch efficiency, gear type used, and other factors. The Preferred Alternative action implements updated ACLs, which are lower (particularly for cod) relative to the status quo ACLs, as well as cod protection closures in the Gulf of Maine. Combined, these two alternatives will likely reduce fishing effort and thereby habitat and ecosystem impacts overall in the fishery relative to current conditions. Furthermore, the Preferred Alternatives do not allow for access to the existing habitat closed areas on GB that were implemented in Amendment 13 to the Multispecies FMP and Amendment 10 to the Scallop FMP and therefore they continue to minimize the adverse impacts of bottom trawling and dredging on EFH, and the ecosystem. Score 80.		
References		NEFMC 2015		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.5.2.

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary.	There is a partial strategy in place, if necessary.	There is a strategy that consists of a plan, in place.
	Met?	Y	Y	N
	Justification	There is a partial strategy in place, if necessary. Management measures in FW 53 are not expected to have a substantial negative impact on biodiversity and/or ecosystem function with the affected area. The use of ACLs and AMs will tightly control catches of target and incidental regulated groundfish stocks. Catches of target and incidental catch species under this program will be consistent with the mortality targets of Amendment 16 (NEFMC 2015a), and as the objectives of this FMP under M/S are to restore formerly overfished finfish populations, management actions should also help to restore ecosystem structure and function. There is no ecosystem plan in place. However, in April 2015 (NEFMC 2015b) the council adopted an official approach that will be used to address ecosystem-based fisheries management (EBFM). The initiative, led by the NEFMC's EBFM Committee and its Plan Development Team, calls for the development of a prototype or pilot fisheries ecosystem plan (FEP) that could be tested and verified, and also be used as a tool to engage with and seek comments from the public during the pilot period. The FEP would be used as a platform to assess, among other important elements, predator- prey relationships, trends in species groups, and climate change impacts, in the context of a specific ecosystem production unit, or management area that has not yet been identified. Score 80.		
b	**Guidepost**	The measures take into account potential impacts of the fishery on key elements of the ecosystem.	The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.
	Met?	Y	Y	N

	Justification	The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. The Northeast U.S. Continental Shelf Large Marine Ecosystem (NESLME) (Sherman et al. 1996) is one of the most studied marine ecosystems in the world (NEFSC 2009b). In addition trawl fisheries interactions with this ecosystem have been documented at several levels (Brown et al. 2010, Byron and Link 2010, Garrison 2000a,b, Garrison and Link 200a,b, Grabowski et al. 2014, Link and Garrison 2002, Nye et al. 2009, NEFSC 2009b,) and continue to be monitored at the NEFSC (Fogarty 2014). Score 80.		
c	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.
	Met?	Y	Y	N
	Justification	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems.The measures in OA@ to protect habitat will help in turn to protect and restore ecosystem structure. Fishery management measure (NEFMC 2015) to recover overfished stocks through catch limits and moratoria will help to restore trophic structure and function, dominated by finfish. Overfishing has resulted in an ecosystem dominated by elasmobranchs at higher trophic levels and small lower trophic level pelagic fishes (Fogarty and Murawski 1998, NEFSC 2009a,b). However ecosystem interactions are complex and the outcomes of stock recoveries on ecosystem structure cannot be predicted with certainty. Score 80.		
d	**Guidepost**		There is some evidence that the measures comprising the partial strategy are being implemented successfully.	There is evidence that the measures are being implemented successfully.
	Met?		Y	N
	Justification	There is some evidence that the measures comprising the partial strategy are being implemented successfully. Because of NEFMC management measures 8/13 groundfish stocks are no longer being overfished and are on their way to or are at stock recovery. This means they are more able to reestablish their roles in the GOM and GB ecosystem. In addition the development and approval of OA 2 will contribute to protection of habitats upon which the ecosystem depends. (NEFMC 2015). Score 80.		
References		Brown et al. 2010, Byron and Link 2010, Fogarty 2014, Fogarty and Murawski 1998, Garrison 2000a,b, Garrison and Link 200a,b, Grabowski et al. 2014, Link and Garrison 2002, NEFMC 2015, NEFSC 2009a,b, Nye et al. 2009, Sherman et al. 1996		
OVERALL PERFORMANCE INDICATOR SCORE: 80 = 4				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.5.3.

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Y	Y	
	Justification	Information is adequate to broadly understand the key elements of the ecosystem., The Northeast U.S. Continental Shelf Large Marine Ecosystem (NESLME) (Sherman et al. 1996) is one of the most studied marine ecosystems in the world (NEFSC 2009b). In addition bottom trawl fisheriy interactions with this ecosystem have been documented at several levels (Brown et al. 2010, Byron and Link 2010, Garrison 2000a,b, Garrison and Link 200a,b, Grabowski et al. 2014, Link and Garrison 2002, Nye et al. 2009, NEFSC 2009b,) and continue to be monitored at the NEFSC (Fogarty 2014). Score 80		
b	**Guidepost**	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail.	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.	Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.
	Met?	Y	Y	N
	Justification	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail. Fisheries interactions with this ecosystem have been documented at several levels and are well known (Brown et al. 2010, Byron and Link 2010, Garrison 2000a,b, Garrison and Link 200a,b, Grabowski et al. 2014, Link and Garrison 2002, Nye et al. 2009, NEFSC 2009b,) and continue to be monitored at the NEFSC (Fogarty 2014). However because of changing species composition and abundance associated with fisheries, and significant climate change effects on species distributions and recruitment, the ecosystem is ever-changing and dynamic (Friedland et al. 2008, Mills et al. 2013), and thus the fishery does not score 100.		
c	**Guidepost**		The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.	The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood.
	Met?		Y	N
	Justification	The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. These elements must be addressed in FMPs under M/S (MAFMC 2014, NEFMC 2009a, NEFMC 2015) and ecosystem functions have been documented in NEFSC (2009b). . > 100c is not met because the ecosystem is dynamic and ever changing because of fishery and other effects on dominant species composition. For instance whereas earlier studies have suggested that spiny dogfish are not a major competitor with cod, a very recent work (Morgan and Sulikowski 2015) has contradicted this notion. Score 80.		

d	**Guidepost**		Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.	Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?		Y	N
	Justification	Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.. The Northeast U.S. Continental Shelf Large Marine Ecosystem (NESLME) (Sherman et al. 1996) is one of the most studied marine ecosystems in the world (NEFSC 2009b). In addition trawl fishery interactions with this ecosystem have been documented at several levels (Brown et al. 2010, Byron and Link 2010, Garrison 2000a,b, Garrison and Link 200a,b, Grabowski et al. 2014, Link and Garrison 2002, Nye et al. 2009, NEFSC 2009b,) and continue to be monitored at the NEFSC (Fogarty 2014). The fishery does not score 100 because the ecosystem is not static, but dynamic because of climate change (Friedland et al. 2008,, Mills etal. 2013), and changing trophic interactions because of overfishing (Morgan and Sulikowski 2015). Score 80.		
e	**Guidepost**		Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Information is sufficient to support the development of strategies to manage ecosystem impacts.
	Met?		Y	N
	Justification	Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). Ecosystem information for this fishery is collected by and resides in the NEFSC which continues to conduct integrated ecosystem assessments and supporting ecosystem–based management within the Northeast LME to meet emerging management needs and mandates including assessing ecosystem impacts by this fishery (NEFSC 2009b).		
References		Brown et al. 2010, Byron and Link 2010, Fogarty 2014, Friedland et al. 2008,, Garrison 2000a,b, Garrison and Link 200a,b, Grabowski et al. 2014, Link and Garrison 2002, MAFMC 2014, Mills etal. 2013, Morgan and Sulikowski 2015, NEFMC 2009a, NEFMC 2015, NEFSC 2009b, Nye et al. 2009, , Sherman et al. 1996		
OVERALL PERFORMANCE INDICATOR SCORE: 80 = 5				**80**
CONDITION NUMBER (if relevant):				

PRINCIPLE 3: Management

Evaluation Table for PI 3.1.1.

PI 3.1.1		**The management system exists within an appropriate legal and/or customary framework which ensures that it:** • **Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and organised and effective cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	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. The Magnuson-Stevens Fishery Conservation and Management Act (MSA, reauthorized and amended in 2007) established requirements to end and prevent overfishing, including annual catch limits and accountability measures. The MSA also provides a process for identifying and evaluating environmental issues associated with Federal actions and for considering a reasonable range of alternatives to avoid or minimize adverse impacts to the extent practicable. The NEFMC provides for the identification and protection of Essential Fish Habitat through its extensive scientific advisory and public consultation process. The management system as defined by the MSA is consistent with MSC criteria in Principles 1 and 2 aimed at achieving sustainable fisheries. These Principles are being implemented by the National Marine Fisheries Service in cooperation with the Regional Councils, meeting the SG60 scoring issue. The management system provides, by the legal authority of the MSA, for extensive co-operation between Councils and NMFS and other parties through public hearings and through the courts, consistent with the SG80 scoring issue. The MSA contains procedures and measures that are binding on the managers of NMFS and the NEFMC to deliver outcomes consistent with MSC principles 1 and 2 meeting the SG100 scoring issue.		
b	**Guidepost**	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.	The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.
	Met?	Y	Y	Y

	Justification	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. The New England Council receives its mandate from the MSA for preparing fishery management plans including a robust public process for resolving disputes, meeting the SG60 scoring issue. The management system provides, by the legal authority of the MSA, for extensive transparent consultation and timely decisions through the Council public hearings and through the courts, consistent with the SG80 scoring issue. The system is tested through its public responses to stakeholders and the NEFMC addresses issues at public hearings, meeting the SG100 scoring issue.		
d	**Guidepost**	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Y	Y	N
	Justification	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2. The management system contains a mechanism to generally respect the legal rights of people dependent on fishing for food or livelihood, though public meetings and the courts, consistent with the SG60 scoring issue. A suitable framework consisting of public meetings and the courts exists within the NEFMC to observe the legal rights that might be established by custom of people dependent on fishing for food or livelihood, meeting the SG80 scoring issue.		
References		The Magnuson-Stevens Fishery Conservation and Management Act (2007) Guidelines for Implementing National Standards		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.2.

PI 3.1.2		**The management system has effective consultation processes that are open to interested and affected parties.** **The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	Y	Y	Y
	Justification	Organizations 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. The preparation of fisheries management plans, frameworks and amendments involve considerable opportunity for transparency since all the meetings are public and for public comment, which is built into each public meeting. The schedule of meetings is posted on the NEFMC website along with meeting materials. Through the consultation processes, fisheries managers obtain information from a wide range of sources, including local knowledge, for input into a broad range of decisions, policies and practices within the management system. Comments are heard and responses are documented in the planning process. All comments and responses are posted for the public. Organizations and individuals involved in the management process and their roles and responsibilities are clearly identified in the MSA and at the NEFMC website (nefmc.org). Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction. The website includes a statement of organization practices and procedures, a full list of Council Membership, a NEFMC member financial disclosure form, the structure and function of committees and all committee deliberations, assessment of options and decisions taken by the committee, meeting the SG60, SG80 and SG100 scoring issue.		
b	**Guidepost**	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.
	Met?	Y	Y	Y

	Justification	The 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 The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge, e.g. public meetings regarding and for the development of management plans. The management system demonstrates consideration of the information and explains how it is used or not used through the publication of the assessment of options considered and an explanation of decisions taken, all available on the NEFMC website, meeting the SG60, SG80 and SG100 scoring issues.		
c	**Guidepost**		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	Met?		Y	Y
	Justification	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement. The consultation process provides opportunity and encouragement for all interested and affected parties to be involved in public hearings, and facilitates their effective engagement through setting aside time at Council meetings for public input. This input is assessed and responses are published as part of decisions taken by Council. Therefore the fishery meets the SG80 and SG100 scoring issues.		
References		The Magnuson-Stevens Fishery Conservation and Management Act (2007) Guidelines for Implementing National Standards NEFMC.org		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.3.

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.
	Met?	Y	Y	Y
	Justification	Clear long-term objectives that guide decision-making and are consistent with MSC's Principles and Criteria and the precautionary approach, are explicit within and required by management policy. The Magnuson-Stevens Reauthorization Act of 2007 (MSA) requires that "conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry." Overfishing and overfished are defined by the MSA as "a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce the maximum sustainable yield on a continuing basis." The MSA also provides a mechanism for identifying and evaluating environmental issues associated with Federal actions and for considering a reasonable range of alternatives to avoid or minimize adverse impacts to the extent practicable. For implementing this mandate, the NEFMC includes a committee to deal with maintaining Essential Fish Habitat (EFH) and Habitat of Particular Concern. The NEFMC has also developed and adopted the use of the Swept Area Seabed Impact (SASI) Model for identification of vulnerable habitat and to minimize the adverse effects of fishing. The SASI Model is used to evaluate the habitat impacts of management measures in the preparation of fishery management plans. The objectives of fisheries management are explicitly described in the MSA and are in line with MSC Principle 1 and 2. These are fully described and available for public view at nefmc.org. There is an explicit legal requirement for planners of NMFS and the Council to produce plans with specific objectives consistent with the MSA. These objectives include sustainability of fish resources though preparation of fishery management plans consistent with MSC principle 1 and objectives to minimize the adverse effects of fishing on EFH, consistent with MSC Principle 2. The fishery meets the SG60, SG80 and the SG100 scoring issues.		
References		The Magnuson-Stevens Fishery Conservation and Management Act (2007) Guidelines for Implementing National Standards NEFMC.org		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.4.

PI 3.1.4		The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.
	Met?	Y	Y	Y
	Justification	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices. Statutory management planning by the Council gives certainty about the rules and goals of management in accordance with principles of sustainability, meeting the SG60 and SG80 scoring issues. Planning Development Team (PDT) of Council conducts a regular review of the management plan to determine if objectives are being met. Action is taken through amendments to the Multispecies Fishery Management Plan and the FW process and incentives for sustainable fishing are explicitly considered through Accountability Measures including reductions in fishing effort in subsequent years if the Annual Catch Limit is exceeded, meeting the requirements of the SG100 scoring issue.		
References		The Magnuson-Stevens Fishery Conservation and Management Act (2007) Guidelines for Implementing National Standards NEFMC.org Sector management operations plan		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.1.

PI 3.2.1		The fishery 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	**Guidepost**	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's 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's 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's management system.
	Met?	Y	Y	Y
	Justification	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's management system. The Fishery Management Plan for the Northeast Multi-Species fishery was adopted by NOAA and the New England Council in consultation with the Mid-Atlantic Council under the authority of the Magnuson Act in 1985 to manage the USA Northeast Groundfish Fishery, including those fisheries targeting the pollock, redfish and haddock stocks under MSC assessment here. Thirteen species are managed through plan amendments and framework adjustments to the original plan, while five additional stocks are managed under a separate small mesh multispecies program. The original objectives of the plan was to: • Allow the multispecies fishery to operate with the minimum of regulatory intervention, and • To adopt initial measures to prevent stocks from reaching minimum abundance levels, defined as those levels below which there is an unacceptable risk of recruitment failure. The second of these objectives deals specifically with the MSC Principle 1 outcome and has developed over a series of amendments to be considered well defined and measurable as required by the SG100 scoring issue. The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, known as the Sustainable Fisheries Act (SFA), emphasized the importance of habitat protection to healthy fisheries and strengthened the ability of the National Marine Fisheries Service (NMFS) and the Councils to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. This habitat is termed "essential fish habitat" (EFH) and is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". To improve fish habitat protection, the SFA requires or authorizes that the Councils, NMFS, and other federal agencies take new actions. The SFA required the Council, after receiving recommendations from NMFS, to amend its fishery management plans by October 1998 to: • Describe and identify the essential habitat for the species managed by the Council • Minimize to the extent practicable adverse effects on EFH caused by fishing • Identify other actions to encourage the conservation and enhancement of EFH.		

		The purpose of the amendment is to identify and describe the EFH for Atlantic herring, sea scallops, Atlantic salmon, and fifteen species of groundfish managed by the Council to better protect, conserve, and enhance this habitat; this amendment will also identify the major threats to essential fish habitat from both fishing and non-fishing related activities and identify conservation and enhancement measures. In support of the Council's habitat policy, the management objectives for the EFH amendment were as follows : 1. To the maximum extent possible, to identify and describe all essential fish habitat for those species of finfish and mollusks managed by the Council 2. To identify all major threats (fishing and non-fishing related) to the essential fish habitat of those species managed by the Council 3. To identify existing and potential mechanisms to protect, conserve and enhance the essential fish habitat of those species managed by the Council, to the extent practicable In 1999, NOAA Fisheries implemented the first Habitat Omnibus Amendment that addressed new Magnuson Fishery Conservation and Management Act mandates in most New England Council FMPs. The amendment also identified and described EFH for the 18 species managed by the Council, major threats to EFH from both fishing and non-fishing related activities, and proposed conservation and enhancement measures and designated Habitat Areas of Particular Concern for Atlantic salmon and Atlantic cod. To meet this requirement, fishery managers have introduced the Swept Area Seabed Impact (SASI) model providing a framework, enabling managers to better understand: (1) the nature of fishing gear impacts on benthic habitats (2) the spatial distribution of benthic habitat vulnerability to particular fishing gears (3) the spatial and temporal distribution of realized adverse effects from fishing activities on benthic habitats These two actions under the original plan addressing Principle 1 and under the 1999 amendment addressing Principle 2 provide evidence that the fishery has short term and long term objectives consistent with scoring issue at the SG60, SG80 and that these objectives are well-defined and measurable as required by the SG100 scoring issue.
References		Multi-Species Fishery Management Plan Amendment 17 Framework 52
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 3.2.2.

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 under assessment.		
Scoring Issue		SG 60	SG 80	SG 100
a	**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	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. The decision making process in management of the multi-species fishery follows the terms of the Magnuson-Stevens Act (2007), which requires managers to follow a process of assessment every two years of scientific information, evaluation of alternatives, public consultation, public documentation and decision according to a prescribed schedule. There is a well-established decision-making process prescribed by legislation that follows specific objectives of F_{MAX} and Ftarget guided by the precautionary approach, meeting the scoring issues of SG60 and SG80.		
b	**Guidepost**	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Y	Y	Y
	Justification	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. The Council website provides formal reporting to all stakeholders of all meetings, background planning documents, analysis of alternatives, public comments and responses and decisions. In addition to the process conducted every two years, if the Secretary of NMFS finds that an emergency or overfishing exists or that interim measures are needed to reduce overfishing for any fishery, he may promulgate emergency regulations or interim measures necessary to address the emergency or overfishing. Proposed emergency regulations are subject to a public comment period upon being published in the Federal Register. The publication of Amendment 17 to the Multi-Species Fishery Management Plan (nefmc.org) provides evidence of a decision making process that responds 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, meeting the SG100 scoring issue.		

c	**Guidepost**		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	Decision-making processes use the precautionary approach and are based on best available information. Decisions are guided by a precautionary approach including F_{MAX} and Ftarget and application of objectives to protect essential fish habitat and habitat of particular concern, consistent with MSC Principles 1 and 2, meeting this SG80 scoring issue.		
d	**Guidepost**	Some information on fishery performance and management action is generally available on request to stakeholders.	Information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Y	Y	Y
	Justification	Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. The process of evaluation of options in Amendment 17 and the record of all input, discussion and analysis indicates a system that responds to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. All information is reported to interested stakeholders through the comprehensive website of the NEFMC, meeting the SG100 scoring issue.		
e	**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	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges. The management system is held accountable by law to the articles of the Magnuson Stevens Act (2007), meeting the SG60 scoring issue and works proactively through the NEFMC to ensure public comment is fully aired and considered in the development of fishery management actions of the Northeast Multispecies Management Plan. The system is tested through its public responses to stakeholders and the NEFMC addresses issues at public hearings, meeting the SG100 scoring issue.
References		Amendment 17 to the Northeast Multispecies Fishery Management Plan Magnuson Stevens Act (2007)
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 3.2.3.

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment 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 under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Y	Y	Y
	Justification	A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules. It is clear that NOAA officers have demonstrated an ability to enforce relevant management measures of an effective fisheries monitoring control and surveillance system including catch monitoring, observers, VMS and enforcement officers, meeting the first scoring issue of SG60 and SG80. The implementation of the sector management scheme through Amendment 16 in 2011 has provided an additional layer of reporting, management and sanctions to this fishery. The monitoring surveillance and control system is comprehensive involving enforcement personnel, observers, VMS and mandatory reporting and sanction of the sector management system. The system has demonstrated a consistent ability to enforce management measures in the fishery, meeting the SG100 scoring issue.		
b	**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	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence Basic sanctions are applied in this fishery through the legal provisions of the MSA. In addition, Amendment 17 includes a requirement that sector develop a sector operations plan to NMFS for review and approval before a sector can operate. These plans include distribution of Annual Catch Entitlement (ACE), the steps the sector will take to avoid exceeding ACE and penalties to be administered if the sector exceeds the sector's ACE. Sanctions are thought to provide a strong deterrent to non-compliance meeting the SG80 scoring issue but the fishery does not meet the higher degree of confidence of the SG100 scoring issue without a demonstration of effective deterrence.		

c	**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	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. Fishermen are formally committed to the sector management system through signed agreements, providing information for effective management, meeting the SG60 and SG80 scoring issues. The sector management system also provided additional pressure on fishing captains to not report discards since the penalty for a sector exceeding its quota is great. Even though observer coverage is considered to be high at 25% compared to other fisheries, there is a lack of sufficient evidence to determine there is a high degree of confidence that fishers comply with the management system Consequently the SG100 scoring issue is not entirely met.		
d	**Guidepost**		There is no evidence of systematic non-compliance.	
	Met?		Y	
	Justification	There is no evidence of systematic non-compliance. With the high level of observer coverage of 25%, there is no evidence of systematic non-compliance in this fishery, meeting the SG80 scoring.		
References		Northeast Multispecies Fishery Management Plan Amendment 17 to the Northeast Multispecies Fishery Management Plan Magnuson Stevens Act (2007) Sector Operations and Management Plan		
OVERALL PERFORMANCE INDICATOR SCORE: All SG80 and one of three SG100				**85**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.4.

PI 3.2.4		The fishery has a research plan that addresses the information needs of management		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2 A comprehensive research plan is prepared and implemented by the Scientific and Statistical Committee of (SSC) of the NEFMC and overseen by the Northeast Regional Coordinating Council (NRCC) coordinating the research between the two affected Councils in New England and in the Mid-Atlantic States. The NRCC prepares a comprehensive research plan involving a review of stock assessment processes, stock assessment schedule worksheet including priorities and an environmental impact statement, meeting the SG60 and SG80 scoring issues. The plan comprises a comprehensive and strategic approach among the Councils and the federal laboratory to address improvements in fishery dependent data and information systems, improvements in stock assessment process and efficiency, assessment of staff time budgeting, management strategy evaluation, and incorporating Ecosystem processes into stock assessments. These will address the MSC P1 and P2 issues. The work of the NEFMC provides the same level of service for the management issues of P3. Meetings of the NRCC and the NEFMC SSC and are available in a timely manner at nefmc.org. This provides sufficient evidence that the research plan is comprehensive and provides management with a strategic approach meeting the SG100 scoring issue.		
b	**Guidepost**	Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.
	Met?	Y	Y	Y
	Justification	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available. The reports of the SSC are publically available in a timely manner to anyone on line at nefmc.org meeting the SG100 scoring issue.		
References		SSC Reports: http://www.nefmc.org/committees/scientific-and-statistical-committee		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.5.

PI 3.2.5		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery has in place mechanisms to evaluate some parts of the management system.	The fishery has in place mechanisms to evaluate key parts of the management system	The fishery has in place mechanisms to evaluate all parts of the management system.
	Met?	Y	Y	Y
	Justification	All parts of the management system are subject to public evaluation through meetings of the NEFMC and related science and management committees. The Northeast Multispecies Fishery Management Plan was developed and is amendment through the Plan Development Team by the use of Amendments and Frameworks. Each Amendment involves a comprehensive review of alternatives and impacts, including regulatory and economic impacts, meeting the SG100 scoring issue.		
b	**Guidepost**	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Y	Y	N
	Justification	Every two years, the Planning Development Team of Council (PDT) evaluates whether management measures need to be revised in order to meet mortality objectives, meeting the SG60 scoring issue. The PDT is required to submit suggested measures to the Council and, if revisions are necessary, the Council will then consider adjustments over the course of two Council meetings. Because the meetings and decisions of Council are public, their actions are subject to occasional external review by NGO's and the courts, meeting the SG80 scoring issue. Although there is an opportunity for an occasional review of specific components of the management system by the National Academy of Science, as provided in 2008 when NAS reviewed the effectiveness of Fish Stock Rebuilding Plans in the United States, there is no such regular external review built into the management system as required by the SG100 scoring issue. Therefore the SG100 scoring issue is not met.		
References		Northeast Multispecies Fishery Management Plan Amendment 17 to the Northeast Multispecies Fishery Management Plan Evaluating the Effectiveness of Fish Stock Rebuilding Plans in the United States, 2014		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				

9.2. Appendix 1.2. Risk Based Framework (RBF) Outputs

RBF has not been used to score any PIs.

9.3. Appendix 1.3. Conditions and Milestones requiring Client Action Plan

Following are the stated conditions and recommendations as provided in the Draft Client Report dated October 2015.

In addition to the general requirements, the Client Group (client) must also agree in a written statement to accept and meet the specific conditions as described below and within the timelines set out. This is formally documented by the Client as the *'Client Action Plan for Meeting the Condition for Continued Certification*' and approved by the CAB, SAI Global.

The Client should also demonstrate through consultation with pertinent management authorities (i.e. NMFS Northeast Fisheries Science Center, NOAA Greater Atlantic Region Fisheries Office, and New England Fisheries Management Council) and supporting evidence where the Client Action requires action to be undertaken by the management authorities.

There are 2 conditions relating to performance indicators 2.1.1, 2.1.2

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y,N,N/A)
1, 2	The client must provide evidence that there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding of the retained species: GOM/GB cod, GOM/GB yellowtail flounder, GB winter flounder, and witch flounder	**2.1.1, 2.1.2**	**Y**

Table B1.3: Condition 1, 2: Retained Species – GOM/GB cod, GOM/GB Yellowtail flounder, GB Winter flounder, and Witch Flounder

Performance Indicator	**PI 2.1.1 Retained Species Outcome** **PI 2.1.2 Retained Species Management**
Score	**75**
Rationale	There has been a growing concern about the current productivity of the Gulf of Maine and Georges Bank cod stocks due to many years of overfishing despite being historically regulated by many different conservation measures and management strategies with no success. In November 2014, emergency actions (drastic reduction of trip limits(i.e 800 lb/trip to 200lb/trip),commercial and recreational fishery closure areas, zero recreational possession of cod) were implemented by NMFS to reduce fishing mortality on the GOM cod and these were expected toreduce relative fishing mortality. Emergency actions has not been implemented for GB cod. Given the most recent 2015 stock assessment update (September 2015) and the re-examination of strategies to reduce GOM and GB Cod retained catch, there is no clear evidence at this time, that the current mitigation measures that act as a partial strategy are demonstrably effective in promoting recovery and rebuilding of GOM and potentially for GB Cod. The assessment team found downward trends in the population indices and extremely low spawning stock biomass estimates for both stocks. • GOM Cod current spawning stock biomass (SSB) is 4% of the biomass target for this stock and there is overfishing $F > F_{MSY}$ occuring with fishing mortality in 2014 reported as 0.932 which is 498% of the overfishing threshold proxy (F_{MSY} proxy = 0.187). • GB Cod current SSB is 1% of the biomass target for this stock. and there is overfishing $F>F_{MSY}$ ocurring with fishing mortality in 2014 reported as 1.69 which is 994% of the overshing threshold proxy (F_{MSY} proxy = 0.169). It was also noted that high natural mortality is also ocurring and that recruitment has remained low potentially slowing the recovery of both stocks . Additional data and analysis are required before determining whether the more recent strategy and management measures have achieved the desired outcomes. Furthermore, current status for GOM yellowtail flounder, GB Winter flounder and witch flounder is overfished and overfishing is ocurring. Status of GB yellowtail flounder is unknown due to changes in stock assessmnet methodologies. There are no existing reference points. Latest assessment shows the 2014 GB stock biomass as one of the lowest in the time series and their condition is categorized as poor. Thus, current partial strategy has not been effective in stopping overfishing and promoting recovery for these species.
Condition	The client must provide evidence that the current partial strategy that has been adopted for GOM and GB cod is demonstrably effective i.e. the fisheries for Acadian redfish, haddock and pollock do not hinder the recovery and rebuilding of: GOM/GB cod, GOM/GB yellowtail flounder, GB winter flounder, and witch flounder.
Milestones	**By Year 1:** In the first year following certification, Sustainable Groundfish Association, Inc will work actively with relevant fishery managers and stakeholders (such as NMFS NEFS, NOAA GARFO and NEFMC)

	to ensure that monitoring activities are in place to assess implementation of the current GOM/GB cod, GOM/GB yellowtail flounder, GB Winter flounder, and Witch Flounder partial strategies and any revised measures as may be appropriate, to demonstrate that these measures can result in sufficiently low fishing mortality on GOM/GB cod, GOM/GB yellowtail flounder, GB Winter flounder, and Witch Flounder stocks such that these fisheries do not hinder their recovery and rebuilding. (Note: Demonstrable evidence of recovery does not necessarily require positive trajectories in cod stocks.) **By Year 2:** The Assessment Team shall be provided with evidence that the current partial strategy to reduce GOM/GB cod, GOM/GB yellowtail flounder, GB winter flounder, and witch flounder mortality by retained catch of US Acadian redfish/pollock/haddock otter trawl fisheries has been reviewed and corrective adjustments (if any) have been proposed. **By Year 3:** The Assessment Team shall be provided with evidence that any revised measures of the partial strategy have been implemented and monitoring activity in place to assess their implementation. Examples of Information as per Year 1 shall be included. **By Year 4:** The Assessment Team shall be provided with evidence that the relative fishing mortality for GOM/GB cod, GOM/GB yellowtail flounder, GB winter flounder, and witch flounder from the target fisheries has been maintained at levels that does not hinder their recovery.
Client action plan	**Action Plan** By the first annual audit: The Client Group will provide the audit team with evidence: that the Client Group worked actively with relevant fishery managers and stakeholders (such as NMFS NEFS, NOAA GARFO and NEFMC) to ensure that monitoring activities are in place to assess implementation of the current GOM/GB cod, GOM/GB yellowtail flounder, GB Winter flounder, and Witch Flounder partial strategies; of any revised measures, as may be appropriate, to demonstrate that said revised measures may result in relative fishing mortality for GOM/GB cod, GOM/GB yellowtail flounder, GB Winter flounder and Witch Flounder stocks from the target fisheries such that these fisheries do not hinder their recovery and rebuilding. (Note: Demonstrable evidence of recovery does not necessarily require positive trajectories in cod stocks.) By the second annual audit: The Client Group will provide the audit team with evidence that the current partial strategy to reduce GOM/GB cod, GOM/GB yellowtail flounder, GB winter flounder and witch flounder mortality by retained catch of US Acadian redfish/pollock/haddock otter trawl fisheries has been reviewed and corrective adjustments (if any) have been proposed. By the third annual audit: If any corrective adjustments were proposed were revised by the Client Group, evidence of the proposal(s) and the plan to monitor and assess the implementation of the proposal(s) will be provided to the audit team. Examples of Information as per Year 1 shall be included. By the fourth annual audit: The Client Group will provide the audit team with evidence that the Client Group has monitored the relative fishing mortality for GOM/GB cod, GOM/GB yellowtail

	flounder, GB winter flounder, and witch flounder from the target fisheries such that these fisheries do not hinder their recovery. Responsible parties Client in consultation with NMFS, NEFMC Timeframe for Milestones as above
Consultation on condition	

SAI Global Recommendations:

GOM and GB Cod

1. One of the findings of the assessment team was there have not been a detailed consideration or scientific consensus about the role of the environmental conditions, climate change and actual trophic structure in Gulf of Maine and Georges Bank influencing major stocks abundance such as cod and how this would affect the accuracy of stock assessments from the GOM and GB region. Management authorities are encouraged to incorporate some evaluation of the current role of trophic structure and environmental covariates on influencing cod abundance and condition within the ongoing GOM and GB cod assessments. This will provide a better understanding of the environmental ecological interactions that surrounds cod species within these regions and their response to current fishing activities.

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

February 16, 2016

Mr. John F. Whiteside, Jr.
General Counsel
Sustainable Groundfish Association, Inc.
678 State Road
Dartmouth, MA 02747

Dear John:

The Sustainable Groundfish Association, Inc. (SGA) contacted me about confirming that there are measures in place to assess the status of Gulf of Maine cod, George's Bank cod, Gulf of Maine yellowtail flounder, George's Bank yellowtail flounder, George's Bank winter flounder, and witch flounder.

On behalf of the NEFMC, I can confirm the following statement is correct:

There are measures in place to assess the status of Gulf of Maine cod, George's Bank cod, Gulf of Maine yellowtail flounder, George's Bank yellowtail flounder, George's Bank winter flounder, and witch flounder.

These five stocks are part of the Northeast Multispecies complex. They are assessed by the Northeast Fisheries Science Center and the assessments reviewed by a panel of independent scientists and members of the Council's Scientific and Statistical Committee. The most recent assessments were performed in the fall of 2015. We anticipate that these stocks will be assessed again in 2017. Georges Bank yellowtail flounder is also assessed annually by the Transboundary Resource Assessment Committee, a panel of U.S. and Canadian scientists.

In addition to the assessments that are performed approximately every two years, catches (both landings and discards) are monitored throughout the year. At the end of the year, catches are compared to the Acceptable Biological Catches that are based on the most recent assessment results.

If you have any further questions, please contact me.

Sincerely,

Thomas A. Nies

Thomas A. Nies
Executive Director

10. Appendix 2. Peer Review Reports

10.1. Peer Reviewer 1

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Conformity Assessment Body Response**
Justification: Overall the assessment team was thorough and documented each of the issues unique to each of the four units of certification (UOC 1 US Northeast Acadian Redfish otter trawl fishery, UOC 2 US Northeast Pollock otter trawl fishery, UOC 3 and UOC 4 US Northeast Haddock otter trawl fishery – GB and GOM). My response below will document my general and specific comments to each of the performance indicators. The assessment team provided a rigorous and sufficiently critical analysis of each of the four units of certification. I was especially impressed with the depth of investigation for each of the three overarching performance indicators – Mateo et al. had a keen attention to detail and their knowledge of the dynamics of the stock, the ecosystem ramifications, and the management setting, history and conditions were clear and well communicated. Given the information provided to me in the report and the qualitative scoring that resulted, the appropriate conclusion has been reached.		No Response Needed

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes**	**Conformity Assessment Body Response**
Justification: The assessment team outlined four conditions that must be fulfilled that are relevant to retained species and retained species management. This is a chronic problem with NE ground fish fisheries and the poor condition of the cod stock (among others) in the area is a challenge. The conditions are appropriate as is the time frame for remedial action.		No Response Needed

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**Yes**	**Conformity Assessment Body Response**
Justification: Yes, the action plan is sufficient and represents the best "way forward" for the fishery to be in compliance with all MSC requirements. The consultation with the management agency will ensure that the proper scientific sampling strategies are employed and that the fishery will maximize the value of the effort to monitor by catch of interest.		No Response Needed

General Comments on the Assessment Report (optional)

I would like to commend the assessment team for their thorough review and clear presentation. Their attention to detail and clarity of presentation made the review of the client report a much easier task.

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
Example: 1.1.2	*No*	*No*	*NA*	*The certifier gave a score of 80 for this PI. The 80 scoring guidepost asks for a target reference point that is consistent with maintaining the stock at Bmsy or above, however the target reference point given for this fishery is Bpa, with no indication of how this is consistent with a Bmsy level.*	
1.1.1	Yes	Yes	NA	Recruitment overfishing occurs when the spawning stock biomass is reduced such that the produciton of offspring (eggs, larvae, or recruitment to the fishery) is impaired. Each of the stocks under consideration have been subjected to the scrutiny of a federal peer-reviewed stock assessment and each have been found to exceed the SSB level for each stock. Although recruitment is variable, the maintainence of stocks at levels that exceed the fishery management reference point reduces the risk that the stock will have a high probability of overfishing. Each of the stock's biomass' exceed the reference point and thus there is likely a low probability that each of the stocks will experience recruitment overfishing. Additionally, the peer-reviewed stock assessment from which these stock biomass estimates were derived are "robust" and do not show problematic retrospective patterns indicating that the model describe the observed data appropriately. Regarding part b, the recent point estimates of B/Btarget in recent years has been fluctuating at values > 1 for each of the stocks. Thus, the stock status has not changed drastically in the last few years. I agree with the core of 100, all issues have been met for SG100.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.2	Yes	Yes	NA	The limit and target reference points of the stocks under consideration were determined quantitatively using per-recruit analysis in a simulation framework (Acadian Redfish, GOM Haddock). Because the assessment models are robust the reference points (though necessarily displaying some uncertainty) can be estimated to some reasonable precautionary level, in this case 50% of maximum spawning potential for Acadian Redfish, F40% MSY proxy for US Atlantic Pollock and GOM Haddock, median SSB MSY for Georges Bank Haddock. For each of the stocks, the limit reference point is set at an appropriate level to ensure, in a precautionary framework, to avoid impairing the sustainability of the stock – the scores on "b" of 100 are justified. Similarly, the target reference points are appropriate for the each of the stocks under consideration; each are relatively standard, widely used, and accepted limit points.	No Response Needed
1.1.3	Yes	Yes	NA	Not applicable to the stocks under consideration for this assessment.	No Response Needed
1.2.1	Yes	Yes	NA	I agree with the review team that there is a robust and precautionary strategy in place for each of the stocks under consideration. The multispecies groundfish management plan is comprehensive in this regard and the harvest strategy is tailored to achieve management goals. Under federal mandate, the annual catch target must be below the annual catch limit and this hierachal structure is meant to address uncertainty in the science used to formulate the assesment model and the uncertainty associated with management. The fishery management plan is supported by monitoring, assessment, stakeholder involvement and a mandate to ensure sustainability for the long term. A score of 100 is justified.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.2	Yes	Yes	NA	The score of 80 is justified for each of the stocks under consideration and well-defined harvest control rules are in place that are consistent with the harvest strategy. The harvest control rules are consistent with a precautionary approach and are defined such that the effort controls are imposed when the limit reference points are approached. In order to address a wide range of uncerainties in management, data collection, and modeling, a quantititvie assessment must be performed, specifically a management strategy evaluation. This has not been performed for the management of the stocks under consideration and thus only a subset of potential uncertainties – evaluated in the stock assessment models for each of the stocks under consideration have been evaluated. The management tools in place are effective in achieving the desired management targets; a score of 100 is justified.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.3	Yes	Yes	NA	The harvest of each of the stocks under consideration is consistently and comprehensively monitored by the state and federal management agencies that are charged with evaluating the condition of the stock and the fishery. A variety of monitoring methods are employed and include fishery-independent and fishery-dependent efforts. Biological aspects of the stock (age- and length-compositon and productivity). Catch statistics (through port sampling and dealer reports) and fleet composition data are collected to support management and assessment. The fishery for each of the stocks under consideration also includes an observer program to measure discards and incidental bycatch of protected and managed species. The notheast U.S. fishing ground is the target of a considerable amount of academic and government (NOAA) reasearch and the ecosystem research performed in the area is some of the most comprehensive in the U.S. An emerging field of analysis to examine uncertainty with respect to the robustness of management is management strategy evaluation, this has not been performed.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.4	Yes	Yes	NA	I agree with the reviewers that a score of 100 is justified for each of the stocks under consideration and that there is an adequate assessment of the stock status and that the assessment includes the temporal and spatial dynamics of the stock. Each of the stocks incorporate age-structured catch and abundance information and these are used to determine reference points and to perform historic stock reconstruction. The age-structured stock assesment modeling framework "ASAP" is used for determination of stock and fishery status of Acadian Redfish, US Atlantic Pollock, and Gulf of Maine Haddock. A similar modeling framework, VPA is used to assess the GB Haddock population. Each of these modeling approaches and the data used in the construciton of the assessment represent the best available inputs and methods to determine stock and fishery status.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.1	Yes	Yes	Yes (condition 1)	The process of using otter trawl gear necessarily means that non-targeted species of management and conservation concern will be incidentally targeted. This is the case for the stocks under consideration and a sub-SG80 score is warranted. The assessors note particularly the fish stocks that warrant SG80 scores and inculde the White Hake, American Plaice, and GOM Winter Flounder. The GOM/GB Yellowtail Flounder, Witch Flounder, GB Winter Flounder, and GOM/GB Cod are all species of concern because of their stock status and all are encountered in the otter trawl fisheries for the stocks under consideration. I agree with the assessment team that the NE multispecies groundfish management plan is attempting to address this concern. The plan is proactive and serves to balance limiting the incidental take of imperiled stocks while promoting the adequate utilization of other groundfish fisheries in the region. To this end a variety of management measures have been imposed historically and a number are currenlty in place. The variety of strategies include the limiting catch in other sectors (recreational), gear modification, and temporal closures. It is justified to include the condition (1) specified by the reviewers.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.2	Yes	Yes	Yes (condition 2)	With the exception of the stocks mentioned in 2.1.1 (GOM/GB Yellowtail, Witch Flounder, GB Winter Flounder, and GOM/GB Cod) the strategy in place regarding the incidental catch of major and minor species does not result in serious or irreducable harm in incidentally encountered stocks. This is true for all of the minor species at SG100. The management actions, outlined in the management plan, have as their goal to promote growth of the GOM Cod and GB Cod – there is little ambiguity in the depleted nature of these stocks. The GOM Yellowtail flounder, GB Winter Flounder, and Witch Flounder are overfished and the F rate is too high. The other stocks for which scores of SG80 cannot be assigned have to do with the ambiguity of the stock status. The remedial condition 2 will help to determine, with more certainty, the potential deleterious effects of otter trawl fishing when targeting the stocks under consideration. I agree with the reviewers that it is not clear if the management strategy is working to improve these conditions and that condition #2 is necessary and will help resolve the amigiuties of the extent to which management measure are helping to improve the stock status.	No Response Needed
2.1.3	Yes	Yes	NA	Through mandatory data reporting and extensive observer coverage the information about the nature (biomass, age and length-composition) and extent of the retained species is well described. Observer coverage is > 25%. The monitoring of retained species is detailed. The assessment panel state that the monitoring does not warrant a score of 100 however because of a lack of a robust assesment model for GOM Yellowtail. The score of 95 is warranted.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.2.1	Yes	Yes	NA	Three of the four major bycatch elasmobranch species are assessed and the stock status determination is "not overfished" and that no overfising is occuring, only Thorny Skate is overfished in this group. All of the minor bycatch species are at stcok levels whrer they are not overfished and overfishing is not occuring. Based on the assesment team's report, the Thorny Skate stock has a quantitative assesment, monitioring, and a management strategy put in place to ensure that catch is limited such that it can be rebuilt to biomass levels that will move it to a status of not overfished. The low score (lower than SG80) for the associate perfromance measures c in this PI is justified however because the Thorny Skate stock is overfished – though the assessment team describes the how, given the difficulties and ambiguities in understanding the state of the stock mitigation measures are in place.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.2.2	Yes	Yes	NA	Thorny skate is the primary species of concern for this performance indicator. All of the other major and minor species have a stock staus' at biomass greater than the biomass reference point and the mitigation strategy in place for these stocks have been effective for recovery from overfishing. The nature of the quantitative assessment for these species is rigorous and includes the inclusion of a comprehensive monitoring program and assessment models that use the best available modeling performed by experts in the fieild. I think the reviewers need to clarify and better justify their statement on p. 196 regarding the score of 80 for the Thorny Skate on this performance measure – The summary of the bycatch management strategy should be invoked here. From the review of this in the report (p. 56 and 57) there looks to be a number of regulations put in place (2010) to ameliorate declines across the skate complex, specifically a reduction in the F rate for thorny skates in 2014.	The team has revised their statement on page 196 for the justification of the score 80 on Thorny Skate
2.2.3	Yes	Yes	NA	The information on the taxonomic composiiton of the incidentally caught bycatch species is of sufficient quality to determine if the stock status of these taxa exhibit marked changes. There are a number of monitoring programs in place to provide information for quantitative assessment. The management authority has a number of fishery-dependent and fishery-dependent programs employed to monitor bycatch and have time-series' of these data that are used to make determination of the trajectory of biomass of stocks.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.1	Yes	Yes	NA	The nature of the gear used in the LMOTfishery and the few records of interaction, it is very likely that these fisheries do not pose a threat to large whales. Thus, the fishery meets national and international requirements for protection of these taxa. Pinnipeds (three species of seals), small cetaceans (seven species), sea turtles, and the fedrally listed Atlantic Sturgeon have a non-zero probability of interaction with the mobile gear. Each of the seal and cetacean species are monitored and assessed following the the Marine Mammal Protection Act and each has an associated maixmum number of animals that can be removed from the stock (PBR). Given these levels, direct and indirect impacts of fishing gear will likely not cause serious harm to the stocks. Sea Turtle interaction is at a low probability and special gear requirements have not been mandated, indicating that, in the area there is not a concern of LMOT and turtle interaciton. Regarding, Atlantic Sturgeon, there is apparent spatial segregation of that population and the relatively deeper water fishing conducted by the Acadian Redfish, Pollock and Haddock fisheries that are the subject of this assessment.	No Response Needed
2.3.2	Yes	Yes	NA	The management authority for the regions living marine resources has in place a suite of strategies to minimize the harm to endangered and threatened species that includes the marine mammal protection act and the endangered species act. Gear restricions and temporal and spatial closures are used to minimize potential harm to some species in the region that may be incidentally trageted by some gears. The monitoring and assessment of pinnipeds and cetaceans ensures minimizing mortality and turtles are of such rarity to be targeted that no specific gear restrictions for the LMOT are thought to be warranted.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.3				I am satisfied that the observer coverage (~25%) is adequate to inform the trajectory of ETP stocks that may be incidentally encountered. Active enforcement, monitoring, and periodic review of ETP stocks to allow estimates of fising related mortality.	No Response Needed
2.4.1	Yes	Yes	NA	Mobile gears have a variable impact on the topography and function of the benthic habitats that it interacts with, but I agree with the reviewers that the harm is not irreversible. Much of the fishable area is composed of loosely aggregated silt, mud, sand, and gravel and fishing does not infringe on sensitive habitats that would not already been impacted by over 70+ years of industrial scale fishing, there is some literture (Auster and others) to show some of the impacts to the bottom on habitat. A score of 80 is justified for this condition.	No Response Needed
2.4.2	Yes	Yes	NA	A variety of strategies are in place to mitigate and limit the harm to habitats and preserve living marine resources in the area targeted by the fishery under investigation. In addition to mapping the area to determine those areas of conservation concern there are a number of areas that are monitored regularly to limit fishing for scallop and also the marine sanctuary in the area. Although fishing is allowed in these areas its impact is monitored. I concur with the score of 80 for this performance indicator.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.3	Yes	Yes	NA	I agree with the assessment team that the benthic habitats that are impacted by the fishery are in both an academic and regulatory setting. Similiarly there have been efforts to understand what the effects on the benthic habitats are. I agree with the review team that a score of 95 is justified because although the effects have not been fully quantified, there is modeling and experimental evidence to allow an understanding of the nature of the impacts. With the use of VMS and associated monitoring, the spatial extent of potential impacts are known.	No Response Needed
2.5.1	Yes	Yes	NA	The assesment team limits their interpretation of ecosystem impact to the impact on the benthic habitat and mention the reduced status of the cod stock. It is not known to what exent the removal of targeted stocks and incidentally caught stocks effect the entire ecosystem. The area of concern is subject to a variety of large-scale biotic and abiotic drivers that include short- and long-term variations in temperature, salinity, and primary production. There is very little reason to believe that the fishery is effecting the ecosystem at this level of organization. In the absence of information to the contrary, I accept the socre of 80 for this performance indicator.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.2	Yes	Yes	NA	A major challenge for management systems in understanding the risks to ecosystem structure and function is to understand a wide variety of ecosystem-level measures of resilience. Often it is not clear how management can achieve and maintain "resilient ecosystems". Ecosystem assesment is performed regulary for the NE Shelf large marine ecosystem. The strategy employed by the managemetn agency is concerned with ecosystem outcome metrics and I agree with the assessment team that SG80 is an appropriate score.	No Response Needed
2.5.3	Yes	Yes	NA	The assesment team points out, and I agree that the area is one of the most intensly studied marine ecosystems in the world and yet a major deficiency in knowledge is to understand and quanitfy the tractable impacts of the fishery on the incidentally-caught species encountered. That this information is lacking makes it dificult to perform quantitative assessment of changes in the community structure. A score of 80 is justified for this performance measure.	No Response Needed
3.1.1	Yes	Yes	NA	I agree with the assessment team, the management system is a contemporary, stake-holder engaged system that delivers, or attempts to deliver, sustainable fishery practices. Legal rightsare explicitly established and have been codified. Although legal rights are observed they are not committed to in a formal way and may be superseded by conservation and other concerns. There are management bodies in place to adjudicate on disputes – relevant to the fishery under examination is the New England Council. A score of 95 is justified for this performance measure.	No Response Needed
3.1.2	Yes	Yes	NA	The management system is characterized as being inclusive, open, and knowledgeable and this promotes an effective consultation process.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.3	Yes	Yes	NA	I agree that the management policy has well-defined long-term objectives that are consistent with precautionary approaches and sustainable targets and these follow from Magnuson-Stevens Fishery Conservation and Management Act.	No Response Needed
3.1.4	Yes	Yes	NA	There is no evidence that social and economic incentives are being used that conflict with the goals of sustainability in the fishery.	No Response Needed
3.2.1	Yes	Yes	NA	The fishery management plan specifies objectives for management that are consistent with MSC's principals 1 and 2. Well defined short and long-term goals are enumerated by the Council.	No Response Needed
3.2.2	Yes	Yes	NA	The NE Council fishery management system has a responsive decision-making process – that is guided by engagement with stakeholders and understanding the objectives of management.	No Response Needed
3.2.3	Yes	Yes	NA	The score of 85 for this performance measure is justified. Monitoring and control to ensure compliance is generally acceptable and enforcement measures are in place. The score of 100 is not justified because it is not clear to what extent sanctions help to deter violators. Similiarly, the compliance with the management system by the fishers is not well doucmented. Such doucumentation should be made available by the particpants of the fishery.	No Response Needed
3.2.4	Yes	Yes	NA	The fishery is engaged in managemetn and assessment. It is not clear to what extent the fishery participates in organized (cooperative fishery research) or ad hoc research (if at all). Research plans are included in the stock assessments and provides a coherent framework for investigating and describing research needs.	No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.5	Yes	Yes	NA	The comprehensive nature of the management system is appropriate to provide review and evaluation of performance.	No Response Needed

Any Other Comments

Comments	Conformity Assessment Body Response

10.2 Peer Reviewer 2

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Conformity Assessment Body Response**
Justification: I concur with the overall conclusions. Some minor disagreements, and editorial comments are noted below. None of the suggested changes will affect the overall conclusion.		No Response Needed

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Partially**	**Conformity Assessment Body Response**
Justification: I concur with the conditions 1 and 2, however, among the measures to reduce mortality to specified limits, is to "ensure that monitoring activities are in place…" but the current draft of the client document already states repeatedly that monitoring is assumed to be sufficiently accurate to support such measures. So the condition provides no direction about what new is actually going to be done with respect to monitoring, other than confirming the monitoring remains in place. The current document affirms that while current monitoring is adequate there are no means for verification. One might anticipate that as species' quotas are reduced there will be more pressure for industry to underreport catches to cope with "choke-point" species. What is required in the condition is a note to increase efforts to verify that the monitoring remains sufficiently accurate. This concern should be explicitly worded in the condition, otherwise all the current condition requires with respect to monitoring is to confirm that methods continue as before. Enhanced verification activities can be as simple as more frequent dockside checks or other forms of short term studies to search for anomalous fishing behaviour in time and space. I am not suggesting a radically new monitoring program.		The CAB does not agree with the reviewers comments. The CAB believes that there is a strong observer program that is based in a sound statistical design and has regular reviews in order to allocate sampling efforts on different sectors of the groundfish fishery. The sampling allocation is statistically based on the goal to achieve 25% of coefficient of variation. There has been reports by USGS and NMFS office of law enforcement documenting that there is a strong compliance. The objective of the client action plan is to show that the current measures are of the NE groundfish otter trawl fishery are demonstrably effective is not hindering recovery. The achievable goal is to stop overfishing on the rebuilding plan for species that are depleted.

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**Partially**	**Conformity Assessment Body Response**
Justification: The client response should explain what steps will be taken and reported to show that the current monitoring continues to be effective and adequate rather than just confirming that the system continues to be operational and assumed to work even though there may be increased pressure to misreport.		Please see above

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
Example: 1.1.2	*No*	*No*	*NA*	*The certifier gave a score of 80 for this PI. The 80 scoring guidepost asks for a target reference point that is consistent with maintaining the stock at Bmsy or above, however the target reference point given for this fishery is Bpa, with no indication of how this is consistent with a Bmsy level.*	
1.1.1	Yes	Yes but see comment to right.	N/A	a and b. While SSB from GOM-H is well above target, the figure on page 127 indicates the F2013 is not 95% (100 score) certain to be less than target F, maybe 80% certainty. A minor point, but appears to be glossed over. Should issue a be scored 80 not 100 for GOM-H for 1.1.1?	The team disagree with the reviewers comments in that the current metrics Spawning Stock Biomass for 2013 is well above the target refrence point (Spawning Stock Biomass MSY) and the limit reference point(½ Spawning Stock Biomass MSY). Given that there are biomass reference points there is no need to use other proxies such as F_{MSY}.
1.1.2	Yes	Yes	N/A		No Response Needed
1.1.3	Yes	Yes	N/A		No Response Needed
1.2.1	Yes	Yes	N/A		No Response Needed
1.2.2	Yes	Yes	N/A		No Response Needed
1.2.3	Yes	Yes	N/A		No Response Needed
1.2.4	Yes	Yes	N/A		No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.1	Yes	?	Condition	2.1.1 a. If the relative status of **GOM WF** is unknown, how can it be perceived to be highly lilkely to be within biolgically based limits? It is currently in 2.1.1c, so perhaps current inclusion in a is a mistake.	The GOM Winter Flounder status referred as overfished is unknown. This is the reason the score had to move to item c.
2.1.2	Yes	No	Condition. See comment above under **Overall Opinion.**	2.1.2.b, c, and d **Atlantic halibut**. I do not agree with the score 100 for AH. "*However, the latest stock assessment update concluded determined that the overfishing and overfished status of Atlantic halibut cannot be determined using the current assessment (NEFSC 2015)".* How can one have high confidence in a strategy (b) or find clear evidence that the stratgy is being implemented successfully (c) or find that the strategy is working (d) when there is no capabaility to track stock status. I also did not find any comment about a survey that would index AH abundance.	Changes on the scores of Atlantic Halibut were done for performance indicator items 2.1.2b, 2.1.2c, 2.1.2d and for perfomance indicator items 2.1.3b, 2.1.3c and 2.1.2d. The NMFSC survey index calculates abundance estimates for Atlantic halibut http://www.nefsc.noaa.gov/publications/crd/crd1524/Individual%20Stocks/Atlantic_halibut.pdf
2.1.3	Yes	No		**See Atlantic halibut comment above.** Comment: The narrative in 2.1.3. b notes that the surveys index all managed species although it apparently fails to index halibut. Perhaps some rewording would be appropriate.	Changes on the scores of Atlantic Halibut were done for performance indicator items 2.1.3b, 2.1.3c and 2.1.3d. The NMFSC survey index calculates abundance estimates for Atlantic halibut http://www.nefsc.noaa.gov/publications/crd/crd1524/Individual%20Stocks/Atlantic_halibut.pdf
2.2.1	Yes	Yes			No Response Needed

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.2.2	Yes	Yes			No Response Needed
2.2.3	Yes	Yes			No Response Needed
2.3.1	Yes	Yes			No Response Needed
2.3.2	Yes	Yes			No Response Needed
2.3.3	Yes	Yes			No Response Needed
2.4.1	Yes	Yes			No Response Needed
2.4.2	Yes	Yes			No Response Needed
2.4.3	Yes	Yes			No Response Needed
2.5.1	Yes	Yes			No Response Needed
2.5.2	Yes	Yes			No Response Needed
2.5.3	Yes	Yes			No Response Needed
3.1.1	Yes	Yes			No Response Needed
3.1.2	Yes	Yes			No Response Needed
3.1.3	Yes	Yes			No Response Needed
3.1.4	Yes	Yes			No Response Needed
3.2.1	Yes	Yes			No Response Needed
3.2.2	Yes	Yes			No Response Needed
3.2.3	Yes	Yes			No Response Needed
3.2.4	Yes	Yes			No Response Needed
3.2.5	Yes	Yes			No Response Needed

General Comments on the Assessment Report (optional)

Minor editorial issues

Figure 7. I do not see the circles, triangles and vertical or horizontal bars mentioned in the caption.
CAB Response: Graphs were updated to the 2015 stock assessment update (NEFSC 2015).

Bottom of P. 27. I do not see the graph that shows:
The estimated Groundfish Assessment Updates from 2012 show Acadian Redfish spawning biomasses in 2010 from the base and alternative models on a magnitude of 24% and 32% greater than the respective new SB (50%MSP) reference point.
CAB Response: Graphs were updated to the 2015 stock assessment update **(**NEFSC 2015).

P 208. 2.3.2c and d - Seems like evidence that a strategy is being implemented successfully would be that that catches are low, and evidence for d is that the populations are increasing and/or approaching target. Should it be re-worded?
CAB Response: Based on the data available a lot of populations have increased their abundances and there has been few interactions. No need to reword**.**

P 209. Comment on catch monitoring effectiveness. I agree with the overall characterization of the catch monitoring in the narrative and the scoring. Overall, it does qualify for an 80 in general but not 100 since there is no verification. However, I think the text incorrectly assigns (repeatedly) the majority of the strength of the monitoring package to the ~25% coverage. First, 25% is not "high for any fishery", when there are examples of 100% coverage in other fisheries. Secondly, partial coverage will crack at the seams as the non-observed portion begins to fish (or report) differently as motivation to do so increases, the likelihood of being caught goes down, and/or penalties decreases. Whether the overall package works depends on the collective package of 1) observers, 2) enforcement, 3) efforts to decrease incentives to misreport.

Perhaps some re-wording would help. Or to put differently, if the current combination of monitoring elements is so effective, why would more verification be beneficial and represent a meaningful improvement such that it would receive a score of 100?

CAB Response: The reviewer thinks that to successfully monitor a fishery you should have 100 to 200% of observer coverage on all vessels. While this would be ideal, it is rarely found in areas where the resources are available to cover an entire fishery and sometimes these "Full Cover" programs exists for fisheries in a small scale. We agree with the reviewer that for a complete evaluation of the performance of a fishery, it should have a combination of things like 1) observers, 2) enforcement, 3) efforts to decrease incentives to misreport monitoring program.

It is worth to mention that in 2005 Northeast has 75% of the landings sampled and this region is second to Alaska (79%) in having all the landings observed (NMFS 2011).

The Magnuson Stevenson Act requires all Councils Fisheries management Plans to include a Standardized Bycatch Reporting Methodology (SBRM) to assess the amount and type of bycatch in managed fisheries; these reporting methods are intended to improve the collection and estimation of bycatch, and to support the development of effective conservation and management strategies and mitigation measures. Following a review Standard Bycatch Reporting Methodology (SBRM) Committee, the New England Fishery Management Council approved a SBRM Amendment in April 2014. The objectives of this action was an effort to determine whether the methods and processes previously used to estimate fisheries discards needed to be modified and/or supplemented. Based on the input of many stakeholders and the Mid-Atlantic and New England Councils, this new action established new standards of precision for bycatch estimation for all Northeast Region fisheries.

Some of the objectives of this sampling strategy is to achieve a precision of 30% of coefficient of variation and allocate the sampling days at sea for many species in the Northeast,

Regarding compliance there are lots of reports by NOAA OLE and USGS Coastguard documenting high compliance on the Northeast Groundfish Fisheries (98%>)

There have been also efforts to reduce bycatch in the Northeast:

- "Weak links" are required on the surface system of gillnet and trap/pot fishing gear to reduce the risk of whales becoming entangled, injured, or killed.
- "Chain mats" are required in the Atlantic sea scallop dredge fishery to reduce the severity (i.e., mortality and injury) of sea turtle interactions with the gear.
- Implementation of acoustic deterrent devices (known as “pingers”) on fishing gear in the Northeast gillnet fishery within seasonal management areas under the Gulf of Maine Harbor Porpoise Take Reduction Plan reduced harbor porpoise bycatch interactions with gillnet gear by 92%.
- The Ruhle Trawl (World Wildlife Fund SmartGear competition winner) reduced bycatch in stocks of concern while catch of the target species did not significantly change (catch ratio of haddock to cod improved from 3:1 in the control net to 20:1 in the test trawl, and skate bycatch was reduced by 98%).

P 212. Strongly suggest deleting comment about Midwest. This is not the place for this comment; rather to score whether current NE state and federal management is consistent with government policy.
CAB Response: It is the intention of the team to use those words to make a point**.**

The document needs a severe editing; the typos are distracting. I have highlighted a few in yellow.
CAB Response: Document was sent for another technical review and for formatting and grammar/spelling checking

The text would be easier to follow, if subscripts (i.e. SSB_{2014}) and italics were used consistently (F_{target}), otherwise tonnages, actual years and subscript years all start to look the same, especially in the stock assessment sections. There are examples of both in the text.
CAB Response: Document was sent for another technical review and for formatting and grammar/spelling checking and will correct those subscripts for consistency

11. Appendix 3. Stakeholder submissions

12. Appendix 4. Surveillance Frequency

Table A4: Fishery Surveillance Plan

The determination of the surveillance level is based on Table C3 and C4. The score was calculated by adding scores from sections 1-4 in Table C3.

Table C3: Determination of the Surveillance level

Default Assessment tree used?	
Yes	0
No	2
2. Number of conditions	
Zero conditions	0
Between 1-5 conditions	1
More than 5	2
3. Principle Level Scores	
≥85	0
<85	2
4. Conditions on outcome PIs?	
Yes	2
No	0

The surveillance score of 6 was used to identify the surveillance level appropriate to the fishery;

Table C4: Surveillance Level Years after certification

Surveillance score (from Table C3)	**Surveillance level**		**Year 1**	**Year 2**	**Year 3**	**Year 4**
2 or more	Normal Surveillance		On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit
1	Remote Surveillance	Option 1	Off-site surveillance audit	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit
		Option 2	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit	On-site surveillance audit
0	Reduced Surveillance		Review of new information	On-site surveillance audit	Review of new information	On-site surveillance audit

13. Appendix 5. Client Agreement
(REQUIRED FOR PCR)

Appendix 5.1. Objections Process
(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR