

## **Marine Stewardship Council Assessment**

### **Public Certification Report**

*For the*

**Gulf Nova Scotia Herring Federation**

**Southern Gulf of St Lawrence Fall Herring Gillnet Fishery**

**Assessors:** Ivan Mateo, Jerry Ennis, Eric Dunne,

Report Author: Ivan Mateo, Jerry Ennis, Eric Dunne  
SAI Global Assurance Service  
3<sup>rd</sup> Floor Block 3  
Quayside Business Park  
Mill Street  
Dundalk, Co. Louth  
Ireland  
Tel: +353 42 9320912  
Fax: + 353 42 9386864  
W: [www.saiglobal.com](http://www.saiglobal.com)

Client name: Gulf Nova Scotia Herring Federation, Inc  
Report Code: MSC022  
Report Date: 5<sup>th</sup> November 2015

---

Excellence. Assured.

---

## Table of Contents

Glossary.....	4
1. MSC Fishery Assessment Report.....	5
2. Executive Summary.....	7
2.1. SGSL Fall 16F Herring Gillnet fishery key strengths and weaknesses .....	8
2.2. Assessment Results.....	8
2.3. Conditions for continued certification .....	9
2.4. Certification Recommendation .....	9
2.5. Assessment Process .....	10
3. Authorship and Peer Reviewers.....	11
3.1. Assessment team .....	11
3.2. Peer Reviewers.....	12
4. Description of the Fishery .....	13
4.1 Unit of Certification and scope of certification sought.....	13
4.1.1 Eligibility for Certification against the MSC Standard.....	13
4.1.2 Eligible fishers .....	13
4.1.3 Scope of Assessment in Relation to Enhanced Fisheries .....	14
4.1.4 Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF) .....	14
4.2. Overview of the fishery.....	14
4.2.1. Biology of the target species.....	14
4.2.2. Fishing area .....	17
4.2.3. History of the SGSL 16 Fall Gillnet Fishery .....	19
4.2.4. Catches.....	19
4.2.5. Fishing season .....	21
4.2.6. Fishing method and fleet description .....	21
4.2.7. Market information.....	22
4.3. Principle One: Target Species Background .....	23
4.3.1. Stock assessment .....	23
4.3.2. Stock status .....	26
4.3.3. Uncertainties.....	29
4.3.4. Reference points .....	30
4.3.5. Harvest Strategy, Harvest Control Rules and Tools .....	32
4.4. Principle Two: Ecosystem Background .....	33
4.4.1. Retained Species and 4.4.2. Bycatch Species.....	33
4.4.3. ETP species.....	35
4.4.4. Habitat.....	39
4.4.5. Ecosystem .....	45
4.5. Principle Three: Management System Background.....	51

4.5.1 The Legal Basis and Scope of the Management System .....	51
4.5.2 Consultation Processes .....	54
4.5.3 Long Term Objectives .....	55
4.5.4 Incentives for Sustainable Fishing .....	56
4.5.5 Fishery Specific Objectives .....	57
4.5.6 Decision-Making Process .....	57
4.5.7 Monitoring, Control and Surveillance .....	58
4.5.8 Monitoring and Evaluation of the Herring Management System.....	61
5. Evaluation Procedure.....	62
5.1 Harmonised Fishery Assessment .....	62
5.2 Previous assessments .....	62
5.3 Assessment Methodologies .....	62
5.4 Evaluation Processes and Techniques .....	67
5.4.1 Site Visit.....	67
5.4.2 Consultations .....	67
5.4.3 Evaluation Techniques .....	70
6. Traceability.....	73
6.1 Eligibility Date .....	73
6.2 Traceability within the Fishery.....	73
6.2.1 Introduction .....	73
6.2.2 Traceability within the fishery .....	73
6.3 Eligibility to Enter Further Chains of Custody .....	75
7. Evaluation Results.....	76
7.1 Principle level score .....	76
7.3 Summary of Conditions.....	78
7.4 Certification Recommendation.....	78
7.5 Determination, Formal Conclusion and Agreement.....	78
References .....	79
Appendix 1. Scoring and Rationales.....	82
Appendix 2. Peer Review Reports.....	157
Appendix 3. Stakeholder submissions .....	191
Appendix 4. Report on the Evaluation of the role of herring as key lower trophic level species based on MSC Standards (SAIG 2014).....	198
Appendix 5. Surveillance Frequency.....	212
Appendix 6. Client Agreement.....	213

## Glossary

AZMP	Atlantic Zone Monitoring Program
$B_{lim}$	Stock size below which the recruitment would be impaired
$B_{MSY}$	Stock size that can produce maximum sustainable yield when it is fished at a level equal to $F_{MSY}$
CAB	Conformity Assessment Body
CoC	Chain of Custody
CPUE	Catch per Unit Effort
CR	Certification Requirements
EAM	Ecosystem Approach Management
EEZ	Exclusive Economic Zone
ESBA	Ecologically and Biologically Significant Areas
ETP	Endangered, Threatened and Protected species
F	Fishing Mortality Rate
$F_{lim}$	Fishing mortality rate that causes a stock to fall below $B_{lim}$
$F_{MSY}$	Fishing mortality rate at the level that would produce maximum sustainable yield from a stock that has size of $B_{MSY}$
FPP	Fisheries Protection Program
FAO	United Nations Food and Agriculture Organization
GSPAC	Gulf Small Advisory Pelagic Committee
HCR	Harvest Control Rule
HFA	Herring Fishing Area
LRP	Limit Reference Point
MPA	Marine Protected Area
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield, it is the largest average catch that can be continuously taken from a stock under existing environmental conditions
NAFO	North Atlantic Fisheries Organization
PA	Precautionary Approach
P1	MSC Principle 1
P2	MSC Principle 2
P3	MSC Principle 3
PI	MSC Performance Indicator
SGSL	Southern Gulf of St Lawrence
SSB	Female spawning biomass
SFF	Sustainable Fisheries Framework
UoC	Unit of Certification

## 1. MSC Fishery Assessment Report

<b>Fishery Unit</b>	This assessment report under the 'Unit of Certification' (UoC) covers one target species and one method of capture and the resulting scores are for landings by registered licence holders. The area for Southern Gulf of St. Lawrence herring stock extends from the north shore of the Gaspé Peninsula to the northern tip of Cape Breton Island, including the Magdalen Islands (Figure 2). The fishery under assessment occurs in the Herring Fishing Area 16F (Figure 3).	
<b>Report Issue</b>	<b>30<sup>th</sup> January 2015</b>	• Client Report
	<b>16<sup>th</sup> June 2015</b>	• Peer Review
	<b>9<sup>th</sup> July 2015</b>	• Public Comment Draft Report
	<b>1<sup>st</sup> October 2015</b>	• Final Report and Determination
	<b>5<sup>th</sup> November 2015</b>	• Public Certification Report
<b>Correspondence to</b>	<b>SAI Global Assurance Service</b> 3rd Floor, Block 3, Quayside Business Park, Mill Street, Dundalk, Co. Louth, Ireland. Website: <a href="http://www.saiglobal.com">www.saiglobal.com</a> <b>Programme Administrator:</b> Jean Ragg <a href="mailto:Jean.Ragg@saiglobal.com">Jean.Ragg@saiglobal.com</a>	
<b>Client Name &amp; Contact Details</b>	<b>Client Group:</b> Gulf Nova Scotia Herring Federation (GNSHF)  <b>Contact details:</b> <b>Gulf Nova Scotia Herring Federation, Inc.</b> Greg Egilsson President Gulf NS Herring Federation, Inc. P.O. Box 1803 Pictou, Nova Scotia B0K 1H0 Email: <a href="mailto:egilsson@eastlink.ca">egilsson@eastlink.ca</a> Tel: 902-396-7068  <b>Point of Contact</b> R.J. (Bob) Allain President   Président OceanIQ Management Services Inc. 409, rue Gaspé Street Dieppe, N.B. E1A 6V8 T: (506) 962-1102 F: (506) 388-2789 e-mail/courriel: <a href="mailto:oceaniq@rogers.com">oceaniq@rogers.com</a> web: <a href="http://www.oceaniq.ca">www.oceaniq.ca</a>	

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.

This Public Certification Report is written for the stakeholders after the site visit, scoring, client review, peer review, stakeholder consultation period on the PCDR, and the objection procedure, and contains:

- The MSC Standard and Certification Requirements (CR) used, MSC Fishery Standard – Principles and Criteria for Sustainable Fishing v1.1 and the MSC CR v1.3
- The scores, weighting and certification outcome (Section 7)
- All intended conditions set in Appendix 1.3  
'Conditions provide for agreed further improvement in the fishery and provide one of the bases for subsequent audit. They are intended to improve performance against the MSC Principles'.
- The assessment team certification recommendation.
- The final decision from the Certification Committee on the fishery certification.
- The assessment followed the current versions of MSC scheme requirements and these were implemented by SAI Global accredited MSC Procedures.
- Information sources used are provided throughout 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.
- The Peer Reviewers comments and the assessment team's responses in Appendix 2.
- The stakeholder submissions and the assessment team's responses in Appendix 3.
- SAI Global report on evaluation of SGSL Herring as key lower trophic level species in Appendix 4.
- The surveillance frequency in Appendix 5.
- The Client Agreement in Appendix 6.

## 2. Executive Summary

This report sets out the details of the MSC full assessment for the SGSL Fall Herring Gillnet fishery against the MSC Principles and Criteria for Sustainable Fisheries. The report details the background, results and justification of the assessment of the fishery, as carried out by SAI Global.

The assessment process began in August 2014. As a requirement of the assessment process (CR 27.9.1), the site visit announcement was advertised in the following local newspapers, New Glasgow News (Nova Scotia) and the Eastern Graphic (Prince Edward Island) as it was felt these were the most appropriate publications for this fishery.

The MSC Guidelines to Conformity Assessment Body (CAB) specify that the 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, SGSL 16F Fall Herring Gillnet fishery proposed for certification is defined according the UoC:

<b>Species</b>	<i>Clupea harengus</i> , Atlantic Herring
<b>Geographical Area</b>	Southern Gulf of St. Lawrence, Herring Fishing Area 16F Fall Fishery
<b>Stock</b>	Southern Gulf of St Lawrence (NAFO 4T)
<b>Method of capture</b>	Gill Net
<b>Management system</b>	Department of Fisheries and Oceans (DFO) Gulf region.
<b>Client Group</b>	Gulf Nova Scotia Herring Federation.

This fishery has not previously been assessed against the MSC Principles and Criteria for Sustainable Fishing under their previous certificates. Therefore, there was no requirement for harmonization to ensure consistency of assessment outcomes as there are no other SGSL Fall 16F Herring fisheries undergoing certification and there are no existing fishery assessments that overlap at present (See Section 5.1).

The SGSL Fall 16F Herring fishery under assessment covers the Herring Fishing Area 16F (Figure 3) which is situated within the area of the Southern Gulf of St. Lawrence from the north shore of the Gaspé Peninsula to the northern tip of Cape Breton Island, including the Magdalen Islands (Figure 2).

A full and up to date active list of fleet licences will be made available by the client group and provided to the SAI Global on an annual basis as a requirement of surveillance conditions. It is to be interpreted in strict accordance with operational practices, including adherence to the certificate sharing mechanism defined in CR 27.23.1. The Client Sharing Letter can be seen at:

[http://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-west-atlantic/gulf-of-st-lawrence-fall-herring-gillnet/assessment-downloads-1/20140826\\_CERT\\_SHARE\\_HER479.pdf](http://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-west-atlantic/gulf-of-st-lawrence-fall-herring-gillnet/assessment-downloads-1/20140826_CERT_SHARE_HER479.pdf)

## 2.1. SGSL Fall 16F Herring Gillnet fishery key strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• SGSL Fall 16F Herring has high abundance based on Long Term Fishery independent based CPUE and Biomass.</li> <li>• SGSL Fall 16F Herring has strong recruitment to the fishery in the last several years based on latest DFO report. SGSL Fall 16F Herring has healthy spawner biomass stock based on latest DFO report.</li> <li>• The fishery is highly unlikely to disrupt key elements underlying ecosystem structure and function.</li> <li>• There is almost no bycatch nor retained species in this fishery.</li> <li>• Robust governance and policy are in place.</li> </ul>	<ul style="list-style-type: none"> <li>• Well-defined harvest control rules are not in place.</li> <li>• No Independent monitoring of bycatch (observer data and logbooks)</li> <li>• No formal documented research plan is in place (or does not exist).</li> </ul>

## 2.2. Assessment Results

A rigorous assessment against the MSC Principles and Criteria was undertaken by the assessment team and detailed, fully referenced scoring rationale is provided in Appendix 1 of this report.

The UoC achieved the minimum required score of 80 or above on each of the three MSC Principles independently and did not score less than 60 against any Performance Indicator (PI). Final Principles scores are shown in the table below.

**Table 1.** Final Principle Scores.

Principle	Score	PASS/FAIL
Principle 1 – Target Species	84.4	Pass*
Principle 2 – Ecosystem	83.7	Pass*
Principle 3 – Management System	85.5	Pass*

\*Although the assessment team found the overall Principle and Unit of Certification in overall compliance with MSC Standard, it also found the performance of three performance indicators (PI 1.2.2, 2.2.3, 3.2.4) to be below the established compliance mark (Score of 80). Full explanation of these conditions is provided in Appendix 1.3.

### 2.3. Conditions for continued certification

Three PIs which contribute to the overall assessment score were assessed as scoring less than the unconditional pass mark, and therefore three conditions were attached to the fishery, which must be addressed within a specified timeframe. The condition is applied with the aim to improve performance to at least the 80 level within a period set by the certification body but no longer than the term of the certification. A full explanation of how the Client intends to meet these conditions is provided in the client action plan in Appendix 1.3 of the report. As a standard requirement of the MSC CR, the fishery shall be subject to (as a minimum) annual surveillance audits. These audits shall be publicised and reports made publicly available.

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y/N/N/A)
1	The client must provide documented evidence of implementation of well-defined harvest control rules that reduce exploitation rates as the limit reference point is approached.	1.2.2	N
2	The client is required to ensure that sufficient data continue to be collected to detect any increase in risk to main by-catch species.	2.2.3	N
3	The client must provide documented evidence a research plan has been developed and steps to implement have been identified that provides the management system with a strategic approach to research and collection of reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2 in respect of the SGSL Fall herring fishery.	3.2.4	N

### 2.4. Certification Recommendation

On completion of the assessment and scoring process, the assessment team has recommended that the SGSL 16F Fall Herring Gillnet Fishery is eligible to be certified according to the MSC Principles and Criteria for Sustainable Fishing

## 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 assessment – 26<sup>th</sup> August 2014
- Stakeholder Notification: Assessment team nominated – 26<sup>th</sup> August 2014
- Stakeholder Notification: Assessment team confirmation - 18<sup>th</sup> September 2014

### **Stage 2: Building the Assessment Tree**

- Stakeholder Notification: Use of the default assessment tree - 25<sup>th</sup> September 2014

### **Stage 3: Information gathering, stakeholder meetings and scoring**

- Stakeholder Notification: Site Visit scheduled – 30<sup>th</sup> September 2014
- Site visits: 5<sup>th</sup> to 7<sup>th</sup> November 2014

### **Stage 4: Client and peer review**

- Variation request: exemption from IPI requirements – 2<sup>nd</sup> April 2015
- Variation response: exemption from IPI requirements – 2<sup>nd</sup> April 2015
- Stakeholder Notification: Revised Timeline – 16<sup>th</sup> April 2015
- Revised Timeline – 16<sup>th</sup> April 2015
- Stakeholder Notification: Peer reviewers proposed – 7<sup>th</sup> May 2015
- Stakeholder Notification: Peer reviewers confirmed – 19<sup>th</sup> May 2015

### **Stage 5: Public review of the draft assessment report**

- Stakeholder Notification: Revised timeline – 25<sup>th</sup> June 2015
- Revised timeline – 25<sup>th</sup> June 2015
- Stakeholder Notification: Public comment draft report released – 9<sup>th</sup> July 2015
- Public comment draft report – 9<sup>th</sup> July 2015

### **Stage 6: Final Report and Determination**

- Stakeholder Notification: Final Report and Determination released – 1<sup>st</sup> October 2015

### **Stage 7: Objection procedure – PCR and certificate issue**

- Stakeholder Notification: PRC and certificate issued - 5<sup>th</sup> November 2015

### 3. Authorship and Peer Reviewers

#### 3.1. Assessment team

##### **Dr. Ivan Mateo (Lead Assessor, Responsibilities on Principle 2)**

Dr. Mateo has over 15 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. Jerry Ennis (Assessor, Responsibilities on Principle 1)**

Following undergraduate and graduate degrees at Memorial University of Newfoundland in the 1960s, Dr. Ennis completed a Ph.D. in marine biology at University of Liverpool in the early 1970s. He retired in 2005 following a 37-year research career with the Science Branch of the Department of Fisheries and Oceans. His extensively published work has focused primarily on lobster fishery and population biology and on various aspects of larval, juvenile and adult lobster behaviour and ecology in Newfoundland waters. Throughout his career, Dr. Ennis was heavily involved in the review and formulation of scientific advice for management of shellfish in Atlantic Canada as well as the advisory/consultative part of managing the Newfoundland lobster fishery. Dr. Ennis has published several articles aimed at presenting fishery science primarily to harvesters and has participated in all aspects of the MSC certification process for several Atlantic Canada fisheries.

##### **Mr. Eric Dunne (Assessor, Responsibilities on Principle 3)**

Eric has over 45 years' experience in the economic, policy and operations analyses and executive management of the full range of fishery management activities and functions. Since 1995, he has been a fishery consultant based in St. John's, Newfoundland, Canada, specializing in comprehensive analysis of all aspects of fisheries management activities and issues. With an educational background in the economics of fishing, he had previously held senior positions in the Department's economics and policy development functions. He later gained experience in the area of fisheries innovation and technology development. As well, he has lectured on fisheries management and fisheries economics in the Masters of Marine Studies Program at Memorial University of Newfoundland and Labrador. Most recently, he has become fully versed in the overall MSC assessment process. In this context, he has assessed all aspects of the management systems utilised for a variety of finfish and shellfish fisheries from the sub-Arctic areas of the Northwest Atlantic to the Gulf of Mexico.

## 3.2. Peer Reviewers

### **Ms. Nancie Cummings**

Ms. Cummings has over 35 years of experience working in marine and estuarine fisheries science in the U.S. She has been actively involved in conducting marine fish stock assessments, in the optimal design of fisheries data collections, and in providing inputs required for management of U.S. federally managed species. As a lead stock assessment analyst she has been involved for more than 30 years with analyses of highly migratory species (albacore and Bluefin tuna), coastal migratory species (king and Spanish mackerels, cobia, and dolphin fish), and reef fish stocks (amberjacks, groupers and shallow and deep-water snappers) in the US Gulf of Mexico, South Atlantic and Caribbean. Ms. Cummings has conducted primary fishery stock evaluations for status determinations required by U.S. fishery management councils, and has conducted stock rebuilding projections of U.S. federally managed marine resources, including reef fish, mackerels, tunas, and shellfish. Ms. Cummings also has experience conducting analyses of salmonid resources off Washington State, including in-season run-size forecasting, escapement estimations, and developing creel census estimations. Ms. Cummings has extensive experience working with commercial and recreational fisheries constituent groups, tribal groups, national and international advisory groups, and academic institutions. Ms. Cummings has experience in application of data poor stock assessment techniques and recent experience developing and leading Data Limited Stock Assessment Workshops in the U.S. and in an International forum. Ms. Cummings received her M.S. degree in Fisheries from the College of Fisheries, University of Washington working on a stock assessment of Pacific cod in the North Pacific Bering Sea. She holds a Bachelor of Science degree in Biology from Erskine College (South Carolina).

### **Dr. John Nichols**

John Nichols is a retired UK government fisheries biologist with 42 years research experience in plankton ecosystems in the North Atlantic. He has been a member of ICES working groups on herring, mackerel, horse mackerel, sardine and anchovy assessments; and mackerel and horse mackerel egg surveys. He was also a member of ICES study groups on herring larval surveys and plankton sampling. He was scientist in charge of numerous research vessel surveys for fish stock assessment purposes. He has also recently taken part in assessments of the PFA North Sea Herring, Hastings Fleet Dover sole, herring and mackerel fisheries and SW mackerel fishery re-assessment.

## 4. Description of the Fishery

### 4.1 Unit of Certification and scope of certification sought

The MSC Guidelines to CAB 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 proposed fishery for certification is defined according to the UoC:

<b>Species</b>	<i>Clupea harengus</i> , Atlantic Herring
<b>Geographical Area</b>	Southern Gulf of St. Lawrence, Herring Fishing Area 16F
<b>Stock</b>	Southern Gulf of St Lawrence (NAFO 4T)
<b>Method of capture</b>	Gill Net
<b>Management system</b>	Department of Fisheries and Oceans (DFO) Gulf region.
<b>Client Group</b>	Gulf Nova Scotia Herring Federation, 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 catches of non-target stocks (Spring Herring) that are inseparable or practicably inseparable (IPI) from the target stock; and
- The assessment of the SGSL 16F Fall Herring Gillnet Fishery will not result in an overlapping assessment (See section 5.1).
- An evaluation of SGSL 16F Fall Herring as key lower trophic level species did not find this stock as a key low trophic level species (Please see appendix 4 for reference).

#### 4.1.2 Eligible fishers

The Gulf Nova Scotia Herring Federation is comprised of incorporated inshore fish harvester organizations based in Gulf Nova Scotia, south-western Cape Breton, and eastern Prince Edward Island. They include:

- Northumberland Fishermen’s Association
- Gulf Nova Scotia Bonafide Fishermen’s Organization
- Inverness South Fishermen’s Association
- Maritime Fishermen’s Union (Local 4)
- Prince Edward Island Fishermen’s Association
- Gulf Nova Scotia Fishermen’s Coalition

SGSL 16F Fall Herring gillnet fishers who are not members of one of the aforementioned organizations but are part of the UoC are equally eligible as the entirety of fishing operations are within herring fishing area 16F. In addition, First Nations and Native Councils holding communal

commercial herring licences authorized for the 16F Fall Herring gillnet fishery may become eligible to join the Client Group under a certificate sharing arrangement.

#### 4.1.3 Scope of Assessment in Relation to Enhanced Fisheries

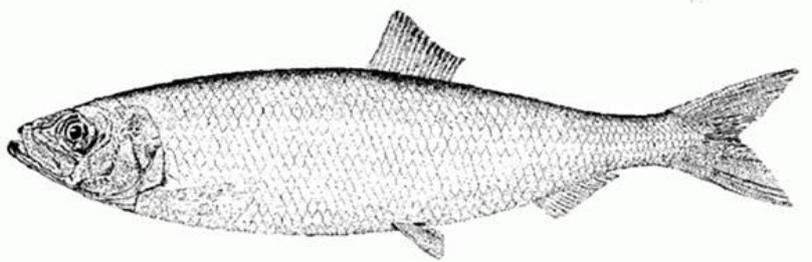
The fishery under assessment is not an enhanced fishery.

#### 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



**Figure 1.** *Clupea harengus*. Source: FAO species fact sheet<sup>1</sup>.

#### Taxonomy and geographic range

Atlantic herring, *Clupea harengus* (Linnaeus, 1758), is part of the family Clupeidae which consists of herring, shads, sardines, and menhadens. The Clupeidae family has 216 species that are distributed globally. Species of the Clupeidae family are chiefly marine coastal and schooling fishes. They are considered one of the most important families of commercial fishes, for many uses such as food, oil and fish meal (FishBase, 2010).

The Atlantic herring is distributed throughout the shelf sea areas of the North Atlantic. It occurs off Norway, Iceland, Greenland and in the North Sea and Baltic Sea as well as the east coast of the USA and Canada. The stocks from the North Atlantic have different migration routes and separate spawning areas. Both spring spawning and fall spawning stocks are distributed throughout the North Atlantic distribution but mixed fisheries based on both spawning components are thought to be very rare. Off the east coast of Canada, herring stocks distribute from the coast of Nova Scotia to the coast of Labrador (DFO 2006a; 2010a, 2012) inhabiting pelagic and coastal habitats (Wheeler et al., 2009)

Herring undertake extensive area migration patterns. For example, they move extensively between feeding areas, overwintering areas, and spawning grounds. In addition, herring undergo daily vertical migrations within the water column, often found deeper in the column during the daytime and shallower at night (Hay et al., 2001).

---

<sup>1</sup> <http://www.fao.org/fishery/species/2886/en>

The herring population of the Southern Gulf of St Lawrence, in NAFO regulatory Division 4T, is characterized by the simultaneous presence of two spawning stocks; the spring spawners and the fall spawners which spawn in separate inshore areas along Southern Gulf of St Lawrence (Figure 2).

### **Stock structure**

It has been considered that Atlantic herring have the most complex stock structure of any marine fish (Iles and Sinclair 1982). There is a plethora of studies attempting to define stock structure (Kornfield et al., 1982). Contrasting results regarding the discreteness of local herring stocks have been shown from examinations of spawning and larval distributions, tagging studies, morphometrics, meristics, genetics, and parasites.

Genetic studies indicate that herring spawning groups are not discrete, genetically distinct stocks. Safford and Booke (1992) did not find consistent differences between Jeffreys Ledge and Trinity Ledge, which are well-separated spawning areas through enzyme electrophoresis studies. Analysis of mitochondrial DNA also failed to distinguish between fish from these areas (Kornfield and Bogdanowicz 1987). Kornfield et al., (1982) found low levels of genetic heterogeneity among fall spawning herring in the Gulf of St. Lawrence and the Gulf of Maine, and concluded there is only one genetic population of fall spawners in the northwest Atlantic. However, they found that spring spawning herring from the Gulf of St. Lawrence were genetically distinct from fall spawners in the Gulf of St. Lawrence and the Gulf of Maine. It has not been definitely determined if adult herring return to spawn at the spawning grounds where they were born, because there have been one study. Herring off Newfoundland were shown to have a homing rate of 66-93% (Wheeler and Winters 1984). It is almost impossible to tag herring larvae in order to determine whether individuals are actually returning to the site where they were spawned. Results from an international herring tagging program and DFO (Stobo 1983) indicate that stocks are generally mixed throughout most of the year and that spatial and temporal isolation occurs chiefly during spawning. However, migration patterns of individual stocks persist among years and there is little straying of fish from a given stock.

### **Early Life History**

The herring is a pelagic fish, and their depth distribution range between 2 and 400 m below the surface of the sea (NMFS 1999). The female herring lays its eggs on the sea bed, usually in depths from 10-80 m, on hard substrate covered with small stones, shells or with seaweed to which the naturally sticky eggs can attach themselves. Normally a female may produce 20,000-40,000 eggs. The eggs are fertilized in the water by males, which discharge their sperm at the same time as the females lay their eggs. The eggs, about 1 mm in diameter, incubate for 10-30 days depending on sea temperature; 14-20 days is typical for Gulf of St Lawrence. The newly hatched fry, with yolk sacs attached, approximately 6-10 mm in length drift with the current. Initially they swim with small jerky movements and depend on nearby supplies of plankton for food. Herring eggs are found in large numbers along the bottom in shallow waters in spring and in deeper waters in summer and fall (DFO 1984).

When the larvae reach a length of about 40 mm, they begin to develop scales, take on a silvery sheen and move to inshore nursery grounds, where they are often caught together with the young of other fish, particularly sprats; the mixture of young herring and sprats is known as white-bait (NMFS 1999). ~23SGSL herring leave the nurseries when about 2½ years old and move out to deep sea feeding grounds until they mature, mostly at 4 years of age. Little is known about the herring's preferred habitat but it is known that spawning occurs anywhere between April and October, often concentrated between the months of May and September. Preferred habitat for spawning grounds tends to be sea-beds mostly composed of rock, gravel and algae where the eggs can easily adhere to the hard substrate (DFO 1984).

### **Physiology and Morphology**

Atlantic herring have an elongated body and a belly that is rounded (NMFS 1999). They don't have adipose fins; this feature distinguishes herrings from the Family of salmon. The Atlantic herring can be distinguished from species in the family Clupeidae by their relatively small size. They have scutes without a prominent keel, and they have a pelvic fin that is located behind the dorsal fin, which is located midway along their body. Atlantic herring can be further identified from other herring populations by their cluster of small teeth that are arranged in the shape of an oval at the roof of its mouth. This feature is particular only to Atlantic herring.

### **Maturity and Reproduction**

Most herring are sexually mature by 4 years of age attaining a length of about 25cm by that time. Spawning takes place annually with spring spawning occurring during April and May and fall spawning through August and September. Studies documenting fecundity report that herring produce approximately 20,000 to 100,000 oocytes per female dependent on size and age (FRCC, 2009). Both males and females release milt and eggs at the same time and then the eggs attach themselves to the sea floor. Within each seasonal-spawning stock (spring and fall) along the Southern Gulf of St Lawrence, there are local components associated with traditional spawning areas comprised of characteristic spawning habitat. The interrelationship between these local components has yet to be clearly established, although most evidence suggests that once an individual spawns in a given area, it will return to spawn in that area year after year (DFO, 2006a).

### **Age and Growth**

Herring are aged through the enumeration of annual bands deposited in otoliths (fish ear stones). Atlantic herring can reach lengths up to 45 cm, and can live up to 22 years of age (NMFS 1999). They undergo fast growth in the first five years of their life, and then their growth begins to slow down. Growth rates are thought to be affected mainly by food availability and its' inter-relationship with environmental conditions such as water temperature

### **Mortality**

Quantification of mortality for SGSL herring stocks has been determined through use of mass-balance ecosystem models (Savenkoff et al., 2007). Many studies show that in the SGSL, predation was the main cause of herring mortality during the mid-1980s while predation and fishing mortality were of similar importance during the mid-1990s. The Savenkoff et al., (2007) study reported that predation was the main cause of herring mortality during the mid-1980s accounting for more than 65% of the total mortality. Fishing and other mortality causes represented 28 and 7% of total mortality, respectively. Large cod were considered the main predators, followed by harp seals (22 and 11% of total mortality, respectively). Annual mortality rates for predation, fishing, and other mortality causes were estimated at 0.22, 0.10, and 0.03 yr<sup>-1</sup>, respectively (total: 0.35 yr<sup>-1</sup>). From the mid-1980s to mid-1990s, total mortality values were similar (3.38 ± 0.43 t km<sup>-2</sup>yr<sup>-1</sup> vs 3.06 ± 0.53 t km<sup>-2</sup>yr<sup>-1</sup>). However, predation decreased from 2.18 ± 0.37 to 1.28 ± 0.41 t km<sup>-2</sup>yr<sup>-1</sup> during the same time period while fishing mortality increased from 0.95 ± 0.12 to 1.35 ± 0.07 t km<sup>-2</sup>yr<sup>-1</sup>. Predation and fishing mortality were of similar importance (nearly 43% of total mortality) during the mid-1990s while other mortality causes accounted for 14%. Large cod and large demersals were the main predators (8 and 7% of total mortality, respectively). In absolute terms, fishing mortality was still the main mortality cause. Annual mortality rates for predation, fishing, and other mortality causes were estimated at 0.17, 0.18, and 0.06 yr<sup>-1</sup>, respectively (total: 0.41 yr<sup>-1</sup>).

### **Recruitment**

In Canada's southern Gulf of St. Lawrence Atlantic herring, *Clupea harengus*, spawn in the spring and in the fall. However, the degree of reproductive allopatry between the two spawning groups is

unknown (Messieh and Tibbo 1971). Both groups are exploited commercially, generally recruiting at Age-2 for spring spawners and Age-3 for fall spawners (Claytor et al., 1995); both spring and fall spawners are subject to large fluctuations in recruitment. Since 1978, the proportion of recruits in the annual catch has fluctuated between 0 and 15% for spring spawners and 0 and 39% for fall spawners.

There have been few studies documenting the factors that influence year-class strength or recruitment mechanisms. There are no studies on pre-recruit abundance for any Canadian Atlantic herring stock (McQuinn and Lefebvre 1994; Stephenson et al., 1994; Wheeler et al., 1994). Instead, estimates of recruitment are calculated by averaging its historical levels as derived from virtual population analysis (Claytor et al., 1995). Winters and Wheeler (1987) showed that recruitment co-varies among several NW Atlantic herring stocks, and showed that year-class strength is related to water temperature and salinity. Although several spawning beds have been identified within the southern Gulf of St. Lawrence (Messieh 1975, 1987, 1988), little is known about the distribution of larvae and juveniles, and there is no fishery on juvenile herring to monitor pre-recruit abundance.

Comparison of recruitment estimates for spring and autumn spawners separately shows poor agreement with within-year reproductive success (Melvin et al., 2009). However, there is indication of a shift to an increased contribution of fall spawners. In the western Gulf of St. Lawrence, spring spawners have produced only one above-average year class since 1991, while during the same period, autumn spawners have had six above-average year classes, suggesting a change in their respective reproduction success (Melvin et al., 2009).

In the western Gulf of St. Lawrence, autumn spawners have essentially dominated the stock since 1978, yet spring spawners have made an important contribution to the total biomass and supported a major fishery (LeBlanc et al., 2008). However, the proportion of autumn spawners augmented significantly since 1997, as a consequence of an increase in abundance of autumn spawners and a decrease in spring spawners, consistent with the general increase in water temperatures.

#### **4.2.2. Fishing area**

The area of the Southern Gulf of St. Lawrence herring stock extends from the north shore of the Gaspé Peninsula to the northern tip of Cape Breton Island, including the Magdalen Islands (Figure 2). There is evidence that adults overwinter off the east coast of Cape Breton primarily in NAFO Division 4Vn.

The fishery under assessment occurs in the Herring Fishing Area (HFA) 16F at two different intervals – a small fall fishery around mid-July to early August with only a small number of fishers participating, and a larger fall fishery in September with approximately 140 active fishers currently engaged. (Figure 3). The area includes the southeast half of Northumberland Strait and a part of the western coast of Cape-Breton, Nova Scotia.

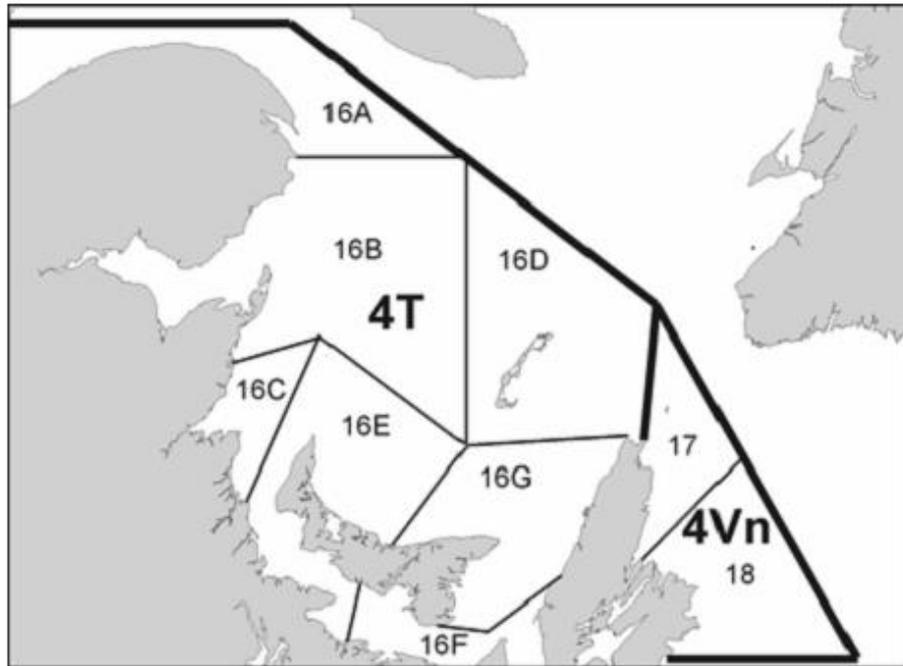


Figure 2. NAFO Divisions 4T and 4Vn with corresponding HFAs. Source: DFO 2012.

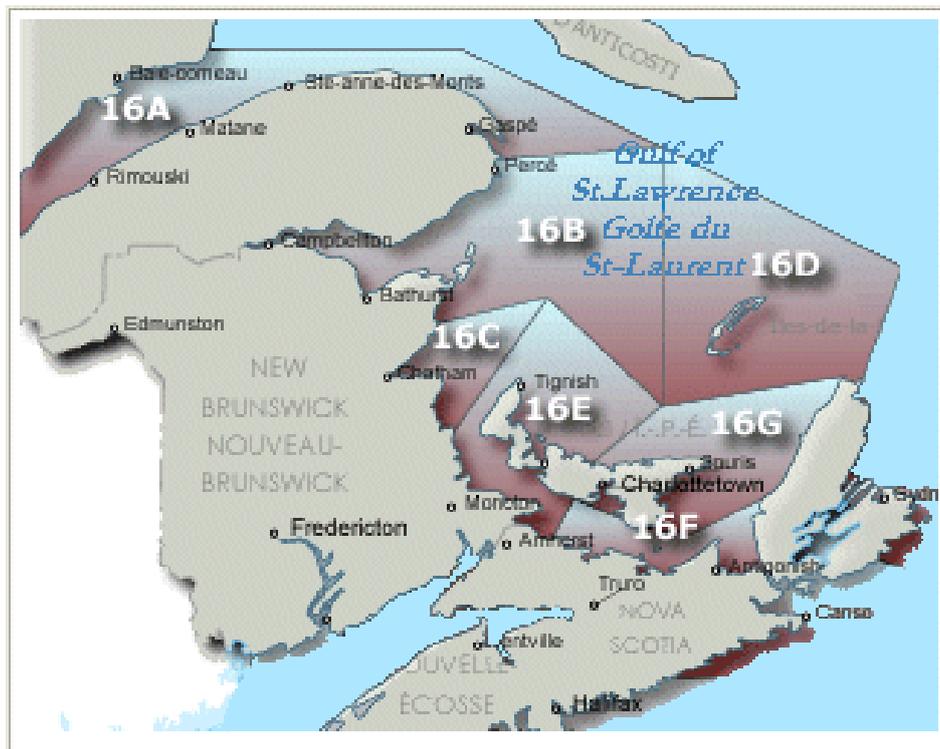


Figure 3. HFAs in the SGSL including HFA 16F. Source: <http://www.glf.dfo-mpo.gc.ca/Gulf/Fishing-Area-Maps/Herring>.

### 4.2.3. History of the SGSL 16 Fall Gillnet Fishery

The Atlantic commercial herring fishery has existed since the late 1800s in the SGSL (Kinney 2001). Before the late 1970s, herring was mostly used for bait, fishmeal and fertilizer because of its abundance and low commercial value. During the 1950s up until the 1970s herring landings for the whole SGSL were stable. The Total Allowable Catch (TAC) management system was first introduced to the herring fishery in 1972, and in 1978 the herring fishery transformed to a major commercial food fishery. Although around that time herring was still being used as meal and bait, expansion of the fishery resulted in increased economic importance and provided more jobs in the fishery sector (Kinney 2001).

Changes in gear used to capture herring have occurred over the past century. Before the mid-1960s, herring was captured on the spawning grounds only with gillnets. In 1965 purse seine vessels entered the herring fishery. As a consequence of all these changes, the number of fishermen participating in the seine fishery increased steadily. Since the early 1980s, the fall spawning herring populations have been fished on the spawning grounds by the inshore gillnet fishery to sell into the roe market in Japan. Previous assessment reports showed that the fishery was stable during the 1980s and that landings doubled during the 1990s. Recently there have been concerns about the abundance of the annual fall herring populations which had been decreasing since 2006, with a slight increase in 2009 and a further decrease again in 2010 and 2011 (DFO 2014a).

### 4.2.4. Catches

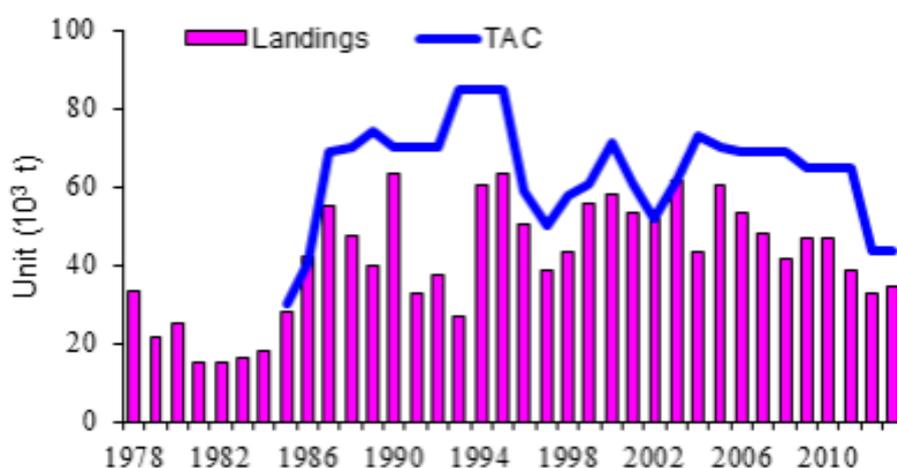
The last assessment of the Gulf of St Lawrence Herring spring and fall spawning components was conducted in 2014 (DFO 2014a). The overall SGSL TAC for the fall spawner component in 2012 and 2013 was 43,500 t (Figure 4, Table 2), a reduction of 21,500 t compared to the 2010 and 2011 TAC of 65,000 t. As in previous years, 77% of the TAC was allocated to the inshore fixed gear fleet and 23% to the seiners (>65 feet) fleet.

The SGSL total landings (both in fall and spring gillnet and seine fisheries) of the fall spawner component were 32,579 t and 34,386 t in 2012 and 2013, respectively. The SGSL landings of the fall spawner component in the gillnet fall fishery were 31,826 t and 29,928 t in 2012 and 2013 (Table 2), respectively, which represent 98% and 87% of the fall spawner component total landings in 2012 and 2013, respectively. The gillnet fishery harvests almost 100% of fall spawners (Table 2).

The allocation for the fall fishery in HFA 16F in 2012 and 2013 was 6,145 t (Table 2), a reduction of 2,363 t compared to the 2010 and 2011 allocation of 8,508 t. The landings of the fall spawner component in the HFA 16F gillnet fall fishery were 6,833 t and 5,575 t in 2012 and 2013, respectively, which represent 111% and 91% of the TAC in 2012 and 2013, respectively. These landings also represent 21.5% and 19% of the SGSL landings of the fall component in the gillnet fall fishery in 2012 and 2013, respectively. The inshore fleets' initial HFA allocations are routinely adjusted through an in-season quota sharing administrative arrangement, the rules of which are outlined in the fishery's management plan.

The gillnet fall fishery in HFA 16F solely harvested the fall spawner component in 2010 and 2012 and almost solely harvested the fall spawner component in 2011 and 2013 (DFO 2012, Table 2). In 2011, 18 t of spring spawner component were caught by the gillnet fall fleet (DFO 2012), which represent 1.3% of the SGSL total landings (both in fall and spring gillnet and seine fisheries) of spring herring and 0.2% of the fall herring gillnet fleet landings.

In 2013, 1 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (Table 2), which represents 0.05% of the SGSL total landings (both in fall and spring gillnet and seine fisheries) of spring herring and 0.02% of the fall herring gillnet fleet landings.



**Figure 4.** SGSL total landings and TAC of the Atlantic herring fall spawner component from NAFO Div.4T. Source: DFO 2014a.

**Table 2.** TAC, allocations and landings overall and by spawning component in the 2012 and 2013 Fall fishery (July – December) by gear and area. Landings are preliminary. Source: DFO 2014a.

Gear and Area	Fall Fishery TAC (t)	Total Reported Landings (t) <sup>2</sup>	Fall Spawner Component Landings (t)	Spring Spawner Component Landings (t)	% Fall Spawners
<b>2012 Gillnet</b>					
Isle Verte 16A	88	10	10	0	100
Chaleur Bay 16B	15,093	14,937	14,886	51	>99
Escuminac-West PEI 16CE	6,275	6,833	6824	9	>99
Magdalen Islands 16D	209	0	0	0	na <sup>4</sup>
Pictou 16F	6,145	6,833	6,833	0	100
Fisherman's Bank 16G	5,478	3,273	3,273	0	100
Reserve <sup>1,3</sup>	18	0	0	0	na <sup>4</sup>
4Vn (Area 17)	218	0	0	0	na <sup>4</sup>
<b>2012 Total Gillnet</b>	<b>33,522</b>	<b>31,886</b>	<b>31,826</b>	<b>60</b>	<b>&gt;99</b>
<b>2012 Seiners (&gt;65') 4T</b>	<b>9,978</b>	<b>643</b>	<b>381</b>	<b>262</b>	<b>59</b>
<b>2012 Grand Total</b>	<b>43,500</b>	<b>32,529</b>	<b>32,207</b>	<b>322</b>	<b>99</b>
<b>2013 Gillnet</b>					
Isle Verte 16A	88	20	20	0	100
Chaleur Bay 16B	15,093	15,440	15,440	0	100
Escuminac-West PEI 16CE	6,275	5,935	5,935	0	100
Magdalen Islands 16D	209	36	36	0	100
Pictou 16F	6,145	5,577	5,575	1	>99
Fisherman's Bank 16G	5,478	2,922	2,922	0	100
Reserve <sup>1,3</sup>	18	0	0	0	na <sup>4</sup>
4Vn (Area 17)	218	0	0	0	na <sup>4</sup>
<b>2013 Total Gillnet</b>	<b>33,522</b>	<b>29,929</b>	<b>29,928</b>	<b>1</b>	<b>&gt;99</b>
<b>2013 Seiners (&gt;65') 4T</b>	<b>9,978</b>	<b>2,057</b>	<b>1,409</b>	<b>649</b>	<b>68</b>
<b>2013 Grand Total</b>	<b>43,500</b>	<b>31,986</b>	<b>31,337</b>	<b>650</b>	<b>98</b>

<sup>1</sup> None of the areas used a reserve in 2012 and 2013.

<sup>2</sup> No landings from the reserve are partitioned into respective areas.

<sup>3</sup> Reserve: The herring reserve allows for setting some quota aside at the beginning of the season, to be redistributed later to areas that catch all of their initial quota and request an extra allocation before the end of the season.

<sup>4</sup> na means not applicable.

#### 4.2.5. Fishing season

The Fishing season for the gillnet fall herring fishery is from July 1 to December 31 (DFO 2014a). However management regulations require that the fall fishery be closed when the quota has been caught. In HFA 16 F as reported previously, a small number of licensed herring gill net harvesters carry out a limited fall fishery in July in advance of the main fishery in September.

#### 4.2.6. Fishing method and fleet description

The Gillnet fishery is part of the fixed gear sector. In practice the fixed gear sector is further divided into tuck seiners (a modified bar seine) and small boat fishers that use handlines, gillnets or traps<sup>2</sup>. Gillnets are anchored at a fixed location, but are moved from one location to another. The vast majority of participating vessels are under 50 ft which is the typical length of Gulf-based inshore multi-purpose fishing vessels. maximum length for the fall gillnet fishery in 16 F is 100 fathoms. Most gillnetters use boats that are between 35 – 45 feet long and equipped with 150 – 500 hp engines, removable decks and are capable of carrying between 15,000 and 30,000 lbs. of fish. The harvesters use echo-sounders, GPS and laptop computers for navigation and fish finding (DFO 2007a; DFO 2010a).

These gillnets are "set" to intercept fish during their normal migrations, either along the shore, on the spawning grounds or as they move in and out of an area. Herring nets are typically fished from the bottom up.



Type of fishing differs between the two seasons in the southern Gulf gillnet herring fishery. In the spring, much of the fishing is in shallow (< 20 feet) water; the nets typically are set from the bottom to the surface and most nets are fished by anchoring overnight and hauling the next morning. In the fall, spawning grounds are searched at night using fish sounders and nets are set only when a school of sufficient size is found. Fall fishing is in much deeper water (30 – 80 feet), so the nets are set from the bottom only part ways to the surface. Herring nets in the fall are typically anchored at least at one end. In some areas, fishermen have anchors and pick-up floats at both ends of the nets. Even with the one-anchor arrangement, the net moves little as the boat drifts down-current and stays there, held by the net's anchor.

A single "set" may last anywhere from less than an hour to the better part of a night, depending on seasons, currents, the weather, and the number of fish being caught.

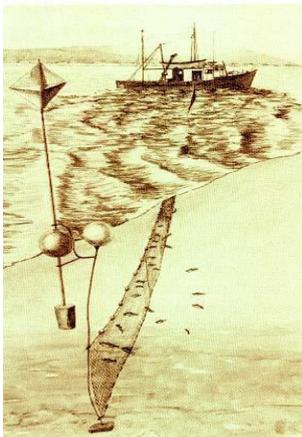
---

<sup>2</sup> <http://www.dfo-mpo.gc.ca/surette/e-eng.htm>

Usually, in the fall, nets are set just before dead water (at the end of falling or rising tide), and picked up when the tide starts to run heavy again. This is because the tide normally lays the nets down (or at the very least, places a great strain on them) and they don't fish well. Of course, if set with two anchors, the fisherman has no idea if any fish was caught until the net is pulled.

The entangled fish are pulled up and shaken out of the net and then thrown into the hold. If the catch is not sufficient, the net is then reset, and the process begins again.

The Inshore herring gillnet fleet in the southern Gulf of St. Lawrence is made up of small vessels, generally under 50 feet in length (approx. 1300 of these vessels are active in both spring and fall seasons). From 100 to 250 vessels may fish on a spawning bed in one night catching between 1000 to 2500 t a night when herring schools are dense. Except for a few bait fishermen that still set by hand, gillnetters now use hydraulic net drums to set and haul their nets (see the picture above). In the southern Gulf, minimum mesh sizes and net size are regulated under the herring management plan. Most spring gillnets mesh sizes range from 2 1/4 inches (57.15 mm) to 2 1/2 inches (63.5 mm) and are 13 to 18 fathoms (46.8 to 63.5 m) long. The majority of fall gillnets mesh sizes are of 2 5/8 inches (66.7 mm) and are 14 to 19 fathoms (25.6 to 34.7 m) long. In the Southern Gulf, the spring gillnet season runs from early April to end of June and the fall gillnet season runs from early July to mid-August.



#### **4.2.7. Market information**

For many centuries herring has been considered a very important food in Europe and Asia. Herring can be prepared into many products such as fresh, frozen, cured, canned, smoked, herring roe, and fish meal and oil. Herring roe is now the most important product form in Canada and it is destined largely for the Japanese market.

Canada's herring fishery's transition to a major commercial and international food fishery happened during the 1970s due to the expansion of two important markets: the European market and the Japanese market. The European market was first to import Canadian herring due to significant declines in the North Sea herring populations. Japan began importing herring from Canada when Japanese fleets were not allowed to fish in traditional herring grounds in various regions. Since then Canada has established trade relations with Japan where there is a large market for herring roe. The roe market is a very economically important component of the Southern Gulf herring fishery and is the driving force behind the fall inshore fishery (DFO 1998). The herring roe captured in the Gulf of St Lawrence is processed in Canada and then exported to Japan, which is the only current market available for herring roe. There are three main types of roe sold in Japan: salted roe, flavoured roe, and roe mixed with other seafood products (DFO 1999). Herring harvesting is market driven. As a

consequence the fishery experiences high fluctuations in economic value. During the 1990s the value for roe herring ranged from 3-4 cents/pound in 1991 to 18-20 cents/pound in 1996 (DFO 1998, 2001).

According to recent information from the Food and Agriculture Organization (FAO), world landings of Atlantic herring are generally 2.5 million tonnes of which Canada's share is about 6%. The most important producers are: Norway ( $\approx 43\%$ ); Iceland ( $\approx 13\%$ ); Denmark ( $\approx 4\%$ ); United States ( $\approx 4\%$ ); United Kingdom ( $\approx 5\%$ ) (Integrated Fisheries Management Plan (IFMP) 2015).

Canada's recent landings of Atlantic herring were  $\approx 155,000$  tonnes, generating average revenues of \$35 million (IFMP, 2015). Historically, the New Brunswick and Nova Scotia areas catch about 75% in volume and value. In the last ten years, there has been a decrease in volume and value. The spring fishery is mainly sold commercially or kept as bait while the fall fishery is used to produce roe, smoked products, filets and sardines. While herring landings represent about 40% of the volume of total landings for all species in the Gulf Region, with an average price per pound of 10¢, they only represent 3% of the total landed value. It is noteworthy to say that in recent years owing to a diminishing Spawning stock biomass (SSB), the spring spawner 4T herring fishery is managed under a nominal quota of 2,000 t and is considered primarily a bait fishery. Landings of herring in the Québec region represent about 10% of total landings of herring in the southern Gulf of St. Lawrence. A significant number of fixed gear herring harvesters have licences for other species the most important being lobster, rock crab or snow crab, and tuna. In the Gulf Region, there are about 35 fish processing plants that process herring employing around 2,000 people.

Traditionally, New Brunswick is the most significant exporter (70%), followed by Nova Scotia, Newfoundland, Quebec, and then Prince Edward Island (PEI) (IFMP, 2015). About 50% of Canadian herring export in value is destined to the USA followed by Japan, the Caribbean, and the European Union (EU). About 50% of Japanese imports of herring roe come from Canada, mostly from British Columbia, because of its similarities to Japanese roe and quality issues with eastern Canadian roe.

### **4.3. Principle One: Target Species Background**

#### **4.3.1. Stock assessment**

##### **Introduction**

There is a long history of research on the population biology and structure of the 4T herring stock, including distribution, abundance and migration patterns of its spring and fall spawning components. The stock is assessed and managed by each spawning component separately (DFO 2014a). Techniques to discriminate spring and fall spawners in biological sampling are well developed and reliable and provide a sound basis for development of the biological databases essential to the assessment of each spawning component.

The current population model used to assess stock status is a variation of a Virtual Population Analysis (VPA) in which negligible error is assumed in the catch at age. The population model is calibrated to the mean annual estimates of two abundance indices (CPUE and acoustic), both of which have associated age composition information. Weight-at-age and recruitment variability are taken into account. The assessment model has been widely used in Canadian east coast fisheries since the mid-1990s. Most recently the status of the fall spawning component of the 4T herring stock was determined using the ADAPT VPA procedure (Gavaris 1999) with two model formulations being derived in the most recent assessment. (DFO 2014a):

Model 1 is the same formulation as in the previous 2012 assessment including:

- CPUE indices of ages 4 to 10 from the fixed gear,
- Acoustic survey juvenile index of ages 2-3, and
- Both indices considered proportional to population abundance in the model.

Model 2 considers changes in catchability in the gillnets for ages 4 and 5 associated with reductions in size at age observed from 2004 to 2013 with:

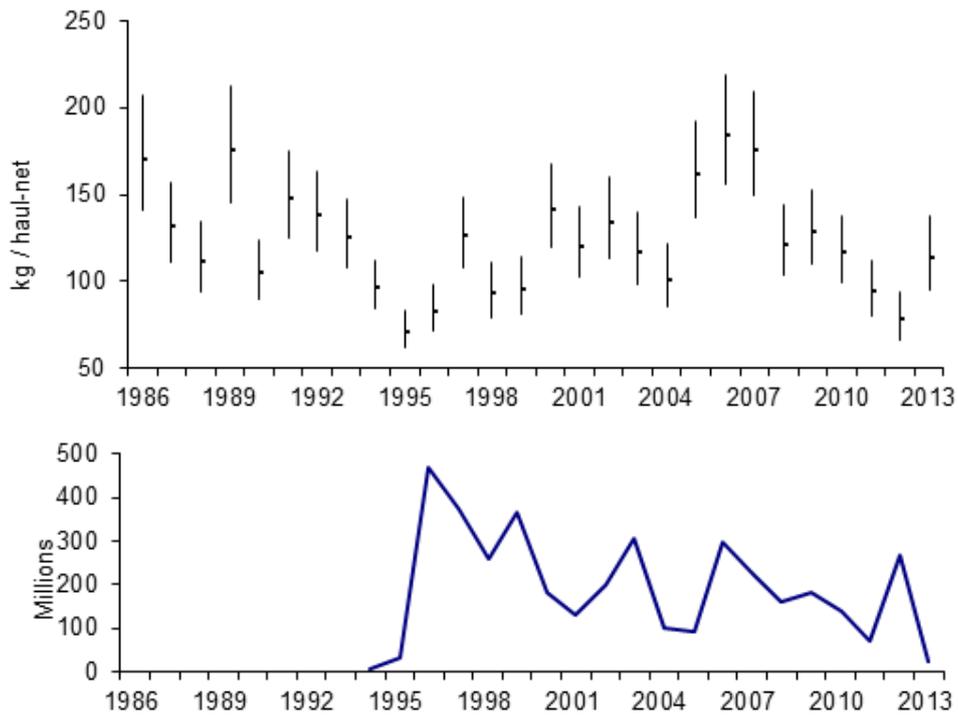
- Gillnet fishery CPUE index of ages 6 to 10 (1986-2013) as CPUE1 index and ages 4 and 5 (in 1986-2003) as CPUE2 index, both considered proportional to population abundance,
- Ages 4 and 5 (in 2004-2013) as CPUE3 index with a trend in catchability rather than proportional to abundance, and
- Acoustic survey juvenile index of ages 2-3, considered proportional to population abundance in the model.

Results from the assessment indicate there are strong residual patterns in both models and both show retrospective patterns in the estimates of abundance. The results of stock status in recent years are model dependent and results from both are presented because the diagnostics of the model fits do not allow a clear choice between them. There are notable differences in estimated biomass between the models; in Model 2 biomass is estimated to be below the upper stock reference (USR) since 2012. Nevertheless, while the estimated absolute biomass values differ substantially between models, the trend in abundance is similar; biomass has declined from the recent peak value in 2009.

Information on landings is compiled by DFO. Docksideside monitoring of landings was introduced in the mid-1990s and the fishery has been subject to 100% docksideside monitoring since 2000 in most HFAs of the SGSL, including HFA 16 F. Logbooks are not used in the gillnet fishery and information on at-sea activities comes primarily from a telephone survey of 20% to 25% of the active gillnet fishers. DFO Science undertakes docksideside sampling to characterize the age and size composition of the landings as well as determine spawning component.

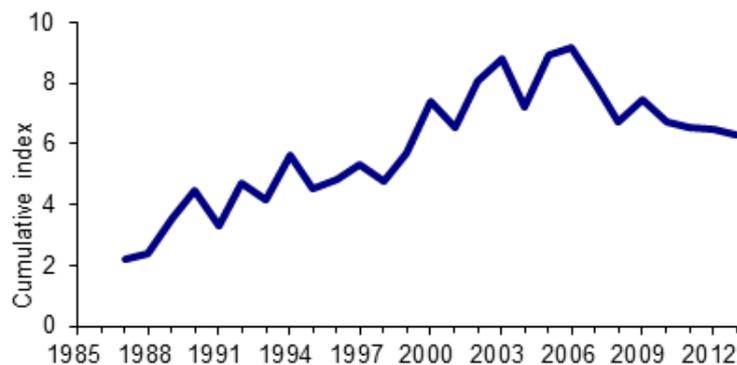
### **Abundance Indices**

The age-disaggregated gillnet catch rate (CPUE) index is based on gillnet catches determined from purchase slips and docksideside monitoring data (DMP) combined with effort information (number of nets and hauls) derived from DMP data and the telephone survey (Figure 5). The effort information in this index uses the product of hauls and nets (haul-net) instead of nets alone. The effort index, which shows a declining trend from 2006, covers the entire gillnet fleet and extends from 1986 to 2013. There are no indices of abundance from the purse seine fleet. The standardized acoustic index of abundance and biomass at age is generated from an annual RV (research vessel) acoustic survey. Internal consistency of the acoustic index by age is examined from correlations and regressions of age-class abundance with a one to three year lag. The acoustic index has been declining since 2006 and remains at a low level in the series that starts in 1994 (Figure 5).



**Figure 5.** Fall spawner catch rate (CPUE) index (kg/haul-net) (1986 to 2013) (upper panel) and acoustic index of abundance for ages 2 and 3 (1994 to 2013) (lower panel). Source: DFO 2014a.

During the annual gillnetter telephone survey, which started in 1986, one question asks the harvesters to compare the abundance of herring in the current year to the previous year. The responses are scaled 1 to 10, 5 meaning no change from the previous year. To construct the index, the responses are re-scaled from  $-5$  to  $+5$ , with 0 indicating no change of abundance. The annual opinion responses are averaged by area and then weighted by the catch in that area. A global yearly weighted average is calculated and yearly averages are added cumulatively to give a trend of abundance from 1987 to the current year. A positive slope indicates harvester opinions consistent with an increasing stock abundance, and a negative slope indicates decreasing abundance. The fall cumulative index of opinion of abundance from the gillnet telephone survey has been decreasing since 2006 (Figure 6).

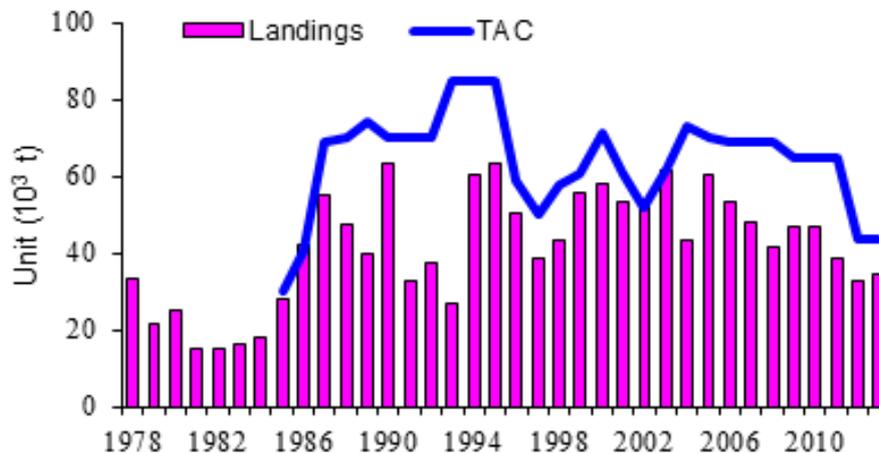


**Figure 6.** Cumulative index of the telephone survey fall spawner opinion on abundance, 1987 to 2013. Source: DFO 2014a.

### 4.3.2. Stock status

#### Catch

Landings (Figure 7) by both the gillnet and purse seine fleets participating in the fishery have been subject to 100% dockside monitoring since 2000 (100% dockside monitoring coverage does not apply to all HFAs of the SGSL). There has been no observer coverage of the gillnet fishery and there is only anecdotal information on bycatch and discards. For the purse seine fishery, there is currently 20% observer coverage. Currently, there are no fisheries on other species in 4T in which herring are a significant bycatch.



**Figure 7.** Total landings (t) and total allowable catch (TAC; t) of the Atlantic herring fall spawner component from NAFO Div. 4T, 1978 to 2013.

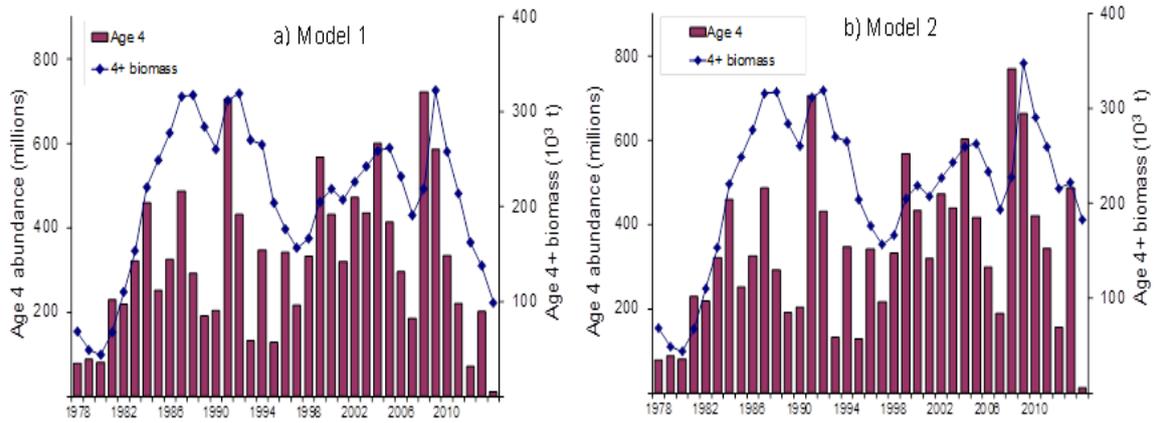
#### Stock Status

##### *Recruitment estimates at age 4*

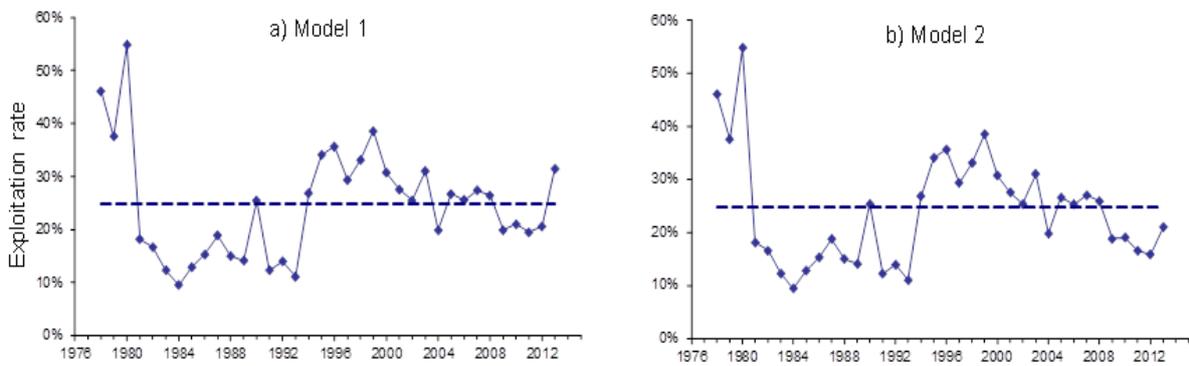
Results from Model 1 indicate that the abundances of the 2004 and 2005 year-classes are above the average (1978-2013) of 344 million fish, but well below average for the 2003 and 2008 year-classes. Age 2 abundance in 2014 is estimated by multiplying the spawning stock biomass (SSB) in 2012 by the 2009-2013 average recruitment rate (age 2 abundance in year  $t$  / SSB in year  $t-2$ ). Very low abundance is projected for the 2010 year-class. Results from Model 2 indicate that the abundances of the 2004, 2005 and 2009 year-classes are above the average of 344 million, but well below average for the 2003 and 2008 year-classes. Age 2 abundance in 2014 is estimated by multiplying the spawning stock biomass (SSB) in 2012 by the 2009-2013 average recruitment rate (age-2 abundance in year  $t$  / SSB in year  $t-2$ ). Very low abundance is projected for the 2010 year-class.

##### *Spawning stock biomass*

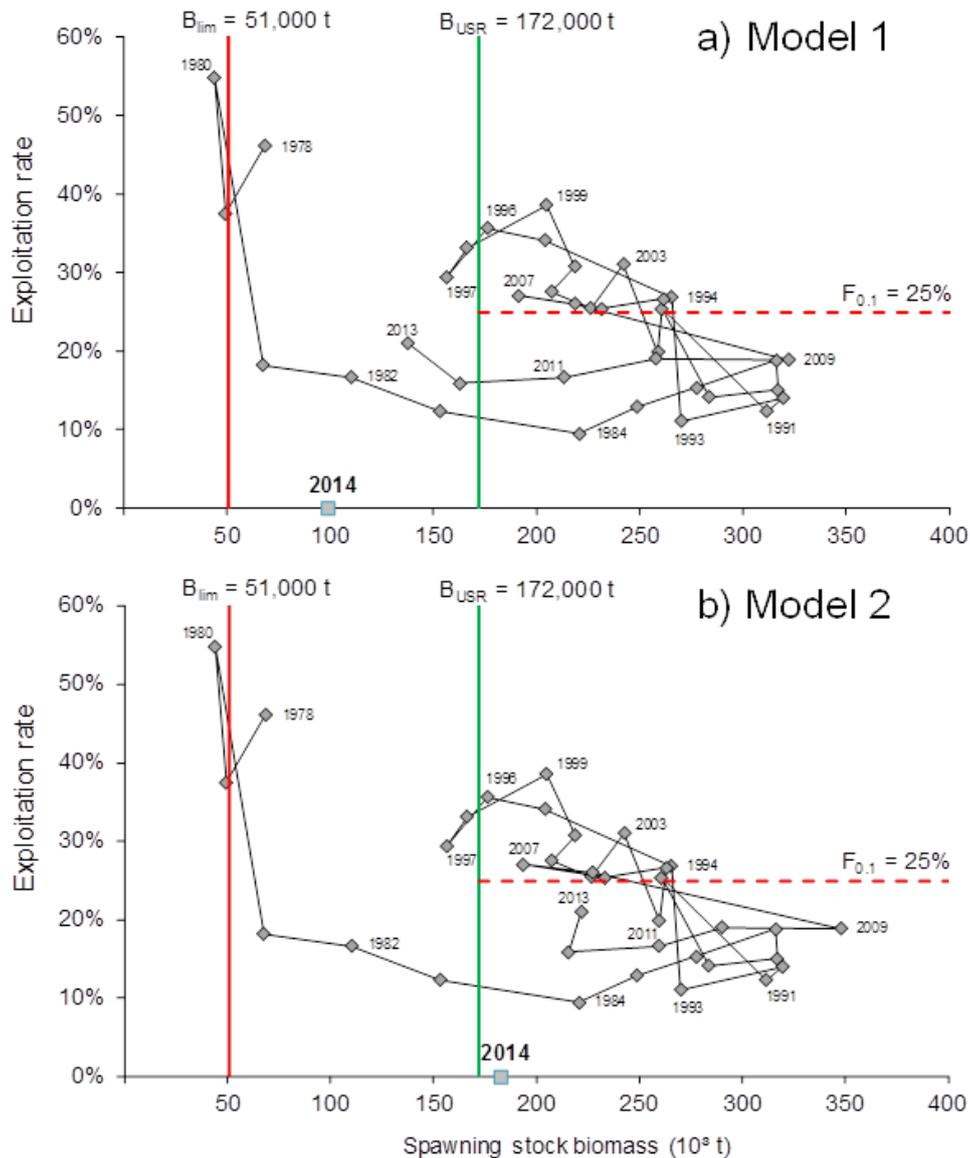
The results from both models indicate that recent SSB of age 4+ fall component peaked in 2009 when the large 2004 and 2005 year-classes were contributing to the fishery (Figure 8). The 2014 beginning-of-year spawning stock biomass (SSB) for Model 1 is estimated to be about 98,000 t and below the upper stock reference ( $B_{USR}$ ) level of 172,000 t (Figure 10). The reference level exploitation rate ( $F_{0.1}$ ) for the fall spawner component is about 25% for fully recruited age-groups (5+). The 2013 exploitation rate of 31% is above the reference level (Figures 9). The estimated SSB for Model 2 is about 182,800 t and above the upper stock reference ( $B_{USR}$ ) level (Figure 10). The 2013 exploitation rate of 21% from Model 2 is below the reference level (Figures 9).



**Figure 8.** Fall spawner component age 4 numbers (millions of fish) and age 4+ biomass (103 t) from a) Model 1 (left panel) and b) Model 2 (right panel).

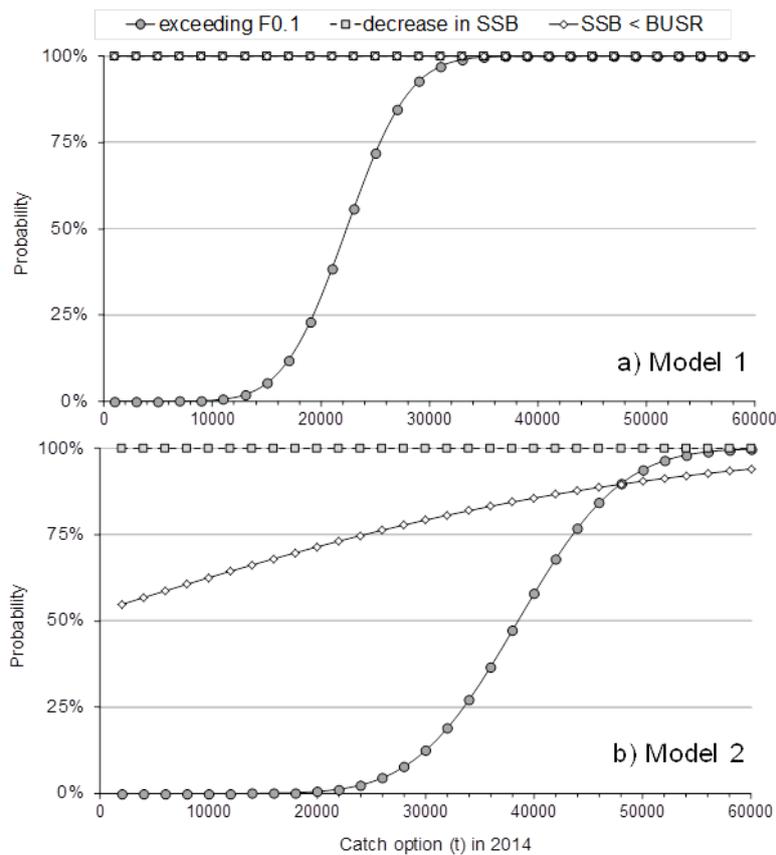


**Figure 9.** Fall spawner exploitation rate estimates from a) Model 1 (left panel) and b) Model 2 (right panel). The horizontal dashed line is the reference removal rate of 25% corresponding to F0.1 for fully recruited ages 5+.



**Figure 10.** Fall spawner SSB (ages 4+) and exploitation rate trajectories relative to reference points for a) Model 1 (upper) and b) Model 2 (lower). The spawning stock biomass for 2014 is shown as the labelled symbol on the x-axis.

Catch options for 2014 were assessed relative to the probabilities of exceeding  $F_{0.1}$ , of no decline in SSB in 2015, and that SSB would be less than  $B_{USR}$  (172,000 t) in 2015 (Figure 11). Fishing at  $F_{0.1}$  is usually considered a safe exploitation rate when the stock is in the healthy zone. The risk analyses include uncertainties of the population estimates but not those associated with natural mortality, weight-at-age, partial recruitment or uncertainties around the age 2 abundance. For Model 1, a catch option of 22,100 t in 2014 corresponds to a 50% chance that the exploitation rate would be above the reference removal rate. There is a 100% probability that the resulting spawning stock biomass in 2015 would be below  $B_{USR}$  even with no fishing. For Model 2, a catch option of 38,017 t in 2014 corresponds to a 50% chance that exploitation rate would be above the reference removal rate and an 85% probability that SSB in 2015 would be below  $B_{USR}$ . For both models, the risk analysis projects a 100% probability of a decrease in biomass even with no fishing.



**Figure 11.** The 4T herring fall spawner component risk analysis for catch options in 2014 based on a) Model 1 (upper) and b) Model 2 (lower).

### 4.3.3. Uncertainties

There is concern that catch rates may not accurately track population biomass because of the nature of the fishery. Boat limits and saturation of nets may impact CPUE negatively, while improved fishing technology could positively influence CPUE. Trips with no catch are not documented prior to 2006 and therefore not incorporated in the effort data. There are potential inconsistencies in the reporting of effort data (number, hauls, length, and depth of gillnets). The weights-at-age have declined. The fixed gear fishery has been using a relatively constant mesh size over the last ten years and with selectivity being size dependent, this may result in reduced catchability at age particularly for age 4 and 5. This was considered under Model 2 in this assessment and the results are dependent upon this assumption.

Further work is required to determine if changes in catchability may have occurred for other ages as well, such as age 6. There are no indices of recruitment for age 2 for 2014 and an average of the previous five-year recruitment rate (recruitment per SSB) is used as has been done in previous assessments.

There are strong residual patterns in both models, including blocks of residuals, suggesting the models do not characterize important dynamics of the population and /or the fishery including possibly hyperstability of the CPUE index (CPUE does not decline as rapidly as population declines), changes in natural mortality, changes in catchability associated with variations in size at age and / or changes in fishing operations.

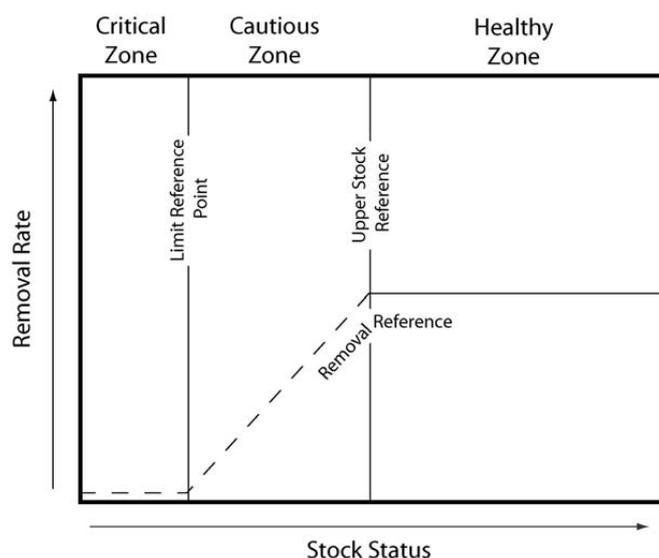
Both models show retrospective patterns in the estimates of abundance. These may be associated with changes in natural mortality, changes in catchability, and other processes not incorporated in the model. An examination of the retrospective pattern indicated that the assumed linear relationship between CPUE and fishable biomass is a plausible cause (Cadigan and Farell 2003).

There is further uncertainty regarding appropriateness of the basis for dividing the overall TAC among HFAs. The 4T herring stock is composed of spring and fall spawning components. Spawning of herring from each component occurs regularly in well-defined geographic areas. TACs are set separately based on the assessment of abundance of each spawning component. For each, 77% of the TAC is allocated to the inshore gillnet fleets and 23% to the seiner (>65') fleet. In 1986, 4T was divided geographically into 7 HFAs. Based on historical catches, each of these areas has been allotted the same fixed percentage of the inshore gillnet fleet's allocation each year since. HFA 16F receives 20% of the allocation for the fall spawning component; this amounted to 5,317 t in 2014.

If herring from each component return to the same spawning areas with a high degree of fidelity, it would be important that the distribution of the allocations be based on this consideration in order to preserve the within spawning component stock structure. There is uncertainty whether the sharing arrangement ensures adequate protection of spawning beds within each HFA. Landings in certain HFAs have been consistently well below allocations over the past five years and only in three, including 16F, have landings consistently matched the allocations. Factors such as social, economic and regulatory aspects could all contribute to the observed patterns, even in the absence of actual changes in local abundance. However, there is no evidence that the sharing arrangement has impacted productivity at the overall stock level.

#### 4.3.4. Reference points

A harvest strategy compliant with the Precautionary Approach (PA) would include the adoption of two biomass reference points, a Limit Reference Point (LRP) and an Upper Stock Reference (USR), which would divide stock abundance into three zones: critical, cautious and healthy (Figure 12). The LRP is the stock level below which productivity is considered sufficiently impaired to cause serious harm but is above the level where the risk of extinction becomes a concern. The USR is defined as the stock level below which the removal rate is reduced from the reference level (DFO 2006).



**Figure 12.** Illustration of a fisheries management framework consistent with the Precautionary Approach (DFO 2006).

When the spawning stock biomass (SSB) is above the USR, the exploitation rate is set at the removal reference level. If the SSB declines below the USR, a harvesting strategy compliant with the Precautionary Approach would progressively reduce the exploitation rate to promote stock growth to above the USR. Finally, if the SSB declines below the LRP, then removals from the stock should be kept to the lowest level possible.

Spawning stock biomass values below the USR represent undesirable stock levels. In some fisheries, target reference points (TRPs) are also used to maintain the stock at a level to achieve desired objectives, the latter taking into account a combination of biological and socio-economic considerations. These TRPs are never set below the USR value (DFO 2006).

For the fall spawning component of the 4T herring stock, expected spawning stock biomass assuming average recruitment (age 2) and the removal rate reference (previously set at  $F_{0.1} = 0.32$ ) was calculated using spawner per recruit analysis based on stock characteristics data (vectors of mean weight at age, natural mortality, partial recruitment) to be about 172,000 t. The USR was not explicitly defined but would be located somewhere between the LRP and this expected SSB at the removal rate reference. SSB could be expected to fluctuate around this value and thus the USR would be set somewhere between the LRP and the expected SSB level.

Three LRP definitions were considered:

1.  $B_{\text{recover}}$  corresponding to the lowest historical SSB from which the stock readily recovered
2. BH50 or RK50 which is the SSB which produces 50% of the maximum recruitment based on either a Beverton-Holt (BH50) or Ricker (RK50) stock recruitment relationship
3. SB50/90 corresponding to the SSB which can produce median recruitment under favourable conditions.

The lowest historical SSB from which the fall spawning component was able to recover ( $B_{\text{recover}}$ ) was 37,000 t. The number of recruits produced from this low SSB level was exceptionally high and may have been a compensatory response to low abundance but additionally could have resulted from favourable biological and environmental conditions prevalent during that period. As such, the high recruitment per SSB ratio observed and the subsequent recovery may not occur at a similar low level of biomass in the future if conditions are less favourable.

Recruitment at age 2 relative to the SSB has large variability and the data yield poorly defined associations between recruitment and SSB for either the Beverton-Holt or the Ricker functions. Therefore, estimation of the LRP from stock and recruitment data was not considered appropriate.

High recruitment to SSB ratios were observed for several years in the late 1970s. Spawning stock biomass also increased as fishing rates were reduced. It was considered that the average of the four lowest values of biomass during that time period would represent a more cautious estimate of the LRP. This corresponds to 51,000 t for the fall spawning component of the 4T herring stock.

Due to the uncertainty in stock and recruitment dynamics, it was considered appropriate to have the USR closer to the expected SSB than to the LRP, therefore, the expected SSB (172,000 t) was considered an appropriate USR (DFO 2005).

Updated SSB and exploitation rate trajectories relative to these reference points are presented in Figure 10 above.

#### 4.3.5. Harvest Strategy, Harvest Control Rules and Tools

Tools in use in the 4T herring fishery include a variety of catch and effort controls:

##### Catch Controls

- Annual TAC (set by consultative process and decided by DFO minister )
- Inshore gillnet allocations by Herring Fishing Area (HFA); reserve is used to manage in-season harvesting
- Purse seine allocation (for whole Gulf)
- 100% DMP (In all but three QC HFAs where mandatory radio reporting is required and partial verification by DMP follows)
- Small fish protocols for the seiners
- 20% observer coverage for the seiners
- Daily trip limits

##### Effort Controls

- Inshore gillnet gear specifications
- Maximum of 150 fathoms in length and 125 mesh deep with the exception of HFA 16F which will be 100 fathoms in length; HFA 16G Southside which will be 100 mesh deep
- Minimum mesh size in all areas of 66.7 mm (63.5 mm in HFA 16A)
- Tagging of all gillnets in all HFAs required beginning in 2012, with one tag for every 15 fathoms of net.
- Inshore gillnet fishery trip limits which vary by HFA
- Seasonal closures which vary by HFA
- Closure from 15:00 Friday to 15:00 Sunday in some HFAs including HFA 16F
- Areal closure off northeast PEI of the commercial inshore herring fishery (April 1 to June 30) and of the large seiners herring fishery (year round)
- Areal closure in Baie des Chaleur, northside of PEI and Northumberland Strait for seiners (also not allowed in 16F)

Harvest control rules within the Precautionary Approach for the 4T herring fishery continue to be developed. The following principles are considered in the application of the Precautionary Approach. In the event that the SSB falls below  $B_{lim}$  and into the critical zone, removals from the stock must be kept to the lowest level possible. When the stock is above  $B_{usr}$  and in the healthy zone, TACs will be based on a fishing strategy at  $F_{0.1}$ . When SSB is in the cautious zone, setting of the TACs must promote stock growth towards the healthy zone. There are no formal harvesting rules currently in place for managing the fishery in the different stock status zones of the Precautionary Approach other than the overriding application of cautionary measures to support the rebuilding of stocks and avoiding a decline of the stock into the critical zone.

This stock has been harvested at  $F_{0.1}$  for approximately 20 years with  $F_s$  maintained near or below that level most years since 2000. Since implementation of a Precautionary Approach framework in 2006, 2014 is the first year the management system has been faced with conflicting results regarding stock status and the possibility the stock may have dropped below  $B_{usr}$ . There was a 19.5 % reduction in TAC for 2014. This is considered a very positive management response under the circumstances and is consistent with principles described above.

A comprehensive review of the assessment framework for this stock is planned for mid-April 2015 and a new assessment with scientific advice, including an estimate of  $F$  in the 2014 season, anticipated by spring 2015. The management system has not had to deal with SSB near  $B_{lim}$  in the case of the fall spawning component of this stock, but it has for the spring spawning component. In

the case of the latter, it has effectively maintained  $F$  well below the  $F_{0.1}$  reference removal rate from 2009.

While the management system has demonstrated a capacity to respond in accordance with PA principles, as yet there is no Integrated Fisheries Management Plans (IFMP) in place with well defined, pre-approved harvest control rules that prescribe management action when SSB is in the cautious zone.

#### 4.4. Principle Two: Ecosystem Background

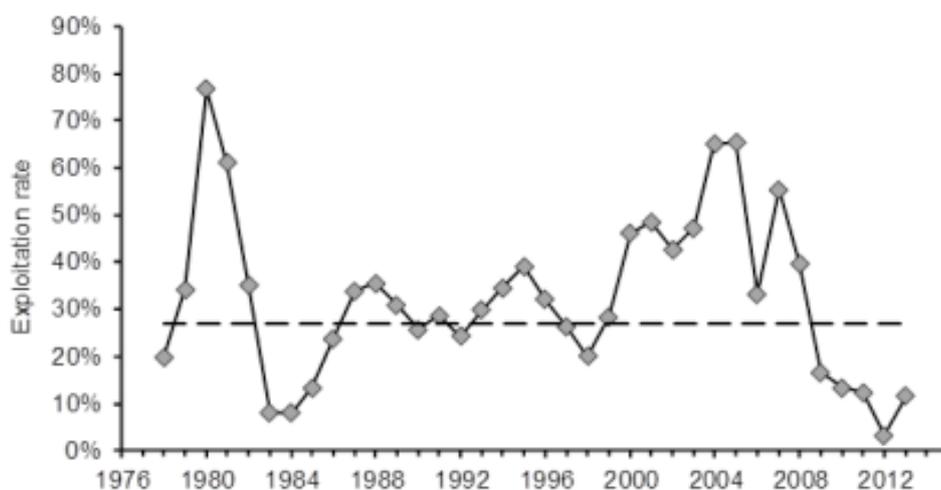
##### 4.4.1. Retained Species and 4.4.2. Bycatch Species

Information on retained species is obtained from commercial landings data. On the site visit, DFO relayed to the assessment team that there is no published information on non-herring landings in this fishery. The assessment team requested a summary of the composition of the landings from DFO. The information received showed that the composition of landings from the fall fishery from 2004 till present consisted of all herring. The assessment team was informed that based on examination of the sexual characteristics (gonads etc), DFO catch sampling distinguishes between fall and spring spawning components with a high degree of accuracy.

The information confirms there is minimal retained catch of spring spawning herring in the fall gillnet fishery. In 2011, 18 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (DFO 2012), representing approximately 0.2% of the fall herring gillnet fleet landings. In 2013, 2 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (Table 2), comprising approximately 0.04% of the fall herring gillnet fleet landings.

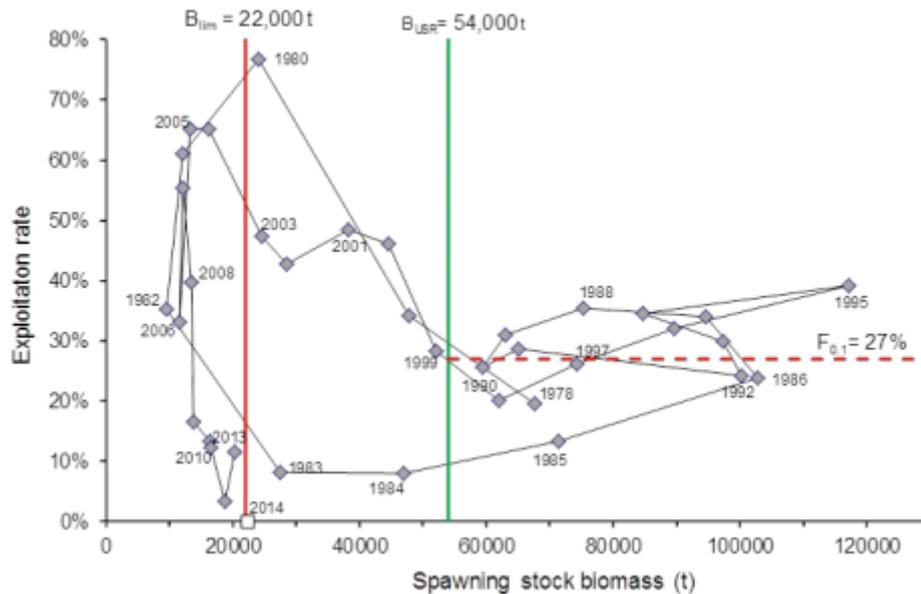
According to MSC GCB3.5.2, a species that comprises less than 5% of the total catch by weight may normally be considered to be a minor species (i.e., not “main”) in the catch, unless it is of high value to the fisher or of particular vulnerability, or if the total catch of the fishery is large, in which case even 5% may be a considerable catch.

For the spring spawner component the reference level exploitation rate at  $F_{0.1}$  is about 27% for fully recruited ages 5+. The estimated exploitation rate in 2013 was 12% which is well below the removal reference level of 27% (Figure 13).



**Figure 13.** Spring spawner exploitation rates (% , ages 6 to 8), 1978 to 2013. The horizontal dashed line is the reference removal rate of 27% corresponding to  $F_{0.1}$ . Source: DFO 2014a.

For the spring component,  $B_{lim}$  and  $B_{USR}$  are 22,000 and 54,000 t respectively (Figure 14). The age 4+ SSB was below  $B_{lim}$  from 2004 to 2013. The current estimate of age 4+ SSB of 22,280 t is just above  $B_{lim}$  (Figure 14). So the spring component is highly unlikely to be within biological based limits.



**Figure 14.** Spring spawner SSB (age 4+, t) and exploitation rate (% ages 6-8) trajectory relative to reference points. The SSB for 2014 is shown as the labelled square symbol on the x-axis. Source: DFO 2014a.

Bycatch is considered to be exceptionally rare and negligible in the SGSL herring gillnet fishery (Pierre Mallet DFO, GNSHF personal conversation). Information on bycatch species generally comes from observer data. However, there has been no observer coverage of the gillnet fishery and thus there is no information on potential discards. DFO staff relayed to assessment team that from 2004 to 2014 there were no landings of other species and it's also assumed there was no bycatch in the herring gillnet fishery (Table 3). The exact level of discards or bycatch cannot be quantified as there is no information from the fishery.

**Table 3.** Historical landings of the HFA 16F SGSL Fall Herring Gillnet Source: DFO quota monitoring

Year	Herring (t)	Other Species (t)
2004	5505	0
2005	8985	0
2006	9055	0
2007	8704	0
2008	5333	0
2009	8330	0
2010	7950	0
2011	8660	0
2012	6856	0
2013	5574	0
2014	5214	0

## **IPI Stocks**

There was a request to MSC to approve Atlantic Herring (*Clupea harengus*) spring component as an IPI stock in accordance with CR 27.4.9.1, and an exemption to requirements for this IPI stock under CR 27.4.10.2.

### **CR 27.4.9.1**

The spring component of the SGSL herring stock can occasionally overlap with that of the fall component and, as a result, may be caught in the fishery. Owing to their physical similarities and appearance they are inseparable during normal fishing operations and practically inseparable during processing (CR 27.4.9.1 a & b).

### *Background*

Information on spring herring as retained species is obtained from commercial landings data. On the site visit, DFO relayed to the assessment team that there is no published information on non-herring landings in this fishery. The assessment team requested a summary of the composition of the landings from DFO. The information received showed that the composition of landings from the fall fishery consisted of all herring. The assessment team was also advised that based on examination of the sexual characteristics (gonads etc.), DFO catch sampling distinguishes between fall and spring spawning components with a high degree of accuracy (DFO personal communication 2014). The information confirms there is minimal retention of spring spawning herring in the fall gillnet fishery. In 2011, 18 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (DFO 2012), representing 0.2% of the fall herring gillnet fleet landings. In 2013, 2 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (Table 2), representing 0.04% of the fall herring gillnet fleet landings. As such, catches of spring herring component in the fishery are approximately 15% or less of the total combined weight of target and IPI species (CR 27.9.4.1 c). The spring herring stock is not an ETP species (CR 27.4.9.1 d) (SARA Public Registry). The spring stock on the SSGSL area has not been MSC certified (CR 27.4.9.1 e).

### **CR 27.10.4.2**

As noted above, the spring component has made up 0.2% of the catch of the target species in the two most recent years for which data are available, thus is less than 2% of the combined weight of target species and IPI species. There is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding for this fishery. There have been a set of management strategies to protect fall and spring herring stocks in 4t. For example, in keeping with the Precautionary Approach, since 2005 biomass and removal reference points have been defined for the spring and fall spawning components of herring of the southern Gulf. In light of this evidence the very small catches of spring herring on the herring fall gillnet fishery are not considered to create a significant impact on the IPI stock as a whole.

### **4.4.3. ETP species**

According to MSC (CB3.11.1), ETP species are defined as those that are recognized by national legislation and those that are listed in Appendix 1 of the Convention on International Trade in Endangered Species (CITES). Species that appear exclusively on non-binding lists such as the IUCN Red List or that are only the subject of intergovernmental recognition (such as FAO International Plans of Action) and that are not included under national legislation or binding international agreement are not considered as ETP species under MSC standards.

## Legislative framework<sup>3,4,5</sup>

The Species at Risk Act (SARA) is a piece of Canadian federal legislation which became law in 2002. The purposes are to prevent Canadian indigenous species, subspecies and distinct populations of wildlife from becoming extirpated or extinct, to provide for the recovery of endangered or threatened species, and to encourage the management of other species to prevent them from becoming at risk.

In June 2003, the SARA recognized the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as an advisory body, thus ensuring that wildlife species will continue to be assessed using the best available scientific and Aboriginal Traditional Knowledge. The COSEWIC, created in 1977, is a committee of experts that assesses and designates which wildlife species are in some danger of disappearing from Canada. Under the SARA, the government of Canada will take COSEWIC's designations into consideration when establishing the legal list of wildlife species at risk.

More specifically, the Act:

- requires that the best available knowledge be used to define long and short-term objectives in a recovery strategy and action plan;
- creates prohibitions to protect listed threatened and endangered species and their critical habitat;
- recognizes that compensation may be needed to ensure fairness following the imposition of the critical habitat prohibitions;
- creates a public registry to assist in making documents under the Act more accessible to the public; and
- is to be consistent with Aboriginal and treaty rights and respect the authority of other federal ministers and provincial governments.

The SARA is a result of the implementation of the Canadian Biodiversity Strategy, which is in response to the United Nations Convention on Biological Diversity. The Act provides federal legislation to prevent wildlife species from becoming extinct and to provide for their recovery.

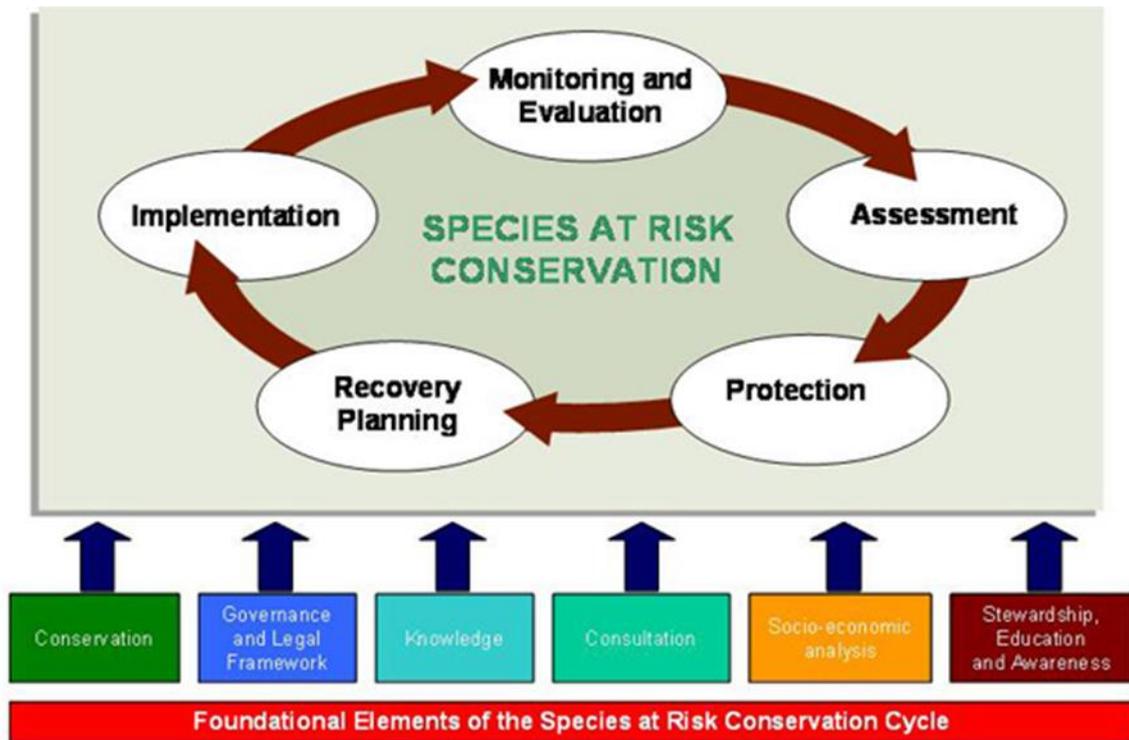
Species at risk conservation is built on a cycle of assessment, protection, recovery planning, implementation, and monitoring and evaluation, as shown in Figure 15. It is premised on an adaptive management approach whereby monitoring progress towards achieving the stated conservation and protection objectives and evaluating the effectiveness of adopted strategies are performed on an ongoing basis and are incorporated into each of the different components of the conservation cycle. Early action at appropriate points on the cycle will be encouraged to expedite implementation of effective protection and recovery measures. Consistent with the 1996 Accord, lack of full scientific certainty will not delay measures to avoid or minimize threats to species at risk.

---

<sup>3</sup> [http://www.sararegistry.gc.ca/approach/act/sara\\_e.pdf](http://www.sararegistry.gc.ca/approach/act/sara_e.pdf)

<sup>4</sup> [http://www.cosewic.gc.ca/eng/sct6/sct6\\_3\\_e.cfm#hist](http://www.cosewic.gc.ca/eng/sct6/sct6_3_e.cfm#hist)

<sup>5</sup> [http://www.sararegistry.gc.ca/approach/strategy/Framework\\_e.cfm](http://www.sararegistry.gc.ca/approach/strategy/Framework_e.cfm)



**Figure 15.** Diagram showing the Species at Risk conservation process.

Under the SARA, species are classified according to status, namely extinct, extirpated, endangered, threatened or special concern. Furthermore, species listed as threatened, endangered or extirpated are subject to immediate prohibitions. The Act prohibits killing, harming, harassing, capturing or taking such species and makes it illegal to destroy their critical habitat. DFO must plan their recovery by developing recovery strategies followed by action plans within the timelines set out in the Act. Recovery strategies must identify recovery objectives for the species to reach population objectives and specify the recovery feasibility.

Species listed as special concern under the SARA are not subject to any prohibitions. However, DFO must develop management plans containing the actions needed for the conservation of these species and their habitats in order to ensure that they do not become threatened or endangered due to human activity.

ETP species in the Gulf Region are wolffish, and the leatherback turtle. There have not been indications of interactions with these species in the prosecution of this fishery. Species at Risk Act Logbooks are distributed with license conditions and entries detail interactions with listed ETP species. The leatherback turtle is also listed by the IUCN Red List in Critically Endangered Species of Wild Fauna and Flora, and is included in the CITES, which reduces commercial exploitation of species at risk. Under the SARA, a recovery strategy has been implemented for the leatherback turtle

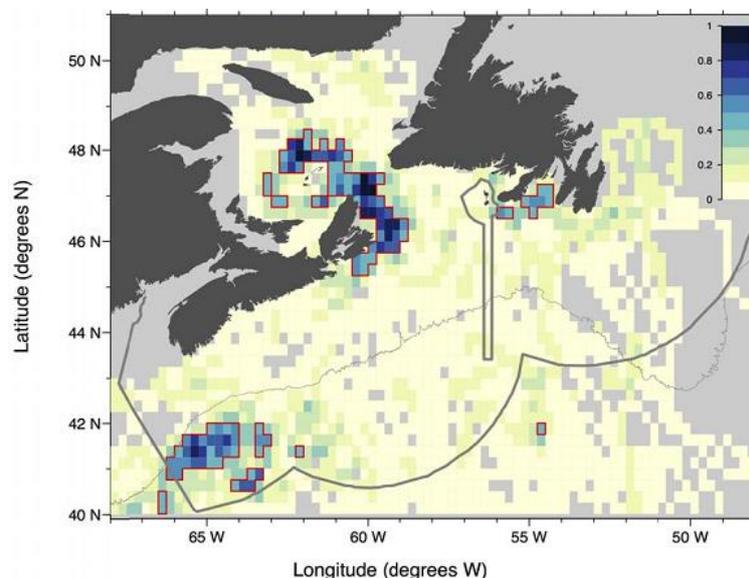
In accordance with the recovery strategy for the Northern Wolffish (*Anarhichas denticulatus*) and Spotted Wolffish (*Anarhichas minor*) and for the Leatherback Turtle (*Dermochelys coriacea*), (Kulka et al., 2007, DFO 2006) the licence holder/operator is permitted to carry out commercial fishing activities authorized under the Fisheries Act that may incidentally kill, harm, harass, capture or take the Northern Wolffish or the Spotted Wolffish or the Leatherback Turtle, as per subsection 83(4) of the Species At Risk Act (SARA).

The following conditions apply:

- a) This permission is only valid while commercial fishing is conducted under the authority of the licence issued under the Fisheries Act in all authorized waters under this licence.
- b) The licence holder/operator is required to ensure that, while the fishing activities are conducted, every person on board the vessel who incidentally catches a Northern Wolffish or the Spotted Wolffish or the Leatherback Turtle forthwith returns it to the place from which it was taken, and where it is alive, in a manner that causes it the least harm.
- c) The licence holder/operator is required to provide information regarding interactions with species at risk while conducting fishing operations. The information that the licence holder/operator is required to collect and subsequently report to DFO and the method by which, the times at which and the person to whom the information is to be provided are set out in the Species at Risk Logbook.

Satellite telemetry data from 70 leatherback turtles tracked in Atlantic Canadian waters were used to identify important habitat for the species (DFO 2012h). This is the single largest telemetry dataset for leatherbacks in the Atlantic. It includes 65 tags deployed on leatherbacks in Atlantic Canadian waters over an 11-year period (1999-2009). At-sea capture of leatherbacks enables more representative sampling of the population versus the traditional focus on tagging adult females on nesting beaches. The sample considered in this analysis included all sexes and size classes that use Atlantic Canadian waters.

As a result, three primary areas of important habitat were identified including the South-eastern Gulf of St. Lawrence and waters off Eastern Cape Breton Island, including Sydney Bight, the Cabot Strait, portions of the Magdalen Shallows and adjacent portions of the Laurentian Channel. The relative probability of residency was estimated (Figure 16).



**Figure 16.** Relative probability of residency estimated from 70 leatherback turtles equipped with satellite tags. Note that all but those areas shaded in light grey were sampled by turtles. Red polygons denote areas where aggregated residency probabilities  $\geq 0.4$  for all satellite tracked turtles. Thick grey line indicates Atlantic Canadian EEZ boundary, thin grey line indicates 1000 m isobaths. Source: DFO 2012h.

Figure 16 shows that the relative probability of residency of leatherbacks in the HFA 16F region is low. However, it was noted that areas of possible residency areas not sampled by tagged turtles included Northumberland Strait (Figure 16, light grey areas). But the author of the analysis pointed out that while opportunistic sightings of leatherbacks have occurred in this area, such records are rare relative to those corresponding to the high-use areas identified via satellite telemetry.

**Table 4.** Marine mammal species with possible interactions with the fall herring fishery in HFA 16F, their status under the COSEWIC and the SARA are given<sup>5</sup>.

Common name	Scientific name	COSEWIC Status	SARA Status
Atlantic walrus	<i>Odobenus rosmarus</i>	Special concern	No status
Grey seal	<i>Halichoerus grypus</i>	Not at risk	No status
Harbour seal	<i>Phoca vitulina concolor</i>	Not at risk	No status
Atlantic and Eastern Arctic species			
Harbor Porpoise	<i>Phocoena phocoena</i>	Special concern	No status
Blue whale	<i>Balaenoptera musculus</i>	Endangered	Endangered
Fin whale	<i>Balaenoptera physalus</i>	Special concern	Special concern

From 2007 to 2013, there were no ETP species interactions reported in DFO species-at-risk logbooks for the fall gillnet herring fishery. (Manon Mallet personal communication 11/29/14)

#### 4.4.4. Habitat

##### Legislative and Policy framework

On June 29, 2013 amendments to the Fisheries Act were approved. The Fisheries Protection Program and its Policy Statements (November 2013) support changes made to the Fisheries Act. The mandate of the Fisheries Protection Program is to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. The Fisheries Protection Policy Statement (FPPS) focuses on the management of impacts to fish resulting from habitats degradation or loss and alterations to fish passage and flow.

Through the FPPS, DFO objectives are to provide consistent guidance through regulations, standards and directives, and to make regulatory decisions in a timely manner. Through this mechanism proponents have the necessary information and direction to avoid, mitigate and offset harmful impacts to fish and fish habitat so that they will meet the goal of this policy, and thereby comply with the fisheries protection provisions of the Fisheries Act.

The prohibition against serious harm to fish applies to fish and fish habitat that are part of or support commercial, recreational or Aboriginal fisheries. Section 35 of the Fisheries Act prohibits serious harm to fish which is defined in the Act as “the death of fish or any permanent alteration to, or destruction of, fish habitat”.

Proponents are responsible for avoiding and mitigating serious harm to fish that are part of or support commercial, recreational or Aboriginal fisheries. When proponents are unable to completely avoid or mitigate serious harm to fish, their projects will normally require authorization under Subsection 35(2) of the Fisheries Act for the project to proceed without contravening the Act.

The Subsection 35(1) prohibition will be applied to those projects that have the potential to cause serious harm to fish. These projects are likely to reduce the ability of the fish habitat to directly or indirectly support the life processes of fish or result in the death of fish. Relationships between typical project impacts (e.g., temperature change, sedimentation, infilling, reduction of nutrients and food supply, etc.) and the consequences to fish or fish habitat are described in various Pathways of Effects diagrams.

Projects requiring authorization are those likely to result in a localized effect to fish populations or fish habitat in the vicinity of the project. Localized effects may also lead to more widespread impacts on fish and fish habitat and, in turn, affect the ability of the area to produce fish.

DFO interprets serious harm to fish as:

- the death of fish;
- a permanent alteration to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes;
- the destruction of fish habitat of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes.

In 2009, DFO published the Policy for Managing the Impact of Fishing on Sensitive Benthic Areas under the auspices of the Sustainable Fisheries Framework in response to the 2006 United Nations Resolution 61/105. The purpose policy is to help DFO manages fisheries to mitigate impacts of fishing on sensitive benthic habitats or avoid impacts of fishing that are likely to cause serious or irreversible harm to sensitive marine habitat, communities and species. This national policy applies to all commercial, recreational and Aboriginal fishing activities licenced and/or managed pursuant to the Fisheries Act and the Coastal Fisheries Protection Act, including fishing inside and outside of Canada's EEZ.

A key tool for use in the implementation of the policy is the (ERAF) ERAF<sup>6,7</sup> which outlines a process for identifying the level of ecological risk of fishing activity and its impacts as sensitive benthic areas in the marine environment. DFO has developed this framework specifically for use in managing coldwater corals and sponge-dominated communities. Both are currently the focus of international efforts to reduce the impacts of fishing on benthic environments (e.g. Food and Agriculture Organization International Guidelines for the Management of Deep-Sea Fisheries in the High Seas, Northwest Atlantic Fisheries Organization (NAFO) Vulnerable Marine Ecosystem (VMES) impact assessments), and hence they are among the most well understood from a management perspective.

The Ecological Risk Assessment Framework (ERAF) outlines a process whereby the ecological risk of fishing impacts is determined through the examination of two factors:

1. consequence, which examines the anticipated degree of impact on a sensitive benthic area resulting from an overlap between it and the fishing gear, and
2. likelihood, which examines the probability that the fishing gear will overlap with sensitive benthic areas.

---

<sup>6</sup> <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/benthi-eng.htm>

<sup>7</sup> <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/risk-ecolo-risque-back-fiche-eng.html>

The development of management options is guided by the ecological risk level. Where the fishing activity presents a low risk to the benthic habitat, no additional management options are generally required. Where risk levels are determined to be moderate, additional management options may be required based on the specific circumstances of the fishery and benthic habitat being investigated. Examples may include changes to the fishing methods. Where the risk has been determined to be high, additional management options will usually be required. Examples include fisheries closures or gear modifications and/or restrictions. Options would be determined on a case-by-case basis, in consultation with stakeholders and Aboriginal groups, using existing processes that would be adapted to the specific circumstances.

### **Marine Protected Areas (MPAs)<sup>8</sup>**

There are a number of MPAs designated under the Ocean Act (1996), including several areas of interest that are at various stages of progress towards designation. These areas are ecologically significant, with species and/or properties that require special consideration.

MPAs are one among various other management tools that contribute to the improved health, integrity and productivity of Canada's marine ecosystems and help advance integrated ocean management. These areas are part of Canada's network of MPAs.

The MPA designation process includes public input to determine the costs and benefits of MPA designation. Areas of Interest (AOI) are identified and will undergo a detailed biophysical and socio-economic evaluation and public consultations before a decision is made to formally designate it as a Marine Protected Area. Consultation with First Nations, stakeholders, industry and interested groups will provide opportunities to contribute to the evaluation and analysis of impacts of MPA designation, establishment of appropriate conservation and management objectives, and development of the regulatory package.

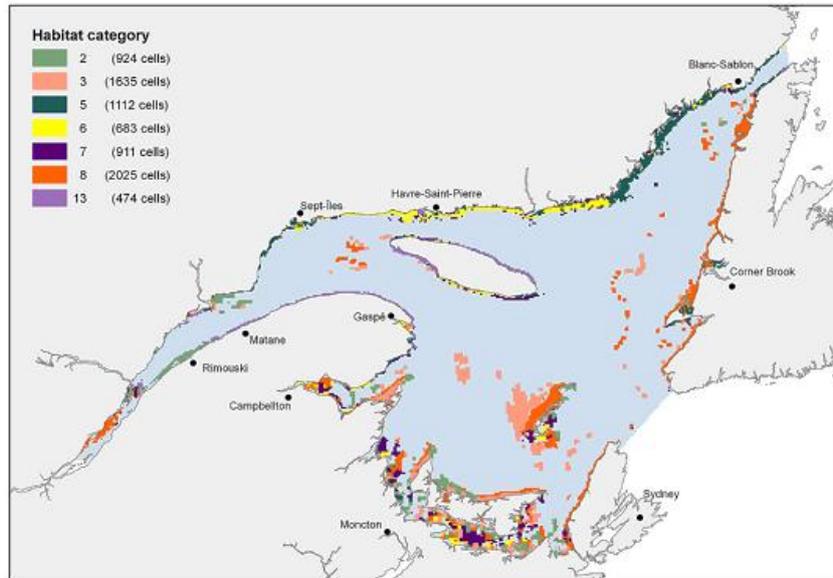
### **Spatial distribution of habitats in the SGSL**

Dutil et al., (2012) mapped the coastal and epipelagic habitats of the estuary and Gulf of St. Lawrence. The database presented describes the pelagic and benthic habitats of the 0 – 30 m surface layer in estuary and Gulf of St. Lawrence. The dataset includes 130 descriptors: cell location parameters such as cell address, latitude and longitude, and distance to the coast; landscape features such as depth, slope, insularity, coastline development, shore material and characteristics, degree of protection front the open sea, sensitivity of the shoreline to sea; hydrographic and oceanographic parameters such as distance to the nearest stream or river and its drainage area and mean annual flow, tidal range, vertical and horizontal currents, ice conditions, salinity and temperature at various depths. Coastal areas, particularly in the southern Gulf, appear to be more diversified locally than midshore and offshore habitats, which formed large patches of more uniform characteristics. The dataset provides useful information on the spatial extent of major coastal epipelagic habitats. 7 habitat categories were mapped from that dataset (Figure 17).

Figure 18 shows shoreline areas suitable for spawning and as nursery for larval and juvenile stages of various fish species (light blue patches). The superimposed deep blue patches indicate known occurrence of nearby eelgrass meadows. Eel grass meadows are considered "fish habitats". According to the FPPS, the prohibition against *serious harm to fish* applies to fish and fish habitat that are part of or support commercial, recreational or Aboriginal fisheries. Section 35 of the *Fisheries Act* prohibits *serious harm to fish* which is defined in the Act as "the death of fish or any permanent alteration to, or destruction of, fish habitat".

---

<sup>8</sup> <http://www.dfo-mpo.gc.ca/oceans/marineareas-zonesmarines/mpa-zpm/index-eng.htm>

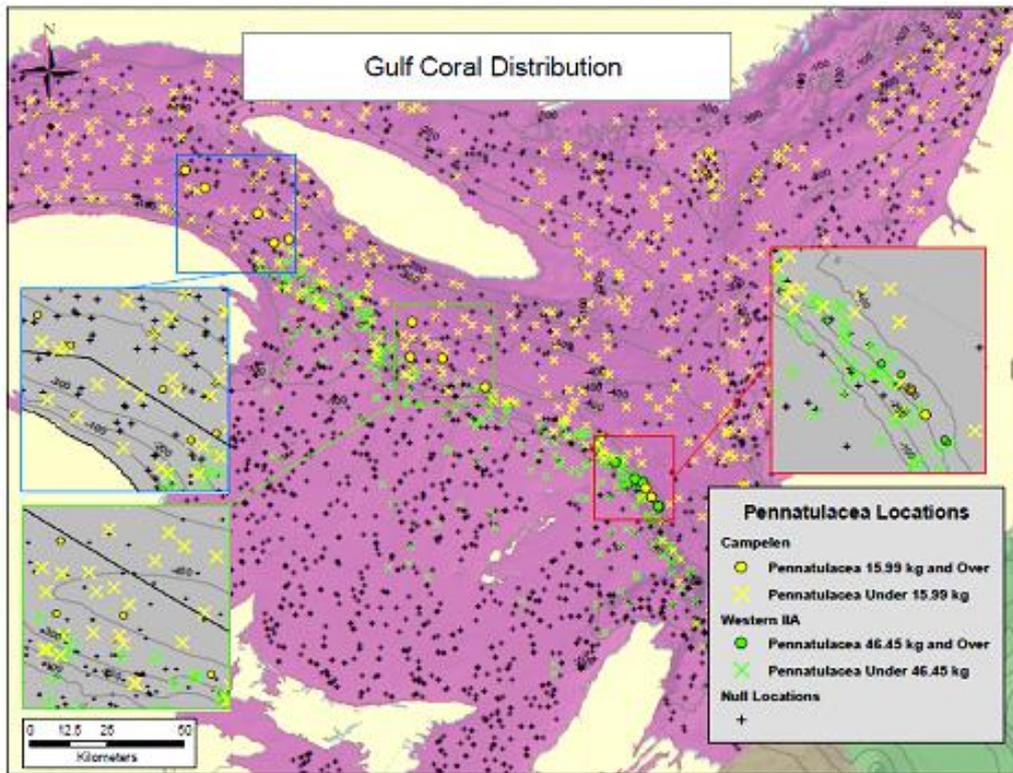


**Figure 17.** Spatial distribution of seven clusters of cells based on 103 habitat descriptors. Source: Dutil et al., 2012.

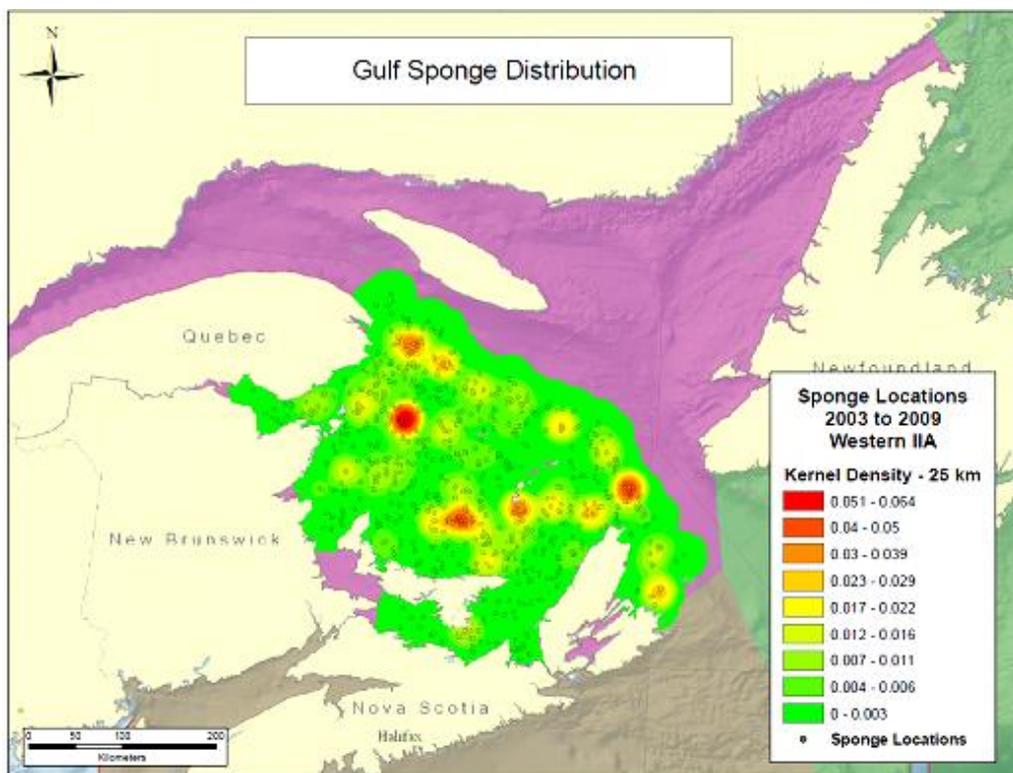


**Figure 18.** Spatial distribution of sand beach, marsh, and mud flat (light blue areas). Within light blue areas, dark areas indicate cells located within 10 km of known eelgrass beds. Source: Dutil *et al.*, 2012.

Corals and sponges are defined as “fish” and “fish habitat” (Campbell and Simms 2009). According to the FPPS, the prohibition against *serious harm to fish* applies to fish and fish habitat that are part of or support commercial, recreational or Aboriginal fisheries. Section 35 of the *Fisheries Act* prohibits *serious harm to fish* which is defined in the Act as “the death of fish or any permanent alteration to, or destruction of, fish habitat”. Concentration of corals and sponges on the east coast of Canada have been identified by Kenchington et al., (2010) through spatial analysis of research vessel survey by-catch data following an approach used by the NAFO. As a result, inshore coastal areas of PEI and NS are not considered as a significant area for corals and sponges (Figures 19, 20).



**Figure 19.** Location of significant Pennatulacea locations in the Gulf Biogeographic Zone. Source: Kenchington et al., 2010.



**Figure 20.** Interpolated density distribution ( $\text{kg}/\text{km}^2$ ) of sponges in the SGSL. Data are from 2003-2009. Source: Kenchington et al., 2010.

### **Studies on impact of Gillnets in Habitats**

There have been no studies that have specifically considered the impacts of the herring gillnet fishery on benthic habitats in 16F or other areas of the southern Gulf of St. Lawrence (DFO, personal communication). The existing information on habitat features is available at a coarser scale and the impacts of the fishery are only known generally. There are no logbooks or use of vessel monitoring systems in the fishery. Therefore, finer spatial scale (i.e., sub-fishing area) patterns of fishing are largely unknown, with the exception of one vessel that conducts the local acoustic projects.

In 2010 DFO Science held a national advisory process to examine more generally the habitat and ecosystem impacts of gillnets and other fishing gears (excluding mobile bottom-contacting gears). That process provided general advice on the potential impacts of gillnets, noting how the context of use might affect the impacts:

- The nature of the impact (i.e. what is impacted and in what way)
- The location and scale of the fishery (overall and relative to the location and scale of the ecosystem feature being impacted)
- How the gear is rigged, deployed, and retrieved
- Any additional threats facing the ecosystem feature being impacted by the gear in question.

Dufour and Ouellet (2007) and DFO (2010b) provide a comprehensive analysis of the potential impacts of non-trawl fishing gear in Canada, including pelagic gillnet which is used to fish herring as in the southern Gulf of St. Lawrence. There are three parts of gillnet gear that can interact with benthic habitats: i) the weights or anchors, ii) the leaded rope or footgear, and iii) the net itself. The weights can destroy benthic fauna or re-suspend sediments through retrieving the gillnet. The leaded rope may have some impact on bottom substrates during retrieval or when the gillnet is moved. The mesh could become entangled on bottom habitats with high vertical structure and when the net is retrieved it can cause damage.

The area in which the gear is deployed can exacerbate the impacts of the gear, for example, if the gear is set in areas with high current, poor weather, high vertical heterogeneity or high species diversity. The breaking strength of the lines, ropes and net can also affect the relative impact of the gear on habitats (Fuller 2008, Shester and Micheli 2011). Ropes of greater strength increase the likelihood of damaging entangled biogenic habitat, while weak lines or web increase the possibility of loss leading to entanglement and fouling.

This is more common for demersal gillnets; mid-water and surface gillnets interact little with benthic habitats except when the gear is lost. Furthermore there could be other problems such as diminished availability of water column habitat to pelagic species or species groups (e.g. marine mammals) if an area becomes unusable or undesirable due to the presence of gillnets.

Nevertheless, regarding lost gear, there is no indication in DFO (2010b), and Dufour and Ouellet (2007) that this is an issue with the SGSL herring gillnet fishery. However, mention is made of a fund for retrieval of lost nets on section 4.5.2 as well as in 4.5.4 and 4.5.7.

Finally, the assessment team considered that 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.

#### 4.4.5. Ecosystem

##### Gulf of St. Lawrence Ecosystem

The Gulf of St. Lawrence is similar to an inland sea with a distinct ecosystem, characterized by partial isolation from the North Atlantic, freshwater runoff from the land, and a deep trough running along its depths, seasonal ice, the presence of a cold intermediate layer, shallow depths, and high biological productivity and diversity (DFO 2005). The distinct qualities of physical and biological components of the Gulf combine to create its unique environment.

The Gulf of St. Lawrence is a semi-enclosed sea, covering an area of about  $240 \times 10^3 \text{ km}^2$ , which opens to the Atlantic Ocean through the Cabot Strait and the Strait of Belle Isle (Figure 21). The Laurentian Channel is a long, continuous trough over 300 m deep that runs 1,500 km from the continental shelf in the Atlantic Ocean to where it ends abruptly in the St. Lawrence Estuary at the mouth of Saguenay River near Quebec City. This trough brings deep oceanic waters to the estuary. There are secondary troughs and plateaus such as the Magdalen Shallows, which cover the southern part of the Gulf. The Gulf's submarine topography is considered complex, and strongly affects how water circulates; circulation in the Gulf is generally counter-clockwise.



Figure 21. Physical environment of the Gulf of St. Lawrence. Source: DFO 2005.

The physical environment and the chemical environment including suspended particulate matter, nutrients, oxygen, organic carbon and contaminants in the Gulf of St. Lawrence are studied and well known (DFO 2005, Dufour and Ouellet 2007, Galbraith et al., 2013).

The Gulf comprises a vibrant marine ecosystem with high biodiversity. The main groups and species found in the waters of the Gulf are: phytoplankton, zooplankton, invertebrates, forage fish, large ichthyophagous fish species, birds and marine mammals (DFO 2007c). At the base of any marine ecosystem, there is the phytoplankton. Benthic invertebrates feed on them when they fall to the bottom but zooplankton is almost its only predator. Zooplankton in turn is consumed by small forage fish species, e.g. capelin, sand lance, herring and mackerel. Forage species play a key role in transferring energy from secondary producers (zooplankton) towards fish and other higher trophic

levels. Large ichthyophagous fish species include cod, redfish and flatfish. Overall, cetaceans, seals, cod and redfish are the main predators of forage species while marine birds also feed on them. The benthic community of invertebrates mostly made up of shellfish, molluscs, sea urchins and worms including species such as the northern shrimp and snow crab have an important role in the transfer of energy. Marine mammals, being at the top of the food web, form an unavoidable component in the trophic links in the Gulf.

A multidisciplinary and inter-regional program known as CDEENA (Comparative Dynamics of Exploited Ecosystems in the Northwest Atlantic) originally proposed a comparative analysis of changes in the structure and function of northwest Atlantic shelf ecosystems to determine how these may have affected the productivity of living resources<sup>9</sup>. To this end, CDEENA brought together the expertise of field scientists and modellers to: (1) describe the changes in time and space, (2) identify and fill critical data gaps in the knowledge base, and (3) develop models to investigate ecosystem-level hypotheses (i.e., environmental variation, predation, fishing effects) concerning changes in reproduction, mortality, growth, and feeding of cod and other species. One of these ecosystems was the southern Gulf of St. Lawrence. Mass-balance models have been used to reconstruct trophic flows through the southern Gulf ecosystem before (mid-1980s) and after (mid-1990s) the collapse of the cod stock. The whole-system model of the southern Gulf is divided into 30 functional groups or compartments from phytoplankton and detritus to marine mammals and seabirds, including harvested species of pelagic, demersal, and benthic domains. Details of the input data (biomass, production, consumption, export, and diet composition) for each compartment used in the modelling have been published. The model provides a tool to evaluate the impact of human and environmental factors on the southern Gulf ecosystem.

### **Framework and Policies<sup>9,10</sup>**

Under the Oceans Act and the Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada, DFO is committed to the development of large-scale and local integrated management plans for all of Canada's oceans. This includes implementation by DFO of an Ecosystem Approach to Management (EAM) in all activities for which it has management responsibility. The governance, regulation and management of activities within and surrounding the Atlantic Canadian waters are shared between a wide variety of government departments and agencies involved in, or with an interest in, the use and management of resources within its coastal, estuarine and marine environments. The process is intended to involve all stakeholders. There is a strategy in place that is being implemented and will continue to develop under new national policies.

Canada has developed a Sustainable Fisheries Framework (SFF) which builds on existing fisheries management practices to form a foundation for implementing an ecosystem approach in the management of its fisheries to ensure continued health and productivity while protecting biodiversity and fisheries habitat. The primary goal of the SFF is to ensure that Canada's fisheries are environmentally sustainable, while supporting economic prosperity. It is designed to foster a more rigorous, consistent, and transparent approach to decision making across all key fisheries in Canada. The SFF incorporates existing policies with new and evolving policies using a phased-in approach. It also includes tools to monitor and assess results of conservation and sustainable use in order to identify areas that may need improvement. Overall, the SFF provides the foundation of an ecosystem-based and precautionary approach to fisheries management in Canada.

---

<sup>9</sup> <http://www.dfo-mpo.gc.ca/Library/279943.pdf>

<sup>10</sup> <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm>

The Framework comprises two main elements: (1) conservation and sustainable use policies, and (2) planning and monitoring tools.

The Conservation and Sustainable Use policies incorporate precautionary and ecosystem approaches into fisheries management decisions. These policies include:

- A Fishery Decision-Making Framework Incorporating the Precautionary Approach (April 2009)<sup>11</sup>
- Managing Impacts of Fishing on Benthic Habitat, Communities and Species (April 2009)<sup>12</sup>
- Policy on New Fisheries for Forage Species (April 2009)<sup>13</sup>
- Ecological Risk Assessment Framework for Coldwater Corals and Sponges dominated communities (April 2013)<sup>14</sup>
- Policy on Managing Bycatch (April 2013)<sup>15</sup>
- Guidance on Implementation of the Policy on Managing Bycatch (April 2013)<sup>16</sup>

The implementation process will use adaptive management principles, whereby experience applying the policies to fisheries management will guide future applications. Integrated Fisheries Management Plans (IFMPs) will continue to play a critical role as the primary resource management tool through which the Framework's policies are applied.

Ecosystem Science is the foundation for the science needed to support the integrated management of diverse human activities and is needed to inform departmental policies and management practices. The Ecosystem Science Framework was developing to provide an effective and comprehensive approach for identifying, monitoring, and interpreting trends important to ecosystem sustainability and integrating knowledge about the effects of human activities on ecosystem components<sup>17</sup>. A Five-Year Research Plan (2008-2013) has been developed to support the ecosystem science through its 20 components and their connections.

This Research Plan showed how four of the priority areas will be addressed primarily through Ecosystem Research Initiatives (ERIs) that address regional research including: Fish Population and Community Productivity, Habitat and Population Linkages, Climate Change / Variability, Ecosystem Assessment and Management Strategies. Each of the Ecosystem Research Initiatives, Centres of Expertise and the Climate Change Science Initiative are strongly influenced by the Ecosystem Science Framework and will produce new knowledge and improve existing knowledge that will be needed for integrated management and demonstrate a strong commitment to research to our clients and partners. Each ERI will serve as a pilot for DFO's ecosystem-based approach by focusing on regional research priorities. This will allow integrated research on a particular ecosystem with predefined geographical boundaries and the knowledge gained from large-scale ecosystem studies will allow the development and testing of tools required to manage human activities within our aquatic ecosystems. Before we can begin to understand how human activities might impact ecosystem components we need to first understand how ecosystems function and how they respond to drivers or perturbations. Thus, the general themes within each ERI include: 1) understanding ecosystem processes, 2) understanding the impacts of climate variability, and 3) developing tools for ecosystem-based management. The Ecosystem Research Initiatives focused on seven geographically-distinct areas including the Gulf of Maine and Northumberland Strait (White et al., 2013).

---

<sup>11</sup> <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm>

<sup>12</sup> <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/benthi-eng.htm>

<sup>13</sup> <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/forage-eng.htm>

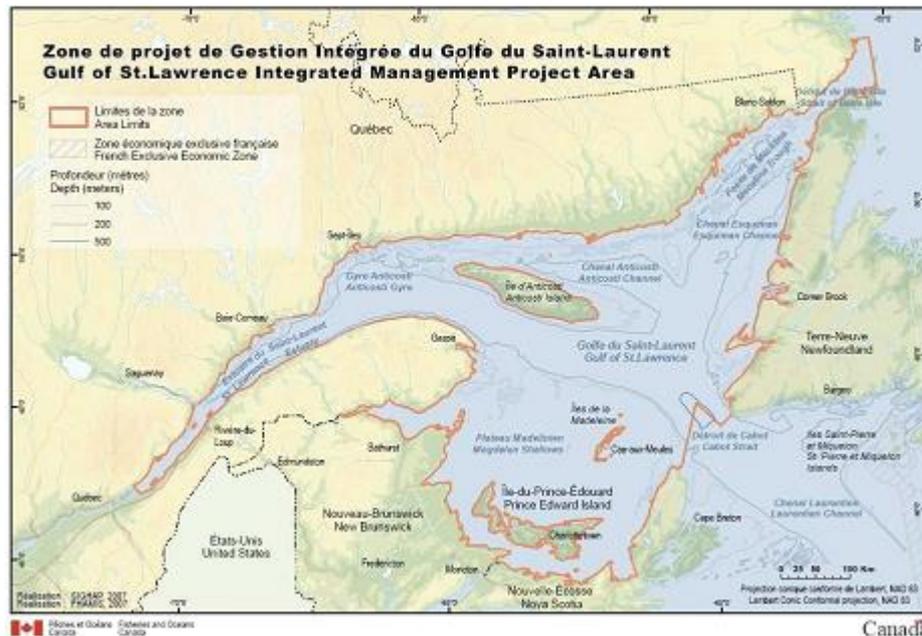
<sup>14</sup> <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/risk-ecolo-risque-eng.htm>

<sup>15</sup> <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/bycatch-policy-prise-access-eng.htm>

<sup>16</sup> <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/bycatch-guide-prise-access-eng.htm>

<sup>17</sup> <http://www.dfo-mpo.gc.ca/science/publications/fiveyear-plan-quinquennal/index-eng.html>

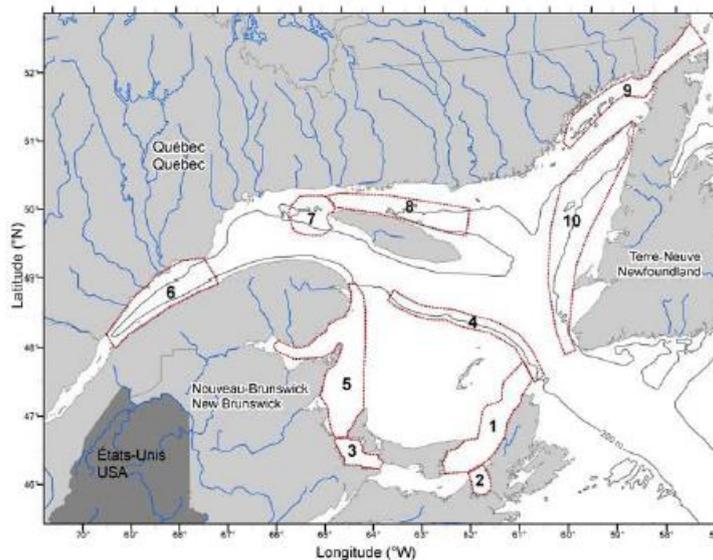
As a result of the wide variety of anthropogenic impacts, the Estuary and Gulf of St Lawrence and the Gulf of Maine were recognized as a Large Ocean Management Areas (LOMA) that required action by the Government of Canada under the *Ocean Act* to ensure the sustainable development of its human uses. In 2000, The Gulf of St. Lawrence Integrated Management (GOSLIM) project was thus created to develop and implement a management plan for ocean resources in the Gulf (Figure 22). The initial goal of GOSLIM was to describe the Gulf of St. Lawrence ecosystem and to identify activities and issues from a broad Gulf-wide perspective. Tools used to manage the Gulf of St. Lawrence include Ecosystem Overview Assessment Reports (Dufour and Ouellet 2007), identification of Ecologically and Biologically Significant Areas (EBSAs), seabed mapping, and development of ecosystem objectives (DFO 2005).



**Figure 22.** Map of the Gulf of St Lawrence illustrating the GOSLIM project. Source: Dufour and Ouellet 2007.

As part of an Ecosystem Approach to Management (EAM) in the Gulf of St. Lawrence, DFO has identified Ecologically and Biologically Significant Areas (EBSAs) which are used to manage the impacts of fishing gear (DFO, 2007b; Therrien et al., 2001). Given the limited impacts of gillnets on the benthic habitat, there have not been actions on development of a habitat management strategy to manage this aspect of the fishery.

As part of EAM efforts which were initiated in response to the 2003 Canada Oceans Act, DFO proposed national guidelines to identify Ecologically and Biologically Significant Areas (EBSAs) in each ecoregion of Canada's three oceans (DFO, 2004). Ecologically and Biologically Significant Areas (EBSAs) for the Gulf of St. Lawrence were identified in 2007 based on biodiversity patterns analysis of primary productivity, zooplankton, meroplankton, ichthyoplankton, benthic invertebrates, demersal and pelagic fish, mammals around the region and patterns in oceanographic conditions (DFO 2007 Dutil et al., 2011, Dutil et al., 2012, Dutil 2013, ). Several workshops (DFO, 2006c) were done to identify EBSAs in the Gulf. The workshops identified 10 EBSAs in the Gulf (Figure 23; DFO, 2007b). There are only (2) that are within HFA 16F, the area of the fishery under assessment. (Figure 23).



**Figure 23.** EBSA distribution in the Estuary and Gulf of Saint Lawrence: EBSA (1) western Cape Breton, (2) St. George's Bay, (3) Northumberland Strait, (4) the southern fringe of the Laurentian Channel, (5) the south-western coast of the Gulf, (6) the lower estuary, (7) western Anticosti Island, (8) northern Anticosti Island, (9) the Strait of Belle Isle, (10) the west coast of Newfoundland (from DFO 2007b).

Information on the physical and oceanographic habitat is available at the scale of 100 km<sup>2</sup> in Dutil et al., (2011) and 6.25 km<sup>2</sup> in Dutil et al., (2012). This information is also summarized in Dutil et al., (2013) along with a summary of spatial patterns in biodiversity as measured using data from annual multispecies trawl surveys. Post-season questionnaires provide some information on the amount of gear used and fishing effort at a very coarse scale

DFO has many tools for protecting habitats and ecological areas, and adheres to federal policies and practices of good risk management and application of precaution. Identifying Ecologically and Biologically Significant Areas is not a general strategy for protecting all habitats and marine communities that have some ecological significance. Rather, it is a tool for calling attention to an area that has particularly high ecological or biological significance, to facilitate provision of a greater-than-usual degree of risk aversion in management of activities in areas of especially high ecological and biological significance (DFO 2004).

A Five-Year Research Plan (2008-2013) has been developed by DFO<sup>18</sup>. This plan provides a rationale for what research is conducted in support of priority areas, especially ecosystem-based management, and how this research will be delivered to ensure federal and departmental priorities are addressed while accounting for regional differences. The plan articulates how DFO Science will address research in support of priorities over the next five years, using the newly developed Ecosystem Research Initiatives, Climate Change Science Initiative and Centres of Expertise. The Research Plan will show how four of the priority areas will be addressed primarily through Ecosystem Research Initiatives (ERIs) that address regional research priorities including: Fish Population and Community Productivity, Habitat and Population Linkages, Climate Change Variability, Ecosystem Assessment and Management Strategies. The remaining six priority areas will be addressed primarily by national Centres of Expertise (COEs) including: Aquatic Invasive Species, Aquatic Animal Health,

<sup>18</sup> <http://www.dfo-mpo.gc.ca/science/publications/fiveyear-plan-quinquennial/index-eng.html>

Sustainability of Aquaculture, Ecosystem Effects of Energy Production, Operational Oceanography, and Emerging and Enabling Technologies for Regulatory and Policy Responsibilities.

There is ongoing monitoring from an inshore bottom-trawl survey of the Northumberland Strait conducted each July/August and an annual multispecies bottom-trawl survey of the southern Gulf of St. Lawrence conducted each September. These surveys collect information on physical oceanographic conditions (temperature, salinity, fluorimetry; the September survey also collects: dissolved oxygen, phytoplankton, and local zooplankton data). They also collect information on the abundance and distribution of demersal and pelagic fish and demersal macroinvertebrates that may constitute part of the habitat and/or act as potential indicators of habitat change. The Atlantic Zonal Monitoring Program (AZMP) regularly collects oceanographic data (physical, chemical and biological) at the Shediac Valley fixed station. The AZMP program also conducts a transect survey across the southern Gulf of St. Lawrence.

### **Effects of the SGSL herring fishery on the Southern Gulf of St Lawrence food web**

Studies on changes of the structure and functioning of the southern Gulf of St Lawrence ecosystems during the 1980s and 1990s have been well documented (Morrissette et al., 2009; Savenkoff et al., 2004; 2007). Information on main predators and prey of herring have also been well documented (Savenkoff et al., 2006). Most of the current research in the Gulf ecosystem focus on studies on the groundfish decline and the biological processes explaining the increased natural mortality in these species (Swain and Sinclair, 2000; Swain et al., 2011)

Most of these studies report that from the mid-1980s, till the early 2000s, small and large zooplankton were the main prey of herring. Herring was also among the third most important main prey for all of those periods. Predation mortality was the main cause of herring mortality during the mid-1980s. Large cod and harp seals were the main predators during the mid-1980s while predation and fishing mortality were of similar importance during the mid-1990s. Then, the ecosystem structure changed significantly from one previously dominated by piscivorous groundfish and small-bodied forage species (capelin, herring, and shrimp) to one dominated by small-bodied forage species (e.g., list species). Overfishing displaced large-bodied demersal predators as one of the most important functional groups. Consequently, marine mammals such as seals and whales were left as the top predators of many fish species during the mid-1990s. For this reason predation by marine mammals on fish increased from the mid-1980s to the mid-1990s while predation by large fish on fish decreased. However, this has not been documented for the fishery within the unit of certification (HFA 16F).

### **Impact of SGSL herring gillnet fishery on the Ecosystem**

There is a large amount of literature which describes the undesired effects of fishing on marine ecosystems. Fishing impacts include changes in size composition of target species, impacts on benthic communities, deleterious effects on population levels of non-target species, loss of diversity, disequilibrium of food web and impacts on habitats (Goñi 1998, Pauly et al., 1998).

Fuller et al., (2008) examined the ecological impacts of the most common types of fishing gear used in Canada and assessed the relative severity of these impacts to seafloor habitat and discarded bycatch of target and non-target species. They determined that bottom gillnets have a low impact on the seafloor, a medium to low impact on forage fish, sharks, large pelagics and seabirds, and a low impact on marine mammals.

The assessment team did not identify any concern indicating that the SGSL herring gillnet fishery causes any disruption of the key elements underlying ecosystem structure and function. The main impact of the fishery on target, bycatch and ETP species, and habitat are identified and there is no

indication that the fishery causes disruption to the ecosystem main structure and function. There is a comprehensive assessment of the target species, and information is available to show the negligible impact on retained, bycatch and ETP species. There is no indication that the fishery causes serious or irreversible harm to habitats.

## 4.5. Principle Three: Management System Background

### 4.5.1 The Legal Basis and Scope of the Management System

The Canadian Constitution Act (formerly the British North America Act of 1867) gives the federal government sole authority to legislate in respect of seacoast and inland fisheries. The provincial powers are restricted to those involving property which have devolved into the right to manage fish once it has been landed (i.e., processing) and to manage access in non-tidal waters. Since 1867, the now mature Canadian fisheries management system has been based primarily on the extensive powers contained in what is now the Fisheries Act of Canada. This legislation gives the Minister of Fisheries and Oceans absolute authority to add or change fisheries management measures at any time (Parsons, L.S. 2009). Various fishery management regulations pertaining to fish harvesting operations are made pursuant to that Act; the principal ones being the *Fishery (General) Regulations* and the *Atlantic Fishery Regulations, 1985*. The Coastal Fisheries Protection Act (and the regulations made under it), which apply to the activities of foreign vessels, is the other main source of the Minister's fisheries management powers. The Department's primary legislation also includes the Oceans Act, which, among other things, gives the Minister the lead authority on integrated oceans management and implementing use of the Precautionary Approach (PA) for resource management. The Department is also one of the three responsible authorities under the *Species at Risk Act* (SARA).

Canada is a signatory to the United Nations Convention on Law of the Sea (UNCLOS) as well as the subsequent United Nations Fish Stocks Agreement (UNFA). It has adopted the FAO Code for Responsible Fisheries and assisted the domestic development of the Canadian Code of Conduct for Responsible Fishing operations. The Canadian Code has been ratified by some 60 Canadian fisheries organizations representing 80% of domestic landings<sup>19</sup>. Canada has also supported the four International Plans of Action (IPOA) (on seabirds, sharks, fishing capacity and illegal, unreported and unregulated fishing) that have emerged under the FAO Code.

Canada is a member of several Regional Fisheries Management Organizations (RFMO) around the world, including (but not limited to) the Northwest Atlantic Fisheries Organization (NAFO), the North Pacific Anadromous Fish Commission (NPAFC), the Inter-American Tropical Tuna Commission (IATTC), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the North Atlantic Salmon Conservation Organization (NASCO) and the Western and Central Pacific Fisheries Commission (WCPFC).

Unresolved disputes within the Canadian fisheries management system can be, and have been, taken to the Canadian judicial system for a final decision. The most notable of these over the last two decades have been the "Sparrow", "Marshall" and "Larocque" decisions. The first two established aboriginal rights to fish under specific circumstances and the latter outlawed the use of resource allocations to pay for services provided to, or on behalf of, government without the approval of Parliament. The Minister's power to allocate for reasons other than conservation was also confirmed in another earlier court challenge. In recent years, there have been several other court challenges to specific resource allocation decisions (mainly in the Atlantic crab fisheries) but none have been successful except that in the case of using quota allocations to pay for services

---

<sup>19</sup> [http://www.dfo-mpo.gc.ca/international/media/bk\\_fao-eng.htm](http://www.dfo-mpo.gc.ca/international/media/bk_fao-eng.htm)

("Larocque"). The Fisheries Act has now been amended to permit this type of quota allocation. Otherwise, the Minister's absolute power to make allocation or access decisions cannot be fettered so long as they are made in accordance with the powers conferred by the Fisheries Act. There is provision for an appeal of licensing decisions to independent Regional and Atlantic License Appeal Boards but the Minister is not legally bound to accept recommendations made by them.

The Aboriginal and treaty rights of Canada's First Nations in respect of the fishery are communal in nature and are recognized and affirmed by the Constitution Act, 1982. In 1990, the Supreme Court of Canada's decision in *R. v. Sparrow* affirmed an Aboriginal right to fish for food, social and ceremonial (FSC) purposes and that this right takes priority, after conservation, over other uses of the resource. The Supreme Court also indicated the importance of consulting with Aboriginal groups when their fishing rights might be affected.

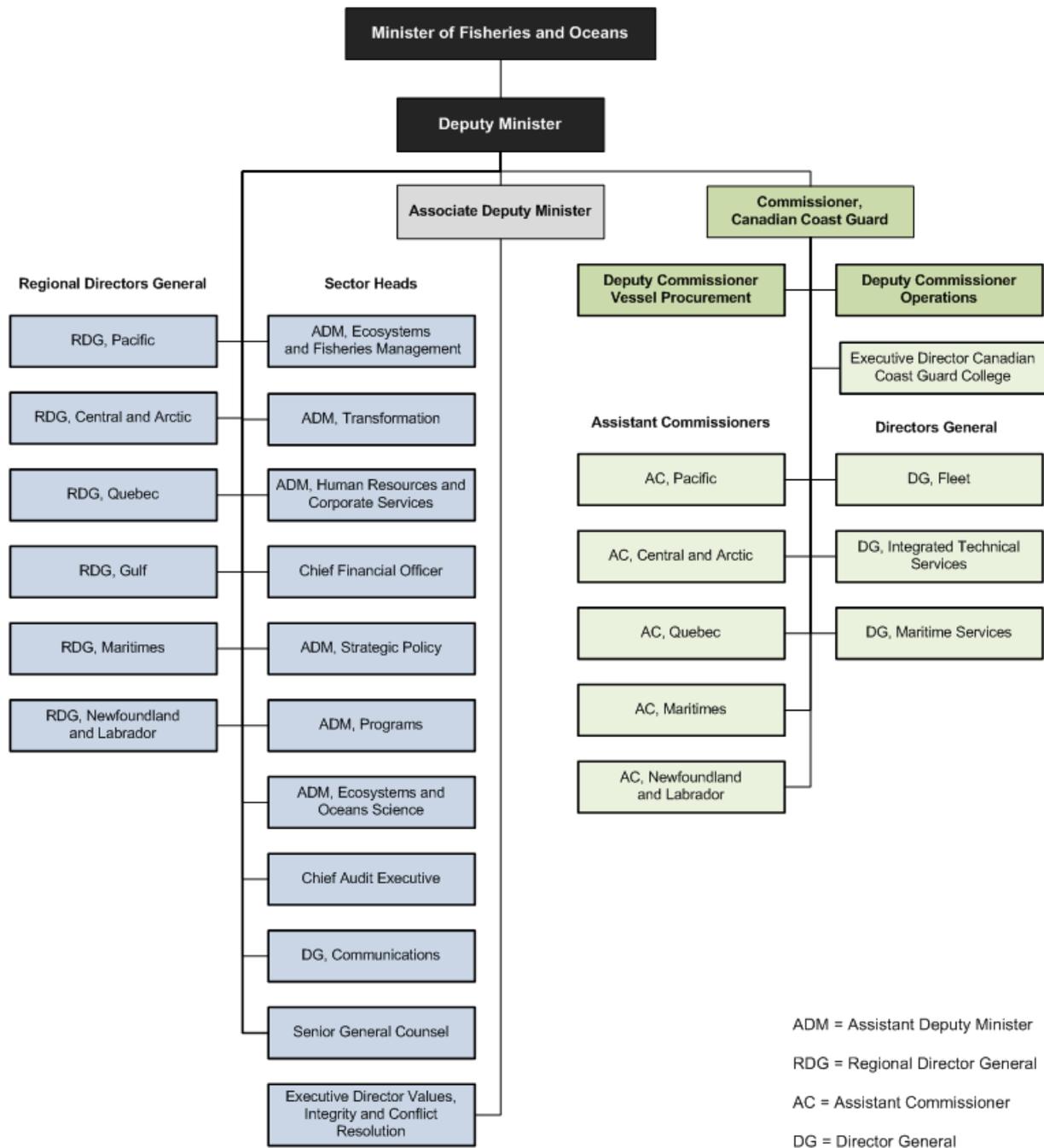
In 1999, the Supreme Court of Canada's decision in *R. v. Marshall* affirmed a treaty right to hunt, fish and gather in pursuit of a "moderate livelihood" arising out of Peace and Friendship Treaties of 1760 and 1761. The decision affected 34 Mi'kmaq and Maliseet First Nations in the Maritimes and the Gaspé region of Québec. As a policy response to the decision, DFO negotiated fishing agreements and undertook a variety of initiatives to support the participation of these First Nations in commercial fisheries.

DFO developed and implemented a national Aboriginal Fisheries Strategy as a framework to manage the fisheries in a manner consistent with the *Sparrow* decision. The objectives of the strategy include to:

- Provide a framework for the management of fishing by Aboriginal groups for food, social and ceremonial purposes.
- Provide Aboriginal groups with an opportunity to participate in the management of fisheries, thereby improving conservation, management and enhancement of the resource.
- Contribute to the economic self-sufficiency of Aboriginal communities.
- Provide a foundation for the development of self-government agreements and treaties.
- Improve the fisheries management skills and capacity of Aboriginal groups.

DFO issues communal FSC licences based on agreements negotiated with the First Nations in which fishery allocations and collaborative management measures are identified. Communal licences are issued in accordance with the provisions of the Aboriginal Communal Fishing Licences Regulations. Aboriginal participation in the commercial fishery is communal in nature; licences are issued to a First Nation who then designates the persons and vessels authorized to fish the licences. Management measures for the communal commercial fisheries are similar to those in effect for the non-aboriginal commercial fisheries. First Nations and other Aboriginal Organizations are invited to participate in DFO's various advisory committees and consultation processes.

Organizationally, the department's headquarters is located in Ottawa. With few exceptions, the department's programs and services are structured around functional "sectors" with corresponding accountabilities and authorities. Many of the programs and services are decentralized and administered in administrative Regions. The organizational structure of the department is outlined at Figure below. National objectives, policies, procedures, and standards for the Department and the Canadian Coast Guard are established at national headquarters. Regions are responsible for delivering programs and activities in accordance with national and regional priorities and within prescribed national performance parameters.



**Figure 23.** Department of Fisheries and Oceans Canada.

For the purpose of this fishery assessment, the fall herring fishery in Herring Fishing Area (HFA) 16F (Unit of Certification) is part of the fishery on the overall 4T herring stock. This is managed by DFO's Gulf Region in conjunction with the Quebec and Newfoundland Regions. There is a First Nations' component in this fishery. There is also a small bait fishery under bait licences but no recreational fishery.

#### 4.5.2 Consultation Processes

The Gulf Small Pelagics Advisory Committee (GSPAC) is the vehicle for consultations on the 4T herring fishery. It met annually until 2014 and will now meet every two years. This advisory committee is composed of DFO Regional officials (including a DFO Science representative), provincial government officials, fish harvesters from various fleet sectors, processors and First Nations. Notice of advisory committee meetings are sent to committee members in advance with a proposed agenda. Meeting minutes are prepared by DFO, Gulf Region and circulated to members (DFO 2014b). They are usually reviewed and adopted at the next committee meeting.

While the most current stock assessment information is discussed at the GSPAC meeting, it is usually preceded by DFO Science's Regional Advisory Process (RAP) sessions on the herring assessment. The 4T herring Science Advisory Reports and Research Documents are published later by the Canadian Science Advisory Secretariat (CSAC) and are available on its website <http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm>.

There is also a local advisory committee at the HFA 16F level that meets before the herring fisheries begin. This meeting is chaired by DFO's Chief, Resource Management, Eastern Gulf Nova Scotia. This committee membership consists of DFO area personnel, local harvesters groups, processors, provincial governments and First Nations. All members are notified by email of the time and place of the meeting and are invited to provide agenda items. These meetings normally review the previous year's fishery in terms of operational outcomes such as catches versus quota, enforcement activities, specific problems or issues with management measures or requirements. The management measures that will be in place for the upcoming fisheries are reviewed in some detail, especially in terms of opening date and time, daily and weekly closed times and daily trip limits. These and other measures constitute the Conservation Harvesting Plan for HFA 16F (DFO 2014c) which is formally issued in a 4T Notice to Harvesters (DFO 2014d) for each year. Minutes are prepared by DFO Area staff and circulated to members for review.

There is also an active harvesters organization for HFA 16F, the Gulf Nova Scotia Herring Federation that provides internal coordination to the operation of the fall herring fishery. This group works closely with DFO in monitoring the HF 16F quota; this is especially so when the landings reaches the 90-95 % level of the quota. Internal discussions then take place to decide on the length of the final fishing period and an adjusted trip limit if that is considered necessary. The aim is to avoid fleet quota over-runs because they are deducted from next year's quota in all HFAs of the SGSL. This harvesters group also has an arrangement in place so that any over-runs of the daily trip limits are sold but paid into a fund administered by the Federation to remove lost nets and to improve management of HF 16F herring.

The roles and responsibilities of all stakeholders in 4T and HF 16F appear to be adequately understood in terms of the regional advisory process (RAP) and the advisory committee process as well as in the annual decision-making. There were no IFMP for this fishery at the time of the fishery, which is where such roles and responsibilities are normally described. However the roles and responsibilities of the stakeholders can be found on the GSPAC's Terms of references (ToRs). The GSPAC has been burdened with resource allocation issues for quite some time. While these originally focused on seiner versus fixed gear allocations they still continue in the context of local (HFA) quota sharing. A small pelagics working group (SPWG) has been established in an effort to focus analysis on specific issues and possible solutions that might in turn find general agreement amongst the broader regional committee membership for application in 4T. The extent to which this approach has been successful so far is unclear.

### 4.5.3 Long Term Objectives

The Department of Fisheries and Oceans has the lead federal role in managing Canada's fisheries and safeguarding its waters. As such it:

- supports strong economic growth in our marine and fisheries sectors by supporting exports and advancing safe maritime trade;
- supports innovation through research in expanding sectors such as aquaculture and biotechnology; and
- contributes to a clean and healthy environment and sustainable aquatic ecosystems through habitat protection, oceans management, and ecosystems research.

The Department of Fisheries and Oceans, on its Website, describes its Mission as follows (DFO 2013): “Through sound science, forward-looking policy, and operational and service excellence, Fisheries and Oceans Canada employees work collaboratively:

To deliver to Canadians the following outcomes:

- Economically Prosperous Maritime Sectors and Fisheries;
- Sustainable Aquatic Ecosystems;
- Safe and Secure Waters.”

Its Vision is described as being “to advance sustainable aquatic ecosystems and support safe and secure Canadian waters while fostering economic prosperity across maritime sectors and fisheries.”

To achieve Sustainable Fisheries and Aquaculture the Department has developed its Sustainable Fisheries Framework “to provide the basis for ensuring Canadian fisheries are conducted in a manner which supports conservation and sustainable use. It incorporates existing fisheries management policies with new and evolving policies. The framework also includes tools to monitor and assess those initiatives geared towards ensuring an environmentally sustainable fishery, and identifies areas that may need improvement. Overall, the Sustainable Fisheries Framework provides the foundation of an ecosystem-based and precautionary approach to fisheries management in Canada” (DFO 2009.)

The website outlines the Department’s intention to incorporate this approach into all Integrated Fishery Management Plans (IFMPs): “Integrated Fisheries Management Plans identify goals related to conservation, management, enforcement, and science for individual fisheries; and they describe access and allocations among various fish harvesters and fleet areas. The plans also incorporate biological and socio-economic considerations that are factored into harvest decisions. Integrated Fisheries Management Plans are an important reporting tool, and a valuable source of information on a given fishery for fisheries managers, industry, and other resource users. They also include a requirement to conduct a regular review of the fishery against the plan’s objectives. In addition, self-diagnostic tools like the Fishery Checklist (a tool for internal use) can help the Department monitor improvements that support sustainable fisheries, and identify areas of weakness that require further work” (DFO 2009). This indicates a clear national intention to orient fisheries management practices and activities so that decisions are made in accordance with the precautionary approach and ecosystem-based management principles.

The aforementioned mission is supported by long-term strategic objectives which constitute DFO’s Fisheries Renewal Initiative DFO (2013b). These objectives include:

- Long-Term Stability – enabling DFO and resource users to achieve strong conservation outcomes through risk management frameworks incorporating the ecosystem and precautionary approaches;
- Economic Prosperity – aligning fisheries policies and decision-making processes to support economically prosperous fisheries for Canadians;

- Improved Governance – increasing stability, transparency and accountability in fisheries management and by promoting shared stewardship.

The Fisheries Renewal Initiative is being implemented through current, renewed and new projects that support DFO's vision of a credible, science-based, affordable and effective fisheries program, which contributes to the sustainable wealth of Canadians.

#### **4.5.4 Incentives for Sustainable Fishing**

The HFA 16F herring fishery is managed through the use of both input and output controls.

Inputs controls are:

- Limited entry licensing,
- Maximum gillnet number (6) and total length (100 fathoms total/15.5 fathoms each),
- Maximum mesh size (66.7 mm)
- Maximum net depth (125 meshes)
- Defined seasonal closed times, (opening date is set in Conservation Harvesting Plan (CHP)).
- Daily and weekly open and closed times (usually no fishing from 1200-1800 daily or on weekends).
- Maximum vessel size (45 ft)

A net tag is required to be attached to all nets fished. All landings must be dockside monitored.

Output controls:

- Trip limits and catch quotas

There are also output controls in the form of a catch quota as well as a limit of one trip daily with a maximum catch limit. Trips below this limit still count as the one daily trip permitted. Almost all of these input and output controls have been developed and refined with a high level of involvement and concurrence by HF 16F harvesters. Most of the individual management measures are included in the conditions of licence issued to each harvester.

The total number of licenses issued in HFA 16F is 408 (including 26 First Nations Communal); about 130-140 are fished in any given fall fishery. Many licences are reported to be held by harvesters in sections of 16F where herring fishing is not a viable option. Such lower level of participation in the 16 F fishery can be attributed primarily by shore price and other more gainful employment opportunities in other economic sectors during the fall fishing season (GNSHF personal communication). There is reported to be little change in the number of licences issued in recent years. These unused licences represent a significant latent fishing effort if they were to be activated (in all of 4T only about 800 of 3,186 fixed gear licences are used annually).

#### **Dockside monitoring**

In addition to the requirement to use a Dockside Monitoring Program (DMP), adherence to the daily catch/trip limit is also encouraged through what is known as the "Special Project". This is an agreement between all HF 16 F fall herring fishers, fish buyers and DFO whereby the daily trip limit is not included in the condition of licence. There is a civil agreement that harvesters are on a daily limit of 15,000 pounds per day. The value of any excess fish is provided by the fish buyers to the Gulf Nova Scotia Herring Federation. The Gulf NS Herring Federation hires a vessel to assist DFO with grappling operations to recover lost nets and gear. It also pays for hiring a boom-truck or crane to secure nets in DFO compound and for crane, trucking and land-fill disposal costs of nets and gear that are seized by DFO staff during these operations from persons unknown. Some of this fund is also used to seek improved management measures for the 16F herring fishery

### **Refinement of HF 16 Quotas**

The Herring Federation has also been lobbying for some years to have the quota allocations by HFA based on individual HFA biomass estimates. They have been conducting self-directed acoustic surveys in the hope they might lead to a biomass estimate for 16F. They feel this is a more objective and conservation-oriented way to allocate shares of the TAC to each HFA instead of the apparently catch based system that has been in use for decades. They argue this would allocate quota shares to where the resource exists year-by-year. They also accept that the 16F share may be decreased under such an approach. At present, there are no plans by DFO to develop and utilize HFA biomass estimates; primarily due to a lack of financial or human resources available to the Region to undertake this task. There are no direct financial subsidies available to the herring fishery in 16F.

### **4.5.5 Fishery Specific Objectives**

Until the IFMP for the 4T Herring was approved in January 2015 there had been no formal written objectives specific to the 4T or 16F herring fishery. Certain implied objectives could be found in the various management measures that are applied to the fall herring fishery in 16F. These include stock conservation and resource stewardship through the measures to ensure the quota allocation is not exceeded. These measures also imply improving the socio-economic conditions of the fishery through the measures used to control fishing effort and to ensure an opportunity to share the quota allocation more widely through daily and weekly closed times and trip limits.

The new IFMP that has been recently approved contains statements of short, medium and long-term objectives under the heading of Stock Conservation. As well, long and short-term objectives are outlined for Ecosystem, Stewardship, Socio-economic and Compliance. These statements of objectives apply to the overall 4T herring fishery management plan. They would be applicable by inference to 16F although they may not capture directly the specific local area objectives that are in play in the HFA. Presumably the annual CHP plans for that HFA will continue to maintain the implicit objectives that are behind the management measures adopted and designed by 16F harvesters.

### **4.5.6 Decision-Making Process**

There is an annual recurring fishery management cycle for all species that are managed by quota allocations and/or annual fishery management plans on the Canadian Atlantic Coast. Data are collected through fishing log books, purchase slips, by port samplers, offshore observers and dockside monitors while the fishery is in operation. Habitat and ecosystem information is also collected and compiled. Annual research vessel surveys are conducted to provide fishery-independent data. After the fishery has closed and once all data are compiled, the Science Advisory Report (SAR) document is prepared, peer-reviewed and shared and discussed with industry before final advice is developed. The SAR is prepared immediately following the Regional Advisory Process (RAP). All participants have an opportunity to comment on the SAR while it is in draft, but after it is finalized, the SAR represents the final science advice as based on the best scientifically available data..

In some areas or fleets within 4T, internal consultations may take place at the HFA level to discuss and reach consensus on local management measures for the upcoming season before the Gulf Small Pelagics Advisory Committee (GSPAC) meets. Based on the outcome of the GSPAC meeting a briefing memo on 4T herring for DFO Headquarters (and the Minister) is prepared by the Regional Director-General (RDG), Gulf Region outlining the issues and the recommended management measures for the upcoming fishing season. This advisory memo is vetted with the RDGs of Quebec and Newfoundland Regions. When decisions are made by the Minister, the industry is notified

through a Notice to Harvesters (DFO 2014d) and the final management decisions for the fishing year are posted on the DFO website<sup>20</sup>.

There is now a longstanding Canadian Atlantic fisheries management decision-making process of which 16F herring industry members and others are well aware and appear to function comfortably within.

#### **4.5.7 Monitoring, Control and Surveillance**

Comprehensive monitoring, control and surveillance of the 16F fall herring fishery is conducted by the Pictou Conservation and Protection Detachment. Access and effort is regulated through limited fishing area licenses, seasons, daily and weekly closed times and a trip limit, an area quota as well as minimum and maximum gear specifications. The fishery is monitored by at sea patrols, land inspections and occasional air surveillance. The fishery is 100% dockside monitored and each vessel gets a copy of the offload Tally Sheet completed by the monitor for every offload. The Dockside Monitoring Company then enters the information from the Tally Sheets into the DFO system daily.

A particular emphasis is placed on retrieval of lost gillnets; harvesters and DFO cooperate in conducting removal efforts. Harvesters pay for some of the costs of these removal and disposal efforts. All unidentified (untagged) nets are disposed of.

The system of paying the proceeds of trip limit overruns into a fund for recovering lost nets and improving HF 16F herring management measures was referenced earlier. In addition to improving management measures through this system self-compliance by the stakeholders is promoted as it removes the possibility of individual harvesters benefiting from exceeding the trip limit or setting nets that exceed the authorized dimensions or number

The specific measures used to achieve compliance with the management measures for this fishery are:

- Sea patrols, both day and night
- At-Sea gear checks, both day and night
- At-Sea vessel boardings, both day and night
- Dockside vessel checks during off-loads
- Dockside gear checks for mesh size, net length, etc
- Monitoring herring off-loads at dockside
- Monitoring dockside monitor activities during off-loads
- Periodic audits of dockside monitors' performance during off-loads
- Stake-outs at off-loads sites, checking for unmonitored fish being landed
- Investigations initiated through complaints and Intel
- Properly securing seized items

No official concerns over the level of compliance or the degree of deterrents achieved in this fishery were expressed to, or detected by, the Assessment Team. The level of rapport with harvesters in the HF 16F fishery appears high as does the apparent level of cooperation between industry and Enforcement personnel. This is a very short and intense seasonal fishery (about two weeks in total) that appears to benefit from this cooperative approach in that quotas are generally adhered to and orderly fishing occurs in the short daily open times (18 hours).

---

<sup>20</sup> <http://www.dfo-mpo.gc.ca/decisions/fm-2014-gp/atl-006-eng.htm>

**Table 5. 2011-2013 Violation Types and Actions Taken (Herring Fishing Area 16F)**

<b>HFA 16F</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<b>CHARGES LAID</b>	0	2	2
Assault / Obstruct	0	0	0
Illegal Buy/ Sell/ Possess	0	0	0
Registration / Licence	0	2	2
Species/Size limit	0	0	0
Area / Time	0	0	0
Illegal Gear	0	0	0
Other Legislation	0	0	0
Inspection	0	0	0
Gear Conflict	0	0	0
<b>CHARGES PENDING</b>	0	0	0
Illegal Gear	0	0	0
Illegal Sale/ Possess	0	0	0
<b>SEIZURE(S) – PERSONS UNKNOWN</b>	<b>65</b>	<b>52</b>	<b>28</b>

The only charges found in the last three years have been for not having license/registration documents on board when checked. The Seizures from Persons Unknown are lost gillnets that were removed and disposed of.

**Table 6. C&P Enforcement activities - Herring Fishery 2011-2013 Seasons (Herring Fishing Area 16F)**

<b>Enforcement Activity (HFA 16F)</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Total Patrol	112	91	73
Total Patrol Hours	462	285	196
Total Fishery Officer Hours (on patrol)	464	288	200
Total Fishery Officer Effort (hrs)	514	327	238
Vessels Checked	448	537	273
Vehicles Checked	2	0	0
Persons Checked	453	243	168
Gear Checked	61	72	112
Sites Checked	196	193	143

The data shown above indicate general declining levels of enforcement resources being applied to this fishery. However, the number of occurrences (violations detected) and the number of charges laid appears to remain very low.

There is no known analysis of the 16F fall herring enforcement efforts that would substantiate a conclusion that any form of serious and flagrant non-compliance exists in this fishery.

There are several ongoing annual research activities in the 4T area that contribute to the information needs of herring management and which require annual work planning. These include:

- Removals from the stock are quantified through catch (landings) data collected from 100% coverage through dockside monitoring at the point of landing and some bycatch from the mackerel fishery.
- Environmental/ecological monitoring is carried out during standardized bottom-trawl surveys and as part of the Atlantic Zonal Monitoring Program (AZMP).
- Diets of cod, a main predator, are collected irregularly as part of ongoing seasonal and inter-annual cod condition monitoring.
- An age-disaggregated gillnet catch rate (CPUE) index is based on data of fishery catches combined with effort information (number of nets and hauls) derived from dockside monitoring data and a telephone survey of about 25% of the active gillnet fishers.
- An age-disaggregated juvenile abundance index for ages 2 and 3 from the annual 4T herring acoustic survey of post-spawning aggregations and includes years 1994 to 2013.
- Biological Monitoring for Age and Size sampling.

Acoustic data have been collected by specific herring gillnet fishing vessels on an annual basis since 2012 on five major fall spawning grounds located within the coastal waters of the southern Gulf of St. Lawrence; including Pictou, N.S. (area 16F). For all these fishing areas, nightly biomass estimates, areas of schools and densities observed were derived following a defined protocol. The means of nightly biomass estimates, areas of schools and densities were calculated by area and year. It has not been possible to incorporate these data into the annual stock assessment so far. Moreover, the Gulf Nova Scotia Herring Federation has partnered with DFO Gulf Science in undertaking self-directed nightly acoustic data collections during the fall fishery since the mid-1990s

In March 2014, two assessment models that varied in the assumptions about catchabilities in the fixed gear for ages 4 and 5 were evaluated. There were reliability issues with using the two models for assessing stock status. A major review of the assessment approach will occur in April 2015, including data inputs and alternate model formulations that could incorporate changes in natural mortality, changes in catchability, and proportionality of indices.

There is no formal documented research plan. Research objectives are discussed during the peer review process and during the Gulf Small Pelagics Advisory consultative committee meetings. Research priorities to date tend to be focussed on providing, and improving the provision of, stock status advice. The herring research section in the Gulf Region consists of one scientist, occasionally supplemented by term staff.

#### **4.5.8 Monitoring and Evaluation of the Herring Management System**

The Gulf Region conducts post-season operational reviews of its annual herring Conservation and Protection (C&P) initiatives internally and also in conjunction with industry members through local advisory committees.

The general view of fishery management personnel is that the annual fishery advisory and Regional Advisory Process (RAP) sessions constitute an external review of fishery management measures as both industry and non-industry members participate and that this meets the need for real-time, in-season, annual and overall management system reviews.

The Canadian Auditor General has the mandate to, and does, review the management of fisheries on an ad-hoc basis and publishes the results. The Parliament of Canada has two Committees pertaining to Fisheries and Oceans: the Standing Committee on Fisheries and Oceans of the House of Commons and the Standing Senate Committee on Fisheries and Oceans of the Senate. These standing committees regularly examine various aspects of fishery management in Canada and prepare public reports on findings and conclusions.

The DFO Internal Checklist is divided into three sections including target stock information, habitats/ecosystems and management systems. This checklist has been adopted and used internally by DFO as a tool to measure effectiveness of all fishery management systems (DFO 2009). However, results of these reviews generally are not available.

The herring stock assessment is reviewed as part of the Canadian Science Advisory Secretariat Regional Advisory Processes. Participants are all expected to contribute to and review the science data and analysis that is presented. Participants include DFO scientists from the Gulf and other regions, scientists from outside DFO (when possible), industry participants and DFO fishery managers.

## 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.

Although the NAFO Division 4R Atlantic herring purse fishery has been recently certified (October 2014), there is no need to harmonize as they are separate stocks within different management units and gear types (Stephenson et al 2009). Division 4R herring is considered one single stock. It is based on the assumption that the population dynamics of 4R herring are different from those of herring elsewhere in Atlantic Canada as described by Stephenson et al (2009). Thus, there are no existing overlapping fisheries for this fishery.

### 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:

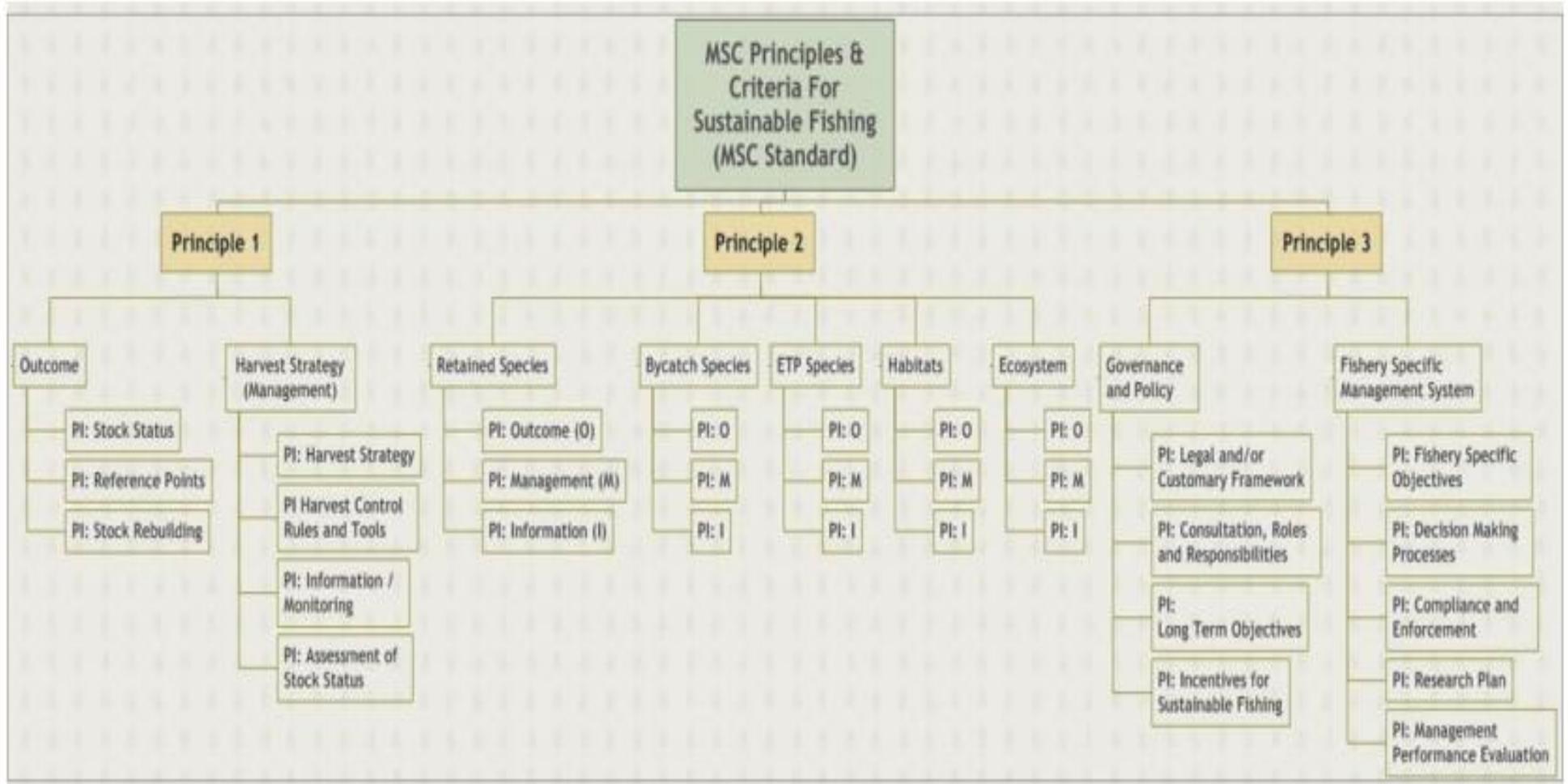
2. demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions 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:

1. 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;
2. implement appropriate fishing methods designed to minimize adverse impacts on habitat, especially in critical and sensitive zones such as spawning and nursery areas;
3. not use destructive fishing practices such as fishing with poisons or explosives;
4. minimize operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.;
5. be conducted in compliance with the fishery management system and all legal and administrative requirements; and
6. 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.

<b>MSC Current Scheme Documents</b>	<b>Version</b>
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 Moncton, New Brunswick and Stellarton, Nova Scotia in November 2014. The objectives of the consultation meetings were to provide information and understanding of the activities of the Certification A Body (CAB) and to discuss the fishery management organizational roles in the management of the SGSL 16F Fall herring gillnet fishery resources. The consultation meetings were designed to be inclusive of all organizations and representatives of the Gulf Nova Scotia and eastern Prince Edward Island. Moreover, a detailed consultation agenda and questionnaire were 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 Moncton, NB and Stellarton, NS and are recorded in Tables 7 and 8.

### 5.4.2 Consultations

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

**Table 7** Stakeholder consultation process.

Date	Purpose	Media
26/08/2014	Fishery Enters Full Assessment	Notification on MSC website Direct email/letter
26/08/2014	Assessment Team Nomination	Notification on MSC website
16/09/2014	Assessment Team Confirmation	Notification on MSC website
25/09/2014	Default Assessment Tree	Notification on MSC website
30/09/2014	Site Visit Scheduled	Notification on MSC website Direct email/letter
02/04/ 2015	Variation request: exemption from IPI requirements	Notification on MSC website Direct email/letter
02/04/ 2015	Variation response: exemption from IPI requirements	Notification on MSC website Direct email/letter
16/04/2015	Stakeholder Notification: Revised Timeline	Notification on MSC website Direct email/letter
16/04/ 2015	Revised Timeline	Notification on MSC website Direct email/letter
07/05/2015	Stakeholder Notification: Peer reviewers proposed	Notification on MSC website Direct email/letter

19/05/ 2015	Stakeholder Notification: Peer reviewers confirmed	Notification on MSC website Direct email/letter
25/06/ 2015	Stakeholder Notification: Revised timeline	Notification on MSC website Direct email/letter
25/06/2015	Revised Timeline	Notification on MSC website Direct email/letter
09/07/2015	PCDR Published	Notification on MSC website Direct email/letter
06/10/2015	Stakeholder Notification: Final report and Determination	Notification on MSC website Direct email/letter
05/11/2015	PCR and certificate issued	

Table 8. Summary of consultation meetings during the November 2014 site visit.

Name Organization	Present at Meetings	Location	Meeting Type	Date
<b>Fisheries and Oceans, Canada</b> Moncton NB	SAI Global Assessment team; Robert Allain, Client Representative; DFO representatives Manon Mallet Tony Gaudet Pierre Mallet Camille Poirier Carole Godin Leroy MacEachern Hughes Benoit Claude LeBlanc Ray Maclsaac	DFO Offices: Gulf region Moncton, NB	Meeting	05/11/14
<b>Gulf Nova Scotia Herring Federation</b>	SAI Global Assessment team; Robert Allain, Client Representative;  Gulf Nova Scotia Herring Federation Executive Board Members: B. Thompson K. Thompson D. Clements T. MacInnis P. Lynds	Museum Of Industry  Stellarton, NS	Meeting	06/11/14
Name Organization	Present at Meetings	Location	Meeting Type	Date
<b>Fisheries and Oceans, Canada</b> Moncton NB	SAI Global Assessment team; Robert Allain, Client Representative; DFO representatives Manon Mallet Tony Gaudet Pierre Mallet	DFO Offices: Gulf region Moncton, NB	Meeting	05/11/14

	Camille Poirier Carole Godin Leroy MacEachern Hughes Benoit Claude LeBlanc Ray MacIsaac			
<b>Gulf Nova Scotia Herring Federation</b>	SAI Global Assessment team; Robert Allain, Client Representative;  Gulf Nova Scotia Herring Federation Executive Board Members: B. Thompson K. Thompson D. Clements T. MacInnis P. Lynds	Museum Of Industry  Stellarton, NS	Meeting	06/11/14

### 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<sup>21</sup> 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

<sup>21</sup> Scoring issues: The different parts of a single scoring guidepost, where more than one part exist covering related but different topics.

of scores achieved by the individual scoring issues (the a to i list below):

- a) Score = 60: all issues meet SG60, and only SG60. Any scoring issues within a PI which fails to reach SG60, represents a failure against the MSC standard and no score shall be assigned.
- b) 65: all issues meet SG60; a few achieve higher performance, at or exceeding SG80, but most do not meet SG80.
- c) 70: all issues meet SG60; some achieve higher performance, at or exceeding SG80, but some do not meet SG80 and require intervention action to ensure they get there.
- d) 75: all issues meet SG60; most achieve higher performance, at or exceeding SG80; only a few fail to achieve SG80 and require intervention action.
- e) 80: all issues meet SG80.
- f) 85: all issues meet SG80; a few achieve higher performance, but most do not meet SG100.
- g) 90: all issues meet SG80; some achieve higher performance at SG100 but some do not.
- h) 95: all issues meet SG80; most achieve higher performance, at SG100; only a few fail to achieve SG100.
- i) 100: all issues meet SG100

**Table 9.** 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	0.5	0.25	0.333	0.1667
				1.1.2	Reference points	0.5	0.25		
				1.1.3	Stock rebuilding				
		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 groups desire to have the opportunity, if they so wish, to take full advantage of this 6 month period. The date was revised from a previous date to accommodate the identification of any existing herring product from the under assessment fishery and held in frozen storage by supply chain entities that are already certified to the MSC Chain of Custody Programme. This product may become eligible for identification with an MSC claim on eventual certification of the fishery.

In accordance with CR Requirements CR 27.6.1.2.b., the client group has chosen the target eligibility date to be September 1, 2015. The group's rationale is straight-forward: Under these MSC V1.3. guidelines, this date coincides with the start of the fishing season in which the Public Comment Draft Report is published.

### 6.2 Traceability within the Fishery

#### 6.2.1 Introduction

This report deals only with the harvesting of 16 F fall inshore gillnet-caught herring at the point of landing, and not beyond processing which constitutes the first step in the chain-of-custody process. All fall herring harvested by the registered fleet of approximately 400 inshore vessels operating from home ports in Gulf Nova Scotia and Prince Edward Island will be eligible to display the MSC logo; however, only those companies that have a certificate sharing arrangement with the client group, the Gulf Nova Scotia Herring Federation's member associations, may carry the MSC label and claim forward through the MSC chain of custody. At the time of fishery certification, approved companies had not been identified.

#### 6.2.2 Traceability within the fishery

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 herring. The regulatory requirements include a daily trip limit, trip hail-outs and hail-ins, and mandatory third party dockside monitoring of landed catch at designated ports located in Herring Fishing Area 16 F. DFO Fishery Officers randomly verify the work undertaken by the independent dockside monitors to ensure it is carried out in accordance with government standards and DFO's control requirements. During the site visit, DFO's senior Conservation and Protection Supervisor indicated that the monitoring program is highly effective and credible. These requirements would be sufficient to allow a future Chain of Custody to be established from the point of landing forward.

Herring sold to buyers and processors is duly recorded in purchase slips provided at the time of each transaction. The slips include the vessel's and licence holder's name, the date and amount of purchase, and the port of landing. This information is provided to DFO Gulf Region and serves as an effective cross reference against the information collected from the dockside monitoring operations.

#### At-sea Processing and Transshipment

Herring harvested in this fishery are landed iced and whole, there is no at-sea processing *per se*. The identity of the species therefore can be easily established at point of landing. While not a common practice among the HF 16 F licensed harvesters, occasions do arise where one vessel will transfer fish

from one gillnet to a receiving vessel in order to remain within the established trip limit. The catch must be logged by the receiving vessel in accordance with the regulatory requirements noted previously. Catch transfers are not permitted between Herring Fishing Areas, and fish harvesters have reported that they do not occur.

### **Points of landing**

Vessels are required by licence condition to hail-in before landing their catch at a DFO-designated port. This allows the dockside monitor to be in place before the vessel arrives for offloading. The Dockside Monitoring Company which provides the services is required to comply with strict conditions established by the Federal Government, and their operations are subject to audits as necessary. Calibrated scales are used by the dockside monitors to validate the amount of herring landed. Moreover, DFO Fishery Officers conduct random surveillance activities at offloading sites to ensure the dockside monitors are carrying out their duties in accordance with approved practices.

### **Fishing Operations**

Inshore fishing vessels participating in the 16 F Fall Herring Gillnet Fishery are only permitted to leave port after 6:00 pm local time. They are not permitted to fish after 12:00 pm (noon) the following day and must return to port. During the fishing season, weekend closures are in effect for conservation reasons.

Vessels are not required to hail out upon departure or hail-in before landing their catch. The majority of vessels carry large tubs onboard that can carry approximately 2,000 lbs of herring. The tubs are weighed in a clean state before being placed onboard a vessel, and are weighed immediately upon removal from the vessel with the assistance of a boom truck. No allowance is made for ice and/or water. The difference in weight is what is recorded as landed catch weight by the independent dockside monitor.

The monitors are required to verify the assigned weight of every tub of herring on every landing. Vessels can only land at a port designated in their licence by the Department of Fisheries and Oceans. New port locations may be added and others removed at the request of industry. At this time, the designated ports in Nova Scotia are: Toney River, Caribou, Logan's Point, Lismore, Port Hood and Pictou Landing. On Prince Edward Island, the designated landing ports are: Wood Island, Beach Point, and Machon's Point. All of the currently-designated ports are located in the Unit of Certification - Herring Fishing Area 16 F (CR 27.12.1.6). After each dockside verification (including a check to ensure that the vessel's hold is empty), the monitor issues the fisher with a DMP Number. After the fish is weighed, a buyer issues a Purchase Slip to the licence holder which contains the licence holder's name, date/time of landing, the weight of fish onboard, and the DMP number. Later, a copy of the slip will also be given to the processing plant and to DFO.

### **Onshore Operations (CR 27.6.2.3 v.1)**

Herring from area 16 F is processed into 2 principal products: roe and "splits". The former is sold to the Japanese market, and the latter is sold to a New Brunswick consortium of smokehouses who, in turn, smoke the product for the Caribbean market.

Herring enter a processing facility through a central location where they must be processed quickly to avoid spoilage and subsequent quality issues. In Canada, federal and provincial regulations stipulate how processing operations are to occur, and what traceability standards must be met to insure effective tracking of product should a product recall or a food safety concern arise. Plant inspections are carried out under both regulations and breaches of licence conditions are subject to prosecution and eventual sanctions.

There is no freezing of the raw material for later processing such as, for example, if a plant labour shortage issue was to arise. Again, for traceability purposes, plants are required by law to have functional, in-house tracking systems which allow a product to be traced back to the original harvester, date of landing and sale, and catch area. The tracking system extends to the point of first sale (wharf) where the tubs that are loaded onto a vessel prior to departure are the same that are subsequently weighed upon arrival; i.e. once loaded onto the boom truck the same tubs enter the processing facility for immediate processing.

Production reports are maintained for each “run” including weight of material prior to processing, weight of production by product type, and weight of offal produced (typically for the pet food or mink market).

### **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 herring harvested from the 16 F fishery. 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 fishery.

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 Herring Fishing Area 16 F will be eligible to land MSC-certified herring and any onshore enterprise will be eligible to acquire 16 F herring 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 16 F fall herring fishery 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 and its supporting regulatory requirements and compliance program for HFA 16 F are 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 herring caught outside the 16 F unit of certification, but the reporting and monitoring obligations described previously are considered to be sufficient to discern the origin of the fish caught.

### Entities included in the Fishery Certificate

During the 16 F fall herring fishery, similar fisheries are taking place in other HFAs of the southern Gulf of St. Lawrence, including the coastal waters of New Brunswick, the Gaspé coast of Quebec, and along the coastal waters of Prince Edward Island. A small seiner fishery takes place between Cape Breton and the Magdalen Islands under a separate management regime and quota. None of these other fisheries is being assessed presently against the MSC Standard.

On successful MSC certification of GNSHF, the following members (Table 10) will be MSC-certified as a sustainable and well managed fishery, and products from this fishery would be eligible for the MSC eco-label.

**Table 10.** Number of eligible vessels by homeport (date 15/08/2014).  
Homeports are Prince Edward Island (PE) and Gulf Nova Scotia (NS)

Count of Licence Id		Species Description		
Homeport Prov	Fishing Area	Participant Category	HERRING	Grand Total
NS	16F	ABORIGINAL ORGANIZATIONS	26	26
		CORE	10	10
		INDEPENDENT CORE	353	353
		NON-CORE	3	3
		<b>16F Total</b>	<b>392</b>	<b>392</b>
<b>NS Total</b>			<b>392</b>	<b>392</b>
PE	16F	INDEPENDENT CORE	16	16
	<b>16F Total</b>		<b>16</b>	<b>16</b>
<b>PE Total</b>			<b>16</b>	<b>16</b>
<b>Grand Total</b>			<b>408</b>	<b>408</b>

## 7. Evaluation Results

The SGSL 16 F Fall Gillnet 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. Score achieved in each Principle and for each Performance Indicator are shown in Table 11 and Table 12, respectively.

Although the assessment team found the UoC in overall compliance, it also found the performance of the SGSL 16 F Fall Gillnet fishery on three PIs ( PI 1.2.2 Harvest Control Rules, PI 2.2.3 By-catch species information and PI 3.2.4 Research Plan) to be below the established compliance mark (Table 11). Therefore, three conditions were attached to the fishery, which must be addressed within a specific timeframe. Full explanation of these conditions is provided in Appendix 1.3. 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

**Table 11.** Final Principle Scores

Final Principle Scores	
Principle	Score
Principle 1 – Target Species	84.4
Principle 2 – Ecosystem	83.7
Principle 3 – Management System	85.5

## 7.2. Summary of Scores

Scores assigned to PIs are shown in Table 12.

**Table 12.** Performance Indicators scoring assigned to the SGSL 16F Fall Herring Gillnet 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	90
				1.1.2	Reference points	0.5	0.25	80
				1.1.3	Stock rebuilding	0.333	0.1667	NA
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125	95
				1.2.2	Harvest control rules & tools	0.25	0.125	70
				1.2.3	Information & monitoring	0.25	0.125	80
				1.2.4	Assessment of stock status	0.25	0.125	90
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667	90
				2.1.2	Management	0.333	0.0667	85
				2.1.3	Information	0.333	0.0667	90
		By-catch species	0.2	2.2.1	Outcome	0.333	0.0667	80
				2.2.2	Management	0.333	0.0667	80
				2.2.3	Information	0.333	0.0667	75
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667	80
				2.3.2	Management	0.333	0.0667	85
				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	85
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667	100
				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	85
				3.1.3	Long term objectives	0.25	0.125	90
				3.1.4	Incentives for sustainable fishing	0.25	0.125	90
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1	80
				3.2.2	Decision making processes	0.2	0.1	80
				3.2.3	Compliance & enforcement	0.2	0.1	95
				3.2.4	Research plan	0.2	0.1	70
				3.2.5	Management performance evaluation	0.2	0.1	80

### 7.3. Summary of Conditions

**Table 13.** Summary of Conditions

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y/N/N/A)
1	The client must provide documented evidence of implementation of well-defined harvest control rules that reduce exploitation rates as the limit reference point is approached.	1.2.2	N
2	The client is required to ensure that sufficient data continue to be collected to detect any increase in risk to main by-catch species.	2.2.3	N
3	The client must provide documented evidence a research plan has been developed that provides the management system with a strategic approach to research and collection of reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2 in respect of the SGSL Fall herring fishery.	3.2.4	N

### 7.4. Certification Recommendation

On completion of the assessment and scoring process, the assessment team has recommended that the SGSL 16F Herring Gillnet Fishery is eligible to be certified according to the MSC Principles and Criteria for Sustainable Fishing.

### 7.5. Determination, Formal Conclusion and Agreement

*The Certification Committee of SAI Global has determined that:*

- **The Southern Gulf of St Lawrence Fall Herring Gillnet Fishery** is to be awarded certification to the Marine Stewardship Council Sustainable Fishing Standard.

SAI Global hereby publicly announces its intention to certify the Fishery Unit and upon issue of a certificate, the client shall have the right to claim the fishery as a “well managed and sustainable fishery” in accordance with the MSC Principles and Criteria for Sustainable Fishing. Fishery material thereof is deemed eligible for entry the MSC Chain of Custody according to requirements.

## References

- Cadigan N. G. and P.J. Farell. 2003. Local Influence Diagnostics for the Retrospective Problem in Sequential Population Analysis. DFO Can. Sci. Advis. Sec. Advis. Res. Doc. 2003/057. i + 43 p.
- Claytor, R.R., G. Nielsen, H.M.C. Dupuis and D.K. Cairns, 1991. Assessment of Atlantic herring in NAFO division 4T, 1990. CAFSAC Res. Doc. 91/66: 74 p
- DFO. 2005. Spawning Stock Biomass Reference Points for Southern Gulf of St. Lawrence Herring. DFO Can. Sci. Advis. Sec. Advis. Rep. 2005/070.
- DFO. 2006. A harvest strategy compliant with the precautionary approach. Can. Sci. Advis. Sec. Advis. Rep. 2006/023.
- DFO. 2009. "Sustainable Fisheries Framework" @ <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm>
- DFO. 2012. Assessment of Atlantic herring in the southern Gulf of St. Lawrence (NAFO Div. 4T). DFO. Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/014.
- DFO. 2013a. "Vision, Mission, Mandate" @ <http://www.dfo-mpo.gc.ca/us-nous/vision-eng.htm>
- DFO. 2013b Fisheries Renewal: <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/index-eng.htm>
- DFO. 2014a. Assessment of Atlantic herring in the southern Gulf of St. Lawrence (NAFO Div. 4T) to 2013. Can. Sci. Advis. Sec. Advis. Rep. 2014/040.
- DFO. 2014b. Summary of Meeting, Gulf Small Pelagics Advisory Committee, March 8 and 9, 2012. (supplied to assessment team during Site Visit)
- DFO. 2014c. "2014 Fall Herring CHP, HFA 16F", DFO Antigonish Area Office, NS. (supplied to assessment team during Site Visit)
- DFO. 2014d. "Notice to Harvesters-Southern Gulf of St. Lawrence Spring and Fall Herring (Herring Fishing Area 16A-16G and 17)", April 17, 2014 @ <http://www.dfo-mpo.gc.ca/decisions/fm-2014-gp/atl-006-eng.htm>
- DFO. 2014e. "HFA 16F Licence Conditions", (supplied to assessment team during Site Visit)
- DFO. 2014f. "C and P Presentation, Site Visit", (supplied to assessment team during Site Visit)
- DFO. 2014g. "Science Presentation, Site Visit", (supplied to assessment team during Site Visit)
- DFO. 2014h. "Fishery Management Presentation, Site Visit", (supplied to assessment team during Site Visit)
- DFO. 2014i. Herring in the Southern Gulf of St. Lawrence Herring Fishing Areas 16A to 16G. Integrated Fisheries Management Plan DFO Gulf Region November 2014.
- Dupuis, H. M. C., E. M. P. Chadwick, S. C. Courtenay. 1997. Distribution of Juvenile Atlantic Herring in

- the Southern Gulf of St. Lawrence. Canadian Technical Report Aquatic Fisheries Sciences. 24pp.
- FRCC (Fisheries Resource Conservation Council) 2009. Fishing into the future: The herring fishery in Eastern Canada. Report to the Minister of Fisheries and Oceans. August 2009. 34p. + appendices.
- Froese, R. and D. Pauly, Editors. 2000. FishBase 2000: concepts, design and data sources. ICLARM, Los Baños, Laguna, Philippines. 344 p.
- Gavaris, S. 1999. ADAPT (ADAPTive Framework) User's Guide Version 2.1. DFO. St. Andrews Biological Station, St. Andrews, N.B., Canada. 25 p.
- Hay, D.E. et al. 2001. Taking Stock: An Inventory and Review of the World Herring Stocks in 2000. Pp 381-454, In F. Funk, J. Blackburn, D. Hay, A.J. Paul, R. Stephenson, R. Torensen and D. Witherell (eds.), Herring: Expectations for a new millennium. Univ. of Alaska Sea Grant, AKSG-01-04, Fairbanks. 800 pp.
- Iles, T.D. and M. Sinclair. 1982. Atlantic herring stock discreteness and abundance. *Science* 215: 627-633.
- Kinney, S. 2001. Southern Gulf St Lawrence Herring Fisheries Social Research for Sustainable Fisheries Fact Sheet #5:6 p.
- Kornfield I, Bogdanowicz S 1987 Differentiation of mitochondrial DNA in Atlantic herring, *Clupea harengus*. *FishBull* 85:561–568
- Kornfield I, Sidell B, Gagnon, P. 1982. Stock definition in Atlantic herring (*Clupea harengus*): genetic evidence for discrete fall and spring spawning populations. *Can. J. Fish. Aquat. Sci.* 39:1610–1621.
- LeBlanc, C. H., Poirier, G. A., MacDougall, C., Bourque, C., and Roy, J. 2008. Assessment of the NAFO Division 4T southern Gulf of St. Lawrence herring stocks in 2007. Canadian Science Advisory Secretariat Research Document, 2008/061. 137 pp
- LeBlanc, C.H., Mallet, A., MacDougall, C., Bourque, C., and Swain, D. 2012. Assessment of the NAFO Division 4T southern Gulf of St. Lawrence herring stocks in 2011. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/111. vi + 167 p.
- Melvin, G.D., Stephenson, R.L. and Power, M.J. 2009. Oscillating reproductive strategies of herring in the western Atlantic in response to changing environmental conditions. *ICES J. Mar. Sci.* 66: 1784–1792
- Messieh, S.N. 1988. Spawning of the Atlantic herring in the Gulf of St. Lawrence. *Am. Fish. Soc. Symp.* 5: 31-48.
- O' Boyle, R. 2014. Report on the Compliancy of the Gulf of St. Lawrence (4T-4Vn) Herring Fall Gillnet Fishery (HFA 16F) with the certification requirements of Marine Stewardship Council 110p.
- Parsons, L.S. 2009. "Canadian Marine Fisheries Management: A Case Study", @ [http://www.sustainablefisheries.ca/download\\_files/LSP\\_Grafto\\_CH30.pdf](http://www.sustainablefisheries.ca/download_files/LSP_Grafto_CH30.pdf)

Reid RN, Cargnelli LM, Griesbach SJ, Packer DB, Johnson DL, Zetlin CA, Morse WW, Berrien PL. 1999. Essential fish habitat source document: Atlantic herring, *Clupea harengus*, life history and habitat characteristics. NOAA Tech Memo NMFS NE 126; 48 p.

Safford, S.E. and H. Booke. 1992. Lack of biochemical genetic and morphometric evidence for discrete stocks of northwest Atlantic herring *Clupea harengus*. Fish. Bull. (U.S.) 90: 203-210.

Savenkoff, C., F. Grégoire, M. Castonguay, J.M. Hanson, D. Chabot, and D.P. Swain. 2006. Main prey and predators of Atlantic herring (*Clupea harengus* L.) in the Gulf of St. Lawrence during the mid-1980s, mid-1990s, and early 2000s. Can. Tech. Rep. Fish. Aquat. Sci. 2643: vi+28 pp.

Savenkoff, C., D.P. Swain, J.M. Hanson, M. Castonquay, M.O. Hammill, H. Bourdages, L. Morrissette and D. Chabot. 2007. Effects of fishing and predation in a heavily exploited ecosystem: comparing periods before and after the collapse of groundfish in the southern Gulf of St. Lawrence (Canada). Ecological Modelling. 204: 115 – 128.

Stephenson RL, Melvin GD, Power MJ 2009 Population integrity and connectivity in Northwest Atlantic herring: a review of assumptions and evidence. ICES Journal of Marine Science 66(8): 1733-1739

Wheeler, J.P. and G.H. Winters. 1984. Homing of Atlantic herring (*Clupea harengus*) in Newfoundland waters as indicated by tagging data. Can. J. Fish. Aquat. Sci. 41: 108-111.

Wheeler, J.P., Purchase, C.F., Macdonald, P.D.M., Fill, R., Jacks, L., Jacks, Wang, H., and Ye, C.L. 2009. Temporal changes in growth, maturation, and condition of spring spawning Atlantic herring (*Clupea harengus*) and the potential implications for fisheries management in Newfoundland waters. ICES J. Mar. Sci. 66: 1800-1807.

Winters, G. H. 2011. Recruitment Mechanisms of Southern Gulf of St. Lawrence Atlantic Herring (*Clupea harengus*) Journal of the Fisheries Research Board of Canada 33(8):1751-1763.

## Appendix 1. Scoring and Rationales

### Performance Indicator Scores and Rationale

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

<b>PI 1.1.1</b>	<b>The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing</b>			
	<b>Justification</b>	<p>There is a high degree of certainty that the stock is above the point where recruitment would be impaired.</p> <p>Resource status of the 4T fall spawning herring was assessed through 2013 in March, 2014 using a population analysis with two model formulations:</p> <p>Model 1 is the same formulation as in the previous assessment to 2012 including:</p> <ul style="list-style-type: none"> <li>• CPUE indices ages 4 to 10 from the fixed gear,</li> <li>• Acoustic survey juvenile index of ages 2-3, and</li> <li>• Both indices considered proportional to population abundance in the model.</li> </ul> <p>Model 2 considers changes in catchability in the gillnets for ages 4 and 5 associated with reductions in size at age observed from 2004 to 2013 with:</p> <ul style="list-style-type: none"> <li>• Gillnet fishery CPUE index ages 6 to 10 (1986-2013) as CPUE1 index and ages 4 and 5 (in 1986-2003) as CPUE2 index, both considered proportional to population abundance,</li> <li>• Ages 4 and 5 (in 2004-2013) as CPUE3 index with a trend in catchability rather than proportional to abundance, and</li> <li>• Acoustic survey juvenile index of ages 2-3, considered proportional to population abundance in the model.</li> </ul> <p>There are strong residual patterns in both models and both show retrospective patterns. Both models are presented because the diagnostics of the model fits do not allow a clear choice.</p> <p>The results of stock status in recent years are model dependent. Results from Model 1 indicate that the abundances of the 2004 and 2005 year-classes are above the average of 344 million fish, but well below average for the 2003 and 2008 year-classes. Model 2 results indicate that the abundances of the 2004, 2005 and 2009 year-classes are above the average of 344 million, but well below average for the 2003 and 2008 year-classes. Both models project very low abundance for the 2010 year-class.</p> <p>The results from both models indicate that recent spawning stock biomass of age 4+ fall component peaked in 2009 when the large 2004 and 2005 year-classes were contributing to the fishery. The 2014 beginning-of-year SSB for Model 1 is estimated to be about 98,000 t and below the <math>B_{usr}</math> level of 172,000 t. The reference level exploitation rate (<math>F_{0.1}</math>) for the fall spawner component is about 25% for fully recruited age-groups (5+). The 2013 exploitation rate of 31% is above the reference level. The estimated SSB for Model 2 is about 182,800 t and above the <math>B_{usr}</math> level. The 2013 exploitation rate of 21% from Model 2 is below the reference level.</p> <p>Because of the important and unresolved model uncertainties, a review of the assessment approach will be undertaken in spring 2015.</p> <p>Despite model uncertainties, current SSB is well above the <math>B_{lim}</math> of 51,000 t and there is a high degree of certainty that the stock is above the point where recruitment would be impaired, thus justifying a score of 100 for issue a.</p>		
<b>b</b>	<b>Guidepost</b>		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.

<b>PI 1.1.1</b>		<b>The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing</b>	
	<b>Met?</b>	Y	N
	<b>Justification</b>	<p>The stock is at or fluctuating around its target reference point.</p> <p>For the fall spawning component, the limit reference point (<math>B_{lim}</math>) and the upper stock reference (<math>B_{usr}</math>) are 51,000 and 172,000 t, respectively. The removal rate reference has been set at <math>F_{0.1}</math>, which corresponds to <math>F = 0.32</math> or about 25% for the fully-recruited age-groups (5+). The stock has been above <math>B_{usr}</math> for all but a couple of years since the early 1980s. However, the most recent assessment (March, 2014) provided conflicting stock status results.</p> <p>Current stock status is model dependent. Under Model 1, the stock appears to be at a low level relative to the 1984 to 2012 period. The spawning stock biomass (SSB) is currently estimated to be about 98,000 t and below <math>B_{usr}</math>. Under Model 2, the stock appears to remain at a moderate level relative to the 1984 to 2013 period. The current estimate of (SSB) is 182,800 t and above <math>B_{usr}</math>.</p> <p>Catch options for 2014 were assessed relative to the probabilities of exceeding <math>F_{0.1}</math>, of no decline in SSB in 2015, and that SSB would be less than <math>B_{usr}</math> (172,000 t) in 2015. Fishing at <math>F_{0.1}</math> is usually considered a safe exploitation rate when the stock is in the healthy zone. These risk analyses include uncertainties of the population estimates but do not include uncertainty associated with natural mortality, weight-at-age, recent changes in the length at 50% maturity, partial recruitment and uncertainties around the age 2 abundance.</p> <p>For Model 1, a catch option of 22,100 t in 2014 corresponds to a 50% chance that the exploitation rate would be above the reference removal rate. There is a 100% probability that the resulting spawning stock biomass in 2015 would be below <math>B_{usr}</math> even with no fishing. For Model 2, a catch option of 38,017 t in 2014 corresponds to a 50% chance that exploitation rate would be above the reference removal rate and an 85% probability that SSB in 2015 would be below <math>B_{usr}</math>. For both models, the risk analysis projects a 100% probability of a decrease in biomass even with no fishing.</p> <p>Given model uncertainties, it cannot be said with a high degree of certainty whether SSB is currently above or below <math>B_{usr}</math>, thus a score of 100 for issue b cannot be justified.</p>	
<b>References</b>	DFO. 2014a. Assessment of Atlantic herring in the southern Gulf of St. Lawrence (NAFO Div. 4T) to 2013. Can. Sci. Advis. Sec. Advis. Rep. 2014/040.		
<b>Stock Status relative to Reference Points</b>			
	<b>Type of reference point</b>	<b>Value of reference point</b>	<b>Current stock status relative to reference point</b>
<b>Target reference point</b>	Expected SSB assuming average recruitment (age 2) and the removal rate reference calculated using spawner per recruit analyses based on stock characteristics data for the fall spawning component.	172,000 t	Uncertain:  Model 1 estimates SSB at 98,000 t.  Model 2 estimates SSB at 182,800 t.
<b>Limit reference</b>	The lowest historical SSB	51,000 t	

<b>PI 1.1.1</b>	<b>The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing</b>		
<b>point</b>	from which the stock was able to recover (Brecover).		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b> The requirements of scoring issue 100 a are satisfied but not 100 b giving a score of 90 for this PI.			<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>N/A</b>

**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
<b>a</b>	<b>Guidepost</b>	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.	
	<b>Met?</b>	Y	Y	
	<b>Justification</b>	<p>Reference points are appropriate for the stock and can be estimated.</p> <p>Expected SSB assuming average recruitment (age 2) and the removal rate reference (<math>F_{0.1}</math>) was calculated using spawner per recruit analyses based on stock characteristics data (vectors of mean weight at age, natural mortality, partial recruitment) for the fall spawning component. <math>B_{usr}</math> was not directly defined but would be located somewhere between <math>B_{lim}</math> and the expected SSB at the removal rate reference (<math>F_{0.1}</math>). The expected SSB level assuming average recruitment and the removal rate reference for the fall spawning component was about 172,000 t. SSB could be expected to fluctuate around this value and thus <math>B_{usr}</math> would be set somewhere between <math>B_{lim}</math> and this expected SSB level. Due to uncertainty in stock and recruitment dynamics, it was considered appropriate to have <math>B_{usr}</math> closer to the expected SSB than to <math>B_{lim}</math>. A plot of historical values of exploitation rate and SSB showed, with exception to the first 5 to 6 years of the time series, the SSB estimate for the fall spawning component was generally above the expected SSB level. The expected SSB level was considered to be an appropriate interim value for <math>B_{usr}</math>.</p> <p>For the fall spawning component, recruitment at age 2 relative to the SSB has large variability. As a result of the poorly defined association between recruitment and SSB for either the Beverton-Holt or the Ricker functions, the estimation of <math>B_{lim}</math> from stock and recruitment data was not considered appropriate. The lowest historical SSB from which the stock was able to recover (Brecover) for the fall spawning component was 37,000 t. The number of recruits produced from this low SSB level was exceptionally high and may have been a compensatory response to low abundance but additionally could have resulted from favourable biological and environmental conditions prevalent during that period. As such, the high recruitment per SSB ratio observed and the recovery of the stock may not occur at a similar low level of biomass in the future if conditions are less favourable. High recruitment to SSB ratios were observed for several years in the late 1970s. SSB also increased as fishing rate was reduced. It was considered that the average of the four lowest values of biomass during that time period would represent a more cautious estimate of <math>B_{lim}</math>. This corresponds to 51,000 t for the fall spawning component.</p> <p>This justifies a score of 80 for issue a.</p>		
<b>b</b>	<b>Guidepost</b>		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.
	<b>Met?</b>		Y	N

<b>PI 1.1.2</b>		<b>Limit and target reference points are appropriate for the stock</b>		
	<b>Justification</b>	<p>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.</p> <p><math>B_{msy}</math> has not been estimated for this stock but is presumed here to be above <math>B_{usr}</math> thus is being used as a lower limit proxy for <math>B_{msy}</math>. <math>B_{lim}</math> represents approximately 30% of the <math>B_{usr}</math>. DFO Precautionary Approach (PA) Framework guidelines require <math>B_{lim} = 40\% B_{msy}</math>. Also, considering caveats above regarding the <math>B_{recover}</math> basis for its determination, <math>B_{lim}</math> is considered not sufficiently cautious for this stock.</p> <p>A score of 80 for issue b can be justified, but not 100.</p>		
<b>c</b>	<b>Guidepost</b>		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.
	<b>Met?</b>		Y	N
	<b>Justification</b>	<p>The target reference point is such that the stock is maintained at a level consistent with <math>B_{MSY}</math> or some measure or surrogate with similar intent or outcome.</p> <p>Despite assessment model uncertainties described above, there is a moderate degree of certainty that SSB has been fluctuating around <math>B_{usr}</math> over recent years, thus justifying a score of 80 for issue c. However, FRCC (2009) considered that there is a strong ecosystem dimension to the management of herring and the conservation of herring resources and recommended implementation of an Ecosystem Approach to Fisheries for decision making. There is no evidence that EAF is being applied in management of this herring fishery. Thus, a score of 100 for issue c cannot be justified.</p>		
<b>d</b>	<b>Guidepost</b>		For key low trophic level stocks, the target reference point takes into account the ecological role of the stock.	
	<b>Met?</b>		Not relevant	
	<b>Justification</b>	A report by SAI Global dated August 2014 reviewed the evidence and concluded that this herring stock is a non key lower trophic level stock. This report is provided as Appendix 4.		
<b>References</b>		<p>DFO. 2005. Spawning Stock Biomass Reference Points for Southern Gulf of St. Lawrence Herring. DFO Can. Sci. Advis. Sec. Advis. Rep. 2005/070.</p> <p>FRCC (Fisheries Resource Conservation Council) 2009. Fishing into the future: The herring fishery in Eastern Canada. Report to the Minister of Fisheries and Oceans. August 2009. 34p. + appendices.</p>		
<b>OVERALL PERFORMANCE INDICATOR SCORE: A score of 80 is justified for issues a, b and c.</b>				<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

**Evaluation Table for PI 1.1.3**

<b>PI 1.1.3</b>		<b>Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe</b>		
<b>Scoring Issue</b>		<b>SG 60</b>	<b>SG 80</b>	<b>SG 100</b>
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Not Relevant		Not relevant
	<b>Justification</b>			
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Not relevant	Not relevant	Not relevant
	<b>Justification</b>			
<b>c</b>	<b>Guidepost</b>	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.	
	<b>Met?</b>	Not relevant	Not relevant	
	<b>Justification</b>			
<b>References</b>				
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>N/A</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

**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
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>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.</p> <p>Prior to 2006, annual TACs were set consistent with the <math>F_{0.1}</math> advice of the RAP. In almost all years, TACs were set either at or below the scientific advice.</p> <p>Since implementation of reference points (see PI 1.1.2) in 2006, TACs have continued to be set at the <math>F_{0.1}</math> harvest rate. Assessments moved to a two-year cycle in 2010 and scientific advice provided based on 2-year projections. Over this period, the reported catch has consistently not exceeded the TAC. The estimated SSB of the stock has been above <math>B_{usr}</math> for all but a couple of years since the early 1980s. However, the most recent assessment (March, 2014) provided conflicting stock status results and advice based on just a 1-year projection (see PI 1.1.1).</p> <p>A comprehensive review of the assessment framework for this stock is planned for mid-April 2015 and a new assessment with scientific advice anticipated by spring 2015. For the 2014 season, the TAC was reduced 19.5% from 43,500 t in 2013 to 35,000 t (approximately the 2013 catch). This is considered a very positive management response under the circumstances and is consistent with principles described in PI 1.2.2 below.</p> <p>A score of 100 is justified for issue a.</p>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.</p> <p>This stock has been harvested at <math>F_{0.1}</math> for approximately 20 years with <math>F_s</math> maintained near or below that level most years since 2000. Since implementation of a Precautionary Approach framework in 2006, 2014 is the first year the management system has been faced with conflicting results regarding stock status and the possibility the stock may have dropped below <math>B_{usr}</math>. There was a 19.5% reduction in TAC for 2014. However, it remains to be determined whether management action will be able to maintain SSB at or above <math>B_{usr}</math> over the short term in the face of an apparent downward trend in abundance.</p> <p>A score of 80 but not 100 is justified for issue b.</p>		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
c	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	<p>Monitoring is in place that is expected to determine whether the harvest strategy is working.</p> <p>Monitoring of both fishery-dependent and fishery-independent indicators of stock abundance is conducted annually. Data collected provide a sound basis for assessment of stock status (see PI 1.2.3 for details).</p> <p>A score of 60 is justified for issue c.</p>		
d	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Y
	Justification	<p>The harvest strategy is periodically reviewed and improved as necessary</p> <p>Stock status is assessed on a 2-year cycle and scientific advice provided for catch options in relation to the <math>F_{0.1}</math> harvest strategy. The Advisory Committee consultative process leads to a consensus recommendation for TAC. The TAC decision is communicated via a Conservation Harvesting Plan that provides fleet sector and HFA allocations as well as all other management measures.</p> <p>Periodic review of harvest strategy is a requirement of the new IFMP which was approved January 29, 2015.</p> <p>A score of 100 for issue d is justified.</p>		
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		<p>DFO. 2014a. Assessment of Atlantic herring in the southern Gulf of St. Lawrence (NAFO Div. 4T) to 2013. Can. Sci. Advis. Sec. Advis. Rep. 2014/040.</p> <p>DFO.2014i. Herring in the Southern Gulf of St. Lawrence Herring Fishing Areas 16A to 16G. Integrated Fisheries Management Plan Gulf Region. November 2014.</p> <p><a href="http://www.glf.dfo-mpo.gc.ca/Gulf/FAM/Herring-Information/Herring-2012-2013-CHP">www.glf.dfo-mpo.gc.ca/Gulf/FAM/Herring-Information/Herring-2012-2013-CHP</a></p> <p><a href="http://www.dfo-mpo.gc.ca/decisions/fm-2014-gp/atl-006-eng.htm">www.dfo-mpo.gc.ca/decisions/fm-2014-gp/atl-006-eng.htm</a></p> <p><a href="http://www.glf.dfo-mpo.gc.ca/Gulf/FAM/herring-information/Home">www.glf.dfo-mpo.gc.ca/Gulf/FAM/herring-information/Home</a></p>		
OVERALL PERFORMANCE INDICATOR SCORE: Requirements are met for all scoring issues except 100 b, giving a score of 95 for this PI.				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
<b>a</b>	<b>Guidepost</b>	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.	
	<b>Met?</b>	Y	N	
	<b>Justification</b>	<p>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.</p> <p>The harvest control rules within the Precautionary Approach for the 4T herring fishery continue to be developed. The following principles are considered in the application of the Precautionary Approach. In the event that the SSB falls below <math>B_{lim}</math> and into the critical zone, removals from the stock must be kept to the lowest level possible. When the stock is above <math>B_{usr}</math> and in the healthy zone, TACs will be based on a fishing strategy at <math>F_{0.1}</math>. When SSB is in the cautious zone, setting of the TACs must promote stock growth towards the healthy zone. There are no formal harvesting rules currently in place for managing the fishery in the different stock status zones of the Precautionary Approach other than the overriding application of cautionary measures to support the rebuilding of stocks and avoiding a decline of the stock into the critical zone.</p> <p>This stock has been harvested at <math>F_{0.1}</math> for approximately 20 years with <math>F_s</math> maintained near or below that level most years since 2000. Since implementation of a Precautionary Approach framework in 2006, 2014 is the first year the management system has been faced with conflicting results regarding stock status and the possibility the stock may have dropped below <math>B_{usr}</math>. There was a 19.5 % reduction in TAC for 2014. This is considered a very positive management response under the circumstances and is consistent with principles described above.</p> <p>A comprehensive review of the assessment framework for this stock is planned for early 2015 and a new assessment with scientific advice, including an estimate of <math>F</math> in the 2014 season, anticipated by spring 2015. The management system has not had to deal with SSB near <math>B_{lim}</math> in the case of the fall spawning component of this stock, but it has for the spring spawning component. In the case of the latter, it has effectively maintained <math>F</math> well below the <math>F_{0.1}</math> reference removal rate from 2009.</p> <p>While the management system has demonstrated a capacity to respond in accordance with PA principles, as yet there is no IFMP in place with well defined, pre-approved harvest control rules that prescribe management action when SSB is in the cautious zone.</p> <p>A score of 60 but not 80 is justified for issue a.</p>		
<b>b</b>	<b>Guidepost</b>		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.
	<b>Met?</b>		N	N

<b>PI 1.2.2</b>		<b>There are well defined and effective harvest control rules in place</b>		
	<b>Justification</b>	<p>The overall 4T herring stock is composed of spring and fall spawning components. Spawning of herring from each component occurs regularly in well-defined geographic areas. TACs are set separately based on the assessment of abundance of each spawning component. For each, 77% of the TAC is allocated to the gillnet fleet and 23% to the seiner (&gt;65') fleet. In 1986, 4T was divided geographically into 7 Herring Fishing Areas (HFAs). Based on historical catches, each of these areas has been allotted the same fixed percentage of the gillnet fleet allocation each year since. HFA 16F receives 20% of the allocation for the fall spawning component, this amounted to 5,317 t in 2014.</p> <p>If herring from each component return to the same spawning areas with a high degree of fidelity, it would be important that the distribution of the allocations be based on this consideration in order to preserve the within spawning component stock structure. There is uncertainty whether the sharing arrangement ensures adequate protection of spawning beds within each HFA. Landings in certain HFAs have been consistently well below allocations over the past 5 years and only in three, including 16F, have landings consistently matched the allocations. However, there is no evidence that the sharing arrangement has impacted productivity at the overall stock level.</p> <p>The management system takes into account the main uncertainties associated with different and varying stock status of each spawning component of the 4T herring stock, however, it doesn't take into account a wide range of uncertainties. While it has demonstrated a capacity to respond in accordance with PA principles, as yet there is no IFMP in place with well defined, pre-approved harvest control rules that prescribe management action when SSB is in the cautious zone.</p> <p>A score of 80 cannot be justified for issue b.</p>		
<b>c</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N

<b>PI 1.2.2</b>	<b>There are well defined and effective harvest control rules in place</b>	
<b>Justification</b>	<p>Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.</p> <p>Tools in use in the 4T herring fishery include a variety of catch and effort controls:</p> <p><u>Catch Controls</u></p> <ul style="list-style-type: none"> <li>• Annual TAC (set by consultative process)</li> <li>• Inshore gillnet allocations by Herring Fishing Area (HFA); reserve is used to manage in-season harvesting</li> <li>• Purse seine allocation (for whole Gulf)</li> <li>• 100% DMP</li> <li>• Small fish protocols for the seiners</li> <li>• 20% observer coverage for the seiners</li> <li>• Daily trip limits</li> </ul> <p><u>Effort Controls</u></p> <ul style="list-style-type: none"> <li>• Inshore gillnet gear specifications</li> <li>• Maximum of 150 fathoms in length and 125 mesh deep with the exception of HFA 16F which will be 100 fathoms in length; HFA 16G Southside which will be 100 mesh deep</li> <li>• Minimum mesh size in all areas of 66.7 mm (63.5 mm in HFA 16A)</li> <li>• Tagging of all gillnets in all HFAs required in 2012, with one tag for every 15 fathoms of net; discussion with industry will take place to decide if tags are required in 2013</li> <li>• Inshore gillnet fishery trip limits which vary by HFA</li> <li>• Seasonal closures which vary by HFA</li> <li>• Areal closure off northeast PEI of the commercial inshore herring fishery (April 1 to June 30) and of the large seiners herring fishery (year round)</li> <li>• Areal closure in Baie des Chaleur, northside of PEI and Northumberland Strait for seiners (also not allowed in 16F)</li> </ul> <p>This stock has been harvested at <math>F_{0.1}</math> for approximately 20 years with <math>F_s</math> maintained near or below that level most years since 2000. Since implementation of a Precautionary Approach framework in 2006, 2014 is the first year the management system has been faced with conflicting results regarding stock status and the possibility the stock may have dropped below <math>B_{usr}</math>. There was a 19.5 % reduction in the TAC for 2014. This is considered a very positive management response under the circumstances that is consistent with PA principles.</p> <p>A comprehensive review of the assessment framework for this stock is planned for mid-April 2015 and a new assessment with scientific advice, including an estimate of <math>F</math> in the 2014 season, anticipated by spring 2015. The management system has not had to deal with SSB near <math>B_{lim}</math> in the case of the fall spawning component of this stock, but it has for the spring spawning component. In the case of the latter, it has effectively maintained <math>F</math> well below the <math>F_{0.1}</math> reference removal rate from 2009.</p> <p>It is yet to be determined how effective the management response for the 2014 season has been in terms of reducing <math>F</math> below the reference removal rate.</p> <p>A score of 80 but not 100 is justified for issue c.</p>	
	<b>References</b>	<p><a href="http://www.glf.dfo-mpo.gc.ca/Gulf/FAM/Herring-Information/Herring-2012-2013-CHP">www.glf.dfo-mpo.gc.ca/Gulf/FAM/Herring-Information/Herring-2012-2013-CHP</a></p> <p><a href="http://www.dfo-mpo.gc.ca/decisions/fm-2014-gp/atl-006-eng.htm">www.dfo-mpo.gc.ca/decisions/fm-2014-gp/atl-006-eng.htm</a></p> <p><a href="http://www.glf.dfo-mpo.gc.ca/Gulf/FAM/herring-information/Home">www.glf.dfo-mpo.gc.ca/Gulf/FAM/herring-information/Home</a></p>
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>		<b>70</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>1</b>

**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	N

PI 1.2.3	Relevant information is collected to support the harvest strategy
Justification	<p>Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.</p> <p>There is a long, exhaustive history of research on the population biology and structure of the 4T herring stock, including distribution, abundance and migration patterns of its spring and fall spawning components. The stock is assessed and managed by each spawning component separately. Techniques to discriminate spring and fall spawners in biological sampling are well developed and reliable and provide a sound basis for development of the biological databases essential to the assessment of each spawning component. The association between recruitment (at age 2) and SSB is poorly defined by either the Beverton-Holt or the Ricker function. Recruitment relative to the SSB has large variability, precluding the quantification of reference points with confidence. Instead, <math>B_{usr}</math> was calculated from a spawner per recruit analysis and <math>B_{lim}</math> is a <math>B_{recover}</math> based on the average of the four lowest values of biomass during the late 1970s when very high recruitment to SSB ratios were observed.</p> <p>Elements of stock productivity are monitored. An annual RV acoustic survey provides ongoing, fishery-independent indices of abundance and biomass at age. Average weights-at-age for ages 3-8 have been declining since the late 1970s. While unexplained, this is considered to reflect changes in the stock rather than in the fishery. The trend is incorporated in the population model (VPA) used to assess the stock. Maturity has been studied comprehensively and changes in size at maturity monitored on an ongoing basis. Natural mortality has been studied as well. There have been important changes in the fish community of 4T over the past four decades - reduced abundance of many predatory groundfish species and increased abundance of small-bodied species. However, increased abundance of other larger predators may have compensated for some of the reduced predation mortality on herring and thus there does not appear to have been a long-term change in <math>M</math> as there has in some groundfish. Assessments assume that <math>M</math> across all ages is 0.2.</p> <p>Detailed information on number and type of vessels in the fishery is collected through the licensing system. The temporal and spatial pattern of fishery, gear usage, etc. are well known. A telephone survey of active commercial license holders provides information on relative abundance and effort trends. A CPUE index is derived from purchase slips of trip landings and effort calculated from the number of trips and the number of nets or hauls determined from the telephone survey – however, there is considerable uncertainty regarding its use as an indicator of stock abundance (see PI 1.2.4). An annual RV acoustic survey of fall concentrations provides ongoing, fishery-independent indices of abundance and biomass at age. Information on landings is compiled by DFO. Dockside monitoring of landings was introduced in the mid-1990s and the fishery has been subject to 100% dockside monitoring since 2000. Logbooks are not used in the gillnet fishery and information on at-sea activities comes primarily from the telephone survey. DFO Science undertakes dockside sampling to characterize the age and size composition of the landings as well as determine spawning component. There has been no observer coverage of the gillnet fishery. An overview of the estuary and Gulf of St. Lawrence marine ecosystem provides a comprehensive synopsis of other information available. The Gulf ecosystem is one of the most extensively studied marine areas on Canada's east coast.</p> <p>A score of 80 is justified for issue a, however, the lack of logbooks and observer coverage in the gillnet fishery precludes a score of 100.</p>

PI 1.2.3		Relevant information is collected to support the harvest strategy		
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	<p>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.</p> <p>An annual RV acoustic survey provides ongoing, fishery-independent indices of abundance and biomass at age. There is also a CPUE index derived from fishery information, however, there is considerable uncertainty regarding its use as an indicator of stock abundance. Nevertheless, both indices are used to calibrate the VPA model used to assess stock status. A second formulation of the model was used for the first time in the most recent assessment (March, 2014) and the two provided conflicting results for stock status (see PI 1.1.1). There are strong residual patterns in both models and both show retrospective patterns. An examination of the retrospective pattern indicated that the assumed linear relationship between CPUE and fishable biomass is a plausible cause. Diagnostics of the model fits do not allow a clear choice between them. Because of the important and unresolved model uncertainties, a review of the assessment approach will be undertaken in mid-April 2015 and a new assessment is anticipated by spring 2015.</p> <p>Landings by both the gillnet and purse seine fleets participating in the fishery are subject to 100% dockside monitoring. There has been no observer coverage of the gillnet fishery and there is only anecdotal information on bycatch and discards. For the purse seine fishery, there is currently 20% observer coverage. Currently, there are no fisheries on other species in 4T in which herring are a significant bycatch.</p> <p>Longstanding uncertainty regarding the CPUE index and recently heightened uncertainty regarding formulation of the VPA model used to assess stock status preclude a score of 100 for issue b, however, a score of 80 is justified.</p>		
c	Guidepost		There is good information on all other fishery removals from the stock.	
	Met?		Y	

<b>PI 1.2.3</b>		<b>Relevant information is collected to support the harvest strategy</b>	
	<b>Justification</b>	<p>There is good information on all other fishery removals from the stock.</p> <p>Harvesters who use herring as bait in other fisheries, primarily the spring lobster fishery, can obtain a personal use licence to catch limited amounts for use as bait. While full accounting of these catches has been an issue in the spring herring fishery, it has not been in the fall fishery. The team was informed at the site visit meeting with HFA 16F harvesters that practically all of the herring used as bait is fully accounted for in the landings reports (i.e., purchase slips) in the fall herring fishery.</p> <p>A score of 80 is justified for issue c.</p>	
	<b>References</b>	<p>Cadigan N. G. and P.J. Farrell. 2003. Local Influence Diagnostics for the Retrospective Problem in Sequential Population Analysis. DFO Can. Sci. Advis. Sec. Res. Doc. 2003/057. i + 43 p.</p> <p>LeBlanc, C.H., Mallet, A., MacDougall, C., Bourque, C., and Swain, D. 2012. Assessment of the NAFO Division 4T southern Gulf of St. Lawrence herring stocks in 2011. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/111. vi + 167 p.</p> <p>DFO. 2014a. Assessment of Atlantic herring in the southern Gulf of St. Lawrence (NAFO Div. 4T) to 2013. Can. Sci. Advis. Sec. Advis. Rep. 2014/040.</p>	
<b>OVERALL PERFORMANCE INDICATOR SCORE: A score of 100 cannot be justified for issues a and b, but a score of 80 is justified for issues a, b and c giving an overall score of 80.</b>			<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>N/A</b>

**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
<b>a</b>	<b>Guidepost</b>		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.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	<p>The assessment is appropriate for the stock and for the harvest control rule.</p> <p>The model used to assess stock status is a variation of a Virtual Population Analysis (VPA) in which negligible error is assumed in the catch at age. It is calibrated to the mean annual estimates of two abundance indices (CPUE and acoustic), both of which include age composition information. Weight-at-age and recruitment variability are incorporated into model application. The assessment model has been widely used in Canadian east coast fisheries since the mid-1990s as well as in U.S. stock assessments since the mid 1980's. The model provides an estimate of stock status in relation to reference points established for the 4T herring stock and projections of catch options associated with the <math>F_{0.1}</math> harvest strategy.</p> <p>A score of 100 is justified for issue a.</p>		
<b>b</b>	<b>Guidepost</b>	The assessment estimates stock status relative to reference points.		
	<b>Met?</b>	Y		
	<b>Justification</b>	<p>The assessment estimates stock status relative to reference points.</p> <p>The assessment provides an estimate of stock status in relation to reference points established for the 4T herring stock.</p> <p>A score of 60 is justified for issue b.</p>		
<b>c</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N

<b>PI 1.2.4</b>		<b>There is an adequate assessment of the stock status</b>	
	<b>Justification</b>	<p>The assessment takes uncertainty into account. An annual RV acoustic survey provides ongoing, fishery-independent indices of abundance and biomass at age. There is also a CPUE index derived from fishery information, however, there is considerable uncertainty regarding its use as an indicator of stock abundance. Nevertheless, both are used to calibrate the VPA model used to assess stock status. A second formulation of the model was used for the first time in the most recent assessment (March, 2014) and the two provided conflicting results for stock status (see PI 1.1.1), one indicated that the stock was below <math>B_{usr}</math> and the other that it was above. There are strong residual patterns in both models and both show retrospective patterns. An examination of the retrospective pattern indicated that the assumed linear relationship between CPUE and fishable biomass is a plausible cause. Diagnostics of the model fits do not allow a clear choice between them.</p> <p>The assessment includes analysis of risk associated with a range of catch (TAC) options based on model projections. This provides probabilities of exceeding the reference removal rate (<math>F_{0.1}</math>), of no decline in SSB, and of <math>SSB &lt; B_{usr}</math>. This risk analysis includes uncertainties of the population estimates but not those associated with natural mortality, weight-at-age, partial recruitment and uncertainties around the age 2 abundance.</p> <p>While the assessment takes much of the uncertainty into account and is evaluating stock status relative to reference points in a probabilistic way, there are important uncertainties regarding model formulation that have to be resolved. Therefore, a score of 80, but not 100, is justified for issue c.</p>	
<b>d</b>	<b>Guidepost</b>		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	<b>Met?</b>		N
	<b>Justification</b>	Because of the important and unresolved model uncertainties, a review of the assessment approach will be undertaken in mid-April 2015 and a new assessment is anticipated by spring 2015. The assessment model has been/is being tested but cannot be shown to be robust at this time. Alternative approaches will undoubtedly be explored in this framework review, however, a score of 100 cannot be justified for issue d at this time.	
<b>e</b>	<b>Guidepost</b>	The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	<b>Met?</b>	Y	Y
	<b>Justification</b>	<p>The assessment has been internally and externally peer reviewed. Participation at the RAP (peer review) includes DFO scientists and fishery managers, representatives of industry and Aboriginal organizations. Peer review is provided by scientists from within the unit responsible for the assessment as well as scientists from other species assessment units within the Region. It is also common practice for species experts from other DFO Regions to participate in a reciprocal arrangement to provide a level of external peer review. Within the limits of budgetary constraints, special effort is made to arrange participation by experts from outside DFO to participate in periodic assessment framework reviews.</p> <p>A score of 100 is justified for issue e.</p>	
<b>References</b>		DFO. 2014a. Assessment of Atlantic herring in the southern Gulf of St. Lawrence (NAFO Div. 4T) to 2013. Can. Sci. Advis. Sec. Advis. Rep. 2014/040.	
<b>OVERALL PERFORMANCE INDICATOR SCORE: A score of 60 is justified for issue b, 80 for issues a, c, and e as well as 100 for issues a and e. This gives an overall score of 90 for this PI.</b>			<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>N/A</b>

**Evaluation Table for PI 2.1.1**

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
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	N	N	N
	<b>Justification</b>	Spring herring has been identified as the main and only retained species in the fall gillnet fishery, and the status of spring herring is a concern. According DFO reports there is minimal retention of spring spawning herring in the fall gillnet fishery. From the reports documenting spring herring landings on the fall fishery from 2009 to 2014, in 2011, 18 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (DFO 2012), which represents 0.2% of the fall herring gillnet fleet landings. In 2013, 2 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (Table 2), which represent 0.03% of the fall herring gillnet fleet landings. According to MSC GCB3.5.2, a species that comprises less than 5% of the total catch by weight may normally be considered to be a minor species (i.e., not “main”) in the catch, unless it is of high value to the fisher or of particular vulnerability, or if the total catch of the fishery is large, in which case even 5% may be a considerable catch. There is information that the status of the spring spawner component is not healthy because according to the 2014 stock assessment the SSB has been below the limit reference points since more than 10 year and now the SSB status is borderline within the critical/cautious zones. Please see scoring issue c.		
<b>b</b>	<b>Guidepost</b>			Target reference points are defined for retained species.
	<b>Met?</b>			Y
	<b>Justification</b>	Target reference points are defined for spring herring.  For the spring component, the limit reference point (Blim) and the upper stock reference (BUSR) point are 22,000 and 54,000 t respectively (DFO 2005). The removal rate reference has been set at F0.1, which corresponds to F = 0.35 (about 27% exploitation rate over fully recruited ages 6 to 8). These reference points can be used in the application of a Precautionary Approach (PA) framework for southern Gulf of St. Lawrence herring. The current estimate of age 4+ SSB of 22,280 t is just in the borderline of the Blim. It scores 100b.		
<b>c</b>	<b>Guidepost</b>	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.	
	<b>Met?</b>	Y	Y	

PI 2.1.1		<b>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</b>	
	Justification	<p>There is a partial strategy of demonstrably effective management measures in place such that the fall herring fishery does not hinder recovery and rebuilding for the spring herring fishery. There have been a set of management strategies to protect fall and spring herring stocks in 4t. For example, in keeping with the Precautionary Approach, biomass and removal reference points have been defined for the spring and fall spawning components of herring of the southern Gulf. The spring spawning component is less abundant than the fall component and the biomass limit reference points for these are 22,000 t and 51,000 t, respectively, of spawning stock biomass. The spring and fall TACs are set based on a risk analysis of various TAC options in relation to the probability of conforming to the biological reference points and ensuring stock sustainability. The list of management measures for the herring fishery in all of the HFAs in 4T follow:</p> <p><b>Total Allowable Catch:</b> TACs are established for each of the spring and fall components based on the status of the stocks and a risk analysis of various TAC options</p> <p><b>Fishing Areas/Seasons:</b> Fishing seasons and spawning area closures are established annually. For the inshore fishery, the spring fishery opens when conditions are safe and closes at the end of June. The summer/fall fishery begins in July and usually lasts until mid-October. The mobile gear fishery runs from the spring to late fall.</p> <p><b>Control and Monitoring of Removals:</b> Removals from the fishery are controlled and monitored by a variety of measures. These measures vary between the spring and fall fisheries and from area to area and may change from year to year. Some of the measures employed in the gillnet fishery include: dockside monitoring (DMP) for Gulf-based fleets, catch monitoring and logbooks for landings in the Quebec Region, radio/telephone hails, weekly and/or trip landing limits and night time and/or weekend closures. As well, there are limits on the length, depth and mesh sizes of gillnets.</p> <p><b>Management measures specific to the mobile gear fleet:</b> Management measures specific to the mobile gear fleet include a satellite-based vessel monitoring system (VMS), at-sea-observer coverage, limits on the percentage of the TAC that can be captured in certain areas, a small fish protocol and a minimum length of herring of 23.5 cm (the current known size of herring at 50% maturity).</p> <p>Habitat Protection Measures: There are no formal habitat protection measures specific to the HFA 16A-G fishery. There are, however, restrictions imposed on the mobile gear (&gt;19.812 m) fleet to limit their access to certain inshore areas at certain time of the year.</p>	
	Justification	<ul style="list-style-type: none"> <li>•The score should meet 80 for issue c</li> </ul>	
d	Guidepost	<p>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.</p>	

<b>PI 2.1.1</b>		<b>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</b>	
	<b>Met?</b>	Y	
	<b>Justification</b>	<p>The status of the herring component is very known and 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. There is information from the DFO assessments that the status of the spring spawner component is not healthy because according to the 2014 stock assessment the SSB has been below the limit reference points since more than 10 years.</p> <p>According to DFO reports there is minimal retention of spring spawning herring in the fall gillnet fishery. In 2011, 18 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (DFO 2012), which represent 0.2% of the fall herring gillnet fleet landings. In 2013, 1 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (Table 2), which represent 0.02% of the fall herring gillnet fleet landings.</p> <p>There is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding for this fishery. the spring fishery is certainly under a PA with reference points etc. There have been a set of management strategies to protect fall and spring herring stocks in 4t. For example, in keeping with the Precautionary Approach, biomass and removal reference points have been defined for the spring and fall spawning components of herring of the southern Gulf. The spring spawning component is less abundant than the fall component and the biomass limit reference points for these are 22,000 t and 51,000 t, respectively, of spawning stock biomass. The spring and fall TACs are set based on a risk analysis of various TAC options in relation to the probability of conforming to the biological reference points and ensuring stock sustainability. Enclosed there is a list of management measures for the herring fishery in all of the HFAs in 4T</p> <ul style="list-style-type: none"> <li>• Total Allowable Catch: TACs are established for each of the spring and fall components based on the status of the stocks and a risk analysis of various TAC options</li> <li>• Fishing Areas/Seasons: Fishing seasons and spawning area closures are established annually. For the inshore fishery, the spring fishery opens when conditions are safe and closes at the end of June. The summer/fall fishery begins in July and usually lasts until mid-October. The mobile gear fishery runs from the spring to late fall.</li> <li>• Control and Monitoring of Removals: Removals from the fishery are controlled and monitored by a variety of measures. These measures vary between the spring and fall fisheries and from area to area and may change from year to year. Some of the measures employed in the gillnet fishery include: dockside monitoring (DMP) for Gulf-based fleets, catch monitoring and logbooks for landings in the Quebec Region, radio/telephone hails, weekly and/or trip landing limits and night time and/or weekend closures. As well, there are limits on the length, depth and mesh sizes of gillnets.</li> <li>• Management measures specific to the mobile gear fleet: Management measures specific to the mobile gear fleet include a satellite-based vessel monitoring system (VMS), at-sea-observer coverage, limits on the percentage of the TAC that can be captured in certain areas, a small fish protocol and a minimum length of herring of 23.5 cm (the current known size of herring at 50% maturity).</li> <li>• Habitat Protection Measures: There are no formal habitat protection measures specific to the HFA 16A-G fishery. There are, however, restrictions imposed on the mobile gear (&gt;19.812 m) fleet to limit their access to certain inshore areas at certain time of the year. Therefore, the score meets 80 for issue d</li> </ul>	
	<b>References</b>	Pierre Mallet DFO personal communication DFO 201X. Stock assessment for herring in 4T.	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>N/A</b>

**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
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>There is a strategy in place for managing retained species.</p> <p>There have been a set of management strategies to protect fall and spring herring stocks in 4t. For example, in keeping with the Precautionary Approach, biomass and removal reference points have been defined for the spring and fall spawning components of herring of the southern Gulf. The spring spawning component is less abundant than the fall component and the biomass limit reference points for these are 22,000 t and 51,000 t, respectively, of spawning stock biomass. The spring and fall TACs are set based on a risk analysis of various TAC options in relation to the probability of conforming to the biological reference points and ensuring stock sustainability. Enclosed there is a list of management measures for the herring fishery in all of the HFAs in 4T:</p> <ul style="list-style-type: none"> <li>• Total Allowable Catch: TACs are established for each of the spring and fall components based on the status of the stocks and a risk analysis of various TAC options</li> <li>• Fishing Areas/Seasons: Fishing seasons and spawning area closures are established annually. For the inshore fishery, the spring fishery opens when conditions are safe and closes at the end of June. The summer/fall fishery begins in July and usually lasts until mid-October. The mobile gear fishery runs from the spring to late fall.</li> <li>• Control and Monitoring of Removals: Removals from the fishery are controlled and monitored by a variety of measures. These measures vary between the spring and fall fisheries and from area to area and may change from year to year. Some of the measures employed in the gillnet fishery include: dockside monitoring (DMP) for Gulf-based fleets, catch monitoring and logbooks for landings in the Quebec Region, radio/telephone hails, weekly and/or trip landing limits and night time and/or weekend closures. As well, there are limits on the length, depth and mesh sizes of gillnets.</li> <li>• Management measures specific to the mobile gear fleet: Management measures specific to the mobile gear fleet include a satellite-based vessel monitoring system (VMS), at-sea-observer coverage, limits on the percentage of the TAC that can be captured in certain areas, a small fish protocol and a minimum length of herring of 23.5 cm (the current known size of herring at 50% maturity).</li> <li>• Habitat Protection Measures: There are no formal habitat protection measures specific to the HFA 16A-G fishery. There are, however, restrictions imposed on the mobile gear (&gt;19.812 m) fleet to limit their access to certain inshore areas at certain time of the year.</li> </ul> <p>Thus, the fishery meets 100 a</p>		

<b>PI 2.1.2</b>		<b>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</b>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>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. According to DFO reports there is minimal retention of spring spawning herring in the fall gillnet fishery. From the reports documenting spring herring landings on the fall fishery from 2009 to 2014, in 2011, 18 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (DFO 2012), which represent 0.2% of the fall herring gillnet fleet landings. In 2013, 2 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (Table 2), which represent 0.03% of the fall herring gillnet fleet landings. Finally The SSB for spring herring for year 2014 appears to be bordering between the cautious zone and critical zone after 10 years below the cautious zone providing evidence that this partial strategy is working</p> <p>Thus, the fishery meets 80b. However, testing to support high confidence that the strategy will work, based on information directly about the fishery and/or species involved have not been done for this fishery preventing to meet 100b</p>		
<b>c</b>	<b>Guidepost</b>		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	<b>Met?</b>		Y	N
	<b>Justification</b>	<p>There is some evidence that the partial strategy is being implemented successfully. According to DFO reports, there is minimal retention of spring spawning herring in the fall gillnet fishery. From the reports documenting spring herring landings on the fall fishery from 2009 to 2014, in 2011, 18 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (DFO 2012), which represent 0.2% of the fall herring gillnet fleet landings. In 2013, 2 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (Table 2), which represent 0.03% of the fall herring gillnet fleet landings</p> <p>There have been a set of management strategies to protect fall and spring herring stocks in 4t. For example, in keeping with the Precautionary Approach, biomass and removal reference points have been defined for the spring and fall spawning components of herring of the southern Gulf. The spring and fall TACs are set based on a risk analysis of various TAC options in relation to the probability of conforming to the biological reference points and ensuring stock sustainability. Enclosed there is a list of management measures for the herring fishery in all of the HFAs in 4T</p> <p>Finally The SSB for spring herring for year 2014 is in border line on the cautious zone after 10 years below the cautious zone providing some evidence that the partial strategy is being implemented successfully. Thus, the fishery meets 80 for issue c.</p> <p>However given that that there is no observer coverage it is difficult to say that there is clear evidence that the strategy is being implemented successfully preventing the fishery to score 100c</p>		

<b>PI 2.1.2</b>		<b>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</b>		
<b>d</b>	<b>Guidepost</b>			There is some evidence that the strategy is achieving its overall objective.
	<b>Met?</b>			N
	<b>Justification</b>	Evidence is lacking that there is some evidence that the strategy is achieving its overall objective. According DFO reports there is minimal retention of spring spawning herring in the fall gillnet fishery. From the reports documenting spring herring landings on the fall fishery from 2009 to 2014, in 2011, 18 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (DFO 2012), which represent 0.2% of the fall herring gillnet fleet landings. In 2013, 2 t of spring spawner component were caught by the HFA 16F gillnet fall fleet (Table 2), which represent 0.03% of the fall herring gillnet fleet landings. However, there is information on the status of the spring spawner component concluding that it is not healthy because according to the 2014 stock assessment the SSB is within the borderline of the limit reference points and has been in the critical zone since since 2004. Therefore it is difficult to say that the strategy is fully meeting the objectives Thus, the fishery does not meet 100 for issue d		
<b>e</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Not relevant	Not relevant	Not relevant
	<b>Justification</b>			
<b>References</b>		DFO's Pierre Mallet personnel communication As per prévois		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>85</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

### 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
	Justification	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. There is complete information on quantities of the retained spring component from the Fall Gillnet fishery in the SGSL 16F Herring Gill net fishery. Scoring meets 100a		
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
	Justification	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. There is complete information on quantities of the retained spring component from the Fall Gillnet fishery in the SGSL 16F Herring Gill net fishery in order to calculate LRPs. As a result Stock assessment are enabled to quantitatively estimates spring spawner status in relation to the LRP based on the information on retained spring herring catch.  Score meets 100b.		
c	Guidepost	Information is adequate to support measures to manage main retained species.	Information is adequate to support a partial strategy to manage main retained species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	N
	Justification	Information is adequate to support a partial strategy to manage main retained species. There is information on quantities of the retained spring component from the Fall Gillnet fishery in the SGSL 16F Herring Gill net fishery. The information have been of great help in developing a partial strategy to manage main retained species . For example the SSB and F indicators from the assessment are used to inform management decisions through harvest control rules. However it is difficult to say that Information is adequate to support a comprehensive strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective given there is no observer coverage to corroborate . Scoring will be set to 80 for issue c .		

<b>PI 2.1.3</b>		<b>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</b>		
<b>d</b>	<b>Guidepost</b>		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.
	<b>Met?</b>		Y	N
	<b>Justification</b>	Sufficient data continue to be collected to detect any increase in risk level . There is ongoing collection of information on quantities of the retained spring component from the Fall Gillnet fishery in the SGSL 16F Herring Gill net fishery through a good dockside monitoring program. However since there is no observer monitoring coveragefor this fishery, it is difficult to say that the ongoing monitoring of the retained species is sufficient enough and very complete to assess ongoing mortalities to all retained species preventing the fishery to score 100d It meets 80d		
<b>References</b>		DFO's Pierre Mallet personnel communication, DFO 2014, DFO 2012		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

**Evaluation Table for PI 2.2.1**

<b>PI 2.2.1</b>		<b>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</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	Main bycatch species are highly to be within biologically based limits. The assessment team was informed by DFO officials at the site visit that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. However given there is no observer coverage on this fishery it is difficult to say with a high degree of certainty that bycatch species are within biologically limits without corroboration of independent data (e.g observer) and without a bycatch logbook program preventing the fishery to meet 100a		
<b>b</b>	<b>Guidepost</b>	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.	
	<b>Met?</b>	Y	Y	
	<b>Justification</b>	There is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding. The IFMP for this fishery states that the short-term objectives are to minimize by catches of other species in the herring directed fisheries. The key management measures in the inshore fixed gear fishery include: limited entry licensing, seasons, size of gillnets, mesh size, weekly and daily trip limits, restricted nighttime and daytime fishing, weekend. Th. Furthermore, the way how the fishery operates (e.g setting the net during herring migration activity that may last one hour to 6 hours) prevents bycatch occurrence. The assessment team was informed by DFO officials that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. It meets 80b.		
<b>c</b>	<b>Guidepost</b>	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.		
	<b>Met?</b>	Y		

<b>PI 2.2.1</b>		<b>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</b>
	<b>Justification</b>	There has been no observer coverage of the gillnet fishery and thus there is no information on potential discards. However 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 . The IFMP for this fishery states that the short-term objectives are to minimize by catches of other species in the herring directed fisheries. The key management measures in the inshore fixed gear fishery include: limited entry licensing, seasons, size of gillnets, mesh size, weekly and daily trip limits, restricted nighttime and daytime fishing, weekend. Furthermore, the way how the fishery operates (e.g setting the net during herring migration activity that may last one hour to 6 hours) prevents bycatch occurrence. The assessment team was also told by DFO that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. It meets 60c.
<b>References</b>		DFO's Pierre Mallet personnel communication
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>		<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>N/A</b>

**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
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	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. The IFMP for this fishery states that the short-term objectives are to minimize by catches of other species in the herring directed fisheries. The key management measures in the inshore fixed gear fishery include: limited entry licensing, seasons, size of gillnets, mesh size, weekly and daily trip limits, restricted nighttime and daytime fishing, weekend. The assessment team was also told by DFO officials that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. It meets 80a. However we cannot say that there is a comprehensive strategy in place for managing and minimizing bycatch for all species given that there is a lack of a current ent logbook program and observer program to support an specific comprehensive strategic plan to manage bycatch preventing the fishery to score 100 a.		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	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. The assessment team was told by DFO officials that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. Furthermore, the fishing operations of this particular fishery are designed to catch only herring. For example these gillnets are "set" to intercept fish during their normal migrations, either along the shore, on the spawning grounds or as they move in and out of an area. . A common single "set" may last from less than an hour to some part of the night, depending on seasons, currents, the weather, and how much fish are catching . During fall season gillnets are set just at the end of falling or rising tide, and retrieved when the tide starts to run heavy again. Because of this common practice it is believed that bycatch for this fishery is minimal to non existent . However there have been no testing to support with high confidence that the current strategy is working , based on information directly about the fishery and/or species involved. Furthermore there is no current logbook program and observer coverage. It meets 80b		

<b>PI 2.2.2</b>		<b>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</b>	
<b>c</b>	<b>Guidepost</b>		There is some evidence that the partial strategy is being implemented successfully.
	<b>Met?</b>		Y
	<b>Justification</b>	There is clear evidence that the strategy is being implemented successfully.	
<b>d</b>	<b>Guidepost</b>		There is some evidence that the strategy is being implemented successfully. The assessment team was told by DFO officials that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. Furthermore, the fishing operations of this particular fishery are designed to catch only herring. Please refer to justification on issue b above. However it is difficult to tell is there a clear evidence that the strategy is being implemented successfully based on some information directly from DFO and fishermen with no current logbook program and observer coverage. Thus, the fishery should be better monitored to see clear evidence that the strategy is being implemented successfully. It meets 80c
	<b>Met?</b>		Y
	<b>Justification</b>	There is some evidence that the strategy is achieving its overall objective.	
<b>References</b>	DFO's Pierre Mallet personnel communication		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>N/A</b>

### 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	N
	Justification	Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery. The assessment team was also told by DFO that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. There is no observer coverage nor a logbook program thus we cannot say that there is accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations. Thus, It is imperative to fulfill the need for corroboration of the limited bycatch in the fishery by an independent monitoring program.  It meets 80a		
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	Y	N
	Justification	Information is sufficient to estimate outcome status with respect to biologically based limits. The assessment team was also told by DFO that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. However, there is no observer coverage, and no logbook program to corroborate this limited bycatch in the fishery thus we cannot say that there is Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.  It meets 80b		
c	Guidepost	Information is adequate to support measures to manage bycatch.	Information is adequate to support a partial strategy to manage main bycatch species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	N
	Justification	Information is adequate to support a partial strategy to manage main bycatch species. The assessment team was told by DFO that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. However there is no observer coverage and the fishery does not have a bycatch logbook program, thus we cannot say that there is Information is adequate to support a comprehensive strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.  It meets 80c		

<b>PI 2.2.3</b>		<b>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</b>	
<b>d</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	N	N
	<b>Justification</b>	The assessment team was also informed by DFO that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. There is no observer coverage, bycatches are not recorded thus we cannot say that there is an ongoing collection program 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) It does not meet 80d	
<b>References</b>		DFO's Pierre Mallet personnel communication	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			<b>75</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>2</b>

**Evaluation Table for PI 2.3.1**

<b>PI 2.3.1</b>		<b>The fishery meets national and international requirements for the protection of ETP species</b> <b>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>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. According to MSC (CB3.11.1), ETP species are defined as those that are recognised by national legislation and those that are listed in Appendix 1 of CITES. Species that appear exclusively on non-binding list such as IUCN Red List or that are only the subject of intergovernmental recognition (such as FAO International Plans of Action) and that are not included under national legislation or binding international agreement are not considered as ETP species under MSC standards.</p> <p>From 2007 to 2013, there were no ETP species interaction reported in DFO species-at-risk logbooks for the fall gillnet herring fishery yielding sufficient support for SG 80. (Manon Mallet personal communication 11/29/14)</p> <p>However, given that there is no observer monitoring system in place, and no verification of the SARA logbooks data, we cannot say with a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species preventing the fishery to score 100a.</p>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>Direct effects are highly unlikely to create unacceptable impacts to ETP species. From 2007 to 2013, there were no ETP species interactions reported in DFO species-at-risk logbooks for the fall gillnet herring fishery implying that direct effects are minimal close to nothing.</p> <p>However, we cannot say with a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species given that there is no observer coverage and no verification of the logbook records (Manon Mallet personal communication 11/29/14) preventing the fishery to meet 100b</p>		

<b>PI 2.3.1</b>		<b>The fishery meets national and international requirements for the protection of ETP species</b> <b>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species</b>		
<b>c</b>	<b>Guidepost</b>			There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	<b>Met?</b>		Y	N
	<b>Justification</b>	<p>Indirect effects are highly unlikely to create unacceptable impacts to ETP species. From 2007 to 2013, there were no ETP species interactions reported in DFO species-at-risk logbooks for the fall gillnet herring fishery implying that indirect effects are minimal close to nothing .</p> <p>However, we cannot say with a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species given that there is no observer coverage and no verification of the SARA logbook records (Manon Mallet personal communication 11/29/14) preventing the fishery to meet 100c. Furthermore indirect effects of this fishery to ETP species has not fully studied in this area.</p>		
<b>References</b>		DFO, 2012b; O'Boyle, 2013		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

**Evaluation Table for PI 2.3.2**

<b>PI 2.3.2</b>		<b>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.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>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. In Canada the primary management strategies for the protection of ETP species are provided by SARA. Once protected under SARA, ETP species are subject to recovery strategies and management plan. Canadian fishermen are obliged to complete a mandatory SARA Logbook and provision of data on ETP species is included. From 2007 to 2013, there were no ETP species interactions reported in DFO species-at-risk logbooks for the fall gillnet herring fishery.</p> <p>Moreover the input controls and fishing operations reduce the possible interactions with marine mammals and turtles Inputs controls in the HFA 16F fishery are:</p> <ul style="list-style-type: none"> <li>• Limited entry licensing,</li> <li>• Maximum gillnet number (6) and total length (100 fathoms total/15.5 fathoms each),</li> <li>• Maximum net depth (125 meshes)</li> <li>• Defined seasonal closed times, (opening date is set in Conservation Harvesting Plan (CHP)).</li> <li>• Daily and weekly open and closed times (usually no fishing from 1200-1800 daily or on weekends).</li> </ul> <p>For example these gillnets are "set" to intercept fish during their normal migrations, either along the shore, on the spawning grounds or as they move in and out of an area. A common single "set" may last from less than an hour to some part of the night, depending on seasons, currents, the weather, and how much fish are catching. During fall season gillnets are set just at the end of falling or rising tide, and retrieved when the tide starts to run heavy again.</p> <p>However, it cannot be said that is comprehensive as the fishery does not have a observer program to verify the SARA logbooks records.</p> <p>It meets 80a.</p>		

<b>PI 2.3.2</b>		<b>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.</b>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved. . From 2007 to 2013, there were no ETP species interaction reported in DFO species-at-risk logbooks for the fall gillnet herring fishery.</p> <p>However, the Assessment Team is not aware of any quantitative analysis that has been conducted to determine the likely success of the approach used to minimize impact of the herring fishery on the ETP species encountered, preventing the fishery from meeting 100b.</p> <p>It meets 80b.</p>		
<b>c</b>	<b>Guidepost</b>		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	<b>Met?</b>		Y	N
	<b>Justification</b>	<p>There is evidence that the strategy is being implemented successfully. Once protected under SARA, ETP species are subject to recovery strategies and management plan. A mandatory SARA logbook must be completed and submitted to DFO as a condition of license. From 2007 to 2013, there were no ETP species interaction reported in DFO species-at-risk logbooks for the fall gillnet herring fishery.</p> <p>However, it cannot be said that there is clear evidence that the strategy is being implemented successfully given that there is no corroboration of the SARA logbooks by an independent monitoring program. The assessment team assigned a N to SG100 as no ongoing observer program is carried out in this fishery.</p>		
<b>d</b>	<b>Guidepost</b>			There is evidence that the strategy is achieving its objective.
	<b>Met?</b>			Y

PI 2.3.2	<p><b>The fishery has in place precautionary management strategies designed to:</b>  <b>Meet national and international requirements;</b>  <b>Ensure the fishery does not pose a risk of serious harm to ETP species;</b>  <b>Ensure the fishery does not hinder recovery of ETP species; and</b>  <b>Minimise mortality of ETP species.</b></p>	
	<b>Justification</b>	<p>One of the IFMP short term objectives is to minimize bycatches of other species including ETP species in the herring directed fisheries. All fishermen are required, through conditions of licence, to submit to DFO a SARA logbook at the end of each fishing season. The SARA logbook requires harvesters to report any interactions with species at risk while conducting fishing operations. From 2007 to 2013, there were no ETP species interaction reported in DFO species-at-risk logbooks for the fall gillnet herring fishery. (Manon Mallet personal communication 11/29/14). Thus evidence exists that the strategy is achieving its objective.</p> <p>It meets 100d</p>
<b>References</b>	Information provided by DFO during site visit meeting.	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>		<b>85</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>N/A</b>

### Evaluation Table for PI 2.3.3

<b>PI 2.3.3</b>		<b>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.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>Sufficient data is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.</p> <p>Canadian fishermen are obliged to complete a mandatory logbook and provision of data on ETP species is included. From 2007 to 2013, there were no ETP species interactions reported in DFO species-at-risk logbooks for the fall gillnet herring fishery. (Manon Mallet personal communication 11/29/14).</p> <p>However, information is not sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty as there is no observer coverage to verify the information provided by the fishermen in the SARA logbooks, preventing the fishery from meeting 100a.</p>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.</p> <p>Canadian fishermen are obliged to complete a mandatory logbook and provision of data on ETP species is included. From 2007 to 2013, there were no ETP species interactions reported in DFO SARA logbooks for the fall gillnet herring fishery (Manon Mallet personal communication 11/29/14).</p> <p>However, it is difficult to obtain accurate and verifiable information for all impacts as there is absence of observer coverage in the fishery and there is no method of verification on the SARA logbooks records. As a result the absence of observer coverage in the fishery may produce inadequate data coverage to fully satisfy 100b. It is likely that unreported encounters with ETP species could occur and that the potential exists for this fishery to have some negative impact on the larger ETP species found in the fishery areas.</p>		

<b>PI 2.3.3</b>		<b>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.</b>		
<b>c</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species. Once protected under SARA, ETP species are subject to recovery strategies and management plan.. From 2007 to 2013, there were no ETP species interactions reported in DFO SARA logbooks for the fall gillnet herring fishery. (Manon Mallet personal communication 11/29/14).</p> <p>However, information to support a comprehensive startegy to manage all impacts of the fishery is not sufficient enough because there is no observer coverage in the fishery and there is no actual verification of the logbook data . It is likely that unreported encounters with ETP species could occur and that the potential exists for this fishery to have some negative impact on the larger ETP species found in the fishery areas. Therefore these factors prevent the fishery to meet 100c.</p>		
<b>References</b>		Information provided by DFO		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

**Evaluation Table for PI 2.4.1**

<b>PI 2.4.1</b>		<b>The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>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.</p> <p>Fuller et al., (2008) examined the ecological impacts of the most common types of fishing gear used in Canada and assessed the relative severity of these impacts to seafloor habitat and discarded bycatch of target and non-target species. They determined that bottom gillnets have a low impact on the seafloor. DFO (2010b) and Dufour and Quillet (2007) provide some evidence that the fall gillnet fishery is having limited impact on the marine habitat.</p> <p>However, there is no specific evidence derived from habitat specific studies in relation to the herring fishery preventing the fishery to meet SG100a. Furthermore, as the evidence is not specific to the area of the fishery, a score of 80 is granted.</p>		
<b>References</b>		<p>Dufour and Quillet, (2007)  DFO, (2010b)  Fuller, (2008)  Shester and Micheli, (2011)</p>		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

## 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	Y
	Justification	<p>There is a strategy in place for managing the impact of the fishery on habitat types.</p> <p>In 1986, DFO implemented the Policy for the Management of Fish Habitat (Habitat Policy) to support the habitat protection provisions of the Fisheries Act. The Habitat Policy's three goals include:</p> <ol style="list-style-type: none"> <li>1. Conservation of existing habitats;</li> <li>2. Restoration of damaged habitat; and</li> <li>3. Development of new habitats.</li> </ol> <p>Several national Policies have been implemented to support habitat protection and to mitigate impacts of fishing on sensitive benthic habitats or avoid impacts of fishing that are likely to cause serious or irreversible harm to sensitive marine habitat, communities and species.</p> <p>In 2009, DFO published the Policy for Managing the Impact of Fishing on Sensitive Benthic Areas under the auspices of the Sustainable Fisheries Framework in response to the 2006 United Nations Resolution 61/105. The purpose policy is to help DFO manages fisheries to mitigate impacts of fishing on sensitive benthic habitats or avoid impacts of fishing that are likely to cause serious or irreversible harm to sensitive marine habitat, communities and species.</p> <p>On June 29, 2013 amendments to the <i>Fisheries Act</i> have been approved. The Fisheries Protection Program and its Policy Statements (November 2013) support changes made to the <i>Fisheries Act</i>. The Fisheries Protection Policy Statement (FPPS) focuses on the management of impacts to fish resulting from habitats degradation or loss and alterations to fish passage and flow.</p> <p>Through the FPPS, DFO objectives are to provide consistent guidance through regulations, standards and directives, and to make regulatory decisions in a timely manner. In this way, proponents will have the necessary information and direction to avoid, mitigate and offset harmful impacts to fish and fish habitat so that they will meet the goal of this policy, and thereby comply with the fisheries protection provisions of the <i>Fisheries Act</i>. The prohibition against <i>serious harm to fish</i> applies to fish and fish habitat that are part of or support commercial, recreational or Aboriginal fisheries. Section 35 of the <i>Fisheries Act</i> prohibits <i>serious harm to fish</i> which is defined in the Act as "the death of fish or any permanent alteration to, or destruction of, fish habitat".</p> <p>Impacts on habitats are limited by restricting the gillnet size, the number of fishermen and the fishing season. Also, fishing activities are not allowed from 15:00 Friday to 15:00 Sunday. It meets 100a</p>		

<b>PI 2.4.2</b>		<b>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</b>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. DFO (2010b) and Dufour and Quillet (2007) provide some evidence that the fall gillnet fishery is having limited impact on the marine habitat. However, there has been no specific testing to determine the impact of the fishery on habitats, preventing the fishery from meeting 100b		
<b>c</b>	<b>Guidepost</b>		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	<b>Met?</b>		Y	N
	<b>Justification</b>	There is some evidence that the partial strategy is being implemented successfully  Several national policies have been implemented to support habitat protection and to mitigate impacts of fishing on sensitive benthic habitats or avoid impacts of fishing that are likely to cause serious or irreversible harm to sensitive marine habitat, communities and species.  Management has also addressed possible impacts on habitats through limiting restricting the gillnet size, the number of fishermen and the fishing season. Also, fishing activities are not allowed from 15:00 Friday to 15:00 Sunday. As part of its EAM, DFO identified EBSAs which require special management measures from anthropogenic disturbances that can have significant impact on the benthic habitat. These EBSAs contained are numerous strategic measures (e.g. closed areas and MPAs) that can be employed to limit impacts. But there is no evidence that a comprehensive strategy have been implemented successfully. It meets 80c but not SG100c.		
<b>d</b>	<b>Guidepost</b>			There is some evidence that the strategy is achieving its objective.
	<b>Met?</b>			N
	<b>Justification</b>	As part of its EAM, DFO identified EBSAs which require special management measures from anthropogenic disturbances that can have significant impact on the benthic habitat. These EBSAs contained numerous strategic measures (e.g. closed areas and MPAs) that can be employed to limit impacts. But there is no evidence that the strategy is achieving its objective. This allows no scoring of SG100d.		
<b>References</b>		DFO presentation on site visit		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>85</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

### 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
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. The nature and the distribution of all main habitat types in the herring fall gillnet fishery are known at a level of detail relevant to the scale and the intensity of the fishery as coastal and epipelagic habitats of the Gulf of St. Lawrence have been mapped, including 16F.</p> <p>Eel grass meadows are considered “fish habitats” and are therefore protected from harmful alteration, disruption and destruction (HADD) unless authorized under Section 35 of the Fisheries Act. Under the Fisheries Act, corals and sponges are defined as “fish” and “fish habitat” and are therefore protected from harmful alteration, disruption and destruction (HADD) unless authorized under Section 35 of the Fisheries Act. 16FI is not considered as a significant area for corals and sponges.</p> <p>An overview of the physical oceanographic and benthic habitat of the Gulf of St. Lawrence is provided in Dufour and Ouellet (2007). These documents allow scoring of this PI. SG60a requires a basic understanding of the habitat in the area of the fishery. The EBSA analysis, which considered all areas, provides this. SG80a requires knowledge of the vulnerability of the habitat in the area of the fishery. The EBSA analysis implies that there is one EBSA (# 2) within the area of the UoC fishery. SG100a requires knowledge of the habitat types over their range. It meets 100a because of the EBSA analysis.</p>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>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. It has been documented that pelagic gillnets have limited impact (DFO 2010b and Dufour and Ouellet 2007), and given the the small area generally covered by the fishery (HFA16F), It meets 80b. On the other hand, SG100b will likely not be met as it requires a fully quantified analysis of the impacts of the fishery which does not exist.</p>		

<b>PI 2.4.3</b>		<b>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</b>	
<b>c</b>	<b>Guidepost</b>		<p>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).</p> <p>Changes in habitat distributions over time are measured.</p>
	<b>Met?</b>		<p>Y</p> <p>N</p>
		<p>Evidence exists that there is sufficient data currently 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) requires the on-going collection of data sufficient to detect any increase in risk to the habitat.</p> <p>However, the overall scale of the fishery (in HFA 16F) in relation to the EBSAs shows that it is unlikely to demonstrate a major impact of pelagic gillnet gear on the habitat. It meets 80c However, SG100c will likely not score given the requirement to monitor temporal changes in the habitat.</p>	
<b>References</b>		DFO presentation on site visit	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			<b>85</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>N/A</b>

**Evaluation Table for PI 2.5.1**

<b>PI 2.5.1</b>		<b>The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>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.</p> <p>The main and perhaps only ecosystem element of concern is the UoC's fishery on the fall spawning stock of Herring. There is only one SI for this PI. It judges the fishery's probability of disrupting key ecosystem elements to the point of serious and irreversible harm, increasing from unlikely (40% probability of harm) at SG60, through highly unlikely (30% probability of harm) at SG80 to having only minor 20% probability of harm) evidence of impact (at SG100.)</p> <p>The assessment team could not find any concern indicating that the SGSL HF 16 F Gillnet fishery causes any disruption of the key elements underlying ecosystem structure and function especially to a point where there would be a serious threat or irreversible harm. The main impact of the fishery on target, bycatch, and ETP species, and habitat are identified and there is no indication that the fishery perturbed to the ecosystem main structure and function. There is a comprehensive assessment of the target species, and information is available to show the negligible impact on retained, bycatch, and ETP species. There is no indication that the fishery causes serious or irreversible harm to habitats.</p> <p>It meets 100a.</p>		
<b>References</b>		DFO presentation at site visit		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

## 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		<p>There is a partial strategy in place outlined in the Herring fall fishery's CHP.</p> <p>Under the <i>Oceans Act</i> and the <i>Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada</i>, DFO is committed to the development of large-scale and local integrated management plans for all of Canada's oceans. This includes implementation by DFO of an Ecosystem Approach to management in all activities for which it has management responsibility. The governance, regulation and management of activities within and surrounding the Gulf are shared between a wide variety of government departments and agencies involved in, or with an interest in, the use and management of resources within its coastal, estuarine and marine environments. The process is intended to involve all stakeholders. There is a strategy in place that is being implemented and will continue to develop under new national policies.</p> <p>Canada has developed a SFF which builds on existing fisheries management practices to form a foundation for implementing an ecosystem approach in the management of its fisheries to ensure continued health and productivity while protecting biodiversity and fisheries habitat. The primary goal of the SFF is to ensure that Canada's fisheries are environmentally sustainable, while supporting economic prosperity. It is designed to foster a more rigorous, consistent, and transparent approach to decision making across all key fisheries in Canada. Overall, the SFF provides the foundation of an ecosystem-based and precautionary approach to fisheries management in Canada.</p> <p>The management of the fall herring fishery limits harm to ecosystem structure and function by restricting the number of fishermen, the size of the gillnets, and the fishing season. The measures outlined in the herring fall fishery's CHP also reference to management in an ecosystem context.</p> <p>However it cannot be said it is a plan in place as they are only management measures preventing to score 100b.</p>		
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.	<p>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.</p> <p>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.</p>
	Met?	Y	Y	N

	<b>Justification</b>	<p>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</p> <p>There are measures outlined in the Herring fall fishery's CHP takes into account available information and is expected to restrain impacts of the fishery on the ecosystem</p> <p>Under the Oceans Act and the Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada, DFO is committed to the development of large-scale and local integrated management plans for all of Canada's oceans. This includes implementation by DFO of an Ecosystem Approach to management in all activities for which it has management responsibility. The governance, regulation and management of activities within and surrounding the Gulf are shared between a wide variety of government departments and agencies involved in, or with an interest in, the use and management of resources within its coastal, estuarine and marine environments. The process is intended to involve all stakeholders. There is a strategy in place that is being implemented and will continue to develop under new national policies.</p> <p>Canada has developed a SFF which builds on existing fisheries management practices to form a foundation for implementing an ecosystem approach in the management of its fisheries to ensure continued health and productivity while protecting biodiversity and fisheries habitat. The primary goal of the SFF is to ensure that Canada's fisheries are environmentally sustainable, while supporting economic prosperity. It is designed to foster a more rigorous, consistent, and transparent approach to decision making across all key fisheries in Canada. Overall, the SFF provides the foundation of an ecosystem-based and precautionary approach to fisheries management in Canada.</p> <p>The management of the fall herring fishery limits harm to ecosystem structure and function by restricting the number of fishermen, the size of the gillnets, and the fishing season. The measures outlined in the herring fall fishery's CHP also reference to management in an ecosystem context. Therefore, it meets 80b</p> <p>However it cannot be said that 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 given that there is no independent monitoring programs preventing the fishery to meet 100b .</p> <p>Therefore, it meets 80b</p>		
<b>c</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N

	<b>Justification</b>	<p>The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems)</p> <p>There are measures outlined in the Herring fall fishery's CHP that provides evidence that the m partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). Under the Oceans Act and the Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada, DFO is committed to the development of large-scale and local integrated management plans for all of Canada's oceans. This includes implementation by DFO of an Ecosystem Approach to management in all activities for which it has management responsibility. The governance, regulation and management of activities within and surrounding the Gulf are shared between a wide variety of government departments and agencies involved in, or with an interest in, the use and management of resources within its coastal, estuarine and marine environments. The process is intended to involve all stakeholders. There is a strategy in place that is being implemented and will continue to develop under new national policies.</p> <p>Canada has developed a SFF which builds on existing fisheries management practices to form a foundation for implementing an ecosystem approach in the management of its fisheries to ensure continued health and productivity while protecting biodiversity and fisheries habitat. The primary goal of the SFF is to ensure that Canada's fisheries are environmentally sustainable, while supporting economic prosperity. It is designed to foster a more rigorous, consistent, and transparent approach to decision making across all key fisheries in Canada. Overall, the SFF provides the foundation of an ecosystem-based and precautionary approach to fisheries management in Canada.</p> <p>The management of the fall herring fishery limits harm to ecosystem structure and function by restricting the number of fishermen, the size of the gillnets, and the fishing season.</p> <p>Despite an ongoing focus on ecological research as part of Canada's efforts to implement an ecosystem approach to management, no issues with herring fall gillnet fishing have been identified and there is no indication that the fishery causes any form of ecosystem disruption or harm to ecosystem structure and function.</p> <p>The assessment team could not find any concern indicating that the herring gillnet fishery causes any disruption of the key elements underlying ecosystem structure and function. The main impact of the fishery on target, retained, bycatch and ETP species, and habitat are identified and there is no indication that the fishery causes disruption to the ecosystem main structure and function. There is a comprehensive assessment of the target species, and information is available to show the negligible impact on bycatch and ETP species. There is no indication that the fishery causes serious or irreversible harm to habitats.</p> <p>However it cannot be said the measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved given that there is no observer data to corroborate these statements preventing the fishery to score 100c</p>	
<b>d</b>	<b>Guidepost</b>		<p>There is some evidence that the measures comprising the partial strategy are being implemented successfully.</p> <p>There is evidence that the measures are being implemented successfully.</p>
	<b>Met?</b>		<p>Y</p> <p>N</p>

	<b>Justification</b>	<p>There is some evidence that the measures comprising the partial strategy are being implemented successfully</p> <p>There are measures outlined in the Herring fall fishery’s CHP that provides evidence that the measures comprising the partial strategy are being implemented successfully. Under the Oceans Act and the Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada, DFO is committed to the development of large-scale and local integrated management plans for all of Canada's oceans. This includes implementation by DFO of an Ecosystem Approach to management in all activities for which it has management responsibility. The governance, regulation and management of activities within and surrounding the Gulf are shared between a wide variety of government departments and agencies involved in, or with an interest in, the use and management of resources within its coastal, estuarine and marine environments. The process is intended to involve all stakeholders. There is a strategy in place that is being implemented and will continue to develop under new national policies.</p> <p>Canada has developed a SFF which builds on existing fisheries management practices to form a foundation for implementing an ecosystem approach in the management of its fisheries to ensure continued health and productivity while protecting biodiversity and fisheries habitat. The primary goal of the SFF is to ensure that Canada’s fisheries are environmentally sustainable, while supporting economic prosperity. It is designed to foster a more rigorous, consistent, and transparent approach to decision making across all key fisheries in Canada. Overall, the SFF provides the foundation of an ecosystem-based and precautionary approach to fisheries management in Canada.</p> <p>The management of the fall herring fishery limits harm to ecosystem structure and function by restricting the number of fishermen, the size of the gillnets, and the fishing season.</p> <p>Despite an ongoing focus on ecological research as part of Canada’s efforts to implement an ecosystem approach to management, no issues with herring fall gillnet fishing have been identified and there is no indication that the fishery causes any form of ecosystem disruption or harm to ecosystem structure and function.</p> <p>The assessment team could not find any concern indicating that the herring fall gillnet fishery causes any disruption of the key elements underlying ecosystem structure and function. The main impact of the fishery on target, bycatch and ETP species, and habitat are identified and there is no indication that the fishery causes disruption to the ecosystem main structure and function. There is a comprehensive assessment of the target species, and information is available to show the negligible impact on bycatch and ETP species. There is no indication that the fishery causes serious or irreversible harm to habitats. However it cannot be said that there is evidence that the measures are being implemented successfully given that there is no independent monitoring programs to corroborate these findings preventing the fishery to score 100d It meets 80d</p>
<b>References</b>	DFO presentation at site visits and materials	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>		<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>N/A</b>

### 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
<b>a</b>	<b>Guidepost</b>	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.	
	<b>Met?</b>	Y	Y	
	<b>Justification</b>	<p>Information is adequate to broadly understand the key elements of the ecosystem. There is extensive quantity of information available to understand the key elements of the ecosystems and has been utilized to model local food webs in the Gulf of St Lawrence. Information is adequate to broadly understand the key elements of the ecosystem. The physical environment and the chemical environment including suspended particulate matter, nutrients, oxygen, organic carbon and contaminants in the Gulf of St. Lawrence are studied and well known.</p> <p>The Gulf comprises a vibrant marine ecosystem with high biodiversity. The main groups and species found in the waters of the Gulf are: phytoplankton, zooplankton, invertebrates, forage fish, large ichthyophagous fish species, birds and marine mammals. At the base of any marine ecosystem, there is the phytoplankton. Benthic invertebrates feed on them when they fall to the bottom but zooplankton is almost its only predator. Zooplankton in turn is consumed by small forage fish species, e.g. capelin, sand lance, herring and mackerel. Forage species play a key role in transferring energy from secondary producers (zooplankton) towards fish and other higher trophic levels. Large ichthyophagous fish species include cod, redfish and flatfish. Overall, cetaceans, seals, cod and redfish are the main predators of forage species. Marine birds also feed on them. The benthic community of invertebrates mostly made up of shellfish, molluscs, sea urchins and worms, and includes species such as the northern shrimp, snow crab have an important role in the transfer of energy. Marine mammals form an unavoidable component in the trophic links in the Gulf. They are at the top of the food web.</p> <p>. So the SG meets 80a</p>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N

<b>PI 2.5.3</b>		<b>There is adequate knowledge of the impacts of the fishery on the ecosystem</b>	
	<b>Justification</b>	<p>Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail by ecosystem modeling . However the focus of the modeling was the whole southern Gulf and not the area of the fishery. Nevertheless, the main impacts on the key ecosystem elements can be inferred and have been studied in detail.</p> <p>However it cannot be said that main interactions between the fishery and these ecosystem elements can be inferred from existing information, and that they have been investigated in detail preventing the fishery to meet 100b.</p> <p>Although there is a comprehensive assessment of the target species, information on occurrence for retained, bycatch species is minimal .Catch of retained and bycatch species are considered to be exceptionally rare and negligible.No ETP species catch has been reported in mandatory SARA logbooks. Furthermore, there is no bycatch monitoring and no comparison studies on direct impacts on habitats before-after-fishing .Thus it meets 80b</p>	
<b>c</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	N
	<b>Justification</b>	<p>The main functions of the Components (i.e., target, bycatch, retained and ETP species and Habitats) in the ecosystem are known by ecosystem modelling.</p> <p>Main impacts of the fishery on target, retained, bycatch and ETP species, and habitat are identified. There is a high degree of certainty that the herring stock is above the point where recruitment would be impaired. Catch of retained and bycatch species are considered to be exceptionally rare and negligible. However, there is no observer monitoring program to confirm this . No ETP species catch has been reported in mandatory logbooks or independent observer reports. Fishery is carried out where almost no contact is made with the seabed and if there is contact, it is negligible because of the minimal dimensions of the fishing gear. Despite this, there is not enough information on the impacts of this fishery on the ecosystem on target, bycatch, retained and ETP species given the lack of observer data and the lack of studies relating direct impacts on habitats before-after-fishing comparisons preventing the fishery to score 100c.</p>	
<b>d</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	N

<b>PI 2.5.3</b>		<b>There is adequate knowledge of the impacts of the fishery on the ecosystem</b>	
	<b>Justification</b>	<p>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.</p> <p>Main impacts of the fishery on target, retained, bycatch and ETP species, and habitat are identified by ecosystem modeling. There is a high degree of certainty that the herring stock is above the point where recruitment would be impaired. Catch of retained and bycatch species are considered to be exceptionally rare and negligible. However, there is no observer monitoring program to confirm this. No ETP species catch has been reported in mandatory logbooks or independent observer reports. Fishery is carried out where almost no contact is made with the seabed and if there are contact it is negligible because of the minimal dimensions of the fishing gear.</p> <p>Despite this there is not enough information on impacts of this fishery on the ecosystem the Components and elements to allow the main consequences for the ecosystem to be inferred because detailed understanding of all ecosystem elements impacted by the fishery is lacking preventing the fishery to score 100d.</p>	
<b>e</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	N
	<b>Justification</b>	<p>Sufficient data continue to be collected to detect any increase in risk level.</p> <p>Catch of retained and bycatch species are considered to be exceptionally rare and negligible however there is no observer monitoring program to confirm this. No ETP species catch has been reported in mandatory SARA logbooks. Fishery is carried out where almost no contact is made with the seabed and if there are contact it is negligible because of the minimal dimensions of the fishing gear.</p> <p>However, complete information on impacts of the fishery is lacking as there is scarce information on major components of the foodwebs would respond on fishing impacts along with environmental factors such as temperatures, ocean acidification, regime shifts, global warming etc. This prevents to score 100e</p>	
<b>References</b>	DFO Information from site visits		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>N/A</b>

**Evaluation Table for PI 3.1.1**

<b>PI 3.1.1</b>		<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b>  <b>Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2;</b>  <b>and</b>  <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b>  <b>Incorporates an appropriate dispute resolution framework.</b></p>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>A</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2</p> <p>The Canadian fisheries management system generally meets this requirement through its administration of Canadian fisheries laws at the national and regional level and its participation in numerous multi-lateral and bi-lateral fisheries management arrangements with other countries. It is based on powerful Acts that give the Minister authority to manage both fisheries and the oceans, to implement a precautionary approach to management and to regulate foreign vessels fishing in or around Canadian waters. Canada is also a signatory to LOS and UNFA and a member of several RFMOs worldwide. It meets 100a.</p>		
<b>B</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>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.</p> <p>The Canadian fisheries management authority is not continually facing court challenges but rather has been influenced by occasional landmark court decisions that significantly impact fisheries policies and programs (e.g. Sparrow, Marshall and Larocque). There are provisions for appeal of licensing decision to Atlantic area appeal boards. Otherwise, unresolved disputes in fisheries can be, and have been, taken to the Canadian court system for a decision. Except for the Larocque case, challenges of the Minister's right to allocate as he saw fit have not been successful. It meets 100b.</p>		

<b>PI 3.1.1</b>		<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <p><b>Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</b></p> <p><b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></p> <p><b>Incorporates an appropriate dispute resolution framework.</b></p>		
<b>c</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p> <p>Ongoing development of quota allocation policies has provided access to various user groups in different fisheries. These arrangements are reflected in licensing policies and quota allocation arrangements that are now usually spelled out in Integrated Fishery Management Plans or in the annual fisheries management decisions posted on the Departmental website.</p> <p>The system does not commit formally to some rights until they have been legally proven or established and then they are implemented in a manner and timeframe consistent with the Minister's resource conservation mandate. In other instances, fishing rights have been worked out or formalized in the context of land claims agreements which is a negotiated process headed by the Department of Indian and Northern Affairs.</p> <p>This management system meets all the requirements for PI except for 100d. Therefore a score of 95 is assigned.</p>		
<b>References</b>	Section 4.5.1 above and Parsons, L.S (2009).			
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>95</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

### 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	Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organizations 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.	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.
	Met?	Y	Y	Y
	Justification	<p>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</p> <p>The roles and responsibilities of all stakeholders in 4T and HFA 16F Herring fisheries appear to be adequately understood in terms of the RAP and advisory committee process (as well as the associated annual decision-making process). While the current IFMP is still in draft form, the annual overall management framework for the 4T and HFA 16 F fisheries is updated periodically with annual fishery management decisions on such elements as TACs, opening/closing dates or changes to other management measures. There is an annual pre-season local advisory meeting in HFA 16F and ongoing dialogue during the open season. All annual decisions are communicated to industry organizations and published on the Department's website.</p> <p>The primary vehicle for consultations on management measures in the 4T fishing area is GSPAC which did meet annually but will now move to a biennial schedule. This committee has been hampered by ongoing allocation issues that necessitated formation of a smaller SGWP to discuss specific management measures relating to allocations within 4T. There are many industry organizations and First Nations groups participating in the GSPAC as well as five provincial governments.</p> <p>The HFA 16F advisory committee process appears to achieve more positive results on that local level. However, strategic challenges which confront the management of the fishery are not debated at the local level but rather at GSPAC where consensus is frequently hard to achieve. Also, the effectiveness of the WG process has not been really tested since it has only met on 2-3 occasions. The overall consultative process could possibly benefit from key stakeholders meeting inter seasonally during the biennial period to identify critical topics that may deserve additional attention.</p>		
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	N

<b>PI 3.1.2</b>		<b>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</b>	
	<b>Justification</b>	<p>The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.</p> <p>It is not fully clear to the Assessment Team that the disposition of information received through the consultative processes is always explained. While the Regional Advisory Process (RAP) involves meetings with interested herring industry members to disseminate and receive information of the status of herring stocks the confusion on the part of HFA 16F harvesters over the lack of analysis or use of their acoustic data seems to suggest that the reasons why certain data are not used are not always adequately explained.</p>	
<b>c</b>	<b>Guidepost</b>		<p>The consultation process provides opportunity for all interested and affected parties to be involved.</p> <p>The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.</p>
	<b>Met?</b>		<p>Y</p> <p>N</p>
	<b>Justification</b>	<p>The consultation process provides opportunity for all interested and affected parties to be involved</p> <p>It appears to the Assessment Team that non-industry parties are not really encouraged to attend consultative meetings nor are the times and locations of such meetings advertised publically. Furthermore, Non-Governmental Organizations (NGOs) are not encouraged/invited to participate at regional and area-level committee meetings. While DFO's regional committee meeting schedules are posted in advance on the regional website, the area-level meetings are not (Robert Allain (GNSHF) personal communication).</p> <p>It is considered that the overall consultative process for 4T herring does not meet the requirements for SG 100c.</p>	
<b>References</b>		Section 4.5.2 above, DFO (2014b) and information and explanations supplied to the Assessment Team during the Site Visit.	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			<b>85</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>N/A</b>

### Evaluation Table for PI 3.1.3

<b>PI 3.1.3</b>		<b>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</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>A</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	P
	<b>Justification</b>	<p>Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.</p> <p>DFO has extensive statements of mission, objectives and priorities posted on its national website.</p> <p>The Department has developed its “Sustainable Fisheries Framework” to achieve its objective of sustainable fisheries and aquaculture. Overall, it advances the Sustainable Fisheries Framework as the foundation of an ecosystem-based and precautionary approach to fisheries management in Canada. The website outlines the Department’s intention to incorporate this approach into all Integrated Fishery Management Plans.</p> <p>While the department’s long-term objectives are consistent with MSC Principles and Criteria and the precautionary approach, until the Canadian precautionary approach is fully implemented in 4T herring (and other fisheries) it cannot be said that they are explicit within and required by management policy. There was no IFMP for 4T Herring at the time of the site visit. The PA is under active development but harvest control rules have yet to be developed or finalized. While the PA is touted as restricting the Minister’s absolute powers under the Fisheries Act it remains to be seen if it will completely remove or fetter them.</p> <p>The present overall status of long term objectives for the fishery management system is viewed as meeting all the requirements of SG 80a. Their status do not fully meet the requirements of SG 100a as the assessed fishery (and others) have not yet fully implemented the PA and the extent to which harvest control rules will be able to fetter the Minister’s absolute authority to make allocation and licensing decisions is still unproven.</p> <p>A score of 90 is therefore assigned.</p>		
<b>References</b>		The “Long-term Objectives” Section 4.5.3 above and DFO (2009), DFO (2013a) and DFO (2013b)		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

**Evaluation Table for PI 3.1.4**

<b>PI 3.1.4</b>		<b>The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing</b>		
<b>Scoring Issue</b>		<b>SG 60</b>	<b>SG 80</b>	<b>SG 100</b>
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	P

<b>PI 3.1.4</b>	<b>The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing</b>	
	<b>Justification</b>	<p>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.</p> <p>The HFA 16F herring fishery is managed through the use of both input and output controls. These include limited entry licensing, gear numbers and sizes, seasonal, weekly and daily closed times, a catch quota and one trip daily with a maximum catch limit. Almost of these input and output controls have been developed and refined with a high level of involvement and concurrence by 16F harvesters.</p> <p>The total number of licenses issued in 16F is 408 (including 26 First Nations Communal); about 130-140 are fished in any given fall fishery. Many licences are reported to be held by harvesters in sections of 16F where herring fishing is not a viable option. There is reported to be little change in the number of licences issued in recent years. These unused licences represent a significant latent fishing effort if they were to be activated. There does not appear to be any interest in a fleet self-rationalization program in HFA 16F or any part of 4T.</p> <p>In addition to the use of a Dockside Monitoring Program (DMP), adherence to the daily catch/trip is also encouraged through an agreement among all harvesters, fish buyers and DFO that pays the value of any fish in excess of the daily trip limit to the Gulf NS Herring Federation. The Federation hires a vessel to assist DFO with grappling operations and also pays for boom-truck or crane to secure nets in DFO's compound and trucking and land-fill disposal costs for unidentified nets and gear seized by DFO staff during these operations.</p> <p>The Herring Federation has also been conducting self-directed acoustic surveys in the hope they might lead to a biomass estimate for 16F. They feel this is a more objective and conservation-oriented way to allocate shares of the TAC to each HFA instead of the apparently catch-based system that has been in use for decades. They argue this would allocate quota shares to where the resource exists year-by-year. They also accept that the 16F share may be decreased under such an approach. At present, there are no plans by DFO to develop and utilize HFA biomass estimates.</p> <p>There are no direct financial subsidies available to the herring fishery in 16F. However, there is significant latent fishing effort in the used licences that are issued in this HFA.</p> <p>A score of 90 is assigned as there is no evidence that the management system for 4T or 16F explicitly considers sustainable fishing incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices. Only part of the requirements of SG 100 is met.</p>
<b>References</b>	Section 4.5.4 above and presentations and explanations provided by DFO staff during site visit.	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>		<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>N/A</b>

**Evaluation Table for PI 3.2.1**

<b>PI 3.2.1</b>		<b>The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>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.</p> <p>Until the IFMP for the 4T Herring was approved in January, 2015 there had been no formal written objectives specific to the 4T or 16F herring fishery. Certain implied objectives could be found in the various management measures that are applied to the fall herring fishery in 16F. These include stock conservation and resource stewardship through the measures to ensure the quota allocation is not overrun. They also imply improving the socio-economic conditions of the fishery through the measures used to control fishing effort and to ensure an opportunity to share the quota allocation more widely through daily and weekly closed times and trip limits.</p> <p>The new "evergreen" IFMP that has been recently approved contains statements of short, medium and long-term objectives under the heading of Stock Conservation. As well, long and short-term objectives are outlined for Ecosystem, Stewardship, Socio-economic and Compliance. These statements of objectives apply to the overall 4T herring fishery management plan. They would be applicable by inference to 16F although they may not capture directly the specific local area objectives that are in play in that HFA. Presumably the annual conservation harvesting plans for that HFA will continue to promote the implicit objectives that are behind the local management measures adopted and designed by 16F harvesters.</p> <p>The fishery specific objectives are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2 and are explicit within the fishery's management system.</p> <p>The current fishery specific objectives contained in the recently approved IFMP are not comprehensively well defined, measurable and nor yet demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2.</p> <p>The extent to which they are discussed, evaluated and applied to guide management of this fishery should be reviewed in the annual surveillance audits.</p>		
<b>References</b>		Section 4.5.5 above and presentations and explanations provided by DFO staff at Site Visit meeting.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

**Evaluation Table for PI 3.2.2**

<b>PI 3.2.2</b>		<b>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.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	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.	
	<b>Met?</b>	Y	Y	
	<b>Justification</b>	<p>There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>There is an annual recurring and comprehensive fishery management decision-making cycle 4T and 16F herring fishery that is well known in the industry in the Atlantic area and in that HFA.</p>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>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.</p> <p>The annual recurring fishery management decision-making cycle for 4T and HFA 16F herring involves a data/information collection and an analysis phase which is followed by some government/industry consultations on science and fishery management issues and problems. This annual recurring and comprehensive fishery management decision-making cycle culminates in a final advisory committee meeting where consensus is sought on management measures (but seldom achieved on TAC) for the following fishing season. This does not go so far as to say that all issues identified are responded to or that the process takes account of the wider implications of decisions.</p>		
<b>c</b>	<b>Guidepost</b>		Decision-making processes use the precautionary approach and are based on best available information.	
	<b>Met?</b>		Y	

<b>PI 3.2.2</b>		<b>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.</b>		
	<b>Justification</b>	<p>Decision-making processes use the precautionary approach and are based on best available information.</p> <p>The precautionary approach for fisheries management is defined in a number of DFO national frameworks. The approach means being cautious when scientific knowledge is uncertain, and not using the absence of adequate scientific information as a reason to postpone action or failure to take action to avoid serious harm to fish stocks or their ecosystem.</p> <p>Reference points have been instituted, an annual risk analysis of various TAC options is conducted and pre-set decision rules are under development.</p>		
<b>d</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>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.</p> <p>It is not clear that explanations are provided for all actions or the lack thereof, although that is certainly the case in some instances such as the general 16F advisory/consultative process. There is no clear evidence of comprehensive formal reporting to all interested stakeholders taking place. The current advisory committee process would be the most likely vehicle but this, understandably, appears to address only the most pressing annual issues because of the multiplicity of views and objectives that exist in the fishery.</p>		
<b>e</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N

<b>PI 3.2.2</b>		<b>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.</b>
	<b>Justification</b>	<p>The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.</p> <p>While the 4T herring fishery has been plagued by allocation issues and the 16F fishery by frustration over lack of action on estimating HFA biomass estimates there are no continuing court challenges or defiance of the fishery laws. The management system generally responds quickly to court decisions but is not so good at acting proactively to avoid legal disputes.</p>
<b>References</b>		Section 4.5.6 above, supplemented by information and explanations provided by DFO staff at site Visit meeting.
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>		<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>N/A</b>

**Evaluation Table for PI 3.2.3**

<b>PI 3.2.3</b>		<b>Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with</b>		
<b>Scoring Issue</b>		<b>SG 60</b>	<b>SG 80</b>	<b>SG 100</b>
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>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.</p> <p>Comprehensive monitoring, control and surveillance fishery is conducted on the 16F fall fishery. Access and effort is regulated through limited entry fishing area licenses, seasons, daily and weekly closed times and a trip limit, an area quota as well as minimum and maximum gear specifications. The fishery is monitored by at sea patrols and boarding's, onshore inspections and occasional air surveillance. Dockside monitoring is required for 100% of 16F herring landings as is submission of SARA logbooks and fish purchase slips.</p> <p>A particular emphasis is placed on retrieval of loss gillnets and harvesters and DFO cooperate in conducting removal efforts. Harvesters pay for some of the costs of these removal and disposal efforts. All unidentified (untagged) nets are disposed of.</p> <p>The system of paying the proceeds of trip limit overruns into a fund for removing lost nets and improving 16F herring management measures was referenced earlier. In addition to improving management measures it also promotes self-compliance as it removes the possibility of individual harvesters benefiting from exceeding the trip limit or fishing more gillnets than are authorized</p> <p>No official concerns over the level of compliance or the degree of deterrents achieved in this fishery were expressed to, or detected by, the Assessment Team. The level of rapport with harvesters in 16F appears high as does the apparent level of cooperation between industry and Enforcement personnel. This is a very short and intense fishery that appears to benefit from this cooperative approach in that quotas are generally adhered to and orderly fishing occurs in the short daily open times (18 hours).</p>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N

<b>PI 3.2.3</b>		<b>Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with</b>		
	<b>Justification</b>	<p>Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence</p> <p>The only charges laid in the last three years have been for not having license/registration documents on board when checked.</p> <p>While C&amp;P data suggest that the overall MSC system is effective, the C&amp;P program lacks performance indicators to measure the effectiveness of its activities, including whether sanctions demonstrably provide effective deterrence, preventing the fisheries from meeting 100b.</p>		
<b>c</b>	<b>Guidepost</b>	<p>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.</p>	<p>Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.</p>	<p>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.</p>
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.</p> <p>The only charges laid in the last three years have been for not having license/registration documents on board when checked. However, the data presented to the Assessment Team indicate general declining levels of enforcement resources being applied to this fishery. However, the number of occurrences (violations detected) and the number of charges laid appears to remain very low.</p>		
<b>d</b>	<b>Guidepost</b>		<p>There is no evidence of systematic non-compliance.</p>	
	<b>Met?</b>		Y	
	<b>Justification</b>	<p>There is no evidence of systematic non-compliance.</p> <p>There is no known analysis of the 16F fall herring enforcement efforts that would substantiate a conclusion that any form of serious and flagrant non-compliance exists in this fishery.</p>		
<b>References</b>		Section 4.5.7 above, DFO (2014f) and presentation and explanations given by DFO staff at Site Visit meeting.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>95</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

**Evaluation Table for PI 3.2.4**

<b>PI 3.2.4</b>		<b>The fishery has a research plan that addresses the information needs of management</b>		
<b>Scoring Issue</b>		<b>SG 60</b>	<b>SG 80</b>	<b>SG 100</b>
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	N	N
	<b>Justification</b>	<p>Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.</p> <p>There is no formal documented research plan. Research objectives are discussed during the peer review process and during the Small Pelagics consultative committee. Research reports are available on the CSAC website when completed and peer reviewed. Research priorities tend to be focused on producing, and improving the provision of, stock status advice. The herring research section in the Gulf Region consists of one scientist, occasionally supplemented by term staff.</p>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>Research results are disseminated to all interested parties in a timely fashion.</p> <p>Research reports are available on the CSAC website when completed and peer reviewed. Research results are discussed during the peer review process and during the Small Pelagics consultative committee.</p> <p>Since there is no documented or written research plan this PI does not meet the requirements of 100B.</p>		
<b>References</b>		Section 4.5.8 above, DFO (2014g) and information and explanations provided by DFO staff at Site Visit meeting.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>70</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>3</b>

### 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
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>The fishery has in place mechanisms to evaluate key parts of the management system.</p> <p>The Gulf Region conducts post-season internal operational reviews of its annual herring Conservation and Protection (C&amp;P) initiatives internally and also in conjunction with industry members through local advisory committees. C&amp;P also presents analysis at the GSPAC and considers recommendations provided by HFA representatives. This review covers how well the various fishery management measures functioned during the course of the fishery. This is a regular feature of industry-DFO interaction in 16F.</p> <p>The herring stock assessment is reviewed as part of Canadian Science Advisory Secretariat Regional Assessment Processes. Participants are all expected to contribute to and review the science information and analysis that is presented. Participants include DFO Scientists from the Gulf and other regions, scientists from outside DFO (when possible), Industry participants and DFO fishery managers.</p> <p>The DFO internal Fishery Checklist is divided into three sections including target stock information, habitats/ecosystems and management systems. This checklist has been adopted and used internally by DFO as a tool to measure effectiveness of all fishery management systems. However, results of these reviews generally are not available.</p>		
<b>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	Y	Y	N

<b>PI 3.2.5</b>		<b>There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives</b> <b>There is effective and timely review of the fishery-specific management system</b>	
	<b>Justification</b>	<p>The fishery-specific management system is subject to regular internal and occasional external review.</p> <p>The DFO internal Fishery Checklist is divided into three sections including target stock information, habitats/ecosystems and management systems. This checklist has been adopted and used internally by DFO as a tool to measure effectiveness of all fishery management systems. However, results of these reviews generally are not available.</p> <p>The general view of fishery management personnel is that the annual fishery advisory and RAP sessions constitute an external review of fishery management measures as both industry and non-industry members participate and that this meets the need for real-time, in-season, annual and overall management system reviews.</p> <p>The Canadian Auditor General has the mandate to, and does, review the management of fisheries on an ad-hoc basis and publishes the results. The Parliament of Canada has two Committees pertaining to Fisheries and Oceans: the Standing Committee on Fisheries and Oceans of the House of Commons and the Standing Senate Committee on Fisheries and Oceans of the Senate. These standing committees regularly examine various aspects of fishery management in Canada and prepare public reports on findings and conclusions.</p>	
<b>References</b>		Section 4.5.8 above plus: DFO (2014g), DFO (2014h) and explanation provided by DFO staff during site visit meeting.	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>N/A</b>

## **Risk Based Framework (RBF) Outputs**

RBF has not been used to score any PIs.

## Conditions and Client Action Plan

Following are the stated conditions as provided in the Draft Client Report dated January 2015.

In addition to the general requirements, the Client Group (client) must also agree in a written contract with SAI Global to meet the specific conditions as described below within the timelines that will be agreed in the 'Action Plan for Meeting the Condition for Continued Certification' that is to be approved by SAI Global.

A draft Client Action Plan was submitted to the client group and to DFO (by the client) in April, 2015. Upon consultation with DFO, the client submitted a ratified Final Client Action Plan to SAI Global on April 30, 2015.

There are 3 conditions relating to performance indicators 1.2.2., 2.2.3, and 3.2.4.

Table 13. Conditions relating to performance indicator

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y/N/N/A)
1	The client must provide documented evidence of implementation of well-defined harvest control rules that reduce exploitation rates as the limit reference point is approached.	1.2.2	N
2	The client is required to ensure that sufficient data continue to be collected to detect any increase in risk to main by-catch species.	2.2.3	N
3	The client must provide documented evidence a research plan has been developed that 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 in respect of the SGSL Fall herring fishery.	3.2.4	N

**Table A1.3: Condition 1**

Performance Indicator	PI 1.2.2 Harvest Control Rules
<b>Score</b>	<b>70</b>
<b>Rationale</b>	While the management system has demonstrated a capacity to respond in accordance with PA principles, as yet there is no IFMP in place with well defined, pre-approved harvest control rules that prescribe management action when SSB is in the cautious zone. Without an IFMP that includes HCRs, it cannot be said that the management system takes into account all the main uncertainties.
<b>Condition</b>	The client must provide evidence of implementation of harvest control rules that achieve the SG 80 level for: SI a “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” and SI b “The selection of the harvest control rules takes into account the main uncertainties”.
<b>Milestones</b>	<p><u>By Year 1</u>: The Assessment team shall be provided with documentary evidence that the Client has worked to promote the development and determination of appropriate harvest control rules, taking into account main uncertainties, for the SGSL Fall herring stock (Score will remain the same: 70).</p> <p><u>By Year 2</u>: The Assessment team shall be provided with documentary evidence that the Client has worked to produce draft harvest control rules (Score will remain the same: 70).</p> <p><u>By Year 3</u>: The Assessment team shall be provided with documentary evidence that the Client has worked to promote the adoption of appropriate harvest control rules (Score will remain the same: 70)</p> <p><u>By Year 4</u>: The Assessment team shall be provided with documentary evidence that appropriate harvest control rules, taking into account main uncertainties, for SGSL Fall Herring stock have been adopted (Score will be updated to: 80).</p>
<b>Client action plan</b>	<p><u>Action Plan</u> The client shall engage DFO on what information and support can be provided to fulfil this condition. The client shall support the acquiring of any additional information that may be required to support these activities. The client will provide documentary evidence of the requests and support provided on this condition. The client will provide all necessary support to DFO to ensure that all required milestones as prescribed are met.</p> <p><u>Responsible parties</u> The client will support all activities of DFO in the development and implementation of the Harvest Control Rules (HCRs). DFO will, in consultation with the southern Gulf of St. Lawrence client harvester groups and other relevant stakeholder groups, develop the draft HCRs through established consultative processes. The client will ensure that the HCRs are consistent with MSC Principles 1 and 2. DFO will make publicly available the final HCRs.</p> <p><u>Timeframe for Milestones</u> By the 1<sup>st</sup> annual surveillance audit, the CAB shall be presented with evidence that consultations with relevant committees or groups regarding the HCRs have been scheduled. By the 2<sup>nd</sup> annual surveillance audit, the CAB will be presented with evidence that consultations have occurred and appropriate HCRs drafted. By the 3<sup>rd</sup> annual surveillance audit, the CAB will be presented with evidence that adoption of appropriate HCRs have been promoted. By the 4<sup>th</sup> annual surveillance audit, the CAB will be presented with evidence that the HCRs have been adopted and a mechanism to implement has been described</p>
<b>Consultation on condition</b>	Department of Fisheries and Oceans, Gulf Region and members of the Southern Gulf Small Pelagics Advisory Committee (or its working group).

**Table B1.3: Condition 2**

<b>Performance Indicator</b>	<b>PI 2.2.3 Bycatch Monitoring/Information</b>
<b>Score</b>	<b>75</b>
<b>Rationale</b>	The assessment team found there is no direct recording of the quantity of discards associated with the fishery under assessment. The only source of information is through anecdotal information from DFO and licence holders operating in the fishery which suggests there are no discards associated with the 16 F fall inshore herring gillnet fishery. However, there is no evidence that 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 effectiveness of the strategy).
<b>Condition</b>	The client is required to ensure that sufficient data are collected to detect any increase in risk to main by-catch species.
<b>Milestones</b>	This will be achieved by the following: <u>By Year 1:</u> GNSHF will, identify options to improve the information base and estimates of discards and condition of discards for the 16 F fall inshore herring gillnet fishery. <u>By Year 2:</u> GNSHF will define mechanisms to improve data collection and estimations of discards for the 16 F fall inshore herring gillnet fishery that have been tabled at the appropriate industry group meeting. <u>By Year 4:</u> There will be documented evidence that the adopted data collection and discard estimation mechanisms have been implemented for the 16 F fall inshore herring gillnet fishery.
<b>Client Action Plan</b>	<p><u>Action Plan</u></p> <p>The client may request advice from DFO on what information can be provided to fulfil this condition.</p> <p>The client will provide documentary evidence of any requests made to DFO and support provided by DFO on this condition.</p> <p>The client shall, define the elements of the required data collection and discard estimation mechanisms, and seek the support of the industry for their adoption and implementation via the appropriate industry consultative process.</p> <p><u>Responsible parties</u></p> <p>The client may confer with DFO in defining and developing the data collection and discard estimation mechanisms for the 16 F fall inshore herring gillnet fishery.</p> <p>The client will be responsible for data collection, data keying and maintenance of the data base ensuring quality control and assurance procedures are maintained.</p> <p>The client will take measures to inform the fish harvester representatives from 16 F of progress in the design of the required elements of the data collection and discard estimation mechanisms. The client will consider any information and advice provided by DFO in the design and development of the data collection and discard estimation mechanisms.</p> <p><u>Timeframe for Milestones</u></p> <p>By the 1<sup>st</sup> annual surveillance audit, the CAB shall be presented with evidence that the GNSHF has sought the advice of DFO (and other appropriate parties, if desirable), in identifying options to improve the information base and estimates of discards for the 16 F fall inshore herring gillnet fishery.</p> <p>By the 2<sup>nd</sup> annual surveillance audit, the CAB shall be presented with evidence that the mechanisms to improve data collection and estimations of discards were tabled at the appropriate industry advisory group for the 16 F fall inshore herring gillnet fishery.</p> <p>By the 4<sup>th</sup> annual surveillance audit, the CAB shall be presented with evidence that the adopted data collection and discard estimation mechanisms have been implemented for the 16 F fall inshore herring gillnet fishery.</p>

<b>Consultation on Condition</b>	Department of Fisheries and Oceans, Gulf Region and members of the 16 F area-level advisory committee.
----------------------------------	--

**Table C1.3: Condition 3**

Performance Indicator	PI 3.2.4 Research Plan
Score	70
Rationale	There is no formal documented research plan. Research objectives are discussed during the peer review process and during the Small Pelagics consultative committee.
Condition	The client must provide documented evidence a research plan has been developed that 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 in respect of the SGSL Fall herring fishery.
Milestones	<p><u>By Year 1:</u> The Assessment team shall be provided with documentary evidence that the Client has worked to achieve development of a draft research plan to achieve the objectives consistent with MSC's Principles 1 and 2 in respect of the SGSL Fall herring fishery (Score will remain the same: 70).</p> <p><u>By Year 2:</u> The Assessment team shall be provided with documentary evidence that the client has worked to have the research plan reviewed at the GSPAC (Score will remain the same: 70).</p> <p><u>By Year 3:</u> The Assessment team shall be provided with documentary evidence that the client has worked to achieve adoption of a research plan to achieve the objectives consistent with MSC's Principles 1 and 2 in respect of the SGSL Fall herring fishery (Score will be updated to: 80).</p>
Client action plan	<p><u>Action Plan</u>            The client shall request advice from DFO on what information and support can be provided to fulfil this condition.            The client will acquire any additional information that may be required to support these activities            The client will provide documentary evidence of the requests and support provided on this condition.            The client shall, in consultation with DFO, define the elements of the research plan specific to the SGSL Fall herring fishery.</p> <p><u>Responsible parties</u>            The client will confer with DFO in defining, developing and updating the research plan.            With DFO assistance, the client will take measures to inform SGSL herring fall fishery stakeholders of the content of the research plan and to invite their input.            The research plan developed by the client will reflect those objectives that are consistent with MSC's Principles 1 and 2.            In developing the research plan, the DFO will provide to the client information germane to it's (and others, if possible) ongoing research activities and associated elements which relate to the SGSL Herring Fall fishery. The information to be provided will be updated as necessary during the fishery's certification period.</p> <p><u>Timeframe for Milestones</u>            By the 1<sup>st</sup> annual surveillance audit, the CAB shall be presented with evidence that consultations are planned or have taken place regarding the development of a draft research plan which achieves the objectives consistent with MSC Principles 1 and 2 in respect of the SGSL Fall herring fishery.            By the 2<sup>nd</sup> annual surveillance audit, the CAB shall be presented with evidence that the research plan (including any related research conducted by other organizations) reflecting existing and scheduled research activities has been reviewed by the</p>

	<p>GSPAC, Gulf Region and members of the Southern Gulf Small Pelagics Advisory Committee (or its working group)..</p> <p>By the 3<sup>rd</sup> annual surveillance audit, the CAB shall be presented with evidence that a research plan (including any related research conducted by other organizations) reflecting existing and scheduled research activities has been adopted, and that these activities and associated elements support the objectives consistent with MSC Principles 1 and 2.</p>
<b>Consultation on condition</b>	Department of Fisheries and Oceans,

## Appendix 2. Peer Review Reports

Template for Peer Review of  
MSC Fishery Assessments  
Version 1, January 2011

---

T

Peer Reviewer 1 or A

**Overall Opinion**

<b><i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i></b>	<b>Yes/No</b> <b>Yes</b>	<b>Conformity Assessment Body Response</b>
<b><i>Justification:</i></b>  Relevant information was provided to the reviewers that allowed the fishery to be evaluated against MSC Principles 1, 2 and 3_		<u>No Response</u>
<b><i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i></b>	<b>Yes/No</b> <b>Yes</b>	<b>Conformity Assessment Body Response</b>
<b><i>Justification:</i></b>  Yes excepting condition 3.2.4- development of a research plan. I believe the plan should be developed/defined in year 1 and reviewed and some components implemented in year 2. As the fishery moves to a biennial assessment schedule it will be imperative to follow the fishery and biology very proactively to rapidly address any concerns or issues that arise.		<u>These suggested actions should be taken into consideration by the Client and the Management Authority. Annual surveillance audits will determine the extent to which the development and implementation of a research plan are progressing against the agreed Client Action Plan.</u>
<b><i>Do you think the client action plan is sufficient to close the conditions raised?</i></b>	<b>Yes/No</b>	<b>Conformity Assessment Body Response</b>
<b><i>Justification:</i></b> <i>Yes, given above comments relating to the research plan.</i>		

If included:

For reports using the Risk-Based Framework please follow [the link](#).

For reports assessing enhanced fisheries please follow [the link](#).

### **General Comments on the Assessment Report (optional)**

The assessment report was complete and well written and provided a good synthesis of background material on the biology, fishery and current stock status of this stock. The report provided sufficient details to evaluate against MSC Principles and Criteria. The information presented on the stock assessment provided sufficient input to address current stock status condition and management process. The overall fishery and biology of this species is well studied and the ecosystem surrounding and adequate material was summarized to document these topics. The team did a thorough job characterizing the management framework and highlighted areas where improvements are needed. In addition to the peer review a general editorial review of the assessment report is provided to the team in the theme of improving the final document.

**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
<i>Example:1.1.2</i>	<i>No</i>	<i>No</i>	<i>NA</i>	<i>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.</i>	
1.1.1	Yes	Yes	NA	SG 90 is appropriate and well supported by the review of the information provided on current stock status and the estimated historical trajectory of SSB and exploitation level. Evidence that the stock is not nearing a scenario of overfishing/overfished state is also provided through a variety of risk analyses.	No response necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
1.1.2	Yes	Yes	NA	While the score of 80 is reasonable for this PI, it is strongly emphasized that uncertainty surrounds the reference points as relates the proxy choice for $B_{MSY}$ and limit reference points. Additional simulation work is needed to further quantify risk associated with these choices.	Dually noted. The CAB will communicate reviewer's point to the DFO scientist responsible for assessment of this stock.
1.1.3	Yes	Yes	NA	NA. There is no evidence to indicate the stock is currently overfished or undergoing overfishing assuming the limit reference points adopted by management.	No response necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
1.2.1	Yes	Yes	NA	The score of 95 is supported. A reasonable and logical system is in place to manage removals, one which is based on the best available science, a transparent peer review process, and consensus agreement. There are multiple checks and balances in place to effect the harvest strategy and they appear to be progressive, adaptive and to be working. However, with the move to a biennial assessment strategy and given the uncertainties associated with the assessment results optimal management of the stock could require closer monitoring.	No response necessary.

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	Yes	The SG 70 is supported. There are multiple tools already in place that work towards ensuring the harvest strategy is followed and is effective. Clearly defined harvest control rules (HCRs) are needed to effectively and optimally manage this stock to ensure that resource can continue to be harvested optimally and to maintain a healthy level. Controls in place currently appear to be followed and well understood. Such rules if effective must incorporate all relevant components of the stock biology and population dynamics and work adaptively to address relevant components throughout the geographical distribution of the stock.	No response necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
1.2.3	Yes	Yes	NA	SG 80 supported. There is strong support that all relevant information needed to monitor the harvest control strategy is being collected. Solid information was provided that demonstrates industry is proactive in data management and a willing participant. In addition, management has been adaptive and proactive in addressing areas where improvements are needed or where critical issues require reconciliation (e.g, CPUE indices, age/growth validation). However, even so further work on issues related to abundance index development, effort estimation could lead to increased confidence in the population model results. As well, observer placement on gillnet vessels is encouraged.	No response necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
1.2.4	Yes	Yes	NA	While the SG 90 score is appropriate, the use of alternative population models (e.g., Stock Synthesis an integrated catch at age model) should be considered as sensitivity models, as these would allow further quantification of the uncertainty in the stock status from a stochastic framework. Such models would also provide an alternative approach to assessing sensitivity regarding important processes such as selectivity, catchability, and also incorporate time varying assumptions.	Dually noted. The CAB will communicate reviewer's points to the DFO scientist responsible for assessment of this stock.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.1.1	Yes	Yes	NA	SG 80 supported through sufficient information provided in the assessment report.	Don't agree. MSC 1.3 states "If not all of the SG100 scoring issues are met the PI shall be given an intermediate score (85, 90 or 95) reflecting overall performance against the different SG100 scoring issues. i. Award 90 where performance against the scoring issues is mid-way between SG80 and SG100 (some scoring issues are fully met and some are not fully met)" issue 80a= Go to issue c issue b=100 issue c=80 issue d=60 (not cumulative) issue b and c are midway between 80 and 100

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.1.2	Yes	Yes		SG 80 supported throughout the document providing sufficient evidence that a strategy exists for ensuring that a strategy does exist (in place) for ensuring with reasonable probability that fishery does not pose harm to other species. Reasonable support indicates it is working and achieving the goals desired.	No response necessary.
2.1.3	Yes	Yes	NA	Score of 90 is well documented. Management is encouraged to implement observer coverage at some point in order to corroborate levels of other retained species and characterize any possible mortalities.	No response necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.2.1	Yes	Yes	NA	The overall SG 80 score of this PI is supported however a score of 70 is more supported for sub-issue 'a' that the "main bycatch species are within biologically based limits". Management is strongly encourage to implement observer coverage in this fishery or perhaps consider other advanced electronic technologies (cameras) to document the characteristics of bycatch component (if any) of this fleet.	Don't agree. For the bycatch outcome the CAB has information provided by DFO that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. There is also information based on dockside landings from this area documenting that there were no landings from 2008-2013 of non herring species. However the CAB is aware that a better monitoring program should be used to assess estimates of bycatch by means of logbook program or an observer program. This is the reason the CAB felt to put a condition on 2.2.3 (Bycatch monitoring/information)
2.2.2	Yes	Yes	NA	The score of 80 is supported and reasonable however more credibility on the level of bycatch and related issues to managing the level could be obtained through management action to implement additional monitoring systems (observers, on-board cameras, etc.)	No response necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.2.3	Yes	No	Yes	There is insufficient information in the assessment report to support an 80 for issue b. Although there is also information from dockside landings suggesting there are no landings from 2008-2013 of non herring species, without a formal sampling survey of the landings for bycatch species or discards it is not possible to estimate outcome status with respect to biologically based limits. An overall score of 70 is supported for PI 2.2.3	Don't agree. Information is sufficient to estimate outcome status with respect to biologically based limits. The assessment team was told by DFO that from 2004 to 2014 there was no bycatch in the fall herring gillnet fishery. This was confirmed by enforcement authorities and industry. Secondly, the nature of how the gill net fisheries operates makes it very unlikely to have bycatch as it is an active fishery where fishermen set the gillnets when the actual spawning migrations are occurring. Therefore, fishermen are very watchful on what it s going into the net, reducing the chance of bycatch .
2.3.1	Yes	Yes	NA	SG 80 supported through sufficient information provided in the assessment report on ETP interactions within the fishery.	No response necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.3.2	Yes	Yes	NA	SG 95 supported documenting sufficient protection of ETP species exists through relevant information provided on multiple protection mechanisms in place in Canada (SARA)	Don't agree. According to MSC 1.3 CR27.10.5.3 iii. Award 85 when performance against the scoring issues is slightly above SG80 (a few scoring issues are fully met but most are not fully met). Issues a, b and c are not fully met. Only d meets 100
2.3.3	Yes	Yes	NA	SG 80 supported by information summarized in the assessment report on this topic.	No response necessary.
2.4.1	Yes	Yes	NA	SG 80 supported by information summarized in the assessment report on this topic.	No response necessary.
2.4.2	Yes	Yes	NA	SG 85 is supported. Assessment team summarized relevant national policies that aim to minimize impacts on habitat. As well management has developed, implemented additional measures to limit habitat impacts and these appear to be working.	No response necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.4.3	Yes	No	NA	SG 90 not supported as adequate quantitative information for the fishery does not exist to quantify the risk posed to the habitats and the effectiveness of the management strategy to minimize such risks. SG 80 is supported however. Issues b and c received scores of 70 each while issue a remains at 100.	For clarification Issues b and c scored 80 not 70 . There is information that address the impacts of the gillnet 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. It has been documented that pelagic gillnets have limited impact (DFO 2010b and Dufour and Quillet 2007). Furthermore the overall small scale of the fishery (in HFA 16F) in relation to the EBSAs from SGSL shows that it is unlikely to demonstrate a major impact of pelagic gillnet gear on the habitat. Furthermore Overall the score changed to 85 According to MSC 1.3 CR27.10.5.3 iii. Award 85 when performance against the scoring issues is slightly above SG80 (a few scoring issues are fully met but most are not fully met). Issues , b and c are not fully met. Only issue a meets 100

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.5.1	Yes	Yes	NA	SG 100 has been supported through multiple summaries of the possible impacts on habitat and also multispecies models.	No response necessary.
2.5.2	Yes	Yes	NA	The SG 80 is supported by summary of measures established through the herring CH documenting strategy for ensuring risk to ecosystem function is minimized and that risk levels are managed appropriately. The governance, regulation and management of the fishery were well described. There is a strategy in place that is being implemented and will continue to develop under new national policies.	No response necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.5.3	Yes	Yes	NA	SG 80 is supported. Lack of information on several key components of the fishery precludes quantification of exact ecosystem impacts. However, sufficient knowledge of general impacts can be ascertained through existing fishery data that includes impacts on the fishery on target species, retained species, bycatch, and ETP species. As well sufficient information exists to address impacts on habitats by the fishery. Continued monitoring and improvements in the basic fishery statistics on several topics (bycatch) should be emphasized to increase confidence in this area of overall ecosystem impacts.	No response necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
3.1.1	Yes	Yes	NA	SG 95 well supported. Sufficient information on the existing management system and it's framework as to how it is implemented is provided. The report provides ample evidence that necessary laws are in place to effectively manage the resources such that the desired outcomes are achieved as relates MSC principles 1 and 2. As well the management system promotes transparency and there are existing processes whereby conflicts are dealt with as well (e.g., license challenges, court opinions). Continued development and adaption of FMPs allow for appropriate allocations by user group.	A matter of opinion; rights are indeed recognised but often after court battles.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
3.1.2	Yes	Yes	NA	SG 90 supported. While the primary roles/duties/functions of the stakeholders appear to be understood, it appears there are some obstacles within the overall consultative process. As the fishery moves to the biennial assessment schedule, attention should be given possibly to establishing intersessional groups to identify issues of concern and also to identify mechanisms to improve and enhance communication amongs all stakeholders.	Agreed. Scoring changed.
3.1.3	Yes	Yes	NA	SG 90 supported. Management has long term clear goals which are generally following the guidelines of MSC principles and criteria, and the PA management approach. However, until all relevant components of the PA are implemented, including the appropriate HCRs, management is not explicitly requiring these objectives to be followed.	No need to change scoring on this PI.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
3.1.4	Yes	Yes	NA	SG 90 is supported by a sufficient summary of the overall management system as relates participants in the fishery and capacity (gear number, size), fishing times, quotas, and trip limits.	No response necessary.
3.2.1	Yes	Yes	NA	SG 90 is supported based on information provided pertaining to the the IFMP implementation. The latter if necessary to ensure short and long term objectives are not only clearly defined but achieved. Close monitoring of the fishery as relates evaluation of performance will be necessary to determine if these objecties are being met.	Don't agree on a partial score. The fishery specific objectives are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2 and are explicit within the fishery's management system. However, they are not comprehensively well defined, measurable and nor yet demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
3.2.2	Yes	Yes	NA	SG 80 supported. There is a clear process relating to decision making for this fishery and it appears to be transparent and effective. Close attention should be put on enhancing consensus agreement regarding critical issues (TACs) and in particular as the fishery moves to a biennial assessment schedule management should consider intersessional meetings to address important issues as they arise. If the fishery moves towards allocation by individual HFAs- greater attention will be required to ensure all stakeholders opinions are heard.	No response necessary.
3.2.3	Yes	Yes	NA	SG 95 supported. This fishery is characterized by well established monitoring, control and surveillance framework, one which has been well accepted and endorsed by stakeholders. This indicates a strong willingness and understanding of the industry of the various measures in place to effectively manage the resource.	No Assessment Team comment necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
3.2.4	Yes	Yes	Yes	SG 70 but not higher is supported. The research plan is not strategic and seems a bit opportunistic. As the fishery moves towards a biennial assessment schedule there is concern that a consistent systematic approach to research might get left behind. Management is encouraged to address the research issue formally possibly through the establishment of a working group that prioritizes individual research topics intersessionally.	Comments noted but a written Research Plan is a MSC requirement.
3.2.5	Yes	Yes	NA	SG 80 supported however management is encouraged to possibly consider an independent review of the performance of the management system. This would provide for additional transparency of the management framework, success level and aid in identifying areas of concern for the stock.	No Comment required from Assessment Team in terms of assigned scoring. The noted course of action could be pursued by the Client with the Management Authority

**Any Other Comments**

<b>Comments</b>	<b>Conformity Assessment Body Response</b>
<p>No additional comments are provided. Some general editorial comments were made on the document and are provided to the review team in an effort to improve the overall readability and presentation of the material. Thank you for the opportunity to review the assessment report.</p>	

For reports using the Risk-Based Framework:

<b>Performance Indicator</b>	<b>Does the report clearly explain how the process used to determine risk using the RBF led to the stated outcome? Yes/No</b>	<b>Are the RBF risk scores well-referenced? Yes/No</b>	<b>Justification:</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response:</b>
1.1.1				
2.1.1				
2.2.1				
2.4.1				
2.5.1				

For reports assessing enhanced fisheries:

<b><i>Does the report clearly evaluate any additional impacts that might arise from enhancement activities?</i></b>	<b>Yes/No</b>	<b>Conformity Assessment Body Response:</b>
<i>Justification:</i>		

Template for Peer Review of  
MSC Fishery Assessments

**Overall Opinion**

<b><i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i></b>	<b>Yes/No</b>	<b>Conformity Assessment Body Response</b>
<u>Justification:</u> The overall conclusion that the fishery should be certified, with Conditions, against the three MSC Principles is a sound one and is strongly supported by the evidence presented in the report and scoring comments.		<u>No Response Necessary</u>

<b><i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i></b>	<b>Yes</b>	<b>Conformity Assessment Body Response</b>
<u>Justification:</u> I have expressed some concerns about the Condition at PI 2.2.3 which in my opinion addresses a minor issue in the context of this specific fishery. Conditions 1 and 3 are appropriately written with explicit and achievable milestones and time frames.		<u>Please see response from PI 2.2.3</u>
<b><i>Do you think the client action plan is sufficient to close the conditions raised?</i></b>	<b>Yes</b>	<b>Conformity Assessment Body Response</b>
<u>Justification:</u> Condition 1: The client has recognized its important role in providing support, as appropriate, in the development of an Integrated Fisheries Management Plan. Condition 2: OK but this issue could have been satisfactorily addressed by a recommendation. Condition 3: The Client cannot produce a research plan for this stock, only DFO can do that together with a commitment to provide the resources to carry out the research.		<u>Please see response from PI 2.2.3 for condition 2</u>

If included:



For reports using the Risk-Based Framework please follow [the link](#).

For reports assessing enhanced fisheries please follow [the link](#).

### **General Comments on the Assessment Report (optional)**

This is a well-constructed report full of interesting background information, although not all of it relevant for the purposes of an MSC assessment. The report contains interesting information on stock structure and other aspects of the biology of the species as well as the ecosystem impact of the fishery and its management.

In section 4.2.1 it is stated that mixed fisheries on spring and fall (autumn) spawners are very rare. This is not actually true across the distribution range of herring where there are many instances of mixed fisheries. For example off the south coast of Ireland, in the eastern North Sea, in the Skagerrak and Kattegat, in the western Baltic, off the Norwegian coast and off the Newfoundland coast in 4R – to name but a few. There were times when I became confused in relation to this fishery regarding the mix of fall and spring spawners and the report should contain a specific labelled section referring to this and the approach of the assessment team in relation to its IPI status. In that context the spring spawners in this fishery clearly qualify as an exemption to the requirements for IPI stocks (CR v1.3: B27.4.10.1). Although the report states that the request to the MSC was made, and I assume was granted, there is no specific statement to this effect.

In the stock status section management terms such as  $B_{usr}$ , LRP and 'healthy zone' are introduced without explanation, which does not come until later. I understand the terms but not all readers will and the explanation and their values should come earlier.

**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
<i>Example:1.1.2</i>	No	No	NA	<i>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.</i>	
1.1.1	Yes	No	N/A	There is uncertainty and conflict between the two models, about the actual level of SSB. In that context I can accept that there is an 80% probability of the stock being above LRP (SG80) However there is not a 95% probability of being above LRP (SG100) and the overall score should be reduced to 80.	The LRP is 51,000 t, 2014 SSB was estimated at 98,000 t (Model 1) or 182,800 t (Model 2). In the latest assessment document (CSAS Res. Doc. 2015/025) that was available to the CAB, which includes data up to 2013, a risk analysis (Model 1, Fig. 55) indicates a <i>p</i> of ~ 0.05 of SSB<LRP in 2015 with the ~ 30,000 t catch in 2014. Despite model uncertainty and given Model 2 results, the CAB is confident that requirements of SG100 for SIa are met, justifying an overall score of 90 for PI 1.1.1.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
1.1.2	No	No	N/A	<p>Firm evidence is needed at scoring issue d) regarding the lower trophic level status of the stock. This needs to be in the body of the report and referenced here. This scoring issue cannot just be dismissed with as 'not relevant' with the comment 'this herring stock is not considered to be a key lower trophic level stock. '.</p> <p>MSC CR v 1.3 clearly identifies herring as a lower trophic level species (CB 2.3.14 Box CB1). The assessment team then has to establish that, in this area it is not a KEY LTL species by very specifically addressing the three sub-criteria at CB2.3.13 where it has to meet at least two of those sub-criteria in order to be a KEY LTL species.</p> <p>Failure to adress this issue appropriately is a serious omission.</p>	Reference to a SAI Global report which concluded the Southern Gulf of St. Lawrence herring stock is a non key LTL stock has been added to SId rationale.
1.1.3	N/A	N/A	N/A		
1.2.1	Yes	Yes	N/A	No further comment	

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
1.2.2	Yes	Yes	Yes	There are many very positive aspects in relation to effective rules and tools in this fishery. However, the team has clearly identified weaknesses in this area in particular the absence of an Integrated Fisheries Management Plan with appropriate harvest control rules. As a consequence they have correctly produced a Condition to address those weaknesses.	No response necessary.
1.2.3	Yes	No	N/A	There is a wealth of relevant information identified in the report and scoring comments including the two valuable fishery independent assessment indices. I do not recall in the report section any strong feeling that there was a serious lack of information and this was not identified as a weakness. I think that the score for this PI should be at least 90.	The CAB considers the absence of logbooks (and the longstanding uncertainty with the CPUE index derived from telephone interviews) and observer coverage in the fishery to preclude scores of 100 for SIs a and b. Therefore, an overall score > 80 cannot be justified.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
1.2.4	Yes	No	N/A	Bearing in mind the use of two assessment models and the serious conflict between them I find it difficult to see how a score of 90 can be justified. Score should be reduced to 80/85. Si a) 80; Si b) default; Si c) 80; Si d) default 80; Si e) 100	Don't agree. Sla refers only to the appropriateness of the assessment methodology; the CAB feels that the requirements of SG 100 are met for issue a. CAB and peer reviewer are in agreement on other SIs. Concerns regarding model formulation, which are considered in SIs c and d, were addressed in a recent framework review. Awarding a score of 80 rather than 100 for Sla would still result in an overall score of 85 for this PI
2.1.1	Yes	Yes	N/A	The small spring spawning component in this fishery has been correctly addressed here as it has been clearly identified as a vulnerable stock component in the body of the report. This component has also been identified and dealt with as an IPI component	No comments necessary
2.1.2	Yes	Yes	N/A	A minor technical point on scoring. With one Si at 100 and 3 at 80 the score should be 85.	Agreed. Scoring changed

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.1.3	Yes	Yes	N/A	No further comment	No comments necessary
2.2.1	Yes	Yes	N/A	This is not a big issue and I am happy with the comments ad score. You have rightly identified in the report section that there is basically only anecdotal information on by catch is this fishery. You have identified the need for a Condition on this issue at 2.2.3.	No comments necessary
2.2.2	Yes	Yes	N/A	No further comment	No comments necessary
2.2.3	Yes	No	No	See relevant comments at 2.2.1. I am not convinced that this issue is serious enough for a Condition. It appears to me from the report that, although information on the absence of significant by-catch is only anecdotal, nobody has expressed serious concern about this. I would like you to consider that in this instance the score should be 80 (as for 2.2.1 and 2.2.2) and a Recommendation made. At least this would ensure, through surveillance audit pressure, that the client fishery produced some verifiable information.	Do not agree. The Cab believe the client (GNSHF) and DFO needs to find a way to quantitatively demonstrate that there is no bycatch in this fishery and propose a monitoring plan for this fishery The CAB agree that although bycatch level is low or negligible the problem is that it needs to be proven as formal documentation, and cannot be based on an oral statement from DFO or the client without any evidence to support it. We need to present more than this.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.3.1	Yes	Yes	N/A	Agreed that it does not meet the 90% probability requirement for Principle 2	No comments necessary
2.3.2	Yes	Yes	N/A	No further comment	No comments necessary
2.3.3	Yes	Yes	N/A	Score fully justified on basis of the level of available information	No comments necessary
2.4.1	Yes	No	N/A	In my opinion the evidence presented in the report is sufficient to conclude that 'the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm' A score of 100 can be justified provided that some additional rationale (pasted from the report) is included in the scoring comments.	Don't Agree. There is no specific evidence derived from a habitat specific study in relation to the herring fishery that could support a score of SG100. There is no evidence specific to the area of the fishery
2.4.2	Yes	Yes	N/A	No further comment	No comments necessary
2.4.3	Yes	Yes	N/A	Agreed that the lack of verifiable information justifies the reduced score	No comments necessary
2.5.1	Yes	Yes	N/A		No comments necessary

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
2.5.2	Yes	Yes	N/A	Justification for the score is very explicit in the scoring comments.	No comments necessary
2.5.3	Yes	Yes	N/A	Again the lack of verifiable information justifies the reduced score. The Condition or Recommendation at 2.2.3 should help to address this issue.	No comments necessary
3.1.1	Yes	Yes	N/A	It is only a reduction of 5 at scoring issue d) but I was rather surprised to see it. From my experience the Canadian system is exemplary in recognising the rights established by custom of people dependent on fishing for food and livelihood.	A matter of opinion; rights are indeed recognised but often after court battles.
3.1.2	Yes	Yes	N/A	Technical point only: Si a) 100, Si b) 80, Si c) 80 = score 85 not 90	Agreed. Scoring changed.
3.1.3	Yes	No	N/A	Whilst a partial score at SG 100 may be appropriate the justification in the final paragraph of the scoring comments is not clear.	Further justification added.
3.1.4	Yes	Yes	N/A	No further comment	No comment necessary.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
3.2.1	Yes	Yes	N/A	No further comment	No comment necessary.
3.2.2	Yes	Yes	N/A	No further comment	No comment necessary.
3.2.3	Yes	No	N/A	The scoring comments at b) to justify a N are rather harsh. I would conclude from the evidence presented in the report that the operation of sanctions does demonstrably provide effective deterrence. The fact that the only charges laid in the last three years have been for not having license/registration documents on board when checked, is evidence enough for me of their effectiveness. Score 100.	Do not agree. Documentary evidence does not exist that the three charges for document infractions are the only ones being committed.

<b>Performance Indicator</b>	<b>Has all the relevant information available been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	<b>Conformity Assessment Body Response</b>
3.2.4	Yes	Yes	Yes	This seems to be a problem endemic to Canadian fisheries and similar Conditions have been raised for other fisheries on the east coast. As a consequence it is difficult for me to argue against a Condition. However I do feel that a formal Research plan as such is unusual in any fishery. In this case the report clearly details that the necessary research, appropriate to the scale and needs of the fishery and its management, are identified and carried out. I consider that a Recommendation for these details to be formally recorded in a plan is all that is needed.	Comments noted but a written Research Plan is a MSC requirement.
3.2.5					

**Any Other Comments**

Comments	Conformity Assessment Body Response
<p>My opinions regarding the report, the scoring comments and the scores are clearly detailed in the sections above and there is little need for further comment from me. I would however like to highlight what I consider to be a serious issue at Performance Indicator 1.1.2, which needs to be thoroughly addressed by the assessment team.</p>	<p>Please CAB comments on PI 1.1.2</p>

For reports using the Risk-Based Framework:

Performance Indicator	Does the report clearly explain how the process used to determine risk using the RBF led to the stated outcome? Yes/No	Are the RBF risk scores well-referenced? Yes/No	<b>Justification:</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response:
1.1.1				
2.1.1				
2.2.1				
2.4.1				
2.5.1				

For reports assessing enhanced fisheries:

<b><i>Does the report clearly evaluate any additional impacts that might arise from enhancement activities?</i></b>	<b>Yes/No</b>	<b>Conformity Assessment Body Response:</b>
<u>Justification:</u>		

## Appendix 3. Stakeholder submissions

No stakeholder's comments have been submitted to SAI Global.

### MSC Comments and Assessment team's responses

www.msc.org



Marine House  
1 Snow Hill  
London EC1A 2DH  
United Kingdom  
Tel: +44 (0)20 7246 8900  
Fax: +44 (0)20 7246 8901

Date 07/08/2015

SUBJECT: MSC Review and Report on Compliance with the scheme requirements

Dear Ivan Mateo

Please find below the results of our partial review of compliance with scheme requirements.

CAB	SAI Global (SAI)
Lead Auditor	Ivan Mateo
Fishery Name	Gulf of St Lawrence fall herring gillnet fishery
Document Reviewed	Public Comment Draft Report

Ref	Type	Page	Requirement	Reference	Details	PI
16366	Major	119-121	CR-27.10.6.1 v.1.3	Rationale shall be presented to support the team's conclusion	There is an issue in the way rationales are written and scores assigned for both 2.2.1 and 2.2.2. 2.2.1 states that there are no bycatch species, but information is lacking to determine whether the bycatch species are within biological limits. Firstly, it needs to be clear whether there are any 'main' species and this assessed in scoring issue 2.1.1. SI a,b,c. If there are no main species, then a partial strategy is 'not necessary' as required by scoring issue a in 2.2.2. SG 100 includes all species so a strategy is required in all cases. Further, the rationale for 2.2.2 is again simply repeated between all scoring issues. Clarity is needed with respect to whether there are main species, is the information sufficient to determine that and whether a partial strategy is required or not.	2.2.1, 2.2.2

MSC – the best environmental choice in seafood

Company Reg. 3322023 Limited by guarantee. Registered Office: 1 Snow Hill London EC1A 2DH Registered Charity No. 1066806

Page 1 of 6

**Assessment team's response:**

Information was revised by the assessment team. On performance indicators 2.2.1 and 2.2.2 it was shown that there was no bycatch for the 16F Gillnet Herring Species for 2004-2014, meeting 80a. However given there is no corroboration by independent sources (e.g observer data, logbook) sufficient additional monitoring is needed to determine if partial a strategy is required or not.

www.msc.org						
16367	Minor	75	CR-27.6.1.2 v.1.3	Any date prior to the certification of the fishery up to a maximum of six months prior to the publication of the most recent Public Comment Draft Report. This date should be linked to: a. The beginning of the fishery management year in which the Public Comment Draft Report is published; or, b. The start of the fishing season in which the Public Comment Draft Report is published; or, c. Any other logical date with regard to the applicant fishery.	The Target Eligibility Date is listed is seven (7) months before the publication of the PCDR. The maximum is six months.	
16368	Minor	75	CR-27.6.1.2 v.1.3	Any date prior to the certification of the fishery up to a maximum of six months prior to the publication of the most recent Public Comment Draft Report. This date should be linked to: a. The beginning of the fishery management year in which the Public Comment Draft Report is published; or, b. The start of the fishing season in which the Public Comment Draft Report is published; or, c. Any other logical date with regard to the applicant fishery.	<p>The report states: "The Assessment Team is satisfied that the fishery and trade system can differentiate product which was sold prior to January 2015 from product that was sold from that date onwards."</p> <p>The Certification Requirements state that no product harvested before the Target Eligibility Date can be sold as certified. The TED relates to the harvest date, not the date of sale.</p> <p>The report does not demonstrate whether and how the fishery can differentiate between product harvested before the TED (ineligible for certification) and after the TED (Eligible to be sold as certified).</p>	
16369	Minor	75	CR-27.6.2.3 v.1.3	The CAB shall document the rationale for the target eligibility date and include an assessment regarding how the assessed risks to traceability systems in the fishery are adequately addressed by the applicant to give confidence in this date.	The report does not document and assess the traceability risks and systems in place to identify and segregate under-assessment product in storage, given the change in the Target Eligibility Date.	

16370	Minor	75	CR-27.12.2.1 v.1.3	27.12.2 If the CAB determines the systems are sufficient, fish and fish products from the fishery may enter into further certified chains of custody and be eligible to carry the MSC ecolabel. The CAB shall determine: 27.12.2.1 The scope of the fishery certificate, including the parties and categories of parties eligible to use the certificate and the point (s) at which chain of custody is needed. a. Chain of custody certification shall always be required following a change of ownership of the product to any party not covered by the fishery certificate. b. Chain of custody certification may be required at an earlier stage than change of ownership if the team determines that the systems within the fishery are not sufficient to make sure all fish and fish products identified as such by the fishery originate from the certified fishery. c. If the point where chain of custody certification is required is covered by the fishery certificate, the team shall determine the parties or category of parties covered by the fishery certificate that require chain of custody certification.	The report states: "The target eligibility date is for product sold by the client group from 9 January 2015 onwards."  However, the report also states: "At the time of fishery certification, approved companies had not been identified."  It is not clear how the fishery is storing and/or selling under-assessment product when approved companies to join the certificate sharing agreement have not yet been identified (i.e. storage or transport). No CoC holder currently lists the fishery as a supplier.	
16372	Guidance	76	CR-27.12.1.6 v.1.3	27.12.1 The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products: 27.12.1.6 The number and/or location of points of landing.	The report states that all catch must be landed at "a DFO-designated port." However, it does not state the number and location of these ports, as required by 27.12.1.6.	

16374	Minor	76	CR-27.12.1 v.1.3	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products.	The report states it can track products based on date of sale. However, it is not clear what are the systems in place to track product from date of harvest. It is also unclear what is the risk of substitution at point of landing and how this is monitored.	
-------	-------	----	------------------	---	---	--

**Assessment team response:** All of these technical comments by MSC were taken off by the assessment team by adding new information provided in consultation with the client:

### **Traceability and Chain of Custody Information – 16 F Fall Herring Gillnet Fishery (as revised by Client on 20-08-2015)**

#### **Fishing Operations**

Inshore fishing vessels participating in the 16 F Fall Herring Gillnet Fishery are only permitted to leave port after 6:00 pm local time. They are not permitted to fish after 12:00 pm (noon) the following day and must return to port. During the fishing season, weekend closures are in effect for conservation reasons.

Vessels are not required to hail out upon departure or hail-in before landing their catch. The majority of vessels carry large tubs onboard that can carry approximately 2,000 lbs of herring. The tubs are weighed in a clean state before being placed onboard a vessel, and are weighed immediately upon removal from the vessel with the assistance of a boom truck. No allowance is made for ice and/or water. The difference in weight is what is recorded as landed catch weight by the independent dockside monitor.

The monitors are required to verify the assigned weight of every tub of herring on every landing. Vessels can only land at a port designated in their licence by the Department of Fisheries and Oceans. New port locations may be added and others removed at the request of industry. At this time, the designated ports in Nova Scotia are: Toney River, Caribou, Logan's Point, Lismore, Port Hood and Pictou Landing. On Prince Edward Island, the designated landing ports are: Wood Island, Beach Point, and Machon's Point. All of the currently-designated ports are located in the Unit of Certification - Herring Fishing Area 16 F (**CR 27.12.1.6**). After each dockside verification (including a check to ensure that the vessel's hold is empty), the monitor issues the fisher with a DMP Number. After the fish is weighed, a buyer issues a Purchase Slip to the licence holder which contains the licence holder's name, date/time of landing, the weight of fish onboard, and the DMP number. Later, a copy of the slip will also be given to the processing plant and to DFO.

#### **Onshore Operations (**CR 27.6.2.3 V.1.3**)**

Herring from area 16 F is processed into 2 principal products: roe and "splits". The former is sold to the Japanese market, and the latter is sold to a New Brunswick consortium of smokehouses who, in turn, smoke the product for the Caribbean market.

Herring enter a processing facility through a central location where they must be processed quickly to avoid spoilage and subsequent quality issues. In Canada, federal and provincial regulations stipulate how processing operations are to occur, and what traceability standards must be met to insure effective tracking of product should a product recall or a food safety concern arise. Plant inspections are carried out under both regulations and breaches of licence conditions are subject to prosecution and eventual sanctions.

There is no freezing of the raw material for later processing such as, for example, if a plant labour shortage issue was to arise. Again, for traceability purposes, plants are required by law to have functional, in-house tracking systems which allow a product to be traced back to the

original harvester, date of landing and sale, and catch area. The tracking system extends to the point of first sale (wharf) where the tubs that are loaded onto a vessel prior to departure are the same that are subsequently weighed upon arrival ie. Once loaded onto the boom truck, the same tubs enter the processing facility for immediate processing.

Production reports are maintained for each “run” including weight of material prior to processing, weight of production by product type, and weight of offal produced (typically for the pet food or mink market).

### **3.0 Target Eligibility Date (CR Reference: 27.6.1.2 v1.3 and CR 27.6.2.3 V1.3)**

In accordance with CR Requirements CR 27.6.1.2.b., the client group has chosen the target eligibility date to be September 1, 2015. The group’s rationale is straight-forward: Under these MSC V1.3. guidelines, this date coincides with the start of the fishing season in which the Public Comment Draft Report is published.

### **4.0 Chain of Custody Considerations**

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 Herring Fishing Area 16 F will be eligible to land MSC-certified herring and any onshore enterprise will be eligible to acquire 16 F herring 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 16 F fall herring fishery 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.

16375	Major		CR-27.10.6.2 v.1.3	The rationale shall make direct reference to every scoring issue and whether or not it is fully met.	For all of P2:  There is general trend in how the rationales for P2 are presented, in that the same text is simply repeated across scoring issues. It is very unclear therefore how each individual rationale directly satisfies the scoring levels for each issue. Individual TO entries have been provided for some specific PIs, but MSC suggests that the entire P2 section is given a comprehensive review to determine what rationale is needed to satisfy each scoring issue requirements, reduce the overlap and make it clear how each scoring issue is met.	
-------	-------	--	--------------------	--	---	--

**Assessment team response:** The assessment team re-examined again each rationale on Principle 2 performance indicators to see if it satisfied each issue requirements to avoid major redundancies and overlaps for a clearer explanation of the scoring. However, due to the way in which the fishery operates with very little bycatch and as a result of the lack of independent bycatch monitoring programs, it was felt that the rationales justifying the scores awarded are somewhat similar in each instance.

www.msc.org						
16376	Major	127	CR-27.10.6.1 v.1.3	Rationale shall be presented to support the team's conclusion	<p>For both 2.3.1 and 2.3.3, it is not clear from the rationales given that each scoring issue is met.</p> <p>2.3.1, Scoring issue a; For instance, the rationale states that some evidence exists that the fishery is causing a moderate threat to turtles, but no further clarification is given on what this evidence is. Similarly, scoring issue a asks whether the mortality caused by the fishery are within limits of protection, but the rationale does not mention what the national limits for protection are and why effects are within those limits?</p> <p>SI B: No evidence given for why threat is moderate. Are there interactions or are there not? Rationale is contradictory here.</p> <p>SI C: What evidence is there that indirect effects from the herring fisheries are not causing e.g. food limitation on ETP species?</p> <p>2.3.3</p> <p>Pertains to all scoring issues. Rationale is simply repeated between all scoring issues and is not specific enough to answer each issue. E.g. SI b) What is the confidence level provided that the logbooks are accurate and is that level of information sufficient? There is no mention of any independent verification.</p>	2.3.1, 2.3.3

**Assessment team's response:** Previous sentences were replaced with new ones for more clarity emphasizing that the information on SARA logbooks shows that there were no interactions with endangered species from 2007 to 2014. However it remains to be verified thoroughly given that there is no observer data. Information supporting rationale was written to be more specific for each scoring issue.

**Appendix 4. Report on the Evaluation of the role of herring as key lower trophic level species based on MSC Standards (SAIG 2014).**



**Report on  
the  
Evaluation of the role of herring  
as key lower trophic level species based on  
Marine Stewardship Council Standards  
by  
SAI Global Assurances Ltd**



**August 2014**

<b>Contents</b>	<b>Page</b>
<b>Company Information</b>	<b>3</b>
<b>Executive Summary</b>	<b>4</b>
<b>Fishery Details</b>	<b>5</b>
<b>Methodology</b>	<b>6</b>
<b>Marine Stewardship Council assessments</b>	<b>7</b>
<b>References</b>	<b>13</b>

## 1. Company Information

Global Trust Certification Ltd is an Irish registered company; Company Registration Number: 307402. SAI Global Assurances, Ireland is wholly owned by SAI Global Assurances Australia and the company operates as SAI Ireland.

SAI Global Assurances, Ireland has been operating as a specialist seafood certification body since 1997, specializing in fisheries, aquaculture, seafood processing, supply chain, food service and retailing.

SAI Global Assurances, Ireland is accredited by Accreditation Services International (ASI) to operate an MSC approved system for the assessment and certification of fisheries to the MSC Standard for Sustainable Fisheries and the MSC Chain of Custody Standard for the use of the MSC eco-label on products from certified fisheries.

SAI Global Assurances, Ireland currently has seafood certification projects in over 28 countries and can certify clients against all the leading seafood standards.

## 2. Executive Summary

This review evaluated the role of herring as key lower trophic level species based on previous Marine Stewardship Council (MSC) Fishery assessments of herring. To date almost all of the MSC herring assessments have been conducted on the North Sea and the Northeast Atlantic. In all of the assessments they consider herring as a non-key low trophic level species.

There has been a pre-assessment study of the herring in the Northwest Atlantic conducted by O'Boyle 2013. He found that for the region of Gulf of St Lawrence, of the three attributes in MSC V1.3 to consider herring as a key low trophic level species (connectance, energy transfer, key presence in wasp waisted ecosystems flow), only one characteristic was attributable to herring as key low trophic level this was connectance.

For the energy transfer criteria (subcriteria ii) on CR V1.3 requirements, using data by Savendorff et al (2006, 2007), O'Boyle (2013) calculated the Consumer/Biomass Ratio (CBR) for Gulf of St Lawrence 16 F Herring to be ranging from 3.72-4.73% during the 1980's and from 2.71% to 3.45% during the 1990's. Both estimates are lower than the required CB criterion of 5% for a species to be eligible to be classified as key LTL species. These findings are similar from what other researchers found in the North Sea and Northeast Atlantic.

In relation to subcriterion iii (wasp-waistedness), the GCB 2.3.13 states that in order to classify a species as a key LTL species, a high proportion of the total energy must pass between lower and higher trophic levels passes through this stock, O'Boyle (2013) calculated that consumption of herring could be in order of in the order of 21.1 – 23.8%. These numbers were considered very low to have a species categorized as a key LTL species. Furthermore, O'Boyle 2013 states that "The dependence of a large number of predators on Herring across a wide range of trophic levels might be taken as lack of support for a wasp-waisted southern Gulf of St. Lawrence ecosystem".

Therefore it is concluded that the assessment of the Gulf of St Lawrence herring is in agreement with previous studies of herring in the North Sea and Northeast Atlantic in that herring should be considered a non key trophic level species.

Based on the information above it is considered that the herring species caught on Gulf of St Lawrence 16 F inshore gillnet fishery would be characterized as non key low trophic level species based on the evidence that the species does not meet all the MSC v.1.3 requirements (connectance, energy transfer, key presence in wasp waisted ecosystems flow) to be categorized as LTL key species.

### 3. Fishery Details

#### Target Species

Atlantic Herring (*Clupea Harengus*)

Fishery

Inshore Fixed Gear Fall Herring Fishery, Southern Gulf of St. Lawrence, Herring Fishing Area 16 F.

Fishery Geographic Location:

The fishing zone lies along the eastern portion of the southern Gulf of St. Lawrence within NAFO Division 4T. It is an inshore /coastal zone which borders the Canadian provinces of Nova Scotia and Prince Edward Island.

Regulatory Authority

Canadian Department of Fisheries and Oceans – Gulf Region, Moncton, New Brunswick.

#### Unit of Certification

Species/stock	Geographic	Gears	Management System
Atlantic Herring ( <i>Clupea Harengus</i> )	Inshore Fall Herring Fishery, Southern Gulf of St. Lawrence, Herring Fishing Area 16 F.	Fixed Gear - gillnets	Canadian Department of Fisheries and Oceans – Gulf Region, Moncton, New Brunswick.

## 4. Methodology

It is proposed that post the outcome of MSC pre assessment, further evaluation activity is undertaken to establish if the fishery will be defined as a Low Trophic Level Fishery (LTLF) component of the full assessment. The outcome of this will allow a more 'risk considered' approach to the full assessment. Activities will include:

- Review information that will be used to confirm LTLF status of fall herring.

This is contained within this report.

- Discuss with MSC in confidence their understanding of LTLF status of Herring Fishery.

Ongoing discussions are held with the MSC team many are "off the record", no issues reported with the conclusion of this review.

- Review the outcome of P1 scores- most particularly PI 1.1.2 in the event of it being defined as an LTLF in full assessment.

Based on the review of all assessments where evaluation of herring as key LTL was conducted. There was no need to conduct a detailed evaluation of the outcome of P1 scores as in all of these assessments it was found that herring was not key LTL.

## 5. Marine Stewardship Council assessments of herring considering herring as a Key Low level Species

### 5.1 [SPFPO Swedish North Sea herring](#)

Assessment Team Conclusion: NON- Key-LTL Considerations

Herring is considered to impact on most other fish stocks either as predator and itself as prey for fish, seabirds and sea mammals in the North Sea area (Dickey Collas et al., 2010, Fauchald et al., 2011; Segers et al., 2007). The populations of herring constitute some of the highest biomass of forage fish in the North Sea and are thus an integral and important part of the ecosystem, particularly of the low trophic level pelagic components (Mackinson and Daskalov, 2007; ICES WKPELA, 2012; Fauchald et al., 2011).

Despite the relevant role of herring in the North sea, and that Herring is a Clupeidae included in Box CB1 of the MSC Certification requirements, the NSAS Herring has not been considered as a Key LTL species because it does not match some of the additional requirements listed in Box CB2 of the certification requirements, as explained below:

- a) According to Essington and Pláganyi, 2013 the connectance level between this herring population and others the ecosystem would be around 3.5%. This is lower than the required 4% threshold level defined in the MSC certification requirements.
- b) According to the assessment made by Essington and Pláganyi (2013) the % of energy passing through this species to both higher and lower trophic layers consumer biomass was 0.47%. This is below the required 5% threshold level.
- c) There are other pelagics and/or forage fishes like Sandeels, Sprat and Norway Pout which also play a relevant role as food supply for other trophic layers (Fauchald et al., 2011; Kempf et al., 2006; Mackinson and Daskalov, 2007) and recently, it has been shown that Sandeel may play the most relevant role in terms of potential impacts on other trophic levels compared to herring (Smith et al., 2011). Therefore herring is not the key component in a 'wasp waisted' ecosystem.

Therefore it seems that none of the criteria in CB2 are met by the NSAS herring, so it cannot be flagged a Key LTL species in the North sea; as such it will not be scored against scoring issued.

## 5.2 Northern Ireland Pelagic Sustainability Group (NIPSG) Irish Sea Herring

Assessment Team Conclusion: It was considered that Irish Sea herring is not a key low trophic stock and scoring issue 1.1.2d is not relevant.

### Considerations

Irish Sea herring is a member of the family Clupeidae, which is listed in box CB1 (MSC CR 1.3), and therefore could be designated as a key low trophic level stock. Therefore Irish Sea herring must fail to satisfy two out of the three sub-criteria below (CB2.3.13a) to avoid being designated a key low trophic species. The sub-criteria are assessed mainly based on information in Lees and Mackinson (2007). Within the Ecopath model, Lees and Mackinson (2007) define herring as part of the “small planktivorous fish” group, of which herring make up of about a third of the biomass.

The Lees and Mackinson (2007) model is publicly available and based on credible data and information. As for all Ecopath models, the Irish Sea model depends on estimating energy flow in the ecosystem in an equilibrium state, although possible dynamics were explored using Ecosim. The model is a simulation, and is not a statistical model fitted to data.

Lees and Mackinson (2007) provided a diet matrix which was used to calculate the food web connectivity indices for small planktivorous fish (see GCB 2.3.13). Based on these estimates, we calculated the Proportional Connectance to be 5% and the weighted SURF index as 0.00125, which places this group in the indeterminate region (guidance reference points: Proportional Connectance > 8% and/or SURF index >

0.005 indicates key LTL, Proportional Connectance < 4% and/or SURF index < 0.001 indicates non-key LTL; GCB 2.3.13). However, the estimates from the diet matrix represent a maximum for these indices, since the “small pelagic planktivorous fish” group, although dominated by herring, consists also of scad (*Trachurus trachurus*), pilchards (*Sardina pilchardus*), shads (*Alosa alosa*), sprat (*Sprattus sprattus*), and anchovy (*Engraulis encrasicolus*). Therefore, it is highly likely that the SURF index calculated specifically for herring would be below the reference point, and therefore Irish Sea herring does not meet this sub-criterion.

A large volume of energy passing between lower and higher trophic levels passes through this stock. Based on the biomass estimates used in the Ecopath model, Lees and Mackinson (2007) estimate that approximately 33% of the small pelagic planktivorous fish group are herring and therefore the biomass was in the region of 1.2 t km<sup>-2</sup>, compared to consumer biomass which was 88 t km<sup>-2</sup>, which equates to significantly less than the 5% threshold of the consumer biomass, and therefore this sub-criterion is not met. In addition, the average catch is relatively small and has always been less than 50,000t threshold (GCB 2.3.13 ii). In addition, the biomass of small herring has typically been less than 5% of the combined biomass of small clupeids (including sprats) estimated by acoustics.

There are few other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, such that a high proportion of the total energy passing between lower and higher trophic levels passes through this stock (i.e. the ecosystem is ‘wasp-waisted’).

Herring make up approximately 33% of the small pelagic planktivorous fish group with five other species. Other species that have a similar trophic role are mackerel (*Scomber scombrus*) and sandeel (*Ammodytes tobianus*, *Hyperplus lanceolatus*). Based on information used by Lees and Mackinson (2007), Irish Sea herring makes up less than 5% of the total biomass across similar trophic groups, which strongly suggests the Irish Sea ecosystem is not “wasp-waisted”.

More generally speaking, the MSC criteria for key low trophic stocks favour low-diversity ecosystems which are dominated by broad environmental effects, such as those found in upwelling systems or systems with strong seasonality. The Irish Sea is not an upwelling system with relatively high diversity, similar to the North Sea where the herring stocks are not key low trophic stocks. The Irish Sea appears to share a wide number of ecosystem characteristics with the North Sea (Lees and Mackinson 2007). In addition, estimated trophic level for Irish Sea planktivorous fish is 4.15, higher than the mean level reported for this species (mean 3.2; [www.Fishbase.org](http://www.Fishbase.org)). Survey data suggests that zooplankton groups account for more than 90% of the diet of small pelagic planktivorous fish.

Therefore it was found that Irish Sea herring is not a key low trophic stock and scoring issue 1.1.2d is not relevant and not scored.

### 5.3 [Norway North Sea and Skagerrak herring](#)

Assessment Team Conclusion: It is not considered to be a key LTL species because it does not meet at least two of the three sub- criteria in CB2.3.13 in Certification requirements v1.3.

#### **Considerations**

There is clear evidence that herring in the North Sea and Skagerrak are a lower trophic level (LTL) species. However it is not considered to be a key LTL species because it does not meet at least two of the three sub-criteria in CB2.3.13 in Certification requirements v1.3,

1. A large proportion of the trophic connections in the ecosystem involve this stock, leading to significant predator dependency. Ecosystem modelling of the North Sea (Mackinson and Daskalov, 2007) has shown that there are numerous other species which form important sources of prey for piscivorous fish. They are mackerel, horse mackerel, sprat, poor cod, Norway pout, sandeels blue whiting, Maurolicus and juvenile saithe and cod. According to Essington and Pláganyi, 2013 the connectance level between this herring population and others in the ecosystem would be around 3.5%. This is lower than the required 4% threshold level defined in the MSC certification requirements. In addition, the SURF index for this stock is 0.0030, which again is lower than the 0.005 threshold as defined to indicate a KEY-LTL stock as defined in in the MSC CR v1.3.
2. A large volume of energy passing between lower and higher trophic levels passes through this stock. There are numerous other species of planktivores, most of which are listed above, through which energy passes from primary production through zooplankton to fish. According to the assessment made by Essington and Pláganyi (2013) the % of energy passing through this species to both higher and lower trophic layers, consumer biomass, was 0.47%. This is below the required 5% threshold level for a KEY-LTL stock as defined in MSC CR v1.3
3. There are few other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, such that a high proportion of the total energy passing between lower and higher trophic levels passes through this stock (ie the ecosystem is 'wasp waisted'). As noted above there are numerous other prey species of planktivores which are abundant in the North Sea through which energy is passed to the top predators. Quite clearly the North Sea ecosystem is not 'wasp waisted'

Further, historical, evidence for herring not meeting the requisite criteria for a key LTL species can be seen when the herring stock was close to extinction in the mid-1970s, there was no evidence of other species being adversely affected. Indeed, it can be argued that the trophic role of herring was simply replaced by other species, not the least of which was the concurrent expansion of the sprat and gadoid stocks. Whereas it appears that some bird populations may have an obligate dependence on juvenile sandeels, no comparable dependence has been identified for North Sea and Skagerrak herring.

#### 5.4 [Norway spring spawning herring](#)

Assessment Team Conclusion: The North East Atlantic and Arctic ecosystem herring cannot be considered to be a key LTL.

##### **Considerations**

CES reports clearly note that herring play an important role in the North East Atlantic and Arctic ecosystem as prey species for larger fish, birds and marine mammals and as a predator on capelin and zooplankton. This provides clear evidence of their role as a lower trophic level species. However in the North East Atlantic and Arctic ecosystem herring cannot be considered to be a key LTL species because it does not meet at least two of the three sub-criteria in CB2.3.13 in Certification requirements v1.3.

1. A large proportion of the trophic connections in the ecosystem involve this stock, leading to significant predator dependency. In the North East Atlantic and Arctic there are numerous other species which form important sources of prey for piscivorous fish Sea birds and mammals. There are mackerel, horse mackerel, capelin, polar cod, Norway pout, sandeels blue whiting, Argentines, Maurolicus and juvenile saithe and cod. According to the connectance score ( $=0.0005$ ) calculated by Essington and Pláganyi (2013), the proportion of the trophic connections in the ecosystem involving this stock are not large as it falls below the required 4% threshold level defined in the MSC certification requirements CR v1.3.
2. A large volume of energy passing between lower and higher trophic levels passes through this stock. There are numerous other species of planktivores, most of which are listed above, through which energy passes from primary production through zooplankton to fish.
3. There are few other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, such that a high proportion of the total energy passing between lower and higher trophic levels passes through this stock (ie the ecosystem is 'wasp waisted' ). As noted above there are numerous other prey species of planktivores which are abundant in the North East Atlantic and Arctic ecosystems through which energy is passed to the top predators. Quite clearly these ecosystems are not 'wasp waisted'

Further, historical evidence for herring not meeting the requisite criteria for a key LTL species can be seen when the NSS herring stock was close to extinction in the late 1980s, there was no evidence of other stocks being placed at risk as the trophic role of herring was probably replaced by other species, such as capelin and young gadoids. Haddock may feed on herring and other fish species if the abundance of capelin, their preferred prey, is low. Within the North East Atlantic and Arctic fish ecosystem there is no evidence that any species of fish bird or mammal is entirely dependent on herring as a source of food.

## 5.5 [Samherji Norwegian & Icelandic herring trawl and seine](#)

Assessment Team Conclusion: NON KEY

### Considerations

The Norwegian spring spawning herring is a very important species in the ecosystems which it inhabits. It preys on *Calanus finmarchicus* and is itself an important prey for other species such as cod, saithe and other demersal species, in addition to sea birds and whales. Large numbers of killer whales follow the herring during its migration (source: [http://www.fisheries.no/ecosystems-andstocks/marine\\_stocks/fish\\_stocks/norwegian\\_spring\\_spawning\\_herring/](http://www.fisheries.no/ecosystems-andstocks/marine_stocks/fish_stocks/norwegian_spring_spawning_herring/)). Herring is listed as potential key low trophic level species (see Box CB1 of the MSC Certification Requirements Annex v1.3) unless evidence is available otherwise. However, analysis on connectivity and wasp-waisted-ness in the ecosystem suggest that it is not a key low trophic species under the definitions in the MSC requirements and guidance (MSC Certification Requirements Guidance V1.3; Essington and Pláganyi 2013), as it does not meet two of the three sub-criteria (CB2.3.13).

1. Predator dependency on the stock: A recent study by Essington and Pláganyi (2013) assess the connectance and proportion of consumer biomass of several stocks under the MSC program or in assessment identified as default key LTL species based on taxonomy. The degree of connectance estimated for the Norwegian Icelandic spring spawning herring is 0.0005. Therefore, the predator dependency is not considered to be significant. The study does not provide estimates for the herring proportion consumer biomass.
2. Energy transfer: Estimated herring consumer biomass is 5% (see Table 3.3.4). Therefore, taking into account the energy transfer criteria, Norwegian Icelandic spring spawning herring could be regarded as a key LTL stock in the ecosystem (suggested by model-based results).
3. Wasp-waisted-ness: The catches of the Norwegian Icelandic spring spawning herring are smaller than those of all the species at the same trophic level (Table 3.3.5), then the ecosystem can be regarded as not wasp-waisted.

## 5.6 [Scottish Pelagic Sustainability Group Ltd North Sea herring](#)

Conclusion: The stock has now been determined as not a key low trophic level stock according to criteria provided.

### Considerations

Herring (Clupeidae) is listed as a mandatory key low trophic species (see Box CB1 CR Annex v1.2) unless evidence is available otherwise. Its abundance and importance in the North Sea ecosystem and ecosystem assessment do not provide evidence to the contrary. The relationships among herring's predators, prey and competitors are complex, and simplistic treatment of herring as a low trophic species may not be the most appropriate option, although it would still be prudent that these relationships are considered in setting target biomass levels.

However, a recent assessment of the proportion consumer biomass and measures of connectance suggest that falls below the required thresholds to be determined as key LTL (Essington and Pláganyi 2013, Table 6). The connectance score suggested that the proportion of the trophic connections in the ecosystem involving this stock were not large (Box CB 2, a), so predator dependency was not significant. The connectance was estimated as 3.5% of all trophic connections involved North Sea herring, which is less than the 4% threshold level distinguishing key from non-

key (Essington and Pláganyi 2013). Estimated herring proportion consumer biomass is 0.47%, less than the 5% threshold suggested in GCB2.3.12c for subcriterion Box CB 2, b. In addition, there are a number of significant planktivore stocks occupying the same trophic level, including sandeel, sprat and Norway pout, which together with the connectance and proportion consumer biomass estimates, imply the ecosystem is not sufficient "waspwaisted" to meet the criteria CB Box 2, c. This is supported by Heath (2005) who found that "bottom up" control of the planktivorous food web in the North sea resulted in the populations of other functionally similar species expanding to fill the vacant niches vacated by exploited stocks, thus maintaining the planktivore role in the system.

## 5.7 Other Assessments

### [Pelagic Freezer Trawler Association North Sea herring](#)

Assessment of qualification for Key LTL species does not apply to fisheries which entered assessment and /or had their site visit prior to 14 August 2011

### [Pelagic Freezer-Trawler Association Atlanto-Scandian herring pelagic trawl](#)

Assessment of qualification for Key LTL species does not apply to fisheries which entered assessment and /or had their site visit prior to 14 August 2011

### [Western Baltic spring spawning herring](#)

In assessment

### **SPSG West of Scotland herring Pelagic Trawl**

Assessment of qualification for Key LTL species does not apply to fisheries which entered assessment and /or had their site visit prior to 14 August 2011

### **CSHMAC Celtic Sea herring**

Assessment of qualification for Key LTL species does not apply to fisheries which entered assessment and /or had their site visit prior to 14 August 2011.

### [Danish Pelagic Producers Organisation Atlanto Scandian herring](#)

Information Not provided on report from 2009. Fishery in reassessment

### [Danish Pelagic Producers Organisation North Sea herring](#)

Information Not provided on report from 2009. Fishery in reassessment

### [Faroese Pelagic Organisation Atlanto-Scandian herring](#)

Suspended

### [From Nord North Sea pelagic trawl herring](#)

In Assessment

### [Hastings fleet pelagic herring and mackerel](#)

NoN Applicable

The TAB directive D-036 which relates to lower trophic level species does not apply to fisheries which entered assessment and /or had their site visit prior to 14 August 2011. The Hastings site visit was on 27 July 2011.

### [NAFO Division 4R Atlantic herring purse seine](#)

Given that the RBF was used to score PI 1.1.1., the default score of 80 is given. The site visit was held during 7-10 September 2010 and thus TAB Directive D-036 v1 states that (Assessment of Low

Trophic Level Fisheries) does not apply to fisheries which entered assessment and /or had their site visit prior to 14 August 2011

**[Scottish Pelagic Sustainability Group Ltd Atlanto Scandian herring](#)**

Assessment of qualification for Key LTL species does not apply to fisheries which entered assessment and /or had their site visit prior to 14 August 2011

**[Scottish Pelagic Sustainability Group Ltd North Sea herring](#)**

Website not updated

## 6. References

- Dickey-Collas, M., Nash, R. D. M., Brunel, T., Damme, C. J. G., van Marshall, C. T., Payne, M. R., Corten, A., et al., 2010. Lessons learned from stock collapse and recovery of North Sea herring: a review. *ICES Journal of Marine Science*, 67: 1875–1887.
- Essington T. and É. E. Pláganyi. 2013: Model and data adequacy for the Marine Stewardship Council key low trophic level species designation and criteria. January 2013. MSC Science Series. In Print
- ICES. 2012a. Report of the Benchmark Workshop on Pelagic Stocks (WKPELA 2012), 13–17 February 2012, Copenhagen, Denmark. ICES CM 2012/ACOM:47. 572 pp.
- Kempf, A., Floeter, J., and Temming, A. 2006. Decadal changes in the North Sea food web between 1981 and 1991—implications for fish stock assessment. *Canadian Journal of Fisheries and Aquatic Sciences*, 63: 2586–2602.
- Lees, K. and Mackinson, S., 2007. An Ecopath model of the Irish Sea: ecosystems properties and sensitivity analysis. *Sci. Ser. Tech Rep., Cefas Lowestoft*, 138: 49pp.
- Mackinson, S. and Daskalov, G., 2007. An ecosystem model of the North Sea to support an ecosystem approach to fisheries management: description and parameterisation. *Sci. Ser. Tech Rep., Cefas Lowestoft*, 142: 195pp
- O' Boyle, R. 2014. Report on the Compliancy of the Gulf of St. Lawrence (4T-4Vn) Herring Fall Gillnet Fishery (HFA 16F) with the certification requirements of Marine Stewardship Council 110p.
- Savenkoff, C., F. Grégoire, M. Castonguay, J.M. Hanson, D. Chabot, and D.P. Swain. 2006. Main prey and predators of Atlantic herring (*Clupea harengus* L.) in the Gulf of St. Lawrence during the mid-1980s, mid-1990s, and early 2000s. *Can. Tech. Rep. Fish. Aquat. Sci.* 2643: vi +28 pp.
- Savenkoff, C., D.P. Swain, J.M. Hanson, M. Castonquay, M.O. Hammill, H. Bourdages, L. Morrissette and D. Chabot. 2007. Effects of fishing and predation in a heavily exploited ecosystem: comparing periods before and after the collapse of groundfish in the southern Gulf of St. Lawrence (Canada). *Ecological Modelling*. 204: 115 – 128
- Segers, F. H. I. D., Dickey-Collas, M., and Rijnsdorp, A. D. 2007. Prey selection by North Sea herring (*Clupea harengus*), with special reference to fish eggs. *ICES Journal of Marine Science*, 64: 60–68.
- Smith, A. D., Brown, C.J., Bulman, C.M., Fulton, E.A., Johnson, P., Kaplan, I.C., Lozano-Montes, H., Mackinson, S., Marzloff, M. and Shannon, L.J., 2011. Impacts of fishing low-trophic level species on marine ecosystems. *Science* 333: 1147–1150.

## Appendix 5. 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: Criteria to determine surveillance score**

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

The surveillance score of 3 was used to identify the surveillance level appropriate to the SGSL-16F Fall Herring gillnet fishery.

Table C4: Surveillance Level Years after certification or recertification					
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 & recertification site visit

## Appendix 6. Client Agreement



October 28, 2015

Ivan Mateo, Ph D  
SAI Global Assurance Services Ltd  
Quayside Business Park, Mill Street  
Dundalk, County Louth  
Ireland

Dear Dr. Mateo,

This letter will serve to confirm the Gulf Nova Scotia Herring Federation's acceptance of the Final Report and Determination for the Southern Gulf of St. Lawrence Fall Herring Gillnet Fishery, identified as MSC 022, dated October 1, 2015.

Members of the Federation's Executive join with me in expressing our appreciation to you and the entire team at SAI Global Assurance Services who participated in the fishery assessment. We look forward to undertaking the important work that lies ahead as we continue our efforts to improve the sustainability of the 16 F fall herring fishery of the southern Gulf of St. Lawrence.

Yours truly,

Greg Egilsson  
Chairman  
Gulf Nova Scotia Herring Federation  
P.O. Box 1803  
Pictou, Nova Scotia  
B0K 1H0

**Objections Process**

(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR)