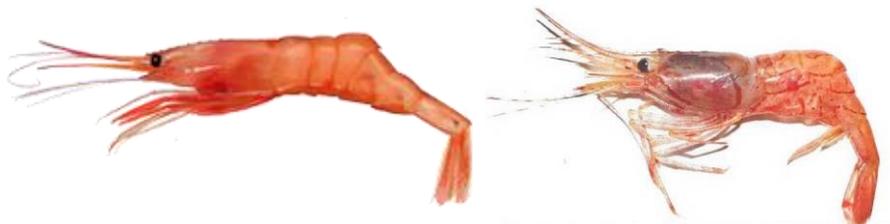


## MSC SUSTAINABLE FISHERIES CERTIFICATION

### Canada Northern and Striped Shrimp Fishery



Northern Shrimp  
(*Pandalus borealis*)

Striped shrimp  
(*Pandalus montagui*)  
(image - DFO)

#### Public Certification Report

October 2016

Prepared For: Canadian Association of Prawn Producers  
Prepared By: Acoura Marine Ltd.



Dear stakeholder. This fishery commenced full assessment with Intertek Fisheries Certification (IFC). During the assessment the client transferred to Acoura Marine Ltd. This report, and subsequent certification product, is from Acoura Marine. Any reference in this report to Intertek or IFC should be read as Acoura Marine Ltd. Any communication related to this fishery assessment should be directed to Acoura Marine:

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## Public Certification Report

October 2016

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## Glossary

AG	Auditor General of Canada
ASP	Association of Seafood Producers
BFC	Baffin Fisheries Coalition
B <sub>LIM</sub>	Biomass limit reference point
B <sub>MSY</sub>	The level of biomass resulting in maximum sustainable yield
C-NOPB	Canada - Newfoundland and Labrador Offshore Petroleum Board
CAPP	Canadian Association of Prawn Producers
COSEWIC	Committee on Status of Endangered Wildlife in Canada
CPUE	Catch per unit effort
CSAS	Canadian Science Advisory Secretariat
DFO	Department of Fisheries and Oceans or Fisheries and Oceans Canada
EAZ	Eastern assessment zone
EEZ	Exclusive Economic Zone
ENGO	Environmental non-government organization
ETP	Endangered, threatened and protected species
FAO	Food and Agriculture Organization of the United Nations
FC	Fisheries Commission of NAFO
GINR	Greenland Institute of Natural Resources
GFLK	Grønlands Fiskerilicenskontrol
HCR	Harvest control rule
FICS	Fogo Island Cooperative Society
F <sub>MSY</sub>	The rate of fishing mortality that results in the maximum sustainable yield
ICES	International Council for the Exploration of the Seas
IFMP	Integrated Fisheries Management Plan
IQF	Individual quick frozen
LRP	Limit reference point
MCS	Monitoring Control and Surveillance
MSC	Marine Stewardship Council
MSY	Maximum sustainable yield
NAFO	Northwest Atlantic Fisheries Organization
NC	Northern Coalition
NGO	Non-governmental Organization
NIPAG	NAFO ICES Pandalus Assessment Group
NRA	NAFO Regulatory Area
NSA	Nunavut Settlement Area

NSAC	Northern Shrimp Advisory Committee
NSRF	Northern Shrimp Research Fund
NWMB	Nunavut Wildlife Management Board
PA	Precautionary approach
PI	Performance indicator
RISA	Resolution Island Study Area
SAR	Scientific Advisory Report
SARA	Species At Risk Act
SC	Scientific Council of NAFO
SFA	Shrimp Fishing Area
SG	Scoring guidepost
SSB	Spawning stock biomass
TAC	Total allowable catch
TRP	Target reference point
USR	Upper stock reference
VMS	Vessel monitoring system
WAZ	Western assessment zone
Z <sub>LIM</sub>	Limit reference point for total mortality (natural plus fishing mortality)
Z <sub>MSY</sub>	Level of total mortality resulting in maximum sustainable yield

# 1 Executive summary

This report provides details of the MSC reassessment process for the Canada Northern and Striped Shrimp Fishery (CNSSF) for the Canadian Association of Prawn Producers (CAPP), the Association of Seafood Producers (ASP), the Baffin Fisheries Coalition (BFC), the Fogo Island Cooperative Society (FICS) and the Northern Coalition. The reassessment process began in May 2015.

Stakeholders were consulted as part of this reassessment, complemented by a full and thorough review of relevant literature and data sources. A detailed and fully referenced scoring rationale is provided as Appendix 1 of this report.

The Actual Eligibility Date for this reassessment is 4<sup>th</sup> October 2016.

The assessment team for this reassessment was changed after the site visit. The original team was led by Ian Scott, who was also covering Principle 3, but he withdrew from the assessment in October 2015. Subsequently, the team leader role was taken on by Dr. Rob Blyth-Skyrme, and John Angel took on the Principle 3 expert role. Dr. Howard Powles undertook the Principle 1 and Principle 2 expert roles, throughout.

The CNSSF targets northern shrimp – *Pandalus borealis* and striped shrimp – *Pandalus montagui*, and is undertaken by an ‘offshore’ fleet (LOA >100’; >500 t) and an ‘inshore’ fleet (LOA ≤100’; ≤500 t). The offshore fleet operates under an Enterprise Allocation (EA) system, with vessels making long trips with on-board processing. The inshore fleet is conducted on a competitive basis with trip limits and harvesting caps determined and regulated by the industry, and vessels land whole shrimp for shore-based processing. All vessels use demersal otter trawls with a minimum mesh size of 40 mm and, since 1997, the use of Nordmore grates has been a requirement to reduce groundfish bycatch.

Northern shrimp is much more abundant and widespread in commercial quantities than striped shrimp. In Canadian waters most catches of striped shrimp occur in 200-400 m compared to 300-500 m for northern shrimp (DFO 2015a). The two species tend to be found mixed in commercial densities in shelf areas near the entrance to Hudson Strait. However, striped shrimp predominates inside Hudson Strait, while northern shrimp predominates in other areas.

The CNSSF under assessment is divided in to six different Units of Certification (UoCs), based on the two shrimp species and seven fishing areas, as below.

UoC	Species and Area
1	Northern shrimp in Shrimp Fishing Area (SFA) 1
2	Northern shrimp in the Eastern Assessment Zone, Western Assessment Zone and SFA 4
3	Striped shrimp in the Eastern Assessment Zone, Western Assessment Zone and SFA 4
4	Northern shrimp in SFA 5
5	Northern shrimp in SFA 6
6	Northern shrimp in SFA 7

On completion of the assessment and scoring process, the assessment team concluded that UoCs 1-5 meet the MSC Standard.

For UoC 6, the northern shrimp stock in SFA 7 has declined in recent years due to environmental conditions and is currently below the NAFO-defined limit reference point (LRP) (and is approaching the DFO-defined LRP). Although the fishery has been closed in SFA 7 for two years (such that the stock is being given the best opportunity to rebuild), UoC 6 does not meet the MSC Standard because no rebuilding timeframe has been specified for the SFA 7 stock (i.e., PI 1.1.3).

Overall scores for the six UoCs are as follows:

Principle	UoC					
	1	2	3	4	5	6
Principle 1 – Target Species	92.5	88.8	82.5	91.3	86.3	<60
Principle 2 - Ecosystem	89.7	93.0	93.0	92.0	92.0	92.7
Principle 3 – Management System	89.3	91.8	91.8	90.3	90.3	86.8

There are a number of areas which reflect particularly positively on the CNSSF. For Principle 1, these include that the shrimp stocks in UoCs 1-5 have been either above or fluctuating around their target reference points in recent years. For each UoC, the harvest strategy is responsive to the state of the stock, while annual assessments of stock status and in-season monitoring of catches against TACs ensure that objectives of the strategy are met. Harvest control rules have also been described, and sufficient information related to stock structure, stock productivity, stock abundance, fishery removals and fleet composition, is available to support the harvest strategy.

For Principle 2, positive aspects of the fishery include that the use of Nordmore grids is compulsory, and there is a ban on retention of non-shrimp catches; together, these measures have resulted in bycatch rates in the CNSSF being very low. There is also a very low level of interaction with spotted and northern wolffish as ETP species, while habitat impact assessment shows that impacts on habitats and ecosystems are low, and management measures have been introduced to minimise the risk posed to vulnerable or sensitive habitats by the CNSSF.

For Principle 3, positive aspects include that there is a well-established legislative framework for fisheries operating solely within Canada’s Exclusive Economic Zone (EEZ), while in international waters outside of the Canadian EEZ, the Northwest Atlantic Fisheries Organization (NAFO) Convention contains binding procedures governing cooperation with other contracting parties. The structure, purpose, functions and operation of the relevant bodies (e.g., the Northern Shrimp Advisory Council and the NAFO Fisheries Commission and Scientific Council) are explicitly defined and well understood. The domestic legislative and policy framework explicitly outline clear long-term objectives that guide decision-making, and the application of the precautionary approach is statutorily required and clearly outlined in policy and practice in the fishery under assessment. Short and long term fishery-specific objectives are elaborated in the Integrated Fisheries Management Plan covering the fishery, and research and data analyses have been conducted on the CNSSF in all UoCs for many years, mainly focused on stock assessments to support the commercial harvest.

In a number of areas, the fishery was assessed as not meeting the MSC passing score of 80, therefore triggering three binding Conditions of Certification; these must be addressed in the specified timeframe. Full explanation of these conditions is provided in Appendix 3 of the report, but the conditions may be summarised briefly as follows:

Condition	UoC	PI	Condition
1	3	1.1.2, Sla	By Year 4, the client shall demonstrate that reference points are appropriate for the stock and can be estimated.
2	4 & 5	2.2.3, SId	By Year 4, the client shall demonstrate 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).
3	1	3.1.1, Sla	By Year 4, the client shall demonstrate that 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.

In addition, the assessment team made a single recommendation. As this is not the result of a failure to meet the unconditional pass mark, it is non-binding; however, in the opinion of the assessment team, following the recommendation would make a positive contribution to ongoing efforts to ensure the long term sustainability of the fishery. The recommendation is detailed in Section 6.4 of this report.

It is noted that there were also two conditions set on UoC 6, but these are non-binding as UoC 6 does not meet the MSC Standard (CR v2.0 7.21.2.2). These conditions serve to provide an indication of the actions that may have been required should UoC 6 have been certified (CR v2.0 7.21.2.3).

Condition	UoC	PI	Non-Binding Condition
4 (non-binding as UoC 6 fails)	6	1.1.1, Sla and SId	By Year 4, the client shall demonstrate that it is highly likely that the stock is above the point where recruitment would be impaired, and that the stock is at or fluctuating around its target reference point.”
5 (non-binding as UoC 6 fails)	6	2.2.3, SId	By Year 4, the client shall demonstrate 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).

For interested readers, the report also provides background to the target species and fishery covered by the assessment, the wider impacts of the fishery and the management regime, supported by full details of the assessment team, a full list of references used and details of the stakeholder consultation process.

Acoura Marine Ltd. confirms that this fishery is within scope.

## 2 Authorship and peer reviewers

### 2.1 Assessment team

All team members listed below have completed all requisite training and signed all relevant forms for assessment team membership on this fishery.

It is noted that Ian Scott was the Assessment Team Leader and P3 Expert Team Member for the site visit portion of the assessment, but he withdrew from any role with the assessment soon after. The Assessment Team Leader role was subsequently taken on by Dr. Rob Blyth-Skyrme, while the P3 role was taken on by John Angel. An announcement of these changes was made on the MSC website: <https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/Canada-offshore-northern-and-striped-shrimp/re-assessment-downloads-1>.

#### **Assessment team leader: Dr. Rob Blyth-Skyrme**

Rob started his professional career in finfish mariculture in 1996, before switching to a focus on the science, management and policy of wild fisheries. Following his PhD, which considered biological and socio-economic aspects of an inshore shellfish fishery, he worked as the Senior Environment Officer and then Deputy Chief Fishery Officer at the Eastern Sea Fisheries Joint Committee, the largest regional fisheries management organization in England. Rob then became Natural England's senior advisor to the UK Government on marine fisheries and environmental issues, leading a team dealing with fisheries policy, science and nationally significant fisheries casework. Since the end of 2008, Rob has run Ichthys Marine Ecological Consulting Ltd., a consultancy providing marine fisheries and environmental advice to a variety of governmental, NGO and industry clients.

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

#### **Expert team member: Dr. Howard Powles**

(Primarily responsible for the assessment of the fishery against Principles 1 and 2).

Howard has worked in fishery science, stock assessment, and conservation and management of fishery resources since the mid-1960's, as a working scientist, science manager, program manager, and consultant. As a science advisor and science program manager at Canada's Department of Fisheries and Oceans (DFO) (1993-1998), he participated in peer reviews of stock assessments of a range of pelagic, demersal and invertebrate species, and led a review of the Department's stock assessment program.

As Director of Fisheries Science and of Biodiversity Science (1998-2004) at DFO Headquarters he was active in developing ecosystem-based approaches to ocean management, in particular approaches based on defining ecosystem objectives and indicators, and led the Department's activities on developing and implementing new endangered species legislation.

As a consultant since 2005, Howard has completed projects on implementing the precautionary approach for Canadian lobster fisheries and in support of FAO reviews of proposals to list species on CITES appendices, among others. Howard has been a member of MSC assessment teams for 7 fisheries in Canada, Greenland and the USA.

### **Expert team member: John Angel**

(Primarily responsible for assessment under Principle 3).

John worked with the federal Department of Justice before moving to the Department of Fisheries and Oceans as head of legal and regulatory affairs in 1983. His last position in government (1994) was as Regional Director of Fisheries Management for the Scotia-Fundy Region. After ten years as Executive Director of the Canadian Association of Prawn Producers, a trade association representing offshore northern shrimp interests in Eastern Canada, John retired from full time employment. He has extensive experience in the development of integrated resource management plans and fishing strategies as well as a background in Canadian fisheries law.

John continues to provide consulting services to the fishing industry through his firm, Angel Consulting Services, located in Bedford, Nova Scotia, Canada. John has been involved as a Principle 3 assessor for MSC certification of several Atlantic Canada species as well as consulting work with the MSC on the Standard review.

## **2.2 Peer Reviewers**

### **Peer Reviewer 1: Johan Groeneveld**

Johan is a marine biologist with over 20 years' experience working in marine fisheries and their impacts on target and bycatch species, and on marine environments. He obtained a PhD in marine ecology in 2001 at the University of Cape Town in South Africa, and currently works as a Senior Scientist at the Oceanographic Research Institute in Durban, where he is also an Honorary Associate Professor at the University of KwaZulu Natal. His previous experience includes 12 years as a government scientist tasked with applied fisheries research and management of commercial spiny lobster fisheries in South Africa. He spent 2 years as a specialist fisheries advisor to the fisheries ministry in the Sultanate of Oman. He regularly undertakes consulting projects to the private sector, including for the fishing industry and clients such as the World Bank, UNEP, and the FAO. Johan has worked extensively on collaborative fisheries development projects, particularly at a regional scale in the Western Indian Ocean. He has a strong publication record in a range of peer-reviewed journals, and is also on the editorial board of the leading journal 'Fisheries Research'. He has written, or contributed to numerous technical reports dealing with fisheries assessments, marine environmental management and research capacity development. He has participated as an assessor in the MSC certified Tristan da Cunha spiny lobster fishery, and in the recent re-assessment of the deep-sea hake trawl fishery in South Africa. At the request of the fishing industry, he was recently (2015) tasked with investigating the potential of an 'Extension of Scope' assessment for the hake trawl fishery, to include bycatch species under the existing MSC certificate. Johan has participated as a peer-reviewer for the Normandy and Jersey lobster fishery, and has been involved in several MSC pre-assessments in southern and eastern Africa. He has also attended and given presentations at MSC training workshops in South Africa.

### **Peer Reviewer 2: Dr. Colin Bannister**

Colin is a fisheries and shellfisheries scientist, Trustee and Vice Chairman of the Buckland Foundation, and an Emeritus Fellow at the Cefas Laboratory, Lowestoft. He retired in 2004, with nearly 40 years knowledge of the dynamics and management of North Atlantic finfish and shellfish stocks.

From 1964-1974 he studied the biology and assessment of flatfish stocks around Iceland and the North Sea, leading to a PhD in 1971. He was seconded to Brussels in 1975-76 to give specialist advice on the distribution, stock status and management of fish stocks during the formulation of the EU CFP. From 1981 to 2000 he headed the Cefas coastal shellfish team where he was advisor to Defra on the monitoring and management of shellfisheries, movement controls for oyster diseases, and the field evaluation of pioneering lobster stock enhancement experiments, in recognition of which he received the 1999 Walne Medal of the Shellfish Association of Great Britain (SAGB). In the 1990s he was a member and chairman of the ICES Shellfish Committee and the Consultative Committee, and contributed to a restructure of the ICES scientific and advisory committee processes. From 2001 until his retirement in 2004 he headed the large Cefas finfish team responsible for monitoring and assessing finfish stocks in waters around the UK, and for advising officials and the fishing industry on ICES and EU recommendations for recovering depleted fish stocks.

In retirement Colin is a guest lecturer on fisheries science and management at King's College, London, and remains active in various roles associated with the Shellfish Association of Great Britain and the management of shellfish stocks, and is a member of the academic board of the National Lobster Hatchery at Padstow. He has undertaken MSC assessments and peer reviews of American lobster, and northern prawn fisheries in Canada and Greenland, and has recently become a member of the MSC peer review college. He received the 2014 Le Cren medal of the Fisheries Society of the British Isles, for communication and knowledge transfer, and in 2015 was made Hon DSc by the University of Hull. Colin was a joint Buckland Foundation Professor for 2015-16, and presented his lecture in London, Edinburgh, Hull and Anstruther, entitled "Has EU fisheries management achieved the recovery of depleted stocks, despite the impact of climate change?".

## **2.3 RBF Training**

RBF was not used for this fishery assessment.

### 3 Description of the fishery

#### 3.1 Units of Certification and scope of certification sought

The MSC Guidelines to Certifiers specify that the unit of certification (UoC) is “*The fishery or fish stock (biologically distinct unit) combined with the fishing method / gear and practice (= vessel(s) and / or individuals pursuing the fish of that stock)*”.

The certified UoCs for the Canada Northern and Striped Shrimp Fishery (CNSSF) are as set out in Table 1.

**Table 1:** Certified Units of Certification (UoCs) in the CNSSF.

<b>UoC 1</b>	<b>Species:</b>	Northern shrimp ( <i>Pandalus borealis</i> )
	<b>Stock:</b>	Shrimp Fishing Area (SFA) 1: Davis Strait
	<b>Geographical area:</b>	SFA 1
	<b>Harvest method:</b>	Otter trawl
	<b>Client Group:</b>	Canadian Association of Prawn Producers Baffin Fisheries Coalition Northern Coalition
	<b>Other Eligible Fishers:</b>	None

<b>UoC 2</b>	<b>Species:</b>	Northern shrimp ( <i>Pandalus borealis</i> )
	<b>Stocks:</b>	Eastern Assessment Zone (EAZ): Southeastern Baffin Island Western Assessment Zone (WAZ): Hudson Strait SFA 4: Northeastern Labrador
	<b>Geographical area:</b>	EAZ WAZ SFA 4
	<b>Harvest method:</b>	Otter trawl
	<b>Client Group:</b>	Canadian Association of Prawn Producers Baffin Fisheries Coalition Northern Coalition
	<b>Other Eligible Fishers:</b>	None

<b>UoC 3</b>	<b>Species:</b>	Striped shrimp ( <i>Pandalus montagui</i> )
	<b>Stocks:</b>	Eastern Assessment Zone (EAZ): Southeastern Baffin Island Western Assessment Zone (WAZ): Hudson Strait SFA 4: Northeastern Labrador
	<b>Geographical area:</b>	EAZ WAZ SFA 4
	<b>Harvest method:</b>	Otter trawl
	<b>Client Group:</b>	Canadian Association of Prawn Producers Baffin Fisheries Coalition Northern Coalition
	<b>Other Eligible Fishers:</b>	None

<b>UoC 4</b>	<b>Species:</b>	Northern shrimp ( <i>Pandalus borealis</i> )
	<b>Stock:</b>	SFA 5: Eastern Labrador
	<b>Geographical area:</b>	SFA 5
	<b>Harvest method:</b>	Otter trawl
	<b>Client Group:</b>	Canadian Association of Prawn Producers Association of Seafood Producers Fogo Island Cooperative Society Northern Coalition
	<b>Other Eligible Fishers:</b>	None

<b>UoC 5</b>	<b>Species:</b>	Northern shrimp ( <i>Pandalus borealis</i> )
	<b>Stock:</b>	SFA 6: Southeastern Labrador / Northeastern Newfoundland
	<b>Geographical area:</b>	SFA 6
	<b>Harvest method:</b>	Otter trawl
	<b>Client Group:</b>	Canadian Association of Prawn Producers Association of Seafood Producers Fogo Island Cooperative Society Northern Coalition
	<b>Other Eligible Fishers:</b>	None

**Table 2:** Unit of Certification which has not passed assessment

<b>UoC 6 (Has not passed assessment)</b>	<b>Species:</b>	Northern shrimp ( <i>Pandalus borealis</i> )
	<b>Stock:</b>	SFA 7: Southeastern Newfoundland
	<b>Geographical area:</b>	SFA 7
	<b>Harvest method:</b>	Otter trawl
	<b>Client Group:</b>	Canadian Association of Prawn Producers Association of Seafood Producers Baffin Fisheries Coalition Fogo Island Cooperative Society Northern Coalition
	<b>Other Eligible Fishers:</b>	None

The MSC Certification Requirements (CR) v.1.3 details the following scope requirements:

- **CR 27.4.4.1: Controversial unilateral exemptions** – the CNSSF is not subject to a “controversial unilateral exemption to an international agreement”.
- **CR 27.4.4.2: Destructive fishing practices** – no destructive fishing practices are used in the CNSSF.
- **CR 27.4.5: Controversial disputes** – there are mechanisms in place for resolving disputes between the fishery and the management system.
- **CR 27.4.7: Previous failed assessments / certificate withdrawals** – the CNSSF has not been subject to a failed assessment or a certificate withdrawal.
- **CR 26.4.9: Inseparable or practically inseparable catches** – Striped shrimp are an inseparable or practically inseparable (IPI) catch in UoCs 1, 4, 5, and 6 (see Section

5.3).

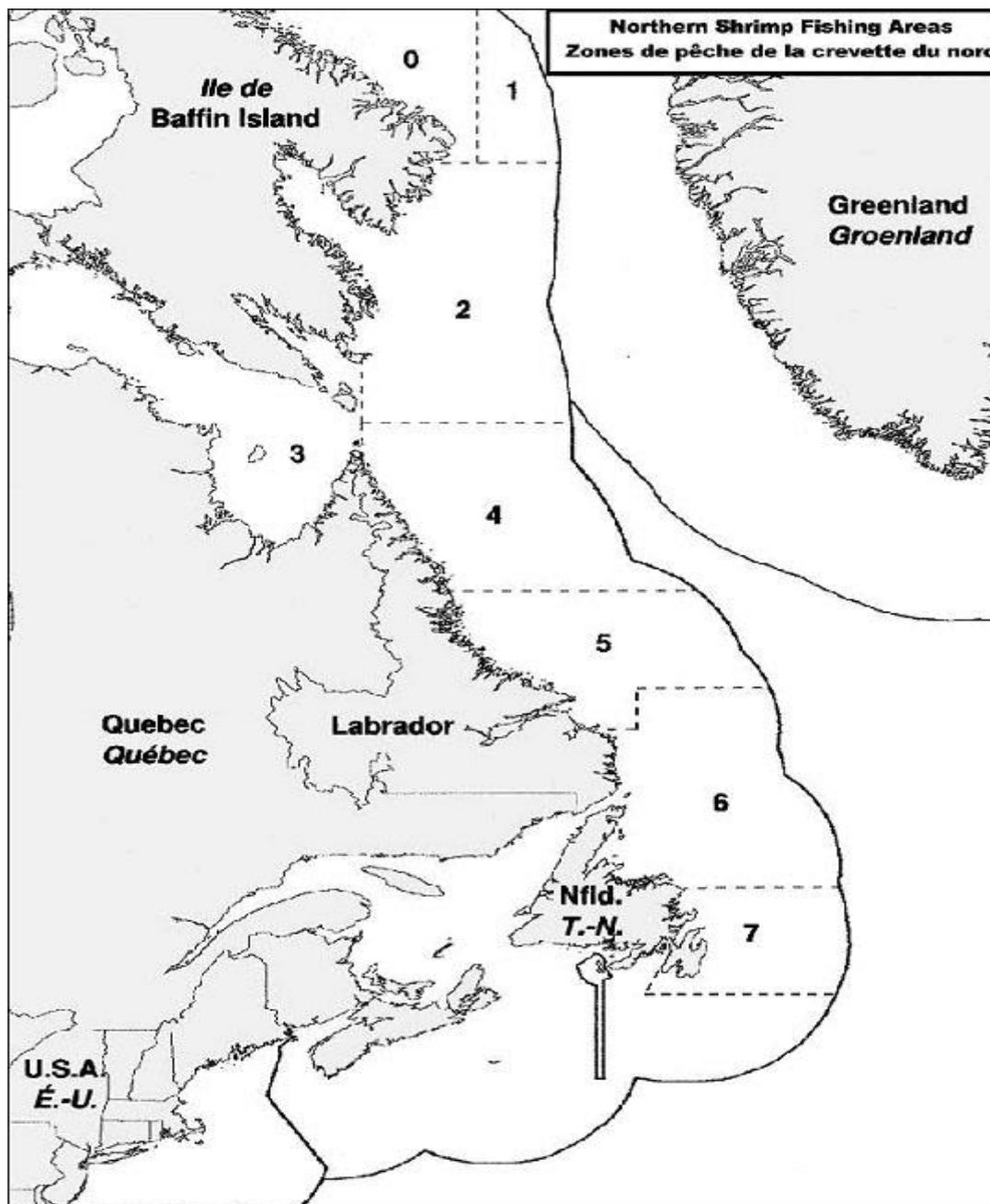
- **CR 27.4.12: Enhanced fishery** – Northern shrimp and striped shrimp are not subject to enhancement. Therefore, enhanced fisheries considerations do not apply to the CNSSF.
- **CR 27.4.13: Overlapping fisheries** – In SFA 1 only, the CNSSF targets the same stock as that fished by the West Greenland Coldwater Prawn Fishery (<https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/arctic-ocean/West-Greenland-Coldwater-Prawn>). This is considered further in Section 4.1.
- **CR 27.4.14: Introduced species based fisheries** – Northern shrimp and striped shrimp are native to the Northwest Atlantic. Therefore, introduced species based fisheries considerations do not apply to the CNSSF.

On the basis of the analysis of scope requirements above, Acoura Marine Ltd. confirms that the CNSSF is within MSC scope, and that the fishery is eligible for reassessment against the MSC Standard.

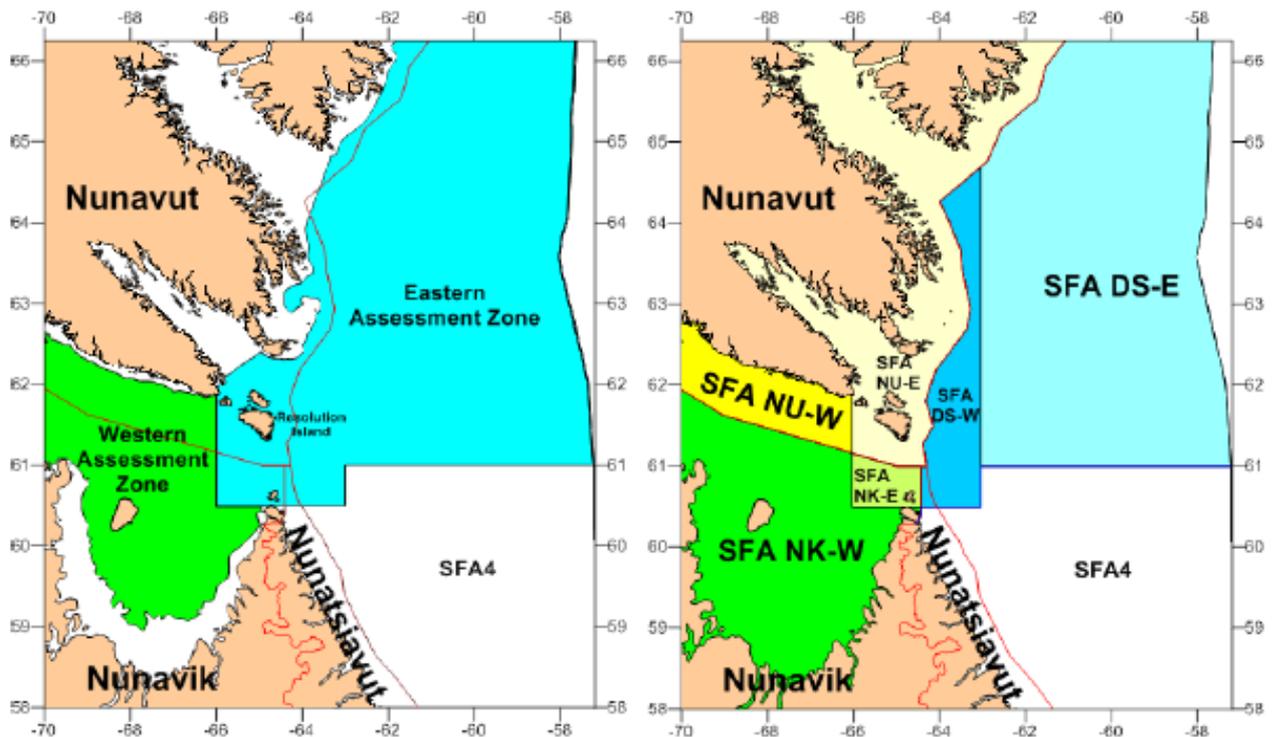
## 3.2 Overview of the fishery

### 3.2.1 The fishing area

The CNSSF is prosecuted in Shrimp Fishing Areas (SFA) 1, the Eastern Assessment Zone (EAZ), Western Assessment Zone (WAZ) and SFAs 4-7 in the Canadian EEZ in the northwest Atlantic. The Eastern Assessment Zone and Western Assessment Zone correspond with some relatively minor adjustments to SFA 2 and 3, respectively, that were made in 2013/2014 (Figure 1 and Figure 2); while the various management units are subunits of these assessment zones.



**Figure 1:** Shrimp Fishing Areas (SFAs) 0-7 in the Canadian Atlantic.  
Source: DFO (2010a)



**Figure 2:** Location of the Eastern Assessment Zone (EAZ) and Western Assessment Zone (WAZ) (left panel) and corresponding Shrimp Fishing Area (SFA) management units (right panel). (Boundaries of the Nunavut (NU), Nunavik (NK) and Nunatsiavut Land Claims Areas are identified with red lines. DS = Davis Strait, E = East, W = West.)

### 3.3 Species and fishing practice

Two target species are taken in the CNSSF – northern shrimp (*Pandalus borealis*) and striped shrimp (*P. montagui*). As indicated initially, this report does not intend to provide a scientifically comprehensive description of the species; interested readers should refer to sources that have been used in compiling the following summary description of the species.

Northern shrimp and striped shrimp are easily identified when mature. Northern shrimp is much more abundant and widespread in commercial quantities, and is the subject of most of the studies and assessments of commercial pandalid shrimp in the northwest Atlantic. Striped shrimp, although widely distributed from Davis Strait to the Grand Banks, is most abundant in more northerly areas and at shallower depths, and is typically found on harder bottoms than northern shrimp (Orr et al 2003). Off west Greenland striped shrimp are taken from waters shallower than 100 m to 300 m, while northern shrimp are caught in waters from 130 m to deeper than 400 m (Kingsley 2011), while in Canadian waters most catches of striped shrimp occur in 200-400 m compared to 300-500 m for northern shrimp (DFO 2015a). Overall, depth ranges for commercial catches of the two species are taken to be 100-400m for striped shrimp, 200-500m for northern shrimp, although the two species occur, and catches can be taken, outside these depth ranges. The two species tend to be found mixed in commercial densities in shelf areas near the entrance to Hudson Strait. However, striped shrimp predominates inside Hudson Strait, while northern shrimp predominates in other areas.

#### 3.3.1 Northern shrimp

Northern shrimp has a discontinuous circumpolar boreal distribution, occurring in the northeast and northwest Atlantic and Pacific Oceans (Bergstrom 2000). In the northwest Atlantic the species occurs from the Gulf of Maine northwards to Davis Strait. The species is usually found in areas with soft, muddy sediment and at temperature ranging from 1-6 °C. In Atlantic Canada northern shrimp occurs from Davis Strait in the north, off the entrance to Hudson Strait, widely on the Labrador and Newfoundland shelves and in 'holes' on the Scotian Shelf. The species occurs off west Greenland and in the Gulf of Maine in areas contiguous to the Canadian distribution.

Northern shrimp is a protandrous hermaphrodite, maturing as a male at age 2-5 and mating as a male for two or three years before changing sex and spending the rest of its lifespan as a female. Shrimp in the Canadian Atlantic can live for 5 to 8 years, depending on conditions. Spawning is in autumn and the female carries the eggs until April-May when they hatch and the pelagic larvae are released (Bergström 2000). The larvae spend the first month in the upper layers but as they develop through 6 stages they become more oriented to the bottom and finally settle on and near the bottom after approximately 2 months. Young benthic individuals are typically found at shallower depths than older adults. Individuals generally live off the bottom, migrating vertically at night, and often occur in dense concentrations.

The larval phase may last as long as 3 months, and larvae may be transported several hundred km in the plankton (Jorde et al 2015). Ocean currents on Canada's Atlantic shelf, principally the Labrador current, are generally from north (Davis Strait/Baffin Island) to south (Scotian Shelf) (Figure 43), and could act to foster dispersal of shrimp larvae over large continental shelf areas. Recent work on population genetics (Jorde *et al.* 2014; Jorde et al 2015) has shown that northern shrimp sampled from west Greenland to the Scotian Shelf are genetically similar, although samples from the Flemish Cap and the Gulf of Maine showed significant differences from the larger group. As such, based on current information, northern shrimp in Canadian shrimp fishing areas and the west Greenland shelf can be considered to be part of a metapopulation with exchange of larvae between areas.

### 3.3.2 Striped shrimp

The biology of striped shrimp is less well known than that of northern shrimp. Global distributions are similar - striped shrimp is found off eastern North America from Baffin Island to the Bay of Fundy, off west and east Greenland and Iceland, in the Barents Sea, off the Norwegian and in the North Sea and as far south as the English Channel (Bergstrom 2000). Striped shrimp is generally found at shallower depths and on harder bottoms than northern shrimp (Bergstrom 2000), and prefers cooler temperatures, -1° to 2°C compared to 0°-4°C for northern shrimp (DFO 2015a). Off west Greenland, fishery catches of striped shrimp start shallower than 100 m and decrease abruptly at depths greater than 300 m, while for northern shrimp catches start at 130 m and extend deeper than 400 m (Kingsley 2011), while in Canadian waters most catches of striped shrimp occur in 200-500 m compared to 300-500 m for northern shrimp (DFO 2015a). In Canadian waters striped shrimp is more abundant than northern shrimp in Hudson Strait, while the two species are taken in mixed catches at the entrance to Hudson Strait and adjacent waters (DFO 2015a). Although striped shrimp are found on the Canadian Atlantic continental shelf as far south as the Bay of Fundy, they are not abundant south of the Hudson Strait area.

Like northern shrimp, striped shrimp are protandric hermaphrodites. Females mate and extrude eggs in late summer-fall and carry them until hatching in spring. Newly hatched shrimp spend 3-4 months as planktonic larvae before settling to the bottom as juveniles. Juveniles and adults are hyperbenthic (bottom-associated) but may live some distance off bottom and perform diel migrations into the water column at night (DFO 2015a).

Stock structure has not been studied in striped shrimp, but given the long planktonic larval period it is likely that, as with northern shrimp (Jorde et al 2015), there would be little population substructure over the species range in Atlantic Canada. The population should thus be considered a single population or metapopulation in the fishery area.

### 3.4 History of the fishery

#### 3.4.1 Northern shrimp

The northern shrimp fishery of Newfoundland and Labrador began in the early 1970s when an exploratory fishing program from Baffin Island to the northeast coast of Newfoundland confirmed the presence of fishable concentrations (DFO 2010a). With extension of jurisdiction in 1977, foreign vessels (mainly Nordic) which had fished these concentrations were brought under Canadian fishery management control, and by the mid-1980s Canadian ownership of enterprises was required (Foley et al 2013). Initially the fishery operated in the Hopedale and Cartwright Channels of SFA 5 (Orr and Sullivan 2013). Annual catches increased from less than 2700 t in 1977 to about 4100 t in 1981 but subsequently declined due to poor markets and high operating costs. Catches in SFAs 5 and 6 increased to about 7800 t in 1987. In 1988 the fishery expanded to SFA 4 and to new areas in St. Anthony Basin and the Funk Island Deep in SFA 6. Catches increased to 14,000-20,000 t/yr in 1990-1993, while exploratory fisheries along the slope in SFAs 4, 5 and 6 revealed commercial concentrations of shrimp in these areas as well. By 2000 catches had increased to 85,000 t.

The fishery was initially exploited by large offshore trawlers which processed on board. A total of 17 licences were in place by 1991 and an Enterprise Allocation regime was also put in place in 1989 (DFO 2010a). After 1996, as total allowable catches (TACs) increased, much of the increase was allocated to small vessels (<65 ft) which landed fresh shrimp for on-shore processing, and to Aboriginal groups (DFO 2010a). In part this was a response to the collapse of groundfish stocks which had supported the small vessel fleet. Small vessel ('inshore') licences were provided following a 'last-in first-out' (LIFO) policy, under which the most recent licences would be affected in case of a stock downturn (Ernst and Young 2012). In SFAs 4-7, the fishery continues to be exploited by a mix of offshore (on-board processing, longer trips) and inshore (on-shore processing, short trips) vessels, while in SFAs 1-3 only offshore vessels operate.

In SFA 2 (EAZ) the fishery began with implementation of an exploratory TAC in 1999, while the fishery began in SFA 7 in 2000 (DFO 2010a).

TACs and catches continued to increase until reaching a maximum in the early/mid 2000s (Orr and Sullivan 2013). Abundance has subsequently declined, beginning in the more southerly areas, and areas of fishable concentrations have declined. The fishery in SFA 7 was closed for 2015 and 2016, and abundance is declining in SFA 6.

In SFA 1, the Canadian fishery began in 1979, after initial development of the offshore northern shrimp fishery on the Labrador shelf in the early 1970s. The shrimp fishery off west Greenland had begun in inshore waters in fjords in 1935, and expanded rapidly in the Disko Bay area in the 1950s, based on small vessels (Bergstrom 2000). The offshore fishery began about 1970, with vessels from a number of countries participating. By the mid-1980s only Canadian vessels were permitted to operate in Canadian waters, and since 1993 only Greenlandic vessels can participate in Greenland waters.

Canadian catches in SFA 1 ranged from 2,000 t to 7,500 t from 1980 to 2006 (with an exceptional period of low catches 1997-2000), but have subsequently declined and have been zero or very low for several recent years. Operating costs are higher in this area than further

south, and with the recent high levels of shrimp abundance in more southerly SFAs it has not been economically advantageous for Canadian vessels to fish SFA 1.

Redefinition of assessment and management areas in SFAs 2 and 3 (now the EAZ and WAZ) described below under striped shrimp also apply to northern shrimp.

### 3.4.2 Striped shrimp

The commercial fishery for striped shrimp began in the eastern Hudson Strait/Ungava Bay area in 1980, following a successful exploratory fishing project in 1979 (Orr et al 2003). Precautionary TACs of 100-300 t were applied for 1978-1982, subsequently increasing to 850 t for 1983-86 and 1200 t in 1987. The TACs applied to striped shrimp in the Hudson Strait/Ungava Bay area west of Resolution Island between 64° 30' and 70° W, which became known as SFA 3.

In 1995 the fishery shifted to the east of Resolution Island into NAFO Division 0B (SFA 2), following high catch rates of striped shrimp mixed with northern shrimp in this area. Parsons et al (1996) concluded that a single population of striped shrimp was probably supporting the fishery in the two areas, and a single TAC (still of 1,200 t) was applied to SFAs 2, 3 and 4 west of 63° W. The TAC for the whole area was increased to 3,800 t, and in 2002 to 6,300 t (Orr et al 2003). The 6,300 t TAC was maintained until the fishing year 2012/3 (Siferd 2015).

Management areas were redefined in 2011 and came into effect for the 2013/4 fishing year (DFO 2014a) (Figure 2). The EAZ and WAZ, corresponding to SFAs 2 and 3 respectively, were adopted as the basis for assessing the status of shrimp in 2011. A new management system for the area of the EAZ and WAZ was approved by the Minister and co-management boards in 2012 and implemented for the 2013/14 fishing season.

New management measures include the following:

- Three new SFAs - Nunavut, Nunavik and Davis Strait - were established reflecting the three jurisdictions present within the area (Figure 2),
- These new SFAs were further subdivided into management units which fall entirely within either the EAZ or WAZ (Figure 2);
- Separate Total Allowable Catches (TACs) are set for northern shrimp and striped shrimp for both the EAZ and WAZ, based on results of surveys conducted in each assessment zone, thereby eliminating quotas that could be fished in multiple SFAs which existed previously;
- The TAC is divided by maintaining existing quotas within an area where possible or by a sharing agreement.

TACs for all areas combined were 7,250 t for 2013/4 and 6,500 t for 2014/5 (Siferd 2015).

### 3.4.3 MSC history of the fishery

The client group for the CNSSF is made up of four organisations - the Canadian Association of Prawn Producers (CAPP), which is acting as the lead for the client group in this reassessment of the fishery, the Association of Seafood Producers (ASP), the Baffin Fisheries Coalition, the Fogo Island Cooperative Society (FICS), and the Northern Coalition (NC). All five of these organisations have been involved previously in MSC-certified shrimp fisheries in SFAs 1-7.

ASP is an association of seafood producing companies based in Newfoundland and Labrador. The ASP inshore and offshore fishery in SFAs 5, 6 and 7 was originally certified by Intertek Moody Marine in 2008 (<https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/canada-scotian-shelf-northern-prawn-trawl> ).

FICS is a cooperative with fishing and fish processing interests. The FICS inshore fishery in SFAs 5, 6 and 7 was certified by Global Trust Certification in 2011 (<https://www.msc.org/track-a-fishery/fisheries-in-the-program/exiting-the-program/withdrawn/fogo-island-cold-water-shrimp>).

CAPP and the NC are associations of shrimp fishing companies, prosecuting offshore fisheries in SFAs 1-7. This fishery was originally certified by Intertek Moody Marine in 2011 (<https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/Canada-offshore-northern-and-striped-shrimp>).

The Baffin Fisheries Coalition (BFC) is an organization consisting of five Hunter and Trapper Associations on Baffin Island and four private businesses with quota allocations for *P. borealis* in SFAs 1, 2 and 3 in 2013.

In 2012, a certification-sharing agreement was put in place between the CAPP, NC, ASP FICS, and thus their certifications were combined (IMM 2012). The following year, the Baffin Fisheries Coalition joined the client group through a certificate sharing agreement. The MSC webpage for the original CAPP and NC fishery assessment has been retained for the reassessment of the CNSSF.

### 3.5 Fishing practices

Two fleets participate in the CNSSF – the ‘offshore’ fleet (LOA >100'; >500 t) and the ‘inshore’ fleet (LOA ≤100'; ≤500 t) (DFO 2010a). The offshore fleet operates under an Enterprise Allocation (EA) system based on equal shares in each SFA. The inshore fleet is conducted on a competitive basis with trip limits and harvesting caps determined and regulated by the industry. Offshore vessels make long trips and process on board, while inshore vessels land for shore-based processing.

The offshore fleet is comprised of twelve to thirteen factory freezer trawlers ranging in length from 49m to 75m (Figure 3). The offshore vessels operate out of ports in Newfoundland and Nova Scotia, with occasional landings in Greenland when fishing in far northern waters (SFAs 0 and 1).

Offshore fishing trips last from 20 to 75 days. Vessels generally make about 12 trips per year, averaging 300-320 sea days annually. The offshore fleet double-crews their vessels (24 to 28 crew depending on the size of the vessel) employing approximately 625-650 crew for the entire fleet.

The ‘inshore’ fleet is composed of vessels less than 100ft (30.48m) in length with the majority being in the range of 50-65ft (Figure 4) (DFO 2010a). Their operations are based out of ports in NAFO divisions 2J3KL (Labrador and eastern Newfoundland) and are established based on area of residence. The majority fish in SFAs 6 and 7 with some effort in SFAs 4 and 5. The inshore fishery is conducted on a competitive basis with trip limits and harvesting caps determined and regulated by the industry.



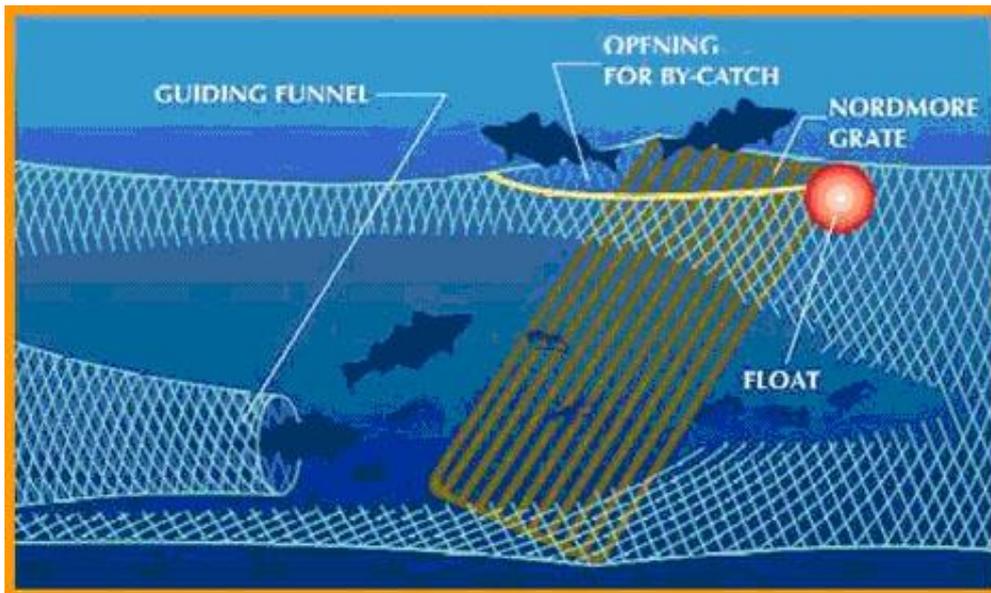
**Figure 3:** Typical offshore shrimp fishing vessel  
Source: DFO (2010a)

The inshore fleet is comprised of approximately 360 multi-species enterprises employing about 2,000 fishers. Twelve inshore shrimp plants employ a core workforce of approximately 1,350 plant workers. The inshore fleet is represented by the Fish Food and Allied Workers (FFAW) and through fleet committees elected by the licence holders.

Both fleets use demersal otter trawls with a minimum mesh size of 40 mm. The Nordmore grate for reduction of groundfish bycatch was introduced into the fishery in 1993 and was used by the inshore and offshore fleet on a voluntary basis (Figure 5). The grate was made mandatory in all fleets and areas in 1997 (DFO 2010a). Bobbins or rubber discs are fitted to the ground rope, with is linked to the leading lower edge of the net by vertical toggle chains. The use of the chains is intended to allow the trawl to be towed clear of the bottom to minimise seabed contact and to further reduce groundfish bycatch. In recent years adjustments have been made to trawl doors, bridles and the net in order to improve hydrodynamics and fuel efficiency.



**Figure 4:** Typical inshore shrimp fishing vessels.



**Figure 5:** Nordmore separator grate for reducing bycatch in shrimp trawls.  
Source: DFO (2010a)

An up to date vessel list (maintained by the client) can be obtained via contacting Acoura Marine Ltd. using the following details:

Acoura Marine Ltd. Fisheries Department

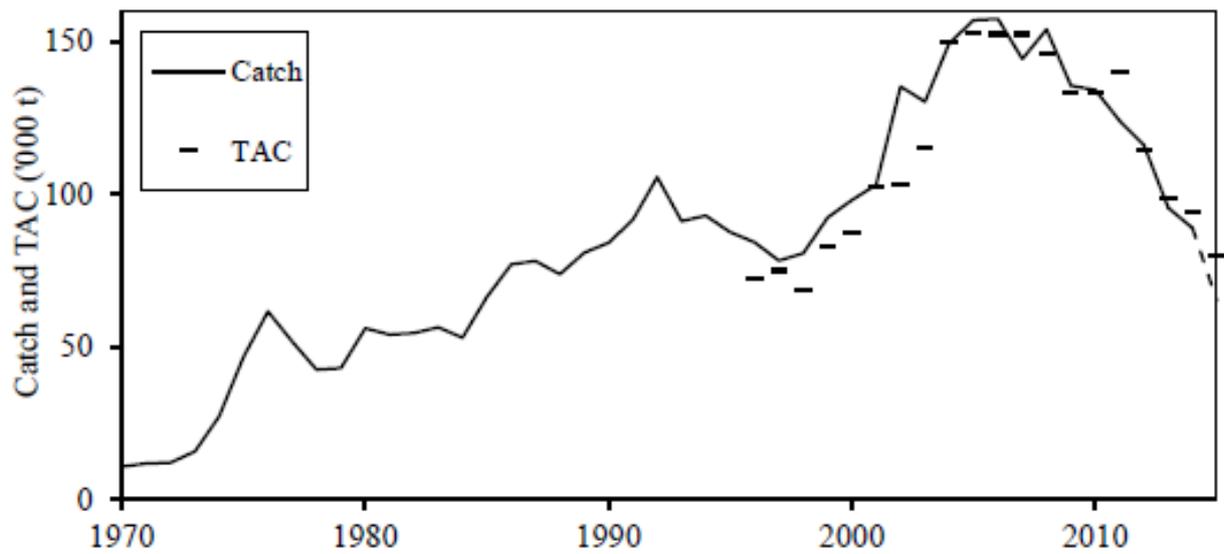
**Contact Email:** Fisheries@acoura.com  
**Contact Tel:** +44(0)131 335 6662

### 3.6 Fishing levels

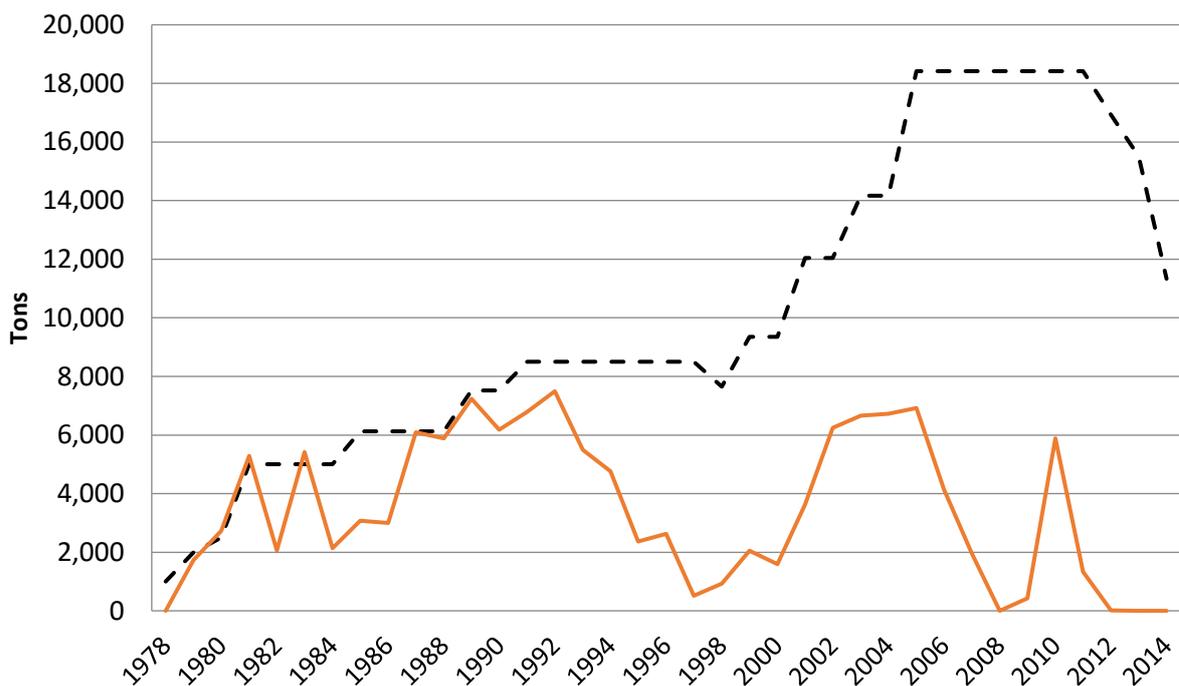
#### 3.6.1 UoC 1 - Northern shrimp, SFA 1

Annual catches for the whole stock (Canada and Greenland combined) (Figure 6) increased from around 10,000 t in the early 1970s to maximum values of almost 160,000 t in 2005-6, declining subsequently to the most recent value of 65,000 t (projected) (NAFO 2015a). TACs for the whole stock are the result of separate TACs set by Canada and Greenland. First set for the whole stock in 1995, these increased from 40,000 t/yr to just over 152,000 t/yr in 2005-7, and subsequently declined to the most recent value of 79,561t.

Canadian catches rose from 1,000 t/yr in 1978 to a maximum of just over 7,000 t/yr in 1992, and have subsequently varied considerably between zero and 6,500 t/yr (Figure 7). Catches since 2012 have been zero or near zero. Canadian TACs increased from the late 1970s to maximums of 18,417t/yr in 2005-2011, subsequently declining to 11,333t in 2014.



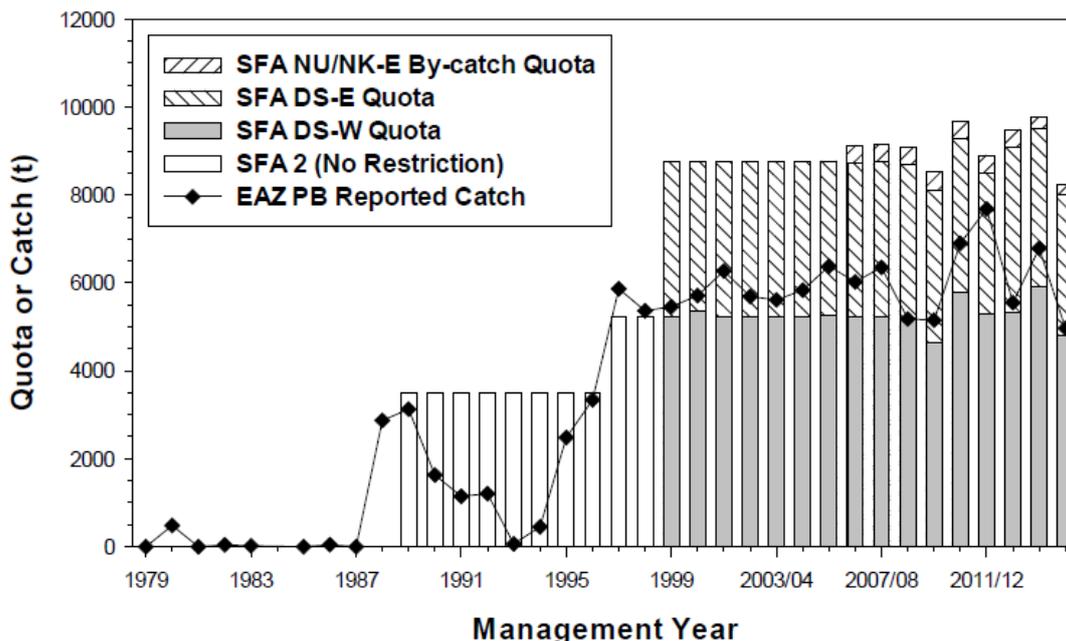
**Figure 6:** Catches and TACs, shrimp in NAFO SA 1 + Canadian SFA 1 (whole stock).  
 Source: NAFO (2015a)



**Figure 7:** Catches and TACs, shrimp in SFA 1 – Canada only.  
 Source: DFO (2010a), NAFO (2015a). Dashed line - TACs; solid line - catches.

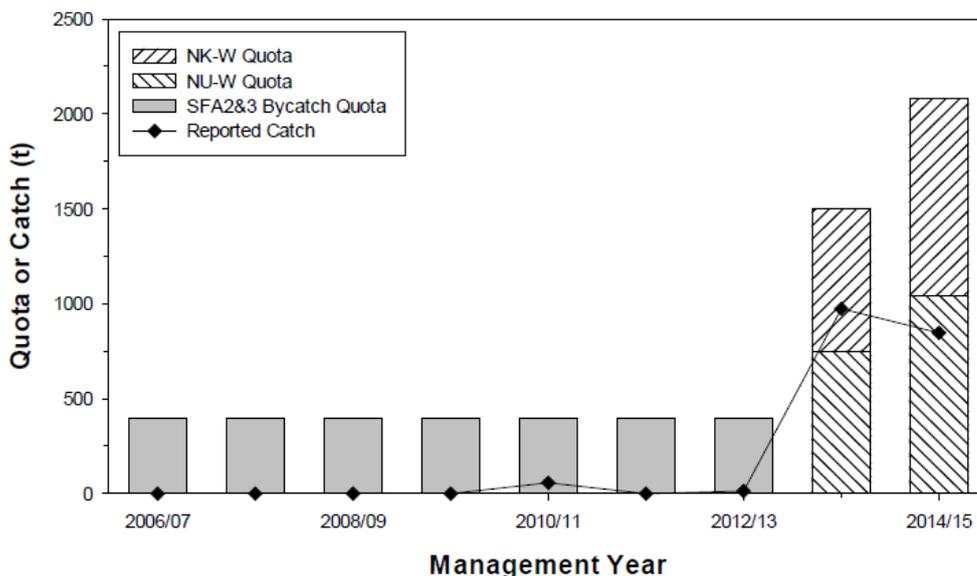
### 3.6.2 UoC 2 - northern shrimp in the EAZ, WAZ and SFA 4

In the EAZ (SFA 2), catches have varied around 6,000 t/yr since the late 1990s (Figure 8), while TACs have varied around 8,750 t/yr in the same period.



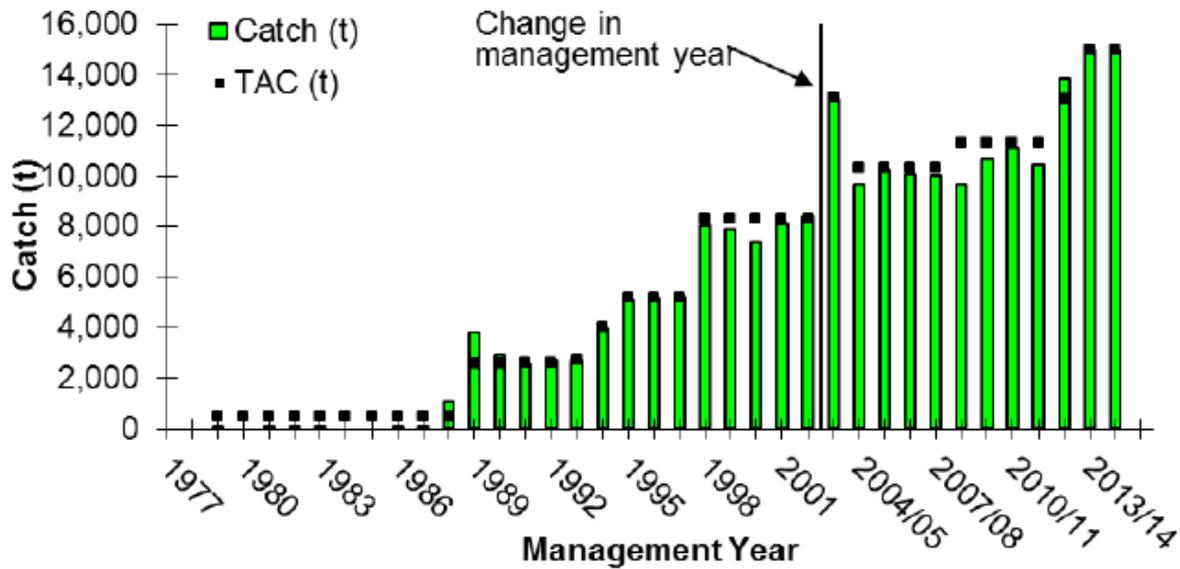
**Figure 8:** Northern shrimp catch and TAC history in the EAZ (formerly SFA 2).  
 Source: DFO (2015a)

In the WAZ (SFA 3), catches have generally been low, approaching 1,000 t/yr in the most recent years. TACs were increased in 2013/4 from the long-term level below 500 t/yr to 1500 - 2000 t/yr (Figure 9).



**Figure 9:** Northern shrimp catch and TAC history in the WAZ.  
 Source: DFO (2015a).

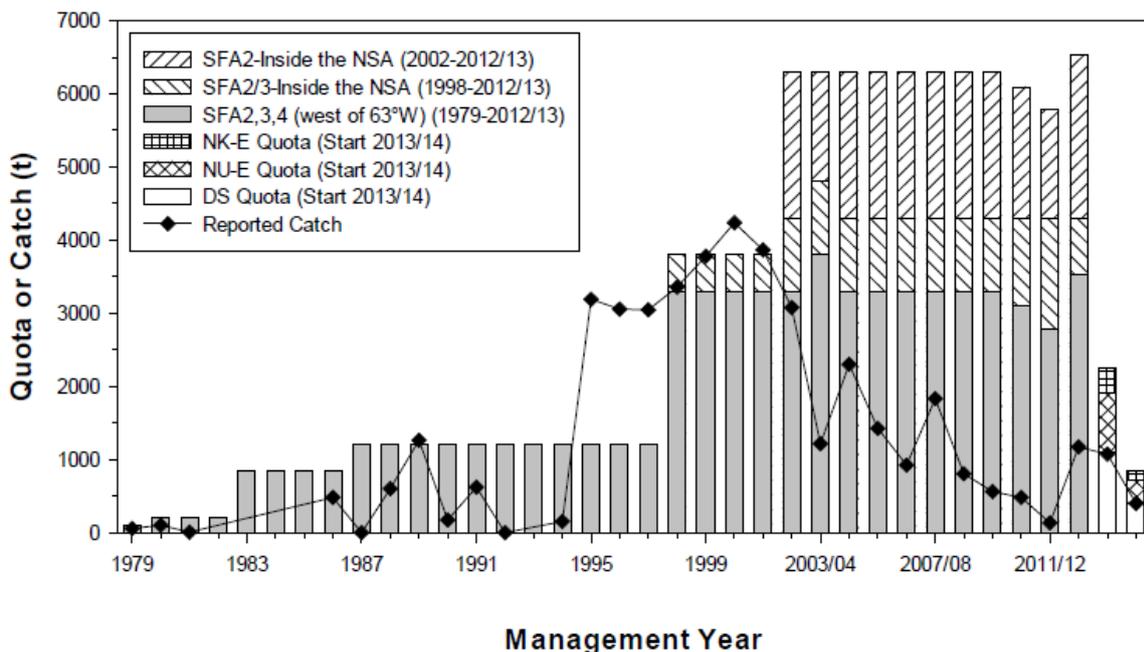
In SFA 4, catches and TACs increased steadily from around zero in the 1980s to their maximum values in 2013/4 and 2014/5, when TACs were set at 14,971t and were taken (DFO 2015b) (Figure 10). The high value in 2003 was due to a change to the management year which added an additional amount for the lengthened management year.



**Figure 10:** Northern shrimp catch and TAC history, SFA 4.  
 Source: DFO (2015b)

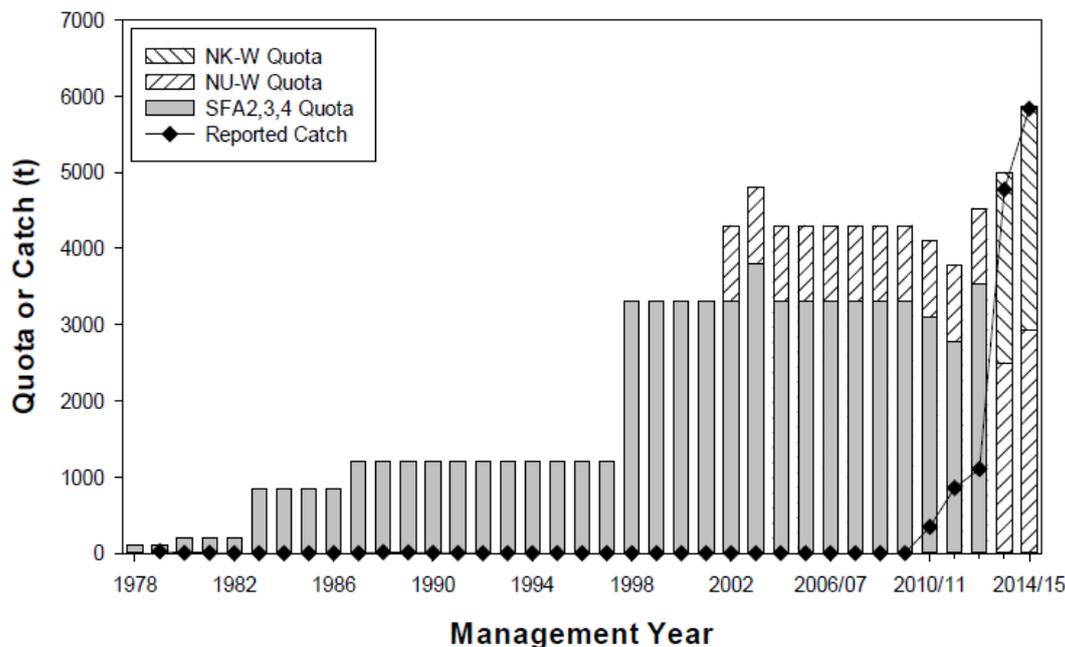
### 3.6.3 UoC 3 - striped shrimp in the EAZ, WAZ and SFA 4

In the EAZ (SFA 2), catches were at a maximum in the late 1990s, with a peak at 4,000 t in 2000, subsequently declining to less than 1,000 t/yr in recent years. TACs increased to a maximum of over 6,000 t/yr in 2002 to 2012/3 but subsequently declined to low levels with the restructuring of management areas (Figure 11).



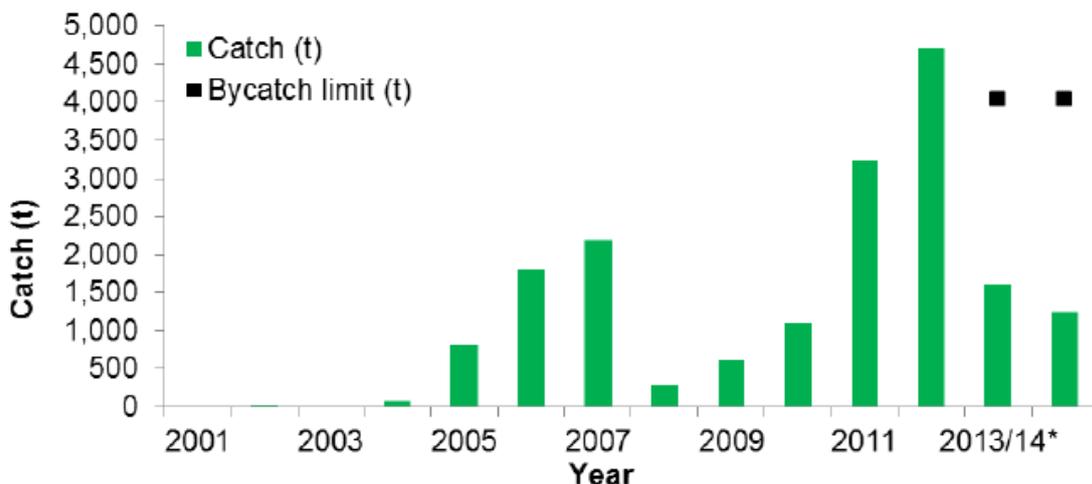
**Figure 11:** Striped shrimp TAC and catch history, EAZ (SFA 2).  
 Source: DFO (2015a)

In the WAZ (SFA 3), catches were zero for many years despite increasing TACs (Figure 12). Catches increased from 2010/11 and with the restructuring of management areas increased to the TAC levels of 5,000-6,000 t/yr in 2013/4 and 2014/5.



**Figure 12:** Striped shrimp TAC and catch history, WAZ (SFA 3).  
 Source: DFO (2015a)

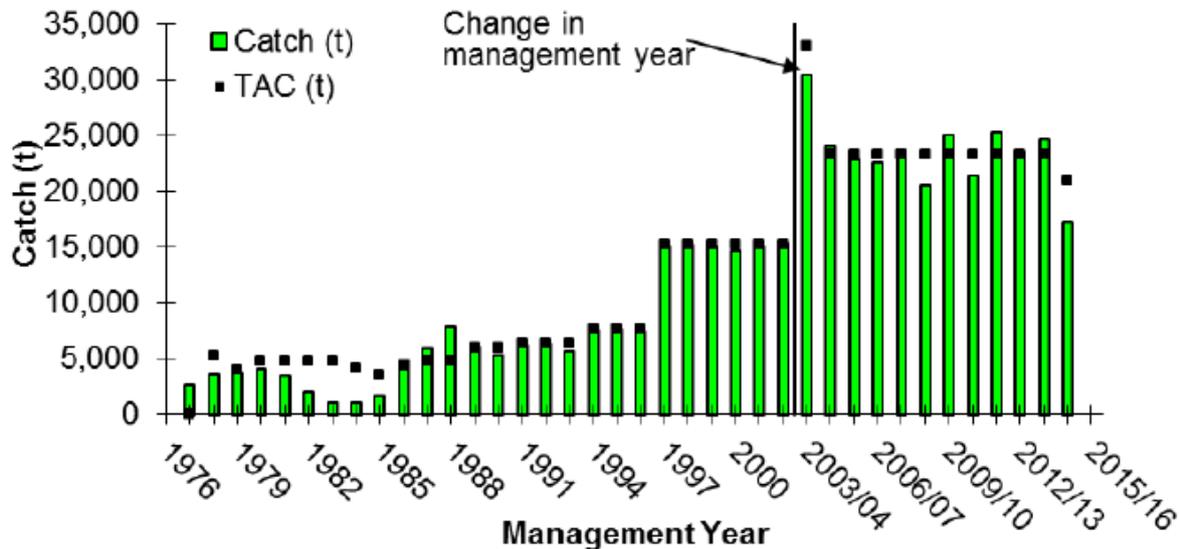
In SFA 4, striped shrimp catches have been highly variable from year to year, as the species was mainly taken as bycatch in the northern shrimp fishery (Figure 13). Distribution of exploitable concentrations of striped shrimp is variable in this area due to strong currents. Bycatch limits were set in 2013/4 and 2014/5 at 4,000 t.



**Figure 13:** Striped shrimp catch levels and bycatch limits, SFA 4.  
 Source: DFO (2015b)

### 3.6.4 UoC 4 - northern shrimp, SFA 5

In SFA 5, catches of northern shrimp increased from less than 5,000 t/yr in the late 1970s and early 1980s to maximum values varying around 23,000 t/yr in 2003/4 to 2013/4 (Figure 14). TACs increased stepwise over the same period and were essentially constant at 23,300 t/yr from 2003/4 to 2013/4. TAC was reduced to 20,970 t for 2014/5 due to a stock decline, and the TAC was taken (the figure for 2014/5 in Figure 14 is based on preliminary information). The high value in 2003 was due to a change to the management year which added an additional amount for the lengthened management year.

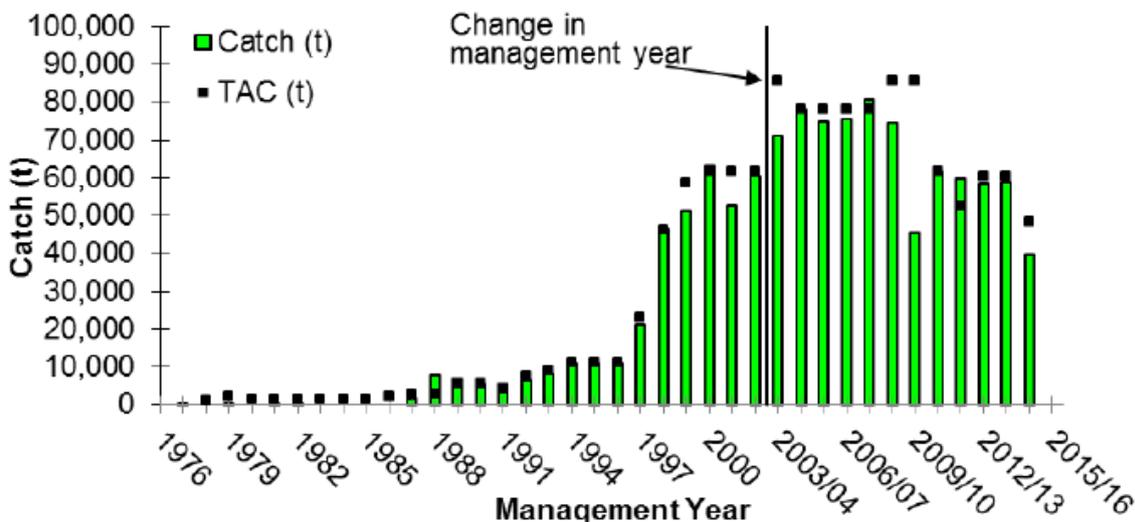


**Figure 14:** Northern shrimp catch and TAC history, SFA 5.  
 Source: DFO (2015b).

### 3.6.5 UoC 5 - northern shrimp, SFA 6

TACs for northern shrimp in SFA 6 increased from below 5,000 t/yr in the late 1970s and early 1980s to a maximum of 85,725 t in 2008/9-2009/10, followed by a stepwise reduction through 61,000 t/yr to the most recent value of 48,196t for 2014/5 (Figure 15).

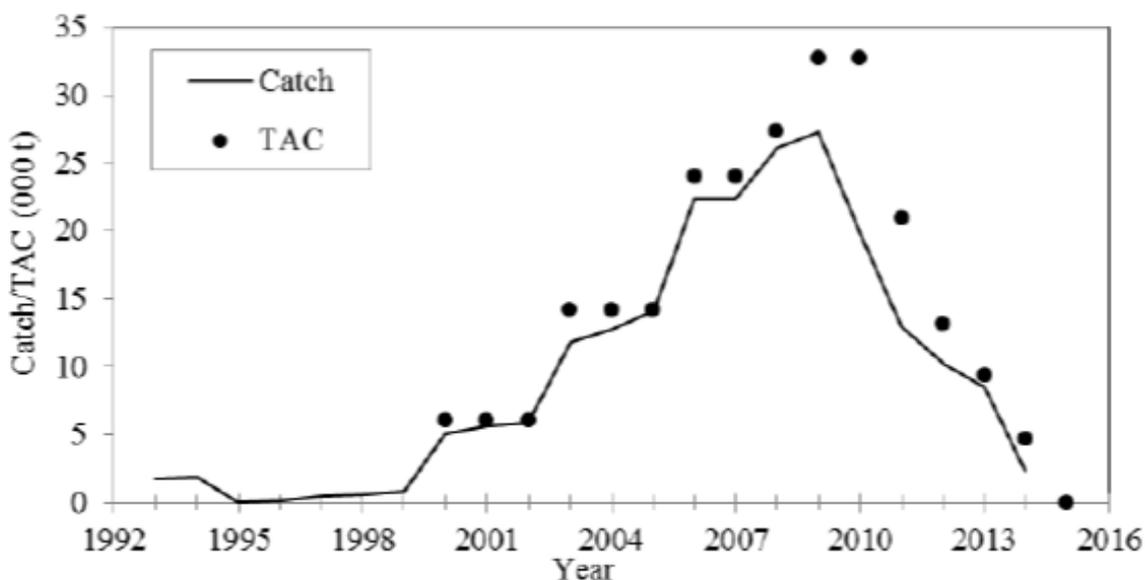
Catches have followed a similar pattern, although TACs have not been taken in some years. Recent catches have been around 60,000 t/yr; the 48,196t TAC for 2014/5 was expected to be taken (the value shown in Figure 15 was based on preliminary information). The high TAC value in 2003 was due to a change to the management year which added an additional amount for the lengthened management year.



**Figure 15:** Northern shrimp catch and TAC history, SFA 6.  
Source: DFO (2015b).

### 3.6.6 UoC 6 - northern shrimp, SFA 7

In SFA 7, catches for the whole stock (all countries) of northern shrimp showed a sustained increase from near zero in the 1990s to around 25,000 t/yr in the mid-2000s, with a subsequent rapid decline to near zero in 2014 and zero in 2015 (the fishery was closed for 2015 and 2016) (Figure 16).



**Figure 16:** Northern shrimp catches and TACs, SFA 7 - whole stock (all countries exploiting the stock).  
Source: NAFO (2015a). TACs include autonomous TACs set by Denmark for Greenland and the Faroes.

TACs showed a similar pattern but were set well above catches in the late 2000s; their decline since the maximum in 2009 has lagged the decline in the catches. In some years, Denmark

set autonomous TACs over and above those set by NAFO for the Faroe Islands and Greenland.

Canada is allocated 83% of the NAFO-determined TAC. Recent Canadian TACs and catches are outlined in Table 3.

**Table 3:** Recent Canadian TACs and catches for SFA 7.

Year	TAC (t) (before transfers)	Catch (t)
2010	24,990	13,538
2011	15,994	8,919
2012	10,000	8,019
2013	7,162	6,119
2014	3,582	1,768
2015	0	0

### 3.7 Other fisheries affecting the target stocks

Groundfish trawl fisheries use mesh sizes that do not retain shrimp, and shrimp are not caught in other fisheries in the area (snow crab trap fisheries, gillnet and longline fisheries for finfish). Accordingly, no other fisheries exert significant impact on northern or striped shrimp populations in the CNSSF area.

## Principle One: Target species background

Principle 1 of the Marine Stewardship Council standard states: “A fishery must be conducted in a manner that does not lead to over fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.”

Principle 1 covers all fishing activity on the entire stock of the species being targeted – not just the fishery undergoing certification. However, the fishery under certification would be expected to meet all management requirements, such as providing appropriate data and complying with controls.

### 3.8 Key low trophic level (LTL) species

Northern and striped shrimp are not key low trophic level (LTL) species under the MSC definition (MSC Certification Requirements v 1.3 CB 2.3.13). Shrimp are an important forage species for a number of predators, notably groundfish and seals, in the fishery area (Parsons 2005b). However, a number of other forage species are also found in the diets of these species (DFO 2014b; Hammill and Stenson 2000) and diet composition of key groundfish predators has changed over time along with changes in the environment (DFO 2014b).

For all species of seals in NAFO 2J3KL (overlapping SFAs 4-6), shrimp made up 17% of the diet in 1996, with 72% being made up of fishes (mainly capelin and sand lance, which made up 35% together) (Hammill and Stenson 2000). Shrimp made up 5-50% of the diet of four important groundfish species in NAFO 2J3KL in 2008-2013; generally, the proportion was higher earlier in the time series, and declined later as abundance of preferred prey (capelin and other fishes) increased and abundance of shrimp decreased (DFO 2014b). Of the four groundfish species, Atlantic cod diet was most dependent on shrimp, ranging from 15-50% shrimp in the diet; American plaice, redfish, and Greenland halibut diets generally had 5-30% shrimp.

Considering northern and striped shrimp in relation to the MSC LTL species guidelines (MSC Certification requirements v 1.3, Section 2.3.13), we draw the following conclusions.

**2.3.13b:** These species are not one of those listed in box CB1 (i.e., fish, krill).

They also do not meet 2 out of 3 of the sub-criteria in CB2.3.13a i-iii.

**2.3.13a i:** Although there are many trophic connections to the species, evidence indicates that there is not significant predator dependency, since shrimp usually form much less than 50% of the diet, and predators can and do switch preys

**2.3.13a ii:** The volume of energy passing through this stock does not appear to be ‘large’ (less than 50% in all cases documented, much less in most)

**2.3.13 iii:** There are a number of other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, and predators show the ability to prey on a wide range of prey species and switch preys as conditions change.

## **3.9 Stock assessment methodology**

### **3.9.1 UoC 1 - northern shrimp, SFA 1**

A Bayesian Schaefer stock production model is the primary tool for assessing northern shrimp in SFA 1, based on combined catch data from Canadian and Greenlandic (offshore and inshore) fisheries, fishery and trawl survey CPUE, survey estimates of abundance and recruitment, and estimates of cod biomass and cod consumption. The model produces estimates of biomass (B),  $B_{MSY}$ , total mortality (Z) and  $Z_{MSY}$  (NAFO 2015a). The stock indicators and catch projection results are expressed probabilistically.

Fishery catch and effort data are from logbooks from Greenland and Canadian vessels. Stratified trawl surveys designed primarily to estimate shrimp stock biomass in SFA 1 have been conducted since 1988, using a codend liner of 22 mm (since 1993). Trawl type changed in 2005 and data series were adjusted based on calibration trials of the two gears (NAFO 2015a). Estimates of cod predation on shrimp from groundfish trawl surveys and cod stock assessments are included as a predation index in the shrimp assessment model.

Details of the assessment methodology are provided by NAFO (2015a) and in SCR documents cited therein.

### **3.9.2 UoC 2 - northern shrimp in the EAZ, WAZ and SFA 4**

Stocks of northern shrimp in the EAZ WAZ and SFA 4 are assessed based on a framework developed in 2007 (DFO 2007). Biomass indices (fishable, female spawning) and biological data (in particular a recruitment index) are obtained from fishery-independent trawl surveys, information on fishery performance is obtained from commercial catch and effort data, logbooks and observers, and biological information on harvested shrimp is obtained from observers. An exploitation rate index is calculated as the ratio of catch to survey fishable biomass. Fishery catch-per-unit-effort is estimated from observer data. Details of the assessment methodology are provided by Siferd (2015).

Biomass and exploitation rate index estimates are compared with reference levels defined in the IFMP or in consultation with industry (see information in Section 3.10, below).

In the EAZ (SFA 2), fishery-independent surveys have been conducted annually by the Northern Shrimp Research Foundation (NSRF) and DFO in 2006-2014 using commercial vessels. Results are considered comparable over this time period. For the WAZ (SFA 3), surveys prior to 2014 were conducted by DFO using a different ship, gear and time period than for the EAZ, such that results were not comparable for the two zones and a full assessment of the stock (which covers the two zones) was not possible. Beginning in 2014, the same vessel is used for both zones. While this ensures future comparability, the time series for the WAZ restarts in 2014 and it will be several years before temporal comparability is possible (DFO 2015a).

### **3.9.3 UoC 3 - striped shrimp in the EAZ, WAZ and SFA 4**

Methods are as for UoC 2, above.

### **3.9.4 UoCs 4-5 - SFAs 5-6**

Stocks in SFAs 5 and 6 are assessed based on the framework developed in 2007 (DFO 2007). Biomass indices (fishable, female spawning) and biological data (in particular a recruitment index) are obtained from fishery-independent trawl surveys, information on fishery performance is obtained from catch and effort data, logbooks and observers, and biological

information on harvested shrimp is obtained from observers. An exploitation rate index is calculated as the ratio of catch to survey fishable biomass (DFO 2015b). Fishery CPUE is estimated from observer data. A summary of the details of the assessment methodology is provided by Orr & Sullivan (2013).

Biomass and exploitation rate index estimates are compared with reference levels defined in the IFMP or in consultation with industry (see Section 3.10, below).

In these areas, trawl surveys have been conducted in the fall since 1996, using constant vessels and gear. The survey trawl is a Campelen 1800 shrimp trawl with 40 mm codend mesh size and a 12.7 mm liner (Orr and Sullivan 2013). This is a multispecies survey whose results are also used in assessments of groundfish and snow crab. Vessel problems have required delaying parts of the survey to January in some years, and coverage of SFA 5 has been incomplete in some years prior to 2009.

Assessment results are interpreted in light of environmental conditions. Recently, efforts have been made to project future stock trends based on trends in environmental conditions (temperature and predator-prey indices) (DFO 2014b) and to compare production in shrimp stocks with removals by the fishery and by predators (DFO 2015b).

A Bayesian production model, similar to that used in assessing the shared Greenland-Canada stock, was developed and tested for the SFA 6 shrimp stock by Hvingel & Orr (2011). Although this model performed reasonably well for a preliminary version, in its initial configuration it was not considered suitable for routine assessment of the stock or for application to other Canadian SFAs.

### **3.9.5 UoC 6 - SFA 7**

The assessment for northern shrimp in SFA 7 is based on information from three trawl surveys (Canadian spring and fall; Spanish) and from the commercial fishery (logbooks, observers) (NAFO 2015a). Commercial fishery catch and effort data are available from 2000 but are not considered to reflect stock abundance well. Canadian trawl survey information using a Campelen trawl is available from 1999 for spring and from 1996 for fall, while Spanish trawl survey information is available from 2003. Fishable (carapace length >17mm) and female spawning biomass indices, and recruitment indices, are obtained from the survey information, while an exploitation rate index is developed based on catch in the current year divided by fishable biomass from the previous autumn survey. Fishable biomass from the Canadian fall survey is compared to a limit reference level (see Section 3.10, below).

## **3.10 Reference points**

### **3.10.1 UoC 1 - northern shrimp, SFA 1**

The probabilistic Schaefer production model used in the assessment (NAFO 2015a) evaluates stock status relative to  $B_{MSY}$  (biomass at maximum sustainable yield),  $Z_{MSY}$  (total mortality providing maximum sustainable yield), and  $B_{LIM}$  (the biomass limit reference point, defined as 30% of  $B_{MSY}$ ). Total mortality ( $Z$ ) is used rather than the more usual fishing mortality ( $F$ ) because of the difficulty of separating natural from fishing mortality. The results are used to advise on the consequences of a range of TAC levels (see below, Table 4). The advice is based on the NAFO Scientific Council (SC) precautionary approach (PA), taking into account stock biology, exploitation history and the limitations of the available fishery and assessment data.

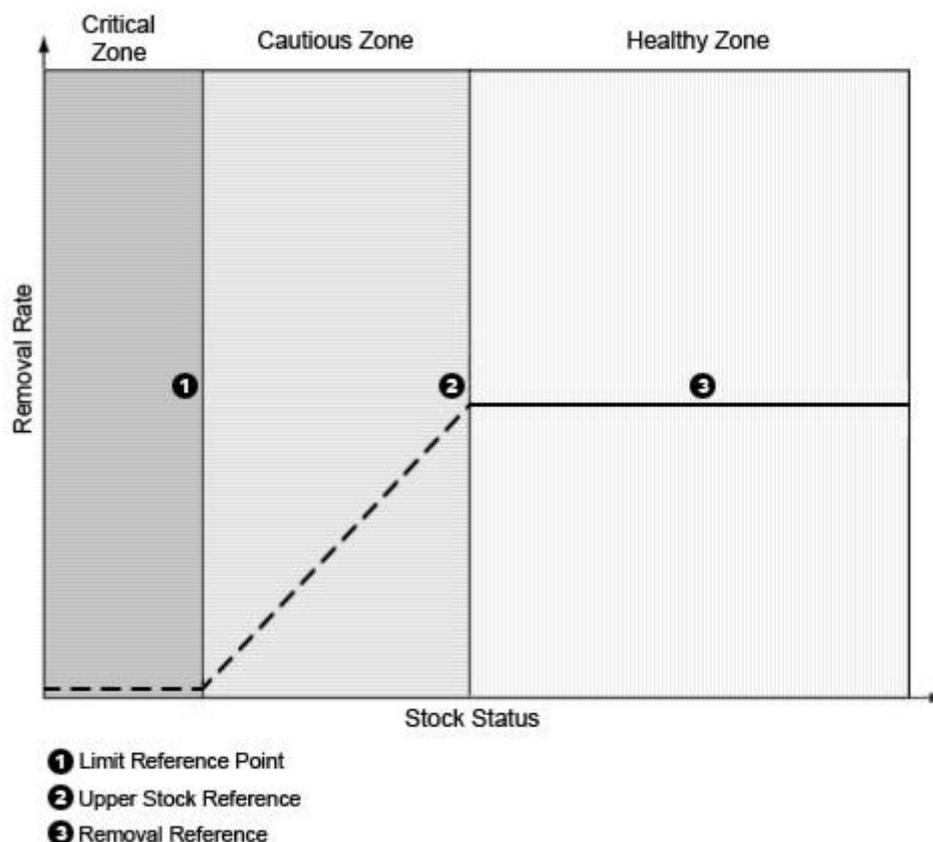
DFO (2016b) outlined a new harvest strategy for this UoC, including reference points. The upper end of the cautious zone (the Upper Stock Reference, USR) is taken as 80% of  $B_{MSY}$

from the NAFO SC assessment, while the limit reference point (LRP) is that used in the NAFO assessment, 30% of the NAFO  $B_{MSY}$ . Since biomass amount is not estimated by the NAFO assessment model (only the current biomass relative to  $B_{MSY}$ ), biomass figures for the reference points are not available for Table 4, below. Application of the harvest control rules in relation to the reference points would be based on the NAFO assessment of current biomass as a proportion of  $B_{MSY}$ .

Although the USR is not explicitly equivalent to a target reference point (TRP), and no TRP is explicitly identified for the stock, use of an USR in this fashion is similar to practice in other UoCs and in other Atlantic Canadian northern shrimp fisheries (see below 3.10.2), although these use proxies for  $B_{MSY}$  based on survey indices during productive periods rather than a modelled  $B_{MSY}$ . Nevertheless, the intent of the harvest strategy is to ensure that biomass remains above the USR; that is, in the area of  $B_{MSY}$ .

### 3.10.2 UoCs 2-6, general approach - northern and striped shrimp

In line with the DFO framework for implementation of the precautionary approach (DFO 2009a) a limit reference point (LRP) defines the boundary between a lower critical zone and an intermediate cautious zone, and an upper stock reference (USR) defines the boundary between the cautious zone and an upper healthy zone (Figure 17). The LRP represents the point below which serious harm is occurring to the stock; it is based on biological criteria and is established by science through a peer-review process.



**Figure 17:** Reference points and stock status zones for the DFO Precautionary Approach Framework.  
 Source: DFO (2009a).

The USR can perform two functions. First, below this level, removals must be progressively reduced in order to avoid reaching the LRP. Second, the USR can be a target reference point (TRP) determined by productivity objectives for the stock, broader biological considerations, and social and economic objectives for the fishery.

Reference points may be determined using biomass and harvest metrics or alternative metrics based on estimates of productive potential and harvest that are most appropriate for the stock concerned. Avoiding serious harm to the reproductive capacity of the stock is the overriding objective (DFO 2009a).

For both shrimp species in the EAZ, WAZ and SFAs 4-7, since an analytical assessment is not available to calculate reference points, provisional proxy reference points are used to ensure implementation of the precautionary approach (DFO 2010a). A provisional LRP is set at 30% of the mean spawning stock biomass (SSB) from annual surveys in a moderately productive period, a variation on the approach adopted by NAFO's SC, which uses 15% of the maximum observed spawning biomass as a LRP. A provisional USR is set at 80% of the mean SSB from surveys in the same identified moderately productive period. These values are based on results of a DFO workshop on PA frameworks for shrimp and prawn stocks (DFO 2009b).

Reference points are considered 'provisional' because of the lack of analytical assessments to define reference points, the lack of experience with stocks at the low levels which might jeopardise recruitment, and the strong environmental influence on recruitment in shrimp stocks which complicates defining a stock-recruitment relationship and thus an abundance level at which recruitment could be affected. Reference points and harvest control rules are being reviewed as experience with stock management over a range of abundance levels is acquired. Reference points based on this framework for the UoCs are provided in Table 4.

**Table 4:** Reference points for UoCs 1-6

UoC		Reference period	LRP (t female SSB)	USR (t female SSB)
1. (Northern shrimp)	SFA 1	N.A.	$B_{NOW}/B_{MSY}=0.3$ (fishable biom)	$B_{NOW}/B_{MSY}=0.8$ (fishable biom)
2: (Northern shrimp)	EAZ	2006-2008	6,800	18,200
	WAZ	2007, 2009, 2011	(1,300) <sup>1</sup>	(3,400) <sup>1</sup>
	SFA 4	2005-2008	21,100	50,000
3: (Striped shrimp)	EAZ	2006-2008	2,300	6,100
	WAZ	2007, 2009, 2011	(6,700) <sup>1</sup>	(18,000) <sup>1</sup>
	SFA 4	N/A	Not available <sup>2</sup>	Not available <sup>2</sup>
4: (Northern shrimp)	SFA 5	1996-2001	14,000	38,000
5: (Northern shrimp)	SFA 6	1996-2003	80,000	212,000
6: (Northern shrimp)	SFA 7	2007	19,300	Not available <sup>4</sup>
	NAFO <sup>3</sup> DFO	1996-2003	9,000	23,000

1. Based on earlier survey time series, not currently used in assessment - RPs to be developed based on new survey time series started in 2014
2. Survey results highly variable from year to year, no reference points developed
3. Based on the NAFO protocol described below.
4. USR not developed by the NAFO protocol

### 3.10.3 UoC 2, UoC 3 - northern and striped shrimp in the EAZ, WAZ and SFA 4

Reference points had been developed for the WAZ (SFA 3) based on three surveys (2007, 2009, 2011) and were used in earlier assessments of stock status (DFO 2013a). However, the surveys were considered non-comparable because different vessels were used. A new survey time series using a single vessel for the WAZ as had previously been used for the EAZ started in 2014 and is expected to ensure consistency between the areas and over time. Reference points for the WAZ will be developed once an adequate time series has been established (DFO 2015a). Pending formal adoption of reference points based on the new survey series, the 'old' reference points are available for guidance in stock management.

### 3.10.4 UoC 6 - northern shrimp, SFA 7

For SFA 7, DFO has established a LRP at 9,000 t of female SSB, 30% of the geometric mean annual SSB for the period 1996-2003, and an USR at 23,000 t, 80% of the mean annual SSB for the same period.

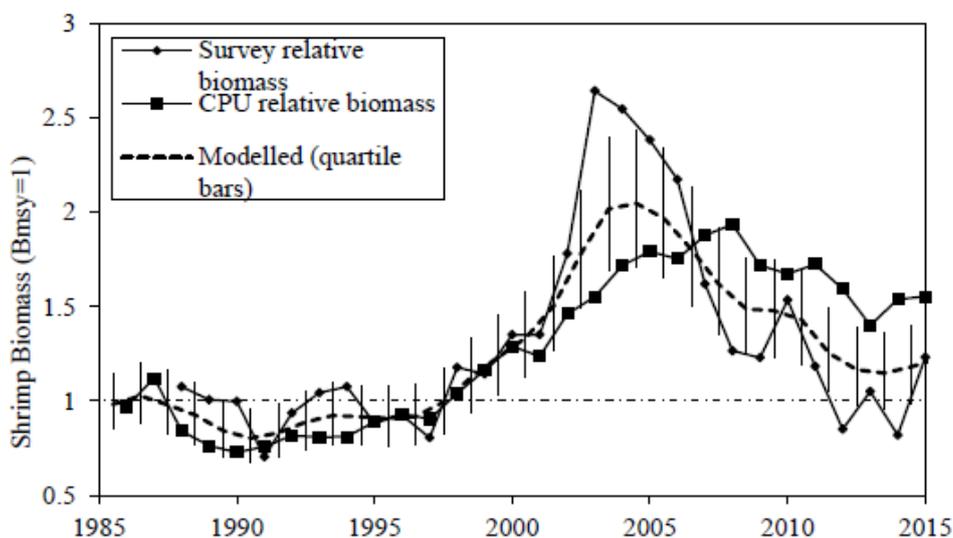
NAFO has established a LRP at 19,300 t SSB, 15% of the highest observed value of SSB in the time series (NAFO 2015a), consistent with general policy in NAFO on LRPs for stocks for which stock-recruitment or production functions cannot be determined (NAFO 2004a). NAFO has not established a TRP for this stock.

Since NAFO has indicated that no fishing will be permitted on this stock now that abundance has gone below the LRP, the DFO reference points have not been invoked for management.

## 3.11 Stock status

### 3.11.1 UoC 1 - northern shrimp, SFA 1

The most recent assessment of stock status for northern shrimp in SFA 1 was in September 2015 (NAFO 2015a, b).

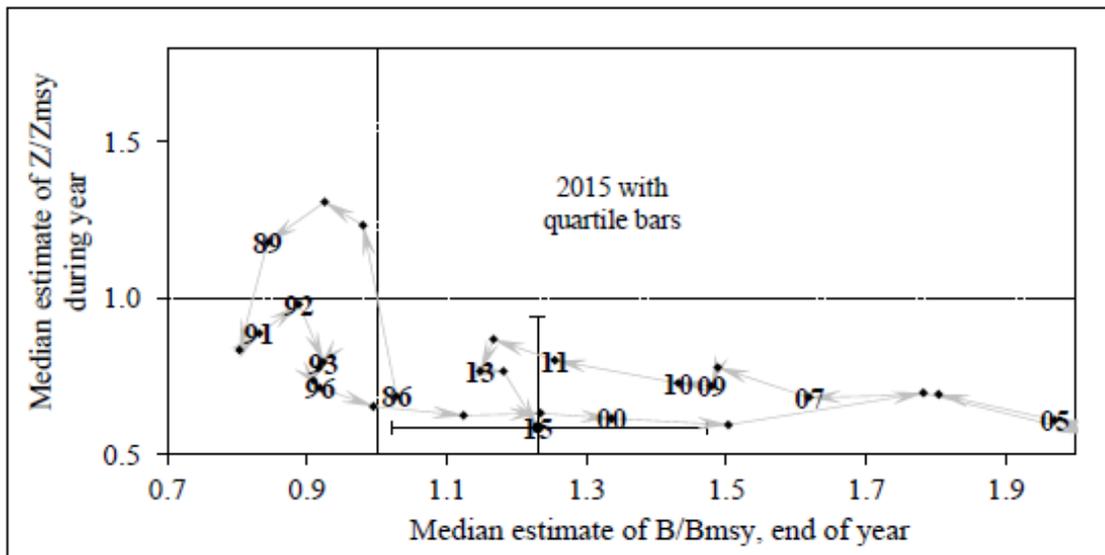


**Figure 18:** Northern Shrimp in NAFO SA 1 and Canadian SFA1: trajectory of the median estimate of stock biomass relative to  $B_{MSY}$  at start of year 1986–2016, with median CPUE and survey indices.

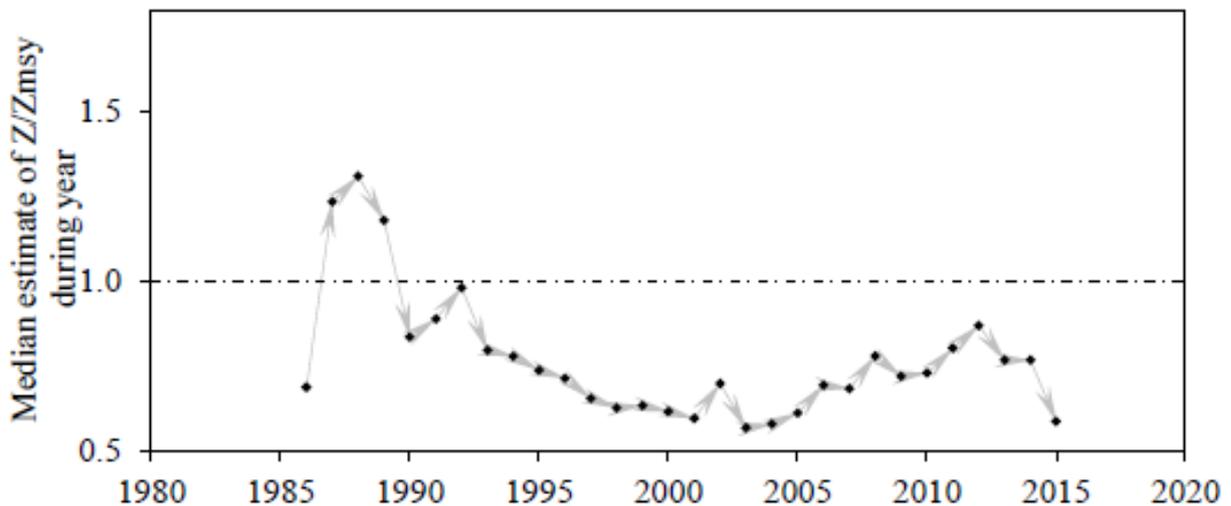
Source: NAFO (2015a)

Following a sustained increase from the early 1990s to a maximum in 2004, stock biomass has been declining, although survey and fishery CPUE show different patterns of decline. The modelled biomass in 2015 was at the same level as in the early 1990s, near  $B_{MSY}$ , and was slightly higher than in 2014 (Figure 18, Figure 19).

Total mortality increased from the early 2000s to 2012, but has remained below  $Z_{MSY}$ ; mortality has decreased since 2012 (Figure 19, Figure 20).



**Figure 19:** Northern shrimp in Subarea 1 and Canadian SFA1: trajectory of relative biomass and relative mortality, 1985–2014.  
 Source: NAFO (2015a)



**Figure 20:** Northern Shrimp in NAFO SA 1 and Canadian SFA1: trajectory of the median modelled estimate of mortality relative to  $Z_{MSY}$ .  
 Source: NAFO (2015a)

NAFO (2015a) summarized the SFA 1 assessment results as follows:

- *Recruitment:* The number of large pre-recruits (recruits to next year's biomass) is close to its ten-year maximum and number at age 2 is also relatively high, presaging good recruitment in the short and medium term.
- *Biomass:* Modelled biomass reached a maximum in 2004 with a continuing decline over 2004-2013; the decline appears to have paused. At the end of 2015, the stock was estimated to be 23% above  $B_{MSY}$ , and risk of being below  $B_{LIM}$  was less than 1%
- *Mortality:* With 2015 catches projected at 65,000 t, the risk that total mortality will exceed  $Z_{MSY}$  is 58.6%.

Based on the NAFO SC objective of maintaining the risk that total mortality would exceed  $Z_{MSY}$  below 35%, NAFO (2015b) advised a 2016 TAC for northern shrimp in SFA 1 of 90,000 t. As in previous years, NAFO (2015b) provided a table showing risk levels that  $B_{MSY}$ ,  $B_{LIM}$  and  $Z_{LIM}$  reference levels would be exceeded, based on different assumptions for future catches and future cod predation (Table 5).

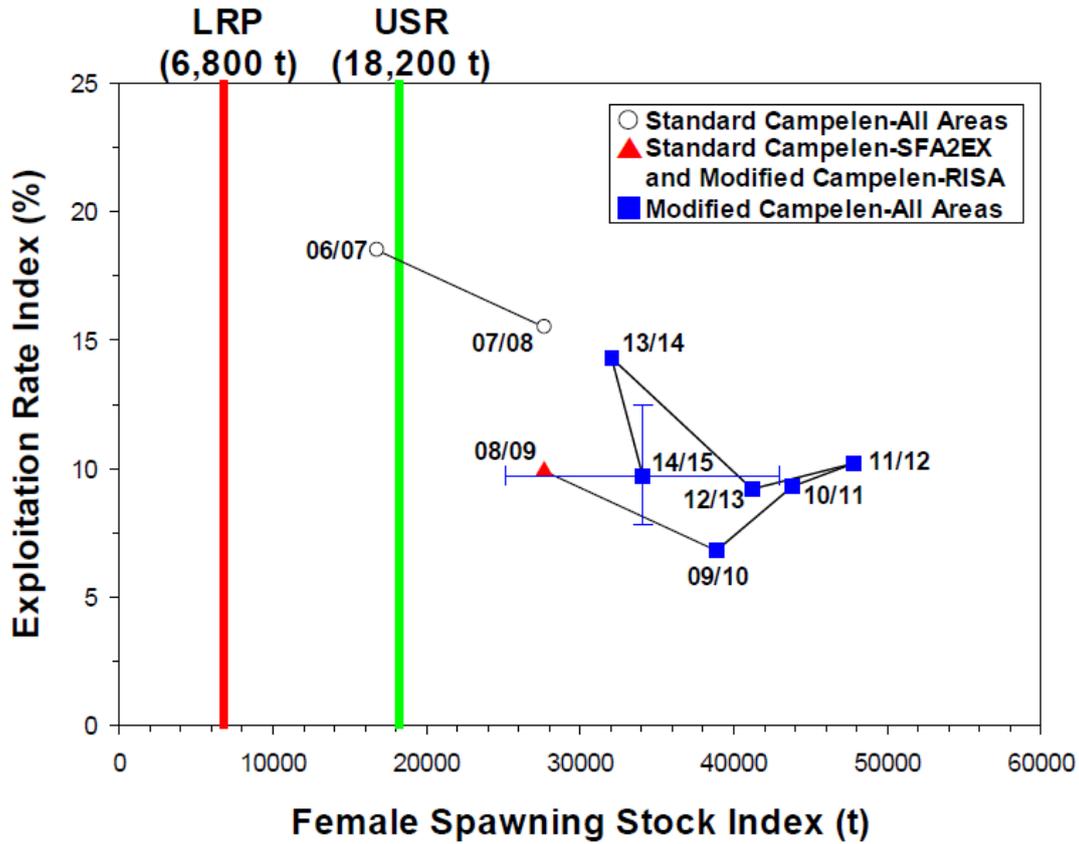
**Table 5:** Predicted probabilities of transgressing precautionary reference points under 7 catch options, assuming predation with a cod stock of effective biomass 55 Kt. Source: NAFO (2015a).

@ 55,000 t cod, risk of:	Catch Option ('000 tons)							
	60	70	75	80	85	90	95	100
Falling below $B_{MSY}$ end 2016 (%)	25.0	25.0	25.4	26.2	26.6	26.6	27.0	27.2
Falling below $B_{MSY}$ end 2017 (%)	25.3	26.0	26.5	27.4	27.7	28.4	29.2	30.3
Falling below $B_{MSY}$ end 2018 (%)	26.4	27.8	28.9	29.7	30.5	31.0	32.1	33.0
Falling below $B_{LIM}$ end 2016 (%)	1.2	1.3	1.1	1.3	1.4	1.1	1.2	1.2
Falling below $B_{LIM}$ end 2017 (%)	2.1	2.1	2.1	2.2	2.5	2.0	2.2	2.2
Falling below $B_{LIM}$ end 2018 (%)	3.3	3.4	3.5	3.3	3.7	3.3	3.5	3.4
Exceeding $Z_{MSY}$ in 2016 (%)	21.7	24.5	26.6	28.2	30.7	32.3	34.7	36.9
Exceeding $Z_{MSY}$ in 2017 (%)	23.0	26.3	27.6	29.4	31.9	33.4	36.8	38.8
Exceeding $Z_{MSY}$ in 2018 (%)	23.8	27.3	28.8	31.0	33.2	35.3	37.8	40.0

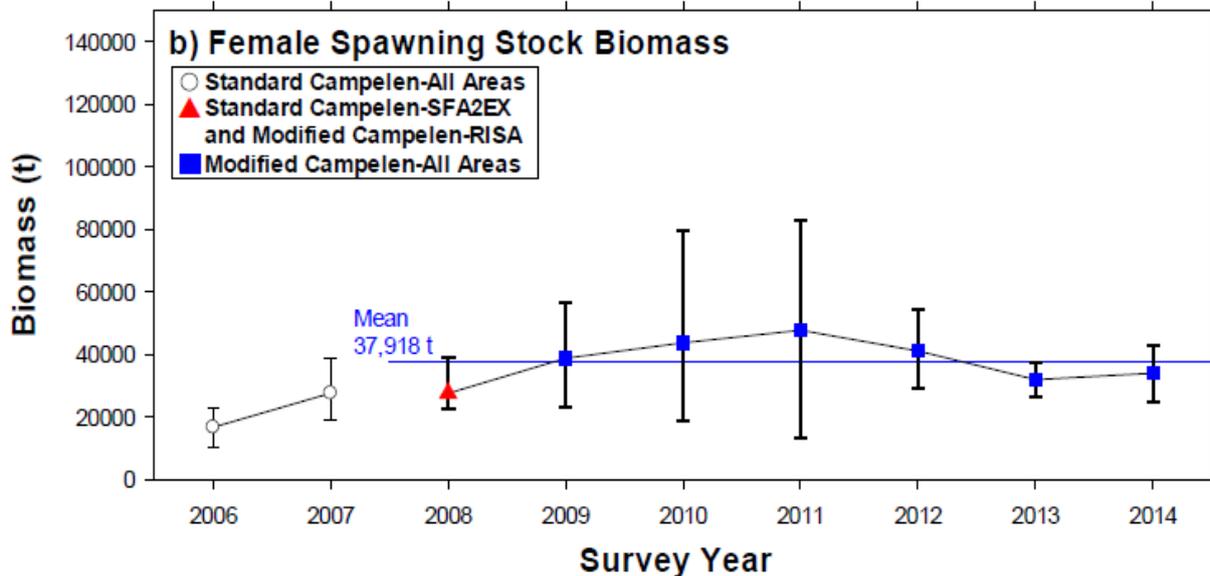
The distribution of the shrimp stock in SFA 1 has shifted over recent years. Following an increase in catches in southerly regions (south of 66°N) and a general expansion in the number of statistical areas fished in the late 1990s, from the early 2000s the distribution of the shrimp fishery has moved northwards with a decrease in the number of statistical areas fished (NAFO 2015a). One consequence of this shift has been a decreased overlap with cod distribution. However, with the increase in cod biomass, in the population model the shrimp mortality due to cod predation has remained more or less constant.

### 3.11.2 UoC 2 - northern shrimp in the EAZ, WAZ and SFA 4

For the EAZ (SFA 2) (DFO 2015b), the stock remained in the healthy zone, well above the USR level (Figure 21) in 2014/15, while the exploitation rate index was just below 10%, with 60% of the TAC taken (due to ice conditions late in the season, this is expected to be most of the year's catch). Female SSB is just below the long-term mean (Figure 22). Recruitment prospects are uncertain, as few pre-recruits are taken in the survey trawl.



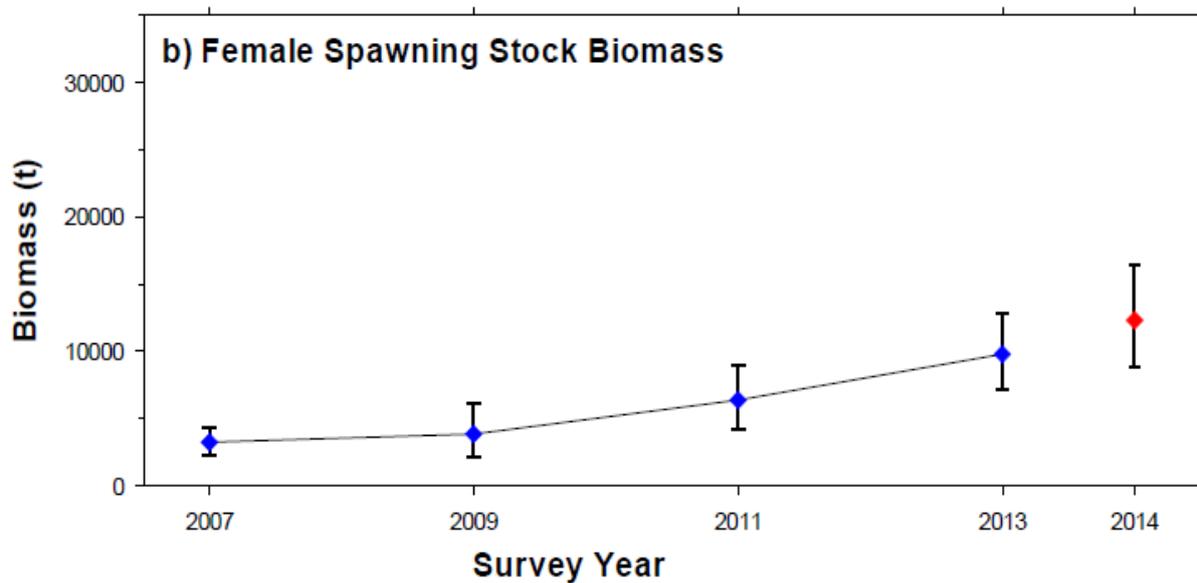
**Figure 21:** Northern shrimp, EAZ - female SSB and exploitation rate indices. Source: DFO (2015a). USR = Upper stock reference, LRP=limit reference point. Error bars are 95% confidence ranges.



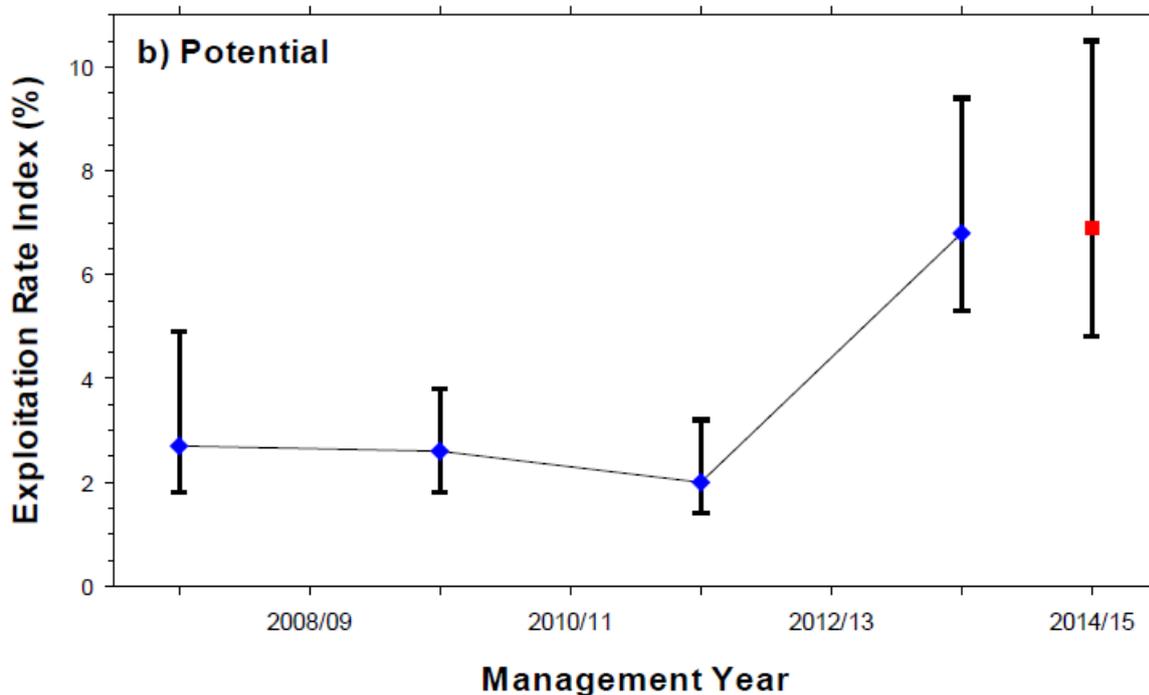
**Figure 22:** Northern shrimp, EAZ - female SSB indices for the survey years 2006–2014. Source: DFO (2015a) The first two years of survey data (2006–2007) are not considered to be comparable with the rest of the series because of poor trawl performance around Resolution Island. Error bars are 95% confidence ranges.

For the WAZ (SFA 3) (DFO 2015a), with the change in management areas in 2013, TACs were established for northern shrimp for the first time. In 2014, a new survey was initiated using the same vessel and gear as for the EAZ, which should bring consistency to assessments in these areas. As a result of these changes, a DFO Precautionary Approach framework is not in place as this will require the establishment of a survey time series of at least 5 years. In the interim the assessment is based on maintaining relatively low exploitation rate indices. Reference points based on the earlier survey series (DFO 2013) are available to guide management.

Survey results prior to initiation of the new survey indicated relatively stable or increasing abundance over the time series (2007- 2013) (Figure 23). Potential exploitation rate indices for 2013/4 and 2014/5 (based on TACs) were around 7% (Figure 24), while the realised indices (based on catch) were around 4%. These are considered cautious harvest levels.

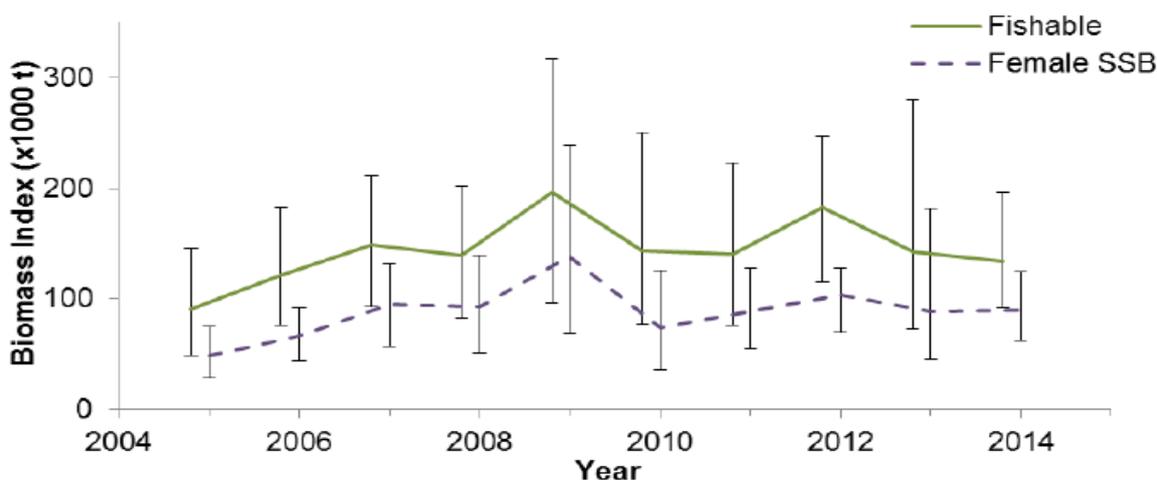


**Figure 23:** Northern shrimp, WAZ – female SSB.  
Source: DFO (2015a). Survey protocol changed in 2014. Error bars are 95% confidence intervals.

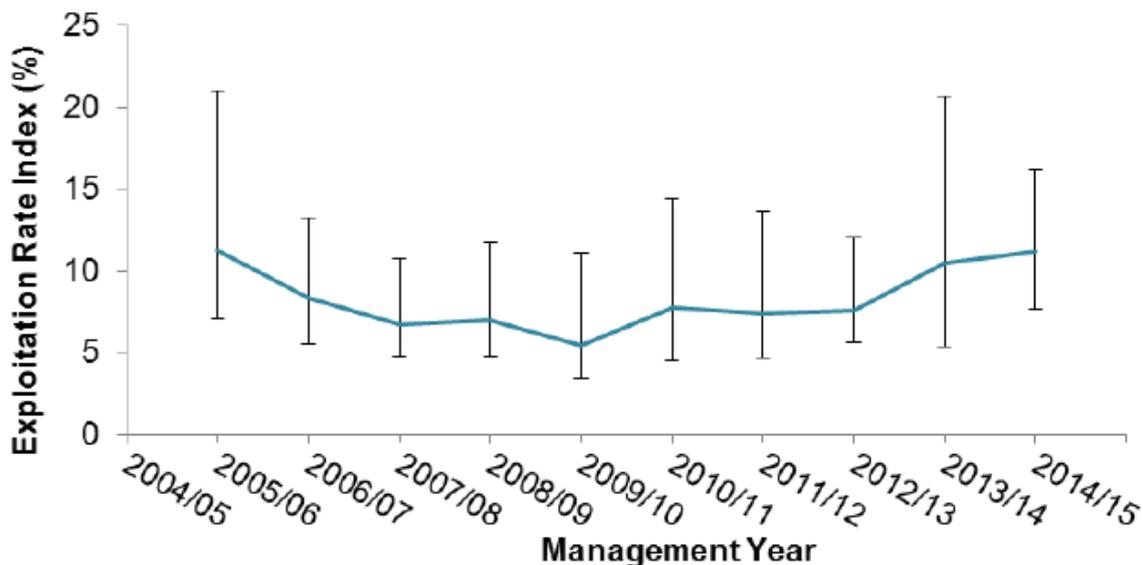


**Figure 24:** Northern shrimp, WAZ – potential exploitation rate index based on full TAC being taken.  
 Source: DFO (2015a). Error bars are 95% confidence limits.

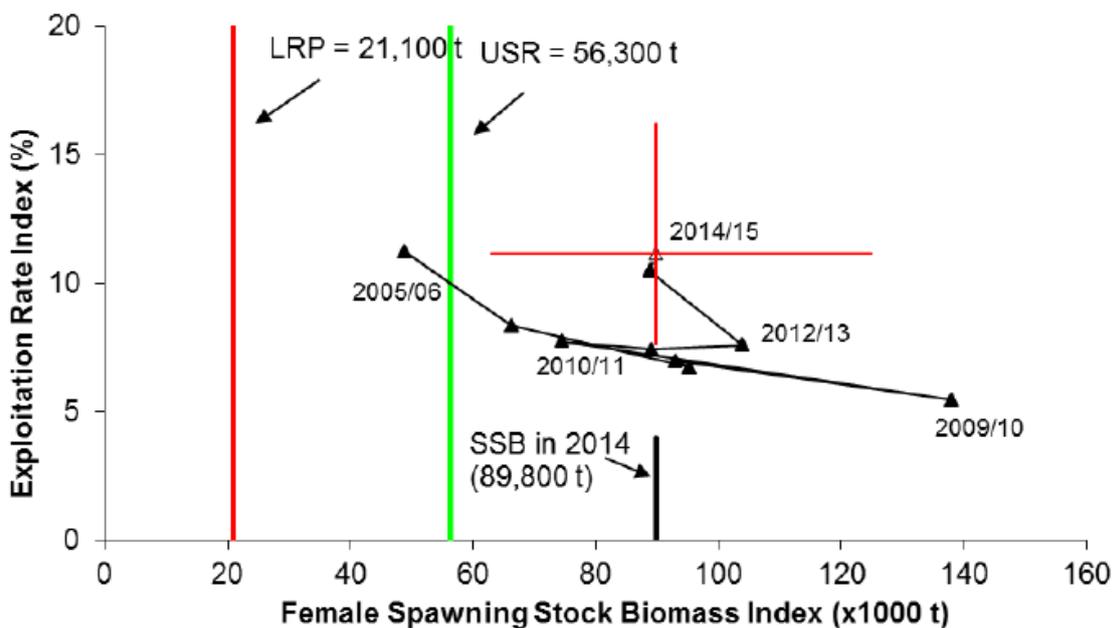
For SFA 4 (DFO 2015b), fishable and spawning biomass have been more or less constant for the duration of the time series (2005-2014), with some indication of an increase to 2009 followed by a decrease (Figure 25). The exploitation rate index has varied between about 6% and 12% in the same period, with an increase since 2009/10 to the most recent value of 11% (Figure 26). Commercial CPUE has been above the long-term mean since 2009 (time series 1998-2014), and the stock is in the healthy zone of the PA framework based on female SSB (Figure 27).



**Figure 25:** Northern shrimp, SFA 4 – biomass indices.  
 Source: DFO (2015b). Fishable biomass index (solid line), female SSB index (dashed line).  
 Error bars indicate 95% confidence intervals.



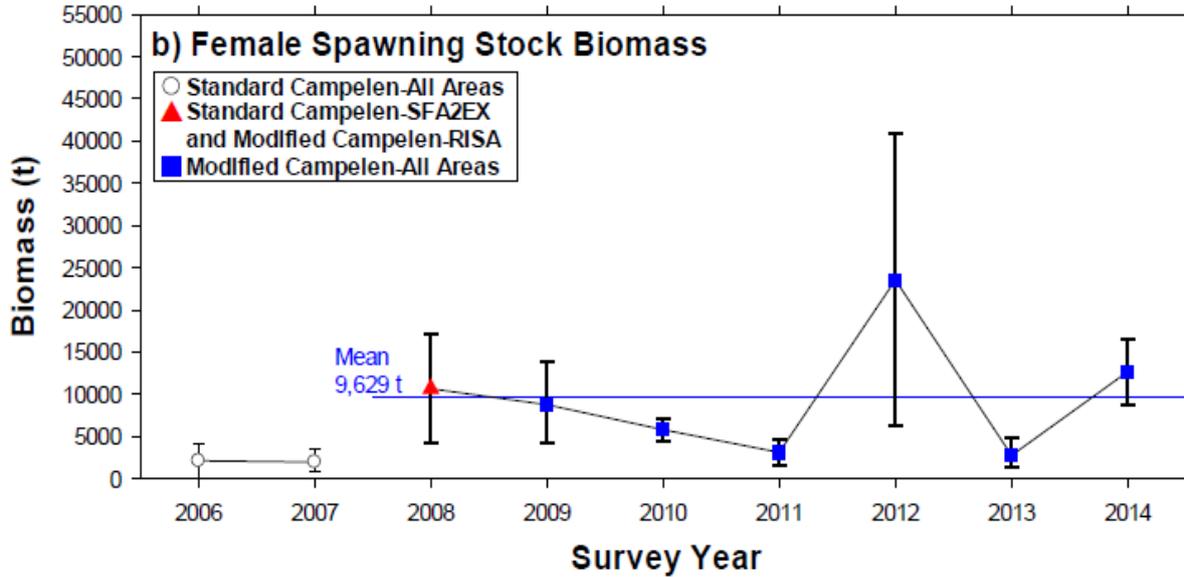
**Figure 26:** Northern shrimp SFA 4 - exploitation rate index, based on total catch in current year/fishable biomass index from current year, expressed as a percentage. Source: DFO (2015b). Error bars indicate 95% confidence interval.



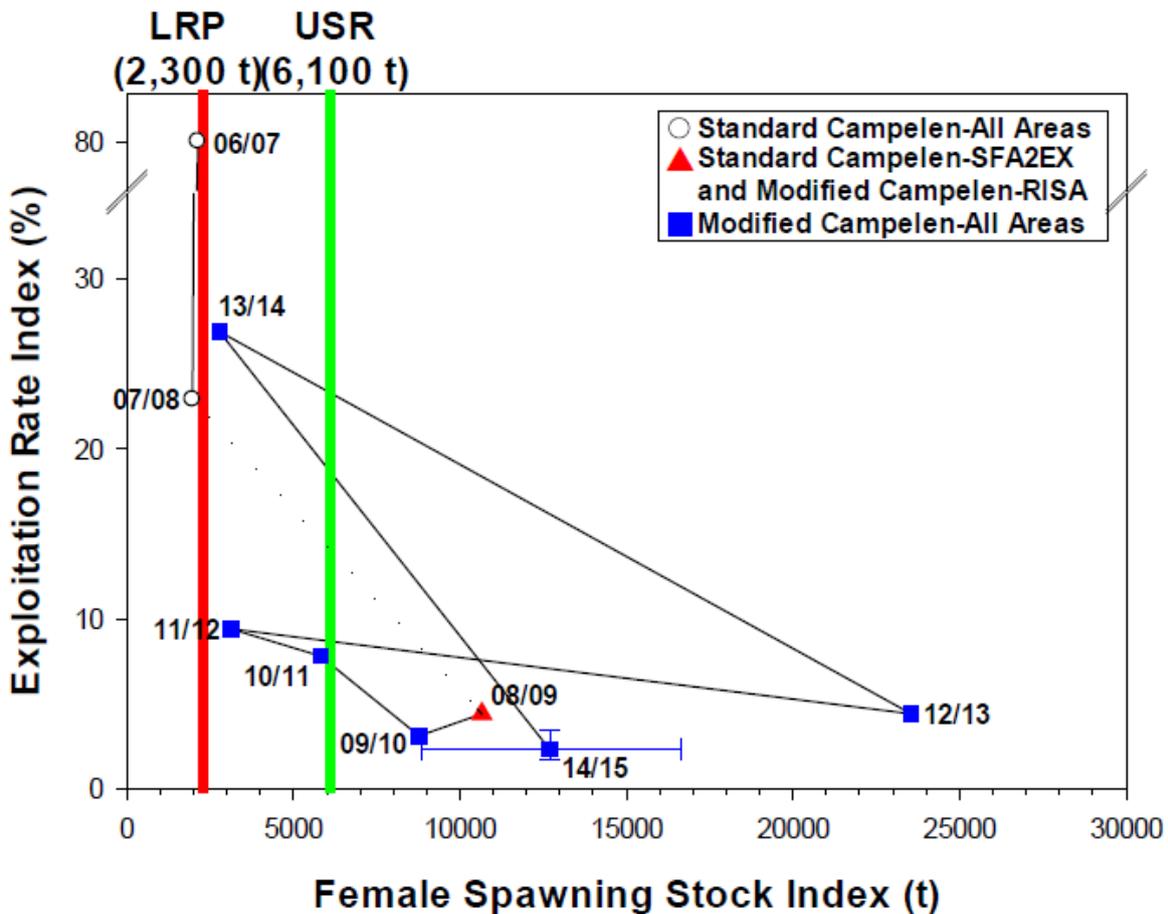
**Figure 27:** Northern shrimp, SFA 4 - trajectory of exploitation rate index versus female SSB index. The red cross on the 2014/15 point indicates 95% confidence intervals for the 2014 female SSB index (horizontal) and the 2014/15 exploitation rate index (vertical)

### 3.11.3 UoC 3 - striped shrimp in the EAZ, WAZ and SFA 4

For the EAZ (DFO 2015a), female SSB has remained more or less constant since 2008 but there are wide fluctuations in recent SSB estimates (Figure 28, Figure 29).



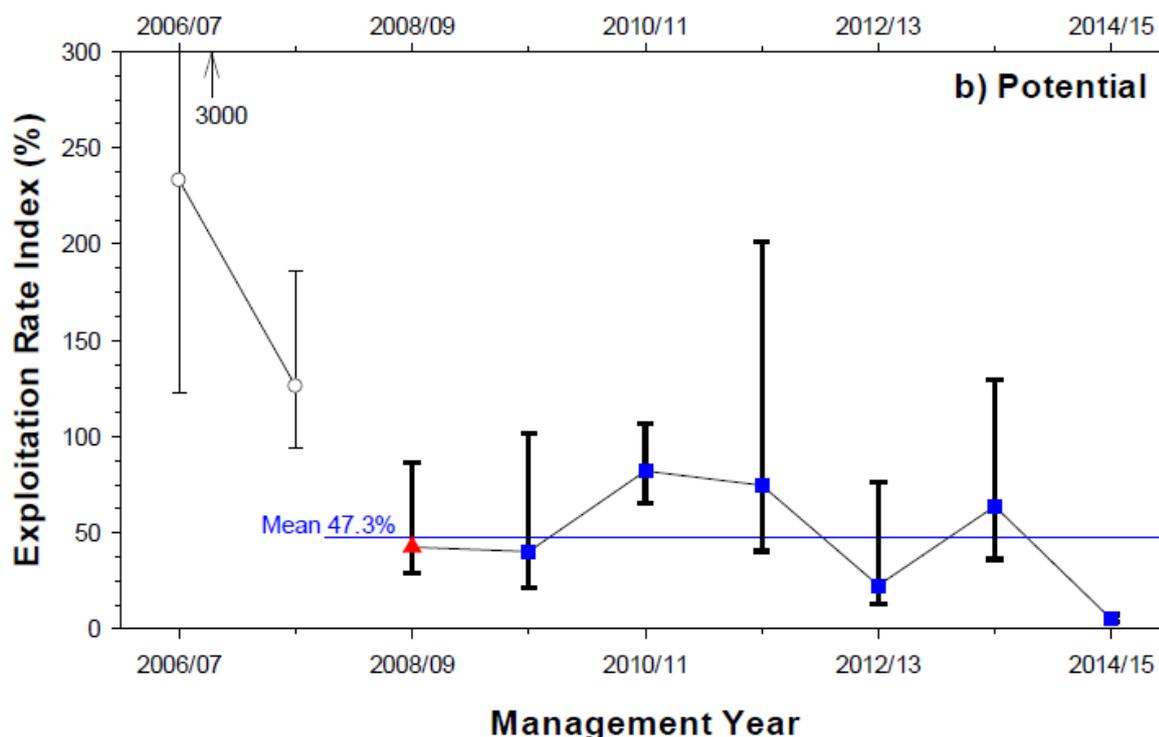
**Figure 28:** Striped shrimp, EAZ - female SSB indices 2006–14.  
 Source: DFO (2015a). Error bars are 95% confidence intervals.



**Figure 29:** Striped shrimp, EAZ - female SSB and exploitation rate indices in relation to reference points.  
 Source: DFO (2015a) Error bars are 95% confidence ranges.

The potential Exploitation Rate Index (based on ratio of TAC to survey fishable biomass estimate in the previous year) varied around 47% from 2008/9 to 2012/3, but was 5.1% for 2014/5 due to a reduction in TAC (Figure 30). Realised exploitation rate (based on catches) has varied without trend from 2008/09 to 2014/5, with an annual average of 8.3%.

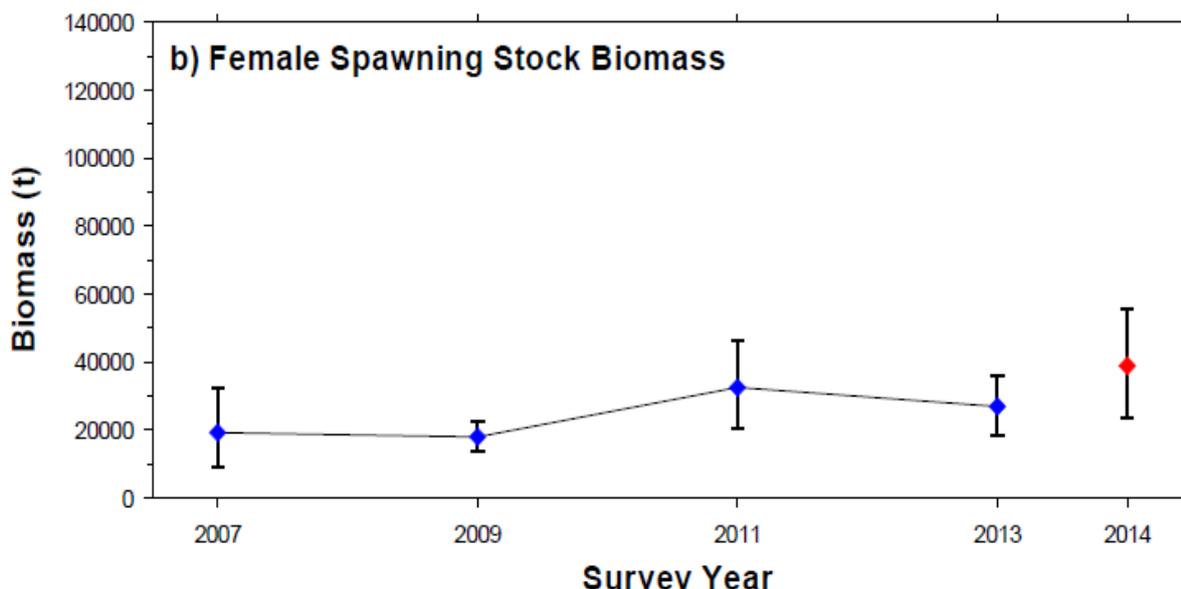
The stock is estimated to be in the healthy zone for 2014/5 but because of fluctuations in annual biomass estimates there has been considerable variation in status as depicted on the PA diagram (Figure 30).



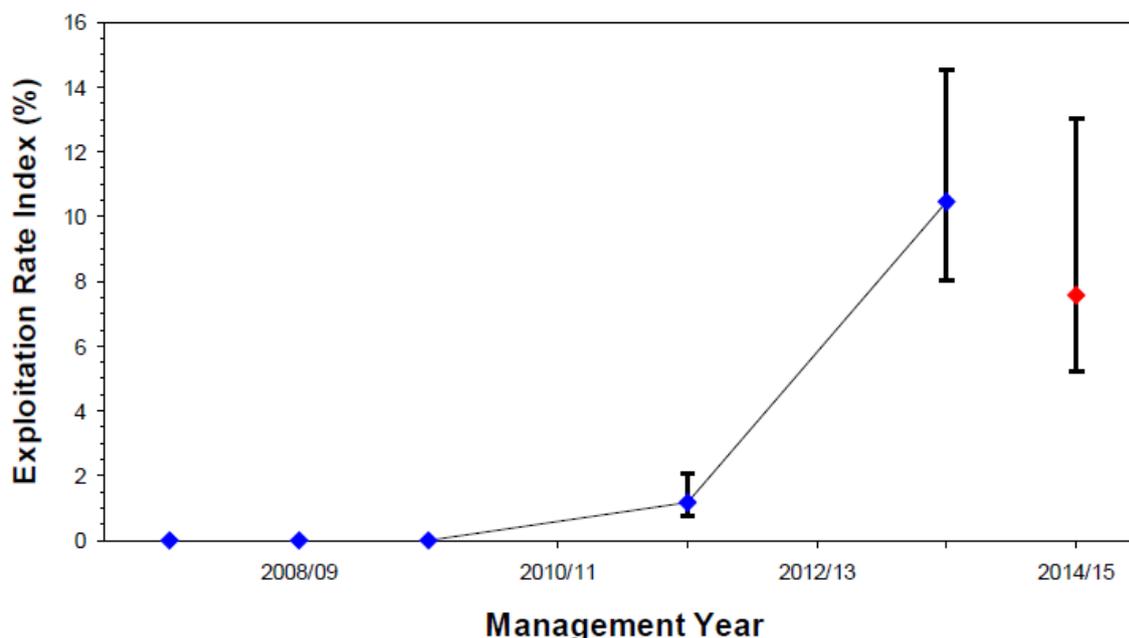
**Figure 30:** Striped shrimp, EAZ - potential exploitation rate index, based on TACs. Source: DFO (2015a). Error bars are 95% confidence intervals.

For the WAZ (SFA 3), the new survey initiated in 2014 using the same vessel and gear as for the EAZ should bring consistency to assessments in the two areas. However, due to the changes in survey protocol a DFO PA framework is not in place as in other areas; this requires a survey time series of at least 5 years. In the interim, the assessment is based on maintaining relatively low exploitation rate indices. Reference points based on the earlier time series (DFO 2013) are available to guide management.

SSB remained more or less constant over the earlier time series (2007-2013) (Figure 31). Realised exploitation rate index was low until 2013/4 when it increased to 11%; for 2014/5 this was about 8% (Figure 32).



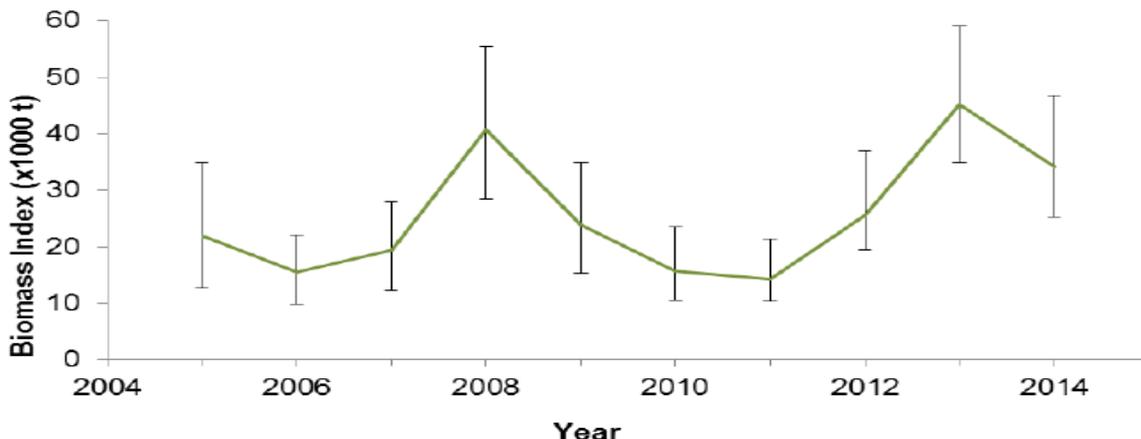
**Figure 31:** Striped shrimp, WAZ - female SSB indices.  
 Source: DFO (2015a). Included are four years of DFO/Cosmos surveys (blue diamonds), and the 2014 NSRF-DFO/Campelen survey (red diamond) which represents the start of a new time series. Error bars are 95% confidence ranges.



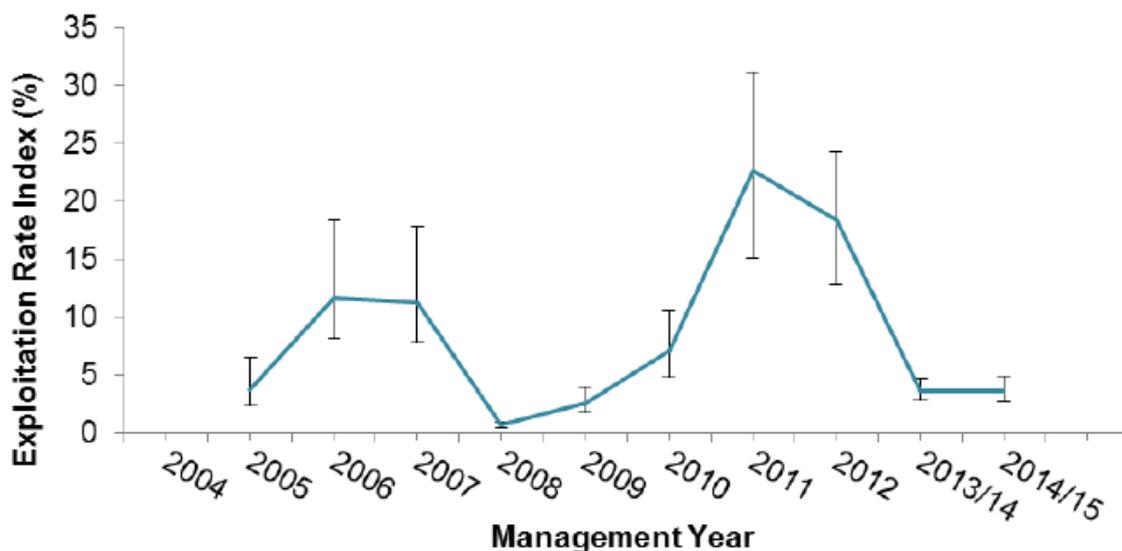
**Figure 32:** Striped shrimp, WAZ - realised exploitation rate index (based on catches).  
 Source: DFO (2015a). The DFO/Cosmos survey (blue diamonds) is not directly comparable with the 2014 survey (red diamond) conducted by the NSRF-DFO/Campelen. 2014 represents the start of a new time series. Error bars represent 95% confidence range.

For SFA 4 (DFO 2015b) striped shrimp biomass estimates have been highly variable from year to year (Figure 33), mainly because the fishery operates in a boundary zone between areas, where distribution of shrimp concentrations can change quickly. Striped shrimp is primarily taken as bycatch in the northern shrimp fishery in this SFA. The assessment is based on maintaining exploitation rate Indices at less than 20%. The realised Exploitation Rate Index

for 2014/5 based on the catch (to January 2015) was 3.5% (Figure 34), and would have been 11.8% had the TAC been taken.



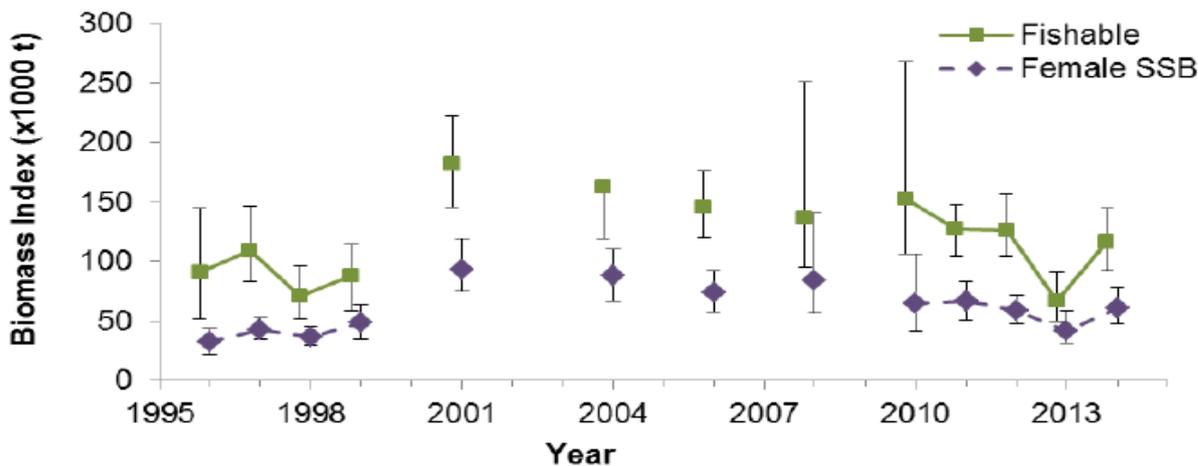
**Figure 33:** Striped shrimp, SFA 4 – fishable biomass.  
Source: DFO (2015b). Error bars are 95% confidence intervals.



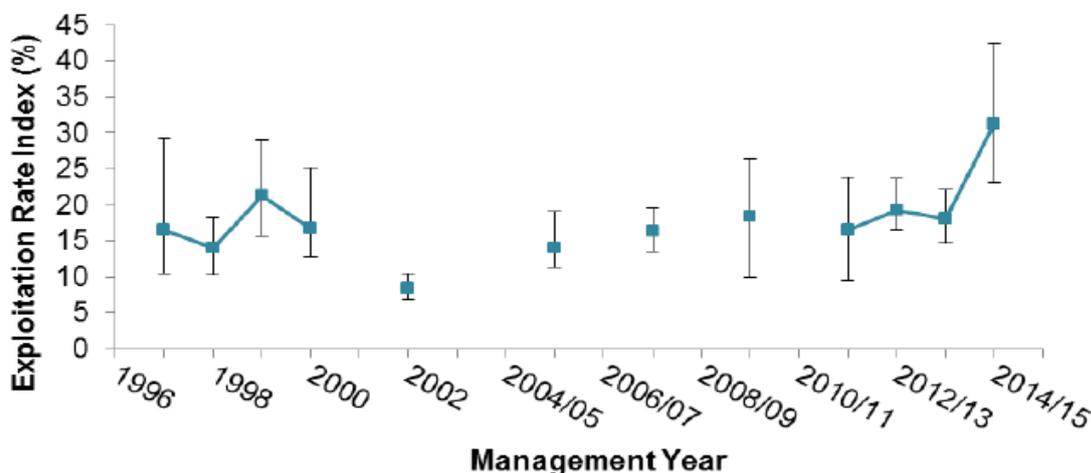
**Figure 34:** Striped shrimp, SFA 4 – realised exploitation rate index based on catch divided by fishable biomass estimate in current year.  
Source: DFO (2015b). Error bars are 95% confidence intervals.

### 3.11.4 UoC 4 - northern shrimp, SFA 5

Northern shrimp survey biomass in SFA 5 increased from the late 1990s to the early 2000s with a subsequent decline to the most recent year (2014) (Figure 35) (DFO 2015b). The Exploitation Rate Index has varied around 18% over the available time series (1996 - present), except for 2014/15 where the value of 25% is based on what appears to be an anomalously low SSB estimate for 2013/4 (Figure 36).



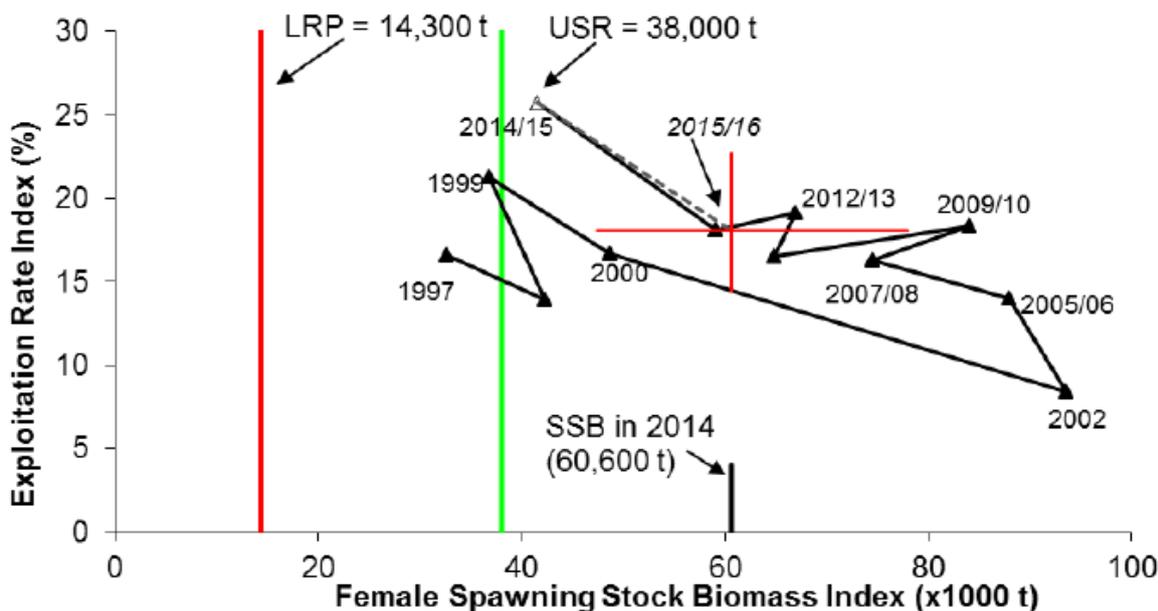
**Figure 35:** Northern shrimp, SFA 5 – biomass indices.  
Source: DFO (2015b). Fishable biomass index (green solid line) and female SSB index (purple dashed line). Error bars indicate 95% confidence intervals.



**Figure 36:** Northern shrimp, SFA 5 - exploitation rate index, based on total catch in current year/fishable biomass index from previous year, expressed as a percentage.  
Source: DFO (2015b). The exploitation rate index in 2014/15 assumes the 20,970 t TAC will be taken. Error bars indicate 95% confidence intervals.

For 2015/16 the SFA 5 northern shrimp stock is in the healthy zone, with a SSB of 60,600 t and a potential exploitation rate index (based on the TAC) of 18.1% (Figure 37).

With warming environmental conditions since the mid-1990s, thermal habitat for the shrimp resource has been reduced and spring plankton blooms have been occurring earlier in the year. Both factors would be expected to negatively affect shrimp recruitment, and accordingly fishable biomass may continue declining in the short term (DFO 2014b). Predation on shrimp may also affect recruitment prospects. Estimates of shrimp predation by groundfish peaked in 2011 and have since declined to around twice the level of the mid-2000s, due to an increase in alternate preferred prey (principally capelin). Future trends in predation will depend on trajectory of predator biomass and of biomass of alternate prey (DFO 2015b).

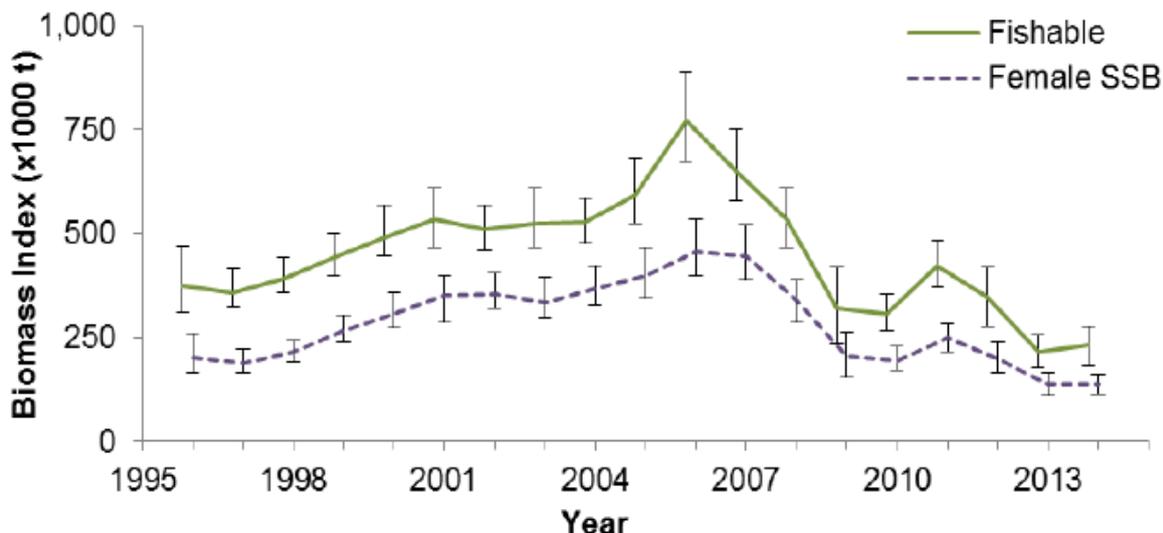


**Figure 37:** Northern shrimp, SFA 5 - PA framework with trajectory of exploitation rate index versus female SSB index.

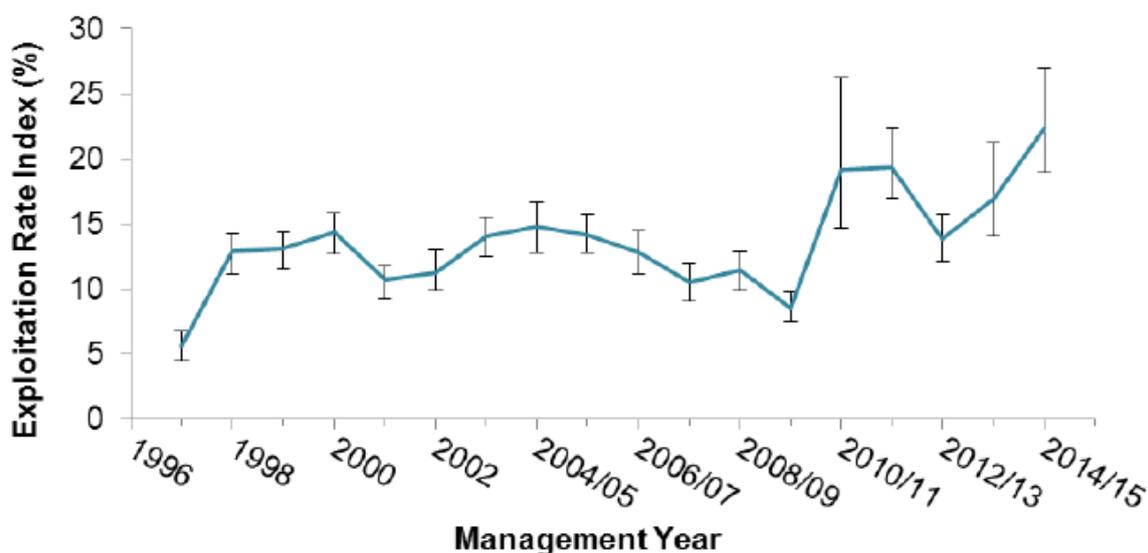
Source: DFO (2015b). The 2014/15 point is based on reported catch as of January 30, 2015. The red cross on the 2015/16 point indicates 95% confidence intervals for the 2014 female SSB index (horizontal) and the 2014/15 exploitation rate index (vertical), assuming that the 20,970 t TAC is maintained and taken in the 2015/16 fishery.

### 3.11.5 UoC 5 - northern shrimp, SFA 6

Following a sustained increase from the mid-1990s, fishable stock biomass and SSB of northern shrimp in SFA 6 have declined from their maximum in 2006, and in 2013 and 2014 were at or near their lowest levels in the time series (Figure 38) (DFO 2015b). The Exploitation Rate Index was below 15% from the beginning of the time series (1996) to 2009/10, but increased to above 15% from 2010/11 and was at the highest value in the time series in the most recent year, 22.3% (Figure 39).



**Figure 38:** Northern shrimp, SFA 6 – biomass indices.  
Source: DFO (2015b). Fishable biomass index (green solid line), female SSB index (purple dashed line). Error bars indicate 95% confidence intervals.

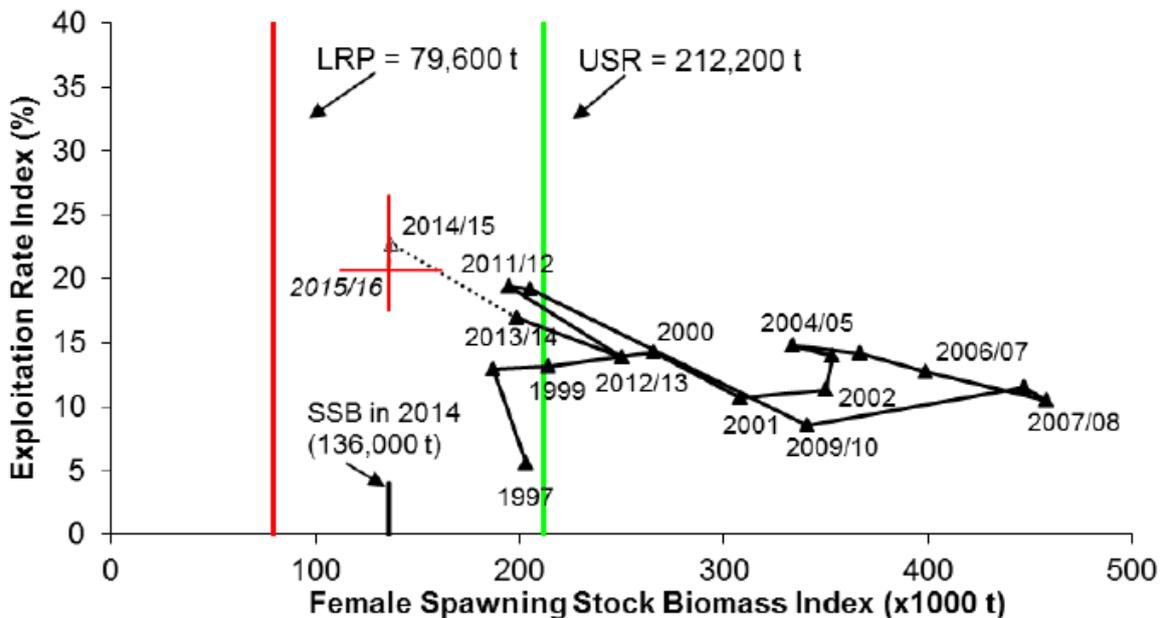


**Figure 39:** Northern shrimp, SFA 6 - exploitation rate index, based on total catch in current year/fishable biomass index from previous year.  
Source: DFO (2015b). The 2014/15 point assumes that the 48,196 t TAC will be taken. Error bars indicate 95% confidence intervals.

Currently, the stock is at the mid-point of the cautious zone in the precautionary approach framework, with a 2014 SSB of 136,000 t (Figure 40).

With warming environmental conditions since the mid-1990s, thermal habitat for the shrimp resource has been reduced and spring plankton blooms have been occurring earlier in the year. Both factors would be expected to negatively affect shrimp recruitment, and accordingly fishable biomass may continue declining in the short term (DFO 2014b). Predation on shrimp may also affect recruitment prospects. Estimates of shrimp predation by groundfish peaked in 2011 and have since declined to around twice the level of the mid-2000s, due to an increase

in alternate preferred prey (principally capelin). Future trends in predation will depend on trajectory of predator biomass and of biomass of alternate prey (DFO 2015b).



**Figure 40:** Northern shrimp, SFA 6 - trajectory of exploitation rate index versus female SSB index.

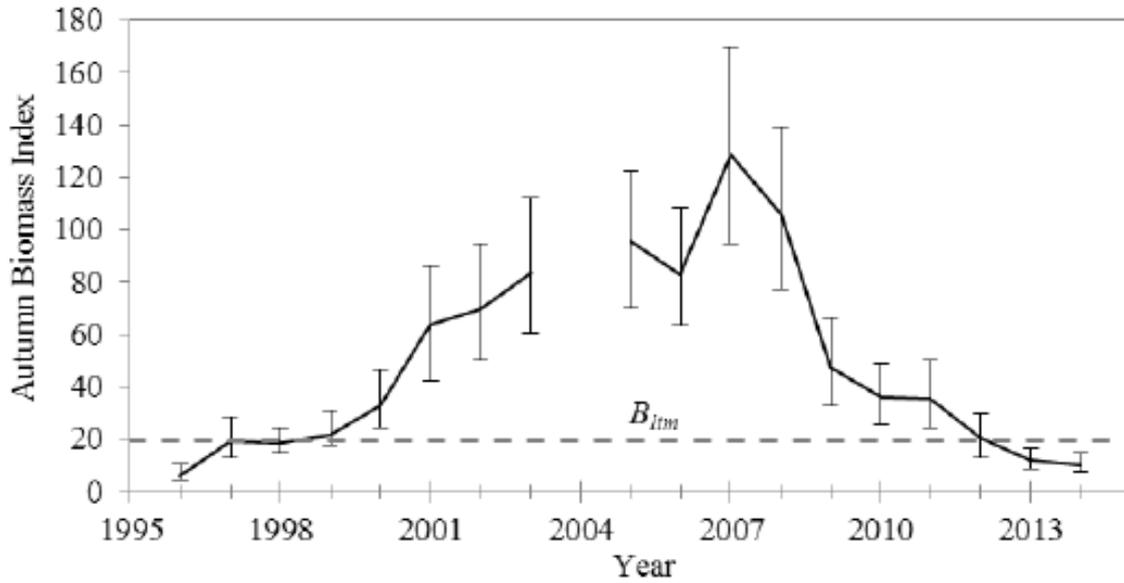
Source: DFO (2015b). The 2014/15 point is based on the TAC since catches for the year were not complete. The red cross on the 2015/16 point indicates 95% confidence intervals for the 2014 female SSB index (horizontal) and the 2015/16 exploitation rate index (vertical), assuming that the 48,196 t TAC is maintained and taken in the 2015/16 fishery.

### 3.11.6 UoC 6 - northern shrimp, SFA 7

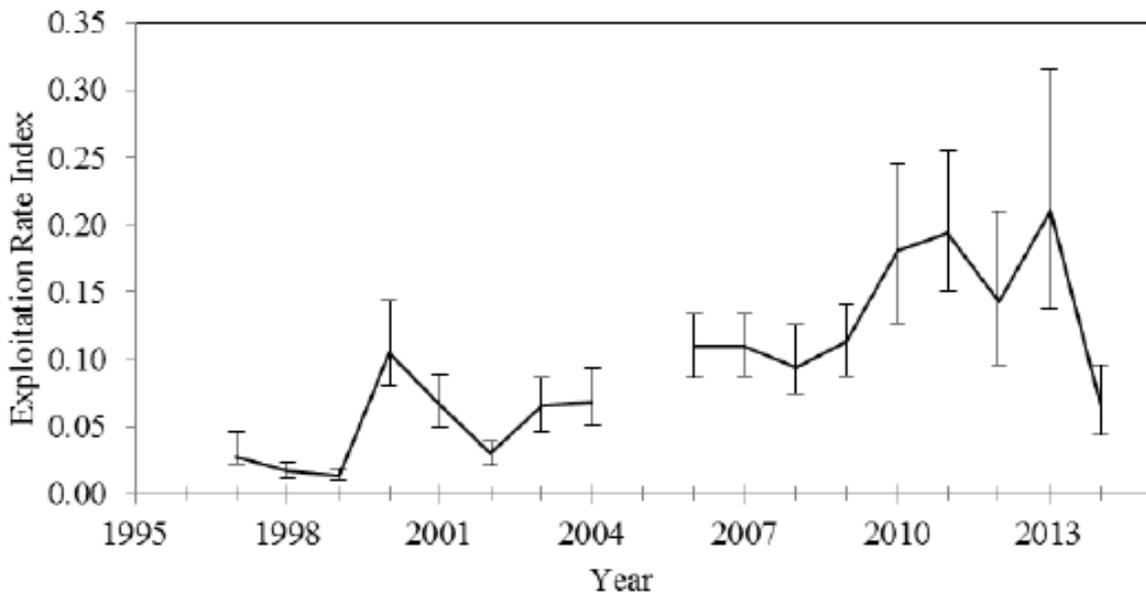
Following a sustained increase from the late 1990s, SSB for northern shrimp in SFA 7 as measured by the fall DFO survey has declined from its peak of 120,000 t in 2007, and in 2014 (the most recent value) was near the lowest level in the time series (Figure 41) (NAFO 2015a). The Canadian spring survey and Spanish survey biomass trends are similar to those of the Canadian fall survey. Based on the most recent survey, there was a >95% probability that female SSB was below the NAFO precautionary LRP of 19,300 t. Recruitment prospects are unfavourable as the recruitment index (biomass of individuals 11.5-17 mm carapace length) has been declining since 2008 and is now among the lowest observed (NAFO 2015a).

The Exploitation Rate Index based on catch and fishable biomass estimates from surveys increased from the mid-2000s to 2013, declined sharply in 2014 and is expected to be zero in 2015 (Figure 42).

Given the high probability that biomass was below the LRP, the NAFO SC recommended no directed fishery on this stock. At its fall 2014 meeting, the NAFO Fisheries Commission (FC) decided against a directed fishery in 2015, and this decision was carried over for the 2016 fishery.



**Figure 41:** Northern shrimp, SFA 7 - autumn survey female SSB and  $B_{LIM}$  as defined by NAFO.  
 Source: NAFO (2015a). Bars indicate 95% confidence limits.



**Figure 42:** Northern shrimp, SFA 7 - exploitation rate index (year's catch divided by previous year's autumn fishable biomass index).  
 Source: NAFO (2015a). Bars are 95% confidence limits.

### 3.12 Fluctuations in stock status in relation to environmental conditions

The relatively recent (approximately 1990-2005) increase in abundance and distribution of fishable concentrations of northern shrimp over large parts of the Northwest Atlantic coincided with changes in the marine environment, including cooling of ocean temperatures and substantial declines in populations of some groundfish species. Changes in the ocean environment and release of predation pressure are considered potential factors to explain the increases in northern shrimp abundance, but the relative importance of these factors and others is not well understood (Lilly 2006; Lilly *et al.* 2000; Parsons & Colbourne 2006; Worm & Myers 2003). Different factors may have predominated at different times during the longer-term (1980's to present) increase in shrimp biomass (Lilly 2006). Off Alaska, pandalid shrimp, including *P. borealis*, declined rapidly and to low levels in the late 1970s and early 1980s apparently in response to a regime shift in the ocean climate and coincident with changes in abundance of many species in their ecosystem (Anderson 2000).

More recently, northern shrimp abundance has decreased markedly in some areas, particularly in the more southerly parts of the distribution off Newfoundland and Labrador. On the Flemish Cap (outside but adjacent to the fishery area), a moratorium on shrimp fishing has been in effect since 2011 following a decline from peak abundance in 2003, and in SFA 7 the NAFO FC determined that there should be no fishery in 2015 following a decline in abundance. Abundance has declined in SFAs 5 and 6 as well (DFO 2014b, 2015b).

The system may be returning to the groundfish-dominated ecosystem observed in the 1980s, as temperatures in the fishery area have been increasing from the low levels of the 1990s and there have been increases in groundfish and capelin abundance, relative to very low levels observed in the 1990s and early 2000s (DFO 2014b). Earlier timing of the spring phytoplankton bloom associated with warming temperatures may also impact shrimp recruitment and production (DFO 2014b). The future trajectory of shrimp populations cannot be predicted in detail but environmental conditions evidently have a major impact on productivity of this resource, not surprisingly given its short life cycle and position in the ecosystem.

### 3.13 Management advice and harvest control rules

#### 3.13.1 UoC 1 - northern shrimp, SFA 1

Management advice for northern shrimp SFA 1 is provided by the NAFO SC (NAFO 2015b), based on annual stock status assessments by the NAFO-ICES *Pandalus* Assessment Group (NIPAG) (NAFO 2015a). A provisional assessment is provided by scientists based at the Greenland Institute of Natural Resources, while information supporting the assessment is provided by scientists from countries exploiting the stock (Canada, Greenland). The most recent assessment was in September 2015.

NAFO (2015b) provides a table of the risk of transgressing reference levels, based on a range of TAC options and of assumptions about the level of cod predation on shrimp (see Table 2 above). Based on this analysis, NAFO (2015b) advises on a TAC level which would ensure that risk of exceeding  $Z_{MSY}$  is maintained below 35%. Thus, for example, based on the table of risks (above Table 2), NAFO advised a TAC of 60,000 t for 2015, the year following the 2014 assessment (NAFO 2014b).

DFO (2016b) provided a set of harvest control rules to be used in setting Canadian TACs for this UoC, as follows:

The Canadian quota will be 17% of 5/6 of the TAC designated by Canada (DFO 2016b), or 14.2% of the entire designated TAC.

- When the biomass is above 80% of  $B_{MSY}$ , the risk of being above  $Z_{MSY}$  should be less than 35%, based on the 3-year projections.
- When the biomass is between 30-80% of  $B_{MSY}$ , the risk of being above  $Z_{MSY}$  based on the 3-year projections should not exceed 17-35%, with the risk tolerance being lower the closer the biomass is to  $B_{LIM}$ , with 17% at the lower end and 35% of the upper end of this range
- If the biomass is below the Healthy Zone and approaching  $B_{LIM}$  (middle of the cautious zone) then a special meeting will be sought with Greenland to develop actions that endeavour to mitigate or reverse the decline (e.g. a rebuilding plan). In the absence of agreement on measures to be taken, special conservation measures may be taken unilaterally by Canada.

DFO (2016b) also notes that in case of a biomass decline of more than 25% in the cautious zone, analysis will be undertaken to determine whether special conservation measures and/or consultations with Greenland are required, and that the HCRs may be further modified as guidance on application of the precautionary approach in Canadian fisheries is developed.

### 3.13.2 UoCs 2-5 - management advice, general

Management advice for these SFAs is based on results of stock assessments, which monitor survey biomass relative to reference points, and exploitation indices based on the ratio of catch to survey biomass. Biennial assessments for northern and striped shrimp (supplemented with a status update in intervening years) are done under the DFO Regional Advisory Process (RAP). The most recent full assessment for the EAZ and WAZ was conducted in February 2015 (DFO 2015a), while a full assessment was done for SFA 4-6 in 2014, with an update in 2015 (DFO 2015b).

TACs are set by DFO early in the calendar year, based on the decision rules outlined below, with input from stakeholders via the Northern Shrimp Advisory Committee (NSAC). In addition to the decision rules, the NSAC and managers consider other biological information from the stock assessments such as abundance of pre-recruits and environmental conditions such as predator abundance and temperature trends.

### 3.13.3 UoCs 2-6 - harvest control rules, general

A series of harvest control rules (HCRs) has been developed for stocks under DFO management for which a precautionary approach (PA) framework including a LRP and an USR is available. These are summarised in the IFMP (DFO 2010a) and have been supplemented by subsequent decisions (e.g. DFO 2015c). The HCRs operate as follows.

#### **When SSB is above the upper stock reference point (USR):**

- Measures should generally promote the SSB remaining above the USR.
- The base target exploitation rate will be 15% of exploitable biomass. This rate can increase gradually, particularly as an artefact of a stable TAC strategy applied during a time of declining SSB while in this zone, subject to monitoring/signals that excessive fishing mortality is being exerted on the stock.
- The exploitation rate should not exceed  $F_{MSY}$ , a level that is yet to be calculated, but is thought to be well above the base target exploitation rate

- DFO (2015c) indicates that exploitation rate should not exceed 20% of harvestable biomass when the stock is in the healthy zone, pending further work to determine  $F_{MSY}$  or a proxy.
- Changes in the TAC should generally not exceed 15% of the previous TAC, unless the stock is declining precipitously.
- Government should not facilitate any increase in industry capacity/infrastructure during any period of stability or decline in SSB.

**When SSB is between the limit reference point (LRP) and the upper stock reference point (USR) (i.e. in the Intermediate/Cautious Zone):**

- Measures should generally promote the SSB rebuilding towards the USR, subject to natural fluctuations that may be expected to occur in biomass and survey results.
- The TAC should not be increased if the SSB is projected to decline.
- Changes in the TAC should generally not exceed 15% of the previous TAC, unless the stock is declining precipitously.
- Specific guidance is provided on exploitation rates when the stock is in the upper ( $2/3 F_{MSY}$ ), middle ( $1/2 F_{MSY}$ ) or lower (15%) portion of the Cautious Zone

**When SSB is Below the Limit Reference Point (LRP):**

- Measures must explicitly promote an increase in the biomass above the LRP within 6 years of falling below the LRP.
- Any fishing mortality must be in the context of a rebuilding plan, and should not exceed 10%.

### **3.13.4 UoC 2 - northern shrimp in the EAZ, WAZ and SFA 4**

For the EAZ, for which a precautionary approach framework is available, the above set of HCRs is in effect (DFO 2010a).

For the WAZ and for SFA 4, a PA framework is not available because of the lack of consistent survey results in the past, and management is based on maintaining a relatively low exploitation rate index.

### **3.13.5 UoC 3 - striped shrimp in the EAZ, WAZ and SFA 4**

For the EAZ, a PA framework is in place based on the survey time series (see above, Section 3.10.3 – Reference Points). Annual TACs are based on maintaining the exploitation rate index relatively low (ca. 10%) and realised exploitation rate indices have generally been near or below 10% over the time series. Higher indices have occurred in some years (e.g. 2013-4) but these have been primarily due to apparently anomalously low survey biomass estimates. Annual biomass estimates have been highly variable in this area.

For the WAZ, a PA framework is not in place because of lack of comparability of biomass surveys over the time series. Management has been based on maintaining exploitation rate relatively low in this area (10% or less).

For SFA 4, since a PA framework is not in place, management is based on maintaining exploitation rate index relatively low, with a value of 20% as a reference level. Exploitation rate indices have been below this throughout the available time series (see above, Section 3.11.3 – Stock Status).

### **3.13.6 UoC 4 - northern shrimp, SFA 5**

Development of management advice, based on HCRs, is as above under the EAZ, WAZ and SFAs 4-6.

### **3.13.7 UoC 5 - northern, shrimp SFA 6**

Development of management advice, based on HCRs, is as above under the EAZ, WAZ and SFAs 4-6.

### **3.13.8 UoC 6 - northern shrimp, SFA 7**

Management advice is provided by the NAFO SC (NAFO 2015b), based on annual assessments of stock status by the NIPAG (NAFO 2015a). The provisional assessment is provided by scientists based in DFO's Newfoundland and Labrador Region, while information to support the assessment is provided by countries exploiting the fishery. The most recent assessment was in September 2015.

DFO has developed a PA framework and decision rules for this stock, as described above for the EAZ, WAZ and SFAs 4-7. This framework is essentially advisory since NAFO has primary responsibility for stock management.

As noted in the most recent annual assessment (NAFO 2015b) there are no explicit management objectives set out by NAFO's FC, and the stock is managed consistent with NAFO's general objectives. An earlier NAFO SC advisory document (NAFO 2012) noted that maintaining exploitation rates around or below 14% was an implicit objective.

Consistent with NAFO's implementation of the PA, the fishery was closed for 2015 and 2016 because the stock was below the identified LRP.

## Principle Two: Ecosystem background

Principle 2 of the Marine Stewardship Council standard states: “*Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent ecologically related species) on which the fishery depends.*”

The following section of the report highlights some of the key characteristics of the CNSSF under assessment and its wider impact on the ecosystem.

### 3.14 Ecosystem overview

Northern shrimp occur over very large areas of Northwest Atlantic continental shelves, from Greenland through Davis Strait, Hudson Strait, the Labrador and Newfoundland shelves, the Gulf of St. Lawrence, the Scotian Shelf and the Gulf of Maine. Ocean currents in this area are generally from north to south and could act to foster dispersal of shrimp over large continental shelf areas, particularly at the larval stage (Figure 43).



**Figure 43:** Currents in the fishery areas.  
Source: DFO

Northern shrimp are generally found in commercial concentrations at depths of 200-500 m and temperatures of 1-6°C (Bergstrom 2000; Kingsley 2011; DFO 2015a).

Striped shrimp are distributed over much the same area as northern shrimp, but are generally concentrated in more northerly areas (northern Labrador shelf and northward), in shallower waters (100-400 m depth), at cooler temperatures, and on somewhat harder bottoms (Bergstrom 2000; Kingsley 2011; DFO 2015a).

Shrimp fishing gear operates in several marine communities and habitats:

- 1) The benthic, including the bottom sediments and substrates and organisms which live in direct contact with the substrate. These include infauna such as burrowing worms, and epifauna such as echinoderms (sea and brittle stars, sea cucumbers), molluscs, crustacea, and attached fauna such as coelenterates (hard and soft corals) and sponges. Hard substrates in the fishery area may support anchored epifauna such as hard corals and sponges, while soft substrates may support anchored, mobile or burrowing organisms
- 2) The demersal, organisms which live in the water near bottom and depend on the benthic community for much of their food or habitat. Key members of this community are the demersal fishes, both the commercially important (cod, flatfishes and others) and non-commercial (eelpouts, alligator fishes).
- 3) The benthopelagic, organisms living somewhat further off bottom than those in the demersal community; shrimp and redfishes are members of this community.

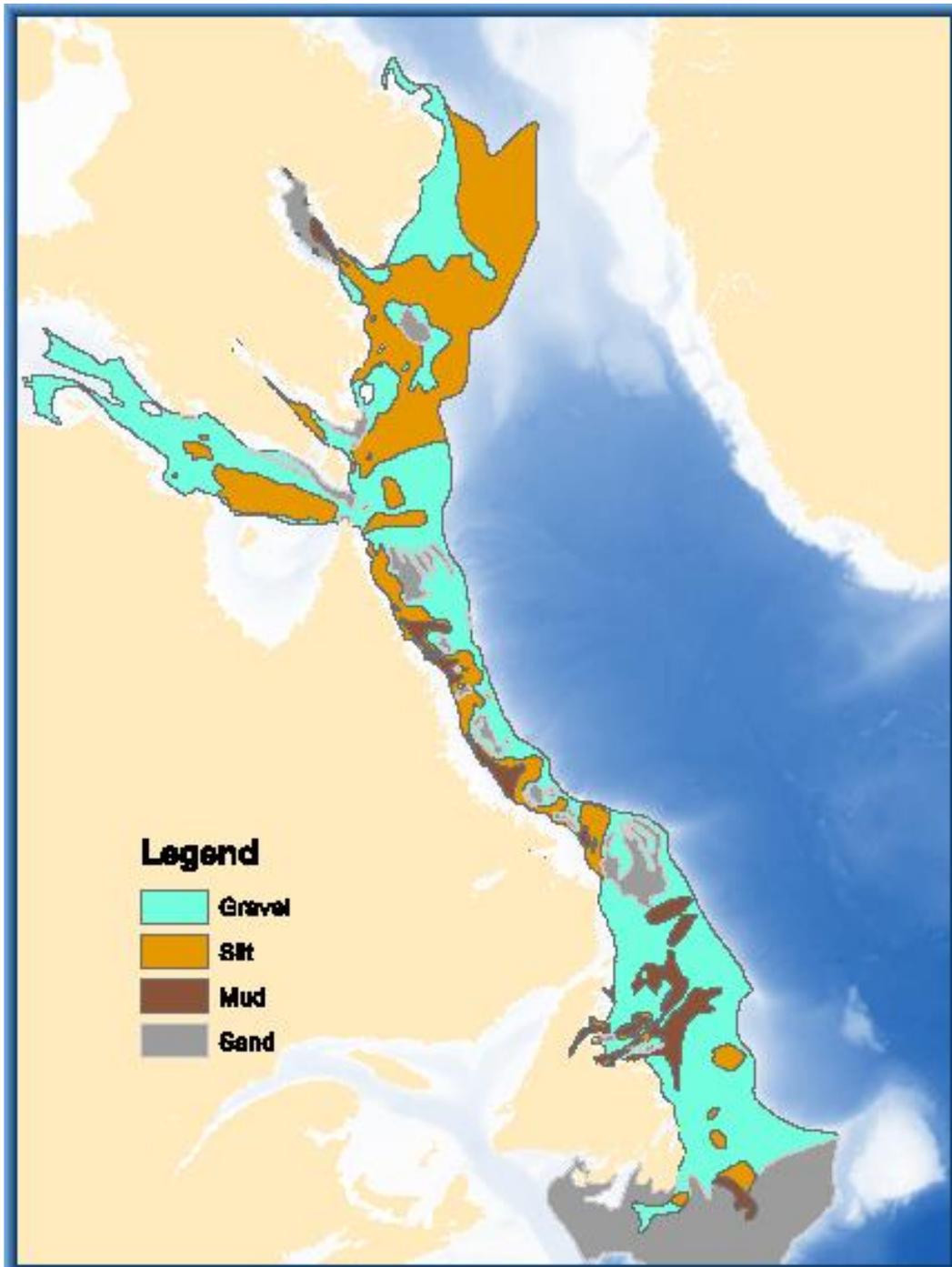
### 3.15 Habitats supporting northern and striped shrimp

Benthic community and ecosystem structure varies with sediment type and depth (and temperature, which is related to depth) in the fishery area, as in other marine areas. Over their broad latitudinal range, northern shrimp concentrate in preferred habitat areas where the bottom is soft and muddy, with a high organic content (although they can be taken on hard bottom areas), mainly at depths 200-500 m (Orr *et al.* 2003; Kingsley 2011; DFO 2015a). Striped shrimp tend to occur at somewhat shallower depths (100-400 m) and on harder bottoms, although there is overlap between the distributions of the two species.

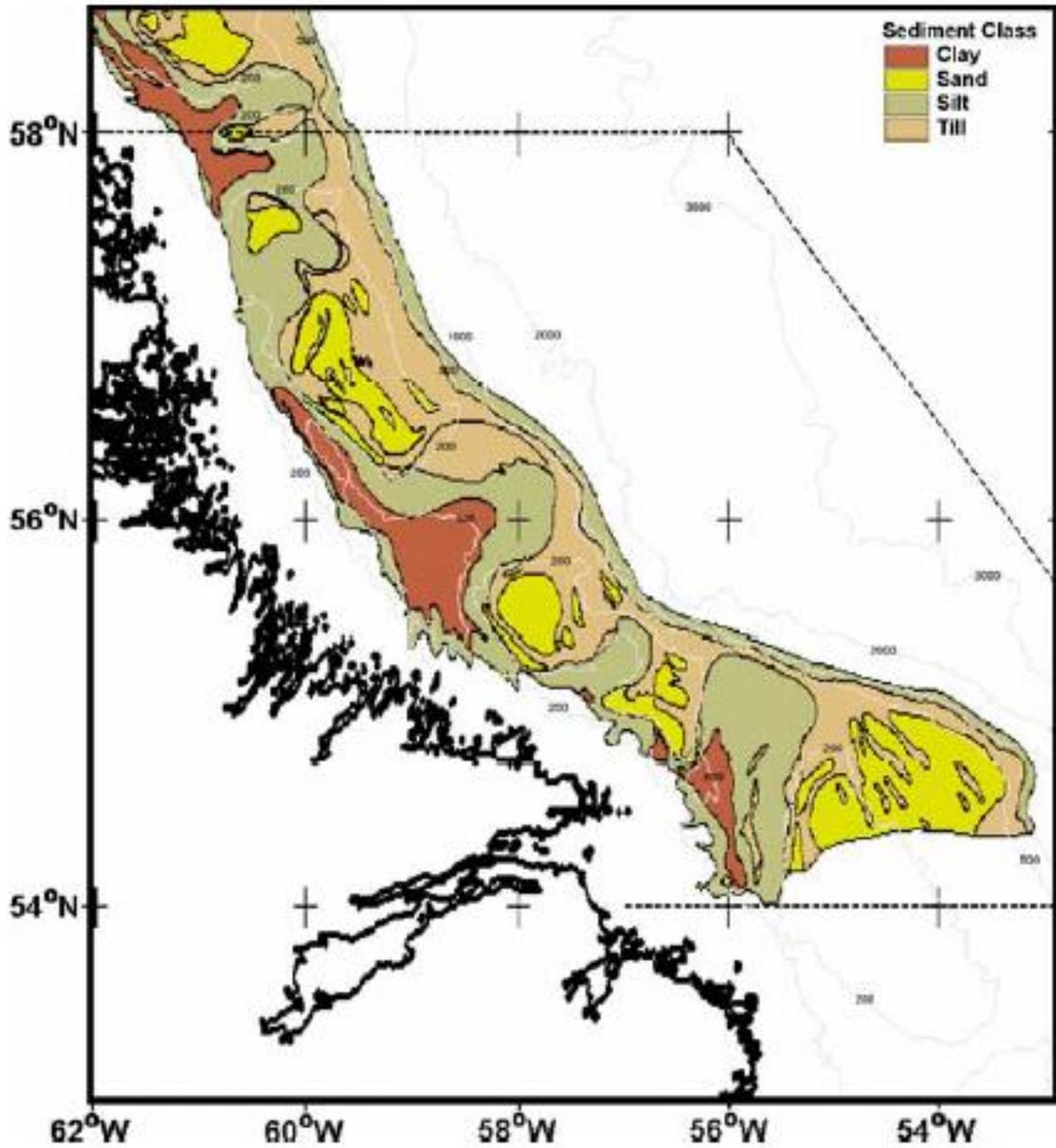
Sediment types have been mapped over the fishery area. CAPP (2015) provides a map of sediment types for the fishery area (Figure 44), while recently-completed reviews of continental shelf and slope geology to support hydrocarbon exploration provide detailed information on distribution of surface sediments for much of the Newfoundland-Labrador shelf (CNLOPB 2008, 2014) (Figure 45, Figure 46).

Channels and basin areas at the edge of the continental shelf are preferred areas for commercial northern shrimp concentrations along the Newfoundland-Labrador shelf. The distribution of sensitive bottom habitat areas, in particular sponge and coral areas, is becoming increasingly well known in the fishery area. Coldwater corals have been classified into five functional groups based on taxonomy, growth form and size, and all these groups have been taken as bycatch in the shrimp fishery, indicating at least some degree of overlap (Edinger *et al.* 2007). A comprehensive review of known distribution of sponge and coral areas has been conducted through the CSAS process (DFO 2010b; Kenchington *et al.* 2010) and this has formed the basis of assessments of this fishery's impact on sensitive habitats (CAPP 2015). Information on distribution has primarily come from bycatch on observed trips in commercial fisheries, including the shrimp fishery (DFO 2010b), so is probably incomplete since this is not the ideal sampling gear. A second such comprehensive review through CSAS is planned for winter 2016, incorporating information obtained since the first review.

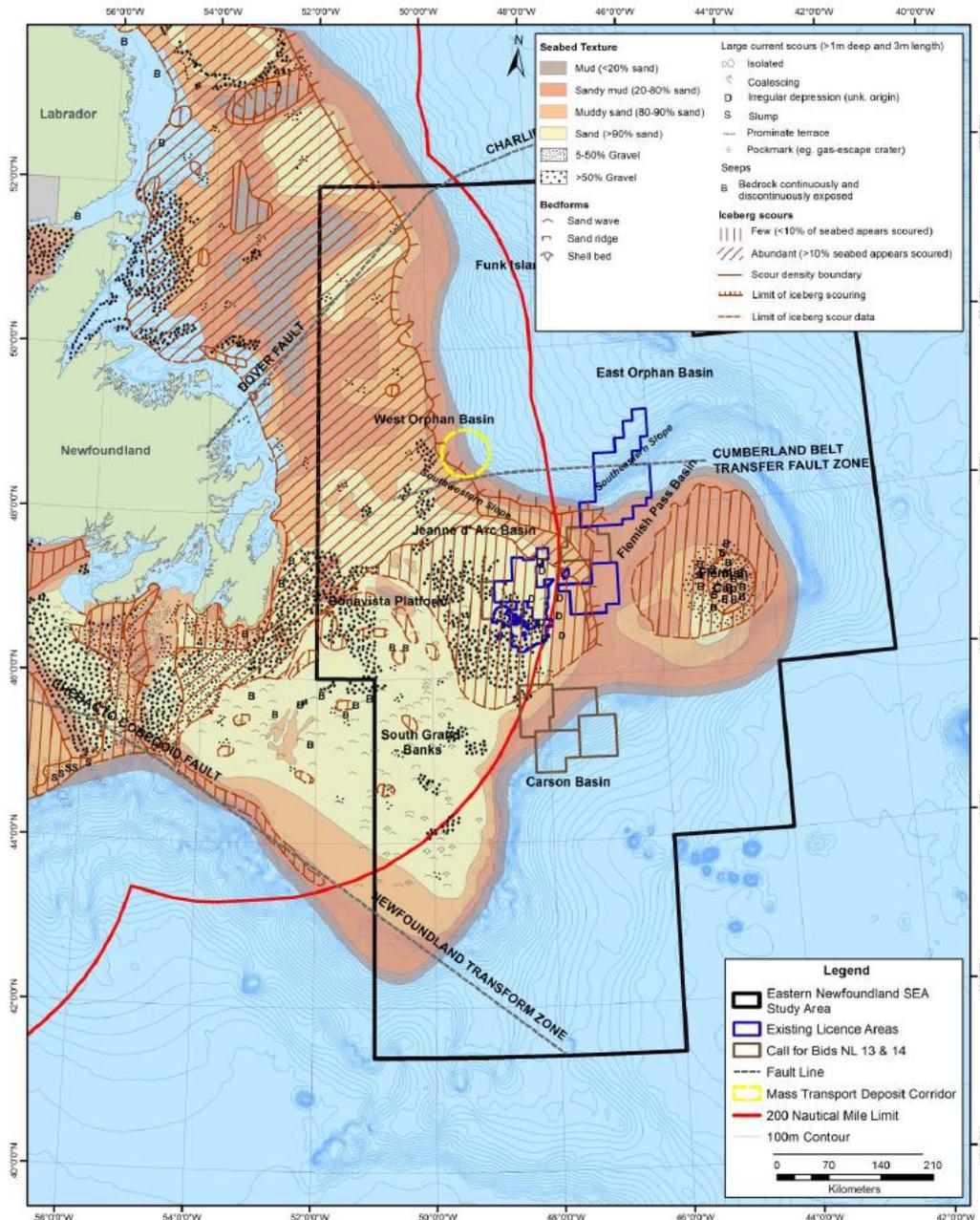
In general, there appears to be little overlap between the shrimp fishery and sensitive sponge and coral areas, as these are typically found at greater depths than commercial concentrations of shrimp (CAPP 2015). Limited areas of overlap with sensitive habitats occur; the overall impact is analysed for each UoC in the scoring table, under PIs 2.4.1, 2.4.2 and 2.4.3.



**Figure 44:** Bottom sediments over the fishery area.  
Source: CAPP (2015, citing Fader 1991).



**Figure 45:** Bottom sediments on the Labrador shelf.  
Source: CNLOPB (2008).



**Figure 46:** Bottom sediments on the Newfoundland shelf.  
 Source: CNLOPB (2014)

### 3.16 Benthic communities and ecosystems associated with shrimp

The general composition and structure of benthic communities and ecosystems in the shrimp fishery has been summarised in impact assessments for hydrocarbon exploration (CNLOPB 2008, 2014) and in a mass balance model of trophic relationships in the southern part of the fishery area (southern Labrador and northeast Newfoundland shelf, Bundy et al 2000). These summaries are based on relatively limited studies of benthic communities (e.g., Gagnon & Haedrich 1991; Gilkinson et al 2006; Ramey & Snelgrove 2003 for the area south of Newfoundland; Schneider et al 1987; Stewart et al 1985 for Davis Strait/Ungava Bay) but provide a general picture of major species in the benthic communities, such that impacts of the fishery can be inferred.

Bundy et al (2000) identify four principal groups of benthic invertebrates: echinoderms, molluscs, polychaetes and an 'other' group including crustaceans (amphipods and others), nematodes and other less abundant groups. Echinoderms include brittle stars and sand dollars, characteristic of sandier bottom types, and sea cucumbers, characteristic of mud bottoms; the most abundant molluscs are bivalves, found both on mud and sand bottoms; tube-dwelling and mobile polychaetes are common.

### 3.17 Role of northern shrimp in ecosystems

Like other pandalid shrimp, northern and striped shrimp are opportunistic predators which feed both near bottom and in the water column during vertical migrations at night (Bergstrom 2000). Studies of trophic relationships have focused on northern shrimp, the more common of the two species, but given their similar size, morphology and distribution, striped shrimp are expected to be similar to northern shrimp in their ecosystem role.

Northern shrimp is an important component of the food web where it occurs, linking the small organisms that it eats, including the zooplankton and benthos that form the base of the food web, and the top predators that eat it, like cod and other commercially important finfish. Studies have identified 26 species which prey on northern shrimp (Parsons 2005a, b).

Principal predators include Atlantic cod (*Gadus morhua*), Greenland and Atlantic halibut (*Reinhardtius hippoglossoides* and *Hippoglossus hippoglossus*), redfishes (*Sebastes spp.*), wolffishes (*Anarhichas spp.*), skates (Rajidae) and harp seals (*Pagophilus groenlandicus*). In the Northern Gulf of St. Lawrence northern shrimp feed on (in decreasing order of importance) detritus, large zooplankton (principally euphausiids, chaetognaths, hyperiid amphipods), small zooplankton (principally copepods), and phytoplankton (Savenkoff et al 2006) and one would expect a similar prey composition across the CNSSF area.

### 3.18 Non-shrimp catches

Catches of all species in the CNSSF are well estimated. Observers identify species to the lowest taxonomic level possible, observer coverage is good, and catch data (used to estimate the non-target : target species catch ratio) is excellent. For the offshore fishery, observers are carried on 100% of trips, meaning that some 70% of tows are observed. For the inshore fishery (SFAs 4-7), target observer coverage is 10%; actual coverage varied from 4.5% of fishing days to over 10% in the four years 2011/12-2014/5 (Table 6).

**Table 6:** Observer coverage of the inshore fleet, 2011/12-2014/5.  
Source: DFO

SFA	2011/12			2012/13			2013/14			2014/15		
	Fished	Observed		Fished	Observed		Fished	Observed		Fished	Observed	
	Days	Days	%	Days	Days	%	Days	Days	%	Days	Days	%
4	-	-	-	-	-	-	-	-	-	20	6	30.0
5	147	0	0.0	173	14	8.1	124	13	10.5	85	0	0.0
6	5071	254	5.0	5631	358	6.4	6233	282	4.5	4452	238	5.4
7	1447	77	5.3	1340	62	4.6	736	47	6.4	379	24	6.3

Detailed analyses of bycatch amount and composition were published by Orr et al (2008) for SFAs 4-7 in years 2004-5 to 2007-8 and by Siferd (2010) for SFAs 0-3 for years 1979-2009. Updated estimates of bycatch from seven offshore vessels in the three years 2012/3 to 2014/5 were provided by the Client (Table 7, below).

**Table 7:** Summary of bycatch information from 7 offshore vessels, 2012/13 - 2014/15 combined.  
Source: CAPP/Javitech (2016). (Note: proportions of northern and striped shrimp in SFA 1 (Div. 0A) are inconsistent with all earlier information on bycatch and with knowledge of striped shrimp biology, which indicate that this species is uncommon in this fishery area and in the bycatch)

Species	Div. 0A (SFA 1)		Div. 0B (EAZ)		Div. 2G (SFA 4)		Div. 2H (SFA 5)		Div. 2J (SFA 5-6)		Div. 3K (SFA 6)		Div. 3L (SFA 7)	
	<i>t</i>	%	<i>T</i>	%	<i>t</i>	%	<i>t</i>	%	<i>t</i>	%	<i>t</i>	%	<i>t</i>	%
Northern shrimp	10.6	37.40	9,746.0	90.80	23,693.0	92.70	22,729.0	98.90	21,116.0	96.20	9,434.0	97.00	1,470.0	93.60
Striped shrimp	17.8	62.60	889.6	8.30	1,718.0	6.70	76.0	0.30	587.1	2.70	134.7	1.40	4.4	0.30
Arctic cod	-	-	34.6	0.32	45.4	0.18			-	-	-	-	-	-
Lanternfishes	-	-	-	-	-	-	77.4	0.34	-	-	-	-	-	-
Capelin	-	-	-	-	-	-	-	-	136.2	0.63	99.9	1.03	72.7	4.63
American plaice	0.0	0.00	1.3	0.01	2.0	0.01	3.1	0.01	7.4	0.03	4.6	0.05	1.8	0.11
Atlantic cod	0.0	0.00	0.8	0.00	2.7	0.01	0.1	0.00	9.0	0.04	10.8	0.11	0.8	0.05
Atlantic wolffish	0.0	0.00	0.1	0.00	0.5	0.00	0.6	0.00	0.4	0.00	0.0	0.00	0.0	0.00
Redfishes	0.0	0.00	19.3	0.18	41.0	0.16	25.8	0.11	21.2	0.10	8.4	0.09	4.5	0.29
Northern wolffish	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spotted wolffish	0.0	0.00	0.1	0.00	0.1	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
Total catch sampled	28.3		10,740.0		25,563.0		22,993.0		21,949.0		9,730.0		1,570.0	

Key

- = Target species
- = IPI retained catch
- = Main bycatch species
- = ETP species

A strategy designed to manage bycatch includes a number of measures, of which the most important is mandatory use of the Nordmore sorting grate by all vessels of the offshore and inshore fleets. Minimum bar spacing is 28 mm for offshore vessels in the EAZ, WAZ and SFAs 4-5, 22 mm for offshore vessels in SFAs 0, 1, 6 and 7, and 22 mm for inshore vessels in all SFAs (DFO 2010a). Toggle chains of minimum length 72 cm are required on all trawls to keep the footrope off bottom and thus avoid bottom associated species such as flatfishes and invertebrates. A 'move-on' protocol applied to all vessels requires that the vessel move 10 nm if bycatch exceeds 100kg or 2.5% of total catch (5 t or 10% of weight in the case of capelin in SFAs 5 and 6) (DFO licence conditions, see DFO 2015h). Several vessels are testing use of lights on trawls to keep small bycatch species such as capelin and lanternfishes away from the gear, as has been used successfully in the Oregon pink shrimp fishery to reduce bycatch of eulachon (Hannah & Jones 2014).

### 3.18.1 Retained species

Retention of any species other than northern and striped shrimp is prohibited in the CNSSF by condition of licence (DFO 2015h).

In the EAZ, WAZ and SFA 4 (UoCs 2 and 3) striped and northern shrimp are assessed and managed actively, and both species are certified separately as MSC target species. Bycatch of either species in tows targeting the other in these areas is accounted for in assessments. However, in UoCs 1, 4, 5 and 6, and noting that striped shrimp are practically inseparable from northern shrimp during normal fishing operations, catches of striped shrimp must be considered as Inseparable / Practically Inseparable (IPI) species, as required under section 27.4.9 of the MSC Certification Requirements v.1.3. Please refer to section 5.3 of this report for more information.

### 3.18.2 Bycatch species

Species in the bycatch of the CNSSF include both commercial and non-commercial finfish species, and mobile and sessile invertebrates. By condition of licence, no non-target species can be retained in this fishery (DFO licence conditions, DFO 2015h).

A large number of species and species groups are recorded in the bycatch (Orr et al 2008; Siferd 2010; CAPP/Javitech 2016) but none are taken in large quantities.

MSC guidance on identifying 'main' bycatch species indicates that these can be identified by weight (normally a species constituting less than 5% of total catch weight is not considered a 'main' species), value or vulnerability.

Annual estimated bycatch of all discard species combined was in almost all cases below 5% of catch weight of the target species in the detailed analyses (Orr 2008; Siferd 2010). Accordingly, weights of individual species were all well below the 5% guideline for 'main' bycatch species, in most cases an order of magnitude or more below. In the compilation of recent data (Table 6), the most abundant bycatch species in any SFA made up less than 1% of the total catch weight in the EAZ, WAZ and SFAs 4-5, 1% in SFA 6, and 4.6% in SFA 7, confirming that no bycatch species meets the "main" species criterion by weight.

In SFA 1, total bycatch of all species combined ranged from 38 to 152 t (1.8-6% of shrimp catch) between 1999 and 2007; equivalent figures for the EAZ are 77-197 t (1.0 - 3.2%) and for the WAZ 0.02-16.5 t (0.8-33%) (shrimp catches were very low in several years in which bycatch percentages were high) (Siferd 2010). A very wide range of species was recorded in the bycatch but weights of individual species were generally very small.

Based on the detailed analyses (Orr et al 2008, Siferd 2010), bycatch species which were most abundant in the catch varied between areas (Table 8), and included Arctic cod, redfishes, lanternfishes and capelin (moving from north to south). Maximum weight of any species recorded was 165 t, while maximum percentage of the shrimp catch was 2.5% (Table 8). The same species, moving from north to south, were recorded as the most abundant in the bycatch in the compilation of recent information (Table 7) (CAPP/Javitech 2016).

**Table 8:** Bycatch species of maximum weight for SFA/fleet/year cells.  
Sources: SFAs 1-3, Siferd (2010); SFAs 4-7, Orr et al (2008). Years sampled: SFAs 1-3, 2003-2007; SFAs 4-7, 2007.

UoC	SFA/Fleet	Species	Year	Bycatch (t)	Shrimp Catch (t)	Bycatch %
1	1 Offshore	Arctic cod	2004	120.7	7,179	1.7
2,3	EAZ Offshore	Redfishes	2005	148.0	5,894	2.5
	WAZ Offshore	Redfishes	2004	0.00	2.1	0.2
	4 Offshore	Redfishes	2007	70.9	10,622	0.7
4	5 Offshore	Lanternfishes	2007	97.1	21,043	0.5
5	6 Offshore	Capelin	2007	165.2	27,505	0.6
	6 Inshore	Redfishes	2007	6.0	52,599	0.0
6	7 Offshore	Capelin	2007	119.1	5,743	2.1
	7 Inshore	Capelin	2007	5.4	12,564	0.0

% = bycatch as a percentage of the shrimp catch

Since all bycatch species are well below the weight guideline, none would be considered 'main' based on weight, and since all non-target species must be discarded, none has commercial value. However, several bycatch species can be considered vulnerable and thus qualify as 'main' bycatch species.

Atlantic cod, redfishes and American plaice can be considered 'vulnerable' species, as abundance is currently at low levels compared to historical levels in parts of the northwest Atlantic where the shrimp fishery operates. Populations of these three species in the fishery area have been assessed as 'at risk' by the Committee on Status of Endangered Wildlife in Canada (COSEWIC) due to their depleted status. Fishery management measures, either catch moratoria or strict catch limits, are in place for these species in much of the area between Davis Strait and the Grand Banks. Atlantic wolffish (sometimes called 'striped wolffish'), assessed by COSEWIC and listed on SARA Schedule 1 as 'special concern', is also considered a main bycatch species because of vulnerability.

Populations of all four 'main' bycatch species identified by vulnerability collapsed or declined substantially in the late 1980s, reaching extremely low levels in the early 1990s relative to their historical abundance. In addition to low abundance, all showed increased total mortality and lowered productivity. All remain at low levels relative to historical abundance, but have recently shown some increase in abundance based on trawl surveys.

Siferd (2010) reported on bycatch in SFAs 1-3, and key points that may be drawn from the data are as follows (Table 9):

- For the species considered 'main' because of vulnerability, redfish was the most abundant in bycatch.

- In SFA 1, for the period 2003-2007, redfish bycatch varied between 24 t (1.2% of the shrimp catch) and 207 t (3.1%), and between 47 t (0.6%) and 148 t (2.5%) in the EAZ (SFA 2).
- Atlantic cod bycatch varied between 220 and 845 kg/yr in SFA 1, and 5-24 kg/yr in the EAZ (SFA 2).
- American plaice bycatch varied between 8.8 t and 1.7 t in SFA 1, 163 and 615 kg in the EAZ (SFA 2).
- Atlantic wolffish bycatch ranged between 40 and 245 kg/yr in SFA 1 and between 146 and 434 t/yr in the EAZ (SFA 2).
- Over the period 2003-2007, in the WAZ (SFA 3) catches of the four 'main' species were below 100 kg/yr, and were often 0.

Orr et al (2008) reported data for bycatch in SFAs 4-7 for the four years 2004-5 to 2007-8 (Table 9). Data for six fleet/area combinations were compiled: the offshore fleet in SFAs 4-7 and inshore fleet in SFAs 6 and 7. The numbers below are provided here as a 'worst-case' scenario for bycatch amounts.

- Atlantic cod: maximum taken was 6.8 tons/yr in the inshore fleet, in SFA 6. Maximum amounts in SFA/fleet combinations ranged from 90 kg to 3421 kg. Overall, between 0.01 and 0.13 kg of Atlantic cod were taken per t of shrimp caught
- Redfishes: maximum taken was 236 t in the inshore fleet in SFA 6. Maximum amounts taken in SFA/fleet combinations ranged from 3340kg to 107905 kg. Bycatch rates ranged from 0.76 to 10.7 kg of redfishes taken per t of shrimp.
- American plaice: maximum taken was 19.7 t in the inshore fleet in SFA 6. Bycatch rates ranged from 0.16 to 0.46 kg per t shrimp. Maxima in other SFA/fleet combinations ranged from 2073 to 6108 kg.
- Atlantic wolffish: maximum taken was 9.1 t/yr in the inshore fleet in SFA 6, while in most fleet/area combinations amount was below 2.5 t/yr. Bycatch rates ranged from 0.02 to 0.23 kg/t shrimp

**Table 9:** Main bycatch species - maximum bycatch weight in year/SFA/ fleet cells sampled.  
Sources: SFAs 1-3 – Siferd (2010); SFAs 4-7 – Orr et al (2008). Years sampled: 2003-2007.

SFA / fleet	Atlantic cod			American plaice			Redfishes			Atlantic wolffish		
	Shrimp (t)	At. cod (t)	At. cod (%)	Shrimp (t)	Am. plaice (t)	Am. plaice (%)	Shrimp (t)	R'fish (t)	R'fish (%)	Shrimp (t)	W'fish (t)	W'fish (%)
1-O	3,589	0.8	0.02	6,983	8.8	0.13	6,983	207.3	2.97	6,983	0.6	0.01
2-O	8,191	0.0	0.00	5,894	0.6	0.01	5,894	148.8	2.52	5,894	0.3	0.01
3-O		0.0			0.0		2.1	0.0	1.62	2.1	0.0	0.19
4-O	10,084	0.2	0.00	10,149	2.1	0.02	10,084	107.9	1.07	10,084	2.3	0.02
5-O	24,615	0.3	0.00	24,615	6.1	0.02	22,501	69.0	0.31	24,615	2.2	0.01
6-O	24,504	3.4	0.01	27,505	4.4	0.02	27,505	55.1	0.20	27,505	1.4	0.01
6-I	50,817	6.8	0.01	50,817	19.7	0.04	50,817	236.2	0.46	49,732	9.1	0.02
7-O	6,016	0.1	0.00	6,016	2.3	0.04	4,039	3.3	0.08	5,743	0.6	0.01
7-I	12,112	1.0	0.01	7,070	3.2	0.05	12,564	21.2	0.17	12,112	2.7	0.02

Fleets: O = offshore, I = inshore.

The more recent compilation of bycatch data (CAPP/Javitech 2016) (Table 7) confirms that catch of the four main bycatch species is very low. Redfishes are the most abundant of the four species, but make up less than 0.2% of the catch and a maximum of 41 t in a sampled shrimp catch of 23,700t in SFA 4. The other three main species occur in much smaller quantities, usually below 0.05% of the shrimp catch and a few tons in any SFA over the three years sampled.

Overall, bycatch levels have been very low in the CNSSF, and amounts taken do not appear significant in ecological terms. However, one reason for low bycatch levels of commercial groundfish species is probably that several of these are currently depleted and at very low abundance compared to historical levels. Rebuilding of populations of these species could lead to greater bycatch, and impact of bycatch mortality on rebuilding might be a concern in a scenario where population recovery was occurring.

To assess the impact of bycatch on the four identified 'main' species, several population assessments are available. All populations of these species in the fishery are considered to be depleted, either 'at risk' by COSEWIC, or below LRP in DFO and NAFO assessments (or both).

Atlantic cod populations were assessed by COSEWIC (2010a); other recent assessments include DFO (2013b) assessment of the northern cod stock (NAFO 2J3KL) which is found in much of the fishery area (SFAs 4-7) and NAFO annual assessments of cod in NAFO 3LNO (NAFO 2015c). Recent catches from the northern cod stock have been over 3,300 t/yr from stewardship and recreational fisheries (DFO 2013b). Model and survey indices of biomass have been increasing since the early 2000s (DFO 2013b, NAFO 2015c). Status of cod in UoCs 1-3 is not well known, but the species is relatively uncommon; populations may be linked to that of West Greenland (COSEWIC 2010a). Survey biomass indices for west Greenland cod have been increasing since the early 2000s (ICES 2014).

The Acadian/deepwater redfish complex was assessed by COSEWIC (2010b); other recent assessments include an assessment of recovery potential for redfish stocks of the Canadian Atlantic (DFO 2011), scientific advice on reference points for these stocks (DFO 2012a) and annual assessments of stocks in NAFO 3LN (NAFO 2014a) and 3O (NAFO 2013b). Trawl surveys indicate that both species are increasing in abundance in populations from northern Labrador to the Grand Banks in recent years, for some areas since the early 1990s, for others since the early 2000s (DFO 2011). For the 'northern' population of deepwater redfish which overlaps all SFAs/UoCs of the fishery area, 2010 biomass was 54,000 t and projections indicate that the population would be likely to increase with annual catches of 3,000 t (DFO 2011). For Acadian redfish in NAFO 2J3KL (SFAs 5-6), biomass is very low (8,000 t in 2010) and the stock is under a fishing moratorium, while for a population of the same species further to the south, overlapping SFAs 6 and 7, biomass is high (1.9m t) and population is projected to increase under catches of 9,000 t/yr (DFO 2011).

American plaice populations were assessed by COSEWIC (2009); other recent assessments include a recovery potential assessment (DFO 2010c), scientific advice on reference points (DFO 2012b), and annual assessments of stock status for NAFO 3LNO (NAFO 2014c). American plaice are under moratorium in the fishery area. Recent bycatches in finfish fisheries in NAFO 3LNO (overlapping SFAs 6 and 7) have been 3,600 t/yr, while in NAFO 2+3K (SFAs 4, 5) they have been much lower, averaging 35 t/yr (DFO 2010c). Survey abundance estimates for NAFO 2J+3K and for NAFO 3LNO have been increasing since the early-mid 2000s but abundance remains low relative to historical levels (DFO 2010c). Recruitment has also shown some improvement in recent years (DFO 2010c).

Atlantic wolffish was assessed by Collins et al (2014), COSEWIC (2012a) and DFO (2013c). COSEWIC (2012a) concluded that there was a significant upward trend in both distribution

and area of occupancy on the Newfoundland-Labrador shelf (i.e., in the fishery area) since the mid-1990s. Collins et al. (2014) estimated Atlantic wolffish catch in the offshore shrimp fishery in the fishery area, concluding that this was very low (typically less than 1 t/yr), and confirmed the increasing abundance trends from trawl surveys.

### 3.19 Endangered, threatened and protected (ETP) Species

Two species of wolffishes, northern (*Anarhichas denticulatus*, sometimes called broadhead wolffish) and spotted (*Anarhichas minor*), both listed as Threatened on Schedule 1 of Canada’s Species at Risk Act, are taken as bycatch in the fishery. A third species, the Atlantic (‘Striped’) wolffish (*A. lupus*), is listed as ‘Special Concern’ on SARA Schedule 1 and accordingly is not considered an ETP species for this assessment. Other SARA listed ETP species occur in the fishery but there have been no recorded interactions with the fishery (e.g. leatherback turtle).

The two wolffish species are found on a wide range of bottom habitats, although only spotted wolffish is normally found on the soft mud habitats in which the shrimp fishery concentrates (Kulka et al 2008). Neither has traditionally been targeted by fisheries as the flesh is of poor quality.

Bycatch of these two species in the shrimp fishery is very low, based on detailed information over the entire distribution of the fishery (Orr et al 2008; Siferd 2010) (Table 9).

**Table 10:** Range of estimated annual bycatches (kg/yr) of northern and spotted wolffish by SFA, 2003-2007.

Sources: Orr et al (2008), Siferd (2010). O=offshore fleet; I=inshore fleet.

UoC	SFA	Northern wolffish (kg, range)	Spotted wolffish (kg, range)
1	1-O	0-38	4-245
2, 3	2-O	4-137	38-141
	3-O	0	0-10
	4-O	1-91	14-36
4	5-O	1-61	50-165
5	6-O	12-38	98-158
	6-I	105-1062	437-1582
6	7-O	0-42	4-58
	7-I	0	0-335

Fleets: O = offshore, I = inshore.

Results of these detailed analyses are confirmed by the more recent compilation of CAPP/Javitech (2016) (Table 7). No northern wolffish were reported in the three years of sampling in any SFA, while catches of spotted wolffish were below 100 kg over the three years sampled.

COSEWIC (2012b, c) reassessed status of the two wolffish species found in the fishery area, while DFO (2013c) assessed status of these three species to support reporting on implementation of the recovery strategy. Abundance indices summarised in the assessments show that the two ETP wolffish species are increasing in abundance and in area of occupancy in the fishery area, with spotted wolffish increasing more rapidly than northern wolffish.

The recovery strategy for the two threatened wolffish species emphasises the need for fisheries to avoid targeting these species, and to return any individuals caught to the sea in the best condition possible (Kulka et al 2008). Although killing or harming threatened and endangered species listed on SARA Schedule 1 is prohibited, the prohibition can be lifted, with conditions, if the harm can be shown not to jeopardise survival or recovery of the species. Following an analysis of allowable harm (DFO 2004a), incidental harm to the two threatened wolffish species from fisheries bycatch is permitted under this provision of SARA, under certain conditions. Licence conditions for shrimp fishing vessels, based on requirements identified in the allowable harm assessment and the recovery strategy, require no targeting of wolffishes and live release of any specimens caught in the best condition possible (DFO licence conditions, DFO 2015h).

### **3.20 Impacts of the fishery on habitat**

Impacts of bottom fishing gear on habitats are of two sorts: direct impacts on sediments and substrates, and impacts on organisms which may contribute to habitat quality. A useful framework for assessing the impacts of fishing on habitats is that applied by NEFMC (2011) to assess habitat impacts of gear off the northeast USA; the approach is summarised concisely by Grabowski et al (2014).

Impacts by the trawl gear used to harvest northern shrimp on bottom habitats, species, and communities have been summarised and reviewed by Grant (2012). Northern shrimp prefer soft mud and silt bottoms and the fishery concentrates on these to minimise the potential for trawl damage, although occasional presence of hard corals and sponges in trawl bycatch indicates that hard bottoms may be contacted. Striped shrimp may be found on harder bottoms than northern shrimp.

The shrimp gear used in the CNSSF is relatively light, and efforts are under way to further lighten gear (doors, foot gear, and netting) in order to reduce fuel costs. Trawl doors and footropes would be the only elements of the gear contacting the bottom in most areas. The exception to this overall pattern is use of twin trawls in some northern areas, where a very heavy (4 t) 'shoe' is used between the two codends, which would dig into the ground over a narrow band (ca 3 m).

No studies of trawl impacts on habitats used by shrimp have been conducted in the fishery area, but studies are available from other pandalid fishing areas and of trawling impacts more generally. General impacts of trawling on bottom habitats have been reviewed in several studies (e.g. Rice 2006, NEFMC 2011). There is considerable variation between results of the available studies of trawling impacts on soft bottom habitats. In general, it has been concluded that while trawl impacts show more rapidly on soft bottom habitats (mud, sand) than on harder bottom habitats, soft bottom habitats tend to recover more quickly (Rice 2006).

A study of impacts of pandalid shrimp trawling in the Gulf of Maine on habitat and community structure of mud bottoms (Simpson and Watling 2006) showed little impact on habitat and relatively short-term (3 months) impacts on community structure. This study concluded that bioturbation (reworking of sediments by benthic organisms) may provide a level of disturbance in relation to which disturbance from trawling should be considered. Moritz et al (2014) examined impact of northern shrimp trawling on benthic invertebrate taxa richness, biomass and community structure in the northern Gulf of St. Lawrence over periods of 4, 10 and 20 years and found little detectable impact. On the other hand, Hixon and Tissot (2007) observed substantial differences between fauna richness and species groups between trawled and untrawled grounds in a pandalid fishery off Oregon, and concluded that relatively slow-growing sea pens, in particular, could be impacted by repeated shrimp trawling. A meta-analysis of studies of mobile gear impacts showed that recovery times on mud-sand habitats can be

relatively long (Kaiser et al 2006). Hinz et al (2009), in a study of changes in species abundance and community structure in mud-sand habitats along a gradient of trawling intensity in the Irish Sea, concluded that species abundance, biomass and diversity decreased with increased trawling intensity and that changes in community structure were also more marked with increasing trawling intensity.

Overall, the results of studies to date depend greatly on methodology, whether the study is of chronic disturbance or of immediate impacts, and on habitat type and community structure (Rice 2006, NEFMC 2011). Level of observed impact may also depend on history of the fishery area - areas which have been trawled for many years may have developed an 'impacted' habitat and fauna which remains relatively stable under trawling, while newly fished areas doubtless sustain changes from the pristine state.

Information on bycatch of coldwater corals in shrimp gear (Edinger *et al.* 2007) suggests that a relatively low proportion of shrimp sets takes hard corals (around 2% over the entire Newfoundland- Labrador shelf), but this probably underestimates the actual impact on habitats and species, since damage may occur even when corals are not taken as bycatch. Given the slow growth rates of coldwater corals and sponges, these species are probably slow to recover from such impacts. Shrimp trawl fishermen, at least in the offshore fishery, avoid known areas of hard-bottom or coral habitat as the likelihood of damage to trawls is high in these areas and cost of repairing trawls is high. Likelihood of damaging gear on hard bottoms is also increasing, as shrimp trawl gear is increasingly light to reduce fuel costs, contributing to increased caution with respect to trawling on hard bottom.

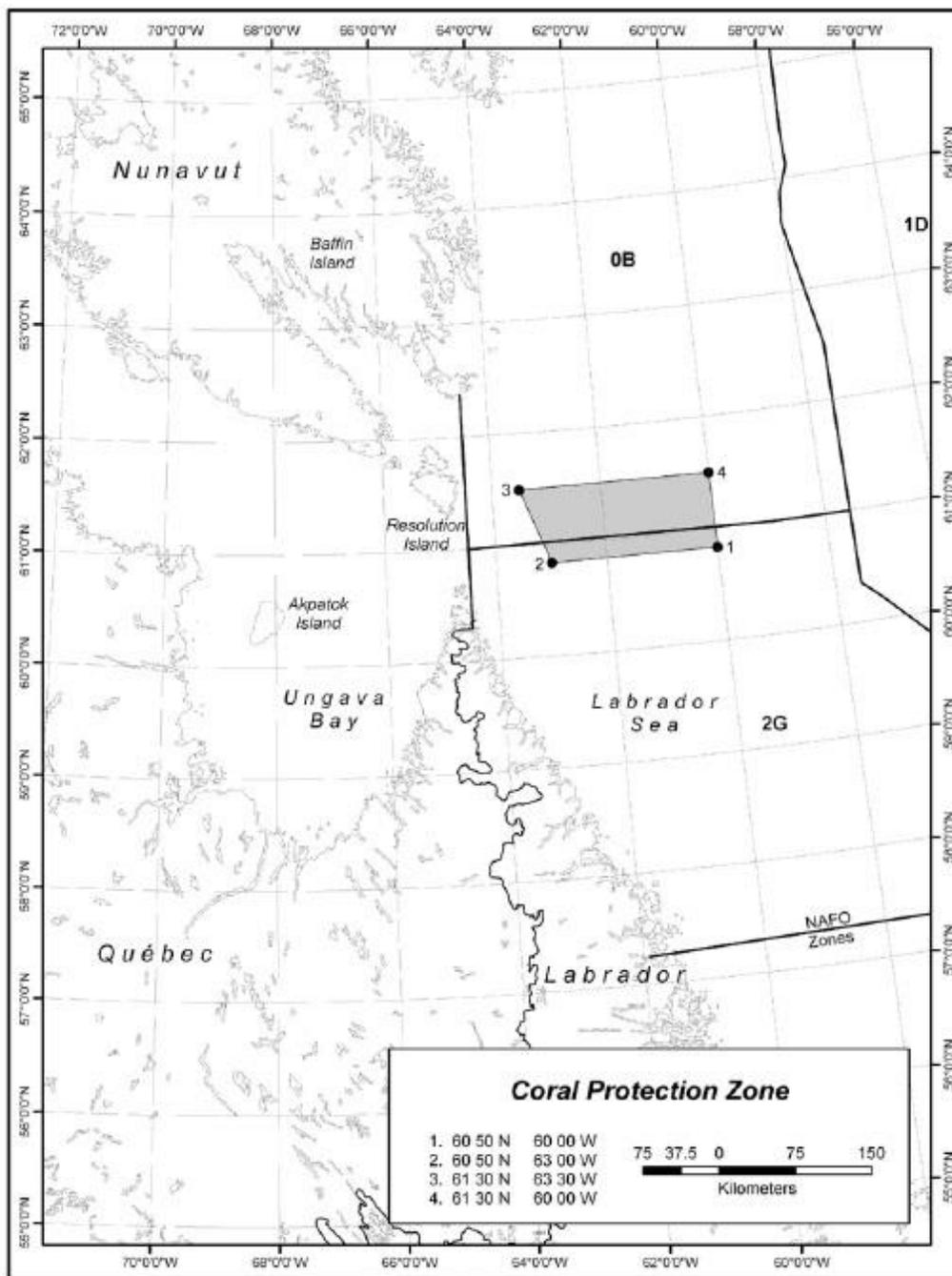
As noted earlier, information on distribution of coldwater corals and sponges has improved substantially in the past decade and continues to improve (DFO 2010b). Several closed areas have been put in place which could help protect bottom habitats (notably an area voluntarily closed to shrimp fishing off the entrance to Hudson Strait, to protect coldwater corals) (DFO 2010a), and NAFO has conducted substantial work to define vulnerable marine ecosystem areas at the edges of the Grand Banks.

Fisheries and Oceans Canada has developed a policy on managing the impacts of fishing on sensitive benthic areas (DFO 2009c) including an ecological risk assessment framework (ERAF) for coldwater corals and sponge dominated communities (DFO 2013d). A Coral and Sponge Conservation Strategy for Eastern Canada has recently been released (DFO 2015d).

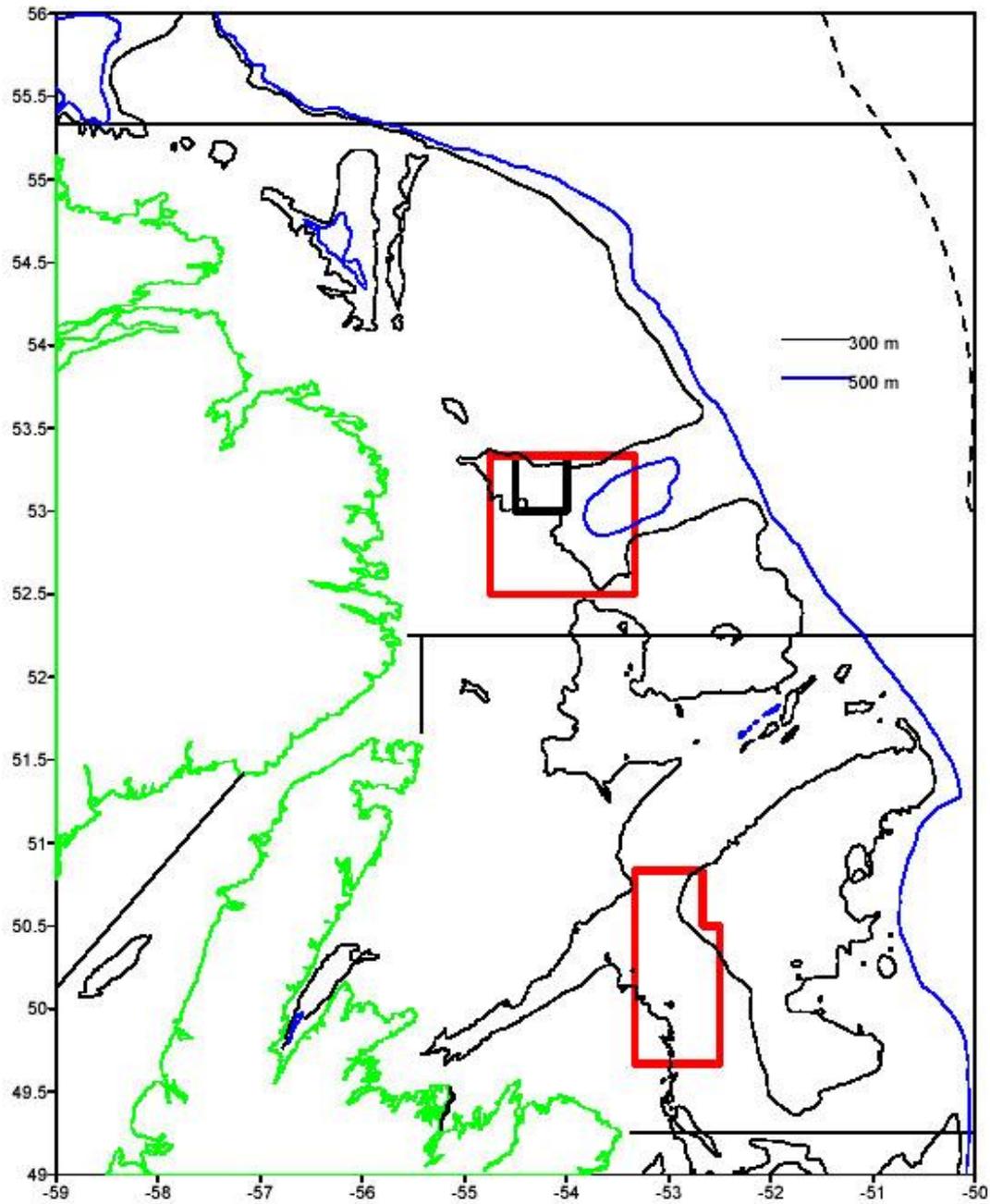
CAPP (2015), using the DFO ERAF as a guideline for assessing risks of impacts on sensitive areas, has conducted an analysis of the impact of shrimp trawling on benthic habitats and communities in the fishery area. The impact analysis is based on compilations of the fishery's spatial footprint in relation to (1) known areas of sensitive habitat (as defined by sponge and coral concentrations) and (2) the overall potential fishery/habitat area (continental shelf areas of depth 100-600 m), considered to be non-sensitive habitats (Spatialanalysis 2013). When the fishery overlaps 10% of sensitive habitat based on the initial analysis, a more detailed analysis of potential impact is conducted, and measures are put in place to protect habitat if necessary. An overlap of 30% with non-sensitive (i.e., other) habitats triggers a more detailed analysis and measures if necessary. Although the DFO ERAF only requires analysis of impact on sensitive habitats, the MSC standard does not differentiate impacts on sensitive and non-sensitive habitats, so the CAPP (2015) analysis covered both.

Several closed areas are in place in the fishery area which serve to protect bottom habitats from the impacts of fishing. In 2007, the industry put in place a voluntary closed area of 12,500 km<sup>2</sup> near the entrance to Hudson Strait with the objective of protecting coral concentrations (DFO 2010a) (Figure 47). An area of 2,500 square nautical miles (8,600 km<sup>2</sup>) was closed to trawling in the Hawke Channel area in 2003, and another area of similar size in the Funk Island Deep area was closed to inshore trawlers in 2005; the latter is closed on a voluntary basis to

offshore shrimp trawlers (DFO 2010a) (Figure 48). The objective of closing these areas was to reduce interactions between trawling and the snow crab fishery, but they also serve to protect bottom habitats from trawling (DFO 2010a).

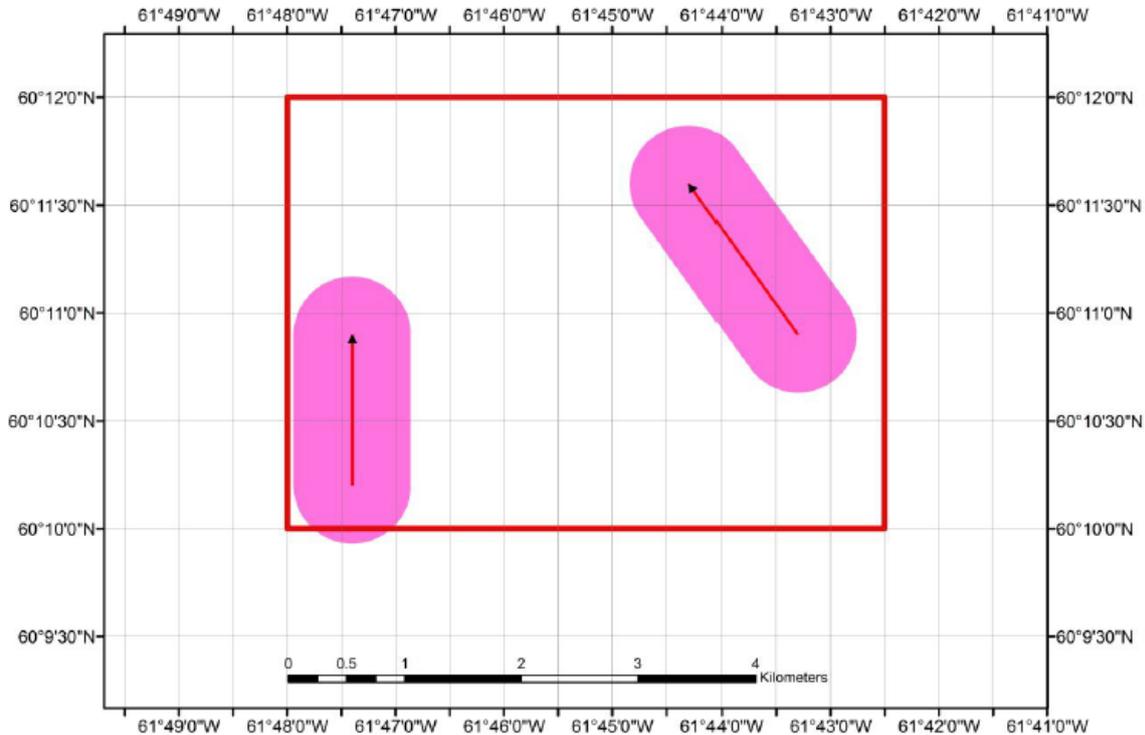


**Figure 47:** Voluntary closed area in the EAZ, WAZ and SFA 4 for protection of coral.  
 Source: DFO (2010a)



**Figure 48:** Areas closed to trawling (red outlines) in Hawke Channel (northern area) and Funk Island Deep (southern area).  
Source: DFO (2010a).

Following completion of the partial strategy analysis by CAPP (2015), a voluntary closed area of 20 km<sup>2</sup> is being put in place to protect coral concentrations in SFA 4 (Figure 49).



**Figure 49:** Voluntary closed area in SFA 4 (sensitive coral area C84). Red arrows are tracks of survey hauls which took corals, pink areas are 0.5 km buffer zones around these which supported definition of the closed area. Source: B. Chapman, CAPP

### 3.21 Impacts of the fishery on ecosystems

The MSC standard requires that the impact of the fishery on broad ecosystem structure and function be assessed, separately from the impact on components (habitats, bycatch species, ETP species) and considering a range of ecosystem elements such as ecosystem structure, trophic relationships, and biodiversity.

For this fishery, two ecosystem-level impacts can be identified in addition to impacts on specific components: impact of removal of the target species on trophic relationships, and impacts on biological diversity and community structure due to non-catch mortality. The latter does not include impacts on sessile, erect organisms of hard bottoms such as corals and sponges as these are considered under 'habitat', although fishery impacts are similar.

#### 3.21.1 Impact of removal of shrimp on trophic relationships

Although they do not meet the MSC definition of key LTL species, northern and striped shrimp are important as forage for a wide range of predators in ecosystems in the fishery area (Parsons 2005a, b). As such, maintenance of adequate biomass to support trophic relationships is an important issue for management.

The IFMP (DFO 2010a) gives explicit recognition to the importance of northern shrimp as a forage species and the need for fishery management to consider this. Exploitation rates in the past have been set relatively low (below 15%), and this has been in part to ensure that shrimp remain available as prey (D. Orr, pers. comm.). The PA framework for northern and striped shrimp outlined in the IFMP (DFO 2010a, Appendix I) indicates that base target exploitation

rates have in the past been set lower than might otherwise be the case because of the role of shrimp as a forage species, although no explicit rationale is provided relating exploitation rates to predator requirements. The PA framework allows for exploitation rates higher than 15% when shrimp abundance is high, but a maximum exploitation rate index of 20% has been adopted by DFO in managing this resource (DFO 2015c), to be reduced if stock abundance declines.

The exploitation rate guideline would be implemented in the EAZ, WAZ and SFAs 4-6 under the DFO IFMP. In SFA 1, the impact of Atlantic cod predation is incorporated into the assessment model, such that scientific advice on TAC levels explicitly accounts for the importance of shrimp in trophic relationships. The DFO IFMP includes a PA framework applicable to SFA 7, although NAFO is responsible for management measures for this SFA. There are no explicit management objectives related to maintaining forage species abundance in NAFO management of this stock, but ecosystem impacts are considered minimal since the fishery has been closed for 2015 and 2016.

Although shrimp is an important forage species, capelin and other fishes are preferred by groundfish. With general ecosystem changes observed since the mid-2000s, including the decline of shrimp stocks, the percentage of shrimp in diets of four groundfish species (American plaice, Atlantic cod, Greenland halibut, and redfishes) has been declining. For two of these (American plaice and Atlantic cod), the proportion of capelin in the diet has been increasing, while for the other two other fishes are increasing (DFO 2014b).

### **3.22 Non-catch impact on biological diversity and community structure**

Although overall impact of the shrimp trawl fishery on biological diversity and community structure due to non-catch mortality in this area has not been studied, the review of shrimp trawl impacts on benthic habitats by Grant (2012) provides information on potential impacts, as do many of the studies cited above in the 'habitat impacts' section. Shrimp trawl impacts on snow crab populations in the fishery area have been assessed in several studies, and the results of these indicate relatively little impact (Gilkinson et al 2006). Two areas in snow crab fishing habitat have been closed to shrimp trawling to reduce potential damage to the snow crab resource (Hawke Channel; Funk Island deep) (DFO 2010a).

Non-catch mortality might be considered potentially low because of the use of large rollers on footgear, and relatively light ground gear and trawl doors. Although there is general information on the community composition of benthic habitats in the fishery area, there remains an overall lack of knowledge of the role of individual species in benthic ecosystems and of the specific impacts of shrimp trawl gear on individual species.

With respect to management of impacts on biological diversity and community structure, the partial strategy document of CAPP (2015), supported by the footprint analyses of Spatialanalysis (2013) indicate that relatively low proportions of the overall habitat are impacted by shrimp trawling (10% of sensitive habitats or less in most SFAs; less than 30% of non-sensitive habitats overall).

## Principle Three: Management system background

### 3.23 Boundaries and jurisdiction

The CNSSF takes place off the coast of eastern Canada from 46°00' N (Grand Bank) to 75° N (Baffin Bay) including the waters of the Hudson Strait and Ungava Bay. As noted previously, although separate stocks of shrimp have not been clearly defined, observed differences in rates of growth and maturation due to different habitat conditions across the geographic range of the species forms the basis for delineating the SFAs as assessment and management units (IFMP, DFO 2010a) (see Figure 1).

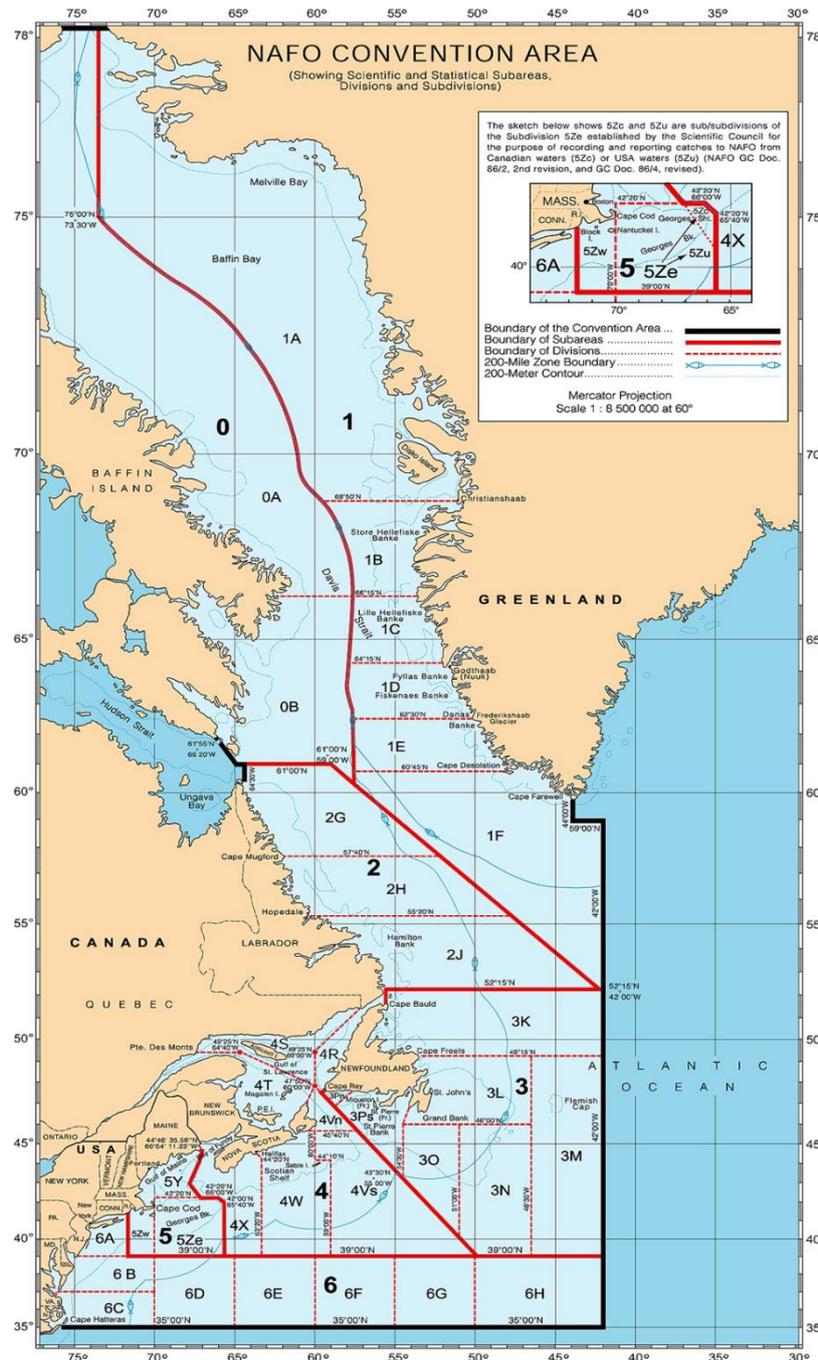
Within the Exclusive Economic Zone (EEZ), the responsibility for the management of fisheries in Canada resides with the federal government (*Constitution Act, 1867*). The Minister of DFO has the absolute discretion to manage the fishery (*Fisheries Act, 1985*) and his/her authority is delegated to officials through the organizational structure of the department. The DFO is organized into geographic regions; the Central and Arctic Region is responsible for managing the fishery in SFA1, while the EAZ, WAZ and SFAs 4-7 are under the jurisdiction of the Newfoundland and Labrador Region. The Resource Management Directorate in national headquarters in Ottawa exercises general oversight.

While the management of the fishery is generally uniform across all SFAs, different approaches are required at times due to constitutional and international responsibilities. For example, SFA 1 covers a straddling stock shared by Canada and Greenland. As noted in 4.6.1 above, stock status is reviewed annually by the NIPAG (NAFO 2015a) with advice provided through the NAFO SC. Each country then sets its own TAC independently. In the interests of providing a more coordinated approach to the SFA 1 fishery, Canada and Greenland entered into bilateral discussions in the summer of 2014, to explore a comprehensive agreement on management of this trans-boundary shrimp resource, including a quota-sharing component and a common approach to the setting of TACs, including HCRs. Formal negotiations continued in 2015, and while both Canada and Greenland express support for a potential agreement, none had been reached at the time of writing. As a result, Canada established a 60,000 t TAC for 2015 following the advice of the NAFO SC. Canada's declared share of that TAC is 8,500 t, based on its claim of 17% of the offshore portion of the resource in SFA 1 (the parties disagree on that claim).

In the EAZ, WAZ and SFAs 4-5, there are legal and administrative obligations with First Nations peoples. The Parliament of Canada has enacted legislation to give effect to several aboriginal land claim agreements including the *Nunavut Land Claims Agreement Act (1993)*, the *Labrador Inuit Land Claims Agreement Act* and the *Nunavik Inuit Land Claims Agreement Act (2006)*. These Land Claim agreements set forth a framework under which the Inuit of Nunavut, Labrador and Nunavik are entitled to fish in waters adjacent to their territories, which has an impact on the process of access, allocation and management in these marine areas (basically within a 12-mile zone from shore). Management bodies created by the agreements exercise jurisdiction over harvesting in the settlement areas. The SFAs affected by these agreements include parts of the EAZ and WAZ for the Nunavut and Nunavik claims, and parts of SFAs 4 and 5 for the Nunatsiavut and Labrador claims, although the portion of the fishery in SFA 4 is so small as to be insignificant in terms of the overall fishery.

In 2011, the EAZ and WAZ were adopted as the basis for setting the TAC for each species within the management areas adjacent to Nunavut and Nunavik. Beginning with the 2013/14 fishing season, a new management system was implemented with three new SFAs – Nunavut, Nunavik and Davis Strait – established to reflect the three jurisdictions present within this area. These new SFAs were further subdivided into management units that fall entirely within either the EAZ or WAZ. The zones are depicted in Figure 2 above.

Finally, the SFA 7 shrimp stock straddles the Canadian 200 nm EEZ. A portion of the stock area (commonly referred to as the 'Tail of the Bank') extends outside Canada's EEZ and falls in the NAFO Regulatory Area (NRA) {the area in the Northwest Atlantic Ocean from Davis Strait to the coast of Virginia in waters that lie outside the 200 nm EEZ of the coastal states (Figure 50)}. Following advice from the NAFO SC in September of 2014, the NAFO FC decided that no directed fishery be conducted in SFA 7 in 2015 and 2016 due to a high probability that biomass was below the LRP.



**Figure 50:** Map of the NAFO Convention Area  
 Source: [www.nafo.int](http://www.nafo.int)

NAFO is a regional fisheries management authority composed of 12 states, including the coastal states of Canada, France (St. Pierre/Miquelon), Denmark (Faroe Islands/Greenland) and the United States. NAFO was formed on January 1, 1979 through its founding document the [Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries](#) (the Convention; NAFO. 1979). NAFO is responsible for the management of all fisheries in the NRA. The NRA is composed of six sub-areas that are further divided into divisions and subdivisions. The NRA portion of the stock is located in division 3O (“Tail of the Bank”).

### 3.24 Legal and policy framework

Canada’s *Constitution Act*, 1867, grants exclusive legislative authority over seacoast and inland fisheries to the Government of Canada. There are several pieces of legislation that apply to the fishing industry, the major one being the *Fisheries Act*. That *Act* grants wide discretionary authority to the Minister of Fisheries and Oceans (§.7) and provides for the enactment of regulations respecting the management of the fishery.

*The Atlantic Fishery Regulations, 1985* and the *Fishery (General) Regulations, 1993* are the main regulatory instruments governing the fishery. *The Species at Risk Act, 2002* is important when fishing near populations of designated vulnerable species. *The Oceans Act, 1996* is an overarching piece of legislation of general application. The *Coastal Fisheries Protection Act, 1985* applies to foreign vessels fishing in Canada’s EEZ and comes into play in the shrimp fishery in SFA 1 as the boundary line abuts that of Greenland. The *Fish Inspection Act* governs the processing of shrimp aboard the offshore factory freezer trawler fleet, vessels that are designated as processing plants for the purposes of the *Act*.

In addition, legislation has also been enacted (as indicated above) to give effect to aboriginal land claim agreements providing authority and responsibility for management of fish resources within the respective settlement areas as outlined in the agreements.

Finally, using the legal instruments outlined above, several policy initiatives have been developed to guide decision-making in the management of fisheries in Canada, three of which are of primary importance for most assessments. The *'Policy Framework for the Management of Fisheries on Canada's Atlantic Coast'* (DFO 2004b) envisions robust fisheries that include all stakeholders and which are biologically and economically sustainable.

The *'Sustainable Fisheries Framework'* (DFO 2009d) is composed of conservation and sustainable use policies and planning and monitoring tools. It also incorporates the precautionary and ecosystem approaches into fisheries management decisions, as well as policies for managing fishing on sensitive benthic areas, new emerging fisheries and new fisheries for forage species. Finally, the *'Aboriginal Fisheries Strategy'* (DFO 2008b) is aimed at ensuring that aboriginal entitlements are respected in the development of stable fisheries management regimes for aboriginal peoples.

Within the Canadian management system, Integrated Fishery Management Plans (IFMP) are developed that outline the fisheries objectives and management measures by stock and area. The Northern Shrimp IFMP is a comprehensive document covering all SFAs. The current IFMP is undergoing substantive revisions but was not sufficiently developed to be released at the time of this report. The Department plans to have a revised IFMP in place in 2016. Stakeholders will be provided the opportunity to provide input and comments on the updated draft IFMP over the coming months. The current IFMP in use for Northern Shrimp became operational in 2007, and an updated version still serves to describe the important components and management measures in place for the fishery.

The shrimp fishery in NAFO Division 0A (east of 60°30' W) and subareas 1A-F is governed and administrated by the Greenland Executive through the Ministry of Fisheries, Hunting, and

Agriculture and the Greenland Fisheries Licence Control. Management is based on research and advice from the Greenland Institute of Natural Resources in conjunction with the Scientific Council of NAFO, of which Greenland is a member. Greenland, like Canada, also has a comprehensive legislative framework for management of fisheries in its zone.

The Greenland *Fisheries Act, No. 18*, of 31 October 1996, as amended is the main legislative instrument for the management of fisheries in Greenland waters. The *Act* prescribes the main objectives for the fisheries, and provides a regulation-making power to carry out its provisions in such areas as TAC setting, identification of fishing Vessels, satellite surveillance, access to fishing areas, catch reporting, on-board observers, licences, control/conservation measures, data collection, bycatch, etc. The component parts of the *Act* are outlined in Table 11, below.

Table 11: Component parts of the Fisheries Act

Part No.	Description
1	Scope and objectives of the Act
2	Definitions
3	Establishment of catch quantities and TACs
4	Access to commercial fisheries in the land and fishing territories of Greenland
5	Non-commercial fisheries in the land and fishing territories of Greenland
6	Fisheries outside the fishing territory of Greenland
7	General regulation of fisheries, licences, etc.
8	Protection, technical conservation measures, etc.
9	Biological fisheries studies and test fishing
10	Statistics
11	Supervision
12	The Fisheries Council
13	Penal provisions
14	Entry into force and transitional provisions

### 3.25 Participants and harvest strategy

As noted in Section 3.5, above, there are two fleets engaged in the CNSSF – the offshore fleet composed of 12 factory freezer trawlers ranging in the 230’ LOA range, and the inshore fleet composed of some 360 wetfish trawlers of <100’ LOA. The offshore fleet operates under an Enterprise Allocation (EA) system whereby each of the 17 licence holders is allocated an equal percentage share of the offshore quota in each SFA. There are further allocations provided to community and aboriginal interests. The fleet fishes in all six UoCs. The vessels are either owned by the licence holder or operate through joint ventures between the licence holders and vessel owners. The relationship between the licence holders and the vessel owners is provided in Appendix 8.

The majority of the inshore fleet has fished in SFA 6 and 7 with less effort in SFA 4 and 5. Landings are monitored through the 100% dockside monitoring program and the inshore fishery is closed once the competitive quota has been taken.

### 3.26 Objectives

Three main objectives form the basis for the management of the CNSSF:

1. Conservation and sustainable harvest;
2. Benefits to stakeholders;
3. Co-management of the shrimp resource.

Using these objectives as a foundation, various strategies and management measures are either in practice, or are in the process of being developed, to maximize the benefit of these resources for all Canadians.

At annual advisory meetings, a review takes place to determine whether these objectives are being met and key management issues are being addressed. As part of this process, the information gathered through other evaluation processes, including the Department's Fishery Checklist (DFO 2014d), is used to help identify areas for improvement in the management of these fisheries. The Checklist includes a review of the effectiveness of over 100 management plan items including data collection, scientific assessments, the MCS program, quota management, research issues, etc. In consultation with stakeholders, improvements are explored and priorities established.

The objectives along with strategies and management measures to achieve them are outlined in section 1.1 of the IFMP (DFO 2010a), and are as follows:

i) Conservation and Sustainable Harvest	
<ul style="list-style-type: none"> <li>• To promote the sustainable utilization of northern shrimp stocks.</li> <li>• To promote cost-effective harvesting strategies that ensures compliance with objective-oriented management and conservation measures and promotes a responsible image for all fleet sectors.</li> <li>• To mitigate the impacts on other species, habitat, and the ecosystem where shrimp fishing occurs, protecting biodiversity and ecosystem structure and function.</li> <li>• Within specified resource management constraints, to promote a harvest level that stabilizes industry infrastructure and meets marketing requirements, in the pursuit of economic viability objectives for the shrimp sector.</li> <li>• To promote fishing practices that avoid or mitigate impact on sensitive habitat and species.</li> <li>• To explicitly recognize the ecosystem role of shrimp in TAC-setting decisions, particularly as a forage species.</li> </ul>	
Strategies	Management Approach
<ul style="list-style-type: none"> <li>• Utilize a precautionary approach framework when setting exploitation rates for the directed fishery</li> <li>• Given that shrimp have a significant role as a forage species, the base target exploitation rate has been set lower than what might otherwise be the case. (Annex I) - objectives</li> <li>• Manage activity in ecologically sensitive areas</li> <li>• Promote the development of sustainable fishing practices.</li> <li>• Manage by-catch or mortality for all non-targeted species</li> <li>• Employ effective monitoring and surveillance tools and mechanisms that ensure compliance with</li> </ul>	<ul style="list-style-type: none"> <li>• Provide biomass and abundance estimates through timely science surveys</li> <li>• Utilize indicators of stock and fishery change</li> <li>• Control fishing mortality by setting annual TAC, taking into account the role of shrimp in the ecosystem.</li> <li>• Utilize appropriate exploitation rates and reference points, which take into account the role of shrimp in the ecosystem. (see Annex I).</li> <li>• Close Hawke Channel to conserve cod concentrations</li> <li>• Prohibit bottom contact fishing in established coral conservation areas</li> <li>• Enforce regulations against discarding and highgrading</li> <li>• Require a maximum of 22 (SFA 6,7) or 28 mm (SFA1,2,3,4,5) separator grates as condition of licence</li> <li>• Require live release of species listed under SARA as endangered or threatened</li> <li>• Observer coverage is targeted at 100% for offshore</li> </ul>

conservation measures	<p>vessels and 10% for inshore boats</p> <ul style="list-style-type: none"> <li>• Use of Vessel Monitoring Systems for all shrimp boats</li> <li>• Employ Dockside Monitoring Programs for 100% of inshore landings</li> <li>• Employ aerial and dockside surveillance in addition to period audits of landings and catch information outside regular operations</li> </ul>
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<b>ii) Benefits to stakeholders</b>	
<ul style="list-style-type: none"> <li>• To promote the continued development of a commercially viable and self-sustaining fishery with particular emphasis on the needs of the traditional licence holders.</li> <li>• To provide fair access to and equitable sharing of the northern shrimp resource.</li> </ul>	
<b>Strategies</b>	<b>Management Approach</b>
<ul style="list-style-type: none"> <li>• No new access to this fishery</li> <li>• Use key departmental criteria of adjacency, historical dependence and economic dependency when providing new allocations</li> <li>• Use of Last in First Out principle as the primary policy guiding allocations when dealing with TAC declines, subject only to land claims obligations</li> <li>• Balance fleet capacity with resource availability</li> <li>• Fulfill obligations with respect to fishery resources as defined in the Nunavut Land Claims Agreement, the Nunatsiavut Claims Agreement and the Nunavik Inuit Land Claims Agreement.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue Enterprise Allocation structure for offshore sector</li> <li>• Limit entry to the fishery through licensing</li> <li>• Consult with Aboriginal management boards on TAC levels in or adjacent to their territorial waters</li> </ul>

<b>iii) Co-management of resource</b>	
<ul style="list-style-type: none"> <li>• To promote, at NAFO, a Total Allowable Catch (TAC) and quotas management scheme for the Flemish Cap shrimp fishery, or otherwise controlling fishing effort to achieve a sustainable fishery.</li> <li>• To continue to promote, with Greenland, an agreed TAC, quota and management scheme for NAFO Division 0A and Subarea 1 shrimp.</li> <li>• To promote a co-management approach, providing licence holders with an effective sharing of responsibility, accountability and decision making, within the constraints of the Fisheries Act, the precautionary approach and harvest control rules.</li> </ul>	
<b>Strategies</b>	<b>Management Approach</b>
<ul style="list-style-type: none"> <li>• Establish an effective consultative process for resource users to participate in the decision-making process.</li> <li>• Establish Multi-Stakeholder Working Groups (WG) designed to examine domestic and international</li> </ul>	<ul style="list-style-type: none"> <li>• Organize annual Northern Shrimp Advisory Committee (NSAC) meetings.</li> <li>• Convene Working Groups as appropriate.</li> <li>• Convene Shrimp Working Group under NAFO consultative process as appropriate.</li> <li>• Convene domestic consultations and bi-lateral discussions with Greenland as appropriate.</li> </ul>

<p>issues, e.g., Conservation and Compliance WG, Closed Areas WG, Marine Stewardship Council Certification WG.</p> <ul style="list-style-type: none"> <li>• Contribute and participate in NAFO meetings.</li> <li>• Providing experts to NAFO SC.</li> <li>• Conduct bi-lateral negotiations between Canada and Greenland, with input and participation from industry.</li> <li>• Manage Joint Project Agreement between DFO and the Northern Shrimp Research Foundation to pursue mutually beneficial scientific activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Collaboratively define science priorities and design appropriate research activities.</li> </ul>
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Regarding Greenland, the 2014 Shrimp Management Plan and Fisheries Act identify an overarching long-term objective: “*To watch over marine nature and environment, in order that society can develop on a tainable basis as regards living conditions for people and for the maintenance of ecosystems.*” New environmental legislation specifically incorporates the principles of sustainability as well as ecosystem and precautionary approaches. The fishing strategy is to maintain the stock in a condition in which it can be most profitably fished provided that the resource remains sustainable.

The harvest strategy is, through the use of HCRs, to maintain the stock above the MSY level with high probability. Further short-term objectives include a provision to avoid sudden large changes in TAC through an agreed 12.5% maximum annual variation, goals to increase knowledge of vulnerable habitats through data collected from the fishing fleets, photography to evaluate the bottom condition related to the historical intensity of trawling, identification and closure of vulnerable marine areas identified from the commercial fishery, development of a strategic research plan to include benthic investigations, and monitoring of the effect of the trawl fishery. Where necessary, regulations are introduced to ensure the integrity of the benthic environment sufficiently to maintain the structure and function of the ecosystem.

### 3.27 Fisheries management approach

There are two fundamental approaches that guide the management of the CNSSF: The *Precautionary Approach* and *Ecosystem-Based Management*.

The Precautionary Approach (PA – legislatively required in the *Oceans Act* for all fisheries in Canada) is a general philosophy for managing threats of serious or irreversible harm where there is scientific uncertainty and is applicable to all fisheries management strategies. The PA requires the development of a harvest strategy that aims to keep the removal rate moderate when the stock status is healthy, promote rebuilding when stock status is low and ensure a low risk of serious or irreversible harm. Harvest strategies are typically implemented by regulating the removal rate either by controlling total catch or by controlling fishing effort.

Ecosystem-Based Management is the management of human activity so that marine ecosystems, their structure (biological diversity), function (productivity) and overall environmental quality (water and habitat), are not compromised and are maintained at appropriate temporal and spatial scales. Using these general principles, management plans along with a suite of tools are established to achieve sustainable use of the resource.

Survey-based assessments by DFO scientists have been available for each SFA since 2005. Catch limits are not recommended but the status of the stock is clearly determined and outlined. The scientific information and advice is presented to the NSAC and the members develop recommendations to the Minister of Fisheries and Oceans with respect to TAC levels in each area.

The portion of the TAC allocated to offshore licence holders in the form of individual enterprise allocations, as well as the additional allocations made to community and aboriginal groups, are fished through joint ventures with the offshore fleet. The fishery is closely regulated (more below), harvest limits are not exceeded and there are severe penalties provided in the *Fisheries Act* should such an event occur.

A second portion of the TAC is allocated to inshore licence holders in each of the areas outlined in Figure 1 in section 3.2.1 above. These quotas are fished on a trip limit basis until the overall inshore quota is reached.

In Greenland waters, the TAC is assigned as quota allocations to the Greenland fleet and to non-Greenland vessels permitted to fish by international agreement. The major portion of the TAC is allocated to the coastal fleet (43%) and the offshore fleet (57%). In addition, as of 2011, the Management Plan for the West Greenland shrimp fishery takes into account the Canadian interest in the fishery by setting aside a quota for the Canadian fishery in SFA1.

### 3.28 Consultation and dispute resolution

In 2004, DFO released its 'Consultation Framework for Fisheries and Oceans Canada' (DFO 2004c), to "...provide DFO officials with mechanisms and direction in support of a common understanding and coordinated approach to ensure enhanced consultation". The Framework is organized under three broad themes - planning and evaluating, building mutual respect and improving consultation culture. Each of these themes is followed by a set of principles that require DFO officials to undertake consultation "...in order to improve departmental decision-making processes, promote understanding of fisheries, oceans and marine transport issues and strengthen relationships." The document is very comprehensive, and outlines considerable detail on how consultations should be carried out. However, it is more a set of guidelines than a binding requirement that could be enforced by stakeholders.

There are some statutory requirements to consult. For example, §.37 of the Fisheries Act requires the minister to consult provinces on undertakings that impact provincial habitat, the *Oceans Act* obliges the Minister to consult with provinces on the development of strategies for marine ecosystems, and the *Species at Risk Act* requires consultation with aboriginal organizations and provincial ministers concerning species at risk residing on their land.

The special place that aboriginal peoples play in the Canadian fishery requires mention. Several Supreme Court of Canada (SCC) decisions have provided guidance on the nature and scope of Aboriginal rights including governments' responsibility to manage natural resources in a manner consistent with those rights. The following three decisions of the court are relevant:

- In the 1990 *Sparrow* decision, the court found that aboriginal groups have a right to fish for "food, social and community" (FSC) purposes and furthermore, that it takes priority, after conservation, over other uses of the resource - in other words, first in line for access to the resource goes to aboriginal peoples.
- In the 1999 *Marshall* case, the SCC ruled that the Mi'kmaq people had the right to fish in order to "produce a moderate livelihood" for its people. This decision expanded upon

Sparrow and elevated fishing rights of aboriginal peoples to that of economic pursuit, albeit a limited one.

- In 2004, the SCC in its *Taku/Haida* decision concluded that government has a duty to consult and, where appropriate, accommodate the interests of aboriginal peoples where government has knowledge of the potential existence of Aboriginal title or rights. This duty is grounded in what the Court called “*the honour of the Crown*” finding that exploiting a resource during the resolution of an aboriginal claim was neither proper reconciliation nor honourable.

In summary, aboriginal groups have a right to fish for specific purposes and Canada has a constitutional, contractual and common-law obligation to ensure that right is protected. The nature and degree of consultation is an important factor in fulfilling this obligation and may require consent in some cases.

In the specific case of northern and striped shrimp, there are additional requirements for the federal government to consult one-on-one with the parties to the Nunavut, Nunavik and Labrador land claim agreements concerning management measures and allocations in and adjacent to their settlement areas. There is a separate and concurrent process in place to consult with the Nunavut Wildlife Management Board (NWMB) and the Nunavik Marine Region Wildlife Board (NMRWB) on TACs in the EAZ and the WAZ, which is entirely within their respective settlement areas. Within these areas, the management boards have a decision-making role. The Minister can accept, reject or vary those decisions based on conservation grounds.

The major consultative mechanism in the fishery is the Northern Shrimp Advisory Committee (NSAC). It is composed of representatives of offshore licence holders, inshore licences holders, and special allocation holders, various processor, fishermen, aboriginal associations, wildlife management boards, a representative from the Nunavut and provincial government representatives from Newfoundland and Labrador, Nova Scotia, New Brunswick, Prince Edward Island and Quebec. Fishery managers, scientists and enforcement staff from DFO attend the committee and provide advice and assistance. The Director General, Resource Management Operations, DFO, Ottawa, chairs the Committee. Non-members may also attend and can participate in discussions following input from members.

NSAC meetings are held annually and as required after the following occurs:

- New proposals emerge as a result of updated domestic scientific advice or NAFO assessments of the Davis Strait, NAFO Divisions 3LNO and 3M shrimp stocks;
- Significant new management regulations are proposed by government or industry; or
- Industry conditions warrant a meeting to provide advice to the Minister.

A second consultative board, the Newfoundland and Labrador Inshore Shrimp Advisory Committee (NISAC) described in the IFMP has not met in a number of years. The inshore fleet chairpersons who represent the sub-fleet sectors described in 1.3 above now attends NSAC along with their representative association, the FFAW.

The IFMP outlines the formal structure and detailed terms of reference of the NSAC including its purpose, scope, membership and operating procedures. The committee focuses mainly on quota allocations and management measures such as seasons, size limits, gear restrictions, other conservation and compliance issues and licensing policy.

Most disputes are resolved using the representational framework in the NSAC forum. Regional managers of DFO have a particular role to play in brokering solutions on policy related issues. The ultimate appeal of last resort is to the Minister of Fisheries, who is the final authority under Canadian fisheries legislation.

There appears to be a good sense of stewardship in the fishery with fishers supplying data and otherwise participating actively in the management of the fishery. One notable initiative is the Collaborative Agreement between DFO, the Marine Institute of Memorial University, and the Northern Shrimp Research Foundation (NSRF) (DFO 2015k), a non-profit research organization funded by the offshore licence holders from proceeds of a special allocation of shrimp quota. The agreement is designed to engage a post-doc to develop a stock assessment model for northern and striped shrimp. Additionally, In the EAZ (SFA 2), fishery-independent trawl surveys have been conducted annually by the NSRF and DFO from 2006 to 2014 using commercial vessels.

In addition there is a collaborative agreement between DFO and one non-governmental organization, the WWF, the Terms of Reference of which aims to *“to achieve shared objectives for the conservation, protection, and sustainable development of Canada’s oceans as mandated by the Oceans Act”* (Anon. 2008). That agreement calls for WWF-Canada and DFO commit to regular and open communications in order to affect positive exchange of information, ensure efficiencies, and implement joint initiatives. The commitment includes:

- An annual meeting between the President of WWF-Canada and the Deputy Minister of DFO to monitor progress under the Collaborative Agreement.
- Meetings are held as necessary between the Director General, Oceans Directorate, DFO and a WWF-Canada Vice-President to review progress, discuss specific concerns, and share ideas to support this agreement. These meetings are informal but occur on a regular basis (DFO, pers. comm.).
- Senior regional staff of the two organizations will meet as necessary to review progress, discuss specific concerns, and share ideas to support this agreement and to assist, as necessary, the staff responsible for the delivery of joint activities.

Internationally, consultation also takes place as noted above between Canada and Greenland with respect to the SFA 1 shared stock with the parties seemingly focused on reaching a conservation and management agreement for the future. Meetings are planned for 2016 in order to facilitate this process (NSAC Minutes, 2015i)

The major consultative mechanism in the Greenland context is a body called “The Fisheries Council”, created pursuant to the *Fisheries Act No. 18*. Members of the Council include the Greenland Fishermen and Hunters Association, the Greenland Employer’s Association, and the Greenland Local Employers’ Association. The Council is supported by appointees from the Agency of Fisheries, Hunting and Agriculture, the Greenland Institute of Natural Resources, the Greenland Fisheries Licence Control Authority (GFLK) as well as industry members from the inshore and offshore fisheries representing crews and corporate interests. The Council is chaired by a member of the Greenland Employers Association or the Greenland Fishermen and Hunters Association in rotation; a Vice Chair is also appointed.

The Ministry discusses the scientific advice with the Fisheries Council, and considers other information, such as social and economic factors, fleet capacity, industry perceptions of the state of the stock, its geographical distribution, etc. A management plan for the fishery is then developed and subsequently adopted by the Greenland Parliament. The Plan is the result of extensive stakeholder consultation and outlines overall objectives for the fishery, the biology, assessment and status of the resource, knowledge of by-catches and fisheries and habitat management measures.

In addition, the Fisheries Council may take up in its own right fisheries issues that do not need to be referred to the Government, and may propose changes or amendments to the Management Plan as required. The Council has Government Approval to periodically request the NAFO SC to audit the Management Plan.

With respect to SFA 7, NAFO is a highly structured regional fishery management organization that provides for consultation and dispute resolution on harvest levels and other management measures for stocks under its purview, including shrimp. Consultation among stakeholders is undertaken following a formal set of rules and procedures within its constituent bodies. The NAFO FC is the major consultative forum for the management and conservation of fisheries resources. It is composed of representatives of each contracting party (a maximum of 3) along with alternates, experts and advisors.

The NAFO Rules of Procedure (NAFO 2009) obliges the Executive Secretary to invite any intergovernmental organizations that have regular contacts with NAFO as regards fisheries matters or whose work is of interest to NAFO, as well as any non-Contracting Parties identified as harvesting fishery resources in the Regulatory Area, to the annual meetings.

Non-governmental organizations (NGOs) may attend the annual meeting as observers upon application to the secretariat 100 days in advance of the meeting. The rules allow any Contracting Parties to object to an application in which case the matter is put to a vote. Any NGO admitted to a meeting of the NAFO FC may attend meetings, make oral statements during the meeting upon the invitation of the Chair, distribute documents at meetings through the Secretariat and engage in other activities as appropriate and as approved by the Chair, but may not vote.

Disputes between or among Contracting Parties about proposals before the NAFO FC are first subject to the usual discussion and negotiating process, and NAFO has a solid history of resolving most disputes through this mechanism. For disputes that cannot be resolved through this process, a formal objection procedure is provided for in Article XII. The process is complex but the end result is that a Contracting Party that submits a formal objection to a proposed measure may elect to not be bound by that measure and can even set its own quota and management measures for the stock in question. Unless a majority of Contracting Parties object to a measure, the measure becomes binding on all who do not register an objection.

Changes to the NAFO Convention had been accepted by the General Council at the time of the assessment and were awaiting ratification by Contracting Parties (2/3 majority required). Notable among the changes was a dispute resolution procedure via an impartial panel that would replace the objection procedure note above.

As one of the coastal states, Canada is obligated by Article XI (3) of the Convention to ensure consistency between its respective management measures for fishing inside Canadian waters and the measures established by NAFO for the NRA. Consequently, as the coastal state in the case of shrimp, Canada is required under this article to inform the NAFO FC of any measures and decisions it takes with respect to that portion of the stock that is fished in its zone. A footnote in the NAFO quota table requires Canada to inform the Executive Secretary of NAFO before December 1<sup>st</sup> of each year of the measures to be taken to ensure that total catches of shrimp for the upcoming year do not exceed the levels allocated.

### **3.29 Monitoring, control and surveillance (MCS)**

The Conservation and Protection Branch (C&P) is the DFO department service enforcement arm for fishing in Canadian waters. It has a staff of land-based and seagoing Fishery Officers and a complete system of MCS, including:

- At-sea observations by patrol vessels and fixed-wing aircraft
- 100% industry funded on-board observer coverage for the offshore fleet and a 10% target for the inshore fleet. Actual coverage inshore ranged from 4.5 to over 10% in the four years 2011/12-2014/15 (Table 6).
- Daily reporting of position and catch and submission of vessel fishing log books for the offshore fleet
- 100% dockside monitoring of landings of the inshore fleet by 3<sup>rd</sup> party contractors or Fishery Officers and random monitoring of the offshore fleet
- Catch and Effort database to track catch against quotas
- Electronic vessel monitoring systems (VMS) on all vessels
- A ticketing system for minor offences
- A court-based system for more serious offences which can result in fines up to \$500,000, jail terms and forfeiture of catch, vessels and gear
- Conditions of licence covering such things as mandatory sorting grate, mesh size, no shrimp discarding etc.
- On-board observer/vessel protocols for the offshore fleet to monitor catch, species, package weights, etc.

DFO advises that the offshore shrimp fleet has not had any serious compliance issues and that there is no evidence of systematic non-compliance. The inshore fleet has had 6, 9 and 3 violations over the past three years and 23, 27, 19 warnings (DFO 2016c, DFO 2016d, DFO 2016e). Whilst not a clean record, the infractions must be placed in the context of a fleet of 360 vessels fishing between 5,000 and 6,500 fishing days per year. Trips are of a few days duration (MM 2008), so this total amounts to some 1600 trips, annually.

The Greenland fishery is enforced by the Grønlands Fiskerilicenskontrol (GFLK) and the Danish Navy. Observers are carried on 84% of the offshore fleet and 10% of the inshore fleet. VMS surveillance for vessels above 90 GT is mandatory. Infractions are subject to criminal investigations by the police and, while it is difficult to break down the figures from the official police statistics, the indication is that serious infractions in the Northern shrimp fishery such as small mesh, quota breaches, failure to use fish excluding device and deliberate misreporting, are few.

### 3.30 Research plan

In response to a condition imposed during the last assessment of these stocks, a NSAC MSC Working Group composed of participants from DFO Science undertook an analysis to identify research gaps and develop a list of on-going research. DFO confirms that the elements of that plan were adopted by NSAC at its 2015 meeting (2015b). DFO notes that for various reasons including the collaborative nature of some the identified research, for example through NAFO, and considering departmental priorities, that this Plan may be subject to change. The plan consists of the following research initiatives;

- Continue to conduct research surveys of the shrimp resources to enable updating of indices (i.e., fishable biomass, SSB, recruitment indices, ageing etc.) that are used to determine relative exploitation rates, and in setting TACs.
  - In SFAs 5,6,7 (autumn DFO survey in 2HJ3KLNO; spring DFO survey in 3LNOPsn).

- In SFA4 and the EAZ (annual summer NSRF-DFO survey)
- In the WAZ (annual summer NSRF-DFO survey)
- Continue to analyse recruitment indices and various environmental covariates with the intent of developing models that will predict fishable biomass.
- Continue to conduct genetic analysis to delineate stock assessment area(s), especially for use in modelling.
- Continue the shrimp ageing project for *P. borealis* and *P. montagui*.
- Continue efforts to develop an assessment model, eventually to cover all SFAs.
- Conditional on the development of an accepted assessment model, to begin a Management Strategy Evaluation to develop modelled HCRs.
- Continue collaborative efforts with Dr. Patrick Ouellet (IML) on an International Governance Strategy project to determine the impacts of climate change upon shrimp population dynamics.
- Continue to gather and analyze information related to corals, sponges and other vulnerable marine ecosystems.
- Continue to analyze trends in the fish community (including shrimp).
- Continue diet studies of major groundfish species (predators of shrimp), and to estimate food consumption by main predator and prey groups.
- Continue to estimate overall food consumption by the fish community.
- Continue to investigate trophic level for key species (including shrimp) using diet composition and stable isotopes.
- Continue to investigate the development of fisheries production potential models.

In addition, a study has recently been published on population structure of *P. borealis* in the northwest Atlantic based on genetic studies. This should help to define the relationships between shrimp in different areas. The study was conducted by scientists based in Norway, with samples from much of the species' range in the northwest Atlantic, in which Newfoundland and Labrador researchers participated (Jorde *et al.* 2014, 2015).

Research in Greenland is the responsibility of the Greenland Institute of Natural Resources (GINR) with strong links to the scientific community in Denmark as well as substantial participation in international programs. The results of work by GNIR are published in the scientific literature, technical reports, and explained to the Fisheries Council as required.

The GINR carries out surveys, data analysis, and stock assessments for the shrimp fishery, participates in NIPAG and the NAFO Scientific Council, and provides advice to the Greenland Government via the Fisheries Council. The Institute also includes programs on marine ecology and climate change in the Greenland area.

In 2014, the GINR presented a research plan in response to a condition imposed during an assessment of the West Greenland shrimp fishery in 2013. The Plan was developed following consultations with industry and addresses priorities of industry as well as issues considered a high priority for the target stock - population dynamics and recruitment dynamics, impact of cod predation, effect of the environment, improvements to stock assessment methods and ecosystem impacts (principally on knowledge of benthic habitats and impacts of fishing). It also provides a rationale for selection of the various research priorities identified in the Plan.

## 4 Evaluation procedure

### 4.1 Harmonised fishery assessment

The MSC has detailed an approach to addressing the assessment of overlapping fisheries, where 'overlapping fisheries' are defined as 'Two or more fisheries which require assessment of some, or all, of the same aspects of MSC Principles 1, 2 and/or 3 within their respective units of certification' (MSC 2013a).

The MSC specifies the following (MSC 2013a):

*'CI3.2.3 CABs shall coordinate their assessments where a fishery under assessment overlaps with a certified fishery to make sure that key assessment products and outcomes are harmonised.'*

*CI3.2.3.1 Where an assessment overlaps with a certified fishery or fishery in assessment that a CAB has already scored, the team shall base their assessment on the rationale and scores detailed for the previously scored fishery.*

*CI3.2.3.2 To achieve harmonisation, CABs shall undertake the following key activities:*

- a. The use of complementary assessment trees.*
- b. The sharing of fishery information.*
- c. The achievement of consistent conclusions with respect to evaluation, scoring and conditions.*

*CI3.2.3.3 The team shall explain and justify any difference in the scores in the scoring rationale for relevant PIs.*

At the time of writing (February 2016), the West Greenland Coldwater Prawn fishery overlaps with UoC 1 (SFA 1) of the CNSSF for P1 PIs and PI 3.1.1. Several other fisheries for northern shrimp are certified or in assessment, including the Canada Scotian Shelf Northern Prawn Trawl Fishery and the Gulf of St Lawrence Northern Shrimp Fishery, as well as others in the north-eastern Atlantic. These other fisheries were not considered for harmonisation because the stocks do not overlap (Principle 1), environmental considerations may be different (Principle 2), and the management regimes are not the same (Principle 3). There are also a number of certified Canadian groundfish fisheries in the Northwest Atlantic, but these were not considered for harmonisation because of being focused on different species with different gear types, and with different specific management approaches.

The assessment report for the West Greenland Coldwater Prawn Fishery formed an important background resource for the assessment team, and was considered for harmonisation.

A brief indication of any differences of  $\geq 15$  in the score between the CNSSF and the West Greenland fishery is provided in Table 12, below. A difference of 5-10 in the score may be due to interpretation of the assessment teams, and has not been commented on unless it resulted in a condition being set on only one of the fisheries.

**Table 12:** PI scores for the CNSSF and the West Greenland Coldwater Prawn Fishery.  
– Yellow highlighted cells indicate where there was a difference in score of  $\geq 15$  between the CNSSF and the West Greenland fishery.

	Canada Northern and Striped Shrimp	West Greenland Coldwater Prawn	
PI	UoC 1	-	Rationale for $\geq 15$ differences in scoring
1.1.1	100	100	n/a
1.1.2	90	90	n/a
1.1.3	n/a	n/a	n/a
1.2.1	85	70	UoC 1 – WGCP: The existing condition on PI 1.2.1 for the CNSSF was closed out at reassessment due to the introduction of a Canadian harvest strategy for SFA 1 that incorporates consideration of harvest levels as advised by NAFO SC. The CNSSF is ahead in the audit schedule, but the WGCP CAB and audit team leader is aware of the harmonisation issue.
1.2.2	80	75	UoC 1 – WGCP: The existing condition on PI 1.2.2 for the CNSSF was closed out at reassessment due to the introduction of a Canadian harvest control rules for SFA 1 that incorporates consideration of harvest levels as advised by NAFO SC. The CNSSF is ahead in the audit schedule, but the WGCP CAB and audit team leader is aware of the harmonisation issue.
1.2.3	100	90	n/a
1.2.4	95	85	n/a
3.1.1	75	90	UoC 1 – WGCP: The CNSSF assessment team considered there to be insufficient evidence of organised and effective cooperation between the Canadian and Greenland management authorities in order to meet SG80 for Sla; a Condition was therefore set on the CNSSF at reassessment. It is noted that the West Greenland fishery was certified under the Fisheries Assessment Methodology (FAM) version of the assessment tree, which was the default standard prior to the introduction of the Certification Requirements v.1.3 default standard assessment tree. The FAM tree did not include the requirement under PI 3.1.1 for 'organised and effective cooperation with other parties where necessary'. Therefore, there is no harmonisation issue for PI 3.1.1. at this stage; however, it is expected that harmonisation on PI 3.1.1 would be required at the next assessment of the West Greenland fishery in order to update that assessment to the v.1.3 (or v.2.0) standard. The CNSSF is ahead in the audit schedule, but the WGCP CAB and audit team leader is aware of the harmonisation issue.

## 4.2 Previous assessments

The CNSSF was assessed previously against the MSC Standard, with UoC 1 being certified as sustainable on the 20<sup>th</sup> March 2012, and the other UoCs being certified earlier on the 23<sup>rd</sup> June 2011. This report therefore presents the results of the second assessment of this fishery against the MSC Standard. The web page address for the original assessment is: <https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/Canada-offshore-northern-and-striped-shrimp/assessment-downloads>.

In general, the strengths and weaknesses of the CNSSF were considered to be the following (from Aschan *et al.* 2011a, Aschan *et al.* 2011b, Aschan *et al.* 2012):

**Principle 1** – It is highly likely that the stock is above the point where recruitment would be impaired; there is considerable information available regarding the stock both through detailed monitoring of the fishery and fishery independent monitoring and research to support the quota levels and harvest strategy.

**Principle 2** –The use of the Nordmore grate helps to ensure that bycatch of other fish species is kept to a minimum; the 100% observer coverage (offshore) and dockside landings coverage provides high confidence in the monitoring data collected for target and other bycatch and discarded species.

**Principle 3** - The management system exists within an appropriate and effective legal and/or customary framework; the management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach; there is a very comprehensive monitoring and surveillance system in place; there is a high level of compliance in the fishery.

Eight conditions were set on all UoCs in the original assessment, and these are detailed in Table 13. Two additional conditions were set on the northern shrimp fishery in SFA 1, and these are detailed in Table 14. One additional condition was set on the northern shrimp fishery in SFA 7, and this is detailed in Table 15.

**Table 13:** Compliance with conditions set at original certification – all UoCs.

#	PI	Closed?	Justification
1	2.4.1 The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.	Closed Year 4 (Year 3 for SFA 1)  (rescored at 100)	The Year 3 Audit Report noted that following the process outlined in DFO’s Ecological Risk Assessment Framework (ERAF) for coldwater corals and sponge dominated communities (DFO 2013), CAPP (2015) summarizes the proportion of sensitive and total habitats impacted by trawls in a three-year period (2009-2011). If more than 10% of sensitive habitats is impacted, a further risk analysis is conducted. Although not part of the DFO ERAF, the document summarizes footprint on non-sensitive habitats (i.e. those not characterized as sensitive) as well as on sensitive habitats. If more than 30% of non-sensitive habitats is impacted a further risk analysis is to be conducted. CAPP (2015) concludes that under the current fishing strategy, areas impacted by trawls in the various SFAs are below the threshold values. In the EAZ, WAZ and SFA 4, industry has undertaken to implement a voluntary fishery closure in an area where the footprint overlaps an identified sensitive area. It was determined 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, and so the condition was met.
2	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.	Closed Year 4 (Year 3 for SFA 1) (rescored at 80)	See Condition 3. The Year 3 Audit Team considered that evidence had been provided that showed a partial strategy is in place such that the fishery is expected to be highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm; there is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or habitats involved; and the partial strategy is being implemented successfully. It was therefore determined that the Condition had been met.

3	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.	Closed Year 4 (Year 3 for SFA 1) (rescored at 80)	See Condition 3. The Year 3 Audit Team considered that evidence had been provided that showed 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). It was therefore determined that the Condition had been met.
4	2.5.1 The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function	Closed Year 4 (Year 3 for SFA 1) (rescored at 90)	See Condition 3. The Year 3 Audit Team considered that evidence had been provided that showed the fishery is highly unlikely to disrupt benthic community structure and function to a point where there would be serious or irreversible harm. It was therefore determined that the Condition had been met.
5	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.	Closed Year 4 (Year 3 for SFA 1) (rescored at 85)	See Condition 3. The Year 3 Audit Team considered that evidence had been provided that showed there is a partial strategy in place that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem – in particular the non-catch impacts on benthic communities - to achieve the Ecosystem Outcome 80 level of performance; the partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems); and the measures comprising the partial strategy are being implemented successfully. It was therefore determined that the Condition had been met.
6	2.5.3 There is adequate knowledge of the impacts of the fishery on the ecosystem.	Closed Year 4 (Year 3 for SFA 1) (rescored at 80)	See Condition 3. The Year 3 Audit Team considered that evidence had been provided that showed sufficient information is available on the impacts of the fishery on benthic communities to allow some of the main consequences for the ecosystem to be inferred; and 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). It was therefore determined that the Condition had been met.
7	3.2.1 The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.	Closed Year 1 (rescored at 80)	The Audit Team confirmed that an expanded set of objectives, strategies and management measures was added to section 1.1 of the IFMP at the request of the MSC Working Group of the Northern Shrimp Advisory Committee. Long term objectives related to mitigating impacts on habitats, protecting biodiversity and ecosystem structure and function, and explicitly recognizing the role of shrimp as a forage species in setting TACs were added, along with strategies and management measures related to these. As such, the suite of long-range objectives explicitly defined in the IFMP now covers the range of P1 and P2 issues as required by the 80SG related to this PI. It was therefore determined that the Condition had been met.

<b>8</b>	3.2.4 The fishery has a research plan that addresses the information needs of management.	Closed Year 4 (Year 3 for SFA 1) (rescored at 80)	At the May 2013 meeting of the NSAC MSC Working Group, participants from DFO Science undertook to review respective checklist data (gap analysis) and develop a list of on-going research. The research elements were reviewed at a subsequent meeting of the MSC Working Group, and the Research Plan was adopted at the March 2015 meeting of NSAC. It was concluded that there is a research plan, and so the condition was closed.
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**Table 14:** Compliance with additional conditions: Northern shrimp in SFA 1.

#	PI	Closed?	Justification
<b>1</b>	1.2.1 There is a robust and precautionary harvest strategy in place.	Closed Reassessment (Year 4 for SFA 1) (rescored at 85)	<p>SFA 1 was certified 9 months after the other UoCs, with the current fishery certificate expiring in March 2017.</p> <p>At the Year 3 audit for SFA 1 (report published November 2015), it was noted that DFO has agreed to proceed with the development of harvest control rules pending an agreement being reached with Greenland, with the Client's expectation that the harvest strategy and the harvest control rules will be adopted by DFO by the first quarter of 2016.</p> <p>Prior to reassessment, it was determined that Canada had introduced a harvest strategy which works to achieve management objectives reflected in the target and limit reference points. This was independent of any measures introduced in Greenland, but was considered to meet the SG80 level of performance for SIs a and b. SId was also scored at 100 because the harvest strategy is periodically reviewed and improved as necessary, so justifying an overall score of 85 for this PI.</p>
<b>2</b>	1.2.2 There are well defined and effective harvest control rules in place.	Closed Reassessment (Year 4 for SFA 1) (rescored at 80)	<p>SFA 1 was certified 9 months after the other UoCs, with the current fishery certificate expiring in March 2017.</p> <p>At the Year 3 audit for SFA 1 (report published November 2015), it was noted that DFO has agreed to proceed with the development of harvest control rules pending an agreement being reached with Greenland, with the Client's expectation that the harvest strategy and the harvest control rules will be adopted by DFO by the first quarter of 2016.</p> <p>Prior to reassessment, DFO outlined a set of HCRs indicating management actions to take when the stock is in the healthy or cautious zones, with additional measures considered in the case of steep declines (<math>\geq 25\%</math>) in the cautious zone. This was determined to meet the SG80 level of performance for all relevant SIs.</p>

**Table 15:** Compliance with additional condition: Northern shrimp in SFA 7.

#	PI	Closed?	Justification
<b>1</b>	1.2.2 Sla: Well defined harvest control rules are in place that are consistent with the harvest	Closed Year 4 (rescored at 80)	<p>At the Year 4 audit, the client referred to a letter from Sylvie Lapointe, Acting Director General, Fisheries Resource Management in DFO (June 9, 2015), indicating that "<i>due to the closure to commercial fishing for 2015, NAFO has suspended the development of HCRs for 3LNO (SFA7)</i>".</p> <p>The Audit Team noted that HCRs equivalent to those for the EAZ, WAZ and SFAs 4-6 are included in the IFMP. NAFO,</p>

	strategy and ensure that the exploitation rate is reduced as limit reference points are approached.		that holds management responsibility for this stock, has suspended development of HCRs for it as the fishery has been closed in 2015. Although this decision was not the result of formal HCRs, it is the result of a <i>de facto</i> harvest control strategy of closing the fishery when the stock is below the NAFO-defined LRP. The <i>de facto</i> NAFO harvest control strategy is more conservative than the strategy outlined by the HCRs for this stock in the IFMP, that is, the NAFO defined LRP below which fishing has been closed is set at a higher level than the LRP in the IFMP. Pending information on future stock trends and NAFO management measures, it was concluded that the client has met the requirement to have clear HCRs in the IFMP, and that the stock is being managed by NAFO in a precautionary manner using a <i>de facto</i> harvest control strategy, consistent with the Canadian HCRs. It was therefore determined that the Condition had been met.
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After these conditions were closed out and the relevant PIs rescored, the overall Principle scores for the different UoCs of the CNSSF under the original certification are provided in Table 16.

**Table 16:** Scores for UoCs of first certification of the CNSSF, after accounting for conditions being closed out.

UoC	Principle 1	Principle 2	Principle 3	Comments
SFA 1	85.0	89.7	87.8	All conditions closed by reassessment
Northern shrimp SFAs 2,3,4	86.3	89.0	89.0	All conditions closed by Year 4
Striped shrimp SFAs 2,3,4	80.0	89.0	89.0	All conditions closed by Year 4
SFAs 5,6	86.3	89.0	89.0	All conditions closed by Year 4
SFA 7	88.1	90.3	84.1	All conditions closed by Year 4

### 4.3 Assessment methodologies

The CNSSF was reassessed using version 1.3 of the MSC Certification Requirements and version 1.3 of the MSC Full Assessment Reporting Template.

#### 4.3.1 Assessment tree

The reassessment has used the Default Assessment Tree, with no modifications.

### 4.4 Evaluation processes and techniques

#### 4.4.1 Site visit

During week commencing 22<sup>nd</sup> June 2015, Ian Scott and Howard Powles of the assessment team undertook a site visit to St. John's, Newfoundland and Labrador. The intention was to hold meetings with the client and DFO science and management personnel, as well as provide good opportunity for other stakeholders in the fishery to meet with the assessment team.

Meetings were held as follows:

June 24<sup>th</sup> 2015: Client

Individual	Affiliation
Ian Scott	Acoura Marine (Lead Assessor)
Howard Powles	Acoura Marine
Bruce Chapman	CAPP
Derek Butler	ASP
Phil Barnes	Fogo Island Coop
Ken Butler	Fogo Island Coop

June 24<sup>th</sup> 2015: Client + DFO

Individual	Affiliation
Ian Scott	Acoura Marine (Lead Assessor)
Howard Powles	Acoura Marine
Bruce Chapman	CAPP
Derek Butler	ASP
Phil Barnes	Fogo Island Coop
Ken Butler	Fogo Island Coop
Don Stansbury	DFO Science
Chad Ward	DFO C&P
Annette Rumbolt	DFO RM
Brooks Pilgrim	DFO Policy
Katherine Skanes	DFO Science
Mariano Cohen-Alfonso	DFO Science
Leigh Edgar (telephone)	DFO RM NHQ
Tim Siferd	DFO

It is noted that Ian Scott's stood down from his role as Lead Assessor and P3 Expert for the reassessment of the fishery in October 2015. The Lead Assessor role was subsequently taken up by Dr. Rob Blyth-Skyrme, while Mr. John Angel took up the Principle 3 role. More information can be found on the MSC webpage for the fishery, here: <https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/Canada-offshore-northern-and-striped-shrimp/re-assessment-downloads-1>.

**4.4.2 Evaluation techniques**

**4.4.2.1 Public consultation**

A total of twenty-four stakeholders who had been identified in the initial assessment of the fishery and subsequent surveillance audits were directly notified by email of the 4<sup>th</sup> audit and re-assessment of the CNSSF. The interest of others not appearing on this list was solicited through the postings on the MSC website.

The David Suzuki Foundation and the Ecology Action Centre provided written comment on the analysis of habitat impacts of the fishery, to be considered both in relation to the audit and to the reassessment.

**4.4.2.2 Process**

The MSC is dedicated to promoting 'well-managed' and 'sustainable' fisheries, and the MSC initiative focuses on identifying such fisheries through means of independent third-party assessments and certification. Once certified, fisheries are awarded the opportunity to utilise

the MSC eco-label to gain market acceptance and potential economic advantages in the marketplace.

The MSC Principles and Criteria for Sustainable Fisheries form the standard against which each fishery is assessed, and are organised in terms of three principles:

**MSC Principle 1** - Resource Sustainability

**MSC Principle 2** - Ecosystem Sustainability

**MSC Principle 3** - Management Systems

A fuller description of the MSC Principles and Criteria and a graphical representation of the assessment tree is presented in Section 8 of this report.

The MSC Principles and Criteria provide the overall requirements necessary for certification of a sustainably managed fishery. To facilitate assessment of any given fishery against this standard, these Criteria are further split into Sub-criteria. Sub-criteria represent separate areas of important information (e.g. Sub-criterion 1.1.1. requires a sufficient level of information on the target species and stock, 1.1.2 requires information on the effects of the fishery on the stock and so on). These Sub-criteria, therefore, provide a detailed checklist of factors necessary to meet the MSC Criteria in the same way as the Criteria provide the factors necessary to meet each Principle.

Below each Sub-criterion, individual 'Performance Indicators' (PIs) are identified. It is at this level that the performance of the fishery is measured. Altogether, assessment of a fishery against the MSC standard is achieved through measurement of 31 Performance Indicators. The Principles and their supporting Criteria, Sub-criteria and Performance Indicators that have been used by the assessment team to assess this fishery are incorporated into the scoring sheets (see Appendix 1).

Scoring of the attributes of a fishery against the MSC Principles and Criteria involves the following process:

1. Determination that the MSC Default Assessment Tree contained within the MSC Certification Requirements (Annex CB) will be used (or, if announced in the stakeholder notification, a different Assessment Tree).
2. Description of the fishery and if/how it meets each Scoring Guidepost (60, 80, 100) for each Scoring Issue within a Performance Indicator.
3. Allocation of a score (out of 100) to each Performance Indicator

The Scoring Guideposts are presented in the scoring table and describe the level of performance necessary to achieve **100** (represents the level of performance for a Scoring Issue that would be expected in a theoretically 'perfect' fishery), **80** (defines the unconditional pass mark for each Scoring Issue), and **60** (defines the minimum, conditional pass mark for each Scoring Issue). The Assessment Tree and Scoring Guideposts for the CNSSF are shown in Section 8 of this report.

#### **4.4.2.3 Scoring outcomes**

There are two, coupled, scoring requirements that constitute the Marine Stewardship Council's minimum threshold for a sustainable fishery:

1. The fishery must obtain a score of 80 or more for each of the MSC's three Principles, based on the weighted average score for all Performance Indicators under each Principle.
2. The fishery must obtain a score of 60 or more for each Performance Indicator.

A score below 80 at the Principle level or 60 for any individual Performance Indicator would represent a level of performance that causes the fishery to automatically fail the assessment; a score of 80 or above for all three Principles results in a pass.

Note that where there is only one Scoring Issue in the SG, the issue can be partially scored – in this case the Assessment Team is able to use their judgement to determine what proportion of it was met. For example, at the SG100 level, if a small part was met = 85, if about half met = 90, and nearly all met = 95.

The scores were decided as follows:

How many scoring issues met?	SG60	SG80	SG100
All	60	80	100
Half	FAIL	70	90
Less than half	FAIL	65	85
More than half	FAIL	75	95

#### 4.4.2.4 Scoring elements

The set of scoring elements (e.g. species or habitats) that have been considered in each outcome PI in Principles 1 and 2 are listed in Table 17, below.

**Table 17:** Scoring elements for the CNSSF.

Component	Scoring elements	Main or not main	Data-deficient?
P1: Outcome	• SFA 1 Northern shrimp	Target spp.	No
	• EAZ, WAZ and SFA 4 northern shrimp	Target spp.	No
	• EAZ, WAZ and SFA 4 striped shrimp	Target spp.	No
	• SFA 5 northern shrimp	Target spp.	No
	• SFA 6 northern shrimp	Target spp.	No
	• SFA 7 northern shrimp	Target spp.	No
P2: Retained	• Striped shrimp	Not main (UoC 1 only)	No
P2: Bycatch	• American plaice – <i>Hippoglossoides platessoides</i>	Main	No
	• Atlantic cod – <i>Gadus morhua</i>	Main	No
	• Atlantic wolffish – <i>Anarhichas lupus</i>	Main	Mo
	• Redfishes – <i>Sebastes mentella</i> / <i>S. fasciatus</i>	Main	No
	• Arctic cod – <i>Arctogadus glacialis</i>	Not main	No
	• Lanternfishes - Myctophidae	Not main	No
	• Capelin – <i>Mallotus villosus</i>	Not main	No
P2:	• Northern wolffish – <i>Anarhichas denticulatus</i>	ETP	No

ETP	<ul style="list-style-type: none"> <li>Spotted wolffish – <i>Anarhichas minor</i></li> </ul>	ETP	No
P2: Habitats	<ul style="list-style-type: none"> <li>Habitats of SFA 1, the EAZ, WAZ and SFAs 4-7, specifically in depths of 200-500 m, comprising sand, mud or mixed sediments offshore, with patches of higher relief and rock or reef areas, and epibenthic structuring species contributing to habitat quality</li> </ul>	N/A	No
P2: Ecosystem	<ul style="list-style-type: none"> <li>The SFA 1, EAZ, WAZ and SFAs 4-7 ecosystem, specifically northern and striped shrimp as benthopelagic foragers and prey species, main retained and bycatch species as predators and prey, ETP species that are vulnerable to capture in the CNSSF, and epibenthic species and communities within SFAs 1-7.</li> </ul>	N/A	No

## 5 Traceability

### 5.1 Eligibility date

The Eligibility Date for the CNSSF is 4<sup>th</sup> October 2016, when the Public Certification Report was published.

It is noted that SFA 1 was certified later than the other UoCs, on 20<sup>th</sup> March 2012, and so the certification period for that part of the fishery ends on the 19<sup>th</sup> March 2017. Following a variation request granted by the MSC, the certificates for the previous certification period for UoCs 1-5 will remain valid until 19<sup>th</sup> December 2016 (cutting short UoC 1's certificate and extending UoCs 2-5's), with new certificates for all UoCs issued on 20<sup>th</sup> December 2016 which will be valid for five years. This brings the certification periods of all UoCs together to enable a more streamlined and cost-effective audit process for the whole fishery. The certificate anniversary date will be treated as 20<sup>th</sup> December 2016 and certificate activity planned accordingly.

All traceability and segregation systems as appropriate for products from the CNSSF are already in place for this fishery as part of the existing certification. The measures taken by the fishery and the client to account for traceability risks are detailed in the rest of this section.

### 5.2 Traceability within the fishery

Traceability up to the point of first landing has been scrutinised as part of this assessment and the results reflect that the systems in place are deemed adequate to ensure products are caught in a legal manner and are accurately recorded.

With respect to traceability within the operation of the fishery, existing fisheries management requirements include the clear identification of species, quantity, fishing method and area of capture by all vessels landing fish from the fishery. The report and scoring texts describe these systems in more detail, but briefly traceability can be verified by:

- The vessels are remotely monitored with an hourly VMS at all times while fishing.
- Offshore vessels must hail-out prior to leaving port and both inshore and offshore vessels must hail-in prior to returning to port.
- All catches are reported in logbooks, by dockside monitors (inshore only), weigh-out slips (offshore vessels) and through daily radio or e-mail hail-ins and by observers.
- At-sea monitoring is undertaken via enforcement aircraft and vessels, and by fishery observers (100% coverage offshore, 5% coverage inshore).
- Vessels are not permitted to direct for both shrimp and other species on the same fishing trip without an observer (there are no trips targeting both shrimp and another species).
- Trans-shipping of products is not permitted in Canadian fisheries, except through special authorisation from DFO; transshipping does not occur in the CNSSF.
- All landings from inshore vessels are 100% dockside monitored.
- Landings from offshore vessels are not dockside monitored because offshore operations are 100% monitored by at-sea observers.
- Offshore, there is a reconciliation process between the observer recorded landings, the fishing logbook and the production logbook of the vessel.
- Cross referencing of logbooks, VMS aerial and at-sea surveillance reports also ensures that shrimp catches are reported from the correct area of capture.
- All vessels engaged in the fishery are part of the Fisheries Certificate (inshore harvesters) or part of the client group (inshore processors and offshore harvesters).

There are no other Canadian vessels engaged in fishing for northern and striped shrimp in the area of the CNSSF.

### **5.2.1 Description of tracking, tracing and segregation systems within the fishery and management systems in place relating to traceability**

All traceability and segregation systems as appropriate for products are already in place for the CNSSF as part of the clients' existing certification. No other Canadian vessels are engaged in fishing for northern and striped shrimp in the area of the CNSSF, and it is considered that there are no risks of mixing or substituting catch prior to or at the point of landing.

### **5.2.2 Evaluation of risk of vessels fishing outside of UoC**

It is considered that there is no opportunity for the vessels currently engaged in the CNSSF to fish outside the Units of Certification, and that at-sea monitoring eliminates the potential for trans-shipping as far as it is possible to do so.

### **5.2.3 Risk of substitution of mixing certified and non-certified catch prior to point of landing**

There are no other Canadian vessels targeting shrimp in the area of the CNSSF, and the catch of shrimp by non-shrimp vessels is very unlikely to occur given the size-selectivity of the larger-mesh gears employed in other fisheries.

Together with existing quota management controls, it is considered that the monitoring in place eliminates the potential for substitution of shrimp from the CNSSF with non-certified products prior to and at the point of landing.

### **5.2.4 At-sea processing**

Offshore: More than 80% of the shrimp are landed as individually quick frozen (IQF), packaged product. Up to 20% are landed as 1kg horizontal plate frozen packs. All offshore product is labelled as to product, form, vessel and production date.

Inshore: Product is bagged and landed fresh. Vessel identifiers are tagged to the loads upon landing to ensure that landings may be linked to the vessels.

### **5.2.5 Trans-shipment**

Trans-shipping of products is not permitted in the CNSSF except through special authorisation from DFO.

### **5.2.6 Eligibility to enter further chains of custody**

The limit of identification of landings is the landing of *Pandalus borealis* and *P. montagui* by client group member vessels at recognised ports where appropriate recording and monitoring of landings takes place.

CNSSF licence holders utilizing vessels registered with DFO and fishing with trawl gear will be eligible to sell MSC certified northern shrimp (*P. borealis*) and striped shrimp (*P. montagui*) for a further certification period if the fishery is recertified.

It is noted that, in the case of fresh shrimp, the landing is the point of first sale; for offshore vessels selling product on a 'delivered' basis, the point of first sale is not at landing. In both cases, *P. borealis* and *P. montagui* products landed by companies from

the client group are eligible to enter further chains of custody. Any companies buying from CNSSF vessels owned by the client group member companies (including client group companies buying directly from other client group companies) must seek chain of custody certification in order to sell CNSSF products as MSC certified.

### **5.2.7 Eligible points of landing**

Subject to the availability of dockside monitoring facilities, there is no restriction on the ports that the inshore vessels may use in Newfoundland and Labrador. The main ports of landing by the offshore vessels are: Newfoundland (Bay Roberts, Harbour Grace and sometimes St Anthony) and Nova Scotia (Country Harbour and North Sydney). Landings may also be made into Greenland (e.g., Nuuk), where vessels undergo rigorous inspection and catch validation. There are no known risk factors after the point of landing that may influence subsequent chain of custody assessments. Chain of custody should begin from the first point of landing.

### **5.2.8 Parties eligible to use the fishery certificate**

Approximately 300 vessels currently prosecute the CNSSF. As such, the client representative will maintain and provide the CAB and the MSC with an up to date list of eligible client group vessels upon request.

This vessel list will be generated through the ASP's size and quality grading system, which means the ASP maintains a list of all the active vessels in the fishery at any time. DFO also maintains a list of active vessels in any year.

## **5.3 Eligibility of inseparable or practically inseparable (IPI) stock(s) to enter further chains of custody**

In the EAZ, WAZ and SFA 4 (UoCs 2 and 3) striped and northern shrimp are assessed and managed actively, and both species are certified separately as MSC target species. Bycatch of either species in tows targeting the other in these areas is accounted for in assessments.

In UoCs 1, 4, 5 and 6, and noting that striped shrimp are practically inseparable from northern shrimp during normal fishing operations, catches of striped shrimp must be considered as Inseparable / Practically Inseparable (IPI) species, as required under section 27.4.9 of the MSC Certification Requirements v.1.3.

Insignificant quantities of striped shrimp have historically been taken with northern shrimp in SFA 1 (UoC 1), as the fishing area is well offshore, and is considered to be outside the typical range of striped shrimp (Kingsley 2011); in the period 1999-2007 catches of striped shrimp were zero in most years, a maximum of 0.05 t in one year (Siferd 2010). However, more recent information indicates that striped shrimp can make up a larger proportion of the catch (e.g., Table 7).

For the determination of striped shrimp as IPI for this reassessment of the CNSSF, whole-year catch data were available for 2014 (Table 18).

These data show that striped shrimp made up 2.81% of the SFA 1 catch in 2014, and so striped shrimp must be considered under the retained catch PIs (i.e., PIs.2.1.1 – 2.1.3).

In SFAs 5-7 (UoCs 4-6) catches of striped shrimp in northern shrimp fisheries comprised less than 1% of the total shrimp catch. These proportions are consistent with the levels observed in past years (Orr *et al.* 2008) (Table 8), and so an exemption to the IPI requirements was sought from the MSC for this reassessment for striped shrimp catches in UoCs 4, 5 and 6.

**Table 18:** Catch of striped shrimp in northern shrimp fisheries, UoCs 1, 4, 5 and 6.  
Source: DFO Catch Statistics for 2014.

UoC	SFA	Northern Shrimp (t)	Striped Shrimp (t)	% Striped
1	1	4,793	139	2.81
4	5	21,748	176	0.80
5	6	46,309	320	0.69
6	7	1,769	-	0.00

In accordance with CR v2.0 7.4.14.2 a i & ii, it is noted that the striped shrimp has a similar distribution to northern shrimp, but that it is typically found in shallower water and over harder seabeds than northern shrimp (Bergstrom 2000). DFO (2015a) report that striped shrimp typically prefer cooler temperatures (-1° to 2°C) than northern shrimp (0°-4°C). Furthermore, while stock structure has not been studied in striped shrimp, given the long planktonic larval period it is likely that, as with northern shrimp (Jorde et al 2015), there would be little population substructure over the species range in Atlantic Canada. The population should thus be considered a single population or metapopulation in the fishery area.

Overall, the small quantities taken and the somewhat different distribution of striped shrimp in comparison to northern shrimp ensures that the total catch of striped shrimp in UoCs 1, 4, 5 and 6 does not create a significant impact on the IPI stock as a whole.

A Variation Request to allow striped shrimp from UoCs 1, 4, 5, and 6 to enter in to certified chains of custody was submitted, and notification of the MSC's acceptance of the Variation Request was posted online on March 29<sup>th</sup> 2016 (<https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/Canada-offshore-northern-and-striped-shrimp/re-assessment-downloads-1>).

## 6 Evaluation results

### 6.1 Principle level scores

**Table 19:** Final principle scores for each UoC.

Principle	UoC					
	1	2	3	4	5	6
Principle 1 – Target Species	92.5	88.8	82.5	91.3	86.3	<60
Principle 2 – Ecosystem	89.7	93.0	93.0	92.0	92.0	92.7
Principle 3 – Management	89.3	91.8	91.8	90.3	90.3	86.8

### 6.2 Summary of scores

**Table 20:** Final performance indicator scores for each UoC.

Principle	Component	Performance Indicator (PI)	UoC					
			1	2	3	4	5	6
1	Outcome	1.1.1 Stock status	100	100	80	100	80	60
		1.1.2 Reference points	90	80	75	80	80	80
		1.1.3 Stock rebuilding	-	-	-	-	-	<60
	Management	1.2.1 Harvest strategy	85	95	95	95	95	95
		1.2.2 Harvest control rules & tools	80	85	85	85	85	85
		1.2.3 Information & monitoring	100	80	80	100	100	100
		1.2.4 Assessment of stock status	95	90	90	90	90	90
2	Retained species	2.1.1 Outcome	80	100	100	100	100	100
		2.1.2 Management	85	100	100	100	100	100
		2.1.3 Information	80	100	100	100	100	100
	Bycatch species	2.2.1 Outcome	80	80	80	80	80	80
		2.2.2 Management	100	100	100	100	100	100
		2.2.3 Information	100	95	95	75	75	75
	ETP species	2.3.1 Outcome	95	95	95	95	95	95
		2.3.2 Management	100	100	100	100	100	100
		2.3.3 Information	95	95	95	95	95	95
	Habitats	2.4.1 Outcome	90	90	90	90	90	90
		2.4.2 Management	80	80	80	80	80	80
		2.4.3 Information	80	80	80	85	85	85
	Ecosystem	2.5.1 Outcome	100	100	100	100	100	100
		2.5.2 Management	90	90	90	90	90	90
		2.5.3 Information	90	90	90	90	90	90
3	Governance and policy	3.1.1 Legal & customary framework	75	95	95	95	95	95
		3.1.2 Consultation, roles & responsibilities	95	95	95	95	95	95
		3.1.3 Long term objectives	100	100	100	100	100	80
		3.1.4 Incentives for sustainable fishing	80	80	80	80	80	80
	Fishery specific management system	3.2.1 Fishery specific objectives	90	90	90	90	90	80
		3.2.2 Decision making processes	85	85	85	85	85	85
		3.2.3 Compliance & enforcement	100	100	100	85	85	85
		3.2.4 Research plan	100	100	100	100	100	100
		3.2.5 Management performance evaluation	80	80	80	80	80	80

## 6.3 Summary of conditions

**Table 21:** Summary of conditions on the CNSSF.

Condition number	Condition	Performance Indicator	Related to previously raised condition?
1	UoC 3: By Year 4, the client shall demonstrate that reference points are appropriate for the stock and can be estimated.	PI 1.1.2 (Sla)	No
2	UoCs 4 and 5: By Year 4, the client shall demonstrate 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).	PI 2.2.3 (Sld)	No
3	UoC 1: By Year 4, the client shall demonstrate that 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	PI 3.1.1 (Sla)	Yes (see details in Section Appendix 3)

As per CR v2.0 7.21.2.2 for fisheries which fail the conditions which would be set shall be set out. In the case of UoC 6, which did not meet the minimum requirement for PI 1.1.3, there were two conditions set (on PI 1.1.1 and PI 2.2.3). These conditions are non-binding and serve to provide an indication of the actions that may have been required should the fishery have been certified (CR v2.0 7.21.2.3).

4 (Non-binding as UoC 6 fails)	UoC 6: By Year 4, the client shall demonstrate that it is highly likely that the stock is above the point where recruitment would be impaired, and that the stock is at or fluctuating around its target reference point.”	PI 1.1.1 (Sla and Slb).	No
5 (Non-binding as UoC 6 fails)	UoC 6: By Year 4, the client shall demonstrate 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).	PI 2.2.3 (Sld)	No

## 6.4 Recommendations

The Assessment Team has identified one non-binding recommendation for the CNSSF, as follows:

**Recommendation 1:** (UoC 2, PI 1.1.2)

The client should seek to ensure that new reference points are defined for northern shrimp in the WAZ within 4 years, to replace those used previously but no longer considered valid because the survey time series is considered too short.

## **6.5 Determination, formal conclusion and agreement**

UoCs 1-5 of the CNSSF attained scores of 80 or more against each of the MSC Principles and did not score less than 60 against any MSC Criteria.

It is therefore determined that UoCs 1-5 of the Canadian Northern and Striped Shrimp Fishery should be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

UoC 6 (covering SFA 7) is not considered to meet the MSC Standard because no timeframe has been set for the rebuilding of the SFA 7 stock.

The decision to uphold this determination was confirmed by Acoura Marine's decision making entity following a recommendation by the assessment team, and review by stakeholders and peer-reviewers.

## 7 References

### 7.1 General

- AG. 1999. "1999 April Report of the Auditor General of Canada. Chapter 4—Fisheries and Oceans— Managing Atlantic Shellfish in a Sustainable Manner." Ottawa, ON Canada.
- AG. 2009. "Auditor General of Canada, 2009 Spring Report of the Commissioner of the Environment and Sustainable Development." Ottawa, ON Canada.
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- Worm, B. and R. A. Myers 2003. Meta-analysis of cod-shrimp interactions reveals top-down control in oceanic food webs. Ecology 84: 162-173

## 7.2 Agreements

UN Convention on the Law of the Sea (United Nations, December 10, 1982)

United Nations Fish Stocks Agreement Relating to the Conservation and Management of Straddling and Highly Migratory Fish Stocks (United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks Sixth Session New York, 24 July-4 August 1995)

UN Code of Conduct for Responsible Fisheries, 1985 (Food and Agriculture Organization of the United Nations)

Collaborative Agreement Between Fisheries and Oceans Canada (DFO) and World Wildlife Fund Canada, October 7, 2008

## 7.3 Case law

1985. R v. Sparrow. [1990] 1 S, C, R, 1075.

1999. R. v. Marshall. [1999] 3 S.C.R. 456.

2004. Haida Nation v. British Columbia (Minister of Forests). [2004] 3 S.C.R. 511.

2006. Larocque v. Canada (Minister of Fisheries and Oceans). [2006] 4 F.C.R. D-41.

2008. Saulnier v. Royal Bank of Canada. [2008] 3 S.C.R. 166, 2008 SCC 58

## 7.4 Land claim agreements

1993 – Agreement between The Inuit of the Nunavut Settlement Area and Her Majesty The Queen in Right of Canada, 1993

2005 – Labrador Inuit Land Claims Agreement Act (S.C. 2005, c. 27)

2006 – Agreement Between Nunavik Inuit and Her Majesty The Queen in Right of Canada Concerning Nunavik Inuit Land Claims, 2006

## **7.5 Legislation**

### **7.5.1 Canada**

Atlantic Fishery Regulations, 1985, SOR/86-21.

Coastal Fisheries Protection Act, (R.S.C., 1985, C. C-33), 2007.

Constitution Act 1867.

Constitution Act, 1982 Part II. Rights of the Aboriginal Peoples of Canada.

Criminal Code of Canada, R.S.C., C, C-46 1985, C. C-46.

Federal Courts Act, R.S.C., 1985, C. F-7.

Fisheries Act R.S. C., 1985, C. F-14. <http://laws-lois.justice.gc.ca/PDF/F-14.pdf>.

Fishery (General) Regulations, 1993 SOR 93/53.

Fish Inspection Act. R.S., 1985, c. F-12

Oceans Act. R.S., 1996, c. 3

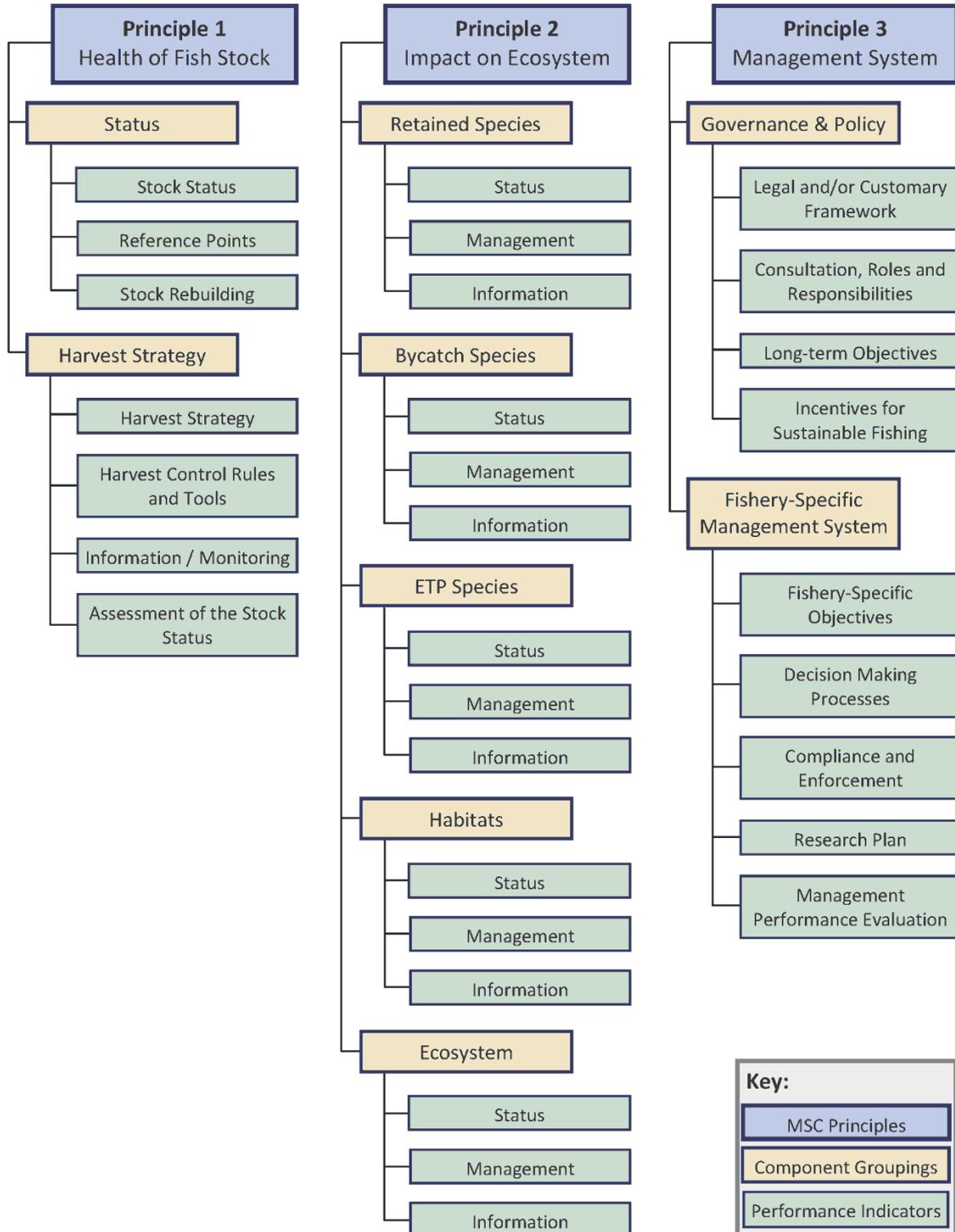
Species at Risk Act, S.C. 2002, C. 29.

### **7.5.2 Greenland**

Fisheries Act, No. 18, 31 October 1996, as amended, Greenland Parliament (Landsting)

## 8 Scoring and rationale

### 8.1 MSC Principles & Criteria



**Figure 51:** Graphic of MSC Principles and Criteria.

Below is a much-simplified summary of the MSC Principles and Criteria, to be used for overview purposes only. For a fuller description, including scoring guideposts under each Performance Indicator, reference should be made to the full assessment tree, complete with scores and justification, contained in Appendix 1 of this report. Alternately a fuller description of the MSC Principles and Criteria can be obtained from the MSC website ([www.msc.org](http://www.msc.org)).

### **8.1.1 Principle 1**

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

#### Intent:

The intent of this Principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short-term interests. Thus, exploited populations would be 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.

#### Stock status

- The stock is at a level that maintains high productivity and has a low probability of recruitment overfishing.
- Limit and target reference points are appropriate for the stock (or some measure or surrogate with similar intent or outcome).
- Where the stock is depleted, there is evidence of stock rebuilding and rebuilding strategies are in place with reasonable expectation that they will succeed.

#### Harvest strategy / management

- There is a robust and precautionary harvest strategy in place, which is responsive to the state of the stock and is designed to achieve stock management objectives.
- There are well defined and effective harvest control rules in place that endeavour to maintain stocks at target levels.
- Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
- The stock assessment is appropriate for the stock and for the harvest control rule, takes into account uncertainty, and is evaluating stock status relative to reference points.

### **8.1.2 Principle 2**

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

#### Intent:

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.

#### Retained species / Bycatch / ETP species

- Main species are highly likely to be within biologically based limits or if outside the limits there is a full strategy of demonstrably effective management measures.
- There is a strategy in place for managing these species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species.
- Information is sufficient to quantitatively estimate outcome status and support a full strategy to manage main retained / bycatch and ETP species.

#### Habitat & Ecosystem

- The fishery does not cause serious or irreversible harm to habitat or ecosystem structure and function, considered on a regional or bioregional basis.
- There is a strategy and measures in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types.
- The nature, distribution and vulnerability of all main habitat types and ecosystem functions in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery and there is reliable information on the spatial extent, timing and location of use of the fishing gear.

#### **8.1.3 Principle 3**

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.

#### Intent:

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

#### Governance and policy

- The management system exists within an appropriate and effective legal and/or customary framework that is capable of delivering sustainable fisheries and observes the legal & customary rights of people and incorporates an appropriate dispute resolution framework.
- Functions, roles and responsibilities of organisations and individuals involved in the management process are explicitly defined and well understood. The management system includes consultation processes.
- The management policy has clear long-term objectives, incorporates the precautionary approach and does not operate with subsidies that contribute to unsustainable fishing.

#### Fishery specific management system

- Short and long term objectives are explicit within the fishery's management system.
- Decision-making processes respond to relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner.
- A monitoring, control and surveillance system has been implemented. Sanctions to deal with non-compliance exist and there is no evidence of systematic non-compliance.
- A research plan provides the management system with reliable and timely information and results are disseminated to all interested parties in a timely fashion.

## Appendix 1: Performance indicator scores and rationale

### Principle 1

#### 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?	All UoCs - Y	UoCs 1, 2, 3, 4, 5 – Y UoC 6 – N	UoCs 1, 2, 4 – Y UoCs 3, 5, 6 – N
	Justification	<p>For UoCs 1 and 4, current stock abundance is clearly high and well above the LRP, based on sound stock assessments (NAFO 2015a; DFO 2015b). This is considered to represent a high degree of certainty, justifying a score of 100.</p> <p>For UoC 2, stock abundance is well above the LRP in 2 of 3 areas (DFO 2015a). In the WAZ, where northern shrimp is not abundant, the LRP previously in place (DFO 2013a) is considered inapplicable as it was based on a survey time series with non-comparable vessels. A new survey series was started in 2014 and a LRP will be established once an adequate time series has been established. Current biomass is well above the former reference point, and biomass in the other two areas (EAZ and SFA 4) is almost 5 times the summed LRPs (123,800 t vs. 25,800 t). The WAZ represents a small fraction of the total biomass (12,300 t) in the UoC. Overall a score of 100 is justified for UoC 2.</p> <p>For UoC 3, a LRP is available for the EAZ (DFO 2015a). For the WAZ the previously-established LRP (DFO 2013a) is not considered applicable as it was based on a survey time series with non-comparable vessels. A new survey series was started in 2014 and LRP will be available once a time series is established. Current biomass is well above the former reference point. For SFA 4 biomass estimates have been highly variable due to variable distribution of the stock, such that an LRP cannot be established. In the WAZ, current biomass is over 5 times the LRP (12,700 t vs. 2,300 t), and biomass is generally high overall in the UoC. For these reasons, it is considered highly likely that the stock is above the point where recruitment would be impaired, and a score of 80 is justified for UoC 3.</p> <p>For UoC 5, stock abundance is midway into the cautious zone and has been undergoing a decline. As such, it is highly likely that the stock is still above the point where recruitment would be impaired, but there is not a high degree of certainty. A score of 80 is justified.</p> <p>For UoC 6, the stock is below the NAFO LRP and is above, but declining close to, the DFO LRP (NAFO 2015a). Northern shrimp in this SFA built to commercial abundance from very low (essentially unmeasurable) abundance in the early 1990s. Because of this capacity to rebuild from very low abundance (well below the established LRPs), a score of 60 is justified, although the currently apparently unfavourable environmental conditions may mean a longer rebuilding period than in the 1990s. A Condition of Certification (#4) would normally be set on UoC 6, but in this case it is non-binding because this UoC does not satisfy PI 1.1.3 and so does not meet the minimum MSC requirements for a certified fishery.</p>		

<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>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>Met?</b>		UoCs 1, 2, 3, 4, 5 – Y UoC 6 – N	UoCs 1, 2, 4 – Y UoCs 3, 5, 6 – N
	<b>Justification</b>	<p>For UoCs 1, 2, and 4 the stock has been above its TRP for recent years and remained above in the most recent year for which information is available (since the late 1990s for UoC 1; mid 2000s for UoC 2; 2000 for UoC 4). This conclusion is based on sound stock assessments (NAFO 2015a; DFO 2015a; DFO 2015b). A score of 100 is justified.</p> <p>For UoC 2 this conclusion is based on the 2 fishing areas (of 3) for which TRPs are available. In the third SFA, where definition of a new TRP awaits a longer survey time series, the stock is well above the former TRP and biomass has been increasing in recent years. Accordingly, a score of 100 is justified.</p> <p>For UoC 3, a TRP has been defined for 1 of 3 fishing areas (DFO 2015b). In the EAZ, the stock has been fluctuating around the TRP over the time series. In the WAZ, where definition of a TRP awaits a longer survey time series, the stock has been above the former TRP over the time series (started in 2007) (DFO 2013a) and has been stable or increasing over time. In SFA 4 the stock has been fluctuating around an average value. Because of these stock trends and the fact that the stock has been fluctuating around the TRP in one SFA, a score of 80 is justified.</p> <p>For UoC 5, the stock has been fluctuating around its TRP - it was well above for the 10 years from 2000-2009/10, below for 2, above for 1, and below for 2 (2013/4 and 2014/5). (DFO 2015b). At this time, this is interpreted as fluctuating around the TRP, but with a lower level of certainty. Should this become a longer-term decline, this conclusion should be revisited. A score of 80 is justified.</p> <p>For UoC 6 the stock was above the DFO-defined TRP from 2000-2011 and has been below since then (NAFO 2015a). All indications are that this stock will continue to decline, due to environmental changes driving a general pattern of shrimp population decline here and in adjacent areas. A score of 80 is therefore not justified.</p>		
<b>References</b>		DFO 2015a, DFO 2015b, NAFO 2015a		
<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>TRP</b>	UoC 1	B <sub>MSY</sub>	80% B <sub>MSY</sub> t fishable biomass	23% above B <sub>MSY</sub>
	UoC 2	Proxy based on 80% of mean female SSB during a moderately productive period	t féale SSB EAZ - 18,200 WAZ - (3,400) <sup>1</sup> SFA 4 - 50,000	t female SSB EAZ - 34,000 WAZ - 12,300 SFA 4 - 89,800
	UoC 3	same	t female SSB EAZ - 6,100 WAZ - (18,000) <sup>1</sup> SFA 4 – NA	t female SSB EAZ - 12,700 WAZ - 38,900 SFA 4 - unknown (fishable biomass - 34,100 t)
	UoC 4	same	t female SSB 38,000	t female SSB 60,600
	UoC 5	same	t female SSB	t female SSB

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
			212,000	136,000
	UoC 6 NAFO DFO	NAFO- NA DFO - proxy, as above UoC 2	t female SSB NAFO - NA DFO - 23,000	t female SSB 10,000
LRP	UoC 1	B <sub>LIM</sub>	B <sub>LIM</sub> t fishable biomass = 30% B <sub>MSY</sub>	Probability of being below B <sub>LIM</sub> <1%
	UoC 2	Proxy based on 30% of mean female SSB during a moderately productive period	t female SSB EAZ - 6,800 WAZ - (1,300) <sup>1</sup> SFA 4 - 21,100	t female SSB EAZ - 34,000 WAZ - 12,300 SFA 4 - 89,800
	UoC 3	same	t female SSB EAZ - 2,300 WAZ - (6,700) <sup>1</sup> SFA 4 – NA	t female SSB EAZ - 12,700 WAZ - 38,900 SFA 4 - unknown (fishable biomass - 34,100 t)
	UoC 4	same	t female SSB 14,000	t female SSB 60,600
	UoC 5	same	t female SSB 80,000	t female SSB 136,000
	UoC 6 NAFO DFO	NAFO - proxy, 15% of highest female SSB in series DFO - proxy as above UoC 2	t female SSB (fall) NAFO - 19,300  DFO - 9,000	t female SSB 10,000
	NB: <sup>1</sup> based on earlier time series, see text			
OVERALL PI SCORE:		UoC 1 (Northern shrimp in SFA 1)		100
		UoC 2 (Northern shrimp in EAZ, WAZ, SFA 4)		100
		UoC 3 (Striped shrimp in EAZ, WAZ, SFA 4)		80
		UoC 4 (Northern shrimp in SFA 5)		100
		UoC 5 (Northern shrimp in SFA 6)		80
		UoC 6 (Northern shrimp in SFA 7)		60
CONDITION NUMBER (if relevant):		UoC 1 (Northern shrimp in SFA 1)		N/A
		UoC 2 (Northern shrimp in EAZ, WAZ, SFA 4)		N/A
		UoC 3 (Striped shrimp in EAZ, WAZ, SFA 4)		N/A
		UoC 4 (Northern shrimp in SFA 5)		N/A
		UoC 5 (Northern shrimp in SFA 6)		N/A
		UoC 6 (Northern shrimp in SFA 7)		4 (non-binding as UoC not certified)

## Evaluation Table for PI 1.1.2

PI 1.1.2		Limit and target reference points are appropriate for the stock		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	
	Met?	All UoCs – Y	UoCs 1, 2, 4, 5, 6 – Y UoC 3 – N	
	Justification	<p>For UoC 1, values of <math>B_{MSY}</math> and <math>B_{LIM}</math> are produced by a probabilistic model incorporating predation on the target species (NAFO 2015a). The model has been in use for several years and has been subject to extensive peer review. DFO (2016b) has recently selected new reference points for this UoC: an upper stock reference (USR) of 80% of <math>B_{MSY}</math>, and a LRP of 30% of <math>B_{MSY}</math>, based on the <math>B_{MSY}</math> estimated by the NAFO assessments. While the USR is not explicitly equivalent to a TRP, it is used in management to ensure that abundance remains above this reference level, in the area of <math>B_{MSY}</math>. A score of 80 is justified.</p> <p>For UoCs 2, 4, 5, and 6, TRPs and LRPs have been established and are considered appropriate for the stock (DFO 2010a; DFO 2015a; DFO 2015b). Because no population model is available for these stocks, reference points are based on proxies for <math>B_{MSY}</math> and <math>B_{LIM}</math> based on abundance trends over relatively long time series. The <math>B_{MSY}</math> proxy is average female SSB over a moderately productive period, while the <math>B_{LIM}</math> proxy is 30% of the same average. These are based on experience with pandalid stocks (DFO 2009) so are considered appropriate for the stock. A score of 80 is justified.</p> <p>For UoC 2, the score of 80 is based on the existence of reference points for 2 of 3 fishing areas and the existence of guide reference points for the third (the WAZ) based on an earlier time series. Revised reference points for the WAZ will be established once a new survey time series is in place. The Team has included a Recommendation (R1) that this be done.</p> <p>For UoC 6, DFO reference points are in effect as described. A NAFO LRP is also in effect, a proxy for <math>B_{LIM}</math> based on 15% of the maximum female SSB value in the time series (NAFO 2015a).</p> <p>For UoC 3, reference points are in place for one (the EAZ) of the three fishing areas in the UoC. Previously, reference points had been established for the WAZ, based on a survey time series with non-comparable vessels (DFO 2013a); while not referred to in the most recent assessment, these are available for guidance. Estimation of reference points for SFA 4 has proved problematical because of very high survey variability from year to year. A score of 60 is justified for UoC 3 and a Condition of Certification is set on the fishery (#1).</p>		
b	Guidepost		The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.
	Met?		All UoCs – Y	UoC 1 – Y UoCs 2, 3, 4, 5, 6 – N

<b>PI 1.1.2</b>		<b>Limit and target reference points are appropriate for the stock</b>	
	<b>Justification</b>	<p>For UoC 1, a probabilistic population model is used to estimate stock status relative to <math>B_{MSY}</math> and <math>B_{LIM}</math> (NAFO 2015a). Because the model outputs values with probabilities, it is considered that precautionary issues are considered, justifying a score of 100.</p> <p>For the EAZ, WAZ and SFAs 4-6, limit reference points are based on a review of experience in pandalid stocks (DFO 2009b) which indicates that the levels chosen would not produce an appreciable risk of impairing reproductive capacity. Shrimp stocks in several UoCs assessed here have shown the capacity to build to commercially exploitable abundance from very low abundance levels (essentially not measurable) under favourable environmental conditions, suggesting that stocks would have to go well below the defined LRPs for reproductive capacity to be impaired. A score of 80 is justified.</p>	
<b>c</b>	<b>Guidepost</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>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, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.</p>
	<b>Met?</b>		<p>All UoCs – Y</p> <p>All UoCs – N</p>
	<b>Justification</b>	<p>For UoC 1, the NAFO assessment model produces values for <math>B_{MSY}</math>. DFO sets a USR at 80% of this <math>B_{MSY}</math> value as an upper reference level for management purposes. The goal of management is to maintain stock abundance above the USR, in the area of <math>B_{MSY}</math>. As such, the USR functions as a TRP which will maintain the stock at a level consistent with <math>B_{MSY}</math>.</p> <p>Although the stock assessment for UoC 1 takes account of predation (by incorporating cod predation into the assessment model), it is not considered that relevant precautionary issues are taken into account “with a high degree of certainty”, since there remains some uncertainty about the impact of predation, and other precautionary issues are not considered. Thus, a score of 100 is not justified.</p> <p>For UoCs 2-6, a similar approach is used but <math>B_{MSY}</math> levels, rather than resulting from population models, are estimated as proxies based on survey biomass levels during moderately productive periods. The approach was based on a review of experience in pandalid stocks indicating that the levels were appropriate (DFO 2009b). USRs are identified at 80% of these proxy <math>B_{MSY}</math> levels and the goal of management is to ensure that stock abundance is maintained above the USR, in the area of <math>B_{MSY}</math>. As such, the USR functions as a TRP which will maintain the stock at a level consistent with <math>B_{MSY}</math>.</p> <p>Scores of 80 are justified for all UoCs.</p>	
<b>d</b>	<b>Guidepost</b>		<p>For key low trophic level stocks, the target reference point takes into account the ecological role of the stock.</p>
	<b>Met?</b>		All UoCs – N/A

<b>PI 1.1.2</b>		<b>Limit and target reference points are appropriate for the stock</b>	
	<b>Justification</b>	Although northern and striped shrimp are forage species, the stocks do not meet the MSC criteria for LTL species. See section 3.8 of this report for an analysis.	
<b>References</b>		DFO 2009b; DFO 2010a; DFO 2013a; DFO 2015a; DFO 2015b; NAFO 2015a	
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>90</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>80</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>75</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>80</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>80</b>
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>1</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
		<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A
<b>RECOMMENDATION</b>		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>R1</b>

### Evaluation Table for PI 1.1.3

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Where stocks are depleted rebuilding strategies, which have a reasonable expectation of success, are in place.		Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.
	Met?	UoC 6 – Y		UoC 6 – N
	Justification	<p>For UoCs 1-5, stocks do not correspond to MSC guidelines (CB 2.4.1.1) for defining 'depleted' stocks - consistently below target reference points, or have dropped toward the point where recruitment would be impaired. As such, this PI is not scored for these UoCs.</p> <p>For UoC 6, biomass has shown a consistent rapidly declining trend since 2007 and has been below the DFO-defined TRP since 2012 (NAFO 2015a). Recruitment prospects are unfavourable based on pre-recruit indices (NAFO 2015a) and environmental conditions (NAFO 2015a, DFO 2014b). The stock is below the NAFO-defined LRP and approaching the DFO-defined LRP. Accordingly, we conclude that the stock meets the MSC guidelines as 'depleted' despite the relatively short period in which it has been below the TRP.</p> <p>NAFO has closed the fishery on the stock in UoC 6 (SFA 7) for 2015 and 2016, based on its being below the NAFO LRP. This is considered a rebuilding strategy with a reasonable expectation of success (no greater measures are possible), justifying a score of 60. A score of 100 is not justified since time has been inadequate to show any effect of the rebuilding strategy, and future recruitment prospects will depend on environmental conditions.</p>		
b	Guidepost	A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock.
	Met?	UoC 6 – N	UoC 6 – N	UoC 6 – N
	Justification	UoC 6. No rebuilding timeframe has been specified by NAFO. On this basis, UoC 6 does not meet the SG60 level of performance, which is the minimum MSC requirement for certified fisheries, and UoC 6 therefore fails assessment.		

<b>PI 1.1.3</b>		<b>Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe</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>	UoC 6 – Y	UoC 6 – N	
	<b>Justification</b>	In UoC 6, stock status is monitored annually by two Canadian surveys and two European surveys. The fishery meets the SG60 level of performance but there is no evidence of rebuilding so it does not meet the SG80 requirement.		
<b>References</b>		DFO 2014b; DFO 2015a; DFO 2015b; NAFO 2015a, b		
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)		<b>N/A</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)		<b>N/A</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)		<b>N/A</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)		<b>N/A</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)		<b>N/A</b>
		<b>UoC 6</b> (Northern shrimp in SFA 7)		<b>&lt;60</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)		N/A
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)		N/A
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)		N/A
		<b>UoC 4</b> (Northern shrimp in SFA 5)		N/A
		<b>UoC 5</b> (Northern shrimp in SFA 6)		N/A
		<b>UoC 6</b> (Northern shrimp in SFA 7)		N/A UoC not certified

## Evaluation Table for PI 1.2.1

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.
	Met?	All UoCs – Y	All UoCs – Y	UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N
	Justification	<p>In all UoCs the harvest strategy is responsive to the state of the stock. Annual assessments of stock status and in-season monitoring of catches against TACs ensure that objectives of the strategy are met.</p> <p>For the stock exploited in UoC 1, both Canada and Greenland have harvest strategies which, taken separately, work to achieve management objectives reflected in the target and limit reference points. However, the result of these independent harvest strategies is that the combined TACs are greater than those advised by NAFO SC, primarily because of lack of agreement on catch shares. Canada and Greenland have been working to achieve a coordinated harvest strategy for several years, and negotiations are continuing. For these reasons, a score of 80 is justified (elements of the strategy work together to achieve management objectives) but 100 is not justified (the harvest strategy is not <b>designed</b> to achieve management objectives).</p> <p>In UoCs 2-6 the harvest strategy was designed to achieve stock management objectives reflected in reference points. The strategy is primarily based on ensuring that harvest levels (TACs) foster long-term productive capacity of the stocks. In addition to harvest levels, other management tools (for example minimum mesh sizes, enterprise allocations, geographically defined management areas) are used to ensure that stock sustainability is assured.</p>		
b	Guidepost	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	All UoCs – Y	All UoCs – Y	All UoCs – N

<b>PI 1.2.1</b>		<b>There is a robust and precautionary harvest strategy in place</b>		
	<b>Justification</b>	<p>For all UoCs, evidence exists in the annual stock assessments that the harvest strategy is achieving its objective of controlling harvest levels such that reference points are not transgressed. In UoC 6 where the stock has declined below the LRP and the fishery is closed, there is a significant environmental component underlying the decline (DFO 2014b) such that it does not appear to be a failure of the harvest strategy which has led to the decline. The recent decline into the cautious zone in UoC 5 is also apparently due in large part to environmental changes (DFO 2014b). Scores of 80 are justified.</p> <p>There have not been formal evaluations of performance of the harvest strategy in any UoC, although annual reviews of the fishing year in NSAC meetings and annual stock assessments provide performance information. The first part of the 100 SG is not met. As noted above, evidence exists to show that the harvest strategy is achieving its objectives. In UoCs 1-5 stocks are above or fluctuating around TRPs under the present harvest strategy, while in UoC 6 the decline below the LRP appears largely due to changes in environmental conditions. As such, the second part of SG 100 is met. Nevertheless, the requirements at the SG100 level must be met in full in order for a score of 100 to be awarded, and so all UoCs score 80, here.</p>		
<b>c</b>	<b>Guidepost</b>	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	<b>Met?</b>	All UoCs – Y		
	<b>Justification</b>	In year monitoring of catches against TACs is in place. Annual assessments of stock status include monitoring of biomass (fishable and spawning) and pre-recruit abundance (surveys), commercial CPUE, and biological characteristics in the stock (surveys) and catches (observers, shore sampling). Annual assessments based on monitoring clearly show that the harvest strategy is working.		
<b>d</b>	<b>Guidepost</b>			The harvest strategy is periodically reviewed and improved as necessary.
	<b>Met?</b>			All UoCs – Y
	<b>Justification</b>	The most recent major review of harvest strategies is outlined in the IFMP (DFO 2010a), and was conducted in 2009. The NSAC established a Precautionary Approach Working Group in 2011 with the objective of developing an improved PA for this fishery (DFO 2015c). This WG proposed revisions to the harvest strategy in 2014 but these were not accepted by the full NSAC. Subsequently DFO has confirmed that an exploitation rate of 20% is to be used as a proxy for $F_{MSY}$ (a maximum exploitation rate when the stock is in the Healthy Zone) (DFO 2015c). The NSAC continues to consider improvements to the PA framework. The harvest strategy for UoC1 was further reviewed and revised in 2016. Given this history of review of the harvest strategy, a score of 100 is justified.		
<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>	All UoCs – N/A	All UoCs – N/A	All UoCs – N/A

<b>PI 1.2.1</b>		<b>There is a robust and precautionary harvest strategy in place</b>	
	<b>Justification</b>	All UoCs – sharks are not a target species, and are almost never taken in the CNSSF.	
<b>References</b>		DFO 2014b; DFO 2015c; references in 1.2.2, 1.2.3, 1.2.4	
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>85</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>95</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>95</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>95</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>95</b>
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>95</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
		<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

## Evaluation Table for PI 1.2.2

PI 1.2.2		There are well defined and effective harvest control rules in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Generally understood harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	
	Met?	All UoCs – Y	All UoCs – Y	
	Justification	<p>For UoC 1, DFO (2016b) has outlined a set of HCRs (see Introduction Section 3.13.1). When the stock is in the healthy zone (above 80% <math>B_{MSY}</math>), TAC decisions are based on allocating 14.2% of the TAC advised by NAFO SC (e.g., NAFO 2015b) to the Canadian fleet. This assumes that the remaining proportion is allocated to Greenland which shares the stock. When the stock is in the cautious zone, TAC decisions will be based on a level of acceptable mortality risk lower than that currently used in the NAFO advice (35%), reducing this to 17% as the LRP is approached. Additional measures will be considered in case of steep declines (<math>\geq 25\%</math>) in the cautious zone. While the degree of reduction of TACs in the cautious zone based on this rule has not been shown, the reduction in the acceptable mortality risk would ensure that exploitation rate is reduced as the LRP is approached.</p> <p>Greenland, which also harvests this stock, has adopted the following objectives for setting harvest levels (IMM 2013, IFC 2014):</p> <ul style="list-style-type: none"> <li>• Biomass is to be maintained close to but above <math>B_{MSY}</math></li> <li>• The risk of exceeding limit mortality should be the primary criterion to be observed in short-term setting of TACs</li> <li>• TAC should not change by more than 12.5% from one year to the next, either upward or downward.</li> <li>• Exceptional measures may be taken to safeguard the stock if there is a greater than 1% risk of being below <math>B_{LIM}</math></li> </ul> <p>In practice, in recent years Greenland has adopted the NAFO TAC advice (based on risk of exceeding <math>Z_{MSY}</math>, thus corresponding to bullet 2), and has applied the principles above, whilst allocating a share to Canada (based on a formula including past catches and distribution of biomass from surveys, typically around 3%) to arrive at a Greenland TAC.</p> <p>Because HCRs are not coordinated between Greenland and Canada, total TACs enacted by the two states can and have been greater than those advised by NAFO (NAFO 2015a). However recent Canadian catches have been extremely low or zero such that total enacted TACs have not been taken. For UoC 1, the SG 80 is met for this PI.</p> <p>For UoCs 2-5, explicit harvest control rules are outlined in the IFMP Annex I (DFO 2010a); these are described in detail in the Introduction sections. IFMP Annex I refers to <math>F_{MSY}</math> as the base exploitation rate but does not provide a value for this. However, DFO correspondence (DFO2015c) confirms that a goal of not exceeding an exploitation rate of 20% is in place. The aim is to reduce the exploitation rate as the</p>		

<b>PI 1.2.2</b>		<b>There are well defined and effective harvest control rules in place</b>		
		<p>LRP is approached. Since the HCRs are well defined and act to reduce exploitation rate as the LRP is approached, a score of 80 is justified.</p> <p>For UoC 6, a DFO HCR is defined in the IFMP similar to that for UoCs 2-5. NAFO also utilises an HCR which reduces exploitation rate to 0 when the stock is below the NAFO-defined LRP, and has closed this fishery based on this rule. The NAFO LRP used in the harvest control rule is at a higher level than that in the DFO IFMP, and the fishery has been closed based on the NAFO protocol, precluding use of the DFO harvest control rule which triggers at a lower LRP. Although it has not come into operation, the DFO HCR meets the MSC requirement to reduce exploitation rate as the LRP is approached, and a score of 80 is assigned.</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>		All UoCs – Y	All UoCs – N
	<b>Justification</b>	<p>For all UoCs, main uncertainties (confidence intervals on survey biomass estimates in particular) are clearly outlined in assessment documents (NAFO 2015a, DFO 2015a, DFO 2015b). HCRs based on survey biomass estimates are inherently precautionary as survey catchability is less than 1 and thus the surveys underestimate biomass. As such, all meet the SG for a score of 80.</p> <p>For UoC 1, the assessment (NAFO 2015a, b) is probabilistic and generates advice in terms of risks associated with varying levels of harvest. In addition to uncertainty about survey biomass, the assessment takes into consideration uncertainties about the impact of cod predation on the stock. Although this broadens the range of uncertainties relative to other UoCs, a “wide range” of uncertainties is not accounted for, so a score of 100 is not warranted.</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>	All UoCs – Y	All UoCs – Y	UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N

<b>PI 1.2.2</b>		<b>There are well defined and effective harvest control rules in place</b>	
	<b>Justification</b>	<p>For UoC 1, although harvest levels have been above the levels advised by the NAFO SC in recent years, this is primarily due to coming into effect of a harvest control rule in Greenland which includes a smoothing clause, under which TACs should change by a maximum of 12.5% from year to year. Under these conditions, adopted TACs may be above the NAFO-advised levels in a given year. The difference between NAFO-advised levels and actual harvest levels has been declining (from 26,000t in 2012 to 5,000t in 2015), consistent with coming into effect of the new Greenland HCR. Kingsley (2016) has shown that mortality levels have been below the MSY level, and biomass levels above the MSY level, for this stock in the period 2009-2015, confirming that the protocol used by NAFO to advise on TAC levels is cautious. We conclude that despite the differences between the NAFO-advised TACs and harvest levels in recent years, available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules, justifying a score of 80. However, the existence of uncoordinated TACs which may lead to exploitation levels greater than those recommended in the TAC advice in future, means that evidence does not yet clearly show that tools are effective, thus a score of 100 is not justified.</p> <p>For UoCs 2-6, available evidence clearly shows that the harvest control tools – TACs – are maintaining harvests consistent with exploitation levels required by the HCRs (NAFO 2015a, DFO 2015a, DFO 2015b). Catch levels are closely monitored by observers (offshore fleet), logbooks and dockside monitoring (offshore and inshore fleets), quota reports (reports of catch relative to TAC) are updated regularly during the fishing season, and fisheries are closed when TAC levels are reached. Accordingly, a score of 100 is justified.</p>	
		<p><b>References</b> DFO 2015a, DFO 2015b, DFO 2015c, IMM 2013, IFC 2014, IFC 2015a, Kingsley 2016, NAFO 2015a, NAFO 2015b.</p>	
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>80</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>85</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>85</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>85</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>85</b>
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>85</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
		<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### 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
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	All UoCs – Y	All UoCs – Y	UoCs 1, 4, 5, 6 – Y UoCs 2, 3 – N
	<b>Justification</b>	<p>For all UoCs, sufficient information related to stock structure (Jorde et al 2015), stock productivity (NAFO 2015a, DFO 2015a, DFO 2015b), stock abundance, fishery removals and fleet composition, is available to support the harvest strategy, justifying a score of 80. While the stock structure information (Jorde et al 2015) is for northern shrimp, the similarity of life history strategies makes this relevant to striped shrimp as well.</p> <p>Additional information, which with the above represents a comprehensive range of information including some that may not be directly related to the harvest strategy, is available for some UoCs:</p> <p>UoC 1 - information on predator-prey relations is available from annual groundfish surveys and is accounted for in the shrimp assessment (NAFO 2015a; Burmeister and Kingsley 2015); oceanographic conditions in the fishery area are monitored (Cisewski 2015) and impact on stock status considered (NAFO 2015a).</p> <p>UoCs 2, 3 - while information on the stock and fishery is sufficient to support the harvest strategy, information on the environment is quite limited in this area, such that a score of 100 is not justified.</p> <p>UoCs 4, 5 - information on predator-prey relations is available and the implications for future stock trends are considered (DFO 2014b; DFO 2015b); comprehensive environmental monitoring is available (Colborne et al 2015; Maillet et al 2015) and implications for future stock trends are considered (DFO 2014b).</p> <p>UoC 6 - comprehensive environmental monitoring is available (Colborne et al 2015; Maillet et al 2015) and impact on stock status considered (NAFO 2015a); information predator abundance is available from groundfish assessments in the fishery area.</p>		
<b>b</b>	<b>Guidepost</b>	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.

PI 1.2.3		Relevant information is collected to support the harvest strategy		
	<b>Met?</b>	All UoCs – Y	All UoCs – Y	UoCs 1, 4, 5, 6 – Y UoCs 2, 3 – N
	<b>Justification</b>	<p>For all UoCs, stock abundance is monitored both by surveys and by commercial CPUE, while fishery removals are monitored by observers, logbooks and dockside monitoring (offshore and inshore fleets). Survey estimates of female SSB are the indicator used to support the harvest control rule in UoCs 2-6, model estimates of fishable biomass in UoC 1. Biomass estimates are developed annually, consistent with the working of the harvest control rules. Scores of 60 are justified.</p> <p>In addition, for all UoCs, the level of accuracy and coverage of monitoring of stock abundance and fishery removals are consistent with the harvest control rule. Survey coverage is comprehensive in all areas and fishery removals are compiled and reported on regularly during the season to ensure adherence to TACs. Annual monitoring of biomass is considered sufficiently frequent to support the HCR. Other indicators are available (fishable biomass, commercial CPUE, pre-recruit indices) in all UoCs which although they do not support the HCR, contribute to interpretation of stock status. Scores of 80 are justified.</p> <p>For UoC1, the probabilistic outputs of the assessment model along with good understanding of the uncertainties underlying the information (in particularly survey and CPUE information) mean that there is good understanding of the inherent uncertainties and robustness of assessment and management. Information required by the HCR is monitored annually, considered high frequency, and confidence intervals on abundance indices are well estimated; experience has shown that the assessment model provide high certainty about stock status (NAFO 2015a). A score of 100 is justified.</p> <p>For UoCs 2 and 3, there is currently not a “high degree” of certainty about annual biomass estimates in relation to historical levels for some SFAs, since new surveys have recently been started in the WAZ. In addition, for UoC 3, stock status of striped shrimp has been difficult to assess with a high degree of certainty because of strong currents and shifts in distribution of the species (DFO 2015a). As such a score of 100 is not justified.</p> <p>For UoCs 4, 5 and 6, there is good understanding of the inherent uncertainties in stock monitoring (survey biomass estimates) and their impact on robustness of the assessments. Although there are confidence intervals on biomass estimates these are well estimated and experience has shown that confidence in assessments is justified, such that information required by the HCR can be considered to reach a high degree of certainty. Annual provision of biomass estimates represents “high frequency” for application of the HCR (DFO 2015b; NAFO 2015a). A score of 100 is justified.</p>		
<b>c</b>	<b>Guidepost</b>		There is good information on all other fishery removals from the stock.	
	<b>Met?</b>		All UoCs - N/A	
	<b>Justification</b>	There are no removals from these stocks by other fisheries. The only fisheries which might potentially harvest shrimp are groundfish trawl fisheries and these are required to use mesh sizes much larger than those that would retain shrimp.		
<b>References</b>		Cisewski 2015; Colborne et al 2015; DFO 2014b; DFO 2015a; DFO 2015b; Burmeister and Kingsley 2015; Maillet et al 2015; NAFO 2015a; NAFO 2015b;		

PI 1.2.3	Relevant information is collected to support the harvest strategy	
<b>OVERALL PI SCORE:</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>100</b>
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>80</b>
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>80</b>
	<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>100</b>
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>100</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### Evaluation Table for PI 1.2.4

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost		The assessment is appropriate for the stock and for the harvest control rule.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
	Met?		All UoCs – Y	All UoCs – Y
	Justification	<p>For all UoCs, assessments have been designed for the stocks, taking into account major features of the species biology (short life cycle, protandrous species, knowledge of distribution and abundance) and the nature of the fishery (bottom trawling on commercial concentrations). The assessments are consistent with best practice in pandalid fisheries in other areas (NAFO 2015a). The assessments are designed to provide outputs allowing application of the harvest control rules. Scores of 100 are justified.</p> <p>For UoC1, a Bayesian surplus production model is the primary assessment tool (NAFO 2015a). For other stocks, examination of biomass trends in relation to reference points and of exploitation rate indices in relation to guideline levels, which trigger application of HCRs, is the primary assessment tool (DFO 2015a, DFO 2015b, NAFO 2015a). Both approaches are considered appropriate for this kind of stock.</p>		
b	Guidepost	The assessment estimates stock status relative to reference points.		
	Met?	All UoCs – Y		
	Justification	<p>All assessments estimate stock status relative to reference points (see introduction, sections 3.9 and 3.10) (DFO 2015a, DFO 2015b, NAFO 2015a).</p> <p>For UoCs 2 and 3, the most recent assessments indicate that reference points are not available for the WAZ (northern and striped shrimp) because of short survey time series, and SFA 4 (striped shrimp), because of uncertainties in distribution and abundance relative to survey coverage (DFO 2015a, DFO 2015b). With establishment of consistent survey coverage over all SFAs from 2014, this problem should be resolved as the new survey series is built. Reference points established in earlier assessments are still available for guidance.</p>		
c	Guidepost	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	All UoCs – Y	All UoCs – Y	UoC 1 – Y UoCs 2, 3, 4, 5, 6 – N

<b>PI 1.2.4</b>		<b>There is an adequate assessment of the stock status</b>	
	<b>Justification</b>	<p>For UoC 1, uncertainties in major indices are outlined and taken into consideration in the assessment, and stock status is evaluated relative to reference points in a probabilistic way, using a Bayesian surplus production model (NAFO 2015a). A score of 100 is justified.</p> <p>For all other UoCs, uncertainties in the main indices used to assess status relative to reference points and to apply the HCRs are clearly presented and taken into account in generating scientific advice (DFO 2015a, DFO 2015b, NAFO 2015a). These uncertainties are confidence intervals on survey biomass and exploitation rate estimates. Scores of 80 are justified.</p> <p>Details of presentation of uncertainties are provided in introductory sections.</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>		All UoCs – N
	<b>Justification</b>	None of the assessments can be considered to have been formally tested and shown to be robust, although experience indicates that they are robust and reliable. Alternative approaches have been considered in some cases - for example, a Bayesian stock-production model has been explored for UoC 5 (Hvingel & Orr 2011), but this has not been further developed.	
<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>	All UoCs – Y	All UoCs - Y
	<b>Justification</b>	<p>For UoCs 1 and 6, stock assessments are reviewed in the NAFO-ICES Pandalus Assessment Group, a multinational committee of scientists from Europe and North America (NAFO 2015a). This is considered internal and external peer review, justifying a score of 100.</p> <p>For UoCs 2-5, stock assessments are reviewed through DFO's CSAS (Canadian Science Advisory Secretariat) process (also known as RAP). Scientists from sections other than that responsible for crustacean assessments routinely participate, more than one DFO Administrative Region typically participate (Newfoundland and Labrador, Central and Arctic), and there is occasional external participation by invitation. A score of 100 is justified.</p>	
<b>References</b>	DFO 2015a, DFO 2015b, Hvingel & Orr 2011, NAFO 2015a		
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>95</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>90</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>90</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>90</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>90</b>

<b>PI 1.2.4</b>	<b>There is an adequate assessment of the stock status</b>	
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

## Principle 2

### 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
a	Guidepost	Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).	There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.
	Met?	All UoCs – Y	All UoCs – Y	UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N
	Justification	<p>Retention of any species other than shrimp is prohibited by condition of licence (DFO 2015h, DFO 2016a). The only potential retained species are striped shrimp in northern shrimp fisheries, and northern shrimp in striped shrimp fisheries.</p> <p>For UoC1, insignificant quantities of striped shrimp have historically been taken with northern shrimp in SFA 1, as the fishing area is well offshore and in deeper water, outside the typical range of striped shrimp (Kingsley 2011). One source of recent information indicates that striped shrimp can make up a larger proportion of the catch (over 50%, Table 7). However, this high percentage was based on a very small catch (total of 28 t), and is considered to be erroneous (possibly due to misidentification by observers) based on other sources. For the determination of striped shrimp as IPI in SFA 1, whole-year catch data were available for 2014 (Table 18). These show that striped shrimp made up 2.81% of the SFA 1 catch in 2014. This species is landed with northern shrimp, and so striped shrimp is an IPI species (see Section 5.3) that must be considered under the retained catch PIs for UoC 1. This low percentage of striped shrimp in the UoC catch is consistent with survey information from this SFA (Siegstad 2015) and with catch composition information over many years (Siferd 2010; Kingsley 2011).</p> <p>At just 2.81% of the catch, however, striped shrimp is not considered to be a main retained species, and so UoC 1 meets the SG80 level of performance by default. There are no reference points for striped shrimp in UoC 1 and so the SG100 level of performance is not met.</p> <p>For UoCs 2 and 3, separate assessment and management frameworks are in place for northern and for striped shrimp, which account for catch of one species when the other is targeted. As such, there are no retained bycatch species in these fisheries and UoCs 2 and 3 meet the SG100 level of performance.</p> <p>For UoCs 4, 5, and 6, catch of striped shrimp is negligibly low in the northern shrimp fisheries. For UoC 4 (SFA 5), striped shrimp represented 0.25% of the northern shrimp catch in 2007-8, and for UoC 5 (SFA 6) it represented 0.01% (Orr <i>et al.</i> 2008). For UoC6 (SFA 7) the figure would presumably be lower as the fishery operates well south of the distribution of this species. These proportions are consistent with the levels observed in 2014, and so an exemption to the IPI requirements was sought from the MSC for this reassessment for striped shrimp catches in UoCs 4, 5 and 6 (see Section 5.3). These UoCs meet the SG100 level of performance.</p>		
b	Guidepost			Target reference points are defined for retained species.

<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>			UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N
	<b>Justification</b>	Reference points are not defined for striped shrimp in UoC 1, and so the fishery does not meet this level of performance.  There are no retained species in UoCs 2, 3, 4, 5 and 6, and so this SG100 requirement is met.		
<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>	All UoCs – Y	All UoCs – Y	
	<b>Justification</b>	There are no main retained species in any UoC, and so this requirement is met at SG80 for all UoCs.		
<b>d</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 retained species to be outside biologically based limits or hindering recovery.		
	<b>Met?</b>	All UoCs – Y		
	<b>Justification</b>	There are no main retained species in any UoC, and so this SG60 requirement is met.		
<b>References</b>		Bergstrom 2000; Kingsley 2011; Orr et al 2008; Siferd 2010		
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)		<b>80</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)		<b>100</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)		<b>100</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)		<b>100</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)		<b>100</b>
		<b>UoC 6</b> (Northern shrimp in SFA 7)		<b>100</b>
<b>CONDITION NUMBER</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)		<b>N/A</b>

<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>(if relevant):</b>	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A	
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A	
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A	
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A	
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A	

## 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>	All UoCs – Y	All UoCs – Y	UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N
	<b>Justification</b>	<p>For UoC 1, striped shrimp is retained as an IPI species. However, the catch of striped shrimp constituted just 2.81% in 2014 (Table 18), and so this does not qualify as a main retained species.</p> <p>The fishing strategy of the Canadian fleet in UoC 1 is such as to constitute a partial strategy which is expected to maintain striped shrimp within biologically based limits. The fishery is only allowed to operate in areas deeper and further from shore than those in which striped shrimp are typically found (Kingsley 2011; Siegstad 2015).</p> <p>While the strategy meets the MSC definition of a “partial strategy”, it does not meet the definition of a “strategy” (designed to manage impact on that component specifically) (MSC CR v 1.3 GCB 3.3); as such a score of 80, but not of 100, is justified.</p> <p>There are no retained species in UoCs 2, 3, 4, 5 and 6, and so these UoCs meet the SG100 level of performance for this SI.</p>		
<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>	All UoCs – Y	All UoCs – Y	UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N
	<b>Justification</b>	<p>For UoC 1, information on the distribution of striped shrimp and on its rarity in the fishery area provides an objective basis for confidence that the partial strategy will work (Kingsley 2011, Siegstad 2015, Siferd 2010), justifying a score of 80. There has not been direct testing of the strategy, so a score of 100 is not justified.</p> <p>There are no retained species in UoCs 2, 3, 4, 5 and 6, and so these UoCs meet the SG100 level of performance for this SI.</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>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>		All UoCs – Y	UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N
	<b>Justification</b>	<p>For UoC 1, observer information from the fishery indicates that catches of striped shrimp have been very low over time (Aschan et al 2012; Kingsley 2011, Siferd 2010), and recent information from the fishery confirms this (Table 16), justifying a score of 80. A single source based on very small catch (Table 6) suggests a high proportion of striped shrimp in the catch but this is considered erroneous for the reasons outlined in the scoring text for PI 2.1.3. This inconsistency in information precludes assigning a score of 100.</p> <p>There are no retained species in UoCs 2, 3, 4, 5 and 6, and so these UoCs meet the SG100 level of performance for this SI.</p>		
<b>d</b>	<b>Guidepost</b>			There is some evidence that the strategy is achieving its overall objective.
	<b>Met?</b>			UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N
	<b>Justification</b>	<p>For UoC 1, although it appears clear that catch of striped shrimp is very low, there is no evidence about the impact of the catch on the population, so a score of 100 is not justified.</p> <p>There are no retained species in UoCs 2, 3, 4, 5 and 6, and so these UoCs meet the SG100 level of performance for this SI.</p>		
<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>	All UoCs – Y	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	No species other than shrimp may be retained in the CNSSF, and the use of Nordmore grids prevent larger fish, including sharks, if they are encountered by the gear, from reaching the codend (see section 3.5). These management rules are enforced through at-sea observers and dockside monitoring programmes.		
<b>References</b>		Aschan et al 2012; Kingsley 2011; Siegstad 2015; Siferd 2010		
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)		<b>85</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)		<b>100</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)		<b>100</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)		<b>100</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)		<b>100</b>

<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>UoC 6</b> (Northern shrimp in SFA 7)	<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### 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?	All UoCs – Y	All UoCs – Y	UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N
	Justification	<p>For UoC 1, striped shrimp is retained as an IPI species. However, the catch of striped shrimp constituted just 2.81% in 2014 (Table 18), and so this does not qualify as a main retained species. UoC 1 therefore meets the SG80 level of performance by default. This low percentage of catch is consistent with earlier information from the fishery (Aschan et al 2012, Siferd 2010) and with information on the distribution of striped shrimp on the Greenland shelf (Kingsley 2011; Siegstad 2015) which indicates that the species is uncommon in the Canadian fishing area. The SG80 level of performance is met.</p> <p>A single source (Table 6) based on a low catch (28 t) suggests a high proportion of striped shrimp in the Canadian catch (63%). This is judged to be erroneous, possibly based on misidentification, because of its inconsistency with all earlier information on bycatch and on species biology. Because of this inconsistency, there is no basis to state that accurate and verifiable information is available on the catch of all striped shrimp in UoC 1, so the SG100 level of performance is not met.</p> <p>There are no retained species in UoCs 2, 3, 4, 5 and 6, and so these UoCs meet the SG100 level of performance for this SI.</p>		
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?	All UoCs – Y	All UoCs – Y	UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N
	Justification	<p>For UoC 1, striped shrimp constituted just 2.81% of the catch in 2014. This is higher than in previous years (Aschan 2012), but striped shrimp is not specifically targeted and the fishery occurs in areas outside the main range of striped shrimp. As such, information is sufficient to determine that the fishery is highly unlikely to place striped shrimp at risk with respect to biologically-based limits. The fishery meets the SG80 level of performance, but not the SG100 level as there is not a high degree of certainty.</p> <p>There are no retained species in UoCs 2, 3, 4, 5 and 6, and so these UoCs meet the SG100 level of performance for this SI.</p>		
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?	All UoCs – Y	All UoCs – Y	UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N

<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>Justification</b>	For UoC 1, striped shrimp is retained as an IPI species. However, the catch of striped shrimp constituted just 2.81% in 2014 (Table 18), and so this does not qualify as a main retained species. Information on distribution of striped shrimp is adequate to support the partial strategy, which is to fish in deep waters far offshore, outside the main range of striped shrimp. There are no retained species in UoCs 2, 3, 4, 5 and 6, and so these UoCs meet the SG100 level of performance for this SI.	
<b>d</b>	<b>Guidepost</b>		<p>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)</p> <p>Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.</p>
	<b>Met?</b>		<p>All UoCs – Y</p> <p>UoCs 2, 3, 4, 5, 6 – Y UoC 1 – N</p>
	<b>Justification</b>	<p>Fishery monitoring and sampling is undertaken with sufficient detail to ensure that all UoCs meet the SG80 level of performance for this SI. For UoC 1, observer information is collected on an ongoing basis to estimate proportions of striped shrimp in the catch; however, there is some inconsistency in recent information. A score of 80 is justified based on the observer information over many years, covering large catch volumes.</p> <p>There are no retained species in UoCs 2, 3, 4, 5 and 6, and so these UoCs meet the SG100 level of performance for this SI.</p>	
<b>References</b>		Aschan 2012; Kingsley 2011; Siegstad 2015.	
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>80</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>100</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>100</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>100</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>100</b>
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
		<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

## Evaluation Table for PI 2.2.1

PI 2.2.1		The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below).	Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below).	There is a high degree of certainty that bycatch species are within biologically based limits.
	Met?	All UoCs – N (see Slb below)	All UoCs – N	All UoCs – N
	Justification	<p>'Main' bycatch species are identified by weight, value or vulnerability (MSC Guidance v 1.3). No bycatch species occurs in amounts over 5% of the total catch of target and bycatch species (section 3.18.2, Table 8), and no bycatch species has commercial value since retention of non-target species is prohibited, so no 'main' bycatch species are identified based on these two criteria. Four bycatch species are 'main' species based on vulnerability - Atlantic cod, redfishes, and American plaice (all assessed by COSEWIC as at risk), and Atlantic wolffish (assessed by COSEWIC and listed on SARA Schedule 1 as 'special concern') (see PI 2.2.3).</p> <p>None of these four main bycatch species is considered to be within biologically based limits, so scoring moves to Slb below.</p>		
b	Guidepost	If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding.	If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	All UoCs – Y	All UoCs – Y	
	Justification	A strategy based on use of the Nordmore sorting grate, toggle chains, and a move-on protocol is in place which minimises bycatch and is ensuring that the fishery does not hinder recovery and rebuilding of bycatch species (see PI 2.2.2).		
c	Guidepost	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.		
	Met?	All UoCs – 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>	Although status of the identified main bycatch species is quite well known, there are species in the bycatch for which status is poorly known (non-commercial fish species, invertebrates). However, use of the bycatch reduction strategy described above (Nordmore grate, toggle chains, moving protocol) ensure that catches of these species are extremely low (Orr & Sullivan 2008, Siferd 2010, CAPP/Javitech 2016), such that the fishery would not cause these species to be outside biologically based limits or to hinder recovery. As such, a score of 60 is justified.	
<b>References</b>		Details of information sources are provided in Sections 2.2.2 and 2.2.3.	
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>80</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>80</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>80</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>80</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>80</b>
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
		<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

## Evaluation Table for PI 2.2.2

PI 2.2.2		There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing and minimizing bycatch.
	Met?	All UoCs – Y	All UoCs – Y	All UoCs – Y
	Justification	<p>There are measures in place to manage and minimise bycatch and which ensure that the fishery will maintain species within biologically based limits and/or does not hinder recovery or rebuilding of bycatch species:</p> <ul style="list-style-type: none"> <li>• Mandatory use of the Nordmore sorting grate in all fleets and areas (grate spacing 28 mm for the offshore fleet in the EAZ, WAZ and SFAs 4-5, 22 mm for the offshore fleet in SFAs 1, 6 and 7 and for the inshore fleet in all areas)</li> <li>• Mandatory use of toggle chains of minimum length 72 cm to keep the groundline off bottom and thus reduce bycatch of bottom-associated species</li> <li>• A move-on protocol requiring vessel to move 10 nm when bycatch is &gt;100kg or &gt;2.5% of total catch (&gt;5 t or &gt;10% of catch for capelin)</li> </ul> <p>As evidence of the awareness of the need to change measures if necessary, testing of further measures to reduce bycatch continues, for example, studies of reducing grate spacing have been conducted (Orr and Cadigan 2009) and some vessels are currently experimenting with lights on trawl which have been shown effective in reducing eulachon bycatch in the Oregon shrimp fishery (Hannah and Jones 2014).</p> <p>The approach to managing bycatch meets the MSC definition of a strategy (Guidance v 1.3 GCB 3.3) in that it is a cohesive and strategic arrangement designed to manage impact on the component, and mechanisms are included to modify fishing practices in light of identification of unacceptable practices. The measures described were designed specifically to manage and minimize bycatch. New measures have been added over the years to strengthen the strategy – following adoption of the Nordmore grate in 1996, mandatory toggle chains and the move-on protocol were subsequently added, indicating that mechanisms are in place to modify fishing practices if necessary. A score of 100 is justified.</p>		
b	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.

<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>Met?</b>	All UoCs – Y	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	Observer coverage of the fleets and areas shows that bycatch is being maintained very low by the strategy in place, and that bycatch levels are so low as to not hinder rebuilding or recovery of bycatch species (see details in the scoring text for PI 2.2.3). The observer information directly from the fishery, and on the various bycatch species involved, is considered to represent testing and to provide a high degree of confidence that the strategy is working.		
<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>		All UoCs – Y	All UoCs – Y
	<b>Justification</b>	There is clear evidence that the strategy is being implemented successfully, based on conservation and protection observations that measures are generally being implemented in conformance with the requirements, and on conclusions from assessments of bycatch species that these species are stable or (more usually) increasing in abundance (see details in the scoring text for PI 2.2.3).		
<b>d</b>	<b>Guidepost</b>			There is some evidence that the strategy is achieving its overall objective.
	<b>Met?</b>			All UoCs – Y
	<b>Justification</b>	There is good and relatively comprehensive information that the strategy is achieving its overall objective, which is to minimise bycatch such that there are no negative impacts on populations of bycatch species. Observer information shows that bycatch amounts are low, while information on status of bycatch species shows that abundance of these is stable or increasing (see details in the scoring for PI 2.2.3).		
<b>References</b>		Hannah & Jones 2014; Orr & Cadigan 2009; other references in PI 2.2.3		
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>100</b>	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>100</b>	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>100</b>	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>100</b>	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>100</b>	
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>100</b>	
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A	

<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>UoC 6 (Northern shrimp in SFA 7)</b>	N/A

### Evaluation Table for PI 2.2.3

<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>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	All UoCs – Y	All UoCs – Y	UoCs 1, 2, 3 – Y UoCs 4, 5, 6 – N
	<b>Justification</b>	<p>Comprehensive quantitative compilations of bycatch information were conducted for UoCs 1-3 (Siferd 2010) and for UoCs 4-6 (Orr and Sullivan 2008). The offshore fleet was covered for all UoCs, with observer coverage on 100% of trips (approximately 70% of tows), while the inshore fleet was covered for UoCs 4 and 5, with target coverage of 10% of trips. A compilation of recent information on bycatch levels for seven vessels of the offshore fleet confirms the conclusions of the earlier studies (CAPP/Javitech 2016). Scores of 80 are justified for all UoCs.</p> <p>Details of bycatch amounts and impact on depleted populations are provided in the introductory sections (3.18.2). Although a wide range of species occurs in the bycatch, annual estimated bycatch of all species combined is in almost all cases (fleet/area/year cells) less than 5% of total catch weight, such that catch of any individual species is well below 5% (Orr and Sullivan 2008; Siferd 2010; CAPP/Javitech 2016). In SFAs 4-7, bycatch species at greatest abundance in 2007-8 varied between areas: redfishes in SFA 4 (0.65%), lanternfishes in SFA 5 (0.4%), capelin in SFA 6 (0.65% of the shrimp catch). All other species were below 0.5% of the shrimp catch (Orr et al 2008). In SFAs 1-3 redfishes and Arctic cod were generally the most abundant species in the bycatch in the period 1999-2007 (Siferd 2010).</p> <p>For the offshore fleet, the information is considered accurate based on the training and materials supplied to observers. Information is considered verifiable because the cited studies were presented in DFO or NAFO peer review meetings; although the recent compilation (CAPP/Javitech 2016) has not been peer reviewed it is consistent with earlier studies. Information is considered appropriate to assess consequences for affected populations because it shows that bycatch is extremely low, and for depleted species population assessments are available which allow assessment of the impact of bycatch. Scores of 100 are justified for UoCs in which only the offshore fleet operates, UoCs 1-3</p> <p>For the inshore fleet, observer coverage is relatively low; despite a target of 10% of trips, realised coverage in recent years has been 4-10% depending on SFA and year (Table 5). A similar level of coverage supported the conclusions of Orr et al (2008) (Table 6). However, this constitutes several hundred days of coverage per year, such that the information is judged to be accurate. Given that recent information on bycatch in the inshore fishery is not available (see below), however, we conclude that a score of 100 is not justified for the inshore fleet, nor for the UoCs in which it operates, UoCs 4-6.</p>		
<b>b</b>	<b>Guidepost</b>	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.

<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>Met?</b>	All UoCs – Y	All UoCs – Y	UoCs 1, 4, 5, 6 – Y UoCs 2, 3 – N
	<b>Justification</b>	<p>For all UoCs, information on bycatch is sufficient to show with a high degree of certainty that bycatch of all species is very low. Amounts in the bycatch are well estimated via observer programs (which provide information on bycatch amount per t of catch) and information on total catch.</p> <p>Estimating outcome status requires information on population status of bycatch species in addition to information on amounts of bycatch.</p> <p>No commercial species other than the four ‘main’ bycatch species have been identified as outside biologically-based limits in the fishery area. Accordingly, it is considered certain that the shrimp fishery is not having an unduly negative impact on these populations. For non-commercial species in the bycatch, bycatch is very small, and these species are common, abundant and widespread (e.g., Scott &amp; Scott 1988), such that it is clear that bycatch is not contributing to a threat environment which is taking these populations outside biologically-based limits.</p> <p>For three of the four ‘main’ bycatch species identified on the basis of vulnerability (Atlantic cod, redfishes, American plaice), available assessments based on trawl surveys and/or population models show that population abundance has been increasing in recent years in UoCs 1, 4, 5 and 6 (SFAs 1, 5-7) (ICES 2014; COSEWIC 2010b; DFO 2011; DFO 2013b; DFO 2010c; NAFO 2015c), while for the fourth (Atlantic wolffish) trends are stable or increasing (COSEWIC 2012a; Collins et al 2014). Because these trends are consistent over a period of years, they are considered to have a high degree of certainty. A score of 100 is justified for UoCs 1, 4, 5 and 6.</p> <p>For UoCs 2 and 3, abundance trends for ‘main’ species are not well known, as trawl surveys for the four main bycatch species have not been published or are infrequent. Information from the irregular surveys in NAFO 2GH (SFA 4) suggests that abundance of redfishes at least has not changed substantially (DFO 2011), and COSEWIC (2010b) indicates that deepwater redfish in this area would be genetically similar to those on the Grand Banks, such that the increasing population trends from the latter area would be applicable to this area. Given the generally increasing trend in groundfish abundance in adjacent areas (West Greenland, Labrador Shelf) it appears likely that abundance is not declining in these UoCs. A score of 80 is justified for UoCs 2 and 3.</p>		
<b>c</b>	<b>Guidepost</b>	Information is adequate to support measures to manage bycatch.	Information is adequate to support a partial strategy to manage main bycatch species.	Information is adequate to support a strategy to manage bycatch, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	<b>Met?</b>	All UoCs – Y	All UoCs – Y	UoCs 1, 2, 3 – Y UoCs 4, 5, 6 – N

<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>Justification</b>	<p>For the offshore fleet, observer coverage of bycatch has been maintained at a constant level of 100% of trips over time. For the inshore fleet coverage is lower but because of the number of fishing days sampled each year this is considered to provide accurate bycatch information (see above).</p> <p>A recent compilation of information from the offshore fleet (CAPP/Javitech 2016) is available which confirms earlier detailed assessments of bycatch, such that the information continues to be adequate to support a bycatch management strategy and evaluate with a high degree of certainty whether the strategy is achieving its objective. A score of 100 is justified for this fleet and for the UoCs in which only this fleet operates, UoCs 1-3.</p> <p>Information from the inshore fleet, from earlier detailed studies, is adequate to support the bycatch management strategy, such that a score of 80 is justified. However there has not been a recent compilation of bycatch information from this fleet, such that it is not possible to state with a high degree of certainty that the bycatch is achieving its objectives, and a score of 100 is not justified. UoCs in which this fleet operates (4-6) are assigned a score of 80 for this PI.</p> <p>Assessments of status of commercial species, in particular depleted 'main' bycatch species, have been maintained in recent years. Accordingly, information on the impact of bycatch on populations is adequate to support the bycatch minimisation strategy and to evaluate whether it is achieving its objectives.</p>	
<b>d</b>	<b>Guidepost</b>		<p>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).</p> <p>Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.</p>
	<b>Met?</b>		<p>UoCs 1, 2, 3 – Y UoCs 4, 5, 6 – N</p> <p>UoCs 1, 2, 3 – Y UoCs 4, 5, 6 – N</p>

<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>Justification</b>	<p>Observer coverage continues at 100% of trips in the offshore fleet and with a target of 10% of trips in the inshore fleet. For the latter, realised coverage has been lower than the target in recent years, from below 5% to a maximum over 10% (Table 5).</p> <p>Bycatch information is apparently not routinely compiled and monitored. A compilation of information from the offshore fleet was provided to the assessment team (CAPP/Javitech 2016) covering seven vessels in three years (2012/3-2014/5), which confirms the results of the earlier detailed studies - bycatch is extremely low, vulnerable (“main”) species are taken in very small quantities which would not jeopardise their recovery. A score of 80 is justified for this fleet.</p> <p>No recent compilation of information from the inshore fishery was available. This fleet takes a substantial proportion of the total catch in some SFAs (5, 6), and bycatch as a proportion of the total catch has been higher in the inshore fleet than in the offshore fleet (Table 8). The earlier detailed studies of bycatch show that total amounts in the inshore fleet are very low, even though the proportion of the total catch is higher than in the offshore fleet. However, because of the lack of recent information on bycatch in the inshore fleet, a score of 80 is not justified for this fleet, in UoCs 4-6 where the inshore fishery operates. A Condition of Certification (#2) is therefore set on UoCs 4 and 5. A Condition of Certification (#5) would also normally also be set on UoC 6, but in this case it is non-binding because this UoC does not satisfy PI 1.1.3 and so does not meet the minimum MSC requirements for a certified fishery.</p> <p>For the offshore fleet, the compilation of recent bycatch information covers all bycatch species, and the observer coverage on this fleet continues at a high level. Accordingly, a score of 100 is justified for this fleet, and applies to UoCs 1-3 where there is no inshore fishery.</p>	
<b>References</b>	Orr & Sullivan 2008; Siferd 2010; ICES 2014; Collins et al 2014; COSEWIC 2010b; COSEWIC 2012a; DFO 2011; DFO 2013b; DFO 2010c; NAFO 2015c.	
<b>OVERALL PI SCORE:</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>100</b>
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>95</b>
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>95</b>
	<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>75</b>
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>75</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>75</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>2</b>
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>2</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>5</b> (non-binding as UoC not certified)

### 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>	All UoCs – Y	All UoCs – Y	UoCs 4, 5, 6 – Y UoCs 1, 2, 3 – N
	<b>Justification</b>	<p>Two ETP species are potentially impacted by being taken as bycatch in this fishery - northern wolffish and spotted wolffish.</p> <p>“<i>Within the limits of national and international requirements</i>” is interpreted as not hindering survival and recovery of the ETP species.</p> <p>Information on amounts of these species in the bycatch is available from observer data in the offshore and inshore fleets (see scoring text for PI 2.3.3), indicating that catches are essentially negligible (Table 7, Table 10).</p> <p>For UoCs 4-6 (NAFO areas 2J3K and 3LNO) survey information is available to show population trends of these species. For these areas, the surveys show that population indices have been stable or increasing since the mid-1990s (Collins et al 2014), indicating that the recent threat environment of which the shrimp fishery is part is allowing for survival and recovery of the species. Because these are intensive, long-term surveys, this is considered to provide a high degree of certainty that the effects are within national and international requirements, and a score of 100 is justified.</p> <p>For UoCs 1-3, published survey information is not available for these species. However, evidence indicates that individuals in these areas are part of the same populations (‘designatable units’) as those further south (COSEWIC 2012b, 2012c), which have been shown to be stable or increasing, and accordingly it is considered that the effects are highly likely to be within national and international requirements, justifying a score of 80.</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>	All UoCs – Y	All UoCs – Y	UoCs 1, 2, 3 – Y UoCs 4, 5, 6 – N

<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>Justification</b>	<p>Available information indicates that bycatch of these species is very small and that their population trajectories are stable or increasing (see scoring text for PI 2.3.3). Accordingly scores of 80 are justified for all UoCs.</p> <p>For the offshore fleet, there is a high degree of confidence that there are no significant detrimental effects. Observer information on bycatch is considered to be of high quality (individuals are identified to species) and observer coverage is high, (100% of trips, around 70% of tows).</p> <p>For the inshore fleet, coverage is low but considered adequate to provide accurate estimates of bycatch. However there have not been recent compilations of bycatch information. While bycatch is very low, based on detailed studies in earlier years, bycatch of the two ETP species in the inshore fleet is substantially higher than in the offshore and recent information would be required to provide a high degree of confidence. The available information on bycatch amounts and population trajectories indicates that direct effects are highly unlikely to create unacceptable impacts.</p> <p>Population trend information is based on well-designed, consistent surveys. Although survey information is not available from UoCs 1-3, individuals of ETP species in these areas are considered to be of the same populations as those for which survey information is available (UoCs 4-6) (COSEWIC 2012b, 2012c), thus there is a high degree of confidence that the information applies in all areas.</p> <p>Overall, for the offshore fleet scores of 100 are justified, while for the inshore fleet scores of 80 are justified. UoCs 1-3 where only the offshore fleet operates is scored at 100, while UoCs 4-6 where both fleets operate scores at 80.</p>	
<b>c</b>	<b>Guidepost</b>		<p>Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</p> <p>There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.</p>
	<b>Met?</b>		<p>All UoCs - Y</p> <p>All UoCs - Y</p>
	<b>Justification</b>	<p>The recovery strategy for northern wolffish and spotted wolffish (Kulka et al 2008) provided a comprehensive summary of potential threats. The only identified potential indirect threat of fishing operations to these species was loss of shelter and nesting habitat due to trawling operations. However, the recovery strategy noted that trawling operations avoid the rocky areas which are preferred habitat for wolffishes, in order to avoid trawl damage, and also noted that areas of greatest population declines of the two species did not correspond to locations of most intense trawling. The present report provides evidence that impact of the fishery on habitat is such as not to cause serious or irreversible harm (see scoring text for PI 2.4.1). Accordingly, we conclude that this indirect effect is not significant.</p> <p>The only other potential indirect effect that can be envisaged is impact of the fishery on prey items. Northern wolffish prey primarily on bathypelagic organisms (ctenophores, medusae, fishes), which would normally not be affected by shrimp trawling (which mainly impacts the benthic and demersal habitats, not the pelagic habitat). Spotted wolffishes prey primarily on benthic invertebrates (echinoderms, molluscs, crustaceans) and some fishes, while northern wolffishes prey to some extent on benthic invertebrates. The present report provides evidence that impacts of the fishery on benthic species and communities is quite limited because the area impacted is a relatively small proportion of the total habitat (See scoring text for PI 2.5.1). Accordingly, we conclude that this indirect effect is not significant.</p>	

<b>PI 2.3.1</b>	<b>The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species</b>	
	Given the available information, in particular the fact that the Recovery Strategy does not identify any significant indirect effects of fishing in its comprehensive summary of potential threats, we conclude that there is a high degree of confidence that there are no significant detrimental indirect effects, such that a score of 100 is justified.	
<b>References</b>	Collins et al 2014; COSEWIC 2012b; COSEWIC 2012c; Kulka et al 2008; further information in the scoring text for PI 2.3.3.	
<b>OVERALL PI SCORE:</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>95</b>
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>95</b>
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>95</b>
	<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>95</b>
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>95</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>95</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

## 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>		<b>SG 60</b>	<b>SG 80</b>	<b>SG 100</b>
<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>	All UoCs - Y	All UoCs - Y	All UoCs - Y
	<b>Justification</b>	<p>There are two parts to the ETP strategy in this fishery.</p> <p>First, there is a strategy designed to manage and minimise bycatch (see 2.2.2), which includes the following elements:</p> <ul style="list-style-type: none"> <li>• Mandatory use of the Nordmore sorting grate in all fleets and areas (grate spacing 28 mm for the offshore fleet in the EAZ, WAZ and SFAs 4-5, 22 mm for the offshore fleet in SFAs 1, 6 and 7 and for the inshore fleet in all areas)</li> <li>• Mandatory use of toggle chains of minimum length 72 cm to keep the groundline off bottom and thus reduce bycatch of bottom-associated species</li> <li>• A move-on protocol requiring vessel to move 10 nm when bycatch is &gt;100kg or &gt;2.5% of total catch (&gt;5 t or &gt;10% of catch for capelin)</li> </ul> <p>For ETP species, fishing on soft bottoms as required to maximise shrimp catches and minimise trawl damage means that the preferred habitats of northern and spotted wolffishes (rocky areas) (Kulka et al 2008) are not much trawled.</p> <p>Testing of further measures to reduce bycatch continues, for example, studies of reducing grate spacing have been conducted (Orr and Cadigan 2009) and some vessels are currently experimenting with lights on footrope of the trawl, which have been shown to be effective in reducing eulachon (<i>Thaleichthys pacificus</i>) bycatch in the Oregon and Washington pink shrimp fishery (Hannah &amp; Jones 2014).</p> <p>Second, a recovery strategy for northern and spotted wolffishes (Kulka et al 2008) identified a number of protection measures. The primary measure applicable to this fishery is mandatory (by condition of licence) return to the water of northern and spotted wolffishes in the bycatch, in as good condition as possible (DFO 2015h).</p> <p>Overall, the strategy meets the MSC definition of a strategy (Guidance v 1.3) in that it is a cohesive and strategic arrangement designed to manage impact on the component, and mechanisms are included to modify fishing practices in light of identification of unacceptable practices. The strategy is comprehensive and is designed to ensure the survival and recovery of the two species. It is considered to be above national and international requirements in that it keeps bycatch to an extremely low level which would allow recovery (rather than just survival) of the species. Bycatch in this fishery is much lower than that permitted in other fisheries operating in the fishery area (Collins et al 2014 - see scoring text for PI 2.3.3). As such, scores of 100 are justified for all UoCs.</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>	All UoCs – Y	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	The strategy is based on information directly about the fishery involved and on information on the complex of demersal fish and benthic invertebrate species inhabiting the target species' habitat, of which northern and spotted wolffishes are part. Quantitative analysis of amounts of these species in the bycatch, and of their population trends in the fishery area, is available supporting high confidence that the strategy is working. Scores of 100 are justified.		
<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>		All UoCs – Y	All UoCs – Y
	<b>Justification</b>	Conservation and Protection patrols and observer information indicate that mandatory measures in place to reduce bycatch are being implemented as required, with very few or no reported violations (DFO 2016c, DFO 2016d, DFO 2016e). Scores of 100 are justified for all UoCs.		
<b>d</b>	<b>Guidepost</b>			There is evidence that the strategy is achieving its objective.
	<b>Met?</b>			All UoCs – Y
	<b>Justification</b>	Evidence from trawl surveys (Collins et al 2014 - see details in the scoring text for PI 2.3.3) shows that populations of northern and spotted wolffishes have been stable or increasing in the past decade in the fishery area, showing that the strategy is achieving the objective of fostering survival and recovery of the species. Scores of 100 are justified for all UoCs.		
<b>References</b>		Collins et al 2014, DFO 2015h, DFO 2016c, DFO 2016d, DFO 2016e, Hannah and Jones 2014, Orr and Cadigan 2009, Kulka et al 2008, further information in the scoring text for PI 2.3.3.		
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)		<b>100</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)		<b>100</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)		<b>100</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)		<b>100</b>

<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>UoC 5</b> (Northern shrimp in SFA 6)	<b>100</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### Evaluation Table for PI 2.3.3

PI 2.3.3		Relevant information is collected to support the management of fishery impacts on ETP species, including: Information for the development of the management strategy; Information to assess the effectiveness of the management strategy; and Information to determine the outcome status of ETP species.		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
	Met?	All UoCs – Y	All UoCs – Y	All UoCs – Y
	Justification	<p>Information on bycatch of the two ETP species, northern wolffish and spotted wolffish, was summarised from observer data from both fleets in all SFAs/UoCs, applied to total catches (Table 10) (Orr &amp; Sullivan 2008; Siferd 2010).</p> <p>Bycatch was very low. In the 5 years 2003-2007, bycatch of northern wolffish ranged from 0-137 kg/yr in most years and SFAs; 1,062 kg were estimated from the inshore fleet in SFA 6 in one year. For the same period bycatch of spotted wolffish ranged in most years from 0-335 kg, with a maximum bycatch of 1,582 kg in the inshore fleet in SFA 6.</p> <p>A compilation of recent information from the offshore fleet over three years (CAPP/Javitech 2016) (Table 6) confirms that bycatch of these species is very low – zero for northern wolffish and below 100 kg per year for spotted wolffish.,</p> <p>A recent analysis by Collins et al (2014) concluded that, over a long period (1985-2012), catches of northern wolffish rarely exceeded 0.3 t/yr in Newfoundland/Labrador offshore shrimp fishery (presumably UoCs 4-6) and that catches of spotted wolffish rarely exceeded 1 t/yr. These figures compare with much larger bycatch in Greenland halibut trawl fisheries (&gt;50 t/yr for northern wolffish in 7 of 13 years 2000-2012) and snow crab trap fisheries (&gt;50 t/yr for spotted wolffish in 9 of the same 13 years).</p> <p>Trawl survey indices are available for the two ETP species to show abundance trends (Collins et al 2014). For northern wolffish, indices have increased slightly since 1995 in NAFO 2J3K (UoCs 4-5), and have been stable since the mid-1990s in NAFO 3LNO (UoC6). For spotted wolffish, indices have increased since 1995 in NAFO 2J3K and are higher from 2005 onward than in the early 2000s in NAFO 3LNO. Reliable indices have not been published for areas further north but individuals in these areas are considered to be of the same population ('designatable unit') as those surveyed (COSEWIC 2012b, 2012c).</p> <p>The information is considered sufficient to quantitatively estimate outcome status with a high degree of certainty, justifying scores of 100 for all UoCs.</p>		
b	Guidepost	Information is adequate to broadly understand the impact of the fishery on ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.	Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	All UoCs – Y	All UoCs – Y	All UoCs – N

<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>Justification</b>	<p>The information on bycatch amounts summarised above, and the information on population trends (stable or increasing) of the two ETP species, is considered sufficient to determine whether the fishery may be a threat to their protection and recovery, justifying scores of 80.</p> <p>Although bycatch information is considered accurate it may not be 'verifiable' in all cases (that is, subject to peer review), and the magnitude of injuries (in particular survival of individuals discarded at sea) is not known. Consequences for the status are considered known based on the survey indices of population abundance. Overall a score of 100 is not justified.</p>		
<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>	All UoCs – Y	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	<p>The observer information is sufficient to measure trends in impact of the fishery, and the intensive trawl surveys are sufficient to measure population trends. Taken together, the information is sufficient to support the full strategy to manage impacts which is described in the scoring text for PI 2.3.2.</p> <p>As noted above (see PI 2.3.2) the strategy for managing impacts is comprehensive. Information available on bycatch amounts and population trends is comprehensive and considered adequate to support the strategy; the only information not available is survival of discarded individuals, but amounts taken are so small that even if survival was low or zero, removals from populations would be insignificant. The trawl surveys described above are considered to provide a high degree of certainty on whether the strategy is achieving its objectives. Scores of 100 are justified.</p>		
<b>References</b>		Collins et al 2014; COSEWIC 2012b; COSEWIC 2012c; Orr and Sullivan 2008; Siferd 2010; CAPP/Javitech 2016		
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>95</b>	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>95</b>	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>95</b>	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>95</b>	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>95</b>	
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>95</b>	
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A	

<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>UoC 6 (Northern shrimp in SFA 7)</b>	<b>N/A</b>

### Evaluation Table for PI 2.4.1

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function																													
Scoring Issue		SG 60	SG 80	SG 100																											
a	Guidepost	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.																											
	Met?	All UoCs - Y	All UoCs - Y	All UoCs – Partial Y																											
	Justification	<p>The following evidence is available to support scoring:</p> <ul style="list-style-type: none"> <li>CAPP (2015) conducted an analysis of shrimp trawl impacts on bottom habitats, examining the proportion of total habitat area impacted in a three-year period, and also examining the proportion of sensitive habitats impacted in this same period.</li> <li>Analysis of information from the three years 2009-2011 shows that the fishery impacted a small proportion (&lt;7%; figures for individual UoCs are provided below) of habitat in each fishery area in this time period (continental shelf between 100 and 600 m depth) (CAPP 2015 p.19; Spatialanalysis 2013); thus the fishery leaves most of the habitat area undisturbed. Actual area impacted was less than the proportions shown, since they assume that no tows overlap, when in fact there would inevitably be some degree of overlap.</li> <li>Although the depth range taken as “total habitat” (100-600m) is larger than that in which the fishery concentrates, it does cover the total depth range of fishing. Even if a much smaller area was taken as “total habitat”, the percentages of this habitat impacted would be relatively small.</li> <li>A relatively small proportion of sensitive bottom habitat areas (significant coral and sponge concentrations as identified in Kenchington <i>et al.</i>, 2010) was contacted (figures for individual UoCs are provided below) (CAPP 2015). Where initial analysis suggested &gt;10% overlap between sensitive habitats and the fishery, more detailed analysis was conducted on overlap (see below).</li> <li>There is very little overlap between areas trawled and sensitive bottom habitat areas as defined, since the latter were almost entirely at greater depths than those exploited in the fishery (CAPP 2015).</li> <li>Based on available information (see scoring text for PI 2.4.3) trawl impacts on the main “non-sensitive” habitat types impacted by the fishery (soft substrates, mud, silt and sand or mixtures thereof) are not such as to cause serious or irreversible harm.</li> </ul> <table border="1"> <thead> <tr> <th>UoC</th> <th>Percent of total habitat impacted</th> <th>Percent of coral areas impacted</th> <th>Percent of sponge areas impacted</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4.75</td> <td>0.1</td> <td>0</td> </tr> <tr> <td>2</td> <td>0.67</td> <td>&lt;10 (22.6)*</td> <td>0.8</td> </tr> <tr> <td>3</td> <td>0.67</td> <td>&lt;10 (22.6)*</td> <td>0.8</td> </tr> <tr> <td>4</td> <td>6.97</td> <td>0.8</td> <td>0.1</td> </tr> <tr> <td>5</td> <td>6.97</td> <td>0.8</td> <td>0.8</td> </tr> <tr> <td>6</td> <td>4.97</td> <td>&lt;10 (32.0)*</td> <td>0</td> </tr> </tbody> </table> <p>*The analysis of CAPP (2015) concluded that a more detailed analysis of risks was required in sensitive areas where initial analysis indicated that percent of habitat impacted was &gt;10%; this applies to UoCs 2, 3 and 6. More detailed risk analysis showed that less than 10% of habitat was actually impacted, as is indicated in the table. A summary of the additional more detailed risk analysis follows:</p>			UoC	Percent of total habitat impacted	Percent of coral areas impacted	Percent of sponge areas impacted	1	4.75	0.1	0	2	0.67	<10 (22.6)*	0.8	3	0.67	<10 (22.6)*	0.8	4	6.97	0.8	0.1	5	6.97	0.8	0.8	6	4.97	<10 (32.0)*
UoC	Percent of total habitat impacted	Percent of coral areas impacted	Percent of sponge areas impacted																												
1	4.75	0.1	0																												
2	0.67	<10 (22.6)*	0.8																												
3	0.67	<10 (22.6)*	0.8																												
4	6.97	0.8	0.1																												
5	6.97	0.8	0.8																												
6	4.97	<10 (32.0)*	0																												

<p><b>PI 2.4.1</b></p>	<p><b>The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function</b></p>
	<p>In UoCs 2 and 3, initial analysis showed 22.6% of overlap of shrimp tows with coral areas; however, further analysis showed the following:</p> <ul style="list-style-type: none"> <li>• Over 95% of the tows in identified sensitive areas occurred in a single coral area identified as C84 (CAPP 2015, p.29)</li> <li>• Detailed examination of the footprint in relation to coral distributions in this area showed very little overlap between the fishery footprint and known coral concentrations, as the fishery concentrates at depths shallower than those at which coral concentrations, in particular large gorgonians, occur (CAPP 2015, p.35);</li> <li>• Of 3247 sets within the identified sensitive coral area, 2 took coral bycatch, but no gorgonians were observed in the bycatch - only soft or unknown corals (CAPP 2015, p.30)</li> <li>• The interpolation technique used to identify sensitive areas based on distribution of large gorgonians in trawl survey catches is shown to extend the boundary of the identified sensitive area into shallower waters than is justified by coral distribution information alone (CAPP 2015, p.31).</li> <li>• Generally, there is little overlap between depths fished (usually 150-450 m) and coral areas (500 m or greater)</li> <li>• As a result, the analysis concludes that the actual overlap between sensitive habitat and the fishery footprint is well below the 10% threshold considered to represent a risk of serious or irreversible harm to habitat</li> <li>• Three trawl survey catches of large gorgonians occurred within depths and areas impacted by the fishery (CAPP 2015, p.35); these areas will be subject to a voluntary closure to fishing (see scoring text for PI 2.4.2, below).</li> </ul> <p>In UoC 6, initial analysis showed 32.0% overlap of shrimp tows with coral areas, however further analysis showed the following:</p> <ul style="list-style-type: none"> <li>• Over 95% of the tows in identified sensitive areas occurred in a single coral area identified as C70 (CAPP 2015, p. 29)</li> <li>• Detailed examination of the footprint in relation to coral distributions showed very little overlap between the fishery footprint and known coral concentrations, as the fishery concentrates at depths shallower than those at which coral concentrations, in particular large gorgonians, occur (CAPP 2015 p. 36);</li> <li>• Of 1607 sets within the identified sensitive area, 16 took coral bycatch, but no gorgonians were observed in the bycatch - only soft corals (CAPP 2015 p. 30)</li> <li>• The interpolation technique used to identify sensitive areas based on distribution of large gorgonians in trawl survey catches is argued to extend the boundary of the identified sensitive area into shallower waters than is justified by coral distribution (CAPP 2015 p. 31)</li> <li>• As a result, the analysis concludes that the actual overlap between sensitive habitat and the fishery footprint is well below the 10% threshold considered to represent a serious risk of serious or irreversible harm to habitat.</li> </ul> <p>Several areas closed to shrimp trawling are in place which serve to protect bottom habitat areas (see details in Section 4.13 and in Scoring Table for 2.4.2 below):</p> <ul style="list-style-type: none"> <li>• A closed area designed to protect coral and sponge concentrations in the EAZ/SFA 4</li> <li>• A closed area to protect sensitive bottom habitats in SFA 4, put in place in response to the analyses of CAPP (2015)</li> <li>• Closed areas in SFAs 5 and 6 intended to reduce interactions with snow crab fisheries, but which have the effect of protecting bottom habitat areas</li> </ul> <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 (MSC 2013b),</p>

<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>	
	since the analysis shows that a relatively small proportion of the bottom habitat is contacted by the fishery in a three-year period, leaving large areas untrawled or in recovery from previous trawling. The evidence, in the form of an original analysis, has been reviewed by the NSAC MSC Working Group and adopted by the NSAC in plenary. A score of 90 is assigned. The score would have been higher had the analysis been subjected to independent peer review by specialists in marine benthic habitats and impacts of fishing gear.	
<b>References</b>	CAPP 2015; Spatialanalysis 2013; Kenchington et al 2010	
<b>OVERALL PI SCORE:</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>90</b>
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>90</b>
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>90</b>
	<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>90</b>
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>90</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

## 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?	All UoCs – Y	All UoCs – Y	All UoCs – N
	Justification	<p>Elements of the way fishing is undertaken are such as to minimize harm to habitats: gear is relatively light; the fishery concentrates on relatively resilient soft substrates where shrimp are concentrated and to minimise gear damage; the fishery concentrates at depths shallower than those at which identified sensitive coral and sponge habitats typically occur.</p> <p>The analysis of CAPP (2015) shows that the existing fishing strategy is such as to ensure that serious or irreversible harm to sensitive habitats does not occur, since a low proportion of habitats is impacted (see scoring text for PI 2.4.1).</p> <p>A partial strategy document, approved by NSAC on March 4, 2015, summarizes fishery footprint in relation to habitats. The document includes a commitment to monitor fishery footprint at five year intervals and to modify fishing practices if analyses show that identified thresholds of proportion of habitat impacted are surpassed (CAPP 2015 p. 45). The fishery has shown the capacity to analyse and monitor habitat impacts and to put in place additional measures to protect habitat if necessary (voluntary closed areas in the EA, WAZ and SFA 4) (CAPP 2015). The partial strategy has been developed in the context of DFO national strategies on fishing in sensitive benthic habitats (DFO 2009c) and on coral and sponge conservation (DFO 2015d).</p> <p>For UoCs 2 and 3, the partial strategy also includes a voluntary closed area of 12,500 km<sup>2</sup> off the entrance to Hudson Strait, with the objective of protecting coral and sponge concentrations (DFO 2010a) (Figure 47). In addition, following the analysis of CAPP (2015) showing areas where large gorgonians were taken in surveys within the fishery footprint, industry has put in place a closed area in SFA 4 and has requested that this be formalised within the IFMP (email from Bruce Chapman, 29<sup>th</sup> November 2015) (Figure 49).</p> <p>For UoC 5, two areas are closed to trawling, in Hawke Channel (2,500 nm<sup>2</sup> or 8,600 km<sup>2</sup>) and in Funk Island Deep (approximately the same size) (DFO 2010a) (Figure 48). While these were not closed to protect bottom habitats (the objective was to assess trawl impacts on snow crab populations), they do represent habitat areas unaffected by trawling.</p> <p>As such, the fishery meets the MSC guidance on a partial strategy: a cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically. (MSC 2013b). A score of 80 is justified for all UoCs.</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>	All UoCs – Y	All UoCs – Y	All UoCs – N
	<b>Justification</b>	Analysis of the fishery, in particular its footprint in relation to sensitive and less-sensitive habitats, shows that the fishery is highly likely to meet the SG 80 outcome indicator for PI 2.4.1 (see above). A score of 80 is justified.		
<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>		All UoCs – Y	All UoCs – N
	<b>Justification</b>	Analyses of the fishery footprint in relation to sensitive and less-sensitive habitats show that the fishery is highly likely to meet the SG 80 outcome indicator for PI 2.4.1 (see above). A score of 80 is justified.  The fishery does not meet the 100 SG because the partial strategy in place does not meet the MSC definition of a “strategy” (MSC Guidance, GCB 3.3) - “a cohesive and strategic arrangement...designed to manage impact on that component specifically”, there has been no testing of the strategy, and there is no evidence to show that intended changes are occurring or that the strategy is achieving its objective.		
<b>d</b>	<b>Guidepost</b>			There is some evidence that the strategy is achieving its objective.
	<b>Met?</b>			All UoCs - N
	<b>Justification</b>	The fishery does not meet the 100 SG because the partial strategy in place does not meet the MSC definition of a “strategy” (MSC Guidance, GCB 3.3).		
<b>References</b>		CAPP 2015; Spatialanalysis 2013; DFO 2009c; DFO 2010a; DFO 2015d		
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)		<b>80</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)		<b>80</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)		<b>80</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)		<b>80</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)		<b>80</b>

<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>UoC 6</b> (Northern shrimp in SFA 7)	<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### Evaluation Table for PI 2.4.3

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There is basic understanding of the types and distribution of main habitats in the area of the fishery.	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
	Met?	All UoCs – Y	All UoCs – Y	UoCs 4, 5, 6 – Y UoCs 1, 2, 3 – N
	Justification	<p>Maps of sediment types in the fishery area are available which show the nature and distribution of habitat types at a level of detail relevant to the scale and intensity of the fishery:</p> <ul style="list-style-type: none"> <li>• UoC 1 – CAPP (2015)</li> <li>• UoCs 2, 3, 4, 5 – CAPP (2015), Josenhans et al (1986); CNLOPB (2008)</li> <li>• UoC 6 – CAPP (2015), CNLOPB (2014)</li> </ul> <p>Vulnerability of the various habitat types to bottom trawl fishing are also known (NEFMC 2011 and others, see below), so justifying scores of 80 for all UoCs.</p> <p>Maps of sensitive habitats, as defined by the presence of significant concentrations of corals and sponges, are available (Kenchington et al 2010; DFO 2010b). These are to be updated in 2016 based on a CSAS review of recent information. This information supports a score of 100 for the second part of SG100 scoring text. However, the distribution of habitat types, while known at a level of detail relevant to the fishery, is not completely known over their range in the more northerly SFAs (UoCs 1-3), so a score of 100 is not justified for these UoCs. For the more southerly SFAs (UoCs 4-6) the detailed maps of sediment distribution are considered to show the distribution of habitat types over their range, justifying a score of 100.</p>		
b	Guidepost	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.	The physical impacts of the gear on the habitat types have been quantified fully.
	Met?	All UoCs – Y	All UoCs – Y	All UoCs – N

<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>Justification</b>	<p>A review of the mode of operation of Newfoundland shrimp gear and potential impacts on bottom habitats is available (Grant 2012). Impacts of shrimp trawl gear on habitats in which they most commonly operate (soft substrates) have been described in publications from Oregon, Maine and the northern Gulf of St. Lawrence (Hixon &amp; Tissot 2007; Simpson &amp; Watling 2006; Moritz <i>et al.</i> 2015). Research on impacts of mobile bottom gear on habitats in the Newfoundland-Labrador area has been summarised and reviewed (Gilkinson <i>et al.</i>, 2006), as has research on impacts in a nearby marine area (Gordon et al 2006). More general reviews of impacts of mobile bottom gear on habitats are available (e.g., Kaiser <i>et al.</i>, 2006; Rice 2006).</p> <p>A framework for assessing fishing gear impacts on bottom habitats has been developed to guide risk assessment (NEFMC 2011, Grabowski et al 2014).</p> <p>Timing and location of use of the fishing gear are monitored by VMS on all vessels at all times, and the information can be used in analyses of the fishery footprint (as for example in Spatialanalysis 2013). Scores of 80 are justified for all UoCs.</p> <p>The 100 SG is not met as the physical impacts of the gear on habitats has not been quantified fully.</p>	
<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>All UoCs – Y</p> <p>All UoCs – N</p>
	<b>Justification</b>	<p>VMS monitoring of fishing locations continues and the client has committed to 5-year reanalyses of fishery footprint in relation to habitat types (CAPP 2015). Scores of 80 are justified.</p> <p>The fishery does not meet the 100 SG because the distribution of habitat types is not known over their range (there are gaps in knowledge of habitat distributions), and changes in habitat distributions are not monitored.</p>	
<b>References</b>		CAPP 2015; Josenhans et al 1986; CNLOPB 2008; CNLOPB 2014; Kenchington et al 2010; DFO 2010b; NEFMC 2011; Grant 2012; Hixon & Tissot 2007; Simpson & Watling 2006; Gilkinson et al 2006; Gordon et al 2006; Kaiser et al 2006; Rice 2006; Grabowski et al 2014; Spatialanalysis 2013.	
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>80</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>80</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>80</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>85</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>85</b>
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>85</b>
<b>CONDITION NUMBER</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>N/A</b>

<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>(if relevant):</b>	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### Evaluation Table for PI 2.5.1

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	All UoCs - Y	All UoCs - Y	All UoCs - Y
	Justification	<p>Two key ecosystem elements could potentially be impacted by the fishery – trophic relationships (removal of shrimp as a forage species) and benthic biodiversity and community structure (non-catch impact of trawl passage).</p> <p>(1) Impact on trophic relationships.</p> <p>For UoC1, predation on shrimp stocks is explicitly accounted for in the stock assessment. By adding a component of mortality on the shrimp stock to the assessment through predation, the assessment essentially assigns an amount of shrimp to predators, such that TAC advice takes trophic relationships into account (NAFO 2015a, NAFO 2015b).</p> <p>For UoCs 2-5, the IFMP acknowledges the need to take predator needs into account in setting TACs (DFO 2010a). Past practice has been generally to keep exploitation rates below 15% and DFO has committed to using 20% as a proxy for <math>F_{MSY}</math>, i.e., as a maximum or target exploitation rate (DFO 2015c). These exploitation rates are set at levels which would allow a surplus for predators. The most recent exploitation rates show that the guideline has been respected: 10% for the EAZ, 6% for the WAZ, 12% for SFA 4, 15-18% for SFA 5. Exploitation rate was predicted to be slightly more than 20% for 2016 in SFA6 due to falling biomass, but this is close to the guideline and is expected to be adjusted in future.</p> <p>For UoC6, although the DFO IFMP allows for the same exploitation rate guideline as in UoCs 2-5, the stock is under NAFO management and no explicit exploitation rate is provided. However, exploitation rates in recent years have been around 15% and the fishery has been closed since 2015 as the stock is below the LRP.</p> <p>Shrimp are an important prey species for a range of fish and seal predators (Parsons 2005b). However, these predator populations are stable or increasing in the fishery area despite operation of the fishery for 20+ years. Groundfish populations are generally increasing on the Newfoundland-Labrador shelf, while the proportion of shrimp in groundfish diets has been declining and the proportion of fish (a preferred prey) increasing (DFO 2014b). Seal populations in the fishery are at high levels (DFO 2015e). Evidence shows that fishing to the current strategies is not impacting predator populations by removing shrimp from the ecosystem, that is, that this ecosystem element is not being disrupted to the extent that there would be serious or irreversible harm to ecosystem structure and function. A score of 100 is justified.</p> <p>(2) Impact on benthic biodiversity and community structure.</p> <p>In the three years 2009-2011 the fishery impacted a small proportion of bottom habitats (and thus benthic communities) in each of the UoCs (continental shelf between 100 and 600 m depth) (&lt;7%, see table above) (CAPP 2015 p. 19; Spatialanalysis 2013), thus leaving most areas and communities undisturbed. Actual area impacted was less than this because this figure does not account for overlapping tows.</p>		

<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>	
	<p>Based on available information (see scoring text for PI 2.5.3), impacts of trawl passage on benthic species (and thus biodiversity and community structure) in the main habitat types impacted by the fishery (soft substrates, mud, silt and sand or mixtures thereof) are known and may cause measurable changes in benthic community structure; however because more than 90% of the distribution area of benthic communities of the fishery area is not impacted by the fishery, the overall impact is not such as to cause serious or irreversible harm.</p> <p>Impacts on benthic biodiversity and community structure in sensitive habitats are addressed under the Habitats PIs (PIs 2.4.1-2.4.3)</p> <p>Since there is evidence that less than 10% of the benthic community is exposed to trawling, a score of 100 is justified.</p>	
<b>References</b>	NAFO 2015a, b; DFO 2010a; DFO 2015c; Parsons 2005b; DFO 2014b; DFO 2015e; CAPP 2015; Spatialanalysis 2013; references under 2.5.3	
<b>OVERALL PI SCORE:</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>100</b>
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>100</b>
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>100</b>
	<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>100</b>
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>100</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

## 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?	All UoCs – Y	All UoCs – Y	All UoCs – N
	Justification	<p>1) Impact on trophic relationships.</p> <p>For UoC1, scientific advice on TACs is based on an assessment which addresses prey requirements for predators explicitly, which represents a partial strategy to address this issue.</p> <p>For UoCs 2-5, the harvest control rules (DFO 2010a; DFO 2015c) allow for a guide maximum exploitation rate of 20%, which is considered low enough to allow for predator requirements to be met. The HCRs reduce the exploitation rate in the cautious and critical zones such that predator needs would be met as stock declines.</p> <p>For UoC 6, no explicit HCR is in place but an implicit HCR has led to closure of the fishery following decline below a defined limit reference point, allowing the remaining surplus for predator requirements.</p> <p>2) Impact on benthic biodiversity.</p> <p>Measures within the fishing strategy are such as to reduce harm to benthic biodiversity and community structure: gear is relatively light; the fishery operates on soft substrates whose benthic species are considered relatively resilient and of relatively short recovery time; the fishery does not impact over 90% of bottom areas in the fishery area.</p> <p>For UoCs 2 and 3, industry has put in place a voluntary closed area of 12,500km<sup>2</sup> off the entrance to Hudson Strait with the objective of protecting coral and sponge concentrations (DFO 2010a), which should contribute to protecting benthic biodiversity and communities in this area.</p> <p>For UoC 5, two areas are closed to trawling, in Hawke Channel (2,500 nm<sup>2</sup>) and in Funk Island Deep (approximately the same size) (DFO 2010a); while these were not closed to protect benthic biodiversity and community structure (the objective was to assess trawl impacts on snow crab populations), they do represent habitat areas unaffected by trawling. A new voluntary closed are in SFA 4 has been put in place to protect identified sensitive bottom areas (see introductory section, Figure 49).</p> <p>A partial strategy document, approved by NSAC on March 4, 2015, summarizes fishery footprint in relation to habitats. The document includes a commitment to monitor fishery footprint at 5 year intervals and to modify fishing practices if analyses show that identified critical thresholds are surpassed (CAPP 2015, p. 45). The fishery has shown the capacity to analyse and monitor ecosystem impacts and to put in place additional measures to protect the ecosystem if necessary.</p> <p>As such, the fishery meets the MSC guidance on a partial strategy: a cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically. (MSC 2013).</p> <p>A score of 80 is justified for all UoCs.</p> <p>The fishery does not meet the 100 SG for this SI because the partial strategies in place do not meet the MSC definition of a “strategy” (MSC Guidance, GCB 3.3) – “a cohesive</p>		

<b>PI 2.5.2</b>		<b>There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function</b>		
		<i>and strategic arrangement ... designed to manage impact on that component specifically</i> ".		
<b>b</b>	<b>Guidepost</b>	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>
	<b>Met?</b>	All UoCs – Y	All UoCs – Y	All UoCs – N
	<b>Justification</b>	<p>(1) Impact on trophic relationships.</p> <p>The partial strategy takes into account available information on the role of shrimp in trophic relationships (Kingsley 2015; Bundy et al 2000; Parsons 2005a, 2005b; Hammill &amp; Stenson 2000; DFO 2014b), which indicates that shrimp may be an important prey item for a range of fish and seal species, but that other prey (fishes) are generally preferred. The partial strategy is expected to maintain adequate levels of shrimp in the ecosystem such as to prevent serious or irreversible harm (see scoring text for PI 2.5.1).</p> <p>(2) Impact on benthic biodiversity.</p> <p>The partial strategy is based on an analysis of the fishery footprint in the fishery area, available information on distribution of benthic species and communities in the fishery area, a review of non-catch impacts of this gear on benthic species and on inference from information in similar fisheries in other areas (see scoring text for PI 2.5.3). Because the current fishing strategy results in less than 10% of the fishery area being impacted by the fishery, and because of the inferred low impact of the gear on those areas that are impacted, the partial strategy is expected to restrain impacts of the fishery such that there would not be serious or irreversible harm to benthic biodiversity and community structure.</p> <p>A score of 80 is justified, but the fishery does not meet the 100 SG for this SI because the partial strategies in place do not meet the MSC definition of a "strategy" (MSC Guidance, GCB 3.3) – <i>"a cohesive and strategic arrangement ... designed to manage impact on that component specifically"</i>.</p>		

<b>PI 2.5.2</b>		<b>There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function</b>		
<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>	All UoCs – Y	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	<ul style="list-style-type: none"> <li>Impact on trophic relationships.</li> </ul> <p>The measures have been shown to work, based on information from this fishery/ecosystem. Groundfish populations are generally stable or increasing in the fishery area (e.g., ICES 2014; DFO 2014b) and seal populations have been high and stable or increasing (DFO 2015e). Accordingly, removals of shrimp by the fishery have not negatively impacted trophic relationships to the extent that populations of key predators have shown any negative effect.</p> <ul style="list-style-type: none"> <li>Impact on benthic biodiversity.</li> </ul> <p>The partial strategy is considered likely to work based on analyses of the fishery footprint in relation to benthic communities (information directly from the fishery/ecosystems involved).</p> <p>A score of 100 is justified for all UoCs.</p>		
<b>d</b>	<b>Guidepost</b>		There is some evidence that the measures comprising the partial strategy are being implemented successfully.	There is evidence that the measures are being implemented successfully.
	<b>Met?</b>		All UoCs – Y	All UoCs – Y
	<b>Justification</b>	<p>(1) Impact on trophic relationships.</p> <p>Evidence shows that TACs are clearly being adhered to. Since setting TACs in consideration for predator requirements is key to the partial strategy, it is clear that the measures are being implemented successfully.</p> <p>(2) Impact on benthic biodiversity.</p> <p>Distribution of fishing, monitored by VMS, shows that the footprint of the fishery on benthic communities is relatively small.</p> <p>Scores of 100 are justified for all UoCs.</p>		
<b>References</b>		DFO 2010a; DFO 2015c; Parsons 2005a; Parsons 2005b; Bundy et al 2000; Hammill & Stenson 2000; DFO 2014b; DFO 2015e; CAPP 2015; Kingsley 2015; ICES 2014		
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>90</b>	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>90</b>	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>90</b>	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>90</b>	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>90</b>	
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>90</b>	

<b>PI 2.5.2</b>	<b>There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function</b>	
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### Evaluation Table for PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	All UoCs - Y	All UoCs - Y	
	Justification	<p><i>Trophic relationships</i> are known generally in the fishery area (Bundy et al 2000) and in a similar shrimp ecosystem in an adjacent area with similar environmental characteristics (Savenkoff et al 2006). More specifically, the trophic role of shrimp in ecosystems has been well documented (Parsons 2005a, 2005b).</p> <p>For <i>benthic biodiversity and community structure</i>, information on distribution of habitats across the fishery area is available (see the scoring text for PI 2.4.3), which along with studies of benthic invertebrates in specific areas allows inference on composition and distribution of communities more broadly. Benthic species of the soft-substrate habitats on which the fishery operates are generally known from studies in the fishery area (Stewart et al 1985 for SFAs 1-4; Gagnon &amp; Haedrich 1991 for polychaetes in SFAs 6-7; Gordon et al 2009 for sand-bottom benthos on the Grand Banks), in areas near and presumably ecologically similar to this area (Chabot et al 2007 for the northern Gulf of St. Lawrence; Ramey &amp; Snelgrove 2003 for mud/sand habitats of Placentia Bay) and in other areas in which <i>Pandalus</i> fisheries operate (Hixon &amp; Tissot 2006, Oregon; Simpson &amp; Watling 2006, Gulf of Maine).</p> <p>Species groupings observed by Stewart et al (1985) in the benthos of the northern UoCs (1-3) were similar to those further south: ophiuroid echinoderms (brittle stars), polychaetes, bivalve molluscs and amphipod crustaceans were the major groups observed. Stewart et al (1985) provided a species list by station and a summary of dominant species by station.</p> <p>Sand-bottom habitats of the Grand Banks have been the subject of most of the available studies in the more southerly UoCs (5-6), and are dominated by echinoderms and molluscs (Schneider et al 1987). Mud-bottom habitats such as those where the shrimp fishery is concentrated have a high proportion of tube-dwelling polychaetes in shelf waters off southern Newfoundland (Ramey and Snelgrove 2003).</p> <p>Available information on the benthic fauna of the Newfoundland-Labrador shelf has been reviewed and summarised to support a mass balance model of this area (Bundy et al 2000). Major benthos groups identified for this model are echinoderms (brittle stars, sea urchins), molluscs (bivalves, gastropods), polychaetes (tube-dwelling and mobile), and others including crustaceans, nematodes and others.</p> <p>Because bottom temperatures and sediments of shrimp fishery areas in all UoCs are generally similar, information from parts of the overall area is considered applicable to all UoCs, at least at the broad level of understanding of benthic biodiversity and community structure which is required here.</p> <p>For <i>productivity</i>, the review and mass balance model of Bundy et al (2000) provides estimates of productivity at different trophic levels from available studies.</p> <p>Given the available information on key elements of the ecosystem, a score of 80 is justified for all UoCs.</p>		

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
<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 in detail.
	<b>Met?</b>	All UoCs – Y	All UoCs – Y	All UoCs – N
	<b>Justification</b>	<p>Two main potential impacts of the fishery on key ecosystem elements have been identified: impact on trophic relationships by removal of shrimp and non-catch impacts on benthic biodiversity and community structure.</p> <p>Impacts of the fishery on trophic relationships can be inferred from information on the role of shrimp in these relationships (Bundy et al 2000; DFO 2014b; Parsons 2005a, 2005b; Savenkoff et al 2006). These publications represent investigations in detail of the trophic role of shrimp in ecosystems.</p> <p>Impacts of the fishery on benthic biodiversity and community structure can be inferred from the information on benthic communities in the fishery area outlined under SIa, on the non-catch impact of shrimp trawling on such communities (Grant 2012; Moritz et al 2015; Hixon &amp; Tissot 2007; Simpson &amp; Watling 2006) and on the impact of trawling on benthic communities more generally (e.g., NEFMC 2011; Grabowski et al 2014; Kaiser et al 2006; Rice 2006). The impacts have not been investigated in detail in the CNSSF.</p> <p>Since impacts can be inferred and some (trophic relationships) have been investigated in detail in the fishery area, and so scores of 80 are justified.</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>		All UoCs – Y	All UoCs – Y
	<b>Justification</b>	<p>Impacts of the fishery on the identified components have been outlined in earlier sections (see the scoring texts for other P2 PIs) and are well established, in light of the scores assigned in those sections of the report.</p> <p>Functions of the component species in the ecosystem are well understood from available studies, in particular of the ecosystem structure in the fishery area (Bundy et al 2000) and studies of species biology and status summarised in the earlier sections (2.1-2.4).</p> <p>Scores of 100 are justified.</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>		All UoCs – Y	All UoCs – Y

<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>Information on fishery impacts on components has been summarised in earlier sections (see the scoring texts for other P2 PIs). Generally, bycatch of discard species (there are no retained species) is very low and population level impacts are negligible, bycatch of ETP species is extremely low and does not jeopardise survival and recovery, while a very low percentage of habitat is impacted by the fishery (&lt;7% of total habitat, &lt;10% of sensitive habitat). Given the low impacts at the level of components, ecosystem-level consequences can be inferred and are considered insignificant (bycatch) or not such as to cause serious or irreversible harm (habitats).</p> <p>Information on impacts on ecosystem elements is summarised above (SIb). Given the low level of impact (2.1.1), consequences for the ecosystem can be inferred and are considered insignificant or minor.</p> <p>Scores of 100 are justified for all UoCs.</p>	
<b>e</b>	<b>Guidepost</b>		<p>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).</p> <p>Information is sufficient to support the development of strategies to manage ecosystem impacts.</p>
	<b>Met?</b>		<p>All UoCs – Y</p> <p>All UoCs – N</p>
	<b>Justification</b>	<p>Observer data continue to be collected to support assessment of impacts on bycatch species and ETP species, at the same level as in previous years. Information on distribution of fishing is collected from all vessels in all SFAs by VMS, allowing for ongoing monitoring of risk to identified sensitive and non-sensitive habitats and to benthic biodiversity. The client has committed to reviewing the fishery footprint in relation to habitats every 5 years. Information on distribution of sensitive habitats will be updated in 2016 through a CSAS review.</p> <p>Catch data collection and population assessments of key predator species are being maintained which will allow monitoring of risk to predator species from removal of shrimp forage.</p> <p>Scores of 80 are justified. While information is sufficient to support development of strategies, and (partial) strategies are in place to manage impacts on components and elements, current information is not sufficient to develop comprehensive strategies to manage ecosystem impacts, so scores of 100 are not justified.</p>	
<b>References</b>		<p>Bundy et al 2000; Chabot et al 2007; DFO 2014b; Parsons 2005a, 2005b; Savenkoff et al 2006; Grant 2012; Moritz et al 2015; Hixon &amp; Tissot 2007; Simpson &amp; Watling 2006; NEFMC 2011; Grabowski et al 2014; Kaiser et al 2006; Rice 2006; Stewart et al 1985; Gagnon &amp; Haedrich 1991; Gordon et al 2009; Ramey &amp; Snelgrove 2003; Schneider et al 1987.</p>	
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>90</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>90</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>90</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>90</b>

<b>PI 2.5.3</b>	<b>There is adequate knowledge of the impacts of the fishery on the ecosystem</b>	
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>90</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

## Principle 3

### 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></p> <ul style="list-style-type: none"> <li>• <b>Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</b></li> <li>• <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>• <b>Incorporates an appropriate dispute resolution framework.</b></li> </ul>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	<p>There is an effective national legal system and <u>a framework for cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2</p>	<p>There is an effective national legal system and <u>organised and effective cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.</p>	<p>There is an effective national legal system and <u>binding procedures governing cooperation with other parties</u> which delivers management outcomes consistent with MSC Principles 1 and 2.</p>
	<b>Met?</b>	All UoCs – Y	UoCs 2, 3, 4, 5 – Y UoC 1 – N	UoC 6 – Y UoCs 1, 2, 3, 4, 5 – N
	<b>Justification</b>	<p>There are three well-established systems for the management of the CNSSF in the Northwest Atlantic – the NAFO treaty for stocks outside Canada’s EEZ, the Greenland regime in those waters east of 60°30’ W in Subarea 0/Subareas 1A-F, and the DFO fisheries management system for the domestic fishery (including in SFA 1).</p> <p>As noted in Section 3.24, the Greenland government has established a fishery management regime based on its <i>Fisheries Act, 1996</i> and regulations made thereunder, which provides for a wide array of management and conservation measures including harvest controls, vessel surveillance, catch reporting, on-board observers, TAC setting, identification of fishing vessels, satellite surveillance, access to fishing areas, catch reporting and licence control measures.</p> <p>Within Canada’s EEZ, there is a well-established legislative framework. The single-jurisdiction federal system has enacted several pieces of legislation that govern fisheries, notably the <i>Fisheries Act</i> and the <i>Oceans Act</i>, which grant authority and regulatory powers for the management of fisheries and oceans. The <i>Atlantic Fishery Regulations, 1985</i> and the <i>Fishery (General) Regulations</i> are the main regulatory instruments governing the fishery. Management measures are developed under the authority of the <i>Act</i> and regulatory powers have been delegated to DFO officials.</p> <p>The NAFO Convention (NAFO 1979) is an international treaty signed by nations fishing straddling stocks and those in international waters in the Northwest Atlantic Ocean outside of the EEZs of the adjacent states - the NAFO Regulatory Area (NRA).</p> <p>NAFO’s overarching objective is “to contribute through consultation and cooperation to the optimum utilization, rational management and conservation of the fishery resources of the Convention Area.” The Scientific Council (SC) is responsible for stock assessments and advice on specific stocks and the Fisheries Commission (FC) is responsible for setting harvest levels, rules and management measures. The structure and processes are clearly described in the Convention including such things as attendance, voting, dissent and dispute resolution mechanisms.</p>		

<p><b>PI 3.1.1</b></p>	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>• <b>Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</b></li> <li>• <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>• <b>Incorporates an appropriate dispute resolution framework.</b></li> </ul>
	<p>The NAFO Convention contains binding procedures governing cooperation with other contracting parties. That cooperation delivers sustainable management under the obligations of UNCLOS Articles 63(2), 118, 119, and UNFSA Article 8. It further delivers the intent of UNFSA Article 10 paragraphs relating to the collection and sharing of scientific data, the scientific assessment of stock status, and development of scientific advice.</p> <p>Within the Canadian and Greenland processes, there is an effective national legal system and organized and effective cooperation with other parties through the advisory process. While there is a constitutionally binding requirement in Canada to consult with aboriginal peoples and Canadian provinces on some issues, there is no general requirement governing cooperation with all interested parties.</p> <p>The Canadian, Greenland and NAFO management regimes provide an effective legal system and some binding procedures for cooperation with other parties that delivers management outcomes consistent with MSC Principles 1 and 2.</p> <p>The CNSSF meets the SG80 level of performance for UoCs 2-5 for this SI. The lack of domestic binding procedures for cooperation with other parties precludes a higher score. Since the NAFO Convention contains binding procedures governing cooperation with other contracting parties and observers, the CNSSF meets the 100 SG for UoC 6.</p> <p>As noted in the scoring text for PI 1.2.1, above, regarding UoC 1, both Canada and Greenland have set harvest limits and strategies which, taken separately, work to achieve management objectives reflected in the target and limit reference points. However, the result of these independent approaches has led to the combined TACs being greater than those advised by NAFO SC, primarily because of lack of agreement on catch shares.</p> <p>Talks between Canada and Greenland aimed at achieving an agreement on a joint harvest strategy have been ongoing for several years and are expected to continue in 2016. However, the current lack of agreement on harvest strategy including prospective control rules in the two fishery zones could result in exploitation levels that exceed the target and limit reference points, in particular if there was an abrupt decline in biomass. Agreement between the parties on joint action to reduce exploitation to acceptable levels in the event of such a situation is needed.</p> <p>Under current circumstances, it cannot be concluded that organized and effective cooperation with other parties exists to deliver management outcomes consistent with MSC Principles 1 and 2 as required by SG80. It can be concluded, however, that there is a framework for cooperation in place as required for a 60 score. A score of 60 is therefore awarded for UoC 1 with a Condition of Certification (#3) imposed.</p>

<p><b>PI 3.1.1</b></p>	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>• <b>Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</b></li> <li>• <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>• <b>Incorporates an appropriate dispute resolution framework.</b></li> </ul>			
<p><b>b</b></p>	<p><b>Guidepost</b></p>	<p>The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.</p>	<p>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.</p>	<p>The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.</p>
	<p><b>Met?</b></p>	<p>All UoCs – Y</p>	<p>All UoCs – Y</p>	<p>UoCs 1, 2, 3, 4, 5 – Y UoC 6 – N</p>
	<p><b>Justification</b></p>	<p>There is an elaborate sanction and penalty structure in the <i>Fisheries Act</i> and regulations. The <i>Federal Court Act</i> provides a mechanism for parties to challenge decisions of administrative bodies or tribunals and receive a hearing before a justice of that court.</p> <p>Legal disputes respecting fishing violations are adjudicated quickly, fairly and transparently in a public forum following procedures outlined in the <i>Criminal Code of Canada</i> and have been shown to be effective. The legal and policy framework has been otherwise tested on several occasions at the Supreme Court of Canada (SCC) in such areas as licensing (<i>Saulnier v The Royal Bank</i>) and fishing rights and allocation practices (<i>Larocque v. Canada (Minister of Fisheries and Oceans)</i> in an open and transparent process. The system implements binding legal decisions quickly.</p> <p>In Greenland, disputes between Fisheries Council members are dealt with in the civilian or criminal courts. During the second site visit of the 2013 assessment of the West Greenland fishery, the client and administrative authority representatives stated that there are no legal challenges, or any related binding judgements, to which the Greenland Government has to respond or adhere to, indicating that there is widespread respect in the Greenland fishing industry for the legal and customary framework of the management system (IMM 2013).</p> <p>The domestic management system is subject to an open, transparent mechanism provided through federal legislation in open, public courts and has been tested numerous times and proven to be effective.</p> <p>The CNSSF domestic management system features transparent legal mechanisms for the resolution of legal disputes that has been tested and proven to be effective. The CNSFF meets the SG 100 level of performance for this SI for UoCs 1-5.</p> <p>Most disputes within the NAFO context are resolved through the process of discussion and negotiation among the CPs. As NAFO is an international organization, the sovereign right of states is respected and the non-binding objection process in the NAFO Convention reflects that right.</p> <p>The resolution of disputes in the NAFO context through discussion and cooperation is effective in dealing with most issues and is appropriate in the context of the shrimp fishery earning an 80 score for this SI for UoC 6. The objection process of NAFO (under</p>		

<p><b>PI 3.1.1</b></p>	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>• <b>Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</b></li> <li>• <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>• <b>Incorporates an appropriate dispute resolution framework.</b></li> </ul>			
	<p>review at time of writing) that can result in disputes not being settled, keeps this indicator from scoring higher for UoC 6.</p>			
<p><b>d</b></p>	<p><b>Guidepost</b></p>	<p>The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>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.</p>
	<p><b>Met?</b></p>	<p>All UoCs – Y</p>	<p>All UoCs – Y</p>	<p>All UoCs – Y</p>
	<p><b>Justification</b></p>	<p>The Greenland Fishery Act, 1996, includes sections on the legal rights and obligations that apply to Greenland nationals who depend on the fisheries for their livelihood.</p> <p>The <i>Constitution Act, 1982</i> recognizes and confirms aboriginal and treaty rights of the indigenous peoples of Canada including the guarantee of legal rights to fish for food and livelihood. This section has been litigated and confirmed by the SCC on several occasions and constitutes a formal commitment to the rights of aboriginal peoples. Disputes regarding aboriginal fishing rights have been fairly litigated (<i>R.v Sparrow, R.v Marshall</i>) and have led to current policy initiatives that ensures the protection of aboriginal rights, the “<i>Aboriginal Fisheries Strategy</i>” (DFO 2008b) which is aimed at ensuring that entitlements are respected in the development of fisheries management regimes for aboriginal peoples.</p> <p>The formal constitutionally-supported land claims process and agreements in Nunavut, Nunavik and Labrador demonstrate how legal rights created by custom of people dependent on fishing for food or livelihood have been acknowledged and respected.</p> <p>The Canadian constitution and subsequent SCC judgments provide a tested and proven mechanism to formally commit to the legal rights of aboriginal peoples to fish for food and livelihood. The Greenland Fishery Act, 1996 provides a similar commitment to its nationals. This SI is met at SG100 for all UoCs.</p>		
<p><b>References</b></p>	<p>DFO 2008b, Atlantic Fishery Regulations, 1985, Constitution Act, 1982, Criminal Code of Canada, Fisheries Act, Fishery (General) Regulations, Federal Court Act, IMM 2013, Larocque v. Canada (Minister of Fisheries and Oceans, NAFO 1979, Saulnier v The Royal Bank, R v. Sparrow, R v Marshall, UNCLOS (1982), Articles 63(2), 118, 119, and UNFSA (2011), Article 8.</p>			
<p><b>OVERALL PI SCORE:</b></p>		<p><b>UoC 1</b> (Northern shrimp in SFA 1)</p>	<p><b>75</b></p>	
		<p><b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)</p>	<p><b>95</b></p>	
		<p><b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)</p>	<p><b>95</b></p>	
		<p><b>UoC 4</b> (Northern shrimp in SFA 5)</p>	<p><b>95</b></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> <ul style="list-style-type: none"> <li>• <b>Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</b></li> <li>• <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>• <b>Incorporates an appropriate dispute resolution framework.</b></li> </ul>	
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>95</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>95</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>3</b>
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

## Evaluation Table for PI 3.1.2

<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>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	<b>Met?</b>	All UoCs – Y	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	<p>In Greenland, the constitution, participants and activities of the main consultative body, the Fisheries Council, are identified in the 2014 Management Plan.</p> <p>Domestically in Canada, the Terms of Reference for the Northern Shrimp Advisory Committee identifies all organizations and all individuals involved in the management process including fishing enterprises, inshore and offshore fishing associations, aboriginal organizations and provincial governments. The structure, purpose, scope and administration of the consultative process is defined in formal Terms of Reference and the process is clearly defined. The land claim agreements outline the functions, roles and responsibilities of the parties for the fishery that takes place within the boundaries of its respective settlement areas.</p> <p>The collaborative agreement between DFO and the WWF, calls for regular and open communications in order to implement joint initiatives. Senior regional staff from both organizations meet as necessary to review progress, discuss specific concerns, and share ideas for the delivery of joint activities.</p> <p>The structure, purpose, functions and operation of the NAFO SC and FC are clearly outlined in the NAFO Convention (NAFO 1979) and on the website. All Contracting Parties are involved and the functions, roles and responsibilities are explicitly defined and well understood. There is provision for parties external to the Convention to participate in NAFO proceedings.</p> <p>All organisations and individuals in the management process have been identified and functions, roles and responsibilities are explicitly defined in the IFMP (DFO 2010a), the NAFO Process, land claim agreements, the NSAC and the DFO-WWF exchange.</p> <p>The CNSSF meets SIa at the SG 100 level of performance for all UoCs.</p>		

<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>b</b>	<b>Guidepost</b>	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.
	<b>Met?</b>	All UoCs – Y	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	<p>In Greenland, the Fisheries Council is the forum where stakeholders and fishers can review and develop the current framework of fisheries policy and management measures, and can discuss issues, principles, implementation of the scientific advice, and the overarching fisheries and habitat management objectives.</p> <p>Domestically, in Canada, the NSAC provides advice to the DFO for the management of the fishery, including implementation of the NAFO Conservation and Enforcement measures for UoC 6. Recommendations on additional management measures and compliance programs are also discussed. DFO scientists advise the committee on stock assessments and research priorities, fisheries managers make presentations on the management of the previous year's fishery and enforcement personnel report on the monitoring and performance of the fishery. The committee chair solicits advice and comments from the membership of the committee including representatives from fishers, First Nations and the provincial governments.</p> <p>The annual NAFO process contains provisions and rules of procedure that regularly seeks and accepts relevant information. Annual assessment reports of the SC and proceedings of the FC include consideration of relevant information and indicate how it is used or not used. Formal stock assessment documents and meeting proceedings are approved and published on the NAFO website.</p> <p>Fishing licences are issued at a later date outlining in detail the requirements of the fishery such as the TAC, authorized gear, quota allocations, bycatch protocols, etc.</p> <p>ENGO advice is received and discussed at the WWF-DFO bilateral meeting. Meetings are held regularly, but are informal and no minutes are taken (DFO, pers. comm.).</p> <p>The minutes of Advisory Committee meetings and NAFO proceedings documents indicate consideration of the relevant information provided and register how that information is considered in the decision-making process.</p> <p>The NAFO and domestic management system have consultation processes that regularly seek and accept relevant information, including local knowledge and demonstrates consideration of the information obtained.</p> <p>The CNSSF meets the 100 SG for SIb in all UoCs.</p>		
<b>c</b>	<b>Guidepost</b>		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

<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>Met?</b>	Y	N
	<b>Justification</b>	<p>In Greenland, the Fisheries Council and its stakeholders debate the annual scientific advice on the management of the shrimp fishery after the October meeting of the NAFO SC. They discuss a TAC proposal from the Agency or the Ministry of Fisheries, Hunting and Agriculture, before submitting a draft proposal to the Greenland Government for its decision. The Fisheries Council can take up in its own right fisheries issues that do not need to be referred to the Government, and may propose changes or amendments to the Management Plan as required.</p> <p>The Greenland Fisheries Council also actively seeks and uses knowledge from fishing skippers where appropriate, such as the use of knowledge from the commercial fishery to categorise seabed type.</p> <p>Both the NAFO and the domestic advisory processes provide opportunity for all interested and affected parties to be involved in the consultative process. Active participation in the NAFO annual meeting is restricted to Contracting Parties. ENGOs attend as observers and only then upon application (NAFO 1979). The rules allow any Contracting Party to object to an application in which case the matter is put to a vote. Observer status allows ENGOs to attend meetings, make oral statements and distribute documents with the approval of the chair but may not vote.</p> <p>The NSAC provides opportunity for all interested and affected parties to be involved in the management of the fishery. Non- member stakeholders may request attendance at the NSAC and an organization or group that has an interest in management of shrimp resources may become a sitting member.</p> <p>The process provides opportunity for all interested and affected parties to be involved. The CNSSF scores 80 for Slc, for all UoCs but not more as meeting dates, agendas and minutes are not published online ahead of time to provide encouragement for parties to be involved. Also, the NAFO provision to exclude participation does not encourage and facilitate effective engagement.</p>	
<b>References</b>		IFMP (2010a), NAFO 1979, NAFO annual reports, NSAC 2015, DFO-WWF collaborative agreement.	
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>95</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>95</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>95</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>95</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>95</b>
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>95</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A

<p><b>PI 3.1.2</b></p>	<p><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></p>	
	<p><b>UoC 6 (Northern shrimp in SFA 7)</b></p>	<p>N/A</p>

### Evaluation Table for PI 3.1.3

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.
	Met?	All UoCs – Y	All UoCs – Y	UoCs 1, 2, 3, 4, 5 – Y UoC 6 – N
	Justification	<p>In the Greenland fishery, long-term objectives are outlined in the 2014 Shrimp Management Plan and <i>Fisheries Act, 1996</i>, as noted above in Section 3.26. The objectives incorporate the principles of sustainability and employ ecosystem and precautionary approaches to fisheries management.</p> <p>In the Canadian fishery, the preamble to the Oceans Act requires the use of the precautionary in fisheries management decisions. That requirement is detailed in the <i>Sustainable Fisheries Framework</i> (DFO 2009d) that incorporates the precautionary and ecosystem approaches to fishery management decisions while protecting biodiversity and fisheries habitat. Harvest control rules are defined within the IFMP (DFO 2010a).</p> <p>The <i>Policy of Managing the Impacts of Fishing on Sensitive Benthic Areas</i> (DFO 2009c), directly aimed at Principle 2, deals with the mitigation of the impacts of fishing on sensitive benthic areas or avoidance of impacts of fishing that are likely to cause serious or irreversible harm to sensitive marine habitat, communities and species.</p> <p>The domestic legislative and policy framework explicitly outline clear long-term objectives that guide decision-making. The application of the precautionary approach is statutorily required and clearly outlined in policy and practice in the fishery under assessment.</p> <p>The NAFO FC has adopted the Precautionary Framework that was developed by the NAFO SC and has agreed to manage NAFO stocks following that framework. However, the FC has yet to define explicit PA objectives. Nor has the FC formally adopted the specific harvest control rules for northern and striped shrimp in the NRA. Instead, General Convention objectives (GC Doc. 08/3, see NAFO 2009) are applied (NAFO 2014d).</p> <p>The principal long-term objective of NAFO is explicitly defined in the Convention as “...the optimum utilization, rational management and conservation of the fishery resources of the Convention Area. NAFO promotes contemporary ideas for international collaboration in the high seas based on the scientific research fundamentals.” (NAFO 1979). The Convention outlines a detailed framework for the development and implementation of fishery management plans to meet this overall objective.</p> <p>The CNSSF fishery meets this PI at the SG100 level of performance for all UoCs except UoC 6 – PA reference points have not been formally adopted by the NAFO FC; although the PA is currently being used, it cannot be said to be ‘required by management policy’ as is required by the 100 scoring guidepost for UoC 6.</p>		

<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>References</b>	DFO 2009c, DFO 2009d, DFO 2010a, Oceans Act, NAFO 1979, NAFO 2009.	
<b>OVERALL PI SCORE:</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>100</b>
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>100</b>
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>100</b>
	<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>100</b>
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>100</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### Evaluation Table for PI 3.1.4

PI 3.1.4		The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.
	Met?	All UoCs – Y	All UoCs – Y	All UoCs – N
	Justification	<p>In Greenland, the fishing strategy is a rights-based Individual transferable quota (ITQ)-based system that, like Canada, provides strong economic incentives to harvest in a sustainable manner. The critical importance of shrimp fishing income for the Greenland fishermen and economy as a whole is also an incentive to harvest sustainably. Licenced fishers also benefit from being able to participate in decision-making through membership in fisheries associations that has led to such things as the rules on quota flexibility (carrying unused quota over / borrowing from next year's quota) which incentivise against cheating on quotas. There are no apparent direct subsidies or perverse incentives.</p> <p>The CNSSF in Canada operates on an Enterprise Allocation (EA) system of fishing which provides a quasi property right to each licence holder in the fishery. Such stability and security of access provides strong economic incentives to harvest for the long-term, to maximize value and not volume, and to minimize negative impacts on the stock and its ecosystem.</p> <p>An overall competitive quota is established for the inshore shrimp fishery. The fishery is conducted in an orderly manner through the use of trip limits and harvesting caps, which are determined and regulated by the industry; 100% dockside monitoring ensures compliance. The privilege of holding a limited-entry licence in the CNSSF is of considerable value and one that fishers do not risk jeopardizing. The extensive consultative approach combined with significant financial penalties to deter negative behaviour provides strong economic incentives for responsible, long-term sustainable fishing. There appears to be a good sense of stewardship in the fishery.</p> <p>In the NAFO setting there are individual and NGO observers who attend, scrutinize and publicly critique its process, findings and behaviour. This watchful eye provides an incentive on NAFO and the industry to ensure that the fishery is well managed and conducted in a sustainable manner.</p> <p>The above economic and social incentives are consistent with achieving the outcomes expressed by MSC Principles 1 and 2. There are neither subsidies nor perverse incentives in the fishery. The CNSSF meets the SG80 level of performance for this PI for all UoCs.</p> <p>The lack of an explicit mechanism that considers incentives in a regular review of management policy or procedures precludes the fishery from meeting the SG100 level of performance.</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>References</b>	DFO 2010a, DFO 2015h, NSRF/DFO collaborative agreement, Atlantic Fishery Regulations, Fisheries General Regulations.	
<b>OVERALL PI SCORE:</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>80</b>
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>80</b>
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>80</b>
	<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>80</b>
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>80</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### Evaluation Table for PI 3.2.1

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system	Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.	Well defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.
	Met?	All UoCs – Y	All UoCs – Y	UoCs 1, 2, 3, 4, 5 – Partial Y UoC 6 – N
	Justification	<p>In Greenland, fishery specific objectives have been defined in the 2014 Management Plan. Important short-term objectives include the determination of annual TACs using established HCRs, the avoidance of sudden large changes in TACs through an agreed 12.5% maximum annual variation aimed at keeping the stock at <math>B_{MSY}</math> and a series of measures designed to increase knowledge of vulnerable habitats, bottom types and to implement closed areas to protect sensitive marine areas. Other objectives include the development of a strategic research plan to implement benthic investigations and monitoring of the effect of the trawl fishery. The Department for Fishery, Hunting and Agriculture considers the fishery's effect on ecosystems and where necessary take action to maintain the structure and function of the ecosystem.</p> <p>Short and long term fishery-specific objectives are elaborated in tabular form in Section 1.1 of the IFMP (DFO 2010a), and are reproduced in Section 3.26, above. Three principles or long-term objectives to manage the CNSSF are outlined in the following sections: i) Conservation and sustainable harvest, ii) Benefits to stakeholders and, iii) Co-management of the shrimp resource. Strategies and management measures enumerated under each principle are considered to be medium- and short-term objectives for management of the fishery consistent with the MSC requirements.</p> <p>Among the objectives is one to "<i>mitigate the impacts on other species, habitat, and the ecosystem where shrimp fishing occurs, protecting biodiversity and ecosystem structure and function.</i>" Measures taken include closing Hawke Channel to conserve cod concentrations, a prohibition on bottom contact fishing in established coral conservation areas as well as an explicit recognition of the role of shrimp as a forage species in setting TACs and management measures.</p> <p>No explicit management plan or management objectives are defined for UoC 6 northern shrimp by the NAFO FC. General objectives outlined in the Convention (GC Doc.08/3, NAFO 1979) govern all proceedings of the General Council and the FC to "<i>promote the long-term conservation and optimum utilization of the fishery resources of the Northwest Atlantic Area</i>" and include such things as using the best scientific evidence, preventing overfishing, preserving biological diversity, etc. The Precautionary Approach Framework (NAFO 2004b) also establishes a process for setting TACs and management measures including specific harvest control rules.</p> <p>The NAFO SC has also created a working group (2013) to focus on such things as identification and mapping of sensitive species and habitats, as well as to update recent and relevant research related to status, functioning and dynamics of ecosystems in the NRA (NAFO 2013a).</p> <p>For UoCs 2-5 under Canadian management and UoC 1 under Canadian and Greenland management it is considered that well-defined and measurable short and long-term objectives are demonstrably consistent with achieving the outcomes of</p>		

<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>	
	Principle 1, although the objectives for Principle 2 are not as well-defined, so these UoCs are scored 90.  For UoC 6, the NAFO objectives and those regarding P2 are not considered sufficiently well-defined, explicit and measurable to meet the 100 score, but they do meet the requirements of SG80.	
<b>References</b>	DFO 2010a, NAFO 1979, NAFO 2004b, NAFO 2013a	
<b>OVERALL PI SCORE:</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>90</b>
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>90</b>
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>90</b>
	<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>90</b>
	<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>90</b>
	<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
	<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
	<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
	<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
	<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### 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>	All UoCs – Y	All UoCs – Y	
	<b>Justification</b>	<p>In Greenland, decisions are taken by the Government at the end of a defined process outlined in the Management Plan. Proposals from the Agency of Fishing, Hunting and Agriculture are prepared and discussed by the Fisheries Council and its stakeholders based on scientific advice provided by GNIR, NIPAG, and the NAFO Scientific Council, and taking into account information on monitoring, surveillance and enforcement by GFLK. Proposals from the Fisheries Council are considered by the Greenland Government, taking into account the scientific advice and also the economic requirements of the fishing industry. The final decision is taken by the Minister.</p> <p>Decision-making processes within the Canadian fishery management system are well established and defined in several overarching policy documents including the “<i>Policy Framework for the Management of Fisheries on Canada's Atlantic Coast</i>” (DFO 2004b), the “<i>Sustainable Fisheries Framework</i>” (DFO 2009d), and in the “<i>Aboriginal Fisheries Strategy</i>” (DFO 2008b) which ensures that aboriginal entitlements are respected in the development of stable fisheries management regimes for aboriginal peoples.</p> <p>In the case of fishing inside the Nunavut Settlement Area, the decision-making process includes the Nunavut Wildlife Management Board (NWMB) and is described in detail in the land claims agreement. Recommendations are made by the NWMB to the Minister of DFO with time frames and restrictions for decisions. The Minister is obliged to give reasons if he rejects a decision, whereupon it is returned to the NWMB for review.</p> <p>The IFMP (DFO 2010a) sets out the decision making process for the management of the fishery. The NSAC serves as a forum for the discussion of issues on the management and development of the northern shrimp fishery providing advice and recommendations to the Minister of Fisheries and Oceans. The NSAC provides input for the content of the IFMP, including but not limited to advice on quota allocations and regulatory measures such as seasons, size limits, gear restrictions, conservation, compliance issues and licensing policy. Advice to the Minister is analyzed by the DFO after which decisions are made and incorporated into the IFMP.</p> <p>Within the NAFO context, decision-making in the SC is based on the Rules of Procedure for the SC that is part of the NAFO Rules of Procedure and Financial Regulations. The document outlines guidelines for representation, voting, order of business, committees and records and reports. Similar rules exist in the Convention for decisions of the NAFO FC.</p> <p>It can be concluded that there are decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives. The SG80 level of performance is met for all UoCs.</p>		

<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>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>	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	<p>As noted above, beginning in 2014, Canada and Greenland engaged in formal bilateral meetings to discuss harvest levels and rules for the fishery in NAFO Area 1 (SFA 1). This process is voluntary and does not require agreement of the parties on specific management approaches. In fact, both states establish TACs and management measures for their respective jurisdictions.</p> <p>In Greenland, the processes are clearly established, and consultation has been made more transparent over the past few years. The Management Plan states objectives, reference points and risk criteria as well as the TAC-setting criteria. The 2013 West Greenland assessment (IMM 2013) noted some uncertainty with respect to decision procedures regarding the choice of TAC and whether the justification for choice of TAC is open to scrutiny in the public domain. On the other hand, there are examples of how the system has adapted or responded to new needs: e.g. the initiation of consultation procedures to produce management plans, new stock assessment procedures giving more equal weighting to the stock survey and the fisher CPUE, the closing of loopholes on over-packing weights, enhancement of closed area sanctuaries for coral, etc.</p> <p>The NSAC reviews issues identified through research, monitoring, evaluation and consultation at its meetings. Stock assessments or updates are conducted each year and ensuing reports are tabled at NSAC meetings. DFO management staff present a resource overview of TAC, landings, number of active fish harvesters and combined enterprises.</p> <p>The Conservation and Protection sector presents an overview of enforcement efforts for the past year, including number of enforcement hours, inspections, violations and warnings issued by type. Also discussed are observer deployments, number of gear checks, mid-distance patrols and enforcement priorities for the upcoming year.</p> <p>For UoC 6, the NAFO process reviews issues identified through research, monitoring, evaluation and consultation at its annual meeting. A full stock assessment for northern shrimp is conducted every two years and advice is provided for two years with updates conducted in the intervening years. NAFO FC decisions on management measures for shrimp are required to be implemented in the Canadian zone in SFA 7 (UoC6). Further management measures within the Canadian zone are discussed at the annual meeting of the NSAC. DFO fisheries management staff present a resource management overview of the previous year's fishery and the Conservation and Protection sector reviews enforcement efforts for the past year.</p> <p>The Canadian domestic, Greenland and NAFO processes are designed to and do respond to serious and important issues identified in a transparent, timely and adaptive</p>		

<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>	
		manner and take account of the wider implications of decisions. A score of 80 is achieved for SI for all UoCs.  It is not possible to say that ' <i>decision-making processes respond to all issues identified</i> ', precluding a 100 score.	
<b>c</b>	<b>Guidepost</b>		Decision-making processes use the precautionary approach and are based on best available information.
	<b>Met?</b>		All UoCs – Y
	<b>Justification</b>	<p>In Greenland, new environmental legislation explicitly focuses on the principle of sustainability and requires that an ecosystem and precautionary approach be applied in combination with the best accessible technology.</p> <p>Within the Canadian system, the use of the precautionary approach in the exploitation of marine resources is legislatively enshrined in the <i>Oceans Act</i> (Legislation-Oceans Act). That requirement is further detailed in the <i>Sustainable Fisheries Framework</i> (DFO 2009d) and the <i>Fishery Decision-Making Framework Incorporating the Precautionary Approach</i> (DFO 2009a) to ensure that the PA is built into fisheries management decisions. The IFMP (DFO 2010a) provides a detailed framework for the implementation of the PA in the CNSSF, including setting TAC limits for <i>P. borealis</i> for UoCs 1-5. Detailed provisional harvest control rules are outlined which are to be used when setting TACs. Any exceptions to the rules must clearly document the rationale for any deviation and the effect of such deviations must not place the stock at risk of serious or irreversible harm. The HCRs use limit reference points for each individual SFA.</p> <p>Regarding UoC 6, the harvest control rules that are reflected in the NAFO SC advice for this stock have in part formed the basis of Canadian positions and subsequent NAFO decisions related to establishment of the TAC and are compliant with the NAFO PA Framework which guides the setting of TACs within that decision-making forum. Further review of these harvest control rules will continue within the NAFO context and may lead to consideration of a proposal to NAFO for adoption.</p> <p>There is a clearly articulated legislative and policy framework consistent with MSC Principles and Criteria in both NAFO and Canada that guides decision-making including guidelines for the precautionary approach. Reference points are included in the current management plan.</p> <p>Decision-making processes, in Greenland, NAFO and Canada use the precautionary approach and are based on best available information. The CNSSF achieves a score of 80 on this SI for all UoCs.</p>	

<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>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>	All UoCs – Y	All UoCs – Y	All UoCs – N
	<b>Justification</b>	<p>In Greenland, there is a combination of formal and informal occasions during the year when the various provisions and decisions are explained, e.g., to the industry at the Fisheries Council, and when the proposal from the Fisheries Council is presented to the Parliament. Legislation, including regulations are published in the Greenland Statute Book and new and changed regulations, TACs, and quotas, are communicated as a licence condition, in annual quota permits, through press releases, or at meetings between the industry and the Directorate, as well as by direct contact with GFLK inspectors and observers on board the vessels. Fishers are therefore fully aware of the regulations governing their activities.</p> <p>Domestically, information on the performance of the fishery is presented at the annual NSAC meeting. Monitoring, surveillance and management action is presented to stakeholders and is made available to committee members and to others upon request. The minutes of the NSAC meetings clearly outline the discussion held and conclusions reached on harvest levels and management measures. In addition, “Fisheries Management Decisions” are posted on the DFO website at the start of each fishing year that outline TACs for the year and any other management changes (e.g., DFO 2015f, DFO 2015g)</p> <p>For UoC 6, NAFO scientific reports, including assessments, are published as SC Reports on the NAFO website (<a href="http://www.nafo.int/">http://www.nafo.int/</a>) and NAFO management conservation and enforcement measures are published in the proceedings documents of the annual meeting of the FC. Several other reports of the various NAFO standing committees (e.g. Standing Committee on International Control), and reports of FC working groups (e.g. Working Group of Fishery Managers and Scientists on Conservation Plans and Rebuilding Strategies) are also published on the NAFO website. These reports provide explanations for action or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p> <p>Explanations for actions, or lack of, associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity are provided in the minutes from the 2015 NSAC meeting (NSAC 2015), in published fishery management decisions and in the NAFO annual meeting report. The CNSSF scores 80 on this SI for all UoCs.</p> <p>The 100 SI is not met as there is no formal reporting, <i>per se</i>, to all interested stakeholders in a comprehensive way, fully describing how the management system responds to findings.</p>		

<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>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>	All UoCs – Y	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	<p>In Greenland, disputes between Fisheries Council members are dealt with in the civilian or criminal courts. A recent site visit to the client and administrative authority representatives in Greenland revealed that there are no legal challenges or any related binding judgements to which the Greenland Government has to respond or adhere (IMM 2013). There appears to be widespread respect in the Greenland fishing industry for the legal and customary framework of the management system. The system has been created to maintain the high economic importance of the shrimp fishery to the Greenland economy, and to secure access for Greenland nationals who meet the residency and fiscal criteria detailed in Section 15 of the Management Plan.</p> <p>The NAFO process and the domestic Canadian advisory system along with very active hands-on management of the fishery in consultation with the major stakeholders acts proactively to avoid legal disputes during the fishing season.</p> <p>Judicial decisions arising from prosecutions or legal challenges are implemented immediately or as soon as is practically possible. The CNSSF meets the SG 100 level of performance for S1e for all UoCs.</p>		
<b>References</b>	DFO 2004b, DFO 2008b, DFO 2009a, DFO 2009d, DFO 2010a, DFO 2015f, DFO 2015g, IMM 2013, NAFO 1979, NAFO Annual Reports, NSAC 2015, Land Claims Agreements			
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>85</b>	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>85</b>	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>85</b>	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>85</b>	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>85</b>	
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>85</b>	
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A	
		<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A	

### Evaluation Table for PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	All UoCs – Y	All UoCs – Y	UoCs 1, 2, 3 – Y UoCs 4, 5, 6 – N
	Justification	<p>The GFLK and the Danish Navy are responsible for the MCS system in Greenland. Observers are carried on 84% of the offshore fleet and 10% of the inshore fleet. VMS surveillance for vessels above 90 GT is mandatory. Infractions are subject to criminal investigations by the police.</p> <p>There is a comprehensive domestic monitoring and surveillance system in place within SFA's 1-6 and inside the Canadian EEZ in SFA 7. All vessels are issued a licence (e.g., DFO 2015h) containing an extensive list of conditions and which is to be on board the vessel at all times for the information of the Captain and crew. Measures such as 100% VMS coverage, hail-in/out requirement, daily hails of position, catch and other information, 100% on-board industry funded observer coverage for the offshore fleet and around 5% for the inshore fleet, aircraft surveillance, at-sea boardings and 100% dockside monitoring for the inshore fleet/spot-checks of landings for the offshore fleet ensure good coverage of the fishery. A ticket and court-based sanction framework is outlined in the <i>Fisheries Act</i> and regulations with court based prosecution for serious offences through the Criminal Code of Canada. Upon conviction maximum penalties of \$500,000 and up to two years in jail may be imposed along with forfeiture of catch and equipment at the discretion of the court.</p> <p>While Canadian vessels do not currently fish in the NRA, the NAFO Conservation and Enforcement Measures adopted by the Fisheries Commission contain similar procedures. Each year at its annual meeting the Fisheries Commission conducts an annual compliance review based on information from the vessel monitoring system, observer reports, port inspection reports, at-sea inspection reports and reports on dispositions of apparent infringements. Flags states are obligated to follow up with further investigations and legal prosecution when NAFO inspectors issue a citation against a vessel of a Contracting Party and advise the NAFO Secretariat of the status of each case.</p> <p>The low level of violations (4 warnings for offshore fleet in the last four years) demonstrates a consistent ability to enforce relevant measures. Similarly, there is no indication of infringements in the NAFO area. The inshore fleet has 6, 9 and 3 violations over the past three years and 23, 27, 19 warnings. This is not considered a high level of non compliance considering that the fleet of 360 vessels fishes between 5,000 and 6,500 fishing days per year. Trips are of a few days duration (IMM 2008) amounting to some 1600 trips annually.</p> <p>The MCS system is comprehensive and demonstrates a consistent ability to enforce relevant management measures, strategies and/or rules in UoCs 1,2 and 3, meriting a score of 100. Due to the lower level of compliance in the inshore fleet, including several</p>		

<b>PI 3.2.3</b>		<b>Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with</b>		
		incidents of failure to hail landing ports, the fishery does not demonstrate a consistent ability to enforce relevant management measures, strategies and/or rules as required by the 100 SG and is therefore scored 80 for UoCs 4,5 and 6.		
<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>	All UoCs – Y	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	The sanctions regime outlined in the <i>Fisheries Act</i> and the <i>Atlantic Fishery Regulations</i> provide deterrents to unacceptable behaviour in the fishery. The <i>Fisheries Act</i> outlines a ticketing system for minor offences and a court-based system for more serious offences which can result in fines up to \$500,000, forfeiture of catch and gear and jail terms for extreme cases. The sanctions are applied through an open and transparent court-based system. Sanctions are consistently applied and have been shown to provide effective deterrence.  All UoCs for the CNSSF score 100 on this SI.		
<b>c</b>	<b>Guidepost</b>	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	<b>Met?</b>	All UoCs – Y	All UoCs – Y	UoCs 1, 2, 3 – Y UoCs 4, 5, 6 – N
	<b>Justification</b>	The compliance level for the Canadian offshore fleet that fishes in UoCs 1,2,3 and 6 indicates a high degree of confidence that fishers comply with the management system. A score of 100 is awarded. A lower level of compliance for the inshore fleet keeps UoCs 4,5, and 6 from attaining the 100 score and a score of 80 is assigned to these UoCs.  Fishers provide information of importance to the effective management of the fishery including, commercial landings provided through an industry funded DMP, logbook returns and fishery data through a harvester-funded observer program.		
<b>d</b>	<b>Guidepost</b>		There is no evidence of systematic non-compliance.	
	<b>Met?</b>		All UoCs – Y	

<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>	There is no evidence of systematic non-compliance in the CNSSF. The Canadian offshore fleet has had virtually no compliance issues for the past three years. While summaries of the Canadian inshore fishery indicate a few areas where compliance is not perfect, it does not constitute "systematic non-compliance" as noted in the SI. The CNSSF fishery therefore meets the SG80 level of performance for all UoCs.	
<b>References</b>		DFO 2010a, DFO 2015h, DFO 2016c, DFO 2016d, DFO 2016e, NAFO Annual Reports, <i>Fisheries Act</i> and the <i>Atlantic Fishery Regulations</i>	
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>100</b>
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>100</b>
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>100</b>
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>85</b>
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>85</b>
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>85</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A
		<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A

### Evaluation Table for PI 3.2.4

PI 3.2.4		The fishery has a research plan that addresses the information needs of management		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
	Met?	All UoCs – Y	All UoCs – Y	All UoCs – Y
	Justification	<p>The Greenland research plan provides a strategic approach to obtaining information, is proactive and identifies gaps in knowledge driven by management need. Information provided is considered reliable due to research coordination among several research providers (GINR, Zoological Society of London, multinational cooperation through NIPAG). Results of research are timely and available to industry and the public through published NAFO assessments, and other scientific publications, and reports. The research is reviewed through NAFO and journal peer review processes, and through presentations at scientific conferences.</p> <p>Research and data analyses have been conducted on the CNSSF in all UoCs for many years mainly focused on stock assessments to support the commercial harvest. Work is focused on the data collection in the commercial fleet as well as research vessel cruises and includes analyses of stock abundance and trends leading to a full scientific assessment of the stock every two years, with an interim review in alternate years.</p> <p>As noted in Section 3.30, above, an NSAC MSC Working Group composed of industry and DFO Science participants conducted a research gap analysis and developed a list of required, on-going research in 2013-14 (DFO 2014c). In addition to the usual stock assessment work including updating of indices on fishable biomass, SSB, recruitment indices, ageing, updating models etc., the plan focuses on such things as genetic analysis, impacts of climate change on shrimp population dynamics (in collaboration with Memorial University), analysis of information related to corals, sponges and other vulnerable marine ecosystems, investigation of trophic levels for key species (including shrimp) using diet composition and stable isotopes, and work on the development of fisheries production potential models.</p> <p>Further research has been conducted to identify areas of the oceans and coasts that are considered to be ecologically or biologically significant (EBSAs) (DFO 2007b). Separately, the NAFO SC Working Group on Ecosystem Science and Assessment (WGESA) is focused on work intended to advance the "Roadmap for developing an ecosystem approach to fisheries (EAF) for NAFO" as well as conducting work intended to address specific requests from SC and/or FC. Accordingly, at the June 2013 meeting, the NAFO SC outlined that the WG should focus on such things as identification and mapping of sensitive species and habitats and appropriate ecosystem-based management areas, an update of recent and relevant research related to status, functioning and dynamics of ecosystems in the NAFO areas as well as on recent and relevant research related to the application of ecosystem knowledge for fisheries management in the NAFO area. A full summary of the work of the WG is contained in NAFO 2013a.</p> <p>The thirteen points covered in the research plan approved by the NSAC in March 2015 (DFO 2015h) along with the research conducted by NAFO contracting parties provides</p>		

<b>PI 3.2.4</b>		<b>The fishery has a research plan that addresses the information needs of management</b>		
		is comprehensive and coherent providing a strategic approach to research and reliable and timely information across PIs 1,2,3. The CNSSF scores 100 on this SI for all UoCs.		
<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>	All UoCs – Y	All UoCs – Y	All UoCs – Y
	<b>Justification</b>	Research results are widely disseminated in a timely fashion through the NAFO publication process and/or in the primary domestic literature through the CSAS system. The publications are readily available to all interested parties. The CNSSF therefore meets the SG100 level of performance for all UoCs.		
<b>References</b>	DFO 2014c, DFO 2015h, NAFO 2013a, NAFO Annual Meeting Reports, SARs through the CSAS process.			
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>100</b>	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>100</b>	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>100</b>	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>100</b>	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>100</b>	
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>100</b>	
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A	
		<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A	

### Evaluation Table for PI 3.2.5

PI 3.2.5		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The fishery has in place mechanisms to evaluate some parts of the management system.	The fishery has in place mechanisms to evaluate key parts of the management system	The fishery has in place mechanisms to evaluate all parts of the management system.
	Met?	All UoCs – Y	All UoCs – Y	All UoCs – N
	Justification	<p>In Greenland, internal annual reviews are conducted on the effectiveness of decisions on the TAC by GNIR, NIPAG and NAFO scientists, on monitoring and surveillance by GFLK, with a report to the EU as per its requirements. The Greenland Fisheries Council routinely reviews the management system and processes, fleet capacity, the TAC and its allocation, and surveillance systems, and the need for additional regulations.</p> <p>A review of the <i>Pandalus borealis</i> and <i>Pandalus montagui</i> fisheries takes place at the annual NSAC meeting, including an assessment of whether the objectives are being met and key management issues are being addressed. As part of this process, the information gathered through other evaluation processes like the Department's Fishery Checklist (DFO 2014d) is used to help identify areas for improvement in the management of these fisheries. In consultation with stakeholders, potential improvements are explored and priorities established.</p> <p>DFO fisheries management staff present a resource management overview of landings and activity and C&amp;P personnel present a performance review of enforcement efforts and results. The committee solicits the opinions of members on past performance and focuses on management measures and recommendations for the future.</p> <p>NAFO established a Performance Assessment Working Group in 2009 to develop a review tasked with addressing NAFO's strengths, weaknesses, challenges and successes, using criteria to identify areas for improvement. A review panel was formed comprising three experts external to NAFO and not nationals of any Contracting Party. These experts were experienced in the fields of fisheries management and the law of the sea. The panel also included three internal experts nominated by NAFO members (from Canada, Denmark, the European Union and the Russian Federation). A review was conducted in August of 2011 and resulted in 7 recommendations at improving the conservation and management of straddling stocks within the Convention Area, including encouraging all Contracting Parties to become parties to United Nations and FAO fishing protocols, bolstering its commitment to CEMs and catch monitoring/reporting, deterring IUU fisheries and conducting more open, public NAFO FC sessions.</p> <p>The NIPAG process and reports also reflect an ongoing of the effectiveness of management of the fishery. These reports are in turn reviewed by plenary bodies in NAFO and ICES. In addition, the Standing Committee on International Control (STACTIC) of NAFO conducts continuing evaluations of management and surveillance issues.</p> <p>There are mechanisms to evaluate the key parts of the management system but there is no evidence that all parts of the management system are assessed against the stated objectives for the fishery. The CNSSF scores 80 for all UoCs.</p>		

<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>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>	All UoCs – Y	All UoCs – Y	All UoCs – N
	<b>Justification</b>	<p>The annual reviews conducted by DFO and Greenland outlined above are internal reviews. They are not external to the fishery specific management system as required by CB4.11.1 (MSC 2013a).</p> <p>External reviews in Greenland include an annual EU review of the GNIR shrimp stock assessments by scientists of NIPAG and NAFO, the EU undertakes a review of control and enforcement systems every 3 years and in 2011 the Fisheries Council of NAFO requested the NAFO Scientific Council to review the Management Plan and the provisions for managing the stock of striped shrimp.</p> <p>The Canadian Auditor General (AG), an independent agency external to the fishery, has the authority to and has in the past conducted reviews of the fisheries management regime on an ad-hoc basis (AG 1999, AG 2009, AG 2011).</p> <p>Occasionally the Fisheries and Oceans committees from the Parliament and Senate of Canada conduct reviews of specific issues in the fishery and require the Minister or officials of DFO and the industry to appear as witnesses to the review.</p> <p>There is regular internal review and occasional external review in both the Canadian and NAFO settings.</p> <p>The NAFO Performance Review is an external review being composed of experts external to the NAFO management system.</p> <p>A score of 80 is awarded for SIb for all UoCs. As there is no regular external review of the management system in Canada, a score of 100 is not justified.</p>		
<b>References</b>		AG 1999, AG 2009, AG 2011, DFO 2010a, DFO 2014d, NSAC Minutes, NAFO Performance Assessment Working Group in 2009 Report, MSC 2013a.		
<b>OVERALL PI SCORE:</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	<b>80</b>	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	<b>80</b>	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	<b>80</b>	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	<b>80</b>	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	<b>80</b>	
		<b>UoC 6</b> (Northern shrimp in SFA 7)	<b>80</b>	
<b>CONDITION NUMBER (if relevant):</b>		<b>UoC 1</b> (Northern shrimp in SFA 1)	N/A	
		<b>UoC 2</b> (Northern shrimp in EAZ, WAZ, SFA 4)	N/A	
		<b>UoC 3</b> (Striped shrimp in EAZ, WAZ, SFA 4)	N/A	
		<b>UoC 4</b> (Northern shrimp in SFA 5)	N/A	
		<b>UoC 5</b> (Northern shrimp in SFA 6)	N/A	
		<b>UoC 6</b> (Northern shrimp in SFA 7)	N/A	

## Appendix 2: Notifications to stakeholders

The following e-mail was sent on the 21<sup>st</sup> May 2015:

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**Sent:** Thu 5/21/2015 2:26pm

**To:** Baillargeon, Danielle [Danielle.Baillargeon@dfo-mpo.gc.ca](mailto:Danielle.Baillargeon@dfo-mpo.gc.ca) ; Barry Rashotte [rashottb@DFO-MPO.GC.CA](mailto:rashottb@DFO-MPO.GC.CA) ; Bettina Saier [BSaier@wwfcanda.org](mailto:BSaier@wwfcanda.org) ; Boudreau, Marcel [Marcel.Boudreau@dfo-mpo.gc.ca](mailto:Marcel.Boudreau@dfo-mpo.gc.ca) ; Ches Cribb [chescribb@nf.aibn.com](mailto:chescribb@nf.aibn.com) ; Couillard, Pierre [Pierre.Couillard@dfo-mpo.gc.ca](mailto:Pierre.Couillard@dfo-mpo.gc.ca) ; Dave Orr [David.Orr@dfo-mpo.gc.ca](mailto:David.Orr@dfo-mpo.gc.ca) ; Dawn Parsons [Dawn.Parsons@dfo-mpo.gc.ca](mailto:Dawn.Parsons@dfo-mpo.gc.ca) ; Derek Butler [dbutler@seafoodproducers.org](mailto:dbutler@seafoodproducers.org) ; Dooley, Tom [tdooley@gov.nl.ca](mailto:tdooley@gov.nl.ca) ; Fradsham, Trevor [Trevor.Fradsham@dfo-mpo.gc.ca](mailto:Trevor.Fradsham@dfo-mpo.gc.ca) ; fred winsor [winsorf@nl.rogers.com](mailto:winsorf@nl.rogers.com) ; Heather Bishop [Heather.Bishop@dfo-mpo.gc.ca](mailto:Heather.Bishop@dfo-mpo.gc.ca) ; Hiltz, Beth [Beth.Hiltz@dfo-mpo.gc.ca](mailto:Beth.Hiltz@dfo-mpo.gc.ca) ; Jason Simms [Jason.Simms@dfo-mpo.gc.ca](mailto:Jason.Simms@dfo-mpo.gc.ca) ; [jeanguybeaudoin@videotron.ca](mailto:jeanguybeaudoin@videotron.ca) ; Jennifer Buie [JenniferB@DFO-MPO.GC.CA](mailto:JenniferB@DFO-MPO.GC.CA) ; [jjustus@nwmb.com](mailto:jjustus@nwmb.com) ; Rob Johnson [seachoiceatlantic@gmail.com](mailto:seachoiceatlantic@gmail.com) ; Scott Wallace [swallace@davidsuzuki.org](mailto:swallace@davidsuzuki.org) ; Susanna Fuller [susannadfuller@gmail.com](mailto:susannadfuller@gmail.com) ; Tim Siferd [Tim.Siferd@dfo-mpo.gc.ca](mailto:Tim.Siferd@dfo-mpo.gc.ca) ; Ian Scott [ianroycott@hotmail.com](mailto:ianroycott@hotmail.com) ; FisheriesCoordination Derby [Intertek.fco.derby@intertek.com](mailto:Intertek.fco.derby@intertek.com)

### **Message: MSC Fisheries Updates - 21 May 2015**

Dear Stakeholder

Please be aware that the Canada northern and striped shrimp fishery will undertake its 4<sup>th</sup> annual surveillance audit the week of 22<sup>nd</sup> June 2015 and has commenced it's re-assessment. The audit and reassessment will follow MSC Fisheries Certification Requirements v 2.0 process and v1.3 standard.

Notice of the announcement and a link to relevant documents can be found below.

<https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/Canada-offshore-northern-and-striped-shrimp/re-assessment-downloads-1>

Stakeholders are encouraged to participate in the audit and reassessment process. MSC provide the attached template as a way for stakeholders to submit information on MSC assessments.

Best regards  
Paul Knapman

**For Intertek Fisheries Certification Ltd**

## Appendix 3: Conditions

There are three conditions for this fishery, as detailed in the following tables.

Conditions 1 and 2 are unrelated to conditions that were set previously on the CNSSF. Condition 3 is related to Conditions 1 and 2 that were set previously on the SFA 1 part of the fishery for the first certification ([https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/Canada-offshore-northern-and-striped-shrimp/assessment-downloads-1/20151109\\_SR\\_SHR25-rev.pdf](https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/Canada-offshore-northern-and-striped-shrimp/assessment-downloads-1/20151109_SR_SHR25-rev.pdf)), but it is not a condition that is being raised again. This new condition instead reflects that, whilst the requirements of the original conditions have been met by Canada unilaterally through the introduction of a harvest strategy and harvest control rules that apply to the Canadian part of the fishery, there is still a requirement that there is organised and effective cooperation between the Canadian and Greenland authorities to ensure that management outcomes consistent with MSC Principles 1 and 2 are delivered for the shared SFA 1 stock and fishery.

### Condition 1

<b>UoC</b>	<b>3 (Striped shrimp in the EAZ, WAZ and SFA 4)</b>
<b>Performance Indicator</b>	<b>1.1.2 – Limit and target reference points are appropriate for the stock)</b>
<b>Score</b>	<b>75</b>
<b>Rationale</b>	Reference points are in place for one (the EAZ) of the three fishing areas in UoC 3. Previously, reference points had been established for the WAZ, based on a survey time series with non-comparable vessels (DFO 2013a); while not referred to in the most recent assessment, these are available for guidance. Estimation of reference points for SFA 4 has proved problematical because of very high survey variability from year to year.
<b>Condition</b>	The client shall demonstrate by the Year 4 audit that the SG80 requirements of PI 1.1.2 are met in full for UoC 3, including for Sla, such that: <i>“Reference points are appropriate for the stock and can be estimated.”</i>
<b>Milestones</b>	<p><u>Year 1:</u></p> <ul style="list-style-type: none"> <li>The client shall provide evidence that there is a plan in place to develop reference points appropriate for the stocks in the WAZ and SFA 4. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 2:</u></p> <ul style="list-style-type: none"> <li>The client shall provide an update on progress towards the development of reference points appropriate for the stocks in the WAZ and SFA 4. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 3:</u></p> <ul style="list-style-type: none"> <li>The client shall provide an update on progress towards the development of reference points appropriate for the stocks in the WAZ and SFA 4. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 4:</u></p>

	<ul style="list-style-type: none"> <li>The client shall demonstrate that the SG80 Requirements of PI 1.1.2 are met in full, including for Sla.</li> </ul> <p><b>Resulting score = 80 (requirement met and condition closed).</b></p>
<b>Client action plan</b>	<p><u>Year 1:</u></p> <ul style="list-style-type: none"> <li>The NSRF's annual research survey in these areas will continue to add to the available time series, which reference points will be based upon in the absence of a quantitative assessment model being adopted.</li> </ul> <p><u>Year 2:</u></p> <ul style="list-style-type: none"> <li>The NSRF's annual research survey in these areas will continue to add to the available time series, which reference points will be based upon in the absence of a quantitative assessment model being adopted.</li> </ul> <p><u>Year 3:</u></p> <ul style="list-style-type: none"> <li>The NSRF's annual research survey in these areas will continue to add to the available time series, which reference points will be based upon in the absence of a quantitative assessment model being adopted.</li> </ul> <p><u>Year 4:</u></p> <ul style="list-style-type: none"> <li>A DFO Science RAP (Regional Assessment Process) will be convened to establish peer reviewed limit reference points, after which an NSAC meeting will recommend target reference points.</li> </ul>
<b>Consultation on condition</b>	<p>The client has consulted with DFO on its action plan. DFO has confirmed that they will support the plan through the activities of its own annual work plan. The client will need to maintain a close working relationship with DFO to ensure support continues (a letter of support is included in belowAppendix 9: Letter of support from DFO).</p>

## Condition 2

<b>UoC</b>	4 (Northern shrimp in SFA 5) and 5 (Northern shrimp in SFA 6)
<b>Performance Indicator</b>	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
<b>Score</b>	75
<b>Rationale</b>	No recent compilation of information from the inshore fishery was available. This fleet takes a substantial proportion of the total catch in some SFAs (5, 6), and bycatch as a proportion of the total catch has been higher in the inshore fleet than in the offshore fleet (Table 8). Because of the lack of recent information on bycatch in the inshore fleet, a score of 80 is not justified for UoCs 4 and 5.
<b>Condition</b>	<p>The client shall demonstrate by the Year 4 audit that the SG80 requirements of PI 2.2.3 are met in full for UoCs 4 and 5, including for SId, such that:</p> <p><i>“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).”</i></p>
<b>Milestones</b>	<u>Year 1:</u>

	<ul style="list-style-type: none"> <li>The client shall provide evidence that there is a plan in place to collect and report on up-to-date bycatch information for the inshore fleet operating in SFAs 5 and 6. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 2:</u></p> <ul style="list-style-type: none"> <li>The client shall provide an update on progress towards the collection of up-to-date bycatch information for the inshore fleet operating in SFAs 5 and 6. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 3:</u></p> <ul style="list-style-type: none"> <li>The client shall provide an update on progress towards the collection of up-to-date bycatch information for the inshore fleet operating in SFAs 5 and 6. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 4:</u></p> <ul style="list-style-type: none"> <li>The client shall demonstrate that the SG80 Requirements of PI 2.2.3 are met in full, including for SId. <b>Resulting score = 80 (requirement met and condition closed).</b></li> </ul>
<p><b>Client action plan</b></p>	<p><u>Year 1:</u></p> <ul style="list-style-type: none"> <li>CAPP will provide evidence of discussions with DFO to discuss options to enable MSC bycatch information requirements to be met in the context of DFO's obligations regarding Privacy.</li> </ul> <p><u>Year 2:</u></p> <ul style="list-style-type: none"> <li>DFO will be requested to provide bycatch information for consideration by the Annual Surveillance Audit.</li> </ul> <p><u>Year 3:</u></p> <ul style="list-style-type: none"> <li>If shortcomings are identified and defined in the Year 2 audit, CAPP will provide evidence of discussions with DFO to define a revised format, and DFO will be requested to provide bycatch information for consideration by the Annual Surveillance Audit.</li> </ul> <p><u>Year 4:</u></p> <p>If shortcomings continue to be identified and defined in the Year 3 audit, CAPP will seek a meeting with the Minister to resolve the problem prior to the 4th Annual Surveillance Audit.</p>
<p><b>Consultation on condition</b></p>	<p>The client has consulted with DFO on its action plan. DFO has confirmed that they will support the plan through the activities of its own annual work plan. The client will need to maintain a close working relationship with DFO to ensure support continues.</p>

### Condition 3

<p><b>UoC</b></p>	<p><b>1 (Northern shrimp in SFA 1)</b></p>
<p><b>Performance Indicator</b></p>	<p><b>3.1.1 – The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li><b>Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</b></li> </ul>

	<ul style="list-style-type: none"> <li>• Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</li> <li>• Incorporates an appropriate dispute resolution framework.</li> </ul>
<b>Score</b>	<b>75</b>
<b>Rationale</b>	Talks between Canada and Greenland aimed at achieving an agreement on a joint harvest strategy have been ongoing for several years and are expected to continue in 2016. However, the current lack of agreement on harvest strategy including prospective control rules in the two fishery zones could result in exploitation levels that exceed the target and limit reference points should there be an abrupt decline in biomass.
<b>Condition</b>	The client shall demonstrate by the Year 4 audit that the SG80 requirements of PI 3.1.1 are met in full for UoC 1, including for Sla, such that: <i>“There is an effective national legal system and <u>organised and effective cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.”</i>
<b>Milestones</b>	<p><u>Year 1:</u></p> <ul style="list-style-type: none"> <li>• The client shall provide an update on progress towards an agreement between Canada and Greenland. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 2:</u></p> <ul style="list-style-type: none"> <li>• The client shall provide an update on progress towards an agreement between Canada and Greenland. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 3:</u></p> <ul style="list-style-type: none"> <li>• The client shall provide an update on progress towards an agreement between Canada and Greenland. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 4:</u></p> <ul style="list-style-type: none"> <li>• The client shall demonstrate that the SG80 Requirements of PI 3.1.1 are met in full, including for Sla. <b>Resulting score = 80 (requirement met and condition closed).</b></li> </ul>
<b>Client action plan</b>	<p><u>Year 1:</u></p> <ul style="list-style-type: none"> <li>• CAPP will provide an update on progress towards an agreement between Canada and Greenland.</li> </ul> <p><u>Year 2:</u></p> <ul style="list-style-type: none"> <li>• CAPP will provide an update on progress towards an agreement between Canada and Greenland.</li> </ul> <p><u>Year 3:</u></p> <ul style="list-style-type: none"> <li>• CAPP will provide an update on progress towards an agreement between Canada and Greenland.</li> </ul> <p><u>Year 4:</u></p> <ul style="list-style-type: none"> <li>• CAPP will provide evidence that Canada and Greenland have reached agreement on a harvest strategy to provide effective control of exploitation</li> </ul>

	rates within compatible target and limit reference points for mortality, particularly in the event of significant biomass decline.
<b>Consultation on condition</b>	The client has consulted with DFO on its action plan. DFO has confirmed that they will support the plan through the activities of its own annual work plan. The client will need to maintain a close working relationship with DFO to ensure support continues.

## Condition 4 (Non-binding)

As per CR v2.0 7.21.2.2, for fisheries which fail the conditions which would be set shall be set out. In the case of UoC 6, which did not meet the minimum requirement for PI 1.1.3, there were two conditions set (on PI 1.1.1 and PI 2.2.3). These conditions are non-binding and serve to provide an indication of the actions that may have been required should UoC 6 have been certified (CR v2.0 7.21.2.3).

<b>UoC</b>	<b>6 (northern shrimp in SFA 7)</b>
<b>Performance Indicator</b>	<b>1.1.1 – The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing</b>
<b>Score</b>	<b>60</b>
<b>Rationale</b>	The stock is below the NAFO LRP and is above, but declining close to, the DFO LRP (NAFO 2015a). Northern shrimp in this SFA built to commercial abundance from very low (essentially unmeasurable) abundance in the early 1990s. Because of this capacity to rebuild from very low abundance (well below the established LRPs), a score of 60 is justified.
<b>Condition</b>	The client shall demonstrate by the Year 4 audit that the SG80 requirements of PI 1.1.1 are met in full for UoC 6, including for Sla and Slb, such that:  Sla: <i>“It is highly likely that the stock is above the point where recruitment would be impaired.”</i>  Slb: <i>“The stock is at or fluctuating around its target reference point.”</i>
<b>Milestones</b>	<u>Year 1:</u> <ul style="list-style-type: none"> <li>The client shall provide evidence that there is a plan in place to support and monitor the growth of the UoC 6 stock towards the TRP. <b>Resulting score = 60 (no change)</b></li> </ul> <u>Year 2:</u> <ul style="list-style-type: none"> <li>The client shall provide an update on UoC 6 stock status to demonstrate that it is highly likely that the stock is above the point where recruitment would be impaired, and that rebuilding toward the TRP continues. <b>Resulting score = 70 (Sla met at SG80, Slb not met at SG80)</b></li> </ul> <u>Year 3:</u> <ul style="list-style-type: none"> <li>The client shall provide an update on UoC 6 stock status, to demonstrate progress in stock status towards the TRP. <b>Resulting score = 70 (no change)</b></li> </ul> <u>Year 4:</u>

	<ul style="list-style-type: none"> <li>The client shall provide an update on UoC 6 stock status to demonstrate that it is highly likely that the stock is at or fluctuating around its target reference point. <b>Resulting score = 80 (requirement met and condition closed).</b></li> </ul>
<b>Client action plan</b>	N/A as per CR v2.0 7.21.2.4
<b>Consultation on condition</b>	N/A as per CR v2.0 7.21.2.4

### Condition 5 (Non-binding)

<b>UoC</b>	<b>6 (northern shrimp in SFA 7)</b>
<b>Performance Indicator</b>	<b>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</b>
<b>Score</b>	<b>75</b>
<b>Rationale</b>	No recent compilation of information from the inshore fishery was available. This fleet takes a substantial proportion of the total catch in some SFAs (5, 6), and bycatch as a proportion of the total catch has been higher in the inshore fleet than in the offshore fleet (Table 8). Because of the lack of recent information on bycatch in the inshore fleet, a score of 80 is not justified for UoCs 4 and 5.
<b>Condition</b>	The client shall demonstrate by the Year 4 audit that the SG80 requirements of PI 2.2.3 are met in full for UoCs 4 and 5, including for SId, such that: <i>“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).”</i>
<b>Milestones</b>	<p><u>Year 1:</u></p> <ul style="list-style-type: none"> <li>The client shall provide evidence that there is a plan in place to collect and report on up-to-date bycatch information for the inshore fleet operating in SFAs 5 and 6. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 2:</u></p> <ul style="list-style-type: none"> <li>The client shall provide an update on progress towards the collection of up-to-date bycatch information for the inshore fleet operating in SFAs 5 and 6. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 3:</u></p> <ul style="list-style-type: none"> <li>The client shall provide an update on progress towards the collection of up-to-date bycatch information for the inshore fleet operating in SFAs 5 and 6. <b>Resulting score = 75 (no change)</b></li> </ul> <p><u>Year 4:</u></p> <ul style="list-style-type: none"> <li>The client shall demonstrate that the SG80 Requirements of PI 2.2.3 are met in full, including for SId.</li> </ul>

	<b>Resulting score = 80 (requirement met and condition closed).</b>
<b>Client action plan</b>	N/A as per CR v2.0 7.21.2.4
<b>Consultation on condition</b>	N/A as per CR v2.0 7.21.2.4

## Appendix 4: Peer review reports

### Peer Reviewer 1: Summary of peer reviewer 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</b>	<b>CAB Response</b>
<p><u>Justification:</u> I have been through all the background information provided in the Report, and thoroughly reviewed the scores and justifications entered in the scoring sheets. I am in addition fairly familiar with the previous status of this fishery from my past roles as an assessment and surveillance team member for the first assessment of the Canadian fishery and the 2013 assessment of the West Greenland fishery.</p> <p>Although I have raised comments on a number of Scoring Issues, none of these represent any serious disagreements with the overall conclusions reached by the assessment team. In P1 my comments mainly stem from minor issues of comparability of scoring between UoCs; the interpretation of recovery potential from a Lower Reference Point in some UoCs where recent recruitment conditions appear to be deteriorating; and other small points of technical detail. For P2, I have virtually no comments, thanks to the clarity and precision of the writing and the ordering of presentation, which I can only describe as exemplary.</p> <p>In the slightly more diffuse context of P3, my primary issue has concerned comparability of scoring between UoC1 and the others. For the former I had expected to see that most of the P3 PIs would have referenced at least some details of the governance system in Greenland, and so I have enumerated my reasons for this in the template at 3.1.1 and flagged the issue in the other P3 PIs where amendments would be necessary if the point is accepted.</p> <p>Overall I am happy to concur with the conclusion reached in Section 6.4 of this CNSSF Report that the fishery in UoC's 1-5 has reached the MSC standard and should be certified, but that UoC 6 has not reached the MSC standard. I am also content with the 3 Conditions that have been raised, and the accompanying Action Plan.</p> <p>In the Optional section of this template I have compiled an overall <u>evaluation</u> of the merit of the Report. I have also placed a paragraph containing some notes on a <u>Tracking Document</u> for the additional edits and questions that are not in Table 1 of this template.</p>		<p>Noted, thank you.</p> <p>Noted, thank you – we have addressed specific comments against the PIs, below.</p> <p>The report has been amended to include text and scoring comments on the governance system in Greenland where appropriate.</p> <p>Noted, thank you.</p> <p>Noted, thank you.</p>

<b><i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]</i></b>	<b>Yes</b>	<b>CAB Response</b>
<p><u>Justification:</u> I concur that the three conditions and their milestones are appropriately written, and that if they are achieved in the time frame they will secure an SG80 outcome.</p>		Noted, thank you.

If included:

<b><i>Do you think the client action plan is sufficient to close the conditions raised? [Reference FCR 7.11.2-7.11.3 and sub-clauses]</i></b>	<b>Yes</b>	<b>CAB Response</b>
<p><u>Justification:</u> Nominally the Action Plan should be sufficient to close out the Conditions, especially as DFO has indicated that it agrees to provide support, but there are certainly risks in each case.</p> <p>For <u>Condition 1</u> there is unlikely to be a problem with the WAZ, but for SFA 4 there is a risk that continued variability in the data could make survey-based reference points difficult to determine. It may therefore be wise for the proposed DFO Science RAP Working Group to commence work earlier, during the later part of year 3, to allow more time if an alternative approach proves to be necessary.</p> <p>For <u>Condition 2</u>, the outcome depends on the operational resources that are made available for collection and compilation of by-catch data from the inshore fishery, but the Year 4 element of the Action Plan appears to represent an appropriate contingency plan.</p> <p>For <u>Condition 3</u>, I am sure that there are enough fishery and assessment data available to provide the basis for a settlement within the time frame of the Action plan, but it is clear that the principal risks are of a political nature, and are outwith the control of the Client. As indicated in the Action Plan much may depend on how stock biomass behaves over the next few years.</p>		<p>Noted, thank you.</p> <p>Condition 1. Re SFA 4, this comment recognizes a significant issue. However, the main requirement to establish a survey-based reference point is for a time series as long as possible, and thus we believe that conducting the analysis in Year 4 remains appropriate.</p> <p>Condition 2. Noted, thank you.</p> <p>Condition 3. Noted, thank you.</p>

### **Performance Indicator Review**

*Please complete the appropriate table(s) in relation to the CAB's Peer Review Draft Report:*

- For reports using one of the default assessment trees (general, salmon or enhanced bivalves), please enter the details on the assessment outcome using Table 22.

**CAB response** – please see the completed Table 22, below.

**Table 22:** Peer Reviewer 1 comments for reports using one of the default assessment trees.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<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.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.1	Yes	No	NA	<p><b>Sl1a:</b>  <u>1<sup>st</sup> sentence of the justification</u>                      I agree that UoCs1,2, and 4 are firmly in the healthy zone and justify the 100 score, but I suggest this score is less justifiable for UoC 5 where exploitation rate has risen to a high point (22.3%) above the recommended DFO level of 20% and, more seriously, stock is at the lowest point in the time series, half way down the cautious zone (Figs 38-40). Biomass is still above the LRP, but with the uncertainty on future recruitment (Section 3.1.5 of the Report) the wording of SG80 seems to be more justifiable, more precautionary, and more in line with the qualified interpretation for this UoC in Slb ("fluctuating round the TRP, but this may have to be revisited if there is a longer term decline in biomass").</p> <p><u>Paragraph 4 Second sentence.</u>                      UoC 6 is at the southern end of the shrimp range where environmental conditions are less favourable than in the expansion phase</p>	<p>Noted, thank you. The Assessment Team agrees so we have reduced the score for UoC 5 to 80 and modified the text.</p> <p>Noted, thank you. We have modified the text to indicate that rebuilding might require a</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<p><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.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	CAB Response
				<p>of the 1990s-mid 2000s. The capacity of the stock to rebuild now from very low abundance, which Fig 41 shows is clearly below Blim, may therefore be lower than during the favourable expansion period. It would be precautionary to consider whether during the moratorium stock recovery will either be more prolonged, or even inhibited, by poor recruitment, and I suggest that the penultimate sentence is amended to reflect this.</p>	<p>longer timeframe than in the 1990s.</p>
1.1.2	Yes	Yes except for query on Slc	Yes (Condition 1)	<p>I fully agree the reasons why the score for Sla does not meet 60 for UoC 3, and that Condition 1 is appropriate.</p> <p><b>Slc</b> You are saying No to a 100 score for all UoCs, but the precautionary issue cited in the guidepost (ecological role of the stock) is included in the Bayesian model for UoC1, which under guidepost b scored 100. Should the same rationale for UoC1 apply here too?</p>	<p>Noted, thank you.</p> <p>While the impact of cod predation is incorporated into the population model, some uncertainty remains about the impact and thus, we do not consider that there is the "high degree of certainty" required to meet the 100 SG for Slc for UoC 1. We have added text to the scoring table to clarify this</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<p><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.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	CAB Response
					point.
1.1.3	Yes	Yes	No condition as the fishery fails here.	<p><b>SI a</b> Last line. Helpful to add that it cannot score 100 as it is too early to see recovery, especially given the uncertainty over future recruitment.</p> <p><b>SI c</b> I accept the justification that the assessment fails for the reasons stated.</p>	<p>We have added a line addressing this point to the scoring table.</p> <p>Noted, thank you.</p>
1.2.1	Yes	No	NA	<p><b>SI a</b> The last paragraph on management tools refers to 'mesh sizes and others': I see no information elsewhere in the Report , or any other shrimp fishery documentation for that matter, specifying what management objective the shrimp mesh size aims to achieve, so I suggest that this phrase needs amplifying.</p>	<p>We have modified the scoring table text to list some of the "others" (enterprise allocations, geographically-defined management areas). The minimum mesh size of 40 mm (noted in the IFMP) was set to optimise the size composition of the catch, focusing on mature males and on females and leaving immature individuals unharvested (although the</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<p><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.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	CAB Response
					rationale is, indeed, not well documented).
1.2.2	Yes	No	NA	<p><b>SI b</b> The last sentence of the scoring justification is not very clear: I suggest re-wording as:- "Although this broadens the range of uncertainties considered in this UoC, it does not reach the 'wide range' required to score 100"</p> <p><b>SI c</b> As for 1.2.1 SIa above, there is no specific information on how the mesh size controls the exploitation <b>rate</b> (as opposed to exploitation <b>pattern</b>). .</p>	<p>We have modified the text to address this point.</p> <p>We have modified the text to remove mesh sizes as a harvest control tool.</p>
1.2.3	Yes	No	NA	<p><b>SI a</b> The text needs comments to support the NO to a score of 100 for UoCs 2 &amp; 3.</p> <p><b>SI b</b> I have made several suggestions for wording changes for clarity</p>	<p>We have added text to clarify this.</p> <p>Noted and incorporated, thank you.</p>
1.2.4	No	No	NA	<p><b>SI a</b> In paragraph 2, I suggest that exploitation</p>	Exploitation rates have been

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<p><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.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	CAB Response
				<p>rate is also mentioned (given its ecosystem role).</p> <p><b>SI d</b> Last part of the paragraph is in the plural: the Bayesian is clearly the main one, but were /are there others ? If not, then make singular.</p> <p><b>SI e</b> "may be occasional external participation" is vague: can a realistic frequency be cited?</p>	<p>added to the text.</p> <p>Text has been modified to singular.</p> <p>We have changed the text to "there is occasional external participation" but there is no established frequency for this - in any case this does not affect the score.</p>
2.1.1	Yes	Yes	NA	Justification fully complete for all SIs	Noted, thank you.
2.1.2	Yes	Yes	NA	Justification fully complete for all SIs	Noted, thank you.
2.1.3	Yes	No	NA	<p>In <b>SI a</b> To justify the 80 score can the text say why it is not possible to determine that accurate and verifiable information is available on the catch of all striped shrimp in UoC1 ?</p>	This is simply because there is no basis to support a statement that accurate and verifiable information is available - we have modified the text to clarify this.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.2.1	Yes	Yes	NA	In <b>Sla</b> , it would help the reader to insert reference to Section 3.18.2 and Table 7 at end of the first sentence.	Done - good comment.
2.2.2	Yes	Yes	NA	Justification fully complete for all SIs	Noted, thank you.
2.2.3	Yes	Yes	Yes (Condition 2)	<b>Sld</b> I fully agree the reasons that the score does not meet 80 for UoCs 4,5,6, and that Condition 2 is appropriate.	Noted, thank you.
2.3.1	Yes	Yes	NA	Justification fully complete for all SIs	Noted, thank you.
2.3.2	Yes	Yes	NA	Justification fully complete for all SIs	Noted, thank you.
2.3.3	Yes	Yes	NA	Justification fully complete for all SIs. but in <b>Sla</b> the reference to Table 5 should be Table 6.	Change has been made in the text.
2.4.1	Yes	Yes	NA	Justification fully complete for all SIs, but in the data table, column 2, should the <10 actually be >10 (UoCs 2,3, and 6) ?	Further clarification has been added to the notes at the end of the data table. The final conclusion, as indicated in the table, is that <10% of habitat

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<p><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.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	CAB Response
					was impacted, but this was based on detailed analysis after the initial analysis suggested that >10% was impacted.
2.4.2	Yes	Yes	NA	Justification fully complete for all Sis.	Noted, thank you.
2.4.3	Yes	Yes	NA	Justification fully complete for all Sis. In <b>S1c</b> , will the 5 year cycle for the fishery footprint fit with the re-certification cycle?	Yes, the 5-year cycle should fit well with the recertification cycle.
2.5.1	No	Yes	NA	<p><b>S1a:</b> para 3 notes that exploitation rate is set at levels to allow a surplus for predators, but how well is this achieved? Since this is scored at 100, I feel you should state the latest observed exploitation rates for UoCs 2-6 in support (10% for EAZ, 6% for WAZ, 12% for SFA4, 15-18% for SFA5, but predicted to be more than 20% for 2016 in SFA6 due to falling biomass). All but one meet the target.</p>	We have added text to show the most recent exploitation rates, as suggested.
2.5.2	Yes	Yes	NA	Justification fully complete for all SIs	Noted, thank you.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<p><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.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	CAB Response
2.5.3	Yes	Yes	NA	Justification fully complete for all Sis. but the text reference in Sla to Chabot et al 2007 does not appear at the end of this PI or in the master reference list.	We have added the citation to the reference list and the list at the end of the PI.
3.1.1	Yes except for Greenland /UoC1	Yes except for Greenland /UoC1	I agree the score giving rise to Condition 3, and agree that it has the potential to raise performance of the fishery to the SG 80 level.	<p><b><u>Sla. UoC1 in PI 3.1.1 and other P3 PIs.</u></b> For UoC 1, I looked see <i>some</i> mention of the systems /operations in West Greenland, which assesses, manages and monitors a fishery taking the major part of the NAFO UoC1 TAC and so has the main effect on stock status there. The latter therefore depends not just on Canadian and NAFO legal systems, rights &amp; frameworks, but also their West Greenland counterparts. The Greenland assessment, and the UoC1 TAC sharing issues, are well covered in the report, but comments on the overarching legal systems, rights, frameworks, licences, consultations, MCS, research plan etc. in West Greenland, which contribute to how well MSC principles are delivered in UoC 1, do not appear in the Introductory sections or the justification section of any P3 PI. It is unclear if this omission is accidental, in which case some amendments are required, or</p>	Text on the governance system in Greenland has been added to the report and comments have been added where appropriate in each PI for UoC 1.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<p><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.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	CAB Response
				<p>deliberate. If the latter then I suggest that a more substantial overall comment needs to be made than that in the harmonization Section 4.1. It should state why no Greenland details are included, whether they are taken into account in the scoring, and state in each PI whether there are/are not discrepancies between the standard reached in Canada and Greenland that have affected the score. For completeness, and in advance of any response by the CAB or the team, I have flagged the Greenland/UoC query throughout the P3 PIs.</p>	Noted, thank you.
3.1.2	Yes except for Greenland in UoC1	Yes, if in UoC1 Greenland reaches the same standard as Canada	NA	<p><b><u>Sla</u></b> For UoC 1, refer to Greenland structure, IFMP objectives, and Shrimp Advisory Committee members and roles</p> <p><b><u>Sib</u></b> For UoC 1 there is consultation between the Greenland Parliament, the industry and ENGO's but in the past there was limited explanation of how information is used. Has this situation changed/ improved since?</p>	<p>The report and this PI has been amended to include details on Greenland structure</p> <p>No change in this situation has been noted in annual surveillance reports. This issue is more fully covered in 3.2.2</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.1.3	Yes except for Greenland in UoC1	Yes, if in UoC1 Greenland reaches the same standard as Canada	NA	<b>Sl</b> Are there also some DFO Policies on Emerging Fisheries, and on New Fisheries for Forage Species?	An addition has been added to §3.2.4 of the report to include these policies.
3.1.4	Yes except for Greenland in UoC1	Yes, if in UoC1 Greenland reaches the same standard as Canada	NA	<b>Sl</b> For UoC, Greenland has comparable provisions (limited entry, enterprise allocation system).	The report has been amended to include wording in response to the comment.
3.2.1	Yes except for Greenland in UoC1	Yes, if in UoC1 Greenland reaches the same standard as Canada	NA	For UoC1 refer to the Greenland short and long term objectives for both P1 and P2 in the Greenland IFMP.	Highlighting GCBA4.0.2 (MSC 2013a), which in relation to CBA4.0.2 (MSC 2013b) states that the intent is to limit the extent of the responsibility of the fishery within the UoC for the actions of non-UoC management bodies, unless they impact directly on the delivery of P1 and P2 outcomes, wording has been added to the PI scoring text in response to the comment.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.2	Yes except for Greenland in UoC1	Yes, if in UoC1 Greenland reaches the same standard as Canada.	NA	<b>SI b</b> Wording issue: the two TACs are not yet coordinated so it cannot be assumed that their total does not exceed the total SFA1 TAC set by NAFO.	Noting again that the MSC's intent is to limit the extent of the responsibility of the fishery within the UoC for the actions of non-UoC management bodies, we note this comment and point to where we say " <i>Canada and Greenland engaged in formal bilateral meetings to discuss harvest levels and rules for the fishery in NAFO Area 1 (SFA 1). This process is voluntary and does not require agreement of the parties on specific management approaches.</i> "
3.2.3	Yes except for Greenland in UoC1	Yes, if in UoC1 Greenland reaches the same standard as Canada.	NA		No comment noted, thank you.
3.2.4	Yes except for Greenland in UoC1	No	NA	<b>SI a</b> Section 3.30 notes the Canadian gap analysis, and the long list of topics on data	The team is of the view that the Canadian research plan is

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<p><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.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	CAB Response
				<p>collection and research on stocks and the environment. The list is comprehensive and meets 80, but is it a plan at the 100 level? The list conveys little information about the quality of the individual work lines, the likelihood of their success, and how resources and progress are to be managed to achieve reliable and timely delivery, which is what is also looked for in scoring 100.</p> <p>Does the Greenland plan reach the same standard as that for Canada in UoC1?</p>	<p>sufficiently comprehensive to meet the 100 SG. An extensive research program is outlined in §3.29 of the report.</p> <p>Noting again that the MSC's intent is to limit the extent of the responsibility of the fishery within the UoC for the actions of non-UoC management bodies, an addition has been added to §3.29 and this PI scoring text to reflect the recently presented Greenland Institute of Natural Resources research plan, as noted in the second annual surveillance report (IFC 2015a) of the 2013 West Greenland assessment.</p>
3.2.5	Yes except for Greenland in UoC1	Yes, if in UoC1 Greenland reaches the same	NA	<p><b>SI a</b> Helpful to add that the NIPAG reports represent an ongoing and enduring review/</p>	Agreed. Wording has been added to the PI.

<b>Performance Indicator</b>	<b>Has all available relevant information 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.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
		standard as Canada.		record of the effectiveness of management of the fishery. These reports are in turn reviewed by plenary bodies in NAFO and ICES	

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

### **EVALUATION OF THE REPORT**

The quality of this Report ranges from good to excellent. The introduction is comprehensive, up to date, and generally very clearly written. Most sections provide the information that is required for scoring, except that for P3 I have asked, and to my mind justified, whether some reference should be made to the governance systems in Greenland in order to better inform the comparison between scoring for UoC1 and the other UoCs. The Report makes very clear the incongruities that undoubtedly exist because of jurisdictional interactions between Canada and Greenland, and between DFO and NAFO, and the technical differences in their objectives, reference points, and control rules. In the context of the observed increase and decrease of shrimp stocks following a sequence of changing environmental conditions, it still remains to be seen whether the current sets of trend based reference points and harvest control rules will stand the test of time, but given where things are now, the MSC assessment team has done a good job to reflect the precautionary features of management and governance in this fishery, and in particular the impressive range of policy, assessment and consultative provisions available. I think it is easy to underestimate the enormous resource implications involved in the DFO scientific and advisory processes. I must add how pleased I am to see the real progress made by the client and managers in closing out the habitat and ecosystem conditions raised under the expiring certificate, illustrating the huge benefits of this aspect of the MSC process. Finally, I must commend again the P2 section of this Report. It was so easy to read and judge why and how the scoring decisions were made that I see it as a model of its kind.

**CAB response:** Noted, thank you.

### **TRACKING DOCUMENT**

My most important comments/questions are entered directly into Table 1 of this template.

In addition I have assembled a tracking document with a large number of basic text edits (obvious mistakes), citation edits, suggested wording changes, and flags to where in the scoring sheets my points in Table 1 arise. This array has been entered onto a Word copy of the Report in the form of Comments rcab1-rcab78 using Track Changes. The comments are identified as EDIT, CITATION, WORDING, TEMPLATE COMMENT. The actual text in the tracking doc has NOT been amended: the comments simply show what is required, so if accepted by the team these would need to be added physically into the text, and then merged with the Master File. But I deemed that this would be much simpler than appending here a long string of verbal descriptions of how to find the bits needing amendment.

A list of the Comment number, Report text page number, and comment identifier, is shown below.

**CAB response:** Noted, thank you.

Comment no.	Text page	Category	Comment no.	Text page	Category	Comment no.	Text page	Category
1	21	EDIT	27	126	TEMPLATE	53	159	EDIT
2	67	EDIT	28	127	EDIT	54	161	QUESTION
3	70	WORDING	29	129	WORDING	55	165	WORDING
4	78	CITATION	30	129	WORDING	56	170	TEMPLATE
5	80	CITATION	31	130	WORDING	57	176	CITATION
6	81	CITATION	32	130	TEMPLATE	58	180	TEMPLATE
7	82	EDIT	33	130	WORDING	59	181	EDIT
8	83	EDIT	34	130	TEMPLATE	60	184	EDIT
9	87	QUESTION	35	132	TEMPLATE	61	184	CITATION
10	88	CITATION	36	133	EDIT	62	184	TEMPLATE
11	98	WORDING	37	133	WORDING	63	185	TEMPLATE
12	103	WORDING	38	133	WORDING	64	187	TEMPLATE
13	118	TEMPLATE	39	133	WORDING	65	189	TEMPLATE
14	118	TEMPLATE	40	135	CITATION	66	189	WORDING
15	119	WORDING	41	135	TEMPLATE	67	191	EDIT
16	121	WORDING	42	135	WORDING	68	191	TEMPLATE
17	122	CITATION	43	136	WORDING	69	193	TEMPLATE
18	122	WORDING	44	136	WORDING	70	194	TEMPLATE
19	122	CITATION	45	136	TEMPLATE	71	196	EDIT
20	122	TEMPLATE	46	136	TEMPLATE	72	198	TEMPLATE
21	122	CITATION	47	143	TEMPLATE	73	199	EDIT
22	124	CITATION	48	145	WORDING	74	201	TEMPLATE
23	124	TEMPLATE	49	152	TEMPLATE	75	203	TEMPLATE
24	124	TEMPLATE	50	153	WORDING	76	203	TEMPLATE
25	125	WORDING	51	153	EDIT	77	204	TEMPLATE
26	125	CITATION	52	154	EDIT	78	207	EDIT
	P1			P2			P3	

## Peer Reviewer 2: Summary of peer reviewer 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</b>	<b>CAB Response</b>
<p><u>Justification:</u> Yes, the evidence supports the conclusion that the fishery is conducted in a responsible manner, and that it adheres to the principles and requirements of the MSC. For Principle 1, UoCs 1-5 (but not 6) are above or fluctuating around their target reference points. All UoCs have clear harvest strategies responsive to the state of the stock, annual stock assessments based on recent data are done, in-season monitoring and appropriate data collection to describe stock structure, abundance, productivity and the impacts of fishery removal. Together these support the harvest strategy.</p> <p>For Principle 2, impacts of the fishery on other species (bycatch, ETP spp), habitats and ecosystems are very low, with good information to support this contention, and there are appropriate management strategies and mechanisms in place.</p> <p>For Principle 3, there are well-established legal frameworks (Canada and NAFO) with binding procedures, long-term objectives that guide decision-making, a transparent decision process, and good monitoring and control systems. Research and data analyses focus on stock assessments to support commercial harvest, but also address the effects of the fishery on the environment and vice versa. The fishery has an Integrated fisheries management plan, which is fully applied, and management is responsive to changes in stocks.</p> <p>The set of 3 conditions set is appropriate and will lead to scores of 80 when they have been cleared. Condition 3 depends on progress with the bilateral negotiations between Canada and Greenland – not always predictable.</p> <p>There are two areas of concern. Even though UoC 5 remains in the cautious zone of the PA framework and above the LRP, the trends from the stock assessment look rather alarming. Declines in the Biomass index have been recorded in 6 years between 2006 (high point) and 2014 (near the low point), and the exploitation rate is at 22.3 % in the last year. In 6 of the most recent years, the SSB fall within the cautious zone of the PA Framework. Just south of UoC 5, no fishing presently takes place in UoC 6, because the stock is depleted. There is no rebuilding strategy in place (see PI 1.1.3), and therefore it does not meet the MSC standard for certification. Pre-recruit indices look unfavourable, and “a change in environmental conditions” is given as a possible cause. This reminds of the situation with the American lobster <i>Homarus americanus</i> fisheries in the NE US (declining in the south) and Canada. If indeed environmental change is driving the declines in the southern part of the region (UoCs 5 and 6), the decline will likely continue for some time – eventually taking UoC5 below the LRP, and triggering harvest control rules which may include closing the fishery. It might not happen, but if it does in the next 5 years, the situation would</p>		<p>Noted, thank you.</p> <p>Noted, thank you.</p> <p>Noted, thank you.</p> <p>Noted, thank you.</p> <p>We agree that this is a good summary of the situation.</p> <p>For UoC 5, careful monitoring of the stock status will be required in future and PI 1.1.3 rescored if the stock remains consistently below the TRP. This would require a formal rebuilding strategy with timelines, in order to meet the MSC PI 1.1.3. Detailed response is provided below under 1.1.3.</p>

<p>arise where a MSC certified UoC is depleted to the extent that it is not harvested any longer. An uncomfortable situation.</p> <p>In PI 2.1.3 (a-d) the assessors state that striped shrimp constitute only 2.81% of total retained catch in UoC 1 in 2014. But what about the information contained in Table 6 (page 66) showing that catches comprised 62.6% striped shrimp in SFA1 (overlapping UoC1) based on information collected between 2012/13 and 2014/15. Based on this information, striped shrimp should be a main retained species in UoC 1, in which case several PIs will have to be rescored. There might be some other explanation for the high proportion of striped shrimp shown in Table 6 – although I could not pick it up from the text. Could the statistics on Table 6 please be checked, and if correct, could the assessors please clarify why this percentage is so different from the 2.81% in the total retained catch in UoC1.</p>	<p>We have responded to this point below, in the detailed comments. Briefly, we note that Table 6 presents data from a very small sample, while Table 16 (showing striped shrimp = 2.81%) reflects the entire 2014 catch. We in fact believe that the proportion of striped shrimp listed in Table 6 is an error, as it is inconsistent with extensive data from earlier years and with the known biology of striped shrimp (which rarely occur in the deep offshore areas where the Canadian fishery in SFA 1 occurs).</p>
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<p><b><i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]</i></b></p>	<p><b>Yes</b></p>	<p><b>CAB Response</b></p>
<p><u>Justification:</u> Yes, the conditions are appropriate and should lead to an SG80 score by year 4 in all 3 cases.</p>	<p>Noted, thank you.</p>	

If included:

<p><b><i>Do you think the client action plan is sufficient to close the conditions raised? [Reference FCR 7.11.2-7.11.3 and sub-clauses]</i></b></p>	<p><b>Yes</b></p>	<p><b>CAB Response</b></p>
<p><u>Justification:</u> Yes for conditions 1 and 2. These depend on collaboration between the client and DFO. For condition 3, it depends on progress with the bilateral negotiations between Canada and Greenland.</p>	<p>Noted, thank you.</p>	

### **Performance Indicator Review**

*Please complete the appropriate table(s) in relation to the CAB's Peer Review Draft Report:*

- For reports using one of the default assessment trees (general, salmon or enhanced bivalves), please enter the details on the assessment outcome using Table 23.

**CAB response** – please see the completed Table 23, below.

Table 23: Peer Reviewer 2 comments for reports using one of the default assessment trees

<b>Performance Indicator</b>	<b>Has all available relevant information 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.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
1.1.1	Yes	Yes	NA	<p>There are several inconsistencies in how the information is represented, leading to some confusion, particularly in UoC2. In the 2<sup>nd</sup> paragraph of the Justification (p118), the sum of the LRPs is given as 25 800 t (from Table 3) but from Figures 21 (6 800t) and 27 (21 100t) it should be 27900 t.</p> <p>Based on Fig 22, the 2014 biomass (SSB) is nearly 38 000t in the EAZ. So the statement that "The EAZ represents a small fraction of the total biomass (12300 t) in the UoC" is incorrect. Incidentally, Fig 23 shows a recent SSB of about 12000 t for WAZ. Are the Figure headings perhaps wrong? Assessment team to check for inconsistencies.</p>	<p>"EAZ" and "WAZ" were mixed up in several tables (Table 3, Table following text in scoring table 1.1.1) and these have been corrected in the text. The correct figure for the LRP in SFA 4 was 21,100t and this has been corrected where wrong. Good editing!</p> <p>"EAZ" here was a misprint, "WAZ" was meant - the text has been modified.</p> <p>We share the concern about the trajectory of this stock, but we judge that based on</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<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.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				<p>Some concern about UoC 5, with the continued decline in the biomass index since 2007 (except 2011; Fig. 38). The interpretation that it is still fluctuating around the TRP can be contested – even if the ER is still in the cautious zone. The suggestion that it should be revisited if the decline becomes long-term is open ended. What is a long-term decline? There has already been 5 – 8 years of decline.</p> <p>Can the assessors be more specific about what will happen if the decline extended for, say another 3 years, edging ever closer or surpassing the LRP?</p>	<p>current information (see Figure 40) it can be considered to be fluctuating around the TRP. The stock was above the TRP for 10 years (1999- 2009/10), below for 2, above for 1, and below for 2 (2013/4 and 2014/5). Although the stock has declined to midway within the cautious zone, we judge that there is potential for an increase based on past fluctuations. MSC CR v 1.3 (2.2.2.1) asks for evidence that the stock has been fluctuating around the TRP “for the past few years” and based on the past five, we judge this to be the case.</p> <p>It has not been practice to provide guidance to future audit teams on when a continuing decline would trigger a score less than 80 on PI 1.1.1. We would expect that monitoring of the trajectory in light of the MSC CR, along with relationship to the LRP, would provide clarity on this in future.</p>
1.1.2	Yes	Yes	Yes	Condition set for UoC3 is appropriate. For UoC2, why a	The reason for a Recommendation was that 2 of 3 SFAs in UoC2 have reference

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				Recommendation and not a Condition? I could not find a definition of 'Recommendation' in the MSC Vocabulary (V1.1, 20 <sup>th</sup> February 2015)	points, covering most of the biomass, while in UoC 3 only 1 of 3 SFAs has a reference point and a relatively small proportion of biomass is covered, thus justifying a Condition.
1.1.3	Yes	Yes (UoC 6) Unsure (UoC 5)	NA	Could be contested for UoC5 – which is in danger of being 'consistently below the TRP' (Fig 38 and Fig 40)	We agree that UoC5 has been below the TRP for the past 4 survey years and has been showing a downward trend, consistent with unfavorable environmental conditions. However we judge that the MSC guideline for "depleted" (MC 2013b) has not yet been met, for reasons given in the scoring table text.
1.2.1	Yes	Yes	NA	a-e) Agreed, robust and precautionary harvest strategy in place throughout.	Noted, thank you.
1.2.2	Yes	Yes	NA	a-c) Good justification for scores, with a slightly lower score for UoC 1	Noted, thank you.
1.2.3	Yes	Yes	NA	UoCs 2 and 3 do not make the SG100. Agreed, but could the	a) Text has been added to clarify the reasoning for the lower score.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				assessors indicate their reasoning as done for the other UoCs Some degree of uncertainty in UoCs 2 and 3 because of new surveys and short data series. Overall PI score of 80 justified.	b) Noted, thank you.
1.2.4	Yes	Yes	NA	a-e) Extensive assessment of stock status undertaken incl. peer-review	Noted, thank you.
2.1.1	Yes	Yes Unsure for UoC 1	NA	a-d) No main retained species. Some confusion surrounding the statistics given for UoC 1. On Table 6 bycatch info from 7 vessels gives 37.4% Northern and 62.6% Striped shrimp (2012 – 2015). And on Table 16 Striped shrimp make up only 2.81% (2014). Could the assessors please explain the vastly different percentages?	We believe that the proportions of the two species given in Table 6 (63% striped shrimp) are erroneous, possibly based on misidentification. The UoC1 figures in Table 6 are based on a very small catch (28 t). All earlier information available indicates that striped shrimp would be very uncommon in this SFA - it is well offshore and in deeper water than typical striped shrimp habitat, and bycatch data from earlier years has consistently shown very low proportions of striped shrimp in catches in this area (see Aschan et al 2012, Kingsley 2011). We give more weight to the figures in

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					<p>Table 16 which are based on a much larger catch (4,800 t). Catches in SFA 1 have fluctuated greatly over the past 10 years, accounting for the big difference in catches in the two tables.</p> <p>We have added text to the scoring table to clarify our interpretation of the numbers in Tables 6 and 16.</p>
2.1.2	Yes	Unsure for UoC1	NA	<p>Striped shrimp in UoC1 is not a main retained species so it meets the SG80 by default. Agreed (but see Table 6 on page 66). But for the subsequent guideposts, it still needs a partial strategy, even if it is not a main retained species? The assessors contend that UoC 1 meets SG80 by default, even though..." there is no strategy in place for managing striped shrimp"... The Guidepost states that there should be a partial strategy in place. The assessors need to explain what the partial strategy is. If there is really no</p>	<p>a+b). It is noted that the partial strategy (S1a) is required only for main retained species, and the convention for MSC assessments against CR v.1.3 has always been that this requirement applies throughout the PI 2.1.2 scoring to main retained species only (or S1a would make no sense). Nevertheless, the current fishing strategy, in particular the distribution of fishing well offshore and in deep waters, represents a partial strategy for minimizing bycatch of striped shrimp even as a minor retained species, and text has been modified to address this.</p>

<b>Performance Indicator</b>	<b>Has all available relevant information 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.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
				strategy at all, it does not meet SG80 by default, as also stated in the justifications of (c) and (d).	
2.1.3	No	No	NA	a-d) The assessors state that striped shrimp constitute only 2.81% of total retained catch in UoC 1 in 2014. But what about the information contained in Table 6 (page 66) showing catches comprised 62.6% striped shrimp in SFA1 (overlapping UoC1) based on information collected between 2012/13 and 2014/15. Could the assessors please elaborate. Based on this information, striped shrimp should be a main retained species in UoC 1, in which case several PIs will have to be rescored.	We believe the information in Table 6 showing a high proportion of striped shrimp to be erroneous, and we have modified the text to clarify our judgement on this source of information. See details in 2.1.1 above.
2.2.1	Yes	Yes	NA	Justification is good	Noted, thank you.
2.2.2	Yes	Yes	NA	Justification is good	Noted, thank you.
2.2.3	Yes	Yes	Yes	Condition 2 will improve	Noted, thank you.

<b>Performance Indicator</b>	<b>Has all available relevant information 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.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
				performance to the SG80 level in UoCs 4 and 5.	
2.3.1	Yes	Yes	NA	The fishery poses negligible risk to ETP species and this is clearly explained in the justification.	Noted, thank you.
2.3.2	Yes	Yes	NA	Comprehensive strategy in place; high confidence in analyses; clear evidence of success and that the objective is being achieved.	Noted, thank you.
2.3.3	Yes	Yes	NA	Agreed, score of SG100 not justified in (b) because survival rates of discarded individuals are unknown.	Noted, thank you.
2.4.1	Yes	Yes	NA	Negligible damage caused to habitat structure because of little gear contact. Agree with score.	Noted, thank you.
2.4.2	Yes	Yes	NA	Agreed that a partial strategy is in place, and not a strategy, thus scoring at SG80 in a-c.	Noted, thank you.

<b>Performance Indicator</b>	<b>Has all available relevant information 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.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
2.4.3	Yes	Yes	NA	Information is adequate to determine risk to habitats	Noted, thank you.
2.5.1	Yes	Yes	NA	Low overall impact on ecosystems	Noted, thank you.
2.5.2	Yes	Yes	NA	A very effective partial strategy in place – high score justified.	Noted, thank you.
2.5.3	Yes	Yes	NA	Difficult to see in (a – d) why scores of 100 are not justified for (e). What more information might be required to develop comprehensive strategies to manage ecosystem impacts? High score justified.	Because partial strategies are in place, and the 100SG at (e) requires information to support strategies (ie full strategies in the MSC sense), we scored this at 80.
3.1.1	Yes	Yes	Yes	Condition # 3 is appropriate. High scores for the other UoCs justified	Noted, thank you.
3.1.2	Yes	Yes	NA	Highly effective and well understood consultation processes. High scores justified.	Noted, thank you.
3.1.3	Yes	Yes	NA	The initial focus on NAFO in the justification is somewhat	Point accepted. The Justification section of this PI has been reordered to better

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				misplaced, because only a small part of the stock (Uoc 1 and Uoc6) falls partially under its jurisdiction. DFO is far more important, and covers all the UoCs – so why are the DFO objectives and management policies not the main issues used in the justification? It won't change the scoring but will provide a better balance to the justification.	focus on the Canadian fishery.
3.2.1	Yes	Yes	NA	Scores are justified	Noted, thank you.
3.2.2	Yes	Yes	NA	(d) Hard to see how the SG100 is not met. All information available on DFO and NAFO websites. Perhaps that should be viewed as 'formal reporting'	The team did not find that there was a formal reporting system that “describes how the management system responded to findings and relevant recommendations” While the crucial information is available, there is no formal accounting to stakeholders on the rationale for decisions.
3.2.3	Yes	Yes	NA	Good record in all UoCs – high degree of confidence	Noted, thank you.

<b>Performance Indicator</b>	<b>Has all available relevant information 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.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
3.2.4	Yes	Yes	NA	(b) Wide dissemination to all interested parties – here it scores 100 but not in 3.2.2d? Perhaps the assessors were overly conservative in that case?	The research plan and all research work is distributed widely to all interested parties, justifying the 100 score. However, PI 3.2.2 refers to more than a distribution of research information. It requires a formal reporting system to stakeholders on the findings/recommendations resulting from that research.
3.2.5	Yes	Yes	NA	OK, not all parts of the management system assessed (a) and only occasional external review (b) brings it down to 80.	Noted, thank you.

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

No comments noted

## Appendix 5: Stakeholder Submission

### Combined stakeholder submission during 4th surveillance:



David  
Suzuki  
Foundation

Vancouver (Head Office)  
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Ecology Action Centre



September 9, 2015

Dear Paul Knapman,

Thank you for the opportunity to comment on the 4<sup>th</sup> annual surveillance audit of the *Canada Northern and Striped Shrimp Trawl Fishery*. The comments in this submission pertain to conditions in the seven certified SFAs related to PIs 2.4.1-3 and PIs 2.5.1-3 and the overall development of a Habitat Ecosystem Strategy for this fishery. While we commend the industry's work to develop the **A (Partial) Habitat & Ecosystem Strategy for the Northern Shrimp Fishery** (unpublished March 2015, here forward referred to as the 'Strategy'), we are concerned by the process of how the Strategy was developed and the lack of transparency and peer review of the information.

It is difficult to comment on whether the Strategy meets the requirements of the MSC performance indicators and conditions when the Strategy itself is an industry created implementation of a federal policy that was undertaken outside of any public process or review. As a result, the outcome of the Strategy is based on assumptions and information that have not been open to critique and therefore may not satisfy the conditions of the certification.

In preparation of our submission into the audit process we contacted yourself and the assessment team for clarification on some of these issues. Through these communications it became clear that our concerns and questions with the Strategy itself could not be addressed through the MSC audit process. By either accepting or rejecting the information presented the assessment team is taking on a role of that should be the purview of the regulatory agency, DFO.

Because the MSC audit process is not the place to have public process and peer review of the Strategy we are limiting our comments into this audit process to one simple request to the certification body.

daidsuzuki.org

 SOLUTIONS ARE IN OUR NATURE

Request: Intertek not close habitat related conditions related to Pls 2.4.1-3 and Pls 2.5.1-3 until the document “A (Partial) Habitat & Ecosystem Strategy for the Northern Shrimp Fishery” has been vetted through a public process as described in the [Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas](#) and the [Sustainable Fisheries Framework](#).

Outstanding questions in the Strategy include the calculation of the footprint, spatial resolution of data used relative to scale of fishing gear, delineation of ecosystems, uncertainty, data deficiencies, cumulative impacts, time frame of data set and other pertinent information. We have attached a copy of the strategy with questions for consideration. Despite these questions, we are withholding judgment as to whether the Strategy is sufficient under the given circumstance.

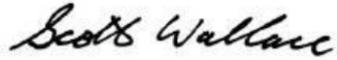
The MSC process is not intended to be a place for peer review of scientific information underpinning what should be a public regulatory process. It is however a place where the certification body can request that “strategies” as requested per MSC conditions are developed in accordance to the policy framework of the regulatory body managing the fishery under certification. Requiring a vetted public peer review process would be in keeping with other SFA’s under MSC certification, in particular the Northern Gulf of St. Lawrence which has a public document associated with its habitat strategy (see [Canadian Science Advisory Secretariat Science Advisory Report 2012/054](#)).

Additionally, related processes to protect Vulnerable Marine Ecosystems within the NAFO Regulatory Area, including draft methodology for impact assessment as well as the development of habitat suitability models indicate that there is more information that should be brought to bear to fully assess the impacts of the Northern Shrimp fishery on sensitive benthic areas. There is an upcoming Canadian Science Advisory Secretariat meeting scheduled for [January 2016](#) to review the data available for delineation of sensitive benthic areas within Canadian waters. We feel that this is a much more transparent process through which Canadian scientists can advise on the extent and vulnerability of sensitive seafloor species, such as corals and sponges, which can inform an industry plan as part of MSC certifications.

It is important that the MSC Certification and meeting of conditions follow good public policy process, and do not set precedents that undermine the implementation of Canadian fisheries management policy.

Thank you for consideration of our input. Please contact us if you have further questions.

Sincerely,



Scott Wallace  
Senior Research Scientist  
David Suzuki Foundation  
SeaChoice Steering Committee



Susanna Fuller  
Marine Conservation Coordinator  
Ecology Action Centre  
SeaChoice Steering Committee

## Response to combined stakeholder submission during 4th surveillance:

It is noted that this letter addresses the 4<sup>th</sup> surveillance audit of the Canadian Northern and Striped Shrimp Fishery. However, the letter arrived on September 9<sup>th</sup> 2015, which was too late to be considered during the 4<sup>th</sup> surveillance audit (the site visit having occurred in the week of June 22<sup>nd</sup> 2015). An e-mail response was provided by Paul Knapman (provided below), who managed the 4<sup>th</sup> surveillance audit process, but because the stakeholder letter was not published previously it is included here for completeness and so that it is available for viewing by all stakeholders.

The letter addresses the adoption by the NSAC of the document ‘A (Partial) Habitat & Ecosystem Strategy for the Northern Shrimp Fishery’; it is requested that the conditions on the first certification of the Canada Northern and Striped Shrimp Fishery covering PIs 2.4.1 – 2.4.3 and 2.5.1 – 2.5.3) not be closed out until the document has been vetted through a public process.

In response, the assessment team notes the comments and points to the scoring text of PI 2.4.1 in this document (P. 169). This states:

*“...the analysis shows that a relatively small proportion of the bottom habitat is contacted by the fishery in a three-year period, leaving large areas untrawled or in recovery from previous trawling. The evidence, in the form of an original analysis, has been reviewed by the NSAC MSC Working Group and adopted by the NSAC in plenary. A score of 90 is assigned. The score would have been higher had the analysis been subjected to independent peer review by specialists in marine benthic habitats and impacts of fishing gear.”*

Essentially, the assessment team accepts that the analysis of impacts would have been stronger had it been peer reviewed by independent experts, but we also note that while there are examples of MSC fisheries making relevant analyses and other documents available for public scrutiny, there are also many other examples where non-peer reviewed evidence is used in scoring a fishery, and the MSC process clearly allows for this approach (see GCB3.2.2, MSC 2013a).

We also highlight the MSC guidance on the scoring for PIs 2.4.1 and 2.5.1 (Table CB18, MSC 2013b):

Table CB18 (MSC 2013b)

Score	Intended probability interpretation
SG60 “unlikely”	There should be no more than a 40% probability that the true status of the component is within the range where there is risk of serious or irreversible harm.
SG80 “highly unlikely”	There should be no more than a 30% probability that the true status of the component is within the range where there is risk of serious or irreversible harm.
SG100 “evidence”	There should be no more than a 20% probability that the true status of the component is within the range where there is risk of serious or irreversible harm.

The team believes the score of 90 for PI 2.4.1 is merited on this basis.

**From:** Paul Knapman <[paul.knapman@acoura.com](mailto:paul.knapman@acoura.com)>  
**Date:** Wednesday, November 11, 2015 at 3:06 PM  
**To:** Scott Wallace <[swallace@davidsuzuki.org](mailto:swallace@davidsuzuki.org)>, Susanna Fuller <[susannadfuller@gmail.com](mailto:susannadfuller@gmail.com)>  
**Subject:** Canada Northern and Striped Shrimp Fishery

Hi Scott and Susanna

I have to apologise for not sending an acknowledgement and response to your letter sent to me dated 9th September associated with the annual audit and recertification of the above fishery.

The letter arrived in the midst of the transfer of Intertek Fisheries Certification (IFC) projects to Acoura Marine and I failed to follow up with you.

I did forward to the audit team when I received it. This was after they had completed the report and it was with the client for review.

It was only very recently that Howard Powles reminded me that you had sent the letter.

While the letter was received outside of the reporting period for undertaking the audit the audit team and I did consider the points you raised. We concluded that the basis on which you were asking the conditions not be closed, (i.e. until the partial habitat and ecosystem strategy had been vetted through a public process as described in DFO Sustainable Fisheries Framework and Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas) was not in conformance with the MSC Certification Requirements.

As you are no doubt aware, CABs are required to use the narrative and metric form of the Performance Indicators and Scoring Guideposts (PISGs) when setting conditions. Furthermore, CABs should not be prescriptive about the means of meeting conditions. This allows the fishery to develop their own corrective actions and deal with a condition in their own way. The important points for the CAB are that the client must demonstrate to the CAB's satisfaction that a condition can be met and how the outcome or result will be, or, has been achieved.

With respect to the audit, the team made the following observation regarding the habitat and ecosystem PIs 2.4 and 2.5:

*We reviewed the most recent draft of "Northern Shrimp Advisory Committee (NSAC) - A (Partial) Habitat and Ecosystem Strategy for the Northern Shrimp Fishery" (CAPP 2015), along with the underlying analyses of the fishery footprint (Spatial analysis 2013). The Partial Strategy was adopted by the NSAC on March 4, 2015 and will be made public as part of the minutes of the meeting. Earlier versions of the document incorporating footprint analyses were considered in previous audit visits and Team comments were summarized in related Annual Surveillance Reports.*

*Following the process outlined in DFO's Ecological Risk Assessment Framework (ERAF) for Coldwater Corals and Sponge Dominated Communities (DFO 2013), CAPP (2015) summarizes the proportion of sensitive and total habitats impacted by trawls in a three-year period (2009-2011). If more than 10% of sensitive habitats is impacted, a further risk analysis is conducted. Although not part of the DFO ERAF, the document summarizes footprint on non-sensitive habitats (i.e. those not characterized as*

*sensitive) as well as on sensitive habitats. If more than 30% of non-sensitive habitats is impacted a further risk analysis is to be conducted.*

*CAPP (2015) concludes that under the current fishing strategy, areas impacted by trawls in the various SFAs are below the threshold values. In SFAs 2-4 and in SFA 7 initial analysis shows that more than 10% of sensitive habitat is impacted, but a more detailed analysis concludes that there is in fact very little overlap between the fishery footprint and identified sensitive areas. In SFA 2-4, industry has undertaken to implement a voluntary fishery closure in an area where the footprint overlaps an identified sensitive area.*

*The Client (CAPP 2015, part H, p. 46) commits to reanalyse the fishery footprint every 5-years to monitor any change in risk level.*

The audit team concluded the following with respect to each habitat and ecosystem PIs:

- *2.4.1 - We find 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. We conclude that Condition Borealis SFA 1: 3 has been met. Accordingly, PI 2.4.1 has been rescored to 100 (Appendix 1) and the Condition is closed.*
- *2.4.2 - Evidence has been provided that shows: A partial strategy is in place such that the fishery is expected to be highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm; there is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or habitats involved; and the partial strategy is being implemented successfully. We conclude that Condition Borealis SFA 1: 4 has been met. Accordingly, PI 2.4.2 has been rescored to 80 (Appendix 1) and the Condition is closed.*
- *2.4.3 - Evidence has been provided that shows: 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). We conclude that Condition Borealis SFA 1: 5 has been met, Accordingly, PI 2.4.3 has been rescored to 80 (Appendix 1) and the Condition is closed.*
- *2.5.1 - Evidence has been provided that shows that: The fishery is highly unlikely to disrupt benthic community structure and function to a point where there would be serious or irreversible harm. We conclude that Condition Borealis SFA 1: 6 has been met, Accordingly, PI 2.5.1 has been rescored to 90 (Appendix 1) and the Condition is closed.*
- *2.5.2 - Evidence has been provided that shows that: there is a partial strategy in place that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem in particular the non-catch impacts on benthic communities - to achieve the Ecosystem Outcome 80 level of performance; the partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems); and the measures comprising the partial strategy are being implemented successfully. We conclude that Condition Borealis SFA 1: 7 has been met, Accordingly, PI 2.5.2 has been rescored to 85 (Appendix 1) and the Condition is closed*
- *2.5.3 - Evidence has been provided that shows that: Sufficient information is available on the impacts of the fishery on benthic communities to allow some of the main consequences for the ecosystem to be inferred; and 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). We conclude that Condition Borealis SFA 1: 8 has been met, Accordingly, PI 2.5.3 has been rescored to 80 (Appendix 1) and the Condition is closed.*

The audit report has recently been published by the MSC. There was a delay in it's publication owing to some back and forth regarding the two conditions that remain open.

Because your letter arrived late it is not recorded in the audit report. It will, however, be inserted in the reassessment report.

Again, I apologise for my oversight for not responding sooner to you letter.

Best regards

Paul

## EAC Letter for new Information Consultation



# Ecology Action Centre

2705 Fern Lane ☐ Halifax ☐ Nova Scotia ☐ Canada ☐ B3K 4L3  
t: 902-429-2202 ☐ f: 902-405-3716 ☐ e: [info@ecologyaction.ca](mailto:info@ecologyaction.ca) ☐ [www.ecologyaction.ca](http://www.ecologyaction.ca)

May 5<sup>th</sup>, 2016

Acoura Marine Ltd.  
[fisheries@acoura.com](mailto:fisheries@acoura.com)

To Whom it May Concern,

Please accept this letter in response to your notification of a new Information Consultation Period opened for the Canada Northern and Striped Shrimp Fishery. We would like to ensure that the assessment team will be reviewing and taking into account the newly available information that was brought to the table at the National Peer Review meeting of the Canadian Science Advisory Secretariat on the *Delineation of Significant Areas of Coldwater Corals and Sponge Dominated Communities in Canada's Atlantic and Eastern Arctic Marine Waters*.

This important meeting was held March 8-10<sup>th</sup>, 2016 in Halifax, Nova Scotia. The Client group for this MSC certification was in attendance, as were we. The meeting introduced new information that should be considered for the current re-assessment of the offshore Northern and Striped Shrimp fishery.

Sincerely,

Dr. Susanna Fuller  
Marine Conservation Coordinator  
Ecology Action Centre

## **Response to EAC Letter for new Information Consultation**

The letter from the EAC highlights that new information was brought to the table at a National Peer Review meeting on the Delineation of Significant Areas of Coldwater Corals and Sponge Dominated Communities in Canada's Atlantic and Eastern Arctic Marine Waters.

In response, the assessment team notes that Isabelle Rondeau at the CSAS was contacted, but no report was available from the meeting in time to be included within the reassessment report. As such, and assuming the fishery is recertified, we look forward to reviewing the new information at the first audit of the CNSSF.

## Appendix 6: Stakeholder submissions at the PCDR

### PCDR Comments – MSC

Date: 18/08/2016

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

Dear Rob Blyth-Skyrme

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

<b>CAB</b>	Acoura Marine
<b>Lead Auditor</b>	Rob Blyth-Skyrme
<b>Fishery Name</b>	Canada northern and striped shrimp
<b>Document Reviewed</b>	Public Comment Draft Report



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1 Snow Hill  
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Ref	Type	Page	Requirement	Reference	Details	PI
20676	Major	123	CR-27.10.6.1 v.1.3	Rationale shall be presented to support the team's conclusion	For UoC 5 the current stock status is reported in the table as 136,000 female SSB, below the TRP of 212,000 female SSB. The rationale in the table simply states the Team's conclusion: "At this time, this is interpreted as fluctuating around the TRP, but with a lower level of certainty. Should this become a longer-term decline, this conclusion should be revisited. A score of 80 is justified." Yet there is no rationale to support that conclusion and its in contrast to Figure 38 which shows a steady decline in biomass over the last several years, and Figure 39 which shows an increase in the exploitation index. What are the factors that lead the team to conclude this is considered fluctuating around?	1.1.1

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www.msc.org						
20677	Major	93-94, 185-186, 130-131	CR-CI3.2.3 v.1.3	CABs shall coordinate their assessments where a fishery under assessment overlaps with a certified fishery to make sure that key assessment products and outcomes are harmonised.	As noted in the PCDR, the West Greenland cold water prawn (WGCWP) fishery scored 90 for PI 3.1.1, while the Canada northern and striped shrimp (CNSS) team have given a score of 75. Although it is noted that the West Greenland team would need to update their PI 3.1.1. score at the next surveillance, it is not clear whether the CNSS team discussed the different score proposed with the WGCWP team in order to come up with a harmonised conclusion that will be adopted by both. It was also noted that WGCWP scored differently on PI 1.2.1 but this PI should be scored at a stock level so harmonisation of outcomes is required.	3.1.1, 1.2.1
20680	Guidance	103	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.	It is not clear when change of ownership first takes place within the fishery.  CoC begins at landing. The report states that "products landed by or purchased by any of the companies from the client group are eligible to enter further chains of custody." It is unclear whether client group members are selling products between themselves, whether other companies are part of the client group and sales activities, and whether this activity is intended to be covered as part of the fishery certificate.	

www.msc.org						
20683	Major	29-30, 133-134	CR-27.10.6 v.1.3	To contribute to the scoring of any PI, the team shall verify that each scoring issue is fully and unambiguously met.	For SFA1 (UoC 1), figures presented suggested that the NAFO advised TAC have been overshoot in a number of years since TACs were originally used so its not clear how available evidence is being used to substantiate this score.	1.2.2

This report is provided for action by the CAB and ASI in order to improve consistency with the MSC scheme requirements; MSC does not review all work products submitted by Conformity Assessment Bodies and this review should not be considered a checking service. If any clarification is required, please contact the relevant FAM for more information.

If you have any questions regarding this response, please do not hesitate to contact the relevant Fisheries Assessment Manager for this fishery.

Marine Stewardship Council  
 cc: Accreditation Services International

## Response to PCDR Comments – MSC

Issue & Page	Details	Assessment Team response
20676 P.123	<p>For UoC 5 the current stock status is reported in the table as 136,000 female SSB, below the TRP of 212,000 female SSB. The rationale in the table simply states the Team's conclusion: "At this time, this is interpreted as fluctuating around the TRP, but with a lower level of certainty. Should this become a longerterm decline, this conclusion should be revisited. A score of 80 is justified." Yet there is no rationale to support that conclusion and its in contrast to Figure 38 which shows a steady decline in biomass over the last several years, and Figure 39 which shows an increase in the exploitation index. What are the factors that lead the team to conclude this is considered fluctuating around?</p>	<p>The same point (asking for clarification of the Team's interpretation that the stock in UoC 5 was fluctuating around the TRP) was raised by Peer Reviewer 2. We provided an explanation of our rationale in the response to the reviewer's point as follows:</p> <p>"... we judge that based on current information (see Figure 40) it can be considered to be fluctuating around the TRP. The stock was above the TRP for 10 years (1999- 2009/10), below for 2, above for 1, and below for 2 (2013/4 and 2014/5). Although the stock has declined to midway within the cautious zone, we judge that there is potential for an increase based on past fluctuations. MSC CR v 1.3 (2.2.2.1) asks for evidence that the stock has been fluctuating around the TRP "for the past few years" and based on the past five, we judge this to be the case."</p> <p>We have modified the text in the certification report at PI 1.1.1 in response to these comments.</p>
20677 P. 93-94, 185-186, 130-131	<p>As noted in the PCDR, the West Greenland cold water prawn (WGCWP) fishery scored 90 for PI 3.1.1, while the Canada northern and striped shrimp (CNSS) team have given a score of 75. Although it is noted that the West Greenland team would need to update their PI 3.1.1. score at the next surveillance, it is not clear whether the CNSS team discussed the different score proposed with the WGCWP team in order to come up with a harmonised conclusion that will be adopted by both. It was also noted that WGCWP scored differently on PI 1.2.1 but this PI should be scored at a stock level so harmonisation of outcomes is required.</p>	<p>The CNSSF assessment team considered there to be insufficient evidence of organised and effective cooperation between the Canadian and Greenland management authorities in order to meet SG80 for Sla; a Condition was therefore set on the CNSSF at this reassessment.</p> <p>In terms of harmonisation, it is noted that the West Greenland fishery was certified under the Fisheries Assessment Methodology (FAM) version of the assessment tree, which was the default standard prior to the introduction of the Certification Requirements v.1.3 default standard assessment tree. The FAM tree did not include the requirement under PI 3.1.1 for 'organised and effective cooperation with other parties where necessary'. Therefore, we do not think there a harmonisation issue for PI 3.1.1. at this point; however, it is expected that harmonisation on PI 3.1.1 would be required at the next assessment of the West Greenland fishery in order to update that assessment to the v.1.3 (or v.2.0) standard – the CAB (Acoura) and the audit team leader for the West Greenland fishery have been consulted and are aware of the issue.</p> <p>For PI 1.2.1, the CNSSF is ahead in the audit schedule and has therefore reported on recent changes first, but the CAB and audit team leader for the West Greenland fishery are aware of the harmonisation issue.</p> <p>We have modified the text in the harmonisation section (Section 4.1) to reflect this.</p>

<p>20680 P.103</p>	<p>It is not clear when change of ownership first takes place within the fishery.</p> <p>CoC begins at landing. The report states that "products landed by or purchased by any of the companies from the client group are eligible to enter further chains of custody." It is unclear whether client group members are selling products between themselves, whether other companies are part of the client group and sales activities, and whether this activity is intended to be covered as part of the fishery certificate.</p>	<p>In the case of the fresh shrimp fishery, the point of sale is at the point of landing.</p> <p>In the case of the frozen-at-sea shrimp fishery, these license holders export most of their product on a delivered basis (to foreign port).</p> <p>We have revised the text in the traceability section (Section 5.2.6) to make the situation with respect to ownership and landings clearer.</p>
<p>20683 P.29-30, 133-134</p>	<p>For SFA1 (UoC 1), figures presented suggested that the NAFO advised TAC have been overshot in a number of years since TACs were originally used so its not clear how available evidence is being used to substantiate this score.</p>	<p>The excess of harvest levels over the NAFO-advised TAC in the past 5 years have primarily been due to (1) recent coming into effect of a new harvest control rule in Greenland (2) a "TAC-smoothing" clause in the Greenland harvest control rule under which TACs should change by a maximum of 12.5% from year to year. Although Greenland adopts the NAFO SC advised TAC level as the basis for setting its TACs, under conditions of stock decline, this clause means that the adopted TAC may be above the NAFO-advised TAC in a given year.</p> <p>The recent harvest levels have been due to actions in Greenland as catches in the Canadian part of the west Greenland fishery have been very low for the past 5 years (2011 - 1,330 t; 2012-2015, less than 100 t).</p> <p>The difference between total catch and NAFO SC-advised level has been declining over recent years, as the Greenland HCR has come into effect - from 26,000t (29%) in 2012 to 5,000 t (8%) in 2015. This is as would be expected, as the HCR with its smoothing rule comes into effect.</p> <p>Kingsley (2016) in an unpublished analysis in support of the 3rd annual audit of the Greenland part of the west Greenland shrimp fishery, conducted a retrospective analysis of fishery performance relative to MSY for the years 2009-2015. He concluded that, even in light of harvest levels above those advised by NAFO SC, the stock had experienced mortality less than the MSY level, and biomass greater than the MSY level over this period. The main reason for this is that the protocol underlying the NAFO SC advice is based is quite cautious.</p> <p>We have revised the text in PI 1.2.2, Slc to clarify this situation.</p>

## Appendix 7: Surveillance frequency

**Table 24: Fishery surveillance plan**

Score from Table 25	Surveillance Category	Year 1	Year 2	Year 3	Year 4
5	Normal Surveillance	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit & recertification site visit

Source: Acoura Marine Ltd assessment team

### Rationale for determining surveillance score

**Table 25: Surveillance Score for the Fishery**

Criteria	Surveillance Score	CNSSF
<b>1. Default Assessment Tree</b>		
Yes	0	0
No	2	-
<b>2. Number of Conditions</b>		
Zero Conditions	0	-
1-5 Conditions	1	1
>5 Conditions	2	-
<b>3. Principle Level Scores</b>		
≥ 85	0	-
<85	2	2
<b>4. Conditions on outcome PIs?</b>		
Yes	2	2
No	0	-
<b>Total score</b>		<b>5</b>

**Table 26: MSC fishery surveillance levels**

Surveillance score	Surveillance level	Years after certification or re-certification				
		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 visit	
1	Remote surveillance	Option 1	Off-site surveillance audit	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit & recertification visit
		Option 2	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit	
0	Reduced surveillance	Review new information	On-site surveillance audit	Review new information	On-site surveillance audit & recertification visit	

## Appendix 8: Offshore shrimp licence holders and vessel operators

Year Issued	# of Licences	Held By	Quota Fished by (vessel)	Vessel Owner
1978	2	Labrador Fishermen's Union Shrimp Co. Ltd.	Northern Eagle/ Labrador Storm	M.V. Osprey Ltd., North Sydney, N.S.
1978	1	Ocean Choice International Inc., St. John's, NL	Newfoundland Lynx	Ocean Choice International Inc., St. John's, NL
1978	1	Ocean Choice International Inc., St. John's, NL	Katsheshuk II	Ocean Choice Seafood Inc., St. John's, NL
1978	1	Mersey Seafoods Ltd., Liverpool, NS	Mersey Venture/ Mersey Phoenix	Mersey Seafoods Ltd., Liverpool, NS
1978	1	Mersey Seafoods Ltd., Liverpool, NS (since 1982)	Mersey Venture/ Mersey Phoenix	Mersey Seafoods Ltd., Liverpool, NS
1978	1	Lameque Offshore Limited (New Brunswick) but leased to M.V. Osprey Ltd (since 1985)	Northern Eagle	M.V. Osprey Ltd., North Sydney N.S.
1978	1	Crevettes Nordiques, Bedford, NS	Atlantic Enterprise	Clearwater Seafoods Limited Partnership., Bedford, NS
1978	1	Atlantic Shrimp Co. Ltd., Lunenburg, NS	Atlantic Enterprise/ Arctic Endurance	Clearwater Ocean Prawns Joint Venture, Lunenburg, NS
1978	1	Torngat Fish Producers Coop Society Ltd., Labrador	Mersey Phoenix Mersey Venture	Mersey Seafoods Ltd., Liverpool, NS
1978	1	Caramer Ltd., Caraquet, NB	Acadienne Gale II	Davis Strait Mgt. Ltd., Halifax, NS
1979	1	Makivik Corp, Lachine, Quebec	Newfound Pioneer	Newfoundland Resources
1987	1	Pikalujak Fisheries Ltd., Labrador	Ocean Prawns	Ocean Prawns Canada Ltd.
1987	1	Qikiqtaaluk Corporation, Iqaluit, NU	Saputi	Qikiqtaaluk Corporation
1987	1	Harbour Grace Shrimp Co., Harbour Grace, NL	Ocean Prawns	Ocean Prawns Canada Ltd.
1987	1	Unaaq Fisheries Inc., Kuujuaq, Quebec	Arctic Endurance	Clearwater Seafoods Limited Partnership, Bedford, NS
1991	1	Newfound Resources Ltd., St. John's, NL	Newfound Pioneer	Newfound Resources Ltd., St. John's, NL

## Appendix 9: Letter of support from DFO



Fisheries and Oceans  
Canada

Pêches et Océans  
Canada

JUN 22 2016

Mr. Bruce Chapman  
Canadian Association of Prawn Producers  
1362 Revell Drive  
Manulick, Ontario  
K4M 1K8  
bchapman@sympatico.ca

Dear Mr. Chapman,

At the request of the Canadian Association of Prawn Producers (CAPP), Fisheries and Oceans Canada (DFO) has reviewed the *Canada Northern and Striped Shrimp Fishery Preliminary Draft Report and the associated draft Client Action Plan for MSC Re-Certification of the Canadian Offshore Shrimp Fishery*.

Within the activities of our departmental mandate, DFO commits to assist CAPP in completing the conditions required for certification as outlined in the Action Plan. We will provide advice and/or guidance as appropriate in your fulfilment of activities in the Action Plan and collaborate, as necessary, on those elements requiring departmental oversight.

Specifically, I would like to bring to your attention to Condition 1.1.2. Science has indicated that it may be difficult to accomplish given the need for a reliable female SSB index in SFA 4. DFO Science will continue to explore the data from SFA 4, and surrounding areas, in an attempt to establish an acceptable SSB index for SFA 4. Additional survey years as well as new DFO staff may provide insight into the problem. Therefore, the wording for Year 4 of the Action Plan could be revised accordingly: *"A DFO Science ZAP (Zonal Assessment Process) will be convened during which potential limit reference points may be discussed. If successful and accepted, a subsequent NSAC meeting will recommend target reference points."*

In closing, DFO supports industry initiatives on eco-certification. Please contact me or my staff on any future endeavours that require departmental expertise and/or participation.

Sincerely,

Sylvie Lapointe  
Director General  
Fisheries Resource Management

## **Appendix 10: Client agreement to PCR**

Acoura Marine Ltd. confirms that the client has reviewed the Public Certification Report and is in full agreement with the terms of certification detailed therein.

## Appendix 11: Objections process

No objections were received.