



INTERTEK FISHERIES CERTIFICATION (IFC)

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**Canadian Scotian Shelf Northern Prawn Trawl Fishery
Shrimp Fishing Areas 13, 14, 15**

PUBLIC CERTIFICATION REPORT

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Glossary

ACAG	Association des Crevettiers Acadiens du Golfe
ACMSA	Atlantic Canadian Mobile Shrimp Association
AOI	Areas of Interest (candidate areas for protection)
ASP	Association of Seafood Producers
B _{MSY}	Biomass supporting Maximum Sustainable Yield
C&P	DFO Conservation and Protection Branch
CIL	Cold Intermediate Layer
CoC	MSC Chain of Custody Certification
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPUE	Catch Per Unit Effort
DFO	Department of Fisheries and Oceans (Canada)
DMP	Dockside Monitoring Program
EBSA	Ecologically and Biologically Significant Areas
EEZ	Exclusive Economic Zone
ESS	Eastern Scotian Shelf
ESSIM	Eastern Scotian Shelf Integrated Management Initiative
ETP	Endangered, Threatened, Protected species
F	Fishing mortality
F _{MSY}	Fishing mortality at Maximum Sustainable Yield
FAM	MSC Fisheries Assessment Methodology
GSL	Gulf of St. Lawrence
IFMP	Integrated Fisheries Management Plan
ITQ	Individual Transferrable Quota
LOA	Length Overall
LRP	Limit Reference Point
MPA	Marine Protected Area
MSC	Marine Stewardship Council
MSC CR	Marine Stewardship Council Certification Requirements
MSE	Management Strategy Evaluation
MSY	Maximum Sustainable Yield
P1	MSC Principle 1
P2	MSC Principle 2
P3	MSC Principle 3
PI	Performance Indicator
SARA	Species at Risk Act
SFA	Shrimp Fishing Area
SFF	Sustainable Fisheries Framework
SG	Scoring Guidepost
SSB	Spawning Stock Biomass
SSSAC	Eastern Scotian Shelf Shrimp Advisory Committee
SSSIFMP	Scotian Shelf Shrimp Integrated Fishery Management Plan
TAC	Total Allowable Catch
TRP	Target Reference Point
URP	Upper Reference Point
USR	Upper Stock Reference (synonymous with URP)
VPA	Virtual Population Analysis
Y/R	Yield per Recruit

1. Executive Summary

The Canadian Scotian Shelf Northern Prawn Trawl Fishery was initially certified to the MSC sustainable fishery standard by Moody Marine Ltd in 2008 (under the fishery name – Canadian Northern Prawn Trawl Fishery – Shrimp Fishing Areas 13, 14, 15). This is the first re-certification of this fishery, the initial certification validity period was from 5 August 2008 to 4 August 2013. In keeping with current MSC certification requirements, Intertek Moody Marine Ltd announced the re-certification assessment coincidently with the fourth annual surveillance audit cycle. The fishery re-assessment, client sharing agreement and assessment team nomination was announced on 18 September 2012. The re-certification assessment team of Mr Don Parsons (Principle 1), Dr Howard Powles (Principle 2), Dr Colin Bannister (Principle 3) and Mr Steven Devitt (Lead Auditor) was confirmed on 4 October 2012. The team announced its intention to use the MSC default assessment tree, as defined in the MSC Certification Requirements (MSC CR), version 1.2 (January 2012), on 9 October 2012. The site visit meetings were conducted in Dartmouth, Nova Scotia from 13 – 15 November 2012.

Species: Northern Prawn/Northern Shrimp *Pandalus borealis*
Geographical Area: Eastern Scotian Shelf in Shrimp Fishing Areas (SFA) 13, 14, 15
Method of Capture: Otter Trawl only
Management System: DFO led management, through Dartmouth, Nova Scotia, supported by an Advisory Committee
Client Group: Association of Seafood Producer (ASP) members:

- Barry Group Inc.
- Ocean Choice International L.P.
- Notre Dame Seafoods Inc.
- Nu Sea Products Inc. (BGI)
- Northern Shrimp Ltd (OCI)
- St. Anthony Seafoods Limited Partnership (Clearwater).

The assessment was undertaken in accordance with the MSC Certification Requirements (v. 1.2, January 10th, 2012) and using the MSC Guidance to MSC Certification Requirements (v. 1.0, August 15, 2011) which sets out the assessment and certification process. As a result, to date, the following steps have been undertaken:

- Announcement of the assessment
- Appointment of the recertification assessment team
- Notification on the use of the assessment tree
- Notification and undertaking of the site visit
- Production of the client draft report that describes the background to the fishery, the fishery management operation and the evaluation procedure and results.
- Production of the Public Comment Draft Report
- Production of the Final Certification Report
- Production of the Public Certification Report.

The following strengths and weaknesses were identified with respect to each MSC Principle:

Principle 1

Strengths:

- The stock is considered healthy. The spawning stock biomass (SSB) has been in the healthy zone, above the upper reference point (URP), for several years and the reference removal has been less than 20% SSB since 2000.
- There is a precautionary, reference point framework in place that provides the basis for harvest control rules.
- There is a comprehensive Integrated Fisheries Management Plan (IFMP) containing a harvest strategy that is responsive to the state of the stock.

Weaknesses:

- Point (mean) estimates of SSB from annual surveys are used to assess stock status relative to reference points. Confidence intervals for survey catch per unit effort (CPUE) are frequently wide and variable, creating some uncertainty in the true status.
- Fishery management decisions are supported by research on stock dynamics but there is a limited understanding of the factors that control recruitment to the fishable stock, and of the likelihood of a reversal of the ecological regime that currently favours shrimp biomass compared to groundfish.
- The future of the the annual DFO-Industry survey, critical to the assessment process, is uncertain.

Principle 2

Strengths:

- There has been considerable recent work in the fishery area (as in Canadian waters in general) to identify areas of sensitive benthic habitat, and several sensitive areas near the fishery area are in the process of receiving protection.
- Bycatch in the fishery is very low due to use of the Nordmore grate, to the gear configuration, and to accurate targeting of the target species by fishermen, and as a result the fishery has no significant impact on populations of bycatch species.
- No ETP species are affected by the fishery.

Weaknesses:

- No documentation is available regarding an analysis of the need for strategies to protect habitats and benthic biodiversity from fishery impacts, and no such strategies are in place

Principle 3

Strengths:

- The management system is consistent with a comprehensive national and regional legal and policy framework for managing fisheries and ecosystems, and achieving in the long term integrated ocean management at the regional level.
- There is a comprehensive integrated fisheries management plan that clearly defines the long term and fishery specific objectives, and that describes the strategies and tactics for achieving them, based on the precautionary approach, and scientific advice.

- Roles and responsibilities in DFO Maritimes are clearly defined, and there is a high degree of consultation between managers and stakeholders through the Advisory Committee, such that decision making is transparent, and there are no ongoing or recurrent disputes.
- The fishery is well regulated by a limited entry licensing system, resource sharing agreements between fleets, an annual TAC based on scientific advice, the allocation of ITQs to licence holders in the trawl fishery, and technical measures regulating selectivity of the trawl gear.
- The allocation system is derived from historic rights, adapted to meet obligations to Aboriginal Communities.
- Compliance and Protection officers have a high degree of confidence that the level of compliance is high and that there is no evidence of systematic non-compliance

Weaknesses:

- The fishery is currently well supported by research on the state of the stock, but there is concern and uncertainty about the continuity of funding for the stock survey, which is a key component of the stock assessment and hence of advice on the TAC.
- It is arguable that the level of enforcement and surveillance is relatively low.
- In connection with biodiversity objectives, significant research has been carried out on the distribution and abundance of sensitive benthic species in the Maritimes, but at present there does not appear to be a systematic research plan for this work.
- There are regular reviews of the science and the advice as part of the Canadian Regional Advisory Process, but there does not appear to be any formal mechanism to ensure that the management system in the Maritimes is reviewed by experts from outside Canada or the Maritimes region.

Based on the information available to date, the Canadian Scotian Shelf Northern Prawn Trawl Fishery achieved overall scores of 90.0 for Principle 1, 87.7 for Principle 2 and 92.9 for Principle 3. As such, it is recommended that the fishery be recertified against the MSC Standard, as no indicator scored less than 60, and all overall principle scores were above 80.

Three conditions of certification were placed on the fishery for performance indicators (PIs) 2.4.2 (Habitat Management Strategy), 2.5.2 (Ecosystem Management Strategy) and 3.2.4 (Research Plan). The conditions and milestones are detailed in Appendix 1.2 of this report.

The Actual Eligibility Date for this fishery will be the date of certification. As a result of the extended period of assessment, there will be a period of time, extending from 31 October 2013 to date of actual recertification, when the fishery will not be covered by a valid fishery certificate. Client group members and businesses within the chain of custody for this fishery should recognize that product captured during this period will not be eligible to be labelled as MSC certified product.

Following the mandatory 15 day objection period, no objections were lodged against the Final Draft Report, hence this Public Certification Report confirms the determination to certify the fishery.

Comments were received from the Sierra Club of Canada by the MSC during the 15 working days within which an objection could be lodged. MSC confirmed that the comments were not associated with a formal objection to the determination and, as such, did not have a bearing on the final determination to certify the fishery.

Intertek Moody Marine Ltd changed its name to Intertek Fisheries Certification (IFC) during the Final Report stage of this assessment. Therefore, this Public Certification Report bears the new company name.

2. Authorship and Peer Reviewers

Assessment Team

The Canadian Scotian Shelf Northern Prawn Trawl Fishery recertification assessment team consisted of four individuals: Don Parsons (Principle 1 Expert Assessor), Howard Powles (Principle 2 Expert Assessor), Colin Bannister (Principle 3 Expert Assessor) and Steven Devitt (Associate Lead Assessor).

Don Parsons, M.Sc. - Principle 1 Expert Assessor - Don is a retired research scientist of Fisheries and Oceans Canada, Newfoundland Region. He was the Principle Scientific Investigator for the biology, ecology and population dynamics of northern and striped shrimp (*Pandalus borealis* and *P. montagui*) and fisheries research in the Newfoundland and Labrador Region from 1978 to 2005. He has been a member of the International Commission for the Exploration of the Sea (ICES) *Pandalus* Working Group and a designated expert for the Scientific Council of the Northwest Atlantic Fisheries Organization (NAFO). He also served as the scientific advisor for the Northern Shrimp Advisory Committee (NSAC) in eastern Canada. Don has represented Canada at various other international fora on *Pandalus* species and has published extensively on the biology and population dynamics of northern shrimp. Since retirement, he has been a team member for MSC fisheries assessments of Pandalid shrimp (Principles 1 and 2), participated in the preparation of MSC pre-assessments and conducted MSC peer reviews.

Howard Powles, Ph.D. - Principle 2 Expert Assessor - 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, with an ongoing interest in crustacean resources. As Director of Fisheries Science and of Biodiversity Science (1998-2004) at Canada's Department of Fisheries and Oceans Headquarters he was active in developing ecosystem-based approaches to ocean management, in particular approaches based on defining ecosystem objectives and indicators, and led a review of the Department's stock assessment program. Howard is/has been a member of MSC assessment teams for three *Pandalus* fisheries, two American lobster fisheries and a snowcrab fishery.

Colin Bannister, Ph.D. - Principle 3 Expert Assessor - Colin is the former Head of the Shellfish Resource Group at Lowestoft in the UK and from 2001 until retirement in 2004 was the Senior Fisheries Science Advisor at the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) providing high level advice to the UK government's Department of Environment, Food and Rural Affairs (DEFRA) and the fishing industry on all aspects of the assessment and management of finfish stocks. He has extensive knowledge and experience of the management of wild shellfish stocks, both crustacean and molluscan, and of scientific research and advice on the same. He has been a scientific member of the Canadian Review Panel for the Snow Crab fishery in the Gulf Region of Canada, and is a member of the Committees and Council of the Shellfish Association of Great Britain, for whom he writes and advises on shellfish management. He is/has been a team member on a number of MSC assessments and undertaken MSC peer reviews for other fishery certifications.

Steve Devitt, B.Sc. – Associate Lead Assessor - Steve Devitt is an Associate Auditor with Intertek Moody Marine Ltd. in Dartmouth, Nova Scotia. Formerly, he was the Operations Manager and Lead Auditor for TAVEL Certification Inc. from 2000 until sold to Moody Marine in 2009. His principle responsibilities include management of the project, verification of proper MSC Fisheries Certification Methodology (FCM) procedural implementation during

the full assessment, preparation of report and client contact. Mr Devitt brings a broad environmental and fisheries background to the project, he is a trained ISO 14000 lead auditor. He worked for 10 years in the environmental services industry in various capacities including Project Manager, Aquatic Scientist and Operations Manager at four different Atlantic Canadian environmental consulting companies. Mr Devitt has participated in over 30 MSC pre-assessments and 10 MSC full certification assessments, as well he has conducted over 50 MSC Chain of Custody audits for fishing companies, seafood processors, value added processors, brokerage companies. He has also conducted Group COC audits for seafood processors and retailers.

Peer Reviewers

Julian Addison, Ph.D. – Peer Reviewer - Dr Julian Addison is an independent fisheries consultant with 30 years' experience of stock assessment and provision of management advice on shellfish fisheries, and a background of scientific research on crustacean biology and population dynamics and inshore fisheries. Until December 2010 he worked at the Centre for Environment, Fisheries and Aquaculture Science (Cefas) in Lowestoft, England where he was Senior Shellfish Advisor to Government policy makers, which involved working closely with marine managers, legislators and stakeholders, Government Statutory Nature Conservation Organisations and environmental NGOs. He has also worked as a visiting scientist at DFO in Halifax, Nova Scotia and at NMFS in Woods Hole, Massachusetts where he experienced shellfish management approaches in North America. For four years he was a member of the Scientific Committee and the UK delegation to the International Whaling Commission providing scientific advice to the UK Commissioner. He has worked extensively with ICES and was Chair of the Working Group on the Biology and Life History of Crabs, a member of the Working Group on Crangon Fisheries and Life History and a member of the Steering Group on Ecosystems Function. He has recently completed or is currently undertaking MSC full assessments for the Newfoundland and Labrador snow crab fishery, the Ireland and Northern Ireland bottom grown mussel fisheries, and Estonia and Faroe Islands Barents Sea cold water prawn fisheries. He is also currently undertaking various MSC pre-assessments and has carried out peer reviews of MSC assessments in both Europe and North America of lobster, cold water prawn, razorfish, cockle and scallop fisheries. Other recent work includes a review of the stock assessment model for blue crabs in Chesapeake Bay, USA, and an assessment of three Alaskan crab fisheries under the FAO-based Responsible Fisheries Management scheme.

Jerry Ennis, Ph.D. – Peer Reviewer - Following undergraduate and graduate degrees at Memorial University of Newfoundland in the 1960s, Dr. Ennis completed a Ph.D. in marine biology at the University of Liverpool in the early 1970s. He retired in 2005 following a 37-year research career with the Science Branch of the Department of Fisheries and Oceans. He has produced an extensive list of scientific/technical reports and journal articles (40 in the primary, peer reviewed literature) focused primarily on lobster fishery and population biology and on various aspects of larval, juvenile and adult lobster behavior and ecology in Newfoundland waters. Dr. Ennis was Head of Shellfish Section for 27 years, in which capacity he oversaw research projects lead by 4-5 other scientists focused primarily on fisheries management related research on northern shrimp, snow crab, scallops, squid and other shellfish throughout the Newfoundland-Labrador area of the Northwest Atlantic. Throughout his career, Dr. Ennis was heavily involved in the review and formulation of scientific advice for management of shellfish in Atlantic Canada as well as the advisory/consultative part of managing the Newfoundland lobster fishery.

In retirement, Dr. Ennis has published several articles aimed at presenting fishery science primarily to harvesters but to other interested parties as well. For several years he served as rapporteur for annual stock assessments of shellfish resources in the Newfoundland-Labrador area and has participated in MSC certification projects for several Atlantic Canada fisheries as assessor for pre-assessments, team member for a full assessment and as peer reviewer.

3. Description of the Fishery

3.1 Unit(s) of Certification and scope of certification sought

The MSC Certification Requirements, Section 27.4.4 state that in order for a fishery to be eligible for certification, it must be in conformity with Principle 3, Criterion A1 and Principle 3, Criterion B14:

- Principle 3, Criterion A1: A fishery shall not be conducted under a controversial unilateral exemption to an international agreement
- Principle 3, Criterion B14: Fishing operation shall not use destructive fishing practices such as fishing with poisons or explosives.

The assessment team and IMM have confirmed that the Scotian Shelf Northern Prawn Trawl Fishery conforms to these criteria.

The MSC Guidelines to Certifiers specify that the unit of certification is "*The fishery or fish stock (=biologically distinct unit) combined with the fishing method/gear and practice (=vessel(s) pursuing the fish of that stock) and management framework.*" The fishery proposed for certification is therefore defined as:

Species: Northern Prawn/ Northern Shrimp (*Pandalus borealis*)
Geographical Area: Eastern Scotian Shelf in Shrimp Fishing Areas (SFA) 13, 14, 15
Method of Capture: Otter Trawl only
Management System: DFO led management, through Dartmouth, Nova Scotia, supported by an Advisory Committee
Client Group: Association of Seafood Producer (ASP) Members

The rationale for choosing this unit of certification is based on the client's interest for having these three shrimp fishing areas (SFAs) certified, where its membership currently procures raw materials for supplying certified product. The definition of the unit of certification is supported by the current Fisheries and Oceans Canada (DFO) management and stock assessment activities for these three SFAs.

3.1.1 Scope of Assessment in Relation to Enhanced Fisheries

This fishery is conducted on a wild stock, MSC certification requirements with relation to enhanced fisheries do not apply.

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

This fishery is conducted on a wild stock, MSC certification requirements with relation to introduced species based fisheries do not apply.

3.2 Overview of the fishery

The history of bottom trawling for northern shrimp (*P. borealis*) comprises an historical phase from the mid-1960s to the mid-1970s, a developmental phase up to the 1990s, and an expansion phase from the late 1990s to the present day.

In the historical phase, northern shrimp fishing began in the mid-1960s in the Sept-Iles (Quebec) area of the Gulf of St Lawrence, and off south west Nova Scotia, but by 1977 the latter fishery had collapsed. (DFO/2006-1140: Scotian Shelf Shrimp Integrated Fisheries Management Plan 207-2011).

In the development phase from the mid-1970s, fisheries developed in the Gulf, north of Anticosti Island (SFAs 9 and 8), and on the eastern Scotian Shelf (SFAs 13-16), but the main development occurred further north when vessels from Newfoundland discovered shrimp concentrations along the Labrador coast in Hawke Channel (SFA 6), Hopedale and Cartwright Channels (SFA 5), as well as north to Davis Strait (SFAs 4 to 1) when ice conditions permitted. Limited entry licensing and TACs were introduced and developed from 1978. Initially, developments were constrained by weak markets and the problem of meeting permitted groundfish by-catch limits, but after 1986 markets improved, and the groundfish by-catch issue was significantly reduced by the voluntary introduction in of the Nordmore groundfish separator grate. The grate became mandatory in the Scotian Shelf area in 1991 (DFO 2007a, 2007b).

In the mid-1990's, a major expansion in the shrimp fishery was facilitated by an increase in shrimp biomass, which appears to have followed the decline in groundfish abundance (Worm & Myers, 2003). TACs in many Atlantic Canadian SFAs were increased stepwise in line with the natural increase in shrimp stocks, allowing more fishing effort and landings by traditional licence holders, but also new allocations to be made in some areas to new temporary licence holders, some of whom have since been made permanent.

The increase in landings was moderate in the eastern Scotian Shelf fishery, where the total TAC allocated to SFAs 13-15 has been in the range 2,000-5,000 t since 1982 (Hardie *et al*, 2011). Following these developments, the Canadian fishery for *P. borealis* has become the primary cold water shrimp resources in the North Atlantic. Table 1 displays the total allowable catches and catches for the period of 1990 to 2012 for the mobile and fixed gear commercial shrimp fisheries in SFAs 13, 14 and 15.

Table 1: Scotian Shelf mobile and fixed gear shrimp landings from SFAs 13-15 between 1990 - 2012

Scotian Shelf Trawl & Trap Gear Shrimp Landings From SFAs 13-15 between 1990 -2005				
	Trawl Fishery		Trap Fishery	
Year	Quota*	Catch	Quota*	Catch
1990	0	50		
1991	2580	810		
1992	2580	1850		
1993	2650	2044		
1994	3100	3073		
1995	3100	3171*		27
1996	3170	3173*		187
1997**	3600	3574		222
1998	3800	3779		131
1999**	4800	4702	200	149
2000	5072	5006	200	201
2001	4711	4505	300	263
2002	2700	2699	300	244
2003	2700	2589	300	157
2004	3300	3134	200	96

Scotian Shelf Trawl & Trap Gear Shrimp Landings From SFAs 13-15 between 1990 -2005				
2005	4618	3635	392	9
2006	4618	3980	392	32
2007	4600	4654	200	4
2008	4600	4317	100	4
2009	3220	3311	25	2
2010	4600	4580	400	2
2011	4232	4247	368	111
2012	3864	3495	336	200

Source for Quota & Catch: Canadian Atlantic Quota Report, 1990 -1997, 2000-2012

* Quota unadjusted for quota transfers

**Includes Science quota

Note: Represents the total harvest, and landed value as a blended value, for both the Gulf-based and the Scotia-Fundy based mobile gear fleets

3.2.1 Shrimp Fishing and Fleets

Shrimp Fishing

The expansion in the shrimp fishery has allowed the consolidation of nationally regulated otter trawl fisheries for shrimp in the Gulf of St Lawrence, eastern Scotian Shelf, Newfoundland-Labrador-Davis Strait, and in the international fishing areas east of the Grand Banks. The catch is predominantly *P. borealis*, with some by-catches of *P. montagui*, especially in SFAs 2, 3 and 4. In addition to otter trawling, traps are used in Chedabucto Bay in SFA 15. For clarification, this gear component is not included in the unit of certification.

The wide distribution of shrimp fishing occurs because shrimp are abundant over a vast area from 44°N (southern Nova Scotia) to 75°N (Baffin Island), principally over soft muddy bottoms in water temperatures ranging from -1.5 to +6°C and depths from 150 to 600 m all along the edge of the continental shelf. Because of high fishing costs and relatively low prices, shrimp fishers search out areas with the largest *P. borealis* and the highest catch rates, mainly in depths from 200-400 m. Large shrimp tend to be females that have previously spent several years (1 – 4) as males prior to transitioning to females.

Shrimp trawlers work the muddy bottoms using otter trawls with a minimum mesh size of 40 mm, and fitted with a Nordmore separator grate. Shrimp pass through the grate, but groundfish are directed upwards towards an exit triangle in the upper panel. Use of a 25mm spacing, Nordmore grate is mandatory in all fishing areas. Fishers fit either bobbins or rubber discs to the groundrope, which is linked to the leading lower edge of the net by vertical toggle chains. The latter enables the net to 'fly' clear of the bottom so that flatfish disturbed by the groundrope can pass below the net entrance. This does not seem to affect the catchability of the net for shrimp, which seem to be less closely associated with the bottom than in, for example, the Barents Sea. In recent years various adjustments have been made to doors, bridles, and the net in order to improve hydrodynamics and fuel efficiency, based on work in the flume tank at the Marine Institute, St John's, Newfoundland (Winger, pers comm.). This includes the adoption of square mesh panels. The shrimp fishery is served by 5 net makers in Newfoundland and 5 in Nova Scotia. Fishers generally fish all day round, but catch rates are usually lowest at night and highest during the day.

The fleets

The principal Canadian trawling fleets are the offshore and inshore fleets. The offshore fleet is not part of this unit of certification and are not described further herein.

The Scotian Shelf inshore mobile fleet comprises 28 licences based in Scotia-Fundy region, most <65 feet in length overall (LOA). An additional 14 licences, based in the Gulf region on vessels 65 – 100 feet LOA are also permitted in SFAs 13 - 15. The fishery is limited entry, all mobile licenses have been operating under an individual transferable quota (ITQ) system since 1998.

Vessels fish the Louisbourg, Misaine and Canso ‘holes’ in SFAs 13, 14, 15. A further 14 Scotia-Fundy mobile gear licenses are allocated to SFA 16 in southwest Nova Scotia but these are largely inactive owing to low shrimp abundance in that area. Fishing is allowed throughout the calendar year, but occurs mainly in spring and fall because of weather constraints and the summer soft-shelled post moulting period.

In addition to the mobile gear trawl fleet, there are 14 shrimp trap licenses issued to prosecute a fishery in Chedabucto Bay. These licenses competitively share the 8% overall quota allocated to them. These licenses and the trap gear are not part of the unit of certification.

3.3 Principle One: Target Species Background

3.3.1 Fishery Resource and Life History

Shrimp occur throughout the Scotian shelf but concentrate in commercial quantities in deep depressions or “holes,” on the eastern shelf (Figure 1) - Louisbourg Hole (SFA 13), Misaine Hole (SFA 14) and Canso Hole (SFA 15). Areas of highest concentrations within and between SFAs vary from year to year.

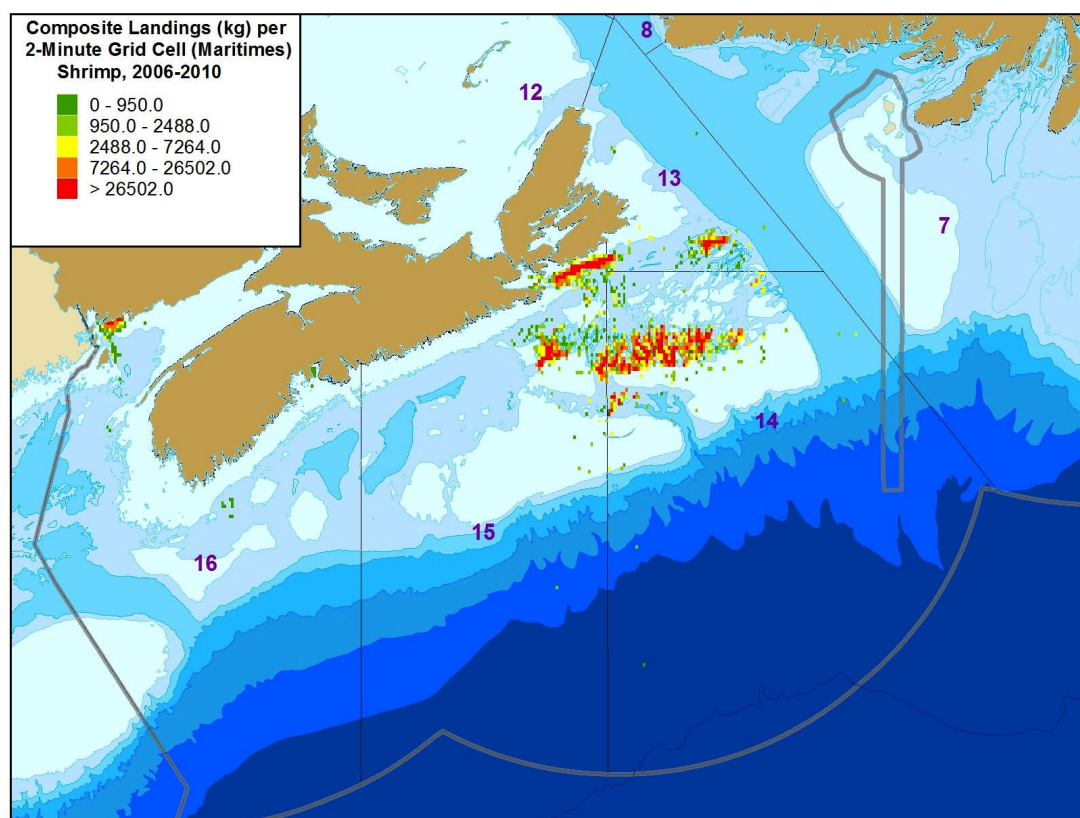


Figure 1: Five year composite (2006 – 2010) of Shrimp trawl and trap landings from Shrimp Fishing Areas 13, 14, 15. (Source: DFO, 2013).

Northern shrimp (*Pandalus borealis* Kröyer 1838) have a discontinuous, circumboreal distribution and occur in the Northwest Atlantic from Davis Strait to the Gulf of Maine. They are usually found in areas with soft, muddy sediment and where temperature ranges from about 1 to 6 °C. Northern shrimp are protandrous hermaphrodites - they mature as males about age 2, mate for two or three years before changing sex and spending the rest of their lives as females. They spawn in autumn and females carry eggs until April-May when the larvae are hatched. The pelagic larvae go through several stages over a period of months before settling to the ocean floor. During day time, shrimp feed on or near the bottom whereas, at night, they can migrate vertically and feed on zooplankton. Shrimp are important prey for several species such as cod, Greenland halibut, skates and wolffish as well as harp seals (from MML, 2008).

Recent DFO Science Advisory Reports (e.g. DFO 2012a) provide a description of the biology of shrimp on the Scotian Shelf. *"The Northern or Pink Shrimp, Pandalus borealis, is the only shrimp species of commercial importance in the Maritimes Region. Shrimp are crustaceans that have a hard outer shell, which they must periodically shed (molt) in order to grow. Females generally produce eggs once a year (not more) in the late summer-fall and carry them, attached to their abdomen until the spring, when they hatch. Consequently, shrimp bear eggs, (i.e., are "ovigerous") for about 8 months of the year. Newly hatched shrimp spend 3 to 4 months as pelagic larvae, feeding near the surface. At the end of this period they move to the bottom and take up the life style of the adults. On the Scotian Shelf, the Northern Shrimp first matures as a male at age 2, and generally changes sex at age 4, to spend another 1 to 2 years as a female. They generally live up to 8 years, depending on current environmental conditions and population dynamics. Shrimp concentrate in deep "holes" (>100 fathoms) on the Eastern Scotian Shelf, but nearshore concentrations along the coastline were discovered in 1995 by the DFO-Industry survey. In general, Northern Shrimp prefer temperatures of 2-6°C, and a soft, muddy bottom with a high organic content."*

3.3.2 Stock Status

Reference Points

A "Fishery Decision-Making Framework Incorporating the Precautionary Approach" (see URL:<http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm>) was adopted as part of DFO's Sustainable Fisheries Framework (SFF) initiative (see URL: <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm>). The main components of the former include: reference points and stock status zones (Healthy, Cautious and Critical); harvest strategy and harvest decision rules; and the need to take into account uncertainty and risk when developing reference points and developing and implementing decision rules. Following, is a summary of the decision framework.

The stock status zones are created by defining the Limit Reference Point (LRP) at the Critical:Cautious zone boundary, and an Upper Stock Reference Point (USR) at the Cautious:Healthy zone boundary and the Removal Reference for each of the three zones (Figure 2). The LRP, the stock status below which serious harm is occurring, is based on biological criteria and established by Science through a peer reviewed process. The USR is the stock size below which removals must be reduced to avoid reaching the LRP. The USR, is set at a safe distance above the LRP to facilitate effective management actions when the stock is in decline. Moreover, 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.

The Removal Reference is the maximum acceptable removal rate, normally expressed in terms of fishing mortality (F) or harvest rate. The Removal Reference must be less than or equal to the removal rate associated with maximum sustainable yield. In the Cautious zone, the adjustment of the Removal Reference requires a progressive (linear or otherwise) reduction in removal rate.

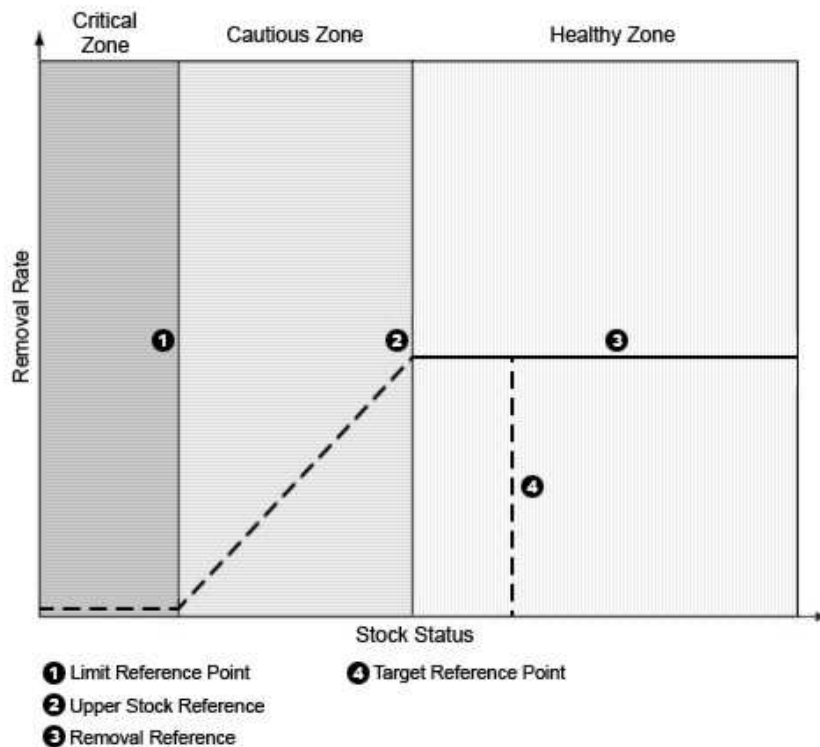


Figure 2: Stock status zones defined by a Limit Reference Point (LRP) at the Critical:Cautious zone boundary, and an Upper Stock Reference Point (USR) at the Cautious:Healthy zone boundary and the Removal Reference for each of the three zones (<http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm>).

Assessment Methods

The assessment of shrimp on the Scotian Shelf relies on both fishery dependent (the fleet) and fishery independent (research survey) data (Hardie et al., 2013). Shrimp catch per unit effort (CPUE) and catch composition (size/sex) from the fishery are provided from logbooks and commercial catch sampling, while survey biomass/abundance indices, recruitment indices and other biological information are provided from a joint DFO / industry shrimp survey using commercial vessels and gear. The survey data provide a time series of trends in stock biomass and recruitment, and the commercial CPUE data are used to provide time series of trends in stock density.

Fishery dependent data:

Data on commercial catch and effort are recorded in vessel log books and also by on-board observers. Catch and position information are also reported daily. Two CPUE series (kg per standard tow) are produced - an unstandardized series - from a long time series of data from Gulf vessels (since 1979) and a standardized series – from Scotian Shelf vessels (since

1993). The standardised series uses data (April to July, inclusive) from 26 vessels that have fished for at least 7 years. A generalised linear model is used to standardise commercial CPUE with respect to year, month, area, and vessel. Predicted, standardised CPUE values and confidence limits are calculated for each year (Hardie et al., 2013).

Catch at carapace length (mm) has been estimated annually since 1995 from commercial sampling.

Fishery Independent Data:

The annual research survey is a joint DFO-industry operation, carried out by industry vessels using commercial gear under DFO direction. This survey has been extended to cover the inshore areas that are fished by the commercial trap fishery and incorporates a mixed stratified random - fixed station design. Survey design and station selection methods have been similar since 1995 (Hardie et al. 2013). Annual biomass (mt) estimates (since 1995) and bootstrapped confidence intervals for the survey CPUE (kg per standard tow) and abundance are calculated. Population abundance (numbers) at length (mm CL) and maturity stage (males, primiparous and multiparous females) are estimated annually since 2003 from the survey catches and biological sampling.

Precautionary reference points for the Scotian Shelf shrimp fishery were developed in accordance with the DFO framework. Although the fishery targets both larger (older) males and females, reference points were established for the spawning stock (female) biomass. The species is protandrous and the oldest males recruit to the SSB upon sex change.

The LRP, Upper Reference Point (URP, synonymous with USR) and the Removal Reference (Figure 3) are described in detail within the Integrated Fisheries Management Plan (IFMP) for Scotian Shelf shrimp (DFO, 2011a).

Limit Reference Point: 30% of the average SSB maintained during the modern fishery (2000-2010). This is approximately equal to the average SSB during the low-productivity (pre-1990) period, characterized by low shrimp abundance, high groundfish abundance and relatively warm temperatures. The justification for this as the limit reference point (LRP) is twofold. First, the Scotian Shelf shrimp population previously increased from low level during the transition from low- to high-productivity, so the working assumption is that shrimp could once again recover from this level given appropriate environmental conditions and fishing pressure. Secondly, given the important role of shrimp in the Scotian Shelf ecosystem, particularly as prey for groundfish, this LRP is set to avoid a decrease in shrimp abundance below the level at which it was previously able to fulfill its ecosystem roles under a situation of high groundfish abundance (i.e., to avoid a scenario in which low shrimp abundance could act as a limiting factor in groundfish non-recovery).

Upper Reference Point: 80% of the average SSB maintained during the modern fishery (2000-2010). This upper reference point (URP) has been selected as it maintains a sufficient gap between the LRP and URP to account for uncertainty in the stock and removal reference values, and to provide sufficient time for real biological changes in the population to be expressed, detected and acted upon. Although the low SSB in 2008 is known to be an artifact of survey gear problems, substantial changes in the SSB index are evident in the stock and reinforce the importance of a conservative URP. Because of the low economic viability of the fishery, a high CPUE is critical under current conditions. As a result, the target reference point may actually be higher than the URP.

Removal Reference: Indicates the maximum removal of 20% of the Spawning Stock Biomass (actual catch/SSB) when above the URP, a closed fishery when below the LRP,

and gradual changes in between. The maximum removal rate has not been exceeded by the modern fishery, during which time high spawning stock biomass and high CPUE have been maintained. Given that shrimp survive for approximately 3-4 years after their recruitment to the fishery, it can be approximated that on the order of 25-33% of the fishable biomass would be subject to natural mortality in any given year. Although some have suggested that exploitation scenarios in which fishing mortality equals natural mortality result in optimal yield, this approach has been shown to overestimate potential yields in many stocks. As a result, the maximum removal reference of 20% for shrimp is on the conservative side of the simplistic approximate range of natural mortality (25-33%).

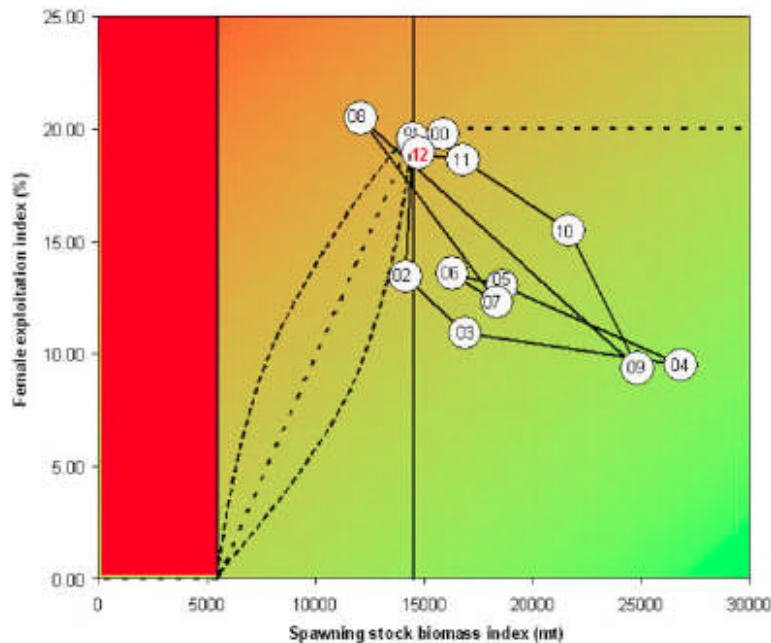


Figure 3: Graphical representation of the precautionary approach for Scotian Shelf shrimp. The dotted lines in the cautious zone represent a range of management actions possible, depending on whether the stock is stable, increasing or decreasing, or on trends in other indicators of stock or ecosystem health (DFO, 2012a).

The assessment of stock status for shrimp on Scotian Shelf relies on information from both fisheries dependent and independent sources (described above) to determine stock status relative to the precautionary reference point framework described above. Furthermore, a traffic light framework provides auxiliary data, evaluating up to 25 indicators which address four stock characteristics: abundance, production, fishing mortality and the ecosystem (Figure 4). The framework includes the period of low abundance observed in the 1980s. Therefore, the time series encompasses both favourable and unfavourable conditions which served as a basis for setting limits for the colours of individual indicators. They are not weighted by importance but an overall summary is given as an un-weighted average of individual indicators (Hardie et al, 2011). The status of these characteristics is used to provide guidance for resource management, additional to the precautionary reference points.

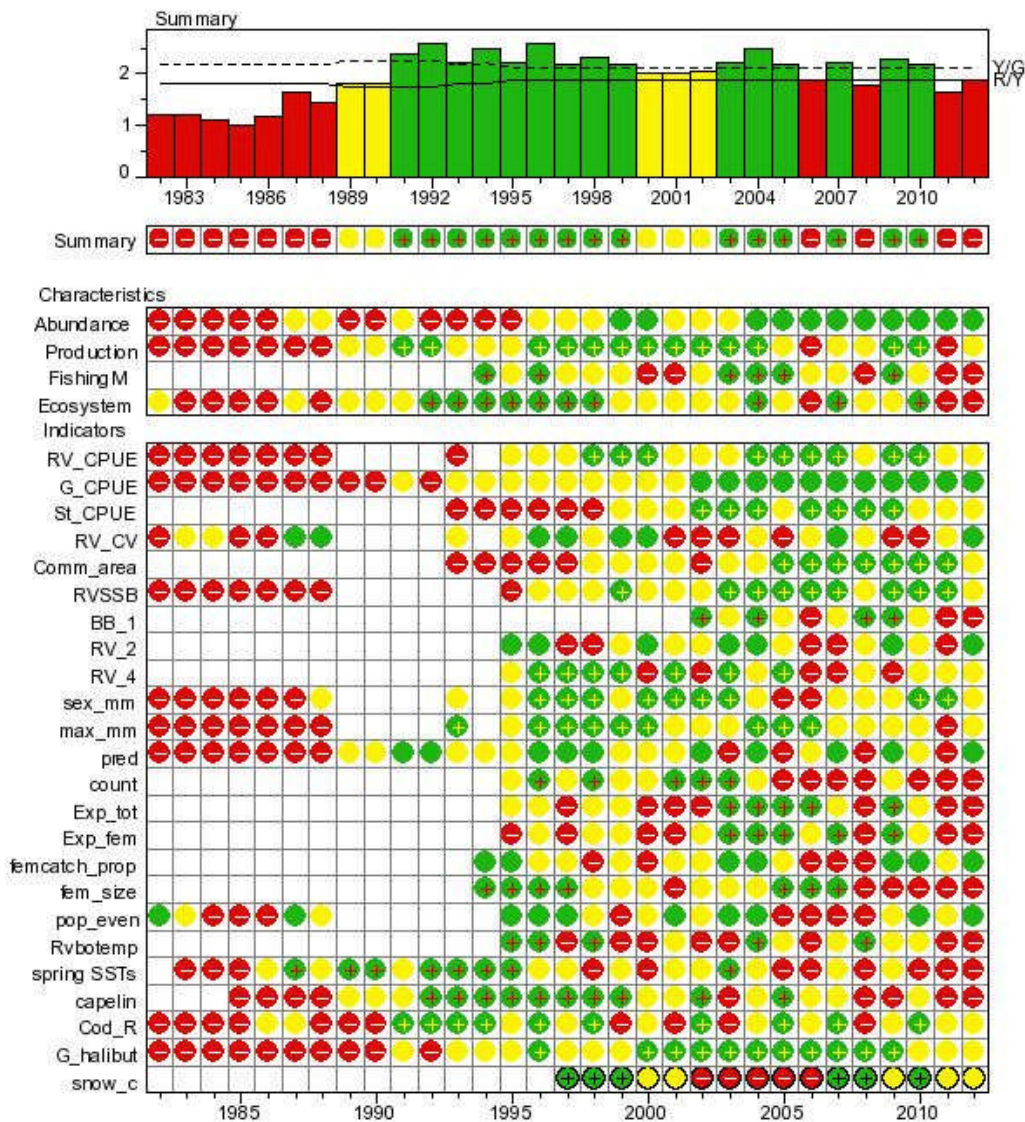


Figure 4: Traffic Light Analysis (DFO, 2012a).

Assessments, subjected to internal peer review, had been annual up to 2012. However, in future, peer-reviewed assessments will be conducted every two years. Annual updates will still be performed to monitor the status the resource, facilitating timely management action, if required. More noteworthy, future funding for the DFO-Industry survey is uncertain. Given the importance of these annual surveys in assessing the resource relative to reference points and within the traffic light analysis, performance against several of the MSC P1 indicators will be compromised should the surveys be interrupted or discontinued.

Current Status

The most recent assessment of shrimp on Scotian Shelf, conducted in December 2012, using 2012 research survey and fishery data (DFO, 2012a) within the precautionary framework, evaluates stock status.

The 2012 spawning stock biomass estimate (14,763 mt) decreased by 12% in 2012. This was the third consecutive decrease from the near-record high 2009 estimate. Nevertheless, biomass in 2012 was 2.7 times the limit reference point (LRP) of 5,460 mt. The current spawning stock biomass remains well above the LRP. Continued high biomass indicates a

low probability of recruitment overfishing. The history of the fishery has shown that recruitment, although variable, has not been impaired, even at much lower stock sizes.

The moderately abundant 2007 and 2008 year class continue to support the fishable and spawning stock biomass in 2012 and 2013. However, succeeding year classes (>2008) appear to be less abundant and longer-term recruitment prospects are uncertain. Biomass should remain stable in 2013 but could decline as early as 2014.

The 2012 spawning stock biomass estimate (14,763 mt) remained in the Healthy Zone, above the URP of 14,558 mt (Figure 3). Biomass estimates for the 13-year period from 2000 to 2012, with the exception of 2008, have been at or above the URP. The low 2008 estimate has been linked with decreased research trawl efficiency and likely underestimated the true biomass (DFO, 2011a). The female exploitation index was 19% in 2012, below the Removal Reference of 20%.

The stock remains within a high productivity period and the Removal Reference of 20% SSB has been rarely exceeded during the modern fishery (i.e. since 2000).

3.3.3 History of Fishery and Management

The history of the shrimp trawl fishery for shrimp on Scotian Shelf is described in detail within the most recent IFMP (DFO, 2011a). A summary of that description is given below.

The fishery for shrimp on the Eastern Scotian Shelf (SFA 13, 14 & 15, Figure 1), began in the mid 1970s, but the resource was underutilized because fishers were unable to operate within established allowable groundfish bycatch limits. Most of the fishers active during the 1970s were based in northeastern New Brunswick. In the early 1980s, additional exploratory licences were created for Maritimes-based groundfish trawlers in the >45' to <65' size range, allowing greater participation of vessels adjacent to the resource.

During the 1980s, groundfish bycatch was a persistent problem. In 1991, the use of separator grates (e.g. the Nordmore Grate) became mandatory for shrimp trawls, virtually eliminating the bycatch problem. Subsequently, the fishery developed further and additional exploratory licences were authorized between 1991 and 1992. These exploratory licences were made permanent by 1994. Gulf-based licence holders agreed to a Resource Sharing Agreement which limited their access to the resource to 6 vessels and 25% of the Total Allowable Catch.

DFO negotiated agreements with the First Nation Bands in the Maritimes Region, resulting in the purchase of seven Maritimes Region based, permanent licences that were then transferred to First Nations. An additional two licences were issued to First Nations for the 2006 fishing season.

In response to numerous request for additional shrimp licences, DFO (in 1998) granted temporary access based on a 75-25% Maritimes Region-Gulf Region Resource Sharing Agreement. Consequently, five Maritimes Region based temporary licences were issued, including one First Nations licence and temporary access was provided to eight Gulf Region fishers who previously had access to this fishery. In 2005, temporary access was converted to permanent status and no new licences have been issued since then. Historically, the Gulf based fleet consisted of >65' vessels while the Maritimes Region based fleet consisted of <65' vessels of which one has a licence allowing processing at sea.

A request made to DFO in 2008 by a licence holder to carry forward uncaught quota was formally rejected due to conservation concerns raised by DFO Science and the Eastern

Scotian Shelf Shrimp Advisory Committee. Also in 2008, Gulf based shrimpers of the Association des Crevettiers Acadiens du Golfe (ACAG) developed a restructuring plan to improve economic viability and identified fishing enterprises to be bought out. This initiative resulted in the purchase of 4 Gulf based fishing enterprises. Consequently, the remaining 10 Gulf and Scotian Shelf shrimp fishing enterprises improved economic viability with the additional quotas acquired as a result of this restructuring plan.

Currently, there are 28 Maritimes Region based licences and 14 Gulf Region based licences in the mobile gear fishery for shrimp on the Eastern Scotian Shelf. Approximately 100 people are directly employed in the harvesting sector. Additionally, employment is required for monitoring, unloading, processing and transporting the landings, as well as the activities required to market the products. The provision and maintenance of fishing vessels, fishing gear and other equipment, and the provision of fuel, food, insurance also generates employment.

Fishery removals are limited by total allowable catch (TAC). Hardie et al. (2011) provide information on the history of TAC regulation.

The TAC ".... was first reached in 1994, when individual Shrimp Fishing Area (SFAs) quotas were removed. With biomass at historical highs and continued good recruitment, the TAC was raised from 3100mt to 3600mt for 1997 and to 3800mt for 1998. Despite evidence of reduced recruitment to the population, and because of continued high spawning stock biomasses (SSBs) and large year classes (1993-1995) recruiting to the fishery, the TAC was increased to 5000mt for 1999 and to 5500mt for 2000. With the strong year classes completing their life cycle; recruitment only average; a decreasing trend in the survey biomass; increasing exploitation rates; changes in the distribution of the resource; and increasing harvest levels during the ovigerous period, the TAC was reduced to 5000mt for 2001 and to 3000mt for 2002 and 2003. In 2003, the survey index increased for the first time following 3 successive declines and the TAC was raised to 3500 mt for 2004. Signs of improved recruitment in the form of a very strong 2001 year class suggested that the stock would continue to increase. The 2004 survey biomass was the highest on record and the TAC was raised to 5000mt for the 2005 fishery. Despite a declining trend since 2004, biomass has remained relatively high, especially in SFA 14. Consequently, TACs were kept at 5000mt for the 2006-2008 fisheries. With the 2001 year class at or past normal life expectancy, below average recruitment following, and a large biomass decrease in SFA 14, biomass was predicted to continue decreasing. Consequently the TAC for 2009 was decreased to 3500 to prevent an increase in the exploitation rate. A problem with the angle of attack of the Nordmøre grate in the survey trawl was discovered and rectified for the 2009 survey. The survey abundance index increased nearly 50% to the second highest value on record in 2009. The degree to which this increase, and the underestimation of the population in preceding years, can be attributed to the degeneration and refurbishment of the survey trawl is discussed in Koeller et al. (2011). In general, the increase in the survey index in 2009 can be attributed to both the increased catchability with the refurbished trawl and increased biomass, the latter due, in part, to the unexpected continued contribution of the 2001 year class beyond its expected lifespan. As a result, the TAC for 2010 was set at 5000 mt."

Although the stock has remained healthy with respect to SSB (DFO, 2011b, DFO 2012b), it was suggested by DFO Science that TAC reductions would be prudent for both 2011 and 2012. This was based on the set of auxiliary traffic light indices that showed decreases in shrimp size, poor recruitment, a temporal shift in fishing effort, and unfavourable ecosystem indicators. As a precautionary measure, TAC reductions would minimize the likelihood of reducing the stock below the upper reference point or of exceeding the removal reference

point. Accordingly, the TAC was reduced from 5000 mt in 2010 to 4600 mt in 2011 and to 4200 mt in 2012.

3.4 Principle Two: Ecosystem Background

3.4.1 The marine ecosystem

The eastern Scotian Shelf has been the subject of considerable ecological study since 2000, driven in part by the need to support an integrated management program (ESSIM, the Eastern Scotian Shelf Integrated Management initiative by DFO) and in part in response to significant ecological changes observed in this area since the late 1980s.

Geomorphologically, the eastern Scotian Shelf is a complex area of highly dissected terrain with partly connected valleys, intervening ridges and small isolated gravel-covered banks. The seabed is characterised by a wide variety of environments as a result of this complex topography, steep slopes, and deep areas (Fader n.d.). Sediments in the deep basins are primarily mud (LaHave clay), while banks are mainly gravel and sand (Fader n.d.) (Figure 5).

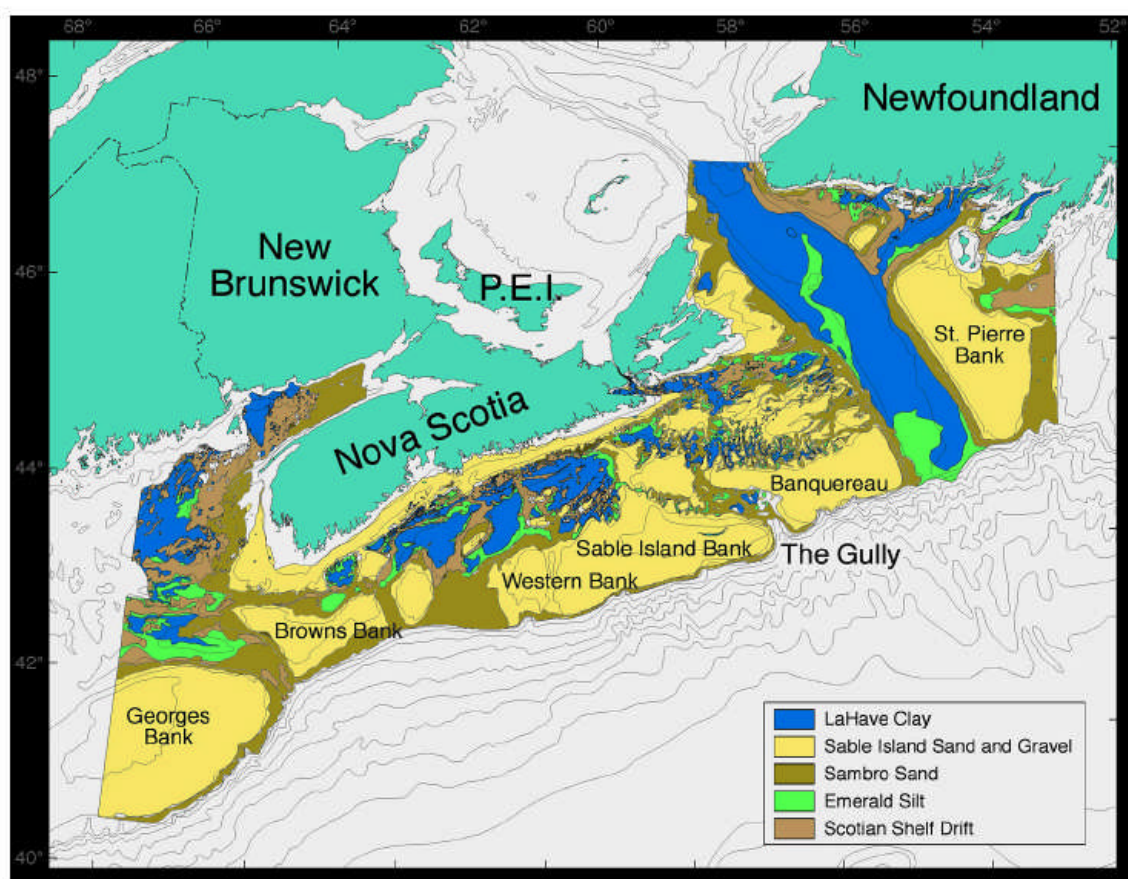


Figure 5: Surficial sediment formations on the Scotian Shelf. (From Fader (n.d.) Figure 6.)

The shrimp fishery is prosecuted in deeper muddy basins or “holes” in this complex topography. Shrimp are typically found on muddy bottoms of high organic content, within appropriate conditions of temperature. On the eastern Scotian shelf temperatures of 2-6° C are preferred, and these generally are found at depths greater than 100 fm (180 m), although shallower areas closer to shore have been discovered and exploited in recent years (DFO 2012a).

Water temperatures show a “3-layer” vertical pattern in this as in other Atlantic Canadian ocean areas, with warm/seasonably variable surface temperatures, a cold intermediate layer (CIL) (on the Scotian Shelf characterised by water of less than 4° C) and a warmer deep layer (Hébert et al 2012a). Shrimp are generally found below the CIL in the warmer deep waters. On the eastern Scotian Shelf, water mass properties are affected by the cool, relatively low-salinity outflow from the Gulf of St. Lawrence, which forms the southwesterly flowing Scotian Shelf current, the downstream influence of the Labrador Current from the north, and the relatively warm, saline Gulf Stream over the continental slope to the southeast (Worcester and Parker 2012).

Benthic biodiversity and community structure is not known in detail for the eastern Scotian Shelf, but a number of studies of specific areas and species groups have been done, allowing a broad characterisation of bottom communities (summarised by Breeze et al, 2002). Areas of fine sediments in deep basins, where northern shrimp are concentrated, support species of echinoderms (brittle stars, mud stars, sea urchins), sea pens (*Pennatulula*), molluscs (tusk shells) and polychaetes in addition to northern shrimp and other commercial species of crustacea (snow crab, Jonah crab). The deep basins supporting northern shrimp are surrounded by sandy or gravelly slopes and banks whose characteristic fauna is also generally known.

Substantial effort has been expended in identifying and mapping sensitive benthic areas in Canadian waters in recent years, based on distributions and threshold concentrations of coral and sponge species from data from research trawls and commercial observer programs (Kenchington et al. 2010; DFO 2010a). Based on these analyses, sponges and corals are widely distributed on the eastern Scotian Shelf (DFO 2010a Figs 19, 20); significant concentrations are found in several areas of the eastern Scotian Shelf but not within the shrimp fishery areas of concentration (DFO 2010a – Figs 23, 34, 41, 42).

A first attempt to identify ecologically and biologically significant areas (EBSAs) was made for the Scotian Shelf based on a survey of expert opinion (Doherty and Horsman 2007). This survey identified four EBSAs on the eastern Scotian Shelf in the vicinity of the fishery, based mainly on importance for individual commercially important species (cod, snow crab, shrimp, lobster), rather than on ecological characteristics. Identification of EBSAs will be revisited in future (DFO 2012b).

Two areas closed to fishing are in place on the eastern Scotian Shelf, neither close to the shrimp fishery area: the Gully has been formally established as a marine protected area, while fishing is forbidden in the “Lophelia” coral conservation area (DFO 2012c). Three further “areas of interest” (AOIs) (areas which are candidates for protection) have been identified on the eastern Scotian Shelf (DFO 2009a): St. Ann’s Bank, Misaine Bank/eastern shoal, and Middle Bank. St. Ann’s Bank has been selected for further study and eventual protection as a marine protected area (DFO, 2012pa). An area of “Russian Hat” sponges has been identified on the central Scotian Shelf and may eventually be given some form of protection. Although none of these closed areas or areas of interest are close to areas where the shrimp fishery occurs, the continuing process of identifying and protecting sensitive areas indicates that this issue is being taken seriously, and that restrictions on the shrimp fishery could be put in place if necessary to protect benthic habitats and ecosystems.

Fishing is concentrated in specific areas, due to commercial “fishable” concentrations of shrimp in these areas. This leaves much of the potential shrimp habitat unimpacted by the fishery, see Figure 6.

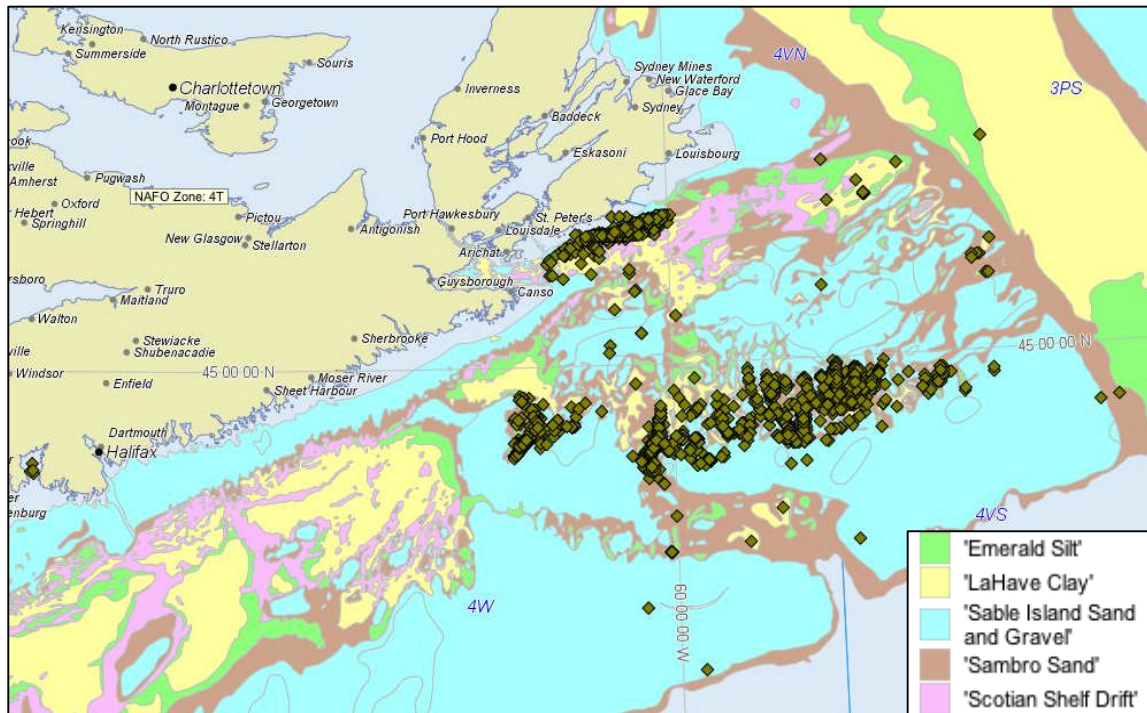


Figure 6: Distribution of shrimp trawl fishing effort in relation to sediment type for the 2010 fishing year. (Source: ASP Atlas of Eastern Scotian Shelf Habitats, unpublished.)

Although shrimp is an important fishery in this area, its ecological role on the eastern Scotian Shelf appears to be somewhat limited. The species is near the southern limit of its distribution here (the southern limit is in the Gulf of Maine off the northeastern USA), and is only found in relatively small areas of concentration despite the existence of apparently suitable habitat conditions (substrate and temperature) over broader areas (Koeller 2000). Fishing areas have changed over time with changes in the areas of concentration of shrimp, presumably in response to changes in environmental conditions (DFO 2012a). Trophic relationships on the eastern Scotian Shelf have been summarised by Bundy (2004) before and after the substantial changes in the ecosystem that occurred from the mid 1980s to the mid 1990s. Shrimp are prey for a variety of species of fishes and marine mammals in this area, but do not appear to play a major role in the diet of any species, unlike some species of small pelagic fishes for example (Bundy 2004). Shrimp are known to be an important prey item for a range of species in areas where they are abundant, but consumption is highly variable depending on predator species, predator size, and area; available evidence suggests that shrimp are a staple in the diets of many species, but not necessarily a main or essential component (Parsons 2005).

The eastern Scotian Shelf ecosystem has undergone substantial changes since the late 1980s, in particular a decrease in abundance of large groundfish and an increase in pelagic fish and invertebrate species, along with a regime of temperatures generally lower than the long-term mean (Worcester and Parker 2010). The reasons for these changes have been much discussed, including removal of groundfish by fishing and responses to colder temperatures (see review by O'Boyle et al 2012). Changes in ecosystem characteristics on the Scotian shelf and elsewhere in Atlantic Canada are monitored and periodically reported upon (for example Worcester and Parker 2010; DFO 2009b; Hébert et al 2012).

3.4.2 Retained, discarded, ETP species

Bycatch in the fishery, based on observer samples of 119 sets in 2008-2010, consists of a range of fish and invertebrate species taken in very low numbers (Table 2).

Table 2: Bycatch in the eastern Scotian Shelf shrimp fishery, based on observer sampling of 119 sets, 2008-2012. Source: Hardie et al 2011.

SPECIES	TOTAL BYCATCH		BYCATCH BY AREA			BYCATCH BY FLEET		BYCATCH BY SEASON	
	Est. Weight (kg)	TOTAL %	14	15	17	GULF	SCOTIA-FUNDY	SPRING	FALL
PANDALUS BOREALIS	223390	98.22%	98.48%	98.67%	97.11%	99.14%	97.00%	99.06%	91.42%
SILVER HAKE	706	0.31%	0.54%	0.31%	0.02%	0.26%	0.38%	0.17%	1.48%
HERRING(ATLANTIC)	583	0.26%	0.18%	0.30%	0.29%	0.08%	0.49%	0.11%	1.42%
OTHER SHRIMP	1137	0.50%	0.01%	0.01%	2.01%	0.00%	1.17%	0.00%	4.57%
AMERICAN PLAICE	340	0.15%	0.12%	0.12%	0.24%	0.08%	0.24%	0.14%	0.26%
WITCH FLOUNDER	292	0.13%	0.22%	0.11%	0.04%	0.07%	0.21%	0.12%	0.16%
REDFISH UNSEPARATED	273	0.12%	0.15%	0.17%	0.00%	0.11%	0.13%	0.09%	0.35%
CAPELIN	245	0.11%	0.06%	0.13%	0.14%	0.10%	0.12%	0.11%	0.07%
SNAKE BLENNY	122	0.05%	0.06%	0.08%	0.00%	0.09%	0.01%	0.06%	0.00%
ALEWIFE	64	0.03%	0.01%	0.00%	0.09%	0.01%	0.06%	0.02%	0.13%
EELPOUTS	84	0.04%	0.06%	0.03%	0.02%	0.02%	0.06%	0.03%	0.06%
THORNY SKATE	28	0.01%	0.03%	0.01%	0.00%	0.01%	0.01%	0.01%	0.00%
GREENLAND HALIBUT	21	0.01%	0.01%	0.01%	0.01%	0.00%	0.02%	0.01%	0.00%
ALLIGATORFISH	20	0.01%	0.00%	0.02%	0.00%	0.02%	0.00%	0.01%	0.00%
FOURBEARD ROCKLING	26	0.01%	0.02%	0.01%	0.00%	0.01%	0.01%	0.01%	0.00%
ATLANTIC SEA POACHER	16	0.01%	0.02%	0.00%	0.00%	0.00%	0.02%	0.01%	0.00%
SNAIL FISH	14	0.01%	0.00%	0.00%	0.01%	0.00%	0.01%	0.01%	0.00%
YELLOWTAIL FLOUNDER	13	0.01%	0.00%	0.01%	0.00%	0.00%	0.01%	0.00%	0.04%
COD(ATLANTIC)	10	0.00%	0.01%	0.00%	0.01%	0.00%	0.01%	0.00%	0.01%
SNOW CRAB (QUEEN)	9	0.00%	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%
SAND LANCES (NS)	6	0.00%	0.00%	0.00%	0.01%	0.00%	0.01%	0.00%	0.00%
WRYMOUTH	5	0.00%	0.00%	0.00%	0.01%	0.00%	0.01%	0.00%	0.00%
BLENNIES	7	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
DAUBED SHANNY	4	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SCULPINS	3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
STRIPED ATLANTIC WOLFFISH	3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TOAD CRAB UNIDENT.	3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SQUIRREL OR RED HAKE	1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WHITE BARRACUDINA	1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
POLLOCK	1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
% BYCATCH		1.78%	1.52%	1.33%	2.89%	0.86%	3.00%	0.94%	8.57%

Applying these percentages to a total allowable catch of 4,600 t of the target species (the catch in 2010 and 2011 averaged 4,414t), estimated total catch of the most abundant species in the bycatch would be low: 23 t for “other shrimp”, less than 15 t for the most abundant fish species, silver hake (Table 3).

Table 3: Estimated annual catches of the 12 most abundant bycatch species for 2010 and 2011, based on percentage in sampled sets (Table 2) and total catch of the target species of 4,600 t.

Species	%	Estimated catch (t)
<i>P. borealis</i>	98.22	4600.00
Silver hake	0.31	14.26
Atlantic herring	0.26	11.96
Other shrimp	0.50	23.00
American plaice	0.15	6.90
Witch flounder	0.13	5.98
Redfishes	0.12	5.52
Capelin	0.11	5.06
Snake blenny	0.05	2.30
Alewife	0.03	1.38
Eelpouts	0.04	1.84
Thorny skate	0.01	0.46
Greenland halibut	0.01	0.46
All other species	0.06	2.76
Total Bycatch	1.78	81.88

Retained species

Retention of any species other than shrimp (unspecified) is prohibited in this fishery. *Pandalus montagui* occurs in small amounts in the bycatch but is not separated from the target species, *P. borealis*. *P. montagui* is accordingly the only retained species.

The biology of *P. montagui* is not well known on the Scotian Shelf but the species is widely distributed in survey catches (Tremblay et al. 2007). Typically this species is found at shallower depths and colder temperatures than *P. borealis* in parts of its range where it is better known (for example, DFO 2011a). The category “other shrimp” in the bycatch (Tables 2) would be mainly *P. montagui*; information from the annual trawl surveys confirms that *P. montagui* is a small fraction of the catch of *P. borealis* (D. Hardie, pers. comm.).

Discarded species. A total of 29 species or species groups were recorded in bycatch samples in 2008-2010: 2 groups of invertebrates (other shrimp, toad crabs) and 27 species or groups of fishes. Bycatch percentages of the target species catch were extremely small (1.78% for all species combined) (Table 3), and estimated removals by this fishery were also extremely small (total removals of all species combined estimated at 82 t versus 4,600t *P. borealis*) (Table 3). Species include commercially-important species for which assessments are available (for example silver hake, Atlantic herring, American plaice and others) and non-commercial species for which relatively little population information is available (for example snake blenny, eelpouts, alligatorfishes and others).

Two species found in the bycatch, American plaice and redfishes (the latter actually a mixture of two species, Acadian redfish and deepwater redfish) are considered depleted and thus meet the definition of a “main” bycatch species despite their low proportions in the

bycatch. The Maritimes population of American plaice has been assessed as Threatened by COSEWIC (2009), the Gulf of St. Lawrence/Laurentian Channel population of deepwater redfish has been assessed as Endangered by COSEWIC (2010), and the Maritimes population of Acadian redfish has been assessed as Threatened by COSEWIC (2010) (Atlantic cod is also considered depleted in this area but bycatch is so small as to be negligible for this MSC assessment). Detailed population assessments of these species are available such that the small removals in the shrimp fishery can be compared with total abundance and with other sources of mortality (American plaice – COSEWIC 2009, DFO 2011b; redfishes – COSEWIC 2010, DFO 2011c).

Detailed assessments of the affected populations of several other species are also available: silver hake (DFO 2010b), Atlantic herring (DFO 2011d), and capelin (DFO 2010c, 2011e). For the remaining fish species, general biological information is available (Scott and Scott 1988).

Endangered, threatened, protected species. ETP species in Canadian fisheries are those listed as Endangered or Threatened on Schedule 1 of the *Species at Risk Act* (SARA Public Registry – see URL: <http://www.sararegistry.gc.ca/>). None of these species are found in the bycatch (Table 2) or are known to interact with the fishery. Atlantic wolffish, listed on SARA Schedule 1 as Special Concern, is taken in the bycatch in very small amounts but is not considered an MSC ETP species because of the Special Concern status (i.e. not formally listed as an endangered or threatened species).

3.4.3 Specific constraints

There are no specific environmental constraints associated with this fishery, other than the general issues described above related to habitat and ecosystem impacts of the fishing gear, bycatch, and the role of the species in trophic relationships.

3.4.4 Critical environments

No critical environments have been identified which would be impacted by this fishery.

DFO's Maritimes Region has invested significant effort in the past decade in identifying sensitive and vulnerable benthic areas on the Scotian Shelf (e.g. Kenchington et al 2010; Doherty and Horsman 2007; DFO 2012b), in moving to protect vulnerable areas (DFO 2009a; DFO 2012c; DFO 2012d), and in including ecosystem issues in fishery management planning (DFO 2011f). The shrimp fishery has not been identified as a significant concern with respect to ecosystem impacts, and is currently considered a relatively low risk fishery for ecosystem impacts (DFO staff, pers. comm.).

This fishery operates on soft-bottom habitats which are considered generally to be relatively resilient (NEFMC 2011). The fishery is concentrated in several months of the year, and fishing locations have changed over the years, following concentrations of shrimp (DFO 2012a), such that bottom environments in which it operates have had time to recover from trawling impacts.

3.5 Principle Three: Management System Background

3.5.1 Area of operation of the fishery, and the jurisdiction under which it falls

Northern shrimp in Eastern Canada

Viewed in its entirety, the shrimp stock in the waters of eastern Canada is widely distributed and abundant over a large area from southern Nova Scotia (44°N) to Baffin Island (75°N), (Figure 1, inset) principally over soft muddy bottoms in water temperatures ranging from -1.5 to +6°C, and depths from 150 to 600 m all along the edge of the continental shelf. These waters are described by two different sets of geographical zones, a) the Divisions of the inter-governmental regional fisheries management agency known as the North Atlantic Fisheries Organisation (NAFO) that originated for assessing and managing groundfish stocks, and b) Canadian Shrimp Fishing Areas 0-16 that were established by DFO. The latter are wholly within the Canadian 200 nautical mile limit that marks the eastern seaward boundary of the Canadian exclusive economic zone (EEZ), and that runs across the western divisions of NAFO.

Eastern Scotian Shelf Shrimp fishery

As the shrimp fisheries occur predominantly within the 200 nautical mile limit, most of them can be described using the SFAs alone, which is the case for the Eastern Scotian Shelf shrimp fishery, which occupies SFAs 13, 14 and 15. These are wholly within the Canadian 200 mile limit and fall under the sole jurisdiction of Fisheries and Oceans Canada. Their management is based on Canadian legislation, management policies and practices, and on scientific advice presented by DFO scientists. Monitoring and active management of the fishery and the environment are carried out at the regional level by the Scotia-Fundy section of DFO Maritimes, located in Dartmouth Nova Scotia. The fishery operates under the framework of the Scotian Shelf Shrimp (*Pandalus borealis*) Integrated Fisheries Management Plan, Version 1.5.2 (SSSIFMP, DFO, 2011), following consultations and recommendations from the Scotian Shelf Shrimp Advisory Committee (SSSAC).

Due to high costs of fishing operations and relatively low prices, shrimp fishers generally search out areas with the largest *P. borealis* and the highest catch rates, and on the Scotian Shelf these are mainly found in the Louisburg, Misaine and Canso 'holes' in SFAs 13, 14, 15, fished by the mobile trawl fleet (see Figure 1), and Chedabucto Bay, fished by the trap fleet.

3.5.2 Recognised groups with interests in the fishery

The main interest groups are the client for this certification, and the numerous groups and organisations that are members of the SSSAC:

- The Client
- Federal Government officials and scientists from Maritimes Region
- First Nations / Aboriginal Organizations
- Mobile and Trap Fishers
- Mobile Shrimp Fishermen's Association
- Processors/Buyers
- Provincial Governments of Nova Scotia and New Brunswick

The SSSAC is chaired by DFO Maritimes Region and the meetings are open to the public, and to observers from NGOs and ENGOs. A more comprehensive listing of members in the different groups is shown in Section 3.5.4, copied from Appendix 4 of the SSSIFMP.

3.5.3 The management system

This section describes the following components of the legal and customary framework applicable to the shrimp fishery: Acts, Frameworks, Policies, Plans, DFO roles and responsibilities, and structure.

Principal National Acts specifying responsibilities and enabling powers:

- *Department of Fisheries and Oceans Act*, 1985 (establishes DFO mandate)
- *Fisheries Act* 1985 (gives Minister responsibility for the management of fisheries, habitat, and aquaculture)
- *Oceans Act* 1996 (entrusts the Minister to lead integrated oceans management)
- *Species at Risk Act* 2002 (gives the Minister responsibilities associated with the management of aquatic species at risk).
- *Atlantic Fishery Regulations*, 1985
- *Fishery (General) Regulations* 1993
- *Atlantic Fisheries Restructuring Act*, 1985
- *Commercial Fisheries Licensing Policy for Eastern Canada*, 1996
- *Aboriginal Communal Fishing Licences Regulations*, 1993 (SOR/93-332)

Frameworks, Policies and Plans :

Under its obligations to the United Nations Convention on the Law of the Sea, the Convention on Biological Diversity, and the United Nations Fisheries Agreement, Canada is committed to developing National and Regional Frameworks, Policies and Plans for delivering sustainable fisheries as part of an ecosystem approach to management implemented by an integrated management planning process (Federal, Provincial and International Ocean Regulatory and Policy Frameworks on the Scotian Shelf (Chao et al., 2004)

Frameworks and Policies relevant to MSC Principles 1 and 2:

- DFO, 2002. Canada's oceans strategy: Our oceans, our future. Fisheries and Oceans Canada, Oceans Directorate, Ottawa, Ontario. See URL: www.dfompo.gc.ca/oceans/publications/cos-soc/pdf/cos-soc-eng.pdf
- Atlantic Fisheries Policy Review: A policy framework for the management of fisheries on Canada's Atlantic Coast (DFO 2004-64). See URL: www.dfo-mpo.gc.ca/afpr-rppa/Doc_Doc/.../Policy_Framework_e.pdf

- Maritimes Region Ecosystem Approach to Management Framework (Principles 1 and 2). (Overview summarised as Appendix 2 of the Eastern Scotian Shelf Shrimp Fishery IFMP, DFO 2011a).
- An Integrated Aboriginal Policy Framework. (Principle 1) See URL: www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/iapf-cipa-eng.htm
- Sustainable Fisheries Framework. (Principles 1 and 2) See URL: www.dfo-mpo.gc.ca/fm-gp/peche-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm
- A fishery decision-making framework involving the precautionary approach. (Principle 1) See URL: www.dfo-mpo.gc.ca/fm-gp/peche-fisheries/fish-ren-peche/sff-cpd/precaution-back-fiche-eng.htm
- National Framework for Marine Protected Areas. (Principle 2) See URL: www.dfo-mpo.gc.ca/oceans/publications/dmpaf-eczpm/framework-cadre2011-eng.asp
- Policy for Managing the Impact of Fishing on Sensitive Benthic Areas. (Principle 2) See URL: www.dfo-mpo.gc.ca/fm-gp/peche-fisheries/fish-ren-peche/sff-cpd/benthi-eng.htm
- Policy for new fisheries on forage species. (Principle 2)

Examples of codes of practice, plans, and regulations :

- Canadian Code of Conduct for Responsible Fishing Operations. See URL: www.dfo-mpo.gc.ca/fm-gp/policies-politiques/cccrfo-cccpr-eng.htm
- Scotian Shelf Shrimp Fishery Integrated Fisheries Management Plan (DFO 2011)
- Coral Conservation Plan, Maritimes Region (2006-2011), Oceans and Coastal Management Report 2006-01.
- Eastern Scotian Shelf Integrated Ocean Management Plan, Strategic Plan (DFO 2007). See URL: www.mar.dfo-mpo.gc.ca/e0010327
- Aboriginal Communal Fishing Licences Regulations, 1993 (SOR/93-332).

Roles and Responsibilities

The Fisheries Act and the Oceans Act give DFO the overarching responsibility for sustainable management of fisheries and ecosystems nationally and regionally, and this responsibility is cited at the head of all major framework, policy and plan documents. At the regional level the comprehensive role of DFO Maritimes in the decision making process is communicated to stakeholders and the public by the following roles and responsibilities, taken from Appendix 6 of the current SSSIFMP:

Resource Management

- takes the lead on bringing the various DFO sectors and elements of the management plan together to develop the management options
- is responsible for consultations with industry, provinces and Aboriginal groups
- is responsible for managing pre, in, post-season processes
- is responsible for updating the annual harvesting plan

Science

- provides the stock forecast for the upcoming season
- indicates any conservation concerns
- provides advice on the appropriateness of management options to address conservation concerns
- specifies what, if any, data requirements they need to have to facilitate in-season adjustments and post-season evaluations

Aboriginal Affairs

- provides advice regarding DFO's relationship with aboriginal people; food, social and ceremonial fishing, consultations and DFO policies and programs

Conservation and Protection

- identifies enforcement problems to be addressed in the development of the management plan
- suggests specific enforcement measures to address enforcement issues

Policy

- provides input on international obligations or concerns
- is responsible for making regulatory changes required in support of the management plan

Communications

- provides advice on developing appropriate strategies for communicating the management plan

DFO Maritimes Structure

Management of the Eastern Scotian Shelf Shrimp Fishery is administered by DFO Maritimes Region. MSC Principles 1, 2 and 3 are delivered by the following work streams and designated team members, who attended the site visit.

Principle 1:

Monitoring and Assessing Stock Status – David Hardie

Assessment of the Science Advice – David Hardie

Development and Implementation of the PA – David Hardie/Sara Quigley

Management decisions for the fishery – Sara Quigley

Review and development of the IFMP – Sara Quigley

Observers and Dockside Monitoring – Bryan Wood

Chair of the Advisory Committee – Sara Quigley

Principle 2:

Habitat and ecosystem policy development and implementation – Scott Coffen-Smout

Fishery impacts on habitat – Eddy Kennedy

Sensitive benthic species – Eddy Kennedy

Ecosystem interactions – Eddy Kennedy

Intertek Fisheries Certification – Canadian Scotian Shelf Northern Prawn Trawl Fishery – Public Certification Report

By-catches – David Hardie
ETP species issues – Scott Coffen-Smout

Principle 3:

Licensing – Sara Quigley

Aboriginal issues – Sara Quigley

Development, implementation and review of the management system generally – Sara Quigley

Eco-certification Co-ordination – Tara McIntyre (now Jennifer Ford, since 15 April 2013.)

Higher level responsibility

The Regional Director for the Maritimes is ultimately responsible for the system of fisheries and ecosystem management in the Maritimes, and for the management decisions that it takes. Higher management positions capable of making last resort decisions include the Sector Heads at DFO Federal level, Ottawa, including the Assistant Deputy Minister for Ecosystems and Fisheries Management, and ultimately the Fisheries Minister.

3.5.4 Consultation

At all levels, DFO practices an open and consultative approach to management, decision making, the implementation of existing policies, and the development of new ones. This is stressed at the head of most frameworks, policies and plans. A good example is the Eastern Scotian Shelf Integrated Management Initiative (ESSIM). Although this initiative was actually concluded in 2012, when it was subsumed into a DFO Maritimes Region Oceans Program (see below) the following quote from the original DFO Maritimes ESSIM webpage (see URL: <http://www.mar.dfo-mpo.gc.ca/e0010281>) illustrates the inherently consultative nature of the DFO approach to initiatives of this kind:

“The aim (of the ESSIM Initiative) is to have an effective, collaborative process that provides integrated and adaptive management plans, strategies and actions for ecosystem, social, economic, and institutional sustainability. A collaborative process is an open, inclusive and transparent planning, advisory and decision-making process involving all interested and affected parties. Ocean management plans and decisions are based on shared information where those with the decision-making authority and those affected by the decision jointly seek outcomes that meet the needs and interests of all parties to the greatest possible degree.”

(Note that DFO Maritimes Region is developing a regional plan – the **DFO Maritimes Region Oceans Program** - to provide a consistent approach for the Department's Oceans Program. The plan will serve as an authoritative source of information, guidance, and support for DFO priority setting and decision-making associated with ocean and coastal management in the Maritimes Region. It represents an evolution of previous ocean management efforts within the Maritimes Region, including the ESSIM Initiative, which concluded in 2012. The current plan draws on evaluations and lessons learned from ESSIM, as well as other initiatives in the Maritimes and beyond)

At the functional operational level in DFO Maritimes, the principal vehicle for consultation with stakeholders for the preparation of advice on the management of the fishery, including the annual setting of the total allowable catch, is the Scotian Shelf Shrimp Advisory Committee, which is chaired by the Senior Advisor for Shrimp for the Maritimes Region. The

following groups are represented on the Committee, either as direct members or as observers (Appendix 4 of the SSSIFMP):

Fishers

Licence holders from the inshore mobile fleets of Scotia-Fundy and Gulf regions, the trap fishery in Chedabucto Bay, and one offshore (>65 foot) fishing vessel. The last is prescribed to land the catch for shore processing along with inshore vessels.

Mobile Shrimp Fishermen's Associations

Atlantic Canadian Mobile Shrimp Association, NS
Fédération Régionale Acadienne des Pêcheurs Professionnelles Inc.(FRAPP), NB
New Brunswick Seafood Processors Association, NB
Seafood Producers Association of NS
Mobile Gear Fish Association, NS

Processors/Buyers

Clearwater Fine Foods, Bedford, NS
Fisherman's Market, Halifax, NS
SeaFreez Foods, Dartmouth, NS
Produits Belle Baie Ltee, Caraquet, NB
Acadian Fish, Yarmouth, NS

Provincial Government

Dept of Fisheries and Aquaculture, Halifax, NS
Dept of Fisheries and Aquaculture, Fredericton, NB

Federal Government officials and scientists

Director, Management, Dartmouth, NS, acting as chair of the SSSAC
Area Director Eastern Nova Scotia, Sydney, NS
Area Director Southwest Nova Scotia, Yarmouth, NS
Area Director Southern New Brunswick, St. Andrews, NB
Resource Manager, Ottawa, ON
Resource Manager, Halifax, NS
Senior Advisor, Resource Management, Moncton, NB
Science, Halifax, NS
Conservation & Protection Halifax, NS
Oceans & Coastal Manager, Halifax, NS

First Nations / Aboriginal Organizations

First Nation Sydney, NS
Council of NS Truro, NS
Fish & Wildlife Association, Afton, NS

Other

Observer: Canadian Association of Prawn Producers

Consultations at the Advisory Committee:

- The Advisory Committee is the forum for the presentation of scientific advice on the status of the shrimp stock and the ecosystem, and it is where the industry is consulted directly on its views about the annual TAC and related aspects of the annual management plan.
- The Committee reviews the performance of the fishery, including reports on monitoring, quota uptake, surveillance, compliance, markets and prices.

- The Committee reviews licensing and quota allocation issues and disputes.
- The Committee decides by consensus the advice it gives to DFO. The basis of the advice is explained, and DFO managers can be questioned at subsequent meetings whether or how the advice has been used.
- The Advisory Committee is where DFO managers consult with the industry on revisions to the evergreen IFMP (in this context the term “evergreen” means that sections of the Plan are revised or updated periodically, or whenever corrections or changes are required and agreed, thus reducing the need for a complete overhaul). Upon agreement with their association, any representative can advance amendments to the plan at any time. If consensus is reached, the appropriate amendment to the IFMP is made.
- The Advisory Committee is also where DFO managers have the opportunity to consult with the industry on proposed new national and regional frameworks, policies and plans. At the site visit DFO Maritimes staff emphasised that they consult widely in order to seek opinions and local knowledge in advance of new legislation or changes to existing regulations and measures, in order to pre-empt problems, disputes or legal disputes, and that they are readily available for individuals to raise problems questions or queries or to seek explanations.
- Minutes of Advisory Committee meetings are available for scrutiny by the public.

During the course of their duties, Fishery Officers are keen to consult directly with the industry on the implementation and enforcement of current and new regulations, and to educate by day to day personal contact on compliance issues.

DFO Maritimes has recognised the need to create a forum for dialogue with Environmental NGOs by establishing the Maritimes Region and Marine Environmental Non-Governmental Organizations Dialogue Forum. This aims to “provide a vehicle for discussion (not decision-making) between the Parties and serves to facilitate information exchange; relationship building; and dialogue on strategic policy issues regarding the sustainable development and conservation of Canada’s marine resources”.

At the recertification site visit the assessors questioned DFO representatives and scientists about the degree of consultation involved in developing and implementing new management measures or policies. DFO stressed the consultative nature of the process. At the SSSAC, new policies, measures or protocols, or changes to existing ones, are as a matter of course discussed and proposed in a proactive manner through presentations or documentation in order to make industry and stakeholders fully aware of the proposals, and to give an opportunity to contribute views and comments. Fishers' experience and knowledge of the resource and of operational and economic issues are actively sought. Special or contentious issues that cannot be resolved simply may be addressed via the working group process. Assessors were satisfied that the approach being adopted is a pro-active one, as recounted by DFO using as examples the workshops, presentations and discussion documents used in the development of reference points and decision rules, and that are currently ongoing during development of the ecosystem approach to management in this region.

3.5.5 Details of non-fishery users or activities which could affect the fishery, and arrangements for liaison and cooperation.

None are known at this time.

3.5.6 Details of the decision making process or processes, including the recognised participants

Policy level

Canadian policy documents formally recommend an open and consultative approach to planning and decision making.

Regional level

Final responsibility for priorities and decisions for the shrimp fishery rests with the senior regional DFO managers and staff assigned to the various Branches and work streams. In practice, managers follow an open and consultative approach, and work closely with stakeholders at the operational level especially through the SSSAdvisory Committee.

Operational level

The shrimp fishery uses a co-management approach, based on discussions and decision making at the SSSAdvisory Committee, whose form and membership were summarised in Sections 3.5.4 based on information in the IFMP. The Committee is chaired by the Senior Advisor for Shrimp for the Maritimes Region, and its terms of reference are listed in Appendix 5 of the SSSIFMP. The following paragraph compiles information from the IFMP text on Governance (Page 11) and from Appendix 5.

The Committee meets at least once a year in order to prepare the fishing plan for each ensuing season, and to discuss and advise on any aspect relevant to the management of the fishery, including management policies, regulations, science, stock status and the TAC, access and allocation rules. All members of the Committee are eligible to attend, all licence holders are invited, and sessions are open to the public. ENGOs are not members of SSSAC, but may attend the meetings as observers if they wish. The Committee operates by consensus and there are no voting rights. Recommendations from industry on the annual Total Allowable Catch (TAC) and other management measures are formalised in the context of scientific advice presented by DFO on the basis of the DFO assessment, scientific advisory reports, and their peer review processes. Owing to the large membership of SSSAC specific issues are sometimes dealt with by smaller working groups that report back to the SSSAC, and at the site visit the assessors were advised that three such working groups took place in 2012. Advisory Committee meetings have simultaneous translation. Working groups are usually in English but are held with simultaneous translation if requested. As a significant portion of the fleet resides within the Gulf Region, advice from the SSSAC is passed to, and discussed by, senior management in both the Gulf and Maritime Regions, but final implementation is the responsibility of the Maritimes Region.

The IFMP notes that consultation and decision making processes were greatly enhanced by the advent of the Atlantic Canadian Mobile Shrimp Association (ACMSA) in 1996, which represented all permanent mobile licence holders. At their request, vessels based in both the Maritimes and Gulf regions are recognised as one fleet. Shrimp trap licence holders, who also participate in SSSAC meetings, have also chosen to be represented by a single association.

Emergency Decisions

Seasonal uptake of individual vessel quotas is monitored during the season, and it is expected that any contingencies or emergencies requiring consideration and action would cause fishers and other stakeholders to meet with their Association, or with DFO Fishery Officers, regional officials, and or scientists, to discuss immediate points arising, or to request for an emergency meeting of the SSSAC, after which further action could be taken or discussed within existing procedures.

Check lists

The reassessment site visit heard several times that DFO Resource Advisors use a fisheries checklist that assists in decision-making at that level, although the assessors were not provided a copy. The fishery checklists incorporate, in part, elements of the DFO Maritimes regional Ecosystem Approach to Management (EAM) framework, which was presented as an appendix in Curran et al. (2012). A key figure of the regional EAM framework has been replicated from Curran et al. (2012) in Annex 1A of this report. The regional EAM framework has not been formally published, although it has received concurrence by senior management in the DFO Maritimes Region (Curran et al, 2012). To date, DFO Resource Advisors have been evaluating existing fishery management plans with respect to the regional EAM framework, with the intent of working with other DFO management sectors over time to incorporate applicable elements of the EAM framework into IFMPs.

Emerging policies

Both nationally and in the Maritimes Region there is an increasing emphasis on the Ecosystem Approach to Management (EAM) and the development of Integrated Oceans Management. The following quote from the DFO Maritimes Ecosystem Approach to Management (EAM) framework, as presented in an Appendix of Curran et al (2012), demonstrates that there is clarity about the scope for synergy between fisheries decision making and ecosystem decision-making processes:

“As a regulator of the commercial fishing industry, DFO will implement the strategies in the general plan for EAM within the fisheries sector, i.e. the Department has a dual role, the longstanding one of directly managing the fishery for sustainability and the more recent one of overseeing the impacts of all marine activities on ecosystems. The management process in DFO is already well developed for fisheries and much of the existing infrastructure of advisory and consultative committees can be reformed satisfactorily for EAM application. However, additional levels of integration may be added as required, to take account of the cumulative effects of multiple uses in relation to the broader EAM considerations.”

3.5.7 Objectives for the fishery.

High level objectives

Fisheries are a common property resource to be managed for the benefit of all Canadians, consistent with conservation objectives, the constitutional protection afforded Aboriginal and treaty rights, and the relative contributions that various uses of the resource make to Canadian society, including socio-economic benefits to communities. In this context, the frameworks, policies and plans listed in Section 3.5.3 all refer to the high level objective of managing fisheries and ecosystems sustainably. Annex 2 illustrates this using selected excerpts from the following documents:

- A Policy Framework for the Management of Fisheries on Canada's Atlantic Coast
- Sustainable Fisheries Framework
- Policy for Managing the Impact of Fishing on Sensitive Benthic Areas
- Coral Conservation Plan, Maritimes Region (2006-2011), Oceans and Coastal Management Report 2006-01.

Operational long and short term objectives

Section 5 of the current SSSIIFMP provides the following long term objectives for the shrimp fishery, consistent with the high level objectives:

Conservation Objectives

Productivity: Do not cause an unacceptable reduction in productivity, so that components can play their role in the functioning of the ecosystem

Biodiversity: Do not cause an unacceptable reduction in biodiversity, in order to preserve the structure and resilience of the ecosystem

Habitat: Do not cause significant modification to habitat, to safeguard both physical and chemical properties of the ecosystem

Social, cultural and economic

Culture and sustenance: Respect Aboriginal and treaty rights to fish for food, social and ceremonial purposes.

Prosperity: Create the circumstances for economically prosperous fisheries, recognising the economic contribution that the fishing industry can make to businesses and coastal communities. Economic viability is partly dependent on the industry itself but the Department is committed to balancing economic success with a use of ocean resources that is environmentally sustainable.

To attain these objectives, the ESS shrimp fishery has adopted operational objectives that the IFMP calls strategies and tactics, as presented in Section 6 of the current SSSIFMP:

Productivity Strategy: Sustain the Eastern Scotian Shelf shrimp population in the high productivity phase observed from 2000 to the present.

Tactics

- Set an annual TAC that will keep fishing mortality under 20% when the stock is in the healthy zone
- Set an annual TAC that will result in a reduction in fishing mortality when the stock is in the cautious zone (as defined by the precautionary reference points)
- Restrict fishing when the stock is in the critical zone
- Continue to deduct quota over-runs on a 1:1 basis
- Continue use of a minimum trawl mesh size of 40 mm

Biodiversity Strategy: Control unintended incidental mortality for all species

Tactics

- Continue to use the Nordmore Grate to minimise bycatch in the shrimp fishery
- Continue to restrict the retention of incidentally caught species in the shrimp fishery

Habitat Strategy: Manage the habitat areas that are disturbed

Tactics

- Clearly establish via licence conditions areas where the shrimp fishery is not allowed due to conservation concerns

Cultural and Sustenance Strategy: Respect Aboriginal and treaty rights to fish

Tactics

- Issue Food, Social and Ceremonial licences as required

Prosperity Strategy

Limit inflexibility within the shrimp fishery

Tactics

- Continue to manage the shrimp fishery with transferable quotas
- Continue to allow the temporary transfer of trap quota to the mobile fleet when appropriate

Minimise instability

Tactics

- Continue to manage the shrimp fishery with stable individual quotas
- Be aware of the importance of maintaining high catch rates to the economic viability of the fishery

Support eco-certification of the shrimp fishery

- Tactics
- Work with the industry to meet commitments relating to maintaining Marine Stewardship Council certification

As part of the co-management approach practised by DFO Maritimes through consultation at the SSSAC, the shrimp industry has contributed fully to discussions about the nature and implementation of these strategies and tactics, which are achieved by the regulatory measures described in Section 3.5.10.

3.5.8 Fleet types, fishing categories, and access rights

Based on the current IFMP, this section summarises the development of the shrimp fishery, and the evolution of access and fishing rights including those made available to First Nation Bands under the Marshall Response Initiative.

Trawling, which is the predominant method of shrimp fishing in eastern Canada, generally began in the 1970s, but did not take off until the 1990s. Expansion was inhibited initially because groundfish by-catches by shrimp trawlers exceeded established limits. This changed in the 1990s with the advent of a groundfish separator grid, the Nordmore grid, which substantially reduced groundfish by-catches, and enabled the sector to take full advantage of the major increase in shrimp abundance that occurred throughout the waters of eastern Canada in the mid 1990s, associated with the decline in groundfish abundance (Worm & Myers, 2003). Thereafter, catches and TACs in many SFAs increased stepwise in line with the increase in shrimp stocks. Fishing effort and landings by traditional licence holders increased, supported in some areas by new allocations to new temporary licence holders, some of whom have since been made permanent. The expansion period facilitated new allocations and fishing rights, as well as various rationalisations and consolidation of the fleets, leading to the following type, number of vessels, and the quota shares operating today.

The Eastern Scotian Shelf mobile shrimp trawl fishery

The Scotian Shelf inshore mobile shrimp trawl fleet comprises 28 licences based in Maritimes (Scotia-Fundy) region, and 14 licences based in the Gulf region. Vessels mainly work single trawls of rockhopper type, fitted with a mandatory Nordmore Grid to reduce groundfish by catch. There is one >65' vessel in the Maritimes Region. The rest are < 65'. The Gulf-based vessels are > 65', because they travel further. A further 14 Scotia-Fundy licenses are allocated to SFA 16 in southwest Nova Scotia but these are largely inactive owing to low shrimp abundance in that area. Fishing is allowed all year, but because of weather constraints and the summer soft-shelled post moulting period, it is usually restricted operationally to the spring and fall period. Mobile fishers are allocated individual quotas (see below). Fishing typically commences in mid-March when Gulf-based vessels arrive. Generally Gulf-based fishers catch their share of the TAC by the end of June, but Maritimes vessels take roughly 75% of their share up to the end of July, then stop fishing during the moult period before returning to take the remainder of the Maritimes catch by the end of October, although a few stragglers may fish on through November.

The trap fishery

There are currently 14 shrimp trap licences, one for the north-eastern shore of Nova Scotia, and 13 of which apply to Chedabucto Bay. Trap licence holders now have 8% of the total TAC assigned to them, for which they fish competitively. They use modified lobster gear in trawls of 1-5 traps set for one day soaks. The fishery is limited to the period starting one week after the end of the lobster season, and ending one week prior to the start of the lobster fishery. According to the IFMP, the fishery typically starts in August, peaks by the end of September, but being less weather dependent than trawling it may continue opportunistically through the winter months, depending on the market. For the past three seasons, however, fishing did not begin until November, and most of the catch was landed from November to March.

Evolution of resource sharing and access rights

In the 1970s most active fishers were based in north eastern New Brunswick, but in the 1980s exploratory licences were offered to groundfish trawlers from Eastern and South Western Nova Scotia to encourage fishers nearer to the resource, although few became active because of the groundfish by-catch problem. From 1991, more exploratory licences were issued to Maritimes vessels. In 1993, as the shrimp stock increased and it was shown that stand-alone licences were financially viable, licences in the Maritimes were converted from exploratory to permanent limited entry status. In 1994, fishers in the Gulf agreed to a Resource Sharing Agreement with the Maritimes, restricting the Gulf share to 6 vessels, and a 25% share of the TAC. In that year Maritimes vessels ceased to fish competitively, in favour of Individual Quotas of equal amounts per licence. Gulf vessels ceased competitive fishing in 1996 in favour of Individual Quotas calculated as a proportion of the 25% TAC share determined by historical track record. Following a trial year at the request of the industry, Individual Quotas were made transferable within constraints set out further below.

In 1995, a First Nation Band entered the fishery for the first time under the Aboriginal Fishing Strategy, following purchase of one of the 12 Maritimes licences through a joint venture. Under the Marshall Decision, DFO were then required to negotiate agreements with First Nation Bands in the Maritimes, and by 2006 the 9 licences stipulated by the Response Initiative were bought and assigned to First Nation Bands.

As shrimp abundance increased extra licences were requested and in 1998 DFO introduced additional temporary licences (including 1 First Nation licence) for the Maritimes, plus new temporary licences for Gulf fishers with previous access to the fishery, but all still within the 75%-25% Maritimes-Gulf Resource Sharing Agreement. In 2005 access and quota shares were established: each temporary Maritimes licence became permanent (but with a quota only 60% of that of existing permanent licences), but the temporary Gulf licences were converted to a single permanent licence (with a quota share only 60% of the average of the other permanent Gulf licences).

No new licences have been issued since 2005, and from 2008-2011 shrimpers in the Gulf implemented a rationalisation plan whereby 4 Gulf-based fishing enterprises were bought out by 10 traditional Gulf harvesters, thus gaining extra quota in order to improve economic viability.

A licence entitles the holder to an individual transferrable quota as a stated percentage share of the annual TAC. Transfers are subject to rules set out in the IFMP (Appendix 2 and 3) and summarised in Section 3.5.10. A request in 2008 to carry over uncaught quota to the next year was rejected by DFO on conservation grounds. Gulf-based vessels, which have to

travel further, are >65 feet, while the Maritimes inshore fleet comprises vessels < 65 feet that process shrimp ashore, and one vessel >65 feet that has the option to process ashore or at sea. Issue of the licence for the latter vessel required the retirement of two core enterprises.

Since 2005 the resource sharing agreement has allocated the TAC in the following proportions: 8% to the trap fleet, 69.5% to the Maritimes mobile inshore fleet, and 22.5% to the Gulf based mobile fleet.

3.5.9 Regulatory measures

The shrimp fishery is subject to the following regulatory framework and measures :

Regulation of fishing effort

- Entry limited by restricting the number of licence holders, taking into account stock conservation and economic considerations

Regulation of the exploitation pattern and the groundfish bycatch

- Prescribed minimum trawl mesh size of 40 mm
- Mandatory use of the Nordmore Grate with specified bar spacing (25 mm) and attachment rules

Regulation of the harvest rate

- Setting an annual TAC in conformity with the harvest control rules and reference points, scientific advice on stock status (exploitation rate and biomass relative to reference points), and industry advice on economic considerations.
- Distributing the TAC to fleets in proportion to the sharing agreements
- Distributing quotas to individual licence holders in proportion to their percentage quota allocations (see Table 3 of the current SSSIFMP (DFO 2011)).
- Managing the individual quota transfer rules, and monitoring quota uptake

Regulation of individual transferable quotas

- Individual quotas for the mobile fleet are determined each year from the TAC, using the allocated percentage share nominated on each licence
- Licence holders must cease fishing when their ITQ is caught
- Transfers must be applied for and approved by DFO, and applicants must not be the subjects of any ongoing or unresolved violation.
- A First Nation licence holder can transfer quota to holders of regular commercial licences on a temporary basis, but any permanent transfer can only be made to another First Nation licence holder.
- In the mobile fleet permanent transfers are limited to 5.35% of the TAC. Temporary (within season) transfers are limited to another 5.35% and cease at the season end.
- Transfers between Scotia and Gulf can only be temporary.
- No transfers are possible from the mobile fleet to the trap fleet, or within the trap fleet, because the trap fleet fishes competitively.
- If monitoring shows that a minimum of 50t of the trap fishery share of the TAC will not be landed in a year, either fleet may apply for a portion of the available quota to be transferred to the mobile fleet.

Monitoring and surveillance

- Licences and licence conditions, TAC and quota allocations, gear specifications
- Completion and submission of trip logs, verified by the Dockside Monitoring Programme (DMP)
- 100% coverage of all mobile gear landings by the DMP, following hailing-in
- Random checks of the DMP by DFO

- Observer monitoring at sea of gear, species, catch, by-catch and discards for a minimum of 3 trips up to a maximum of 5% of average sea-days, at industry expense
- Observer reports
- 20% coverage of trap landings by the DMP
- Fishery officer audit of landings documents, DMP data, and observer reports
- VMS monitoring of all vessels

Measures for Habitat Management

To protect sensitive habitat and corals the Gully Marine Protected Area is closed by MPA regulation (Gully Marine Protected Area Regulations P.C. 2004-606 7 May, 2004). DFO has also designated a *Lophelia* Coral Conservation Zone and a Northeast Channel Coral Conservation Zone, and is preparing to designate a closed zone at St Anne's Bank. Bottom fishers are excluded from these areas by their licence conditions. Although the Eastern Scotian Shelf shrimp fishery does not exploit these areas the following descriptions are included here to illustrate the role of such measures.

- The Gully MPA was designated in May 2004 under Canada's *Oceans Act* and comprises an area of 2364 Km². Objectives are to protect the rich diversity of marine habitats and species found there, including many different species of corals.
- The *Lophelia* Coral Conservation Area, established in 2004, is a 15 Km² zone located at the eastern end of the Laurentian Channel known as the Stone Fence. In September 2003, mounds of reef-building hexacoral, *Lophelia pertusa* (i.e. spider hazards), were observed. This area was the only known location with living *Lophelia pertusa* colonies on Canada's Atlantic coast until another area was discovered in The Gully MPA (Cogswell et al. 2009). The coral structures and nearby seabed had signs of extensive damage from fishing gear. It is anticipated that the closure will protect the reef complex from further damage and allow for gradual recovery (DFO 2004a).
- The Northeast Channel Coral Conservation Area is a 424 Km² portion of the Northeast Channel off southwestern Nova Scotia. This area has been a focus of coral conservation efforts in the Region since the late 1990s. In June 2002, the Conservation Area was established to protect the high densities of intact octocorals, mainly bubblegum and seacorn coral. The area selected was based on analysis from 2000 and 2001 visual surveys by DFO and Dalhousie University. About 90% of the area is restricted to all bottom fisheries, while 10% is open only to longline fishing gear (DFO 2002a).

3.5.10 Conservation and Protection

Conservation and Protection (C&P) activity in the Maritimes Region utilises 160 staff of which 130 are trained Fishery Officers spread across 13 onshore bases, several offshore and pending new mid-shore patrol vessels, and surveillance aircraft. Resources on Eastern Scotian Shelf shrimp mainly involve about 20 staff deployed from bases at Sherbrooke and Sydney. The following information is based on Section 6 of the current IFMP, responses given at the site visit, and a Summary Report of C&P for Scotian Shelf Shrimp in Areas 13-15 for 2010-2011 that was sent to assessors after the visit (Wood, 2012, pers comm).

C&P tools and measures (Section 6.5 of PCR 2008)

- Licences and licence conditions, TAC and quota allocations, gear specifications
- Vessel log books, hailing in and hailing out, activity and position monitoring using on-board electronic vessel monitoring equipment (VMS)
- Completion and submission of trip logs, verified by a Dockside Monitoring Programme carried out by independent contractors (DMP)

- 100% coverage of all mobile gear landings by the DMP, following hailing-in
- Random checks of the DMP by DFO
- Observer monitoring at sea of gear, species, catch, by-catch and discards for a minimum of 3 trips up to a maximum of 5% of average sea-days, at industry expense
- Observer reports
- 20% coverage of trap landings by the DMP
- Fishery officer audit of landings documents, DMP data, and observer reports

C&P surveillance activity

- At sea, Fishery Officers inspect shrimp vessels to check licences, gear, catches, assess observer performance and ensure compliance in boundary areas;
- On shore, Fishery Officers conduct licence and landings checks, monitor weigh-outs and assess the integrity of the dockside monitoring program;
- Aerial surveillance, to ensure compliance with licence conditions, seasonal and area closures;
- Fishery Officers monitor hail-outs and hail-ins as an aid in planning enforcement activities;
- Generally, across a broad range of fisheries, C&P carries out investigations into reports of large scale fraud and collusion

C&P management of surveillance

- C&P authorizes VMS service providers, monitors the accuracy of their reporting systems and uses the data for actual surveillance but also for planning patrols and other investigations;
- C&P is the contract authority for at-sea observer services and quality assures the delivery of accurate data and reports as per specification;
- C&P designates both at-sea and dockside observers (third parties). Designation is subject to an individual meeting background checks and eligibility criteria, and requires the successful completion of exams.
- C&P monitors the performance of at-sea and dockside observers and may initiate action to revoke the designations of observers found to be deficient in performance.

Logbook data including area fished is entered into an appropriate data base, and automated programmes check for conformity between the fishing area and the area licensed, backed up by aerial surveillance data. Illegalities are also noted in observer reports. At-sea monitoring and surveillance at sea may lead to charges of illegal activity when evidence is found. Aerial surveillance provides evidence of conformity with licence conditions and closed areas

Education and Shared Stewardship

- Informal interactions are ongoing, but effort of this kind is not recorded on a day-to-day basis for individual fisheries.
- Periodic meetings occur with DFO and industry as required to track the annual performance of the fisheries and the C&P programme; to discuss expectations, problems and solutions; and to modify plans and priorities.
- The advent of a new or amended regulation will trigger increased contact with industry in order to explain what is required, and why, and how it will be enforced.
- The “Report a Poacher” programme contributes to the effectiveness of the enforcement regime.

Records of performance

The following performance records are copied from the 2010-2011 Summary Report of Compliance and Performance for Scotian Shelf Shrimp, sent to the assessment team by DFO.

Total Fishery Officer Hours in the Scotian Shelf Shrimp Fishery by Year					
2006	2007	2008	2009	2010	2011
199.75	197.5	112	80.75	90	135.75

Note 1: Hours assigned to the shrimp fishery is a 'best estimate' when other fisheries are involved.

Note 2: Officers have recorded 233 hours for 2012 to date.

Vessels Checked (all Platform Types) by Year					
2006	2007	2008	2009	2010	2011
51	68	92	44	51	43

Note 1: includes inspections at dockside, at sea, from the air.

Note 2: 45 vessels have been checked to date in 2012.

Shrimp Dedicated Vessel Patrol Time					
2006	2007	2008	2009	2010	2011
7.5					4

Note 1: the priority for offshore vessels is mainly for snow crab and lobster, but shrimp will become a priority for new midshore patrol vessels due in 2013 and 2014.

Aerial Surveillance Hours for Inshore Shrimp					
2006	2007	2008	2009	2010	2011
11	34	5.75	9.75	9.5	4.5

Note 1: it only takes a few minutes to check the identity and position of a shrimp vessel once radar has been used to decide whether a close check is needed.

At-Sea Observer Coverage					
2006	2007	2008	2009	2010	2011
2 trips ¹	No coverage	2 trips ²	3 trips ³	4 trips ⁴	2 trips ⁵

Note 1: Both SFA 14

Note 2: Both trips straddled SFA's 14 and 15

Note 3: One in SFA14, one in SFA 15 and one straddling SFA13-15

Note 4: One in SFA 14, 2 in SFA 15 and one straddling 14-15

Note 5: One in SFA 14 and one in SFA 15

N.B. 1: The main task is scientific sampling and recording, but observers are trained to report compliance issues. Observers are trained for all the fisheries and so do not work exclusively on shrimp.

N.B. 2: Observers and dockside monitoring duties are contracted out, but C&P is required to monitor performance against the contract specification.

Compliance and violations

Two violations in 2010 -11 were due to a failure to hail-in through ignorance of the rules by fishers from outside the Maritimes Region, who were warned and complied thereafter. In 2012 there was one violation in the mobile fishery because of a VMS malfunction, which was rectified promptly. In 2012 there were also two violations in the trap fishery for not tending shrimp traps on time, and although the trap fishery is not under review in this recertification, it is worth noting as an example of the enforcement operation that the trap offences were taken to court and are awaiting judgement. C&P retains the view that compliance in the mobile shrimp fishery is good.

Sanctions

Sanctions are available to deal with breaches of licence conditions and fishery regulations, including tickets issued by enforcement officers for low level infractions, and the institution of court proceedings for major offences. At the site visit it was stressed that the principal theme of C&P work in the Maritimes is that court action is a last resort, because it is time consuming, expensive, and a blunt tool. C&P objectives are best secured by informal interactions with industry through the advisory process, at wharves, plants, or at sea during day to day monitoring, surveillance and enforcement patrols. Initial infractions are dealt with by warnings and individual guidance, and assessors were assured that repeat offending is rare. Consideration is being given to the feasibility of using a ticketing system for infractions in all fisheries in the future. The Head of Compliance and Protection concluded that based both on the low number of infractions, and intelligence received, the Eastern Scotian Shelf shrimp trawl fishery is regarded as a low risk fishery from a compliance perspective. In case of serious concerns or problems the Advisory Committee has a sub-committee on conservation and compliance.

3.5.11 Education and training

So far as we are aware, education for stakeholders is mainly achieved through day to day contact with Fishery Officers and monitoring officers, and during the operation of the SSSAC, where scientific and technical presentations are made regularly in support of the provision of scientific advice. Compliance & Protection officers and dockside monitoring staff will receive training for their duties.

There is a considerable emphasis on educational outreach for policy, management and science throughout the DFO domain. This is partly facilitated by the very comprehensive and user friendly DFO website pages devoted to all aspects of DFO activities and regions, but other educational activities do occur. For example, an important deliverable of the Coral Conservation Plan was the development of a Maritimes Region Deep-Sea corals Outreach and Education Strategy (Martin 2007, unpublished). The Strategy (2006-2010) identifies key messages and priority outreach and education initiatives for target audiences. The Region developed a corals educational kit which was designed for high schools in Nova Scotia. In 2009, the Maritimes Region released a DVD entitled "*Oasis of the Deep: Cold Water Corals of Atlantic Canada*". The DVD describes the different types of corals found in Atlantic Canada and includes videos and photographs taken during recent scientific surveys (DFO 2008a).

4. Evaluation Procedure

4.1 Harmonised fishery assessment

Shrimp fishing areas 13, 14, 15 were certified to the MSC standard under a separate client group in June 2011, thus, as per MSC Certification Requirements version 1.2, section 27.4.13, this is an overlapping fishery. That certification (Scotian Shelf Shrimp in Shrimp Fishing Areas 13, 14 and 15; SCS 2011) used the MSC Default Assessment tree and associated guidance issued in the MSC Fisheries Assessment Methodology (FAM) version 2.1, issued in May 2010. The MSC Default Assessment tree used in this evaluation of the fishery emanates from the MSC, issued in January 2012. While guidance for evaluation with the MSC default assessment tree has improved, and become more precise, the trees used in the two assessments in question, that of SCS certified in 2011, and this re-assessment,

are essentially the same. Thus, there was no need for additional harmonization of the two assessment trees.

4.2 Previous assessments

This fishery was initially certified with conditions in 2008, using a pre-FAM assessment tree. During that certification, five conditions were raised in relation to twelve performance indicators (of a total of 74) in that tree. Over the course of the ensuing certification validity period, the client, with the assistance of the scientific/ management agency, successfully closed out those five conditions. There are no conditions which remained open after the fourth surveillance audit for this fishery.

4.3 Assessment methodologies

The Scotian Shelf (SFA 13, 14, 15) shrimp trawl fishery was reassessed against the MSC Principles and Criteria using the MSC Certification Requirements, version 1.2 (10 January 2012), and associated MSC Guidance to MSC Certification Requirements, version 1.1 (10 January 2012).

This reassessment was conducted using the default assessment tree, without modification, contained within MSC Certification Requirements v.1.2. There were no stakeholder comments received regarding the use of the default assessment tree during the consultation period. The Risk-based Framework was not used in this reassessment.

4.4 Evaluation processes and techniques

4.4.1 Site visits

The fishery site visit for the Scotian Shelf northern shrimp recertification was combined with the fourth annual surveillance audit. The site visit was conducted during the period of 13 – 15 November 2012, with all meetings held in Dartmouth, Nova Scotia (See Table 4). Site visit meetings were conducted with members of the client group and DFO personnel including stock biologists, resource management staff, conservation and protection personnel. General topics discussed with each group are outlined in Table 4. In addition, a more detailed summary of the discussions is included in Appendix 3.

Table 4: Site visit participants and issues discussed for the Canadian Scotian Shelf Northern Prawn Trawl Fishery, 14 November 2012.

Individual	Organization/ Position	Issues Discussed
Tara McIntyre	DFO Ecolabelling Co-ordinator	DFO ecolabelling coordinator responsibilities,
Sara Quigley	DFO Resource Management	Resource management, IFMP updating, PA policy, sensitive habitat initiatives, EAM initiative, fishery performance checklist, Advisory process
Jennifer Ford	DFO Policy and Economics	Sensitive habitat initiative
Scott Coffen-Smout	DFO Oceans and Coastal Management	Habitat initiatives, mapping of habitat and fishery overlaps.
David Hardie	DFO Science	Biology of shrimp, assessment of target (P1)

Individual	Organization/ Position	Issues Discussed
		species, development of reference points, assessment data sources, catch composition, survey program, research plan, retained, bycatch and ETP species
Bryan Wood	DFO Conservation and Protection	Fishery rules and tools, monitoring, control and surveillance system, compliance in the fishery, enforcement tools, sanctions, at-sea and dockside monitoring programs,
Derek Butler	Association of Seafood Producers (Client)	Unit of certification, current issues/ concerns within the fishery, involvement within the fishery management and advisory process, update on remaining conditions from first certification period

There were no written submissions or requests for meetings with the assessment team received from Environmental Non-Governmental Organizations (ENGOS) or any other stakeholders.

With the exception of follow up questions and responses between the assessment team and DFO personnel, all other meetings were conducted in person at the Bedford Institute of Oceanography in Dartmouth, Nova Scotia.

All members of the assessment team, Don Parsons, Howard Powles, Colin Bannister and Steve Devitt, attended each of the site visit meetings.

4.4.2 Consultations

See Table 4, above, with respect to details of the individuals interviewed during the site visit, and summary of topics discussed. Summaries of all meetings conducted over the course of the site visit are included in Appendix 3.

4.4.3 Evaluation techniques

IMM published the notification of the fishery proceeding to recertification in the Navigator, an industry paper in Atlantic Canada, the MSC website and via email to known interested stakeholders. In discussion with the client, it was decided that the magazine selected was most appropriate due to wide spread distribution and substantive reader base. Notification of the site visit as well as any announcements regarding team and peer reviewer selection, and publication of assessment report were circulated to stakeholders via email and posted on the MSC website.

Several sources of information provided the basis of assessment conclusions, including a review of information and references provided by the client prior to the site visit, site visit meetings held with stakeholders involved with the fishery (see Table 4), and review of literature and information provided following site visit meetings. Inspection of the fishery focused on the practicalities of fishing operations, the mechanisms and effectiveness of the management agency and assessment of the fishery and its impact on non-target species, habitats and ecosystems.

The MSC Principles and Criteria set out the requirements for sustainable fishing. These Principles and Criteria have subsequently been used to develop a standardized, default assessment tree (within the MSC Certification Requirements), including Performance

Indicators (PI) and Scoring Guideposts (SG), by the MSC and its advisory boards, which have been used in the recertification of this fishery.

Proposed use of the default assessment tree was announced on the MSC website. In order to make the assessment process as clear and transparent as possible, each PI has three associated scoring guideposts (SGs) which define the level of performance necessary to achieve 100, 80 (a pass score), and 60 scores for each PI; 100 represents a theoretically ideal level of performance and 60 a measurable shortfall, below which the candidate fishery fails.

For each PI, the performance of the fishery is evaluated, and a score issued. In order for the fishery to achieve certification, an overall weighted average score of 80 is necessary for each of the three Principles and no PI should score less than 60. Scores are issued using a minimum increment of five. Average scores for each Principle are rounded to one decimal place.

Following the review and synthesis of information available, the assessment team discussed each individual scoring issue under each scoring guidepost to determine if evidence is present to demonstrate which scoring issues are met. Justification of issues that were met is provided in the scoring table presented in Appendix 1.1. Scores for each PI were determined based on guidance outlines in Section 27.10 of the Certification Requirements. Scores were agreed upon by each team member, with the principle lead responsible for writing the rationales.

Scores allocated for each PI were entered into the MSC Fishery Assessment Scoring Worksheet in order to attain the overall Principle scores.

5 Traceability

5.1 Target Eligibility Date

The target eligibility date for product from the fishery under assessment is concurrent with the expiry of the existing certificate. As this is a recertification assessment, any product landed prior to the expiry of the existing certificate is considered certified.

5.2 Actual Eligibility Date and initial certificate expiration

The assessment took longer than initially predicted. IMM applied for and received a Variation from the MSC to extend the initial certificate validity to 31 October 2013. The assessment was not completed at that time. The Actual Eligibility Date for this fishery will be the date of certification.

As a result of the extended period of assessment, there will be a period of time, extending from 31 October 2013 to date of actual recertification, when the fishery will not be covered by a valid fishery certificate. Client group members and businesses within the chain of custody for this fishery should recognize that product captured during this process will not be eligible to be labelled as MSC certified product.

5.3 Traceability within the fishery

The Scotian Shelf northern shrimp trawl fishery is managed through a limited entry and licence based management system. As noted previously, the number of vessels permitted to operate in the candidate fishery is currently 42. Harvesters operating in the fishery are required to renew permits annually, report catch and comply with conditions of license related to regulation of the fishery, thereby, allowing DFO to track the number of permit holders in total as well as the number active permit holders in the fishery.

Through requirements associated with dockside monitoring, landings reporting, and VMS, those involved in the management and enforcement of regulations have the ability to identify the quantity of product caught, as well as the area from which it was harvested.

As the unit of certification covers the entire area of operation of the fishery, and does not exclude any areas in which fishing is permitted, along with the fact that the fishery operates on a single stock, the possibility of those vessels included in the unit of certification legally fishing outside the UoC is minimal. There are several New Brunswick vessels permitted to harvest northern shrimp which also hold fishing permits for certified shrimp fishing areas in the Gulf of St. Lawrence. The vessels are required to either offload product prior to changing fishing zones or are required to have an at-sea observer on board who can verify catch quantities prior to moving to new fishing zones. These permits are controlled through ITQ quotas, hence it is not a concern that these vessels would comingle product from outside this unit of certification.

Likewise, the risk of substitution of certified product with non-certified product prior to landing is negligible, as the adjacent stocks in both the Gulf of St. Lawrence and Newfoundland are also certified and product from those Units of certification are typically landed at ports within the UoC. Therefore, although harvesters may be permitted to fish in other SFAs, that product would be landed and recorded against ITQs in those SFAs.

There is no at sea processing of shrimp harvested in the Scotian Shelf northern shrimp trawl fishery under assessment. All harvested product is landed for processing as fresh (iced), whole shell-on product. The raw material must be cooked and peeled prior to being sold. Members of the client group (processing companies) would be required to have a valid chain of custody in effect in order to be able to sell the certified product further into the distribution chain. As such, these member companies would all be knowledgeable and in compliance with MSC segregation requirements for certified and non-certified raw materials.

Over the course of the assessment it was evident that there were no concerns associated with transshipping in the fishery under consideration.

5.4 Eligibility to enter further Chains of Custody

The fishery assessment covers all northern shrimp, *P. borealus*, landed from vessels operating in the Unit of Certification until the point of landing, therefore the scope of certification ends at the point of landing. Downstream certification of the product would require the appropriate chain of custody certification.

As noted above, the fishery certificate is applicable to all permitted trawl vessels that hold valid ITQ licences for the three SFAs. Any product landed by vessels operating within the UoC is considered within scope, and MSC certified provided that the product is purchased by members of the client association, currently as follows (at the time of recertification).

Association of Seafood Producer (ASP) members:

- Barry Group Inc.
- Ocean Choice International L.P.
- Notre Dame Seafoods Inc.
- Nu Sea Products Inc. (BGI)
- Northern Shrimp Ltd (OCI)
- St. Anthony Seafoods Limited Partnership (Clearwater).

Beyond landing, any company taking ownership of the product and wishing to identify it as MSC certified will need to be a member of ASP and hold a CoC certificate.

Traceability of product from the fishery is covered by the fishery certificate up until the first point of landing to ASP member companies by legally licenced SFA 13, 14, 15 shrimp fishing vessels. In order for subsequent links in the distribution chain to be able to use the MSC logo, companies and/or individuals must enter into a separate chain of custody certification, and be able to track product to the ASP member companies.

Product from the fishery under assessment is landed in any port authorized by DFO where certified dockside monitoring companies can verify weight and species composition of offloaded product.

5.5 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to enter further Chains of Custody

The distribution of *P. montagui* can overlap with that of *P. borealis* on the Scotian Shelf and, as a result, is liable to be caught in the fishery. Owing to their physical similarities and appearance they are inseparable during the normal fishing operation and practically inseparable during processing (CR 27.4.9.1 a & b).

Observer information for the most recent years available (2008-2010) indicates that “other shrimp” (i.e. shrimp other than *P. borealis*) made up 0.50% of the target species catch in this period (Hardie et al 2011) (Table 2, above). Although observers do not separate *P. montagui* from other species of shrimp taken in the fishery, it would make up most of the “other shrimp” category, and accordingly, it is estimated that *P. montagui* makes up 0.50% or less of the target species catch. As such, catches of *P. montagui* in the fishery are < 2% of the total combined weight of target and IPI species (CR 27.9.4.1 c).

The *P. borealis* fishery is the only fishery that uses small enough mesh size to catch *P. montagui* and so it is not subject to any other fishing mortality (CR 27.4.9.1 c).

P. montagui is not an ETP species (CR 27.4.9.1 d) (SARA Public Registry).

The *P. montagui* stock on the Scotian Shelf has not been MSC certified (CR 27.4.9.1 e).

Because of the inseparability and low quantities of *P. montagui* that may be retained in the *P. borealis* fishery a variation request was submitted to and granted by the MSC to: 1. Recognise the IPI status of *P. montagui* and, 2. Exempt it from MSC requirements as set out in Annex CH of the MSC CR v1.3. This was accepted by MSC, see Annex 3 showing variation request and response.

As long as the proportion of *P. montagui* does not exceed 2% then product will be eligible to carry the MSC logo.

6 Evaluation Results

6.1 Principle Level Scores

Table 5: Final Principle Scores

Final Principle Scores	
Principle	Score
Principle 1 – Target Species	90.0
Principle 2 – Ecosystem	87.7
Principle 3 – Management System	92.9

6.2 Summary of Scores

Table 6: Summary of performance indicator scores

Prin- ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Score
One	1	Outcome	0.5	1.1.1	Stock status	90
				1.1.2	Reference points	90
				1.1.3	Stock rebuilding	
		Management	0.5	1.2.1	Harvest strategy	95
				1.2.2	Harvest control rules & tools	90
				1.2.3	Information & monitoring	90
				1.2.4	Assessment of stock status	85
Two	1	Retained species	0.2	2.1.1	Outcome	80
				2.1.2	Management	100
				2.1.3	Information	100
		Bycatch species	0.2	2.2.1	Outcome	80
				2.2.2	Management	100
				2.2.3	Information	100
		ETP species	0.2	2.3.1	Outcome	100
				2.3.2	Management	100
				2.3.3	Information	100
		Habitats	0.2	2.4.1	Outcome	80
				2.4.2	Management	60
				2.4.3	Information	85
		Ecosystem	0.2	2.5.1	Outcome	80
				2.5.2	Management	60
				2.5.3	Information	90
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	100
				3.1.2	Consultation, roles & responsibilities	95
				3.1.3	Long term objectives	100
				3.1.4	Incentives for sustainable fishing	80
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	100
				3.2.2	Decision making processes	90
				3.2.3	Compliance & enforcement	100
				3.2.4	Research plan	70
				3.2.5	Management performance evaluation	100

The fishery attained a score of 80 or more against each MSC Principles 1, 2 and 3 and there were no individual PI's with a score of less than 60. It is therefore confirmed that the Canadian Scotian Shelf Northern Prawn Trawl Fishery be recertified according to the MSC Principles and Criteria for Sustainable Fisheries.

6.3 Summary of Conditions

Table 7: Summary of Conditions

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y/N/N/A)
1	<p>By the 3rd surveillance audit, the client must provide evidence that a partial strategy, if necessary, has been implemented and is expected to achieve the Habitat Outcome 80 level of performance, i.e. the <u>fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.</u></p> <p>In addition, by the 4th surveillance audit, the client must provide evidence to demonstrate that there is some objective basis for confidence that the partial strategy, if necessary, will work, based on information directly about the fishery and/or habitats involved.</p>	2.4.2	N
2	<p>By the 4th surveillance audit, the client must provide evidence that a partial strategy, if necessary, has been successfully implemented which takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.</p> <p>The client must provide evidence to demonstrate that the partial strategy, if necessary, is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).</p>	2.5.2	N
3	<p>By the 2nd surveillance audit the client must provide evidence that a documented and approved research plan has been completed to provide the management system with a strategic approach to research, and reliable and timely information sufficient to achieve the objectives consistent with both MSC Principle 1 and Principle 2.</p>	3.2.4	N

Recommendations

Given the importance of the annual shrimp surveys in assessing the resource status relative to reference points and within the trafficlight framework, performance against several of the Principle 1 indicators could be compromised should the surveys be interrupted or discontinued. Developements in this regard will be montiorred in future surveillance audits.

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Appendices

Appendix 1: Scoring and Rationales

Appendix 1.1 Performance Indicator Scores and Rationale

Evaluation Table 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	It is likely that the stock is above the point where recruitment would be impaired.
			See 100a.
80	a	Y	It is highly likely that the stock is above the point where recruitment would be impaired.
			See 100a.
	b	Y	The stock is at or fluctuating around its target reference point.
			<p>Rationale for the use of the Upper Reference Point (URP) as a proxy for a target reference point (TRP) is described below in PI 1.1.2.</p> <p>The 2012 spawning stock biomass estimate (14,763 mt) remained in the Healthy Zone, above the URP of 14,558 mt. Biomass estimates for the 13-year period from 2000 to 2012, with the exception of 2008, have been at or above the URP. The low 2008 estimate has been linked with decreased research trawl efficiency and likely underestimated the true biomass (DFO, 2011a).</p> <p>The most recent 2012 Science Advisory Report (DFO, 2012a) further noted that the female exploitation index was 19% in 2012, below the Removal Reference of 20% (see PI 1.1.2).</p> <p>The stock remains within a high productivity period. Based on evidence from 13 years of biomass estimates, the stock has been fluctuating around its upper reference point for a prolonged period (CB 2.2.2.2). Furthermore, the Removal Reference of 20% SSB has been rarely exceeded during the modern fishery.</p>
100	a	Y	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
			<p>The following is based on information presented in DFO (2012a) Science Advisory Report 2012/073 - Assessment of Northern Shrimp on the Eastern Scotian Shelf (SFAs 13 – 15). The assessment was conducted in December 2012, using 2012 research survey and fishery data.</p> <p>The 2012 spawning stock biomass estimate (14,763 mt) decreased by 12% in 2012. This was the third consecutive decrease from the near-record high 2009 estimate. Nevertheless, biomass in 2012 was 2.7 times the limit reference point (LRP) of 5,460 mt. (Reference points within a precautionary approach framework are described below in PI 1.1.2).</p> <p>The moderately abundant 2007 and 2008 year class continue to support the fishable and spawning stock biomass in 2012 and 2013. However, succeeding year classes (>2008) appear to be less abundant and longer-term recruitment prospects are uncertain. Biomass should remain stable in 2013 but could decline as early as 2014.</p> <p>The current spawning stock biomass remains well above the LRP. Continued high biomass indicates a low probability of recruitment overfishing. The history of the fishery has shown that recruitment, although variable, has not been impaired, even at much lower stock sizes. Therefore, there is a high degree of certainty that the stock is above the point where recruitment would be impaired.</p>
	b	No	<p>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.</p> <p>Confidence intervals for survey catch per unit effort (CPUE) and abundance are frequently wide and variable (Hardie, pers. comm.), creating uncertainty in the true status of the SSB. Therefore, it is not possible to state with 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.</p>
References		DFO, 2011a (IFMP); DFO, 2012a (SAR 2012/073).	
Stock Status relative to Reference Points			
	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	URP - 80% of the average 2000-2010 SSB.	14,558 mt	14,763/14,558 = 1.01
	Removal Reference	<20% SSB when above URP.	19% SSB
Limit reference point	LRP - 30% of the average 2000-2010 SSB.	5,460 mt	14,763/5,460 = 2.70
	Removal Reference	Closed fishery when below LRP.	NA

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
OVERALL PERFORMANCE INDICATOR SCORE:		90
CONDITION NUMBER (if relevant):		

Evaluation Table: PI 1.1.2

PI 1.1.2		Limit and target reference points are appropriate for the stock	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			See 80a.
80	a	Y	Reference points are appropriate for the stock and can be estimated.
			<p>A "Fishery Decision-Making Framework Incorporating the Precautionary Approach" (see URL: http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm) was adopted as part of DFO's Sustainable Fisheries Framework (SFF) initiative (see URL: http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm). The main components of the former include: reference points and stock status zones (Healthy, Cautious and Critical); harvest strategy and harvest decision rules; and the need to take into account uncertainty and risk when developing reference points and developing and implementing decision rules. The following is abridged from the documentation describing the decision-making framework.</p> <p>The stock status zones are created by defining the Limit Reference Point (LRP) at the Critical:Cautious zone boundary, and an Upper Stock Reference Point (USR) at the Cautious:Healthy zone boundary and the Removal Reference for each of the three zones (see Figure 2 in Section 3.3b above). The LRP, the stock status below which serious harm is occurring, is based on biological criteria and established by Science through a peer reviewed process. The USR is the stock size below which removals must be reduced to avoid reaching the LRP. The USR, is set at a safe distance above the LRP to facilitate effective management actions when the stock is in decline. Moreover, 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.</p> <p>The Removal Reference is the maximum acceptable removal rate, normally expressed in terms of fishing mortality (F) or harvest rate. The Removal Reference must be less than or equal to the removal rate associated with maximum sustainable yield. In the Cautious zone, the adjustment of the Removal Reference requires a progressive (linear or otherwise) reduction in removal rate.</p> <p>Precautionary reference points for the Scotian Shelf shrimp fishery were developed in accordance with the DFO framework and are described below (SG 80c and SG 100b).</p>
			<p>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.</p> <p>See 100b.</p>
	c	Y	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.

PI 1.1.2		Limit and target reference points are appropriate for the stock	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>The URP (or USR) and the Removal Reference, developed by DFO Science (DFO, 2012c, Smith et al., 2012), are described in detail within the Integrated Fisheries Management Plan (IFMP) for Scotian Shelf shrimp (DFO, 2011a).</p> <p><i>Upper Reference Point: 80% of the average SSB maintained during the modern fishery (2000-2010). This upper reference point (URP) has been selected as it maintains a sufficient gap between the LRP and URP to account for uncertainty in the stock and removal reference values, and to provide sufficient time for real biological changes in the population to be expressed, detected and acted upon. Although the low SSB in 2008 is known to be an artifact of survey gear problems, substantial changes in the SSB index are evident in the stock and reinforce the importance of a conservative URP. Because of the low economic viability of the fishery, a high CPUE is critical under current conditions. As a result, the target reference point may actually be higher than the URP.</i></p> <p><i>Removal Reference: Indicates the maximum removal of 20% of the Spawning Stock Biomass (actual catch/SSB) when above the URP, a closed fishery when below the LRP, and gradual changes in between. The maximum removal rate has not been exceeded by the modern fishery, during which time high spawning stock biomass and high CPUE have been maintained. Given that shrimp survive for approximately 3-4 years after their recruitment to the fishery, it can be approximated that on the order of 25-33% of the fishable biomass would be subject to natural mortality in any given year. Although some have suggested that exploitation scenarios in which fishing mortality equals natural mortality result in optimal yield, this approach has been shown to overestimate potential yields in many stocks. As a result, the maximum removal reference of 20% for shrimp is on the conservative side of the simplistic approximate range of natural mortality (25-33%).</i></p> <p>The URP and Removal Reference are consistent with and demonstrate similar intent or outcome as B_{MSY} and F_{MSY}, respectively and ensure that the stock is maintained at a high level.</p>
	d	NA	<p>Key low trophic level species, the target reference point takes into account the ecological role of the stock.</p> <p>Although <i>Pandalus borealis</i> is a low trophic level species, it is not considered "key" for this assessment (CB 2.3.13). It is not one of the species types listed in Box CB1 and does not fully meet the criteria in Box CB3 (i.e. >10,000 eggs/spawning). Furthermore, although northern shrimp are prey for a range of species, they do not appear to play a critical role in the diet of any species, unlike some species of small pelagic fishes for example (Bundy 2004).</p>
100	b	Yes	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 .

PI 1.1.2		Limit and target reference points are appropriate for the stock	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>The LRP is described in detail within the IFMP for Scotian Shelf shrimp (DFO, 2011a).</p> <p><i>Limit Reference Point: 30% of the average SSB maintained during the modern fishery (2000-2010). This is approximately equal to the average SSB during the low-productivity (pre-1990) period, characterized by low shrimp abundance, high groundfish abundance and relatively warm temperatures. The justification for this as the limit reference point (LRP) is twofold. First, the Scotian Shelf shrimp population previously increased from low level during the transition from low- to high-productivity, so the working assumption is that shrimp could once again recover from this level given appropriate environmental conditions and fishing pressure. Secondly, given the important role of shrimp in the Scotian Shelf ecosystem, particularly as prey for groundfish, this LRP is set to avoid a decrease in shrimp abundance below the level at which it was previously able to fulfill its ecosystem roles under a situation of high groundfish abundance (i.e., to avoid a scenario in which low shrimp abundance could act as a limiting factor in groundfish non-recovery).</i></p> <p>Therefore, an LRP has been implemented above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.</p>
	c	No	<p>The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.</p> <p>There was no evidence to demonstrate that either the URP or the Removal Reference takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.</p>
References			<p>See URL: http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm (decision framework); See URL: http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm (SFF); DFO, 2011a (IFMP).</p>
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 1.1.3

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	NA	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			The most recent assessment (see DFO, 2012a) describes a healthy stock for which spawning stock biomass in 2012 was 2.7 times the limit reference point (LRP) and remained in the Healthy Zone, above the upper reference point (URP). Furthermore, the female exploitation index was 19% in 2012, below the removal reference of 20%.
			The stock is not considered depleted; therefore this indicator is not applicable and not scored (CB2.4.1).
	b	NA	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.
	c	NA	Monitoring is in place to determine whether they are effective in rebuilding the stock within a specified timeframe.
80	a	NA	Where stocks are depleted rebuilding strategies are in place.
	b	NA	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.
	c	NA	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.
100	a	NA	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe .
	b	NA	The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock.
References		DFO, 2012a (SAR 2012/073).	
OVERALL PERFORMANCE INDICATOR SCORE:			NA
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 1.2.1

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.
			See 100a.
	b	Y	The harvest strategy is likely to work based on prior experience or plausible argument.
			See 80b.
	c	Y	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			<p>The IFMP for this fishery (DFO, 2011a) provides the details for monitoring to confirm that the harvest strategy is working. The IFMP is reviewed annually to ensure that the objectives, strategies, and tactics remain appropriate and up-to-date.</p> <p>Shrimp landings are subjected to 100% independent dockside monitoring ensuring accuracy in landing statistics.</p> <p>The DFO-industry trawl survey is currently conducted annually to assess shrimp biomass relative to precautionary reference points and evaluate recruitment prospects. The survey also provides the basis for ensuring the exploitation rate index remains below the Reference Removal of 20% SSB.</p> <p>A target of 5% of commercial mobile shrimp fishing trips are monitored by independent at-sea observers who verify fishing location, catch, bycatch, etc. Furthermore, the mandatory use of VMS ensures that shrimp fishing does not occur in prohibited areas.</p>
80	a	Y	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.
			See 100a.
	b	Yes	<p>The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.</p> <p>There has not been a Management Strategy Evaluation (MSE) conducted for this fishery, therefore the harvest strategy has not been fully tested. However, monitoring (described in SG 60c above) is required within the IFMP and prescribed conditions of licence. The combination of monitoring, stock assessment (PI 1.2.4), harvest control rules and management actions (PI 1.2.2), explicit within the IFMP, comprises an effective harvest strategy, as evidenced by the stock remaining within the Healthy Zone and the exploitation rate index remaining below the Reference Removal of 20% (DFO, 2012a). TAC's have not been exceeded and there was no evidence of systematic fishery rules violations.</p>

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
100	a	Y	<p>The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.</p> <p>DFO's Sustainable Fisheries Framework (see URL: http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm) ensures that fisheries are supportive of conservation and sustainability of the target stocks. The framework includes tools to monitor and assess initiatives for an sustainable fishery and identifies areas for improvement. The SFF "<i>provides the foundation of an ecosystem-based and precautionary approach to fisheries management in Canada.</i>" The framework includes implementation of IFMPs that identify objectives related to conservation, management, enforcement, and science and require a regular review of the fishery against the plan's goals.</p> <p>The IFMP for Scotian Shelf shrimp (DFO, 2011a) was designed in accordance with the SFF initiative. The overarching productivity conservation objective ensures the fishery does not cause an "<i>unacceptable reduction in productivity so that all components can play their role in the functioning of the ecosystem</i>". Stock management objectives seek to maintain the stock within the healthy zone with the exploitation index not exceeding 20%. Exploitation must be decreased by reducing the Total Allowable Catch (TAC) when the stock is assessed within the cautious zone and the fishery is closed in the critical zone.</p> <p>The stock has remained healthy with respect to SSB (DFO, 2011b, DFO 2012b), however it was suggested by DFO Science that TAC reductions would be prudent for both 2011 and 2012. This conclusion was based on the set of auxilliary indices that showed decreases in shrimp size, poor recruitment, a temporal shift in fishing effort, and unfavourable ecosystem indicators. (See PI 1.2.2 and PI 1.2.4 for details of auxilliary, traffic light indicators.) As a precautionary measure, TAC reductions would minimize the likelihood of reducing the stock below the upper reference point or of exceeding the removal reference point. Accordingly, the TAC was reduced from 5000 mt in 2010 to 4600 mt in 2011 and to 4200 mt in 2012, thereby providing evidence that the harvest strategy is responsive to the state of the stock.</p>
	b	N	<p>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.</p> <p>There is no Management Strategy Evaluation (MSE) for this fishery. Furthermore, there is no operational history of effectiveness (e.g. we have yet to see a scenario where the stock falls into the cautious zone; the TAC is reduced, Exploitation rate falls, and the stock moves back to the healthy zone).</p>
	d	Y	The harvest strategy is periodically reviewed and improved as necessary.

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
			The IFMP is reviewed annually to ensure that the objectives, strategies, and tactics remain appropriate and up-to-date. The review comprises an internal DFO assessment as well as opportunity for Eastern Scotian Shelf Shrimp Advisory Committee (ESSSAC) members to provide feedback on the plan during the annual meeting. In Canada, the Minister of Fisheries and Oceans has the final authority on stock conservation decisions.
References		http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm (SFF); DFO, 2011a (IFMP); DFO, 2011b (SAR 2011/029); DFO, 2012a (SAR 2012/073); DFO, 2012b (SAR 2012/001).	
OVERALL PERFORMANCE INDICATOR SCORE:			95
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 1.2.2

PI 1.2.2		There are well defined and effective harvest control rules in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	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.
			See 80a.
	c	Y	There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			See 100c.
80	a	Y	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.
			Harvest control rules are based on the precautionary approach for the Scotian Shelf shrimp fishery (see PI 1.1.2 above). The framework (Figure 2, Section 3.3b) provides for reductions in exploitation (i.e. decreases in TAC) when the SSB falls within the Cautious zone and total closure of the fishery if the SSB is less than the LRP. These rules are explicit and well defined within the IFMP (DFO, 2011a). Decreases (or increases) in exploitation within the Cautious zone (i.e. between LRP and URP) are illustrated in Figure 2 by broken lines. These lines represent a range of management actions, depending on whether the stock is stable, increasing or decreasing, or on trends in other indicators of stock or ecosystem health. The precautionary reference points are based on single abundance and removal indices. However, the fishery is also assessed using a holistic approach within a traffic light framework (Figure 4, section 3.3b) which considers information from 25 indicators of stock abundance and productivity as well as fishing and ecosystem effects (DFO 2012a). Groundfish predator abundance and spring sea surface temperature are ecosystem factors known to exert strong influences on shrimp abundance. Furthermore, advice can also be based on abundance trends expected from shrimp recruitment indices. Harvest control tools include limited entry for the number of available fishing licenses, TAC, ITQ, gear restrictions (otter trawl with minimum mesh size of 40 mm), mandatory separator grates (25 mm maximum bar spacing), at-sea observer coverage (up to 5%), a mandatory logbook system and dockside monitoring (100%). Shrimp is the only retained species permitted and bycatch must be returned immediately to the sea. Licence Conditions (DFO, 2011a, Appendix 9) define fishing areas and seasons, target species, fishing gear, observer and monitoring coverage, reporting requirements.
	b	Y	The selection of the harvest control rules takes into account the main uncertainties.

PI 1.2.2		There are well defined and effective harvest control rules in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Uncertainty was considered in the selection of the LRP, URP and the Removal Reference defined in the IFMP. Reference points delimiting the “cautious” zone (URP to LRP) are based on knowledge of stock biology and take account of limitations of data and of uncertainties (DFO, 2011a, pp. 15-16 and PI 1.1.2 above). The maximum exploitation rate of 20% when the stock is above the URP is lower than what would have been set if stock status was known with high certainty (25-33%, based on an estimate of natural mortality) (DFO, 2011a, p. 16).</p> <p>Major uncertainties and assumptions about stock status are outlined in the IFMP (DFO, 2011a, p.15). These include: 1. The uncertainty that the recent favourable environment could rapidly revert to the low productivity conditions associated with high predator abundance and warm water temperatures. 2. The uncertainty associated with environmental and ecological influences on productivity requires an adaptive approach, allowing for effective changes to the TAC in the event of stock decline. 3. There is greater vulnerability and uncertainty related to fishing of a stock near the limits of its geographical distribution. 4. Shrimp are one of the important ecosystem components for a variety of finfish and invertebrates, and especially to the non-recovering groundfish populations on Scotian Shelf. 5. Maintaining a high SSB increases the probability of strong recruitment.</p> <p>The Science Advisory Report on stock status (DFO, 2012a) provides a separate section describing sources of uncertainty. Briefly, these include: high variance and biases in survey results; spatial and temporal variability in shrimp distribution; faulty trawl sensors and data logging during 2007 - 2008; subjectivity in determining age composition and growth rates; and incomplete data for the current year's assessment.</p>
	c		<p>Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.</p> <p>See 100c.</p>
100	b	N	<p>The design of the harvest control rules takes into account a wide range of uncertainties.</p> <p>Although the selection and design of the harvest control rules addresses main uncertainties (SG 80b), it cannot be said that a wide range of uncertainties is taken into account. For example, confidence limits for the survey CPUE and abundance are calculated (Hardie, pers. comm.) but these are not taken into account when relating current SSB to the LRP, URP or Removal Reference; rather, point (mean) estimates are used.</p>
	c	Yes	<p>Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.</p>

PI 1.2.2		There are well defined and effective harvest control rules in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>The stock has remained healthy with respect to SSB (DFO, 2011b, DFO 2012b), however it was suggested by DFO Science that TAC reductions would be prudent for both 2011 and 2012. This conclusion was based on the set of auxilliary indices within the traffic light framework that showed decreases in shrimp size, poor recruitment, a temporal shift in fishing effort, and unfavourable ecosystem indicators. As a precautionary measure, TAC reductions would minimize the likelihood of reducing the stock below the upper reference point or of exceeding the removal reference point. Accordingly, the TAC was reduced from 5000 mt in 2010 to 4600 mt in 2011 and to 4200 mt in 2012, thereby providing evidence that clearly shows the tools in use are effective in achieving the exploitation levels required under the harvest control rules.</p> <p>Additional evidence can be found in past management actions (prior to the reference point framework), which imposed 2 substantial decreases in the TAC (by 30% and 40%) in response to declines in stock health indicators despite continued high catch rates and biomasses (DFO, 2011a).</p> <p>Over the longer term, the history of a successful fishery and a healthy resource provides evidence for the efficacy of harvest control tools. TAC's are respected and the stock remains within a high productivity period. There are no indications of growth or recruitment overfishing.</p>
References		DFO, 2011a (IFMP); DFO, 2011b (SAR 2011/029); DFO,2012a (SAR 2012/73); DFO, 2012b (SAR 2012/001).	
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 1.2.3

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			See 100a.
	b	Y	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.
			See 80b
80	a	Y	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			See 100a.
	b	Y	Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule , and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			<p>Stock abundance is monitored annually through the DFO-Industry research survey which covers the main stock area. The SSB estimate calculated is evaluated relative to the LRP, URP and Reference Removal within the precautionary reference point framework (PI 1.1.2 above).</p> <p>Fishery removals are monitored and well estimated through a combination of vessel logbooks, daily hails and 100% independent dockside monitoring as required by the IFMP (DFO, 2011a), thereby providing timely information for quota monitoring and accurate estimates of fishery removals. The integrity of the dockside monitoring program is routinely assessed by Fisheries Officers who also conduct inspections of shrimp vessels to check licences, gear, catches, assess at-sea observer performance and ensure compliance within boundary areas. Fishery removals from both the trawl and trap fisheries are compared each year to the survey estimate of SSB to calculate and evaluate the exploitation rate index relative to the 20% Removal Reference within the precautionary reference point framework. As there is no evidence of removals due to illegal, unreported, unregulated, recreational, customary or incidental fishing, other sources of shrimp mortality are considered insignificant.</p> <p>In addition to precautionary reference points, the holistic, traffic light framework (see SG 80a of PI 1.2.2 above) considers information from 25 indicators of stock abundance and productivity as well as fishing and ecosystem effects (DFO 2012a). These indicators also influence the decision-making process with respect to setting TACs.</p>
	c	Y	There is good information on all other fishery removals from the stock.

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>The trap fishery is the only other source of removals and catches are low and well-estimated (20% dockside monitoring). This component accounts for a minor part of the total catch and is not included in this assessment. Removals by the trap fishery are included in the calculation of the exploitation rate index.</p> <p>In 2012, 155 mt were taken in the trap fishery, 46% of the TAC for this gear sector (336 mt or 8% of the global TAC) and 3.7% of the global TAC (4200 mt). Currently, there are 14 licences for the trap fishery, of which 6 or 7 are active (Hardie, pers. comm.). There are also a few exploratory licences but none are active.</p>
100	a	Y	<p>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.</p> <p>The auxiliary data contained with the multiple indicator, traffic light framework comprise an extensive source of information that is used to support the harvest strategy and control rules (DFO 2012a, Hardie et al. 2013).</p> <p>Stock structure and productivity: Information on the distribution and geographical range of the stock is derived from the annual DFO-Industry surveys for shrimp. Six indicators are used for inference and estimation of stock structure and production - 1. Age 1 shrimp abundance. 2. Age 2 shrimp abundance. 3. Age 4 shrimp abundance. 4. Spawning stock biomass (females). 5. Average size at sex transition. 6. Average maximum size.</p> <p>Other sources include - 1. Vessel logbook and daily hail records include catch and fishing positions as required by the IFMP (DFO, 2011). 2. Sevigny et al. (2000) conducted a genetic study of <i>Pandalus borealis</i> and concluded that, with a few local exceptions, shrimp in Atlantic Canada form a single population. Fecundity of northern shrimp is known in some areas of the north Atlantic (e.g. Parsons and Tucker, 1986), but no study from the Scotian shelf area has been performed.</p> <p>Stock abundance: Five indicators are used for inference and estimation of stock abundance - 1. A research vessel abundance index is obtained from the swept area, stratified trawl survey. 2. Gulf-based vessel unstandardized catch per unit effort (CPUE). 3. Commercial Trawler Standardized CPUE. 4. Research vessel coefficient of variation (a measure of resource aggregation/dispersal). 5. Commercial fishing area (used to interpret changing distribution and dispersion patterns).</p> <p>Other information: The environment (e.g. temperature, competition, predation) is believed to play an important role in controlling the shrimp population on Scotian Shelf (Koeller, 2000).</p>

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Accordingly, seven indicators provide information pertaining to the ecosystem - 1. Population age-length evenness (a measure of recruitment patterns). 2. Research vessel bottom temperatures. 3. Spring sea surface temperatures. 4. Research vessel capelin abundance. 5. Atlantic cod recruitment. 6. Greenland halibut recruitment. 7. Snow crab recruitment.</p> <p>Fishery removals: As noted above (SG 80b), fishery removals are monitored and well estimated through a combination of vessel logbooks, daily hauls and dockside monitoring as required by the IFMP (DFO, 2011a).</p> <p>All catch must be landed and discarding of shrimp is illegal. During the period 2002 – 2009, shrimp discards were estimated at 0.19% of the total catch (SCS, 2011). Therefore, shrimp discards are believed to be negligible.</p> <p>Fleet composition: The IFMP for this fishery provides a complete listing of mobile gear licence holders (DFO, 2011a, Table 3, page 30). The mobile shrimp fishery comprises both >65' (mainly Gulf-based fleet) and <65' (Maritimes Region fleet) vessels, using otter trawls. There are 28 Maritimes Region based licences and 14 Gulf Region based licences involved in the commercial mobile gear fishery on the Eastern Scotian Shelf (DFO, 2011a).</p>
	b	N	<p>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.</p> <p>Although there is a good understanding of inherent uncertainties in the information required by the harvest control rule, the use of point estimates for the mean survey biomass creates uncertainty with respect to the true status of the SSB relative to the limit and upper reference points and the exploitation rate index relative to the Removal Reference. The use of confidence intervals would evaluate uncertainty in this regard.</p> <p>The traffic light indicators, used to support the harvest strategy and control rules, also have inherent, unresolved uncertainties.</p>
References		DFO, 2011a (IFMP); DFO, 2012a (SAS 2012/073); Hardie et al., 2013 (Res. Doc. 2013/033 draft.); Koeller, 2000; SCS, 2011; Parsons and Tucker, 1986; Sevigny et al., 2000.	
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 1.2.4

PI 1.2.4		There is an adequate assessment of the stock status	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	b	Y	The assessment estimates stock status relative to reference points.
			Rationale presented in PI 1.1.1 and PI 1.1.2 above clearly demonstrates that the assessment estimates stock status relative to reference points (LRP, URP and Removal Reference). The research survey estimates of SSB are critical to the reference point framework and the auxiliary information contained within the traffic light framework provides additional guidance for management through a holistic approach.
	c	Y	The assessment identifies major sources of uncertainty. See 80c.
80	a	Y	The assessment is appropriate for the stock and for the harvest control rule.
			See 100a.
	c	Y	The assessment takes uncertainty into account .
			Uncertainty is taken into account through the calculation of confidence limits for both the survey CPUE and abundance and the standardized CPUE series from the fishing fleets (Hardie, et al., 2013). Indicators within the traffic light framework also address uncertainties (not statistical) related to abundance, production, fishing mortality and the ecosystem. Although the stock remained healthy with respect to SSB (DFO, 2011b, DFO 2012b), TAC reductions were recommended for both 2011 and 2012. This was based on the set of auxiliary indices that showed decreases in shrimp size, poor recruitment, a temporal shift in fishing effort, and unfavourable ecosystem indicators. Accordingly, the TAC was reduced from 5000 mt in 2010 to 4600 mt in 2011 and to 4200 mt in 2012, thereby providing evidence that uncertainty relevant to overall stock conditions is taken into account. Furthermore, the assessment (DFO, 2012a) reports the unresolved sources of uncertainty (PI 1.2.2 above) which include high variance and biases in survey results, spatial and temporal variability in shrimp distribution, faulty trawl sensors and data logging during 2007 - 2008, subjectivity in determining age composition and growth rates, and incomplete data for the current year's assessment.
	e	Y	The assessment of stock status is subject to peer review.
			Assessments had been annual up to 2012 and were subjected to internal peer review. However, in future, peer-reviewed assessments will be conducted every two years. Annual updates will still be performed to monitor the status the resource, facilitating timely management action, if required.
100	a	Y	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.

PI 1.2.4		There is an adequate assessment of the stock status	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>The assessment of stock status for shrimp on Scotian Shelf relies on high quality information from both fisheries dependent and independent sources to determine stock status relative to precautionary reference points. The traffic light framework provides auxiliary data, evaluating up to 25 indicators which consider four stock characteristics: abundance, production, fishing mortality and the ecosystem. The status of these characteristics is used to provide guidance for resource management, additional to the precautionary reference points for the Scotian Shelf shrimp fishery that was developed in accordance with the DFO decision-making framework (see URL: http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm).</p> <p>The assessment is critically dependent on the annual stock survey, and could be undermined by any changes to the frequency of surveys (see section 6.3.1).</p>
	c	N	<p>The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.</p> <p>The assessment is empirical, not model-based. Therefore, stock status relative to reference points is not evaluate in a probabilistic way.</p>
	d	N	<p>The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.</p> <p>The current stock assessment methodology of is not model based and, therefore, is not greatly influenced by errors in assumptions.</p> <p>Prior to the addition of precautionary reference points for the assessment of stock status in 2011 (DFO, 2012b), the traffic light framework evaluated up to 25 indicators which addressed four stock characteristics: abundance, production, fishing mortality and the ecosystem. This long-standing method, which addressed environmental influence on stock dynamics as well as the effects of fishing, was deemed appropriate for advice generated for catch control. The history of a successful fishery and a healthy resource provides evidence for the efficacy of the assessment methodology. TAC's are respected, the stock remains healthy and there are no indications of growth or recruitment overfishing. However, the reference point framework is new and the assessment component has not yet been tested for robustness.</p> <p>Other assessment approaches (e.g. VPA, general production, Y/R) have been attempted for <i>P. borealis</i> in Atlantic Canada but with limited success (IMM, 2013; SCS, 2011). Recent attempts at alternative modelling approaches have not been promising to date (Hardie, pers. comm.).</p>
	e	N	<p>The assessment has been internally and externally peer reviewed.</p> <p>The assessment has been reviewed internally but not externally.</p>
References			<p>DFO, 2012a (SAR 2012/073); DFO, 2012b (SAR 2012/001); Hardie, et al., 2013 (Res. Doc. 2013/033 draft); http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm. IMM, 2013; SCS, 2011.</p>

PI 1.2.4		There is an adequate assessment of the stock status		
SG	Issue	Met? (Y/N)	Justification/Rationale	
OVERALL PERFORMANCE INDICATOR SCORE:				85
CONDITION NUMBER (if relevant):				

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Main retained species are likely to be within biologically based limits (if not, go to scoring issue d below).
			See 80a.
	c	Y	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.
			See 80c.
	d	Y	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.
			See 80d.
80	a	Y	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).
			<p>The only retained species in this fishery is <i>Pandalus montagui</i>; retention of any other species is prohibited. Owing to its physical similarities and appearance to the target species, <i>P. borealis</i>, the two species are inseparable during the normal fishing operation and practically inseparable during processing, and so when caught <i>P. montagui</i> is retained.</p> <p>Owing to the inseparable and practically inseparable (IPI) nature of <i>P. montagui</i>, and the relatively low proportion that it contributes to the total catch of <i>P. borealis</i> and <i>P. montagui</i> (0.5% of the total, see 2.1.3), MSC accepted a variation request to have <i>P. montagui</i> identified as an IPI stock and agreed to exempt it from MSC requirements set out in Annex CH of MSC CR v1.3 (see Annex 3). As such, <i>P. montagui</i> is required to be assessed under the retained species component of Principle 2 (PIs 2.1.1, 2.1.2, and 2.1.3).</p> <p>Total annual estimated catches of <i>P. montagui</i> are some 23 t/yr (see 2.1.3). The species is relatively abundant and widespread on the Scotian Shelf. Although it may not be as abundant overall as <i>P. borealis</i>, nor occur in such dense concentrations, it occurs in many areas where <i>P. borealis</i> does not occur (Tremblay et al 2007). There is no likelihood of fishing mortality being exerted by another fishery as mesh sizes in all other fisheries are too large to retain pandalid shrimp.</p>

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Because of the very small catches from a relatively abundant and widespread stock, it is highly likely that this species is within biologically based limits.</p> <p>Because <i>P. montagui</i> has little market value in this fishery, a mixture of this species into catches of the target species can reduce the landed value of the catch and for this reason fishermen are motivated to avoid this species. Thanks to accurate targeting, bycatches of <i>P. montagui</i> are expected to remain very low.</p>
	c	NA	<p>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.</p>
			Not applicable – the only retained species is highly likely to be within biologically based limits.
100	a	N	<p>There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.</p>
			<p>There is a high degree of certainty that the only retained species, <i>P. montagui</i>, is within biologically based limits, since annual catches are estimated at around 23 t from a very widely distributed population. However, there is no evidence that the species is fluctuating around its target reference point.</p>
	b	N	<p>Target reference points are defined for retained species.</p>
			No target reference point has been defined for <i>P. montagui</i> .
References		<p>Tremblay et al 2007 See 2.1.3</p>	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	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.
			See 100a.
	b	Y	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).
			See 100b
80	a	Y	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.
			See 100a.
	b	Y	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.
			See 100b.
	c	Y	There is some evidence that the partial strategy is being implemented successfully .
			See 100c.
100	a	Y	There is a strategy in place for managing retained species.
			As an IPI species, the only retained species, <i>P. montagui</i> is required to be assessed under this PI. <i>P. montagui</i> is widely distributed on the eastern Scotian Shelf, and there is some overlap with distribution of <i>P. borealis</i> , but it is generally found at shallower depths than <i>P. borealis</i> (Tremblay et al 2007). As such fishermen are able to target concentrations of <i>P. borealis</i> while avoiding <i>P. montagui</i> .

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
			Targeting of <i>P. borealis</i> is so effective in this fishery that bycatch of the only retained species, <i>P. montagui</i> , is extremely low and negligible in its impact (see 2.1.3). As such, the fishermen's ability to selectively harvest the target species constitutes a strategy to maintain catch of <i>P. montagui</i> at minimal levels. <i>P. montagui</i> is a low-value species relative to <i>P. borealis</i> , such that admixture of <i>P. montagui</i> can reduce value of landed catches, so there is a strong incentive not to catch this species. The MSC definition of a "strategy" (GCB 3.3.1) is met in that there is a cohesive and strategic arrangement of measures (primarily geographical targeting) designed to manage impact on the retained species specifically, an understanding of how they work, and mechanisms to modify fishing practices if impacts become unacceptable (change distribution of fishing).
	b	Y	<p>Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.</p> <p>Information from the observer program (see 2.1.3) supports high confidence that the strategy is working to maintain catch of the only retained species at essentially negligible levels.</p>
	c	Y	<p>There is clear evidence that the strategy is being implemented successfully.</p> <p>Information from the observer program (see 2.1.3) supports high confidence that the strategy is working to maintain catch of the only retained species at essentially negligible levels, thus the strategy is being successfully implemented.</p>
	d	Y	<p>There is some evidence that the strategy is achieving its overall objective.</p> <p>Information from the observer program (see 2.1.3) supports high confidence that the strategy is working to maintain catch of the only retained species at essentially negligible levels, thus achieving its overall objective.</p>
References		Tremblay et al 2007 See 2.1.3	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Qualitative information is available on the amount of main retained species taken by the fishery.
			See 100a.
	b	Y	Information is adequate to qualitatively assess outcome status with respect to biologically based limits.
			See 100b.
	c	Y	Information is adequate to support measures to manage main retained species.
			See 100c.
80	a	Y	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.
			See 100a.
	b	Y	Information is sufficient to estimate outcome status with respect to biologically based limits.
			See 100b.
	c	Y	Information is adequate to support a partial strategy to manage main retained species.
			See 100c.
	d	Y	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)
			See 100d.
100	a	Y	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Quantitative information is available on bycatch from 119 observed commercial sets in 2008-2010 (Hardie et al. 2011), which indicates that “other shrimp” (ie species other than <i>P. borealis</i>) are a very low proportion of the total catch. <i>P. montagui</i>, the only potential retained species, is not identified to species but the “other shrimp” category would primarily be this species (D. Hardie, pers. comm.).</p> <p>“Other shrimp” were 0.50% of the total catch in these sets (see Introduction Table 2). Proportion of “other shrimp” in the bycatch varied by location (making up a maximum of 2.01% of the catch in areas closer to the Cape Breton shore), fleet (1.17% of catch in the Scotia- Fundy fleet), and season (4.57% in fall as opposed to 0.00% in spring).</p> <p>Information from observer data from a representative selection of commercial sets over three years is available and has been through a peer review process (Hardie et al 2011); as such the information is considered accurate and verifiable. Although the only retained species is not identified to species in the information, it is part of an “other shrimp” category and as such actual bycatch would probably be somewhat lower than for the total “other shrimp” category.</p> <p>With respect to consequences for the population of <i>P. montagui</i>, applying the proportion of catch to recent catches of the target species (4,600 t/yr in 2010 and 2011 from DFO 2012a) provides an estimated annual catch of 23 t of “other shrimp” of which <i>P. montagui</i> would be a part (see Table 3 in Introduction Section 3.4). <i>P. montagui</i>, although less abundant than <i>P. borealis</i> in survey catches on the Scotian Shelf, is relatively abundant and very widely distributed, including in areas where the northern shrimp fishery does not operate (Tremblay et al 2007). Annual catches in the 10’s of tons can be considered extremely low relative to total population abundance.</p> <p>As such the observed removals are considered very low, with negligible consequences for the overall population.</p>
	b	Y	<p>Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.</p> <p>Based on the above, information is considered sufficient to quantitatively estimate outcome status with a high degree of certainty – the bycatch of <i>P. montagui</i> is considered extremely low and negligible in its impact on the overall population.</p>
	c	Y	<p>Information is adequate to support a comprehensive strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.</p> <p>As catch of this species is considered extremely low and negligible in its impact, the score defaults to 100. An effective targeting strategy is used by fishermen to ensure that catches of the retained species are minimal, and the observer information indicates that this strategy is achieving its objective.</p>
	d	Y	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
			As catch of this species is considered extremely low and negligible in its impact, the score defaults to 100. Monitoring continues via the observer program, such that ongoing mortalities to the only retained species can be assessed.
References		DFO 2012a Hardie et al. 2011 Tremblay et al 2007	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below).
			Retention of any bycatch species is prohibited in this fishery, thus all bycatch species other than <i>P. montagui</i> are considered discard species. See 80a.
	b	Y	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. See 80b.
	c	Y	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.
			There are published status assessments of some of the bycatch species, indicating that the bycatch levels are extremely low compared to other sources of mortality and not such as to hinder recovery where necessary (see references in PI 2.2.3). Those species for which status assessments are not available are widely distributed on the eastern Scotian shelf (Scott and Scott 1988) and thus reasonably abundant; as a result of the bycatch minimisation strategy in this fishery, the bycatches of these species are extremely low (less than 10 t/yr, see PI 2.2.3) and thus are not such as to move the species outside biologically based limits or hinder recovery.
80	a	N	Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below). Retention of any bycatch species is prohibited in this fishery, thus all bycatch species other than <i>P. montagui</i> are considered discard species. No bycatch species comes close to the weight guideline for indentifying “main” bycatch species (5% of the target species weight). Two species are identified as “main” bycatch species because of vulnerability, American plaice and redfishes (two species combined), which have been identified as “at risk” by COSEWIC (2009, 2010). These species are not currently considered to be within biologically based limits. . Bycatch of American plaice is 0.15% of the target species catch, and of redfishes is 0.12% of the target species catch (Table 12, Section 3.4). Scoring is thus based on 80b.
	b	Y	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.

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>There is a comprehensive strategy of regulatory (prohibition on retaining bycatch species; mandatory use of the Nordmore grate) and fishermen-initiated (use of toggle chains; moving when excessive bycatch taken) measures which is designed to minimise bycatch. The strategy has been shown to be effective at reducing bycatch to very low, ecologically negligible, levels (see 2.2.2).</p> <p>Estimated bycatches of American plaice and redfishes in this fishery are less than 10 t/yr (Table 12 in Section 3.4). With respect to American plaice, a 1000 t/yr TAC is in place for mixed flatfish in the fishery area, although recent landings against this TAC have been extremely small (DFO 2011b). Assuming that the existence of this TAC is such as to ensure recovery of species to which it applies, the very small annual removal of American plaice in the shrimp fishery would not jeopardise recovery of this population. For redfishes in Unit 2 (the redfish management area including the fishery area for Scotian shelf shrimp), for the most recent year for which information is published (2009), a TAC of 8,500 t was in effect and landings were around 6,000 t (DFO 2010d). The very small removal of redfishes in the shrimp fishery is orders of magnitude below this and thus can be considered not to hinder recovery.</p>
100	a	N	There is a high degree of certainty that bycatch species are within biologically based limits.
			Some bycatch species are outside biologically based limits, in particular American plaice (COSEWIC 2009) and redfishes (COSEWIC 2010), so this SG is not met.
References		See references in 2.2.2, 2.2.3 COSEWIC 2009 COSEWIC 2010 DFO 2010d DFO 2011b Hardie et al 2011 Scott and Scott 1988	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are measures in place, if necessary, which are expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.
			See 100a.
	b	Y	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).
			See 100b.
80	a	Y	There is a partial strategy in place, if necessary, for managing bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.
			See 100a.
	b	Y	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved.
			See 100b.
	c	Y	There is some evidence that the partial strategy is being implemented successfully.
			See 100c.
100	a	Y	There is a strategy in place for managing and minimising bycatch. There is a comprehensive strategy, including both regulatory and fisherman-initiated measures, in place designed to minimise bycatch. Retention of any species other than <i>P. borealis</i> (with comingled <i>P. montagui</i>) is prohibited, and use of the Nordmore grate with a 25 mm grid spacing is mandatory. Fishermen incur economic losses if bycatch levels are any greater than negligible, either from requirements to sort catch on board, or from reduced payment for landed catches if bycatch levels are excessive, so they work to ensure minimal bycatch levels by using toggle chains of 30 cm length to keep gear off the ground, and by moving when bycatch levels are high.
	b	Y	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>The Nordmore grate has been tested and shown to be very effective in reducing bycatch to very low levels in many <i>Pandalus</i> fisheries using similar gear (for example Newfoundland, Hickey et al 1993; Alaska, Jackson and Irving 2007; Oregon, Hannah et al 1996; Gulf of Maine, GMRI 2009). Application of the current bycatch reduction strategy, based on the Nordmore grate and other measures above, has been shown to keep bycatch levels extremely low over a period of 13+ years in this fishery (Hardie et al 2011; Koeller et al 2006).</p>
	c	Y	<p>There is clear evidence that the strategy is being implemented successfully.</p> <p>Fishermen have strong economic motivation to apply the strategy to minimise bycatch, since they sustain economic losses from processors if bycatch levels are any greater than negligible.</p> <p>Infractions of the condition of licence requiring use of the Nordmore grate are rarely reported (DFO pers. comm.).</p> <p>The very low level of bycatch constitutes clear evidence that the strategy is being implemented successfully.</p> <p>Published stock assessments of some bycatch species show that bycatch amounts are very small compared to other sources of mortality, such that these would not jeopardise recovery if needed; for other species for which assessments are not available, amounts are so small compared to the distribution of the species that they can be considered ecologically negligible (see references in PI 2.2.3).</p>
	d	Y	<p>There is some evidence that the strategy is achieving its objective.</p> <p>Evidence from the observer program, summarised in Hardie et al (2011) and in Koeller et al (2006) shows that the strategy is achieving its objective of maintaining bycatch levels extremely low, essentially negligible in ecological terms.</p>
References		<p>Hardie et al 2011 Koeller et al 2006 Hickey et al 1993 Jackson and Irving 2007 Hannah et al 1996 GMRI 2009 References in 2.2.3</p>	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 2.2.3

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Qualitative information is available on the main bycatch species affected by the fishery.
			See 80a.
	b	Y	Information is adequate to broadly understand outcome status with respect to biologically based limits
			See 80b.
	c	Y	Information is adequate to support measures to manage bycatch.
			See 80c.
80	a	Y	Qualitative information and some quantitative information are available on the amount of main bycatch species affected by the fishery.
			Retention of any species other than shrimp is prohibited in this fishery; accordingly all bycatch species other than <i>P. montagui</i> (see retained species PIs above) are considered discard species.
			Detailed quantitative information on bycatch species is available from the observer program. Data from 119 sets in 2008-2010 provide information on total bycatch as a percentage of the target species catch and on variations by area, season and fleet (Hardie et al 2011, see Table 11 in Section 3.4). An estimate of bycatch amounts based on these percentages applied to total catches of the target species is provided in Table 12 in Section 3.4 of Hardie et al, 2011.
			Bycatch of all species combined (other than “other shrimp”) was 1.3% of the target species catch. The most abundant species in the bycatch was silver hake at 0.3% of the target species. As such, all discard species were an order of magnitude below the 5% abundance guideline for identifying “main” bycatch species. Bycatch amounts of all species are very low; total annual catch of the most abundant, silver hake, is estimated as 14.5t in recent years based on applying the percentage (0.3%) to the total target species catch (4,600t).
			Discard species of particular vulnerability are American plaice (Maritimes population assessed as “threatened” by COSEWIC, 2009) and redfishes (deepwater redfish Gulf of St. Lawrence/Laurentian Channel “endangered” by COSEWIC 2010; Acadian redfish Maritimes population “threatened” by COSEWIC 2010). These are thus considered the only two “main” bycatch species.
			Bycatch of American plaice was 0.15% of target species bycatch (Hardie et al 2011), equivalent to a total catch of 7 t based on a total target species catch of 4,600 t; for redfishes the equivalent figures are 0.12% and 5.6 t respectively.

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch	
SG	Issue	Met? (Y/N)	Justification/Rationale
	b	Y	Information is sufficient to estimate outcome status with respect to biologically based limits.
			<p>Detailed assessments of population status (COSEWIC 2009, 2010) and recovery potential (DFO 2011b, DFO 2011c) are available for the two main bycatch species.</p> <p>With respect to American plaice, a 1000 t/yr TAC is in place for mixed flatfish in the fishery area, although recent landings against this TAC have been extremely small (DFO 2011b). Assuming that the existence of this TAC is such as to ensure recovery of species to which it applies, the very small annual removal of American plaice in the shrimp fishery would not jeopardise recovery of this population. For redfishes in Unit 2 (the redfish management area including the fishery area for Scotian shelf shrimp), for the most recent year for which information is published (2009), a TAC of 8,500 t was in effect and landings were around 6,000 t (DFO 2010d). The very small removal of redfishes in the shrimp fishery is orders of magnitude below this and thus can be considered not to hinder recovery.</p>
	c	Y	Information is adequate to support a partial strategy to manage main bycatch species.
			Information is adequate to support the strategy in place, described in 2.2.2, which is successful in keeping bycatch levels extremely low.
	d	Y	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).
			Observer data continue to be collected on amounts of bycatch in the commercial fishery, with a target of 5% of sets sampled annually.
100	a	Y	Accurate and verifiable information is available on the amount of all bycatch and the consequences for the status of affected populations.
			<p>Information from the observer program (Hardie et al 2011) is considered accurate, and is considered verifiable as it has been peer reviewed through the CSAS process. In addition to providing information on percentage of bycatch species relative to the target species, information is available on variability with season, area and fleet. Information is summarised in Tables 11 and 12 in Section 3.4 of Hardie et al, 2011.</p> <p>Population assessments are available for 5 of the 6 most abundant species in the bycatch; in addition to the two main bycatch species noted above, these are silver hake, estimated catch 14.5 t (DFO 2010b), Atlantic herring, estimated catch 12 t (DFO 2011d), and capelin, estimated catch 5 t (DFO 2010c, DFO 2011e for adjacent areas). In all cases the removals by this fishery are orders of magnitude smaller than removals in other fisheries.</p> <p>No assessment is available for witch flounder (estimated catch 6 t), but this species is common and widely distributed (Scott and Scott 1988). Other species in the bycatch have estimated catches of 2.5 t or less. In all these cases bycatch is considered negligible in ecological terms</p>

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch	
SG	Issue	Met? (Y/N)	Justification/Rationale
	b	Y	Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty .
			For 5 of the 6 most abundant bycatch species, peer-reviewed assessments are available which permit comparing bycatch levels with other sources of mortality. In all cases removals in the shrimp fishery are orders of magnitude lower than removals in other fisheries. This provides a high degree of certainty that the shrimp fishery is having a minimal impact on these species. For other bycatch species, removals are so low as to be ecologically negligible. There is a high degree of certainty about bycatch levels, given the quality of the available observer information.
	c	Y	Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective .
			Information is adequate to support a comprehensive strategy, given the level of coverage and the detail of identification of species in the bycatch. The information allows examination of seasonal, areal and fleet differences in bycatch which would allow adjusting the strategy if specific issues were encountered. The available information supports a high degree of certainty that the strategy is achieving its objective of keeping bycatch extremely low such as to not negatively impact population status of bycatch species.
	d	Y	Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
			Monitoring of bycatch continues in sufficient detail (5% target of sets to be sampled) to assess ongoing mortalities of all bycatch species.
References		Hardie et al 2011 COSEWIC 2009 COSEWIC 2010 DFO 2011b DFO 2011c DFO 2010b DFO 2011d DFO 2010c DFO 2011e	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 2.3.1

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.
			See 100a. No ETP species are affected by this fishery.
	b	Y	Known direct effects are unlikely to create unacceptable impacts to ETP species.
			See 100b. No ETP species are affected by this fishery.
80	a	Y	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.
			See 100a. No ETP species are affected by this fishery
	b	Y	Direct effects are highly unlikely to create unacceptable impacts to ETP species.
			See 100b. No ETP species are affected by this fishery.
	c	Y	Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.
			See 100c. No ETP species are affected by this fishery.
100	a	Y	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.
			No ETP species are affected by this fishery. There are no species of demersal or other fishes listed as Endangered or Threatened on SARA Schedule 1 which are reported as bycatch in this fishery (SARA Public Registry; Hardie et al 2011), and marine mammals and marine turtles do not interact with this type of trawl fishery. Atlantic wolffish, listed as Special Concern on SARA Schedule 1, is not considered an ETP species and is covered under retained species (bycatch species PIs). As such, a default score of 100 is assigned.
	b	Y	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
			As no ETP species are affected by the fishery, a default score of 100 is assigned.

	c	Y	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
			As no ETP species are affected by the fishery, a default score of 100 is assigned.
References			Hardie et al 2011 SARA Public Registry See URL: http://www.sararegistry.gc.ca/ References in 2.3.2, 2.3.3
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 2.3.2

PI 2.3.2		<p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • 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. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are measures in place that minimise mortality, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.
			See 100 SG
	b	Y	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).
			See 100 SG
80	a	Y	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.
			See 100 SG
	b	Y	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.
			See 100 SG
	c	Y	There is evidence that the strategy is being implemented successfully.
			See 100 SG
100	a	Y	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality that is designed to achieve above national and international requirements for the protection of ETP species.
			<p>ETP species found in the fishery area include marine mammals and a marine turtle species (SARA Public Registry). These species do not interact with trawl fisheries, as indicated in the recovery strategies for leatherback turtle, (Atlantic Leatherback Turtle Recovery Team 2006), and northern bottlenose whale, Scotian Shelf population (DFO 2010e).</p> <p>No ETP species of demersal fishes are found in the fishery area (SARA Public Registry), thus none are taken as bycatch in the fishery (Hardie et al 2011).</p> <p>The mode of operation of the fishery, which ensures that it does not affect ETP species of marine mammals or marine turtles, and the distribution of fishing well away from areas where ETP species of demersal fisheries are found, can be considered a comprehensive strategy for eliminating mortality to ETP species altogether, thus achieving above national and international requirements for protection of these species.</p>

PI 2.3.2		The fishery has in place precautionary management strategies designed to: <ul style="list-style-type: none">• 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.	
SG	Issue	Met? (Y/N)	Justification/Rationale
	b	Y	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.
			The strategy is based on information on the distribution of ETP species in the fishery area and on knowledge of how the fishery operates. Recovery strategies for ETP species in the area are based on comprehensive information on their biology and threats to their status. No interactions with any ETP species have ever been reported.
	c	Y	There is clear evidence that the strategy is being implemented successfully.
			No interactions with any ETP species have ever been reported, so the strategy is being implemented successfully.
	d	Y	There is evidence that the strategy is achieving its objective.
			No interactions with any ETP species have ever been reported, so the strategy is achieving its objective.
References		Atlantic Leatherback Turtle Recovery Team 2006 DFO 2010e Hardie et al 2011 SARA Public Registry See URL: http://www.sararegistry.gc.ca/	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 2.3.3

PI 2.3.3		Relevant information is collected to support the management of fishery impacts on ETP species including: <ul style="list-style-type: none"> Information for the development of the management strategy; Information to assess the effectiveness of the management strategy; and Information to determine the outcome status of ETP species. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.
			See 100 SG
	b	Y	Information is adequate to broadly understand the impact of the fishery on ETP species.
			See 100 SG
	c	Y	Information is adequate to support measures to manage the impacts on ETP species.
			See 100 SG
80	a	Y	Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.
			See 100 SG
	b	Y	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.
			See 100 SG
	c	Y	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.
			See 100 SG
100	a	Y	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.

PI 2.3.3		<p>Relevant information is collected to support the management of fishery impacts on ETP species including:</p> <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Three groups of marine ETP species have been identified on Canada's Atlantic coast (SARA Public Registry):</p> <ul style="list-style-type: none"> • marine mammals, of which only the northern bottlenose whale, Scotian Shelf population, is known to occur in the fishery area (DFO 2010e). Others such as blue whale may occasionally occur in the area. • marine turtles, of which the leatherback turtle occurs in the fishery area (Atlantic Leatherback Turtle Recovery Team 2006). • marine fishes, of which no ETP species occurs in the fishery area. Northern and spotted wolffishes, listed as Threatened on SARA Schedule 1, do not occur on the eastern Scotian Shelf. The Atlantic wolffish, listed on SARA Schedule 1 as Special Concern, is not considered an ETP species as only species listed as Endangered or Threatened are so considered. <p>Trawl fisheries are not considered threats to marine mammals or marine turtles in this area (Atlantic Leatherback Turtles Recovery Team 2006, DFO 2010e), or in other areas, although marine mammals and marine turtles are subject to entanglement in fixed fishing gear. No ETP marine mammal, marine turtle, or marine fish has been recorded in the bycatch of this fishery over the 13 year period for which observer data are available (Hardie et al 2011, 2008-2010; Koeller et al 2006, 1995-2004).</p>
	b	Y	<p>Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.</p> <p>Thirteen years of observer data are available (Hardie et al 2011; Koeller et al 2006) indicating that no ETP species have been affected by the fishery.</p>
	c	Y	<p>Information is adequate to support a comprehensive strategy to manage impacts, minimise mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.</p>

PI 2.3.3		Relevant information is collected to support the management of fishery impacts on ETP species including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Information on distribution of ETP species on Canada's Atlantic coast, and in the fishery area, is based on many years of trawl surveys which sample demersal fish ETP fish species, and on many years of biological observations for other groups. All available information is summarised in COSEWIC Status Reports (COSEWIC 2011 for northern bottlenose whale, Scotian Shelf population; COSEWIC 2012 for leatherback turtle; COSEWIC 2001a, COSEWIC 2001b for wolffishes) and in recovery strategies prepared in accordance with the Species at Risk Act (eg Atlantic Leatherback Turtle Recovery Team 2006; DFO 2010e; Kulka et al 2008 for wolffishes).</p> <p>Information on bycatch of ETP species is available from 13 years of observer reports, which indicate no bycatch (Hardie et al 2011; Koeller et al 2006).</p> <p>The above information provides a high degree of certainty that there have been no interactions with ETP species, thus that the objective of minimising mortality and injury has been attained.</p>
References		COSEWIC 2001a COSEWIC 2001b COSEWIC 2011 COSEWIC 2012 Atlantic Leatherback Turtle Recovery Team 2006 DFO 2010e Hardie et al 2011 Koeller et al 2006 Kulka et al 2008 SARA Public Registry - http://www.sararegistry.gc.ca/	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
			See 80a.
80	a	Y	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
			<p>Given the mode of operation of the fishery, and in particular the spatial and temporal distribution of fishing, it is highly unlikely that the fishery would be causing serious or irreversible harm to habitat structure and function. In particular:</p> <ul style="list-style-type: none"> - the fishery operates on soft bottom habitats, where the target species concentrates, which are considered to be more resilient to damage than harder bottom substrates and their associated vertically-developed fauna; - the fishery concentrates on certain subareas of the total area of soft-bottom habitat of the eastern Scotian Shelf within relevant depth and temperature ranges, at places where the target species concentrates, leaving a substantial portion of the relevant habitat unimpacted in any given year; - the fishery operates for part of the year, leaving time for impacted habitats to recover; - the distribution of the fishery has changed over the past decade, following changes in distribution of concentrations of shrimp, such that some areas formerly impacted have been allowed to recover and some areas currently impacted have been impacted for several years only; - the fishery does not operate on known areas of vulnerable benthic habitat; identified by DFO (see section 2.4.3). <p>While the proportions of bottom habitat impacted have not been quantified, thus not meeting the evidentiary requirements of SG100, the observations above are considered adequate to state that there is no more than a 30% probability that the true status of habitats would be within the range where there would be serious (gross change and disruption of habitat function) or irreversible (regime-type change from which recovery would not occur) harm. There has been no indication of changes in productivity in eastern Scotian Shelf ecosystems due to habitat changes caused by this fishery; this has never been mentioned as a potential factor in driving recent ecosystem changes in this area (review by Ford and Serdyska, 2013). This fishery is considered by managers not to be a major concern for habitat issues (DFO Fisheries Management staff, pers. comm.).</p>
100	a	N	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.

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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
			There has not been specific evidence presented to show that the fishery is highly unlikely to cause serious or irreversible harm to habitats, and it is not possible to provide evidence that the standard for this PI is met (no more than 20% probability that true status is within range for serious or irreversible harm).
References		References in 2.4.2, 2.4.3 Ford and Serdynska, 2013.	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	<p>There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.</p> <p>A combination of measures in place, principally distribution of fishing in relation to habitat types but also the mode of operation of the fishing gear, is expected to ensure that there is not serious or irreversible harm to habitats. These are actions taken by fishermen which are not directed to managing impacts on the component (habitat), but which have the effect of reducing impacts to an acceptable level.</p> <p>Fishermen target their activities in mud bottom habitats where the target species is concentrated, and does not impact (or only incidentally and occasionally impacts) harder bottom habitats which would be expected to be more sensitive (DFO 2012a; Hardie et al 2011; ASP Atlas). Fishing does not occur in identified areas of vulnerable habitats identified by DFO (Kenchington et al 2010). Fishermen do not operate in all areas of soft-bottom habitat on the eastern Scotian Shelf, but leave some areas of this habitat type unimpacted (see Figure 6, above). The distribution of fishing in available mud-bottom habitats has changed over time, with changes in distribution of shrimp concentrations, such that some areas formerly fished have subsequently been left unfished and able to recover (Grant 2012). Most of the TAC is taken during part of the year (April to July, although some fishing may continue to December; pattern may vary from year to year), leaving some months during which habitats are relatively undisturbed and can recover (DFO 2012a).</p> <p>Trawl doors, bridles and ground gear would be the principal parts of the trawls contacting the bottom. Bridles are relatively short in the shrimp fishery, and rockhopper ground gear is used which would tend to roll over sessile benthic invertebrates (Grant 2012).</p>
	b	Y	<p>The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).</p> <p>Since fishermen only operate in areas of concentration of the target species, the fishery allows substantial areas of soft-bottom habitat unfished, such that there would not be serious or irreversible harm to such habitats overall. Leaving some habitat areas unfished is generally considered an effective tool for protecting habitats. Seasonal concentration of fishing would allow some time for recovery of habitats in the areas on which fishing is concentrated. Known areas of vulnerable habitats are not impacted by this fishery (ASP Atlas; Kenchington et al 2010).</p>
80	a	N	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>A partial strategy to ensure habitat outcome 80, is not in place in this fishery; in particular there has not been analysis to develop an understanding of how the existing measures work to achieve an outcome and no analysis of potential requirements to change measures should this become necessary has been conducted.</p> <p>DFO has put in place a Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas, which focuses on identifying vulnerable marine ecosystems (areas of concentration of cold-water corals, sponge-dominated communities, hydrothermal vents and seamounts) and protecting these from impacts of fishing. Distribution of such areas has been mapped on the eastern Scotian Shelf (DFO 2010) and it has been determined that the fishery area does not overlap with these.</p> <p>The Scotian Shelf Shrimp Advisory Committee, following a recommendation from its MSC Working Group, concluded in 2012 that no further measures were necessary to protect habitats in this fishery. Although the SSSAC considered relevant issues in making this determination (the distribution of the fishery in relation to habitat types and the existence of closed areas to protect habitat types on the eastern Scotian Shelf), a detailed justification was not provided for making the determination. In particular, an analysis of the seasonal and areal distribution of fishing in relation to habitats, and a consideration of potential impacts of the gear on habitats in its area of operation, would have been important in making a determination that no further measures were necessary.</p>
	b	N	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.
			Given that no partial strategy is in place, and that no detailed justification having been developed that no further measures are necessary to protect habitat, this SG issue is not met.
	c	N	There is some evidence that the partial strategy is being implemented successfully.
			Given that no partial strategy is in place, and that no detailed justification having been developed that no further measures are necessary to protect habitat, this SG issue is not met.
100	a	N	There is a strategy in place for managing the impact of the fishery on habitat types.
			No strategy is in place.
	b	N	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
			No testing has been done.
	c	N	There is clear evidence that that strategy is being implemented successfully.

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
			No evidence is available.
	d	N	There is some evidence that the strategy is achieving its objective.
			No evidence is available.
References		DFO 2010f.	
OVERALL PERFORMANCE INDICATOR SCORE:			60
CONDITION NUMBER (if relevant):			1

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There is basic understanding of the types and distribution of main habitats in the area of the fishery.
			See 80a.
	b	Y	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.
			See 80b.
80	a	Y	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.
			As in other pandalid fisheries, this fishery concentrates on soft-bottom (mud and sandy mud) habitats. The fishery concentrates on deep muddy “holes” on the eastern Scotian shelf, and on muddy areas nearer shore following the discovery of shrimp concentrations in these areas in 1995 (DFO 2012a).
			Distribution of habitats, based on distribution of bottom sediment types, is known (Fader n.d) from information from the Canadian Geological Survey and other sources (Fader n.d.) (see Figure 5 in the Introduction). This information has been included in an Atlas compiled by the Marine Institute, St. John's, NL for the client (ASP Atlas). The information is shown at a relatively fine scale, at a level of detail relevant to the scale and intensity of the fishery. The nature of habitat types can be inferred from the distribution of the bottom sediments in the atlas.
			Vulnerability of habitat types in the fishery area is known, based on general knowledge of the vulnerability of benthic habitat types to impacts of trawl fisheries. Vulnerability would be a combination of vulnerability of the muddy bottom sediments themselves, with associated features (e.g. mounds, burrows) and of organisms which contribute to habitat quality through reworking or structuring of the sediments (NEFMC 2011). Vulnerability is a function of the probability of encounter with fishing gear, and of the probability of impact in case of an encounter (MSC CR CB 3.16.2).
			Probability of encounter between muddy habitats in the fishery area and the fishing gear is generally high in areas where effort is concentrated; there are areas of muddy habitat which are not impacted or less impacted because they are unsuitable or less suitable for the target species.

			<p>The probability of damage from the gear to muddy habitats in this area can be inferred from studies in other areas. Muddy habitats in the fishery area are probably subject to relatively low natural disturbance regimes, as they are considered to have high organic content (DFO 2012a); however such habitats may be subject to a high rate of bioturbation which provides a background level of disturbance upon which trawl impacts would be superposed (Simpson and Watling 2006). A comprehensive assessment of the vulnerability of habitat types and organisms contributing to habitat quality (NEFMC 2011) concluded that geological features of mud habitats are relatively resilient and rapid to recover, but that organisms contributing to habitat quality (sea pens, hydroids, molluscs, amphipods) had varying resilience with molluscs being relatively long to recover from damage, amphipods relatively rapid.</p>
	b	Y	<p>Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.</p> <p>The mode of operation of shrimp trawl gear in this fishery has been described in detail with an emphasis on potential impacts on bottom habitats (Grant 2012). Bottom contact is primarily via the trawl doors and footrope (rigged with rockhopper gear which would roll over bottom fauna); the trawl netting “flies” off bottom.</p> <p>Impacts of trawls on soft bottom habitats (mud and mud-sand) are generally known from studies in other areas (eg Simpson and Watling 2006; Hixon and Tissot 2007) and have been summarised by NEFMC (2011).</p> <p>Reliable information on spatial and temporal interaction of the gear with bottom habitats is available from logbooks and VMS monitoring. Information on spatial distribution of the fishery is published in detailed stock assessment documents (eg Hardie et al 2011) and has been plotted (overlain on bottom sediment information) on the ASP Atlas developed on contract to the client (see Figure 6 above). Information on temporal distribution of fishing is available in stock assessment documents (eg DFO 2012a).</p>
	c	Y	<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>The main subject of concern here would be changes to distribution of the fishery in relation to habitat types. Information continues to be collected on distribution of fishing and is published in documents supporting stock assessments (eg Hardie et al 2011).</p>
100	a	Y	<p>The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.</p> <p>Distribution of habitat types, based on distribution of bottom sediments, has been mapped over the entire eastern Scotian Shelf (ASP Atlas). Distribution of vulnerable habitat types has been mapped in detail, based on available information (mainly trawl survey), for all Canadian Atlantic marine areas including the Scotian Shelf (Kenchington et al 2010); identification of vulnerable areas is based on threshold concentrations of sponges and corals (hard and soft).</p>
	b	N	<p>The physical impacts of the gear on the habitat types have been quantified fully.</p>

			Although physical impacts have been estimated and are known generally, these have not been quantified fully.
	c	N	Changes in habitat distributions over time are measured.
			This is not being done, although it appears questionable as to whether habitat distributions (distribution of soft and hard bottom areas with associated fauna) would change at time scales less than decades.
References		ASP Atlas DFO 2012a Grant 2012 Hardie et al 2011 Hixon and Tissot 2007 Kenchington et al 2012 NEFMC 2011 Simpson and Watling 2006	
OVERALL PERFORMANCE INDICATOR SCORE:			85
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	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.
			See 80a
80	a	Y	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
			<p>Previous sections (2.1.x - 2.4.x) have shown that ecosystem impacts on specific ecosystem components - retained species, discard species, ETP species and habitats - are not serious or irreversible.</p> <p>Two potential ecosystem impacts have been identified, other than those covered under other Principle 2 components in earlier sections:</p> <ul style="list-style-type: none"> • potential impact of removal of the target species on trophic relationships • potential non-catch impact of fishing gear on benthic biodiversity and community structure <p>For trophic relationships, see 100a.</p> <p>With respect to non-catch impacts of fishing on benthic biodiversity and community structure, in light of the spatial and temporal distribution of fishing, it can be inferred that it is highly unlikely that the fishery would be causing serious or irreversible harm to these ecosystem elements. In particular:</p> <ul style="list-style-type: none"> • the fishery operates on soft bottom communities, where the target species concentrates, which are considered to be more resilient to damage than the complex, bottom-rooted, vertically-developed species and communities; • the fishery concentrates on certain subareas of the total area of soft-bottom communities of the eastern Scotian Shelf within relevant depth and temperature ranges, at places where the target species concentrates, leaving a substantial portion of the relevant benthic communities unimpacted in any given year; • the fishery operates for part of the year, leaving time for impacted communities to recover; • the distribution of the fishery has changed over the past decade, following changes in distribution of concentrations of shrimp, such that some areas formerly impacted have been allowed to recover and some areas currently impacted have been impacted for several years only; • the fishery does not operate on known areas of vulnerable benthic habitat where particularly sensitive species or communities may be found.

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
			While the proportions of bottom areas impacted by the fishery have not been quantified, the observations above are considered adequate to state that there is no more than a 30% probability that the true status of benthic biodiversity and community structure would be within the range where there would be serious (gross change and disruption of habitat function) or irreversible (regime-type change from which recovery would not occur) harm. There has been no indication of changes in productivity in eastern Scotian Shelf ecosystems due to ecosystem changes caused by this fishery, other factors having been considered more important in driving recent ecosystem changes in this area (review by O'Boyle et al 2012). This fishery is considered by fishery and habitat managers not to be a major concern with respect to its impacts on benthic species or communities (DFO Fisheries Management staff, pers. comm.).
100	a	N	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.
			For trophic relationships, there is evidence that the fishing strategy in place (see 2.5.2) is highly likely to maintain shrimp abundance at levels which will allow the species to play its ecological role, and thus to prevent serious or irreversible harm to the ecosystem. The evidence is made up of (a) the rationale for the limit reference point and removal rate reference, which are intended to ensure that shrimp biomass is maintained at a level which will maintain forage for predators (IFMP v 1.5.2; Hardie 2012ppt) and (b) the catch monitoring system based on logbooks and dockside monitoring which ensures that catches are consistent with the limit reference point and removal rate reference. The catch monitoring system is almost 100% likely to keep catches at or below TACs, and the limit reference point and removal rate reference level are at least 80% likely to maintain shrimp at a level where predator requirements will not be compromised, based on information from the fishery area and other similar fisheries.
			With respect to non-catch impacts on benthic biodiversity and community structure, although it appears quite unlikely that impacts from this fishery would be such as to cause serious or irreversible harm, this cannot be stated at the relevant probability level (80%).
References		References in 2.5.2, 2.5.3	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	<p>There are measures in place, if necessary.</p> <p>Two potential ecosystem impacts have been identified (not covered in earlier performance indicators, see 2.5.1 80a):</p> <ul style="list-style-type: none"> • potential impact of removal of the target species on trophic relationships • potential non-catch impact of fishing gear on benthic biodiversity and community structure <p>With respect to impact on trophic relationships, the Limit Reference Point and Removal Reference (less than 20% when stock is in the healthy zone) are intended to maintain shrimp abundance at levels which will allow this species to play its role in the ecosystem, including in predator-prey relationships (IFMP v 1.5.2; Hardie 2012ppt). Measures stemming from this strategy (principally TACs) are effective in implementing the strategy.</p> <p>With respect to non-catch impacts on biodiversity and community structure, the measures in place to control these involve spatial and temporal distribution of fishing effort. These measures are actions taken by the fishermen, which are not primarily directed at managing this component, but which have the effect of reducing impacts to an acceptable level. The trawl fishing gear used in the shrimp fishing gear can impose non-catch mortality on benthic species, mainly from the trawl doors, bridles and foot gear, although this may be low relative to other types of trawl gear (Grant and Hiscock 2010). Because of the distribution of shrimp concentrations, fishermen restrict their operations to certain soft-bottom areas where shrimp are concentrated, such that substantial areas of benthic communities are left unimpacted. Fishermen have changed the spatial distribution of fishing over time such that formerly fished areas have had time to recover (DFO 2012a). Temporally, fishing is concentrated in certain months of the year (April to July) (DFO 2012a), such that benthic communities have some time to recover from impacts. Fishermen do not operate in known areas of vulnerable habitats where benthic biodiversity may be particularly high, since these are not areas where shrimp concentrations are found, and some areas of the eastern Scotian Shelf are closed to fishing to protect vulnerable habitats and populations.</p>
	b	Y	The measures take into account potential impacts of the fishery on key elements of the ecosystem.

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>The measures in place to limit removals of the target species such that trophic relationships can be maintained are based on information about the Scotian Shelf ecosystem, and thus take into account potential impacts on a key element (trophic relationships) (Hardie 2012ppt).</p> <p>Measures in place to reduce non-catch impacts on benthic biodiversity and community structure are effective based on the distribution and recovery potential of benthic communities in the fishery area, although these are not explicitly considered in determining distribution of fishing - this is primarily determined by existence of shrimp concentrations, since closed areas are not near shrimp fishing areas.</p>
	c	Y	<p>The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).</p> <p>The measures to protect trophic relationships are based on experience with pandalid fisheries in other parts of North America, and on past experience in the fishery area, and thus are considered likely to work. There has been no indication from the extensive work on ecosystem changes on the Scotian Shelf over more than two decades that fishery removals of shrimp are a significant factor in ecosystem changes (see references in 2.5.3).</p> <p>The measures in place to protect benthic biodiversity and community structure are considered likely to work based on knowledge of the distribution of the fishery and of benthic communities in the fishery area (see references in 2.5.3). Leaving portions of benthic communities unimpacted by fishing, and allowing time for recovery between fishing periods, are generally considered to be appropriate means of reducing trawl non-catch impacts on bottom communities (NEFMC 2011).</p>
80	a	N	<p>There is a partial strategy in place, if necessary.</p> <p>With respect to the strategy (Hardie 2012ppt; IFMP v 1.5.2) for ensuring that removals of the target species do not negatively impact trophic relationships, this meets the definition of a partial strategy (MSC GCB 3.3.1c) in that it is a cohesive arrangement based on an understanding of how the measures will work to achieve an outcome, and awareness of the need to change the measures if required. The LRP is set at a level based on a previous ecosystem status during which shrimp played a role in trophic relationships, while the removal reference is set at a level consistent with that in a wide range of other pandalid fisheries in which trophic relationships have been maintained.</p>

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>For non-catch impacts on benthic biodiversity and community structure, no partial strategy is in place, as the potential impacts of the fishery on these ecosystem components has not been explicitly considered and measures have not been put in place explicitly to address potential impacts. The Scotian Shelf Shrimp Advisory Committee (SSSAC) concluded, following a consideration of ecosystem impacts of this fishery, that no further measures were necessary to address ecosystem impacts, following a recommendation from its MSC Working Group (SSSAC MSC WG October 2012), but the basis for this conclusion was not presented in detail.</p> <p>DFO has put in place a Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas, which focuses on identifying vulnerable marine ecosystems (areas of concentration of cold-water corals, sponge-dominated communities, hydrothermal vents and seamounts) and protecting these from impacts of fishing. Distribution of such areas has been mapped on the eastern Scotian Shelf (DFO 2010) and it has been determined that the fishery area does not overlap with these.</p>
	b	N	<p>The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.</p> <p>The strategy to ensure that removals of the target species do not prejudice trophic relationships is based on information from the fishery area (LRP set at a level at which shrimp were playing a role in trophic relationships) and from pandalid fisheries in other areas (removal reference). The strategy is expected to maintain shrimp at abundance levels which will allow the species to continue to play its trophic role, and thus to ensure that serious or irreversible harm is not caused to the ecosystem.</p> <p>As noted (SG 80a) no partial strategy based on available information is in place to ensure that impacts on benthic biodiversity and community structure are within acceptable limits.</p>
	c	Y	<p>The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).</p> <p>(From SG60c) The measures to protect trophic relationships are based on experience with pandalid fisheries in other parts of North America, and on past experience in the fishery area, and thus are considered likely to work. There has been no indication from the extensive work on ecosystem changes on the Scotian Shelf over more than two decades that fishery removals of shrimp are a significant factor in ecosystem changes (see references in 2.5.3).</p> <p>The measures in place to protect benthic biodiversity and community structure are considered likely to work based on knowledge of the distribution of the fishery and of benthic communities in the fishery area (see references in 2.5.3). Leaving portions of benthic communities unimpacted by fishing, and allowing time for recovery between fishing periods, are generally considered to be appropriate means of reducing trawl non-catch impacts on bottom communities (NEFMC 2011).</p>

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
	d	N	<p>There is some evidence that the measures comprising the partial strategy are being implemented successfully.</p> <p>TACs (the principal measure for implementing the strategy to protect trophic relationships) are closely adhered to in this fishery, based on a comprehensive catch monitoring and surveillance and protection system.</p> <p>As noted (SG 80a) there is no partial strategy to manage non-catch impacts on benthic biodiversity and community structure.</p>
100	a	N	<p>There is a strategy that consists of a plan, in place.</p> <p>The partial strategy to protect trophic relationships does not meet the definition of a “strategy” (MSC GCB 3.3.1b) as no mechanisms to modify fishing practices are included should unacceptable impacts be identified (that is, there is not provision to modify the LRP or removal reference if it appears that trophic relationships are compromised).</p>
	b	N	<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> <p>As noted (SG 100 a) there is no full strategy in place for either ecosystem issue.</p>
	c	N	<p>The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.</p> <p>No strategy in place for trophic relationships, no partial strategy for non-catch impacts.</p>
	d	N	<p>There is evidence that the measures are being implemented successfully.</p> <p>No strategy in place for trophic relationships, no partial strategy for non-catch impacts.</p>
	References		<p>DFO 2010f DFO 2012a Grant and Hiscock 2010 Hardie 2012ppt IFMP v 1.5.2 NEFMC 2011 SSSAC MSC WG October 24, 2012, References in 2.5.3</p>
	OVERALL PERFORMANCE INDICATOR SCORE:		60
CONDITION NUMBER (if relevant):			2

Evaluation Table: PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).
			See 80a.
	b	Y	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail .
			See 80b.
80	a	Y	Information is adequate to broadly understand the key elements of the ecosystem.
			<p>Considerable work has been undertaken on the eastern Scotian Shelf ecosystem, in support of the ESSIM (Eastern Scotian Shelf Integrated Management initiative) and to consider causes of the considerable ecosystem changes observed since the early 1990s.</p> <p>Trophic structure and function before and after the groundfish collapse (early 1990s) have been modelled using Ecopath, based on feeding and biological data from a wide variety of sources (Bundy 2004). Predator-prey relations and temporal changes in trophic patterns are summarised by Worcester and Parker (2010).</p> <p>Biodiversity and community composition are generally known, based on syntheses of available studies - Breeze et al (2002) provide a comprehensive summary of available knowledge of biological communities on the Scotian Shelf, while DFO (2003) provides a good general summary of ecosystem knowledge to the date of publication. Worcester and Parker (2010) provide a comprehensive review of knowledge of Scotian Shelf ecosystems, focusing on trends and changes in ecosystem structure and function. Knowledge is best for commercially exploited species (fishes and crustaceans), but general knowledge of community composition in benthic and planktonic communities is available (Breeze et al 2002, Worcester and Parker 2010).</p> <p>Primary and secondary production patterns in the plankton are summarised by Worcester and Parker (2010). Trends and changes in these patterns are monitored and reported on (for example DFO 2009b). Benthic productivity patterns are not well described but can be inferred from general knowledge of community composition (Breeze et al 2002).</p>

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Temporal changes in the Scotian Shelf ecosystem have been the subject of considerable study. Physical oceanographic trends (eg Hébert et al 2012; DFO 2008), and biological and chemical oceanographic trends (eg DFO 2009b) are monitored and reported on regularly. A major shift in ecosystem structure and function occurred in the early 1990s (Worcester and Parker 2010), summarised as a shift from a large-bodied groundfish dominated system to a system dominated by pelagic fish and macroinvertebrates (lobster, snow crab), and a change in ocean climate (cooler temperatures). A number of studies have attempted to relate the observed ecosystem changes to changes in ocean climate, fishing down of large-bodied species and increase in abundance of grey seals (summarised by O'Boyle et al. 2012).</p> <p>As a result of these studies, there is a good broad understanding of elements of the eastern Scotian Shelf ecosystem.</p>
	b	Y	<p>Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.</p>
			<p>Shrimp are a relatively small component of the eastern Scotian Shelf ecosystem, at least as regards trophic interactions (Bundy 2004). Their distribution is localised in specific well-defined areas of the shelf, and it has been hypothesized that they become abundant in this ecosystem only during cool periods (Koeller 2000). As a result, it can be inferred that impacts of the fishery on the ecosystem would be relatively restricted.</p> <p>Potential impacts of the fishery can be inferred from available information; these are:</p> <ul style="list-style-type: none"> • impacts on populations of species taken as bycatch (see 2.1, 2.2) • impacts on habitats (see 2.4) • non-catch impacts on community structure and biodiversity • impact of removal of the target species on trophic relationships <p>Impacts on bycatch have been studied in detail (see 2.1 and 2.2 series), and these are considered to be ecologically negligible. Trophic relationships have also been studied in some detail, before and after the significant ecosystem changes of the early 1990s (Bundy 2004); shrimp are a relatively minor part of the trophic webs, according to this study.</p> <p>A review of information on non-catch impacts of shrimp trawling gear on bottom species and communities is available (Grant and Hiscock 2011), which indicates that these are likely to be relatively limited.</p>
	c	Y	<p>The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.</p>
			<p>The main functions of the components named are known from the studies of community structure (Breeze et al 2002, Worcester et al 2010) and trophic relationships (Bundy 2004, Worcester et al 2010) described above.</p>
	d	Y	<p>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.</p>

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Information on the impacts of the fishery on the components has been summarised in preceding sections 2.1 to 2.4.</p> <p>Based on that information it can be concluded that:</p> <ul style="list-style-type: none"> • impact on retained and discarded bycatch species is ecologically negligible, since removals of these species are very small relative to overall population sizes; removals would not hinder rebuilding or recovery of these species if this was necessary • there is no impact on ETP species, since none are taken in the fishery • it is highly unlikely that the fishery is causing serious or irreversible harm to habitats
	e	Y	<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 continues to be collected which would permit detecting increase in risk level. Observers continue to collect information on amounts of bycatch species (including ETP species) with a coverage level appropriate for the fishery. The distribution of the fishery continues to be monitored by logbooks and VMS, and is reported on regularly, such that distribution of effort in relation to habitats and ecosystems can be monitored. Catch of the target species is well monitored, such that potential impact of removal of this species on trophic relationships can be assessed. There has been regular reporting on ecosystem status and trends and this is expected to continue, in light of the increasing interest in ecosystem-based management within DFO (eg. DFO 2011f).</p>
100	b	N	<p>Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.</p>
			<p>Some of the interactions have not been investigated in this ecosystem/fishery, for example non-catch impacts of the fishing gear on bottom species and communities.</p>
	c	Y	<p>The impacts of the fishery on target, bycatch and ETP species are identified and the main functions of these Components in the ecosystem are understood.</p>
			<p>Impacts of the fishery on target, bycatch and ETP species are well known (see sections 2.1-2.3), and the functions of these components in the ecosystem are understood from the studies cited above SG80a.</p>
	d	Y	<p>Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.</p>

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Sufficient information on impacts on components is available, as summarised above SG80d.</p> <p>With respect to information on impacts on ecosystem elements potentially impacted by the fishery – impact on trophic structure from removal of the target species, and non-catch impacts on benthic species and communities – sufficient information is available to allow main consequences for the ecosystem to be inferred.</p> <p>In an extensive review of the potential non-catch impacts of shrimp trawling gear on bottom species and communities, Grant and Hiscock (2011) identified the main sources of potential impact in the trawling gear (doors, foot gear, bridles) and concluded that this gear was unlikely to cause serious or irreversible harm to benthic populations and communities. Information on distribution of the fishery suggests that it concentrates on specific areas which have changed over time (Hardie et al 2011; other ref), such that benthic communities in unfished areas would not be affected and communities formerly affected would have been allowed time to recover.</p> <p>With respect to potential impact on trophic relationships, removals of target species are very well known in relation to estimates of population abundance (these would be underestimates since catchability of the survey trawl is less than 1), such that exploitation rates can be estimated (these would be overestimates for the same reason) (DFO 2012a). Information on trophic structures in the fishery area suggests that shrimp are a relatively minor component of trophic webs (Bundy 2004).</p>
	e	N	<p>Information is sufficient to support the development of strategies to manage ecosystem impacts.</p> <p>Although considerable information is available to support strategies to manage ecosystem impacts, some key pieces of information are not available: for example, information on composition of benthic communities in fished areas, more detailed information on distribution of fishing effort in relation to benthic habitats and communities, information on secondary production patterns in benthic communities.</p>
References		Breeze et al; 2002; Bundy 2004; DFO 2003; DFO 2008; DFO 2009b; DFO 2011f; DFO 2012a; Grant and Hiscock 2011; Hardie et al 2011; Hébert et al 2012; Koeller 2000; O'Boyle et al 2012; Worcester and Parker 2010	
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 3.1.1

PI 3.1.1		<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	<p>The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p>
			<p><i>The management system is comprehensive and well structured, and it provides effective rule-making capable of delivering sustainable use of the shrimp resource and the ecosystem, consistent with MSC principles 1 and 2. The legal and customary framework of the fishery therefore meets the criteria at the SG 60 standard.</i></p> <p>Evidence:</p> <p><u>Legal and Policy framework</u></p> <p>Canada has made a public policy commitment to the sustainable management of ocean resources and ecosystems (DFO, 2002a. Canada's oceans strategy: Our oceans, our future. Fisheries and Oceans Canada, Oceans Directorate, Ottawa, Ontario. See URL: www.dfompo.gc.ca/oceans/publications/cos-soc/pdf/cos-soc-eng.pdf). See also Canada's 'Ocean Action Plan For Future Generations' (DFO 2005).</p> <p>The legal and policy framework for achieving this at the national, regional and fishery level is a set of <u>enabling Acts, Regulations and an elaborate suite of Frameworks, Policies and Plans</u>, listed above in Section 3.5.3. This framework meets Canadian obligations to international laws and conventions on sustainable use in line with the precautionary and the ecosystem approaches. It provides the drivers to manage the resource and ecosystem impacts of the shrimp fishery as part of the long term aim of implementing the Eastern Scotian Shelf Integrated Ocean Management Plan, Strategic Plan (DFO 2007).</p> <p>With respect to guidance notes CB4.2.2.1 and 2.2.2, DFO Maritimes has the following customary responsibilities, structure, practices and processes to deliver the sustainable fishery and ecosystem objectives:</p> <ul style="list-style-type: none"> • <u>Responsibilities</u>: DFO Maritimes responsibilities are listed in Section 3.5.3 copied from Appendix 6 of the ESS Shrimp Integrated Fishery Management Plan (IFMP, DFO 2011). • <u>Structure</u>: Section 3.5.3 has a list of work streams and responsible staff for delivering Principles 1, 2 and 3

			<ul style="list-style-type: none"> • <u>Practices and processes:</u> DFO Maritimes managers work through a consultative and participatory decision-making process based on scientific advice and the activities of the Scotian Shelf Shrimp Advisory Committee (SSSAC) with fully-representative membership and work practices described in Sections 3.5.4 and 6 and in PI 3.1.2 The process results in the regulatory measures that are described in Section 3.5.9 and are enforced by the compliance and protection activities described in Section 3.5.10. Individual fishing rights, including those for First Nation communities, are met by resource sharing agreements and quota allocation rules described in Section 3.5.8.. <p><u>What the system delivers:</u></p> <ul style="list-style-type: none"> • Licensed access and fishing rights based on historical dependence, including aboriginal rights; • Managing exploitation rate using a TAC to achieve sustainable fishing, based on scientific advice from stock surveys, assessments and precautionary reference points; • Contributing to the ecosystem approach by operating gear configurations that regulate the fishing pattern, by-catches, and contact with the seabed, and by limiting access to closed conservation zones and coral protection areas • An advisory and consultative decision making process at the ESS Shrimp Advisory Committee, which has a commitment to co-management • Effective monitoring, surveillance and enforcement appropriate to the ESS shrimp fishery, where the risk of compliance infractions is evaluated to be low.
	b	Y	<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>See 100b.</p>
	c	Y	<p>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 of the fishery.</p> <p>See 100c.</p>
	d	Y	<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>See 100d.</p>
80	b	Y	<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>See 100b.</p>
	c	Y	<p>The management system or fishery is attempting to comply in a timely fashion within binding judicial decisions arising from any legal challenges.</p>

			See 100c.
	d	Y	<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>See 100d.</p>
100	b	Y	<p>The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.</p> <p><i>The shrimp fishery provides a transparent and effective mechanism for the informal resolution of management disputes within the shrimp fishery, and for formal legal disputes the Courts provide a mechanism that has been tested and proven to be effective in at least three landmark cases. The regional and national systems meet the criteria at the SG100 standard.</i></p> <p>Evidence</p> <ul style="list-style-type: none"> • There is a customary and transparent process for dealing with disputes at a succession of levels. • As advised by DFO Maritimes at the site visit, operational or interpretational queries or concerns can be raised at any time with the DFO personnel responsible for each sector or work stream, whose contact details are readily available. An individual matter can be resolved informally by discussion or education, and where possible this is the preferred route. For compliance issues, Fishery Officers make considerable efforts to be non-confrontational and non-litigious wherever possible. • An issue or dispute with wider implications can be added to the agenda of the SSSAC for plenary discussion, or, if necessary, for further exploration by an SSSAC working group. For disputes between rival fishers or fisheries, the SSSAC encourages the parties to discuss and present a proposed solution either for voluntary action on the ground, or for agreement to pursue more formal measures. • Serious issues unresolved by this process, including those with high level implications, can be referred upwards to, in succession, the level of the Regional Director General of the Maritimes Region; an appropriate person in DFO Ottawa (e.g. Assistant Deputy Minister for Ecosystems and Fisheries Management); and in extreme cases to the highest level, the Fisheries Minister. The Minister may approve or change a decision, or could for example instruct officials to conduct a reconciliation process, as illustrated by the Workshop for Industry–DFO Reconciliation on Scientific Monitoring of the Southern Gulf of St. Lawrence Cod Stock. (DFO 2009a). • In cases where individuals are making serious legal challenges to the management system, or the Federal agencies are making serious challenges to an individual, the final step would be resolution by an action in the Courts.

			<p><u>The efficacy of dispute resolution:-</u></p> <ul style="list-style-type: none"> • The effectiveness of <u>informal</u> resolution procedures in the shrimp fishery can be inferred from the absence of significant, or ongoing, or recurrent disputes on fishery management, allocation, or compliance issues. • The scope for <u>formal</u> resolution of individual disputes in favour of an appellant at High Court level in Canada is illustrated by three landmark fisheries cases: <ul style="list-style-type: none"> ○ In 1990, the Supreme Court of Canada Sparrow Decision found that where an Aboriginal group has a right to fish for food, social, and ceremonial purposes, it takes priority, after conservation, over all other uses of the fishery. This decision is relevant to the allocation of licences and quotas in a fishery, and was a precursor of the development of the Aboriginal Fishing Strategy in 1992. ○ In 1999, the Supreme Court of Canada <i>Marshall</i> Decision affirmed a Treaty right to hunt, fish and gather in pursuit of a moderate livelihood, stemming from Peace and Friendship Treaties of 1760 and 1761. The Decision affected 34 Mi'kmaq and Maliseet First Nations in New Brunswick, Prince Edward Island, Nova Scotia, and the Gaspé region of Quebec, and was the touchstone for the development of the Marshall Response Initiative motivating the allocation of fishing licences to First Nation communities. ○ In 2006, the Supreme Court of Canada Case of Larocque (snow crab licence holder) v Canada (Minister of Fisheries and Oceans) found for the appellant on grounds that the Minister did not have powers to finance scientific research activities by selling fishery resources.
	c	Y	<p>The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.</p> <p><i>The management system acts proactively to avoid legal disputes, and shows that it rapidly implements binding judicial decisions, thus meeting the criteria at the SG100 standard.</i></p> <p>Evidence:</p> <p>When questioned at the site visit, DFO Maritimes staff emphasised the efforts made by them and the ESS Shrimp Advisory Committee to:</p> <ul style="list-style-type: none"> • Be available for individuals to raise problems, questions or queries or to seek explanations; • Consult widely in advance of new legislation or changes to existing regulations and measures, in order to pre-empt problems, disputes or legal disputes, and to seek local knowledge. <p>The Chief of Compliance and Protection stressed that unless compliance breaches are very serious, the preferred route is to issue warnings and guidance rather than to take costly legal action, which is regarded as the action of last resort. The preference is to develop a ticketing fine system to minimise contestable cases.</p>

			Regarding binding judicial decisions, the Sparrow case led DFO to develop the Aboriginal Fisheries Strategy in 1992, and the Marshall case led to the Marshall Response Initiative. In response to these, DFO Maritimes purchased and issued one First Nations fishing licence for the mobile shrimp fishery in 1995, followed by a further nine First Nations shrimp licences in 1996, and one additional temporary (later permanent) licence in 1998. This shows the Maritimes capacity to make a rapid response to critical judicial decisions.
	d	Y	<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><i>The limited entry licensing and quota allocation systems implemented under the licensing regulations are <u>formal commitments</u> to the legal rights of dependent fishers including First Nations fishers. The resource sharing agreement brokered by the ESSS Advisory Committee qualifies as an <u>informal commitment</u> to a customary sharing of the shrimp fishing opportunity based on historical track records. The fishery therefore demonstrates a respect for rights consistent with the MSC Principles, and meets the SG100 standard.</i></p> <p>Evidence: The ESS mobile shrimp fishery is managed by a limited entry licensing system that provides legal rights to those dependent on fishing, in the form of a licence and an individual transferable quota share of the TAC (see Section 3.5.8 of this report). Section VII of the 1998 version of the ESS Shrimp Fishery IFMP states that licences for SFAs 13-15 were conferred and regulated under the 1985 Fisheries Act (Section 7), and the 1996 Commercial Fisheries Licensing Policy for Eastern Canada, of which fishers can obtain a copy at any DFO Licensing Center. ITQ rules were noted in Appendix 2 and 3 of the 1998 IFMP, and described in Section 3.5.9 of this Report. Following the Marshall Decision, shrimp fishery managers recognised the rights of First Nations communities by issuing First Nation licenses from 1992 onwards. Legislation governing Aboriginal communal licences is contained in the Aboriginal Communal Fishing Licences Regulations SOR/93-332.</p> <p>The ESS mobile shrimp fishery has formalised geographical and fleet fishing rights by voluntarily developing a resource sharing agreement that allocates 8% of the TAC to the trap fleet, 69.5% of the TAC to the Scotia-Fundy mobile fleet, and 22.5% to the Gulf-based mobile fleet, based on their traditional shares of the fishery.</p>
References			DFO 2002a; DFO 2005; DFO 2007a; DFO 2009a; DFO 2011a
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 3.1.2

PI 3.1.2		<p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p>	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood .
			See 100a.
	b	Y	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.
			See 80b.
80	a	Y	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.
			See 100a.
	b	Y	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.
			<p><i>The management system includes consultation processes that regularly seek, accept and consider information and local knowledge for Principle 1 issues (via the Advisory Committee) and Principle 2 issues (e.g. ESSIM, and the ENGO Dialogue Forum) so the fishery meets the SG80 standard.</i></p> <p>Evidence:</p> <p>The following examples illustrate the consultative nature of the management system.</p> <p><u>The Scotian Shelf Shrimp Advisory Committee</u> The SSShrimp Advisory Committee and its wide ranging membership groups (see Section 3.5.4) is the principal forum for consultation on the operational management of the ESS Shrimp Fishery, for both Principle 1 and 2 issues. The Committee is chaired by the Senior Advisor for Shrimp for the Maritimes Region.</p>

PI 3.1.2		<p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p>	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<ul style="list-style-type: none"> • During the site visit, DFO Maritimes staff emphasised that through the Advisory Committee they consult widely in order to seek opinions and local knowledge in advance of new legislation or changes to existing regulations and measures, in order to pre-empt problems, disputes or legal disputes, and that they are readily available for individuals to raise problems questions or queries or to seek explanations. • Fishery Officers consult with the industry at the fishery level, and educate through day-to-day personal contact, on compliance and enforcement issues. • The text for PI 3.1.1 Issue B described the role of DFO staff and the Advisory Committee in resolving disputes. • The Advisory Committee is the forum for the presentation of scientific advice on the status of the shrimp stock and the ecosystem, and is where the industry is consulted directly on its views about the annual TAC and related aspects of the annual management plan. • The basis for consensus decisions by the Committee on the advice it gives to DFO is explained, and DFO managers will in return explain at subsequent meetings whether or why it was used or not. • The Advisory Committee is where DFO managers have the opportunity to consult with the industry on revisions to the evergreen IFMP, which is rewritten every five years, and where they consult on the implementation of new national and regional frameworks, policies and plans. • Minutes of the ESSS Advisory Committee meetings are available for scrutiny by the public. <p><u>Eastern Scotian Shelf Integrated Management (ESSIM) Initiative</u></p> <p>DFO Maritimes actively consults on the development and implementation of new policies and initiatives. This is stressed at the head of most frameworks, policies and plans. A good example is the Eastern Scotian Shelf Integrated Management Initiative (ESSIM). Although this initiative was actually concluded in 2012, when it was subsumed into a DFO Maritimes Region Oceans Program, the following quote from the original DFO Maritimes ESSIM webpage (see URL: http://www.mar.dfo-mpo.gc.ca/e0010281) illustrates the inherently consultative nature of the DFO approach to initiatives of this kind:</p>

			<p>“The aim of the ESSIM Initiative is to have an effective, collaborative process that provides integrated and adaptive management plans, strategies and actions for ecosystem, social, economic, and institutional sustainability. A collaborative process is an open, inclusive and transparent planning, advisory and decision-making process involving all interested and affected parties. Ocean management plans and decisions are based on shared information where those with the decision-making authority and those affected by the decision jointly seek outcomes that meet the needs and interests of all parties to the greatest possible degree”</p> <p><u>Environmental Non-Governmental Organizations Dialogue Forum.</u> DFO Maritimes has recognised the need to create a forum for dialogue with Environmental NGOs by establishing the Maritimes Region and Marine Environmental Non-Governmental Organizations Dialogue Forum. This aims to “provides a vehicle for discussion (not decision-making) between the two Parties and serves to facilitate information exchange; relationship building; and dialogue on strategic policy issues of relevance to all organizations involved in the forum, regarding the sustainable development and conservation of Canada’s marine resources.”</p>
	c	Y	<p>The consultation process provides opportunity for all interested and affected parties to be involved.</p> <p>See 100c.</p>
100	a	Y	<p>Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.</p> <p><i>Organisations and individuals have been identified, and their functions, roles and responsibilities in the ESS shrimp fishery are explicitly defined and well understood for key areas of responsibility and interaction, and meet the criteria of the SG100.</i></p> <p>Evidence:</p> <p><u>At the higher level</u>, the the Fisheries Act and the Oceans Act gives DFO the overarching responsibility for sustainable management of fisheries and ecosystems nationally and regionally, and this responsibility is cited at the head of all major framework, policy and plan documents, as shown by the italics in two representative examples:</p> <ul style="list-style-type: none"> • Existing Policy From the Sustainable Fisheries Framework (see URL www.dfo-mpo.gc.ca/fm-gp/peche-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm) <p>“The Sustainable Fisheries Framework was developed through engagement with resource users and others with an interest in sustainable fisheries. Combined with reforms to socio-economic policies and initiatives, the <i>Sustainable Fisheries Framework is a key instrument in developing environmentally sustainable fisheries that also support economic prosperity in the industry and fishing communities</i>”</p>

		<ul style="list-style-type: none"> • Developing Policy Maritimes Ecosystem Approach to Management (Curran et al, 2012) “As a regulator of the commercial fishing industry, DFO will implement the strategies in the general plan for EAM within the fisheries sector, i.e. <i>the Department has a dual role, the longstanding one of directly managing the fishery for sustainability and the more recent one of overseeing the impacts of all marine activities on ecosystems.</i> The management process in DFO is already well developed for fisheries and much of the existing infrastructure of advisory and consultative committees can be reformed satisfactorily for EAM application. However, additional levels of integration may be added as required, to take account of the cumulative effects of multiple uses in relation to the broader EAM considerations.” <p>At the fishery level, DFO Maritimes has clearly-stated responsibilities as shown in Appendix 6 of the current Scotian Shelf Shrimp Fishery IFMP (DFO 2011a). These are discharged by Branches or Divisions, and for the shrimp fishery. Section 3.5.3 shows information provided by the DFO ecocertification coordinator, identifying the various work streams for Principles 1, 2 and 3, the current responsible staff members, and the Branch or Divisional officers to whom they report.</p> <p>As discussed below under Issues B and C, DFO managers work with the ESS Shrimp Advisory Committee and its membership groups, whose responsibilities are included in terms of reference defined in Appendix 5 of the current SSSIFMP. The role of stakeholders at the Advisory Committee is to represent their interests; to hear and scrutinise proposals for management of the fishery based on scientific or other advice; and to advise DFO accordingly based on consensus decisions.</p> <p>Day to day management of the fishery is supported by the compliance and protections operations described in Section 3.5.10 and PI 3.2.3. There are clear surveillance and enforcement roles and duties for Fishery Officers on land, at sea and in the air, and the Compliance and Protection division is also responsible for specifying the dockside monitoring and observer at sea programmes that are contracted out, but whose performance is monitored by DFO.</p>
	b	N <p>The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.</p> <p>There is no evidence of systematic explanation of how considered information is used or not used.</p>
	c	Y <p>The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.</p>

		<p><i>The consultation process provides opportunity and encouragement for all interested parties to be involved and facilitates their effective engagement. The fishery meets this issue at the SG 100 level.</i></p> <p>Evidence:</p> <p>At the <u>Policy level</u> in Canada and the Maritimes, participation is a key theme of the preamble to all framework, policy and plan documents, and many of the published copies of policy documents have an appendix listing the groups that were consulted during policy development, and that will continue to be involved in policy implementation. This is shown by the excerpts from the Sustainable Fisheries Framework and the ESSIM Initiative cited for Issue B, and by the quote below from the Sensitive Benthic Areas policy.</p>
		<ul style="list-style-type: none"> From the Policy for Managing Impacts of Fishing on Sensitive Benthic Areas (see URL: www.dfo-mpo.gc.ca/fm-gp/peche-fisheries/fish-ren-peche/sff-cpd/benthi-eng.htm) <p>“The fishery is a common property resource to be managed for the benefit of all Canadians, consistent with conservation objectives, the constitutional protection afforded Aboriginal and treaty rights, and the relative contributions that various uses of the resource make to Canadian society, including socio-economic benefits to communities.</p> <p>Shared stewardship is an important part of managing Canada’s fisheries resources. As such the Department will promote collaboration, participatory decision-making and shared responsibility with resource users and other stakeholders.</p> <p>Integrated management is an essential aspect of ensuring commercial and non-commercial interests are considered in the planning and management of oceans activities, such as fishing”.</p> <p>At the <u>operational level</u>, membership of the SSSAC (Sections 3.5.4) is wide ranging and representative of all fishery stakeholders, and although NGOs and ENGOs are not formal members of the Committee they may attend meetings as observers, as may the general public. Participation is emphasised by the fact that Advisory Committee decisions are taken by consensus rather than by vote, and that the Advisory Committee process leads to a significant component of co-management, including agreements between DFO and industry on shrimp research and other cooperative projects (Section 8, Shared Stewardship Arrangements, in the current IFMP).</p> <p>The text for Issue B quoted the participatory nature of the Eastern Scotian Shelf Integrated Management Initiative, and the establishment of joint DFO-ENGO participation in the Maritimes Region and Marine Environmental Non-Governmental Organizations Dialogue Forum</p>
	References	Curran et al 2012; DFO 2011a
OVERALL PERFORMANCE INDICATOR SCORE::		95
CONDITION NUMBER (if relevant):		

Evaluation Table: 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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy
			See 100a.
80	a	Y	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.
			See 100a
100	a	Y	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.
			<p><i>There are explicit long term objectives that guide decision-making consistent with Principles 1 and 2 and the precautionary approach, and they are required by the high level national and regional policy documents to which the fishery specific objectives for the shrimp fishery should conform. Management policy meets the SG100 standard.</i></p> <p>Evidence: <u>At the management policy level</u>, Canada has a public non-technical Oceans Strategy (DFO, 2002), and a range of comprehensive and well-structured technical frameworks, policies and plans developed at both national and regional levels to provide high level guidance for decision making. The examples below (from Section 3.5.3) illustrate relevance to First Nation Rights, Principle 1 (fishers rights and sustainable harvesting of stocks), Principle 2 (sustainable use of the ecosystem), the Ecosystem Approach to Management, and Integrated Ocean Management. The descriptors in brackets are the assessor's and are not part of the titles.</p> <p><u>Ocean Strategy</u> DFO, 2002. Canada's oceans strategy: Our oceans, our future. Fisheries and Oceans Canada, Oceans Directorate, Ottawa, Ontario. See URL: http://www.dfompo.gc.ca/oceans/publications/cos-soc/pdf/cos-soc-eng.pdf</p>

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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
			<p><u>Frameworks and Policies</u></p> <p>An Integrated Aboriginal Policy Framework. (First Nation Rights) See URL: http://www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/iapf-cipa-eng.htm</p> <p>Maritimes Region Ecosystem Approach to Management Framework. (Principles 1 and 2) (Overview summarised as Appendix 2 of the IFMP, DFO 2011a)</p> <p>A policy framework for the management of fisheries on Canada's Atlantic Coast (DFO 2004-64) (Principle1) See URL: http://www.dfo-mpo.gc.ca/afpr-rppa/Doc_Doc/.../Policy_Framework_e.pdf</p> <p>Sustainable Fisheries Framework (Principles 1and 2). See URL: http://www.dfo-mpo.gc.ca/fm-gp/peche-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm</p> <p>A fishery decision making framework involving the precautionary approach (Principle 1) http://www.dfo-mpo.gc.ca/fm-gp/peche-fisheries/fish-ren-peche/sff-cpd/precaution-back-fiche-eng.htm</p> <p>Commercial Fisheries Licensing Policy for Eastern Canada, 1966 (Principle 1) See URL: http://www.dfo-mpo.gc.ca/fm-gp/policies-politiques/licences-permis/index-eng.htm</p> <p>National Framework for Marine Protected Areas. (Principle 2). See URL: http://www.dfo-mpo.gc.ca/oceans/publications/dmpaf-eczpm/framework-cadre2011-eng.asp</p> <p>Policy for Managing the Impact of Fishing on Sensitive Benthic Areas (Principle 2). See URL: http://www.dfo-mpo.gc.ca/fm-gp/peche-fisheries/fish-ren-peche/sff-cpd/benthi-eng.htm</p>

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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
			<p>Plans</p> <p>Scotian Shelf Shrimp Fishery Integrated Fisheries Management Plan (DFO 2011a) (Principle 1 and 2)</p> <p>Coral Conservation Plan, Maritimes Region (2006-2011), Oceans and Coastal Management Report 2006-01. (Principle 2)</p> <p>Eastern Scotian Shelf Integrated Ocean Management Plan, Strategic Plan (DFO 2007a). See URL: http://www.mar.dfo-mpo.gc.ca/e0010327.</p> <p>Preparing an Integrated Fisheries Management Plan. (Section 3.2.6 discussed the setting of objectives). See URL: http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/guidance-guide/preparing-ifmp-pgip-elaboration-eng.htm</p> <p>These all provide high level rationales and visions for what is to be achieved. They usually contain high level objectives for sustainable use of the resource and the ecosystem, and they frequently contain overviews and lists that specify the need to develop objectives, strategies and methodologies consistent with the precautionary approach and the ecosystem approach to management (i.e. for Principles 1 and 2). Annex 2 shows illustrative examples excerpted from</p> <ul style="list-style-type: none"> • A Policy Framework for the Management of Fisheries on Canada's Atlantic Coast (Principle 1); • The Sustainable Fisheries Framework (Principles 1 and 2); • The Policy for Managing the Impact of Fishing on Sensitive Benthic Areas (Principle 2); • The Coral Conservation Plan Maritimes Region 2006-2011 (Principle 2). <p>The excerpt from the Sustainable Fisheries Framework makes clear the long-term nature of these policy commitments "The Framework and its policies will be implemented progressively over time. The phased-in approach will be done according to the priorities identified through fishery planning sessions held across DFO regions beginning in 2009".</p>

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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
			<p>At the site visit, several of the key framework and policy documents were referred to frequently as to make it very clear that Regional Managers in the Maritimes regard them as fundamental guideposts for developing and implementing regional operational priorities, targets, methodologies and measures.</p> <p>Based on the various Frameworks, Policies and Plans examined, it can be concluded that the management policy in the Maritimes has the following long term goals or objectives that are driving the integrated management approach :</p> <ul style="list-style-type: none"> • an ecosystem approach to managing the impacts of fishing on the resource and the ecosystem based on the precautionary approach and the best available science • effective allocation of rights to regional fisheries and First Nation communities • sustainable and economically viable harvesting • management of the impact of fishing in order to avoid irreversible harm to habitat • effective conservation of sensitive benthic areas, with emphasis in the first instance on corals • development of a network of conservation zones and marine protected areas • development of long term integrated ocean management for the whole Eastern Scotian Shelf
References		DFO 2007a; DFO 2011a	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.
			See 80a.
80	a	Y	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.
			<p><i>The management system has incentives that are consistent with achieving the outcomes for Principles 1 and 2, and it seeks to ensure that perverse incentives do not arise. The system meets the criteria at the SG80 standard for this PI.</i></p> <p>Evidence: The following processes and provisions for the ESS shrimp fishery are conducive to achieving a sustainable fishery and ecosystem:-</p> <ul style="list-style-type: none"> • Consultative and co-operative approach to management, including elements of co- management, through membership by all groups in the ESSS Advisory Committee. • Restriction of access rights to those dependent on fishing, through limited entry licensing for the mobile and trap fisheries, including specific licences for Aboriginal fishers. • An annual TAC set by consultation, but in line with advice based on a stock assessment with precautionary reference points, contributes to economic viability by reducing the risk of overfishing, hence also ensuring that the ecological role of shrimp is not compromised. • Prescribed allocation of the TAC between Maritime and Gulf fleets based on a resource sharing agreement that reduces the risk of illegal fishing by competing sectors. • Allocation of transferable quota shares to skippers of individual vessels in the mobile fleet TAC reduces the risk of competitive overfishing (but the low-power trap fishery is fished competitively). • Regular review of the economic viability of the fishery vis a vis changes in stock status, markets and prices, leading to periodic rationalisation of licences and enterprises. • Effective surveillance of gear and landings based on VMS, log books, observers, periodic surveillance at sea and from the air, hailing in and hailing out, dockside monitoring, all act as incentives to comply with regulations managing the shrimp fishery. VMS also ensures that fishers comply with licence conditions requiring them not to fish in any closed areas proscribed for the protection of sensitive benthic species. • Consultative and educational initiatives by the Compliance and Protection Division, and regular engagement with Fishery Officers on the dockside, ensure that fishers are encouraged to stay within the rules.

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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
			<p>Incentives that motivate shrimp fishers to avoid hard bottom areas that support sensitive corals and sponges are their fishing strategy of seeking the highest abundance of shrimps on soft bottom areas, plus the use of rockhopper gear and toggle chains to reduce operating costs by minimising expensive gear damage.</p> <p>Fishers are incentivised to minimise fish by-catch by regulations specifying the use of the Nordmore grid, and regulations prohibiting the retention of fish by-catches.</p> <p>There are regular operational reviews of management policy at the SSSAdvisory Committee and within DFO Branches.</p> <p>To our knowledge there are no subsidies that contribute to unsustainable fishing or ecosystem degradation and the Chief of Compliance & Protection stated that, based on intelligence sources and Fishery Officers, there were no examples of perverse incentives.</p>
100	a	N	<p>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 not contribute to unsustainable fishing practices.</p> <p>There are regular operational reviews of management policy at the SSSAdvisory Committee and within DFO Branches. The team heard no evidence that in the present era the question of incentives is explicitly raised in these reviews, although since the development of the incentives described under 80a must originally have required explicit consideration, it is very likely that management of the fishery has now evolved to the point where such explicit consideration is no longer needed routinely.</p>
References			
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/P N)	Justification/Rationale
60	a	Y	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.
			See 100a.
80	a	Y	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.
			See 100a.
100	a	Y	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.
			<p><i>The ESS Shrimp Fishery has explicit, well defined and measurable short and long term objectives that are consistent with achieving the outcomes expressed by Principle 1 and Principle 2 for the relevant threats posed by this fishery, and therefore meet the criteria at the SG 100 standard.</i></p> <p>Evidence: <u>Overall objectives</u> Section 5 of the IFMP (DFO 2011a) describes the overall objectives identified and pledged for this fishery. These objectives are cited in Section 3.5.7 of this Report, and are repeated below in order to emphasise their focus on concern for the impact of the fishery on the resource and the ecosystem, the rights of First Nation communities, and a legitimate desire that a well-managed fishery should also be economically viable. This is therefore consistent with the high level frameworks, policies and plans referred to in the previous Principle 3 PIs.</p> <ul style="list-style-type: none"> • Conservation <u>Productivity</u> : Do not cause an unacceptable reduction in productivity, so that components can play their role in the functioning of the ecosystem <u>Biodiversity</u> : Do not cause an unacceptable reduction in biodiversity, in order to preserve the structure and resilience of the ecosystem <u>Habitat</u>: Do not cause significant modification to habitat, to safeguard both physical and chemical properties of the ecosystem. • Social, cultural and economic <u>Culture and sustenance</u> : Respect Aboriginal and treaty rights to fish for food, social and ceremonial purposes. <u>Prosperity</u>: Create the circumstances for economically prosperous fisheries, recognising the economic contribution that the fishing industry can make to businesses and coastal communities.

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
			<p>Economic viability is partly dependent on the industry itself but the Department is committed to balancing economic success with a use of ocean resources that is environmentally sustainable.</p> <p><u>Operational objectives</u> Attainment of the overall objectives requires the definition and implementation of more specific objectives to manage fishery impacts on the resource and ecosystem at the operational level. In the ESS shrimp fishery, the operational objectives are what the IFMP calls <u>strategies</u> and <u>tactics</u>; these are also listed in Section 3.5.7 above, where they have been copied over from Section 6 of the IFMP.</p> <p>Productivity Strategy: Sustain the Eastern Scotian Shelf shrimp population in the high productivity phase observed from 2000 to the present. Tactics</p> <ul style="list-style-type: none"> • Set an annual Total Allowable Catch (TAC) that will keep fishing mortality under 20% when the stock is in the healthy zone • Set an annual TAC that will result in a reduction in fishing mortality when the stock is in the cautious zone (as defined by the precautionary reference points) • Restrict fishing when the stock is in the critical zone • Continue to deduct quota over-runs on a 1:1 basis • Continue use of a minimum trawl mesh size of 40 mm <p>Biodiversity Strategy: Control unintended incidental mortality for all species Tactics</p> <ul style="list-style-type: none"> • Continue to use the Nordmore Grate to minimise bycatch in the shrimp fishery • Continue to restrict the retention of incidentally caught species in the shrimp fishery <p>Habitat Strategy: Manage the habitat areas that are disturbed Tactics</p> <ul style="list-style-type: none"> • Clearly establish via licence conditions areas where the shrimp fishery is not allowed due to conservation concerns <p>Cultural and Sustenance Strategy: Respect Aboriginal and treaty rights to fish Tactics</p> <ul style="list-style-type: none"> • Issue Food, Social and Ceremonial licences as required <p>Prosperity Strategy Limit inflexibility within the shrimp fishery Tactics</p> <ul style="list-style-type: none"> • Continue to manage the shrimp fishery with transferable quotas • Continue to allow the temporary transfer of trap quota to the mobile fleet when appropriate • Minimise instability <p>Tactics</p> <ul style="list-style-type: none"> • Continue to manage the shrimp fishery with stable individual quotas • Be aware of the importance of maintaining high catch rates to the economic viability of the fishery • Support eco-certification of the shrimp fishery

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
			<p>Tactics</p> <ul style="list-style-type: none"> Work with the industry to meet commitments relating to maintaining Marine Stewardship Council certification <p><u>Regulatory Measures</u> The strategies and tactics are executed by the following regulatory measures and tools summarised from Section 3.5.9:</p> <p>Harvest Regulations</p> <ul style="list-style-type: none"> Regulation of fishing effort by limiting entry to licence holders Regulation of the exploitation and ground fish by-catch using mesh size and Nordmore Grate Regulation of the harvest rate by TAC (based on scientific advice, assessments and reference points) and allocating resource sharing and individual transferrable quota shares Rules for use of individual transferrable quota Monitoring, surveillance and enforcement of the regulations <p>Habitat Regulations To protect sensitive habitat and ecology, the Gully Marine Protected Area is closed by regulation, and DFO has designated the <i>Lophelia</i> Coral Conservation Zone and the Northeast Channel Coral Conservation Zone. Bottom fishers are excluded from these areas by their licence conditions.</p> <p><u>Performance against the objectives</u> The performance of these regulatory measures and tools is measurable as follows (more details of the compliance framework are in Section 3.5.10, and PI 3.2.3):</p> <ul style="list-style-type: none"> surveillance and enforcement (fulfilment of licence conditions, inspections on the dockside and at sea to ensure correct mesh size, rigging of the gear and the Nordmore grate, monitoring of VMS records and of air and at-sea patrols for conformity with fishing seasons and closed areas) monitoring catches at sea and landings at the dockside (check log book records of catch and by-catch and check dockside records of landings; accumulate the data to check for over-runs of individual quotas and the annual fleet TAC) stock surveys and stock assessments (trends in stock abundance and juvenile recruitment from surveys, estimation of exploitation rate, and the determination of stock status with respect to reference points)

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2	
SG	Issue	Met? (Y/P N)	Justification/Rationale
			<ul style="list-style-type: none"> reviews by managers and stakeholders (DFO Maritimes monitors the day-to-day performance of the fishery against the compliance criteria, and will make an end of year review of the performance of the fishery against all criteria including the stock assessment. Stakeholders will monitor economic performance of the fishery. The fishery performance and economic performance will then be evaluated at the SSS Advisory Committee during discussion of the annual management plan for the next year. Urgent issues arising in mid-year can trigger an emergency meeting of the SSSAC if required.) <p><u>The balance between Principal 1 and Principal 2</u> The operational objectives, regulatory tools, and surveillance activities for this fishery are predominantly associated with productivity and biodiversity objectives because these are long established and have evolved to a relatively advanced stage. Policies and objectives for managing the ecosystem, and sensitive benthic habitats and species, are generally newer, and although they are developing very rapidly they are still at a comparatively early stage. Nevertheless, it was clearly stated at the site visit that to date the shrimp fishery in SFAs 13-15 is not regarded as being a major threat to sensitive benthic areas.</p>
References		[DFO 2011a	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 3.2.2

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.
			See 80a.
	b	Y	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.
			See 80b.
80	a	Y	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.
			<p><i>There is a fully established consultative decision making process that results in measures and strategies to achieve the fishery specific objectives and that meets the SG80 standard.</i></p> <p>Evidence:</p> <p><u>Policy level</u> Most Canadian policy documents formally recommend an open and consultative approach to planning and decision-making, and some include formal recommendations for the management decision making process that should be adopted (e.g. Section 7 of the Policy for Managing Impacts of Fishing on Sensitive Benthic Areas). See URL: www.dfo-mpo.gc.ca/fm-gp/peche-fisheries/fish-ren-peche/sff-cpd/benthi-eng.htm).</p> <p><u>Regional level</u> Final responsibility for priorities and decisions for the shrimp fishery rests with the senior regional DFO managers and staff assigned to the various Branches and work streams. In practice, managers follow an open and consultative approach, and work closely with stakeholders at the operational level especially through the SSSAdvisory Committee.</p> <p><u>Operational level</u> The shrimp fishery uses a co-management approach, and the decision making process starts with the SSS Advisory Committee, whose form and membership were summarised in Section 3.5.4 based on information in the IFMP (DFO 2011a). The Committee is chaired by the DFO Senior Advisor for Shrimp for the Maritimes Region, and terms of reference listed in Appendix 5 of the SSSIFMP define its purpose and scope as follows:</p>

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>“Purpose The Scotia-Fundy Shrimp Advisory Committee will provide input and advice to the Department of Fisheries and Oceans on the conservation, protection and management of the Scotia-Fundy shrimp resource. The Committee will continue to serve as an open and public consultative forum on all issues affecting the Scotian Shelf shrimp fishery. The committee will also undertake the annual review of the Scotian Shelf Shrimp Integrated Fish Management Plan.</p> <p>Scope The Committee will provide recommendations and advice on Regional policy issues.</p> <p>The Committee will make final recommendations on annual total allowable catches, quotas, and on the introduction of new fishing technologies into the fishery that may affect existing management measures.</p> <p>The advice offered by the Committee will be consistent with the Department of Fisheries and Oceans established policy.”</p> <p>The Committee receives information from officials, scientists and the industry about the performance of the fishery the previous year, plus formal advice from DFO scientists on stock status with respect to quantitative reference points and a suite of indicators. The reference points ensure that the stock assessment and TAC-setting is based on the precautionary approach. The Committee discusses the implications for changes to the TAC required under the harvest control rule, taking into account the views of industry. The Committee discusses any proposals for new regulations or changes to existing regulations that have been made during the year, and may request that further work be done at a working group if required. The Committee aims to reach consensus on the advice to be given to DFO on these issues. Based on this advice, decisions are finalised at the level of the Regional Director General. The resource sharing agreement between Maritime and Gulf-based vessels means that advice to DFO senior managers includes input from both regions, including from representatives of the Provincial Governments of Nova Scotia and New Brunswick.</p> <p><u>Check lists</u> DFO Resource Advisors use a fisheries checklist that assists in decision-making, although the assessors were not provided a copy. The fishery checklists incorporate, in part, elements of the DFO Maritimes regional Ecosystem Approach to Management (EAM) framework, which was presented as an appendix in Curran et al. (2012). A key figure of the regional EAM framework has been replicated from Curran et al. (2012) in Annex 1A of this report. The regional EAM framework has not been formally published, although it has received concurrence by senior management in the DFO Maritimes Region (Curran et al, 2012). To date, DFO Resource Advisors have been evaluating existing fishery management plans with respect to the regional EAM framework, with the intent of working with other DFO management sectors over time to incorporate applicable elements of the EAM framework into IFMPs.</p>

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives	
SG	Issue	Met? (Y/N)	Justification/Rationale
	b	Y	<p>Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.</p> <p><i>The decision process responds to the serious and important issues in a timely and transparent manner, and it takes into account the wider implications.</i></p> <p>Evidence: The Advisory Committee topics highlighted under Scoring Issue 80a qualify as being ‘serious and important issues’, and the scope of the Committee specifies that the advice must be consistent with established DFO policy, so that it clearly takes into account the wider implications of a decision. The main business is dealt with in a timely manner because the time scale is determined by the annual TAC cycle. The Committee must be responsive because of the need to agree on the advice by consensus rather than by vote. The site visit made clear that the Committee is the preferred forum to receive and resolve disputes, which could arise at any time and in any number, and these would clearly be serious and important. The decision process requires that the advice is passed up to DFO Regional managers for decision taking, so that regional managers also deal with the serious and important issues by definition. Managers also work pro-actively to develop new DFO national and regional policies, or to instigate action on them, but it seems likely that these activities would be prioritised taking into account their relevance to the shrimp fishery, or an analysis of the risk posed by the shrimp fishery.</p>
	c	Y	<p>Decision-making processes use the precautionary approach and are based on best available information.</p> <p><i>The Shrimp fishery meets the criteria at the SG80 standard</i></p> <p>Evidence: <u>The policy level</u> At the National and Regional level it is well-established that DFO is committed to implementing resource and ecosystem management policies using the precautionary approach and the best available scientific information. This has been amply demonstrated by the numerous excerpts from various frameworks and policies cited earlier in this Report.</p> <p><u>The operational level in the shrimp fishery</u></p> <ul style="list-style-type: none"> • The precautionary approach is implemented a) during the stock assessment, which compares exploitation rate to a removal reference value, and defines stock status using limit and upper reference points for spawning biomass, and b) during TAC-setting, which takes note of trends in a suite of 25 ‘traffic light’ indicators for fishing, stock abundance, productivity, and the ecosystem, including two key factors, water temperature and predator abundance.

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<ul style="list-style-type: none"> Scientific advice on stock status is based on the best available measurements of survey abundance and size distribution. The assessment and advice are quality controlled through peer review of the annual Scientific Advisory Report, plus the periodic public review of the assessments as part of the Canadian Regional Advisory Process (last review in 2011). Monitoring of quota uptake and by-catch levels are based on the best available information from log books, dockside monitoring, and observer reports. <p>Decisions about closed areas and conservation zones are based on an assessment of risk using the best available information on the distribution of sensitive habitats and species, the distribution and intensity of the shrimp fishing footprint, and the precautionary concept of avoiding irreversible harm.</p>
	d	Y	<p>Explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p> <p>See 100d.</p>
100	b	N	<p>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.</p> <p>The assessors lack definitive evidence that the decision process responds to all issues as required to meet the SG100 standard.</p>
	d	Y	<p>Formal reporting to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p> <p><i>DFO pursues a transparent approach that is open to the provision of information and explanations about policy, the aims and operations of management, the nature and basis of the decisions taken, and the information and research on which it is based. This contributes to the effective operation of the management system. This meets the criteria at the SG100 standard.</i></p> <p>Evidence:</p> <ul style="list-style-type: none"> The DFO website provides a comprehensive archive of all Framework, Policy and Strategy documents which can be accessed by stakeholders wishing to determine whether decisions taken to manage the fishery and the ecosystem conform to Federal and Maritimes policies and recommended practices. . The IFMP (DFO 2011a) is published and provides a comprehensive summary of the management and ecosystem objectives, TAC and quota sharing principles and agreements, and the fishery monitoring and surveillance systems, including mandatory reporting and recording.

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<ul style="list-style-type: none"> DFO pursues effective public and stakeholder consultation on policy changes. Fishing licence conditions describe the rules and regulations that fishers must follow, and they can seek guidance on these from Fishery Officers and managers.
			<ul style="list-style-type: none"> DFO managers and scientists attend the Advisory Committee meetings when required, so that the basis for advice and decisions about stock status, management of the resource and the habitat, and monitoring and compliance issues, can be explained directly to stakeholders, and reports on assessment and monitoring activities tabled and explained. For example, during the site visit, the IMM assessment team viewed slides from the 2012 Power Point presentation on stock status by biologist David Hardie of the Population Ecology Division. The team also received a copy of the Summary of Compliance and Enforcement for 2010-11 (the source of the data presented in Section 3.5.10). The Advisory Committee therefore ensures a high degree of general transparency over decision-making, and minutes of the meetings are recorded and can be consulted. Science-based decisions are supported in the longer term by explanatory information that is publicly available in the form of Research Documents and peer reviewed Scientific Advisory Reports posted on the DFO website by the Canadian Science Advisory Secretariat. As already explained under Issue C, transparency is enhanced by periodic public review of the science through the Regional Advisory Process. At the site visit, the team heard that the Compliance and Protection Division uses personal contact in day-to-day operations to explain all aspects of new regulations or entitlements, or changes to existing ones. As stated at the site visit, stakeholders are free to contact DFO Maritimes divisional staff and managers at any time to raise issues or to seek explanations of policy decisions.
References		Curran et al 2012; DFO 2011a	
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Monitoring, control and surveillance <u>mechanisms</u> exist are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.
			See 100a.
	b	Y	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.
			See 100b.
	c	Y	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.
			See 100c.
80	a	Y	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.
			See 100a.
	b	Y	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.
			See 100b.
	c	Y	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.
			See 100c
	d	Y	There is no evidence of systematic non-compliance.
			<i>The Division Chief stated clearly that the shrimp fishery presents a very low risk of non-compliance and that there is no evidence of systematic non-compliance, thus meeting this issue at the SG80 standard.</i>
100	a	Y	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.
			<i>There is a high degree of confidence that fishers comply with the management system for the shrimp fishery, and the co-management approach ensures that fishers provide the information required for management of the fishery. The fishery meets the SG100 standard.</i>

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Evidence: DFO Maritimes Fisheries Management Branch has a Conservation and Protection Division utilising the following resources: 160 staff of whom 130 are trained Fishery Officers spread across 13 onshore bases; several offshore and pending new mid-shore patrol vessels; plus surveillance aircraft. Resources on the Eastern Scotian Shelf shrimp mainly involve about 20 staff deployed from bases at Sherbrooke and Sydney, plus a share of the maritime patrol and aerial surveillance resources. Section 3.5.10 lists the comprehensive suite of monitoring tools and measures, surveillance activities, and surveillance management that are in being for the Shrimp Fishery. Dockside monitoring, and at-sea observer activities are contracted out under arrangements managed and reviewed by the Division.</p> <p>Logbook data including area fished are entered into an appropriate data base, and automated programmes check for conformity between the fishing area and the area licensed, backed up by aerial surveillance data. Illegalities are noted in observer reports. At-sea monitoring and surveillance at sea may lead to charges of illegal activity when evidence is found. Aerial surveillance provides evidence of conformity with licence conditions and closed areas.</p> <p>At the site visit, the Divisional Chief for Planning and Analysis explained Divisional policy on the allocation of resources to individual fisheries, the planning of operational priorities, and their preferred approach to education and sanctions. He discussed the level of violations and compliance in the fishery, and quoted from the 2010-11 Summary Report of Compliance and Enforcement for Scotian Shelf Shrimp Wood, 2012 pers comm), of which a copy was later sent to assessment team and used to paste the tables of surveillance effort into Section 3.5.10.</p> <p>The system is clearly comprehensive; monitoring and surveillance effort and sanctions for individual fisheries are planned and prioritised annually; and the Summary Report cited above indicates that they are implemented systematically at whatever priority level is selected for each fishery. The compliance and protection <u>capability</u> in the Maritimes therefore meets the SG100 standard for this Issue.</p>
	b	Y	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
			<p>Based on evidence presented at the site visit, the fishery meets the criteria at the SG 100 standard.</p> <p>Evidence: Sanctions are available to deal with breaches of licence conditions and fishery regulations, including tickets issued by enforcement officers for low level infractions, and for major cases the institution of court proceedings.</p>

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with	
SG	Issue	Met? (Y/N)	Justification/Rationale
			At the site visit it was stressed that in the Maritimes Region, costly and time-consuming court action is seen as a blunt tool and a last resort, and that C&P objectives are best secured by informal interactions with industry at wharves, plants, or at sea during day to day monitoring, surveillance and enforcement patrols. Initial infractions are dealt with by warnings coupled with guidance. Assessors were assured that very few sanctions have been applied in the shrimp fishery, not because of a lack of will or capacity, but because they have not been required. Where infractions have occurred, and warnings or sanctions have been applied, there have been few, repeat offences.
	c	Y	<p>There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.</p> <p><i>There is a high degree of confidence that fishers comply with the management system for the shrimp fishery, and the co-management approach ensures that fishers provide the information required for management of the fishery. The fishery meets the SG100 standard.</i></p> <p>Evidence:</p> <ul style="list-style-type: none"> Monitoring and surveillance activities, and the level of compliance, are reviewed on an ongoing basis by the C&P Division, and evaluated by a subcommittee of the Advisory Committee. The "Report a Poacher" programme is a significant contributor to the effectiveness of the enforcement regime. Dockside monitoring effort conforms to the number of vessels and landings because of the hailing in and hailing out regulations, but the data tables in Section 3.5.10 showed that the number of fishery officer hours, and dedicated patrol vessel and aerial surveillance hours, devoted to the shrimp fishery is low, as is the level of observer coverage. The Divisional Chief stated categorically that whilst this reflects the low priority attached to the shrimp fishery, this is to do with confidence that compliance in this fishery is high, as evidenced by intelligence reports, and the very low number of infractions found year on year, rather than a lack of capacity or commitment. Most infractions are due to low-level offences, such as short term technical malfunctions of the VSM kit, or failures to hail in by skippers unaware of the rules, but in almost all cases there was no repeat offence after warning guidance was given. As noted in Section 8 of the current IFMP (DFO, 2011a), the shrimp fishery is managed by a co-management approach between DFO and the industry, including agreements on research and other cooperative projects. Therefore when required the fishery is empowered to provide information important for the effective management of the fishery.
References			
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 3.2.4

PI 3.2.4		The fishery has a research plan that addresses the information needs of management	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	<p>Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.</p>
			<p>A significant body of strategic and tactical research has been carried out as required to enable the management system to achieve the range of MSC Principle 1 and 2 objectives set out in the SSSIFMP (DFO 2011a) and assessed by the Pls. A selection of examples is shown below for the principal management activities. The examples are cited in full for ease of comprehension.</p> <p>Assessment of stock status and TAC relative to reference points DFO. 2006a. A Harvest Strategy Compliant with the Precautionary Approach. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2006/023.</p> <p>DFO. 2009b. Proceedings of the Precautionary Approach Workshop on Shrimp and Prawn Stocks and Fisheries; November 26-27, 2008. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2008/031.</p> <p>DFO. 2012b. Reference points consistent with the precautionary approach for a variety of stocks in the Maritimes Region. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/035.</p> <p>DFO. 2012e. Assessment of Northern Shrimp on the Eastern Scotian Shelf (SFAs 13-15). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/073.</p> <p>Drouineau, H., L. Savard, M. Desgagnés and D. Duplisea, 2012. SPAM (Sex-Structured Pandalus Assessment Model): a stock assessment model for Pandalus Stocks. Can. J. Fish. Aquat. Sci. 69: 770–783.</p> <p>Hardie, D., M. Covey, M. King, and B. Zisserson. 2011. Scotian Shelf Shrimp 2010-2011. DFO Can. Sci. Advis. Sec. Res. Doc. 2011/102</p> <p>Koeller, P. 2000. Relative importance of abiotic and biotic factors to the management of the northern shrimp (<i>Pandalus Borealis</i>) fishery on the Scotian Shelf. J. Northw. Atl. Fish. Sci. 27: 21-33.</p> <p>Koeller, P., L. Savard, D. Parsons, and C. Fu. 2000. A Precautionary Approach to Assessment and Management of Shrimp Stocks in the Northwest Atlantic. J. Northw. Atl. Fish. Sci. 27: 235-247.</p> <p>Koeller, P. 2006. Inferring Shrimp (<i>Pandalus borealis</i>) Growth Characteristics from Life History Stage Structure Analysis. J. Shellf. Res. 25: 595-608.</p> <p>Koeller, P., C. Fuentes-Yaco, T. Platt, S. Sathyendranath, A. Richards, P. Ouellet, D. Orr, U. Skúladóttir, K. Wieland, L. Savard, and M. Aschan. 2009. Basin-scale coherence in phenology of shrimps and phytoplankton in the north Atlantic Ocean. Sci. 324:791-793.</p>

		<p>Koeller, P., C. Fuentes-Yaco, M. Covey, M. King, and B. Zisserson. 2010. The Last Traffic Light on the Scotian Shelf: Shrimp 2009-2010. DFO Can. Sci. Advis. Sec. Res. Doc. 2010/061.</p> <p>By-catch issues</p> <p>Benoit, H.P, and J. Allard, 2009. Can the data from at-sea observer surveys be used to make general inferences about catch composition and discards? Can. J. Fish. Aquat. Sci. 66: 2025–2039</p> <p>GMRI 2009. A contemporary assessment of the bycatch of regulated species and the Nordmore grate in the northern shrimp fishery. Gulf of Maine Research Institute, Contract PZ09020, Final Report: v + 37 pp.</p> <p>Hickey, W. M., G. Brothers and D. L. Boulos. 1993. By-catch reduction in the northern shrimp fishery. Can. Tech. Rep. Fish. Aquat. Sci. 1964: vi + 41 pp.</p> <p>Habitat Issues</p> <p>DFO, 2004a. Habitat Status Report on ecosystem objectives. Fisheries and Oceans Canada. Canadian Science Advisory Secretariat. Habitat Status Report 2004/001.</p> <p>DFO, 2006b. Impacts of Trawl Gears and Scallop Dredges on Benthic Habitats, Populations and Communities. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2006/025.</p> <p>Grant, 2012. Otter Trawl Impacts on Benthic Habitats and Communities in the Northern Shrimp Fishery on the Newfoundland-Labrador Shelf (SFA's 5, 6, and 7) and Eastern Scotian Shelf (SFA's 13, 14, and 15): the Fishery, Trawling Impacts, and Vulnerable Marine Ecosystems. Client Report.</p> <p>Hixon, M. A. and B. N. Tissot. 2007. Comparison of trawled vs untrawled mud seafloor assemblages of fishes and macroinvertebrates of Coquille Bank, Oregon. J. Exp. Mar. Biol. Ecol. 344: 23-34.</p> <p>NEFMC 2011. The swept area seabed impact (SASI) model: a tool for analyzing the effects of fishing on essential fish habitat. New England Fishery Management Council Management, 21 January 2011. 203 pp.</p> <p>Coral issues</p> <p>Breeze, H., Fenton, D.G. 2007. Designing management measures to protect cold-water corals off Nova Scotia, Canada. <i>In</i> Conservation and adaptive management of seamount and deep-sea coral ecosystems. Edited by R.Y. George and S.D. Cairns. Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami. pp.123-133.</p> <p>Campbell, J.S. and Simms, J.M. 2009. Status Report on Coral and Sponge Conservation in Canada. Fisheries and Oceans Canada: vii + 87 p.</p> <p>Cogswell, A., Kenchington, E., Lirette, C., MacIsaac, K., Best, M., Beazley, L., Ferguson, D. and Vickers, V. 2009. The current state of knowledge concerning the distribution of coral in the Maritimes Region of Canada. Can. Tech. Rep. Fish. Aquat. Sci. 2855: v + 66 p.</p>
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			<p>DFO 2010f. Occurrence, sensitivity to fishing, and ecological function of corals, sponges and hydrothermal vents in Canadian waters. Can. Sci. Adv. Sec. Sci. Adv. Rep. 2010/041: 54 pp.</p> <p>Kenchington, E., C. Lirette, A. Cogswell, D. Archambault, P. Archambault, H. Benoit, D. Bernier, B. Brodie, S. Fuller, K. Gilkinson, M. Lévesque, D. Power, T. Siferd, M. Treble, and V. Wareham. 2010. Delineating coral and sponge concentrations in the biogeographic regions of the east coast of Canada using spatial analysis. Can. Sci. Adv. Sec. Res. Doc. 2010/041. vi + 202 pp.</p> <p>Sensitive Benthic Areas DFO, 2004b. Identification of Ecologically and Biologically Significant Areas. Fisheries and Oceans Canada. Canadian Science Advisory Secretariat. Ecosystem Status Report. 2004/006.</p> <p>Doherty, P and T. Horsman. 2007. Ecologically and Biologically Significant Areas of the Scotian Shelf and Environs: A Compilation of Scientific Expert Opinion. Can. Tech. Rep. Fish. Aquat. Sci. 2774: 57 + xii pp.</p> <p>Protected areas and Conservation Zones DFO. 2010a. Gully Marine Protected Area Monitoring Indicators, Protocols and Strategies. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2010/066.</p> <p>DFO. 2012c. Conservation Priorities, Objectives, and Ecosystem Assessment Approach for the St. Anns Bank Area of Interest (AOI). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/034.</p> <p>DFO. 2012d. Marine Protected Area Network Planning in the Scotian Shelf Bioregion: Objectives, Data, and Methods. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/064.</p> <p>Ecosystem Approach to Management Curran, K., Bundy, A., Craig, M., Hall, T., Lawton, P., and Quigley, S. 2012. Recommendations for Science, Management, and an Ecosystem Approach in Fisheries and Oceans Canada, Maritimes Region. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/061. v + 48 p.</p> <p>Worcester, T. and M. Parker. 2010. Ecosystem status and trends report for the Gulf of Maine and Scotian Shelf. Can. Sci. Adv. Sec. Res. Doc. 2012/070: vi + 59 pp.</p>
	b	Y	<p>Research results are available to interested parties.</p> <p>See 80b.</p>
80	a	N	<p>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.</p>

			<p>At the site visit it was advised that ongoing research in support of managing shrimp stocks, including those on the Eastern Scotian Shelf, were routinely identified and reviewed by DFO assessment scientists, as well as at meetings of the joint NAFO/ICES Working Group on Pandalid Shrimp, but no strategic research plan document along the lines of MSC Guidance note CB4.10.3 was available for scrutiny. It was also made clear that planning was in a state of transition following a move to a two-year assessment cycle. After the site visit, a draft list of research topics and priorities (Hardie, pers comm) for the Eastern Scotian Shelf shrimp fishery was sent to the assessment team by the DFO Regional ecocertification coordinator. This plan, has the following priorities, which at that time had yet to be presented to and discussed by the SSSAC:</p> <ul style="list-style-type: none"> • Restore funding (industry) for continuation of the trawl survey^[1] • Improve survey design (consider adaptive survey design and/or redistribution of sampling effort among SFAs by area) • Test survey gear changes to address the fact that commercial gear has evolved while the survey gear has remained constant (swept area method is predicated on assumption of maximum gear efficiency). • Explore the scientific and economic costs/benefits of changing to a beam-trawl survey (currently otter trawl), as has been suggested by some industry representatives. • Provide variance estimates on Traffic Light indices including biomass indices, in particular those used in the Precautionary Approach Framework. • Explore model fits to shrimp data (Surplus Production and explore Delay Difference and Bayesian Biomass Dynamic model with explicit predation and temperature terms). • Provide a complete justification, including literature review, for the inclusion of all Traffic Light Indicators for the 2014 Framework. • Extend the analysis of shrimp trap data in the assessment. Currently it is considered in terms of biomass only, whereas the catch composition and temporal/spatial nature of the fishery is very different. Now that the trap fishery is more fully developed, further analysis of the details of the size and sex distribution as well as catch rate trends are needed. • Develop an index of egg production • Explore evidence for shifts in the timing of shrimp life history (Industry indicates that the timing of reproduction has shifted earlier in recent years). • Test new methods of shrimp aging (eye stalks) for this stock and compare to modal analysis of length classes (additional funding required – currently not available). • Compare Traffic Light results from high-productivity period only (as used in the Precautionary Approach) to the current analysis (using the entire data time-series).
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			<ul style="list-style-type: none"> Evaluate the influence of a reduced survey schedule on the provision of science advice (for TESA workshop – Ottawa 2013). <p>This list was accompanied by caveats and comments (Hardie, pers comm.) that can be summarised as follows:</p> <ul style="list-style-type: none"> The research plan is dependent on the allocation of resources, and the effect of conflicting work demands. Time lines cannot be allocated until survey and staffing uncertainties are resolved. The list assumes the continuation of the survey time-series, but the DFO-Industry cooperative shrimp survey on the Eastern Scotian Shelf Shrimp is currently unfunded for 2013, since the DFO portion of the funding has been cancelled. If the survey is terminated or changed dramatically, the Research Plan will need to change too. Results of this research will appear in Research Documents, Science Advisory Reports, and RAP Proceedings published by the Canadian Science Advisory Secretariat, but under the new two year assessment cycle, the first expected peer-review of some of the work items listed will not be until the next full shrimp assessment (RAP/Framework) in the fall/early winter of 2014. The plan is focussed on survey, modelling and population issues that are the principal priorities among DFO managers in the current time horizon. <p>This information shows that research planning is in progress to meet the ongoing challenges of assessing and managing the Eastern Scotian Shelf shrimp stock during the current transition into the two year assessment cycle, but because of the draft nature of the document, and the uncertainties cited, the criteria for issue 80a are not met, particularly for Principle 2.</p>
	b	Y	<p>Research results are disseminated to all interested parties in a timely fashion.</p> <p>Research results are disseminated in the form of Research Documents, Science Advisory Reports, RAP Proceedings, and Technical Reports on shrimp and ecosystem topics, both for the Maritimes and other waters in Eastern Canada, many of which are included in the publications listed under issue 60a. After peer review they become available quickly on the web pages of the Canadian Science Advisory Secretariat, which are open to public access via the Fisheries and Oceans web site. Papers are also published, but on a slower time scale, in scientific journals. This scoring issue is met.</p>
100	a	N	<p>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.</p>

		<p>There is an overarching five year research plan for the whole of DFO (DFO 2008), but it is very general. The elements of the draft Scotian Shelf Shrimp research priorities cited under 80a above mainly cover survey, modelling and population issues that are the principal priorities among DFO managers in the current time horizon. There are individual plans for some issues, such as the Maritimes Coral Conservation Plan (DFO 2006c), but there is no overarching plan that provides strategic guidance for planning research on the biodiversity and habitat issues of the Scotian Shelf shrimp fishery as a whole, therefore the planning is not comprehensive.</p> <p>This issue does not meet the criterion at SG100.</p>
	b	<p>N</p> <p>Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.</p> <p>The fishery meets only one of the criteria for this issue, since a strategic research <u>plan</u> is not yet complete or disseminated, although research <u>results</u> are rapidly and widely disseminated by DFO scientists.</p> <p>Research results are disseminated in the form of Research Documents, Science Advisory Reports, RAP Proceedings, and Technical Reports on shrimp and ecosystem topics, both for the Maritimes and other waters in Eastern Canada, many of which are included in the publications listed under issue SG60a. After peer review they become available quickly on the web pages of the Canadian Science Advisory Secretariat, which are open to public access via the Fisheries and Oceans web site. Papers are also published, but on a slower time scale, in scientific journals.</p>
References		<p>DFO 2005. DFO 2008</p>
OVERALL PERFORMANCE INDICATOR SCORE:		70
CONDITION NUMBER (if relevant):		3

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	The fishery has in place mechanisms to evaluate some parts of the management system.
			See 100a.
	b	Y	The fishery-specific management system is subject to occasional internal review.
			See 100b.
80	a	Y	The fishery has in place mechanisms to evaluate key parts of the management system
			See 100a.
	b	Y	The fishery-specific management system is subject to regular internal and occasional external review.
			See 100b.
100	a	Y	The fishery has in place mechanisms to evaluate all parts of the management system.
			<p><i>There is a comprehensive review of all parts of the management system, thus meeting the criteria at the SG100 standard.</i></p> <p>Evidence:</p> <p><u>High level Federal Review</u> All government departments, agencies, and their scientific programmes are subject to periodic internal review and external review of their organisation, core functions and effectiveness by an appropriate high level body or groups of experts. The highest level of external review for the shellfisheries, by the Auditor General of Canada, took place in 1999. (Anon, 1999. Fisheries and Oceans – Managing Atlantic Shellfish in a Sustainable Manner. Chapter 4 in Report of the Auditor General of Canada.. 35pp)</p> <p><u>Review by DFO Resource managers</u></p> <ul style="list-style-type: none"> Resource Managers review monitoring results showing uptake of the annual TAC, and the annual performance of the shrimp fishery against other regulatory requirements, for discussion of the new TAC at the Advisory Committee. Habitat managers review the outcomes of VMS surveillance with respect to conservation and closed areas. Relevant managers periodically review how well DFO Maritimes follows and implements the wide range of Frameworks, Policies and Plans for management of the shrimp fishery and ecosystem, in order to assess and amend existing and future operations and priorities.

			<ul style="list-style-type: none"> • Key management plans that involve ongoing review are a) the ESS Shrimp Fishery Integrated Fisheries Management Plan (DFO 2011a), an evergreen plan that is reviewed and updated on a regular basis, and rewritten every five years, and b) the ESS Integrated Ocean Management Plan (DFO 2007b), which deals with all aspects of managing the fisheries and the ecosystem. The plan evaluation section on pages 63 and 64 commits to a biennial progress report, use of external specialists or reviewers, and the use of interviews, audits, or questionnaires. • The site visit indicated that DFO resource managers use checklists for progress chasing, gap analysis and priority setting. An active fisheries check list was not available for view, but we were informed that the check list takes into consideration information provided in Curran et al (2012). The latter describes the Eastern Scotian Shelf Ecosystem Approach to Management, where Table 1 shows a proposed Resource Management Check List for objectives, strategies and managed activities, and Table 4 shows a process diagram with a management planning boxes for 'performance evaluations of tactics', and 'review and reform of the management committees'. <p><u>Review by DFO Compliance and Protection Division</u> This Division reviews the performance of contractors carrying out shrimp dockside monitoring and at-sea observer programmes, and can recommend changes when necessary. It reviews the performance of intelligence, enforcement and surveillance activities on land, at sea, in the air, and via VMS records, in order to assess effectiveness of coverage; compliance, infractions and sanctions; plan future priorities and allocation of resources; and report to the Shrimp Advisory Committee, where recommendations for change can be discussed.</p> <p><u>Review by the Scotian Shelf Shrimp Advisory Committee</u> The Advisory Committee is where the full range of stakeholders and managers are invited to meet at least annually to review active shrimp fishery management processes, the performance of the fishery including TAC uptake and economic viability; monitoring, surveillance and enforcement activities; stock status from the latest assessment; and new scientific advice. The Committee can review licensing, resource sharing, and quota allocation issues and disputes. The Committee is mandated to review and update the IFMP on a regular basis, and to renew it every five years. According to MSC guidance notes for this PI, the Advisory Committee meetings count as being both internal and external since meetings can be attended by the public and by stakeholders who are Canadian but are external to DFO .</p> <p><u>Scientific Peer Review under the Regional Advisory Process</u> As with all DFO regions, Research Documents and Scientific Advisory Reports (stock assessments, habitat assessments, and advice) for fisheries and ecosystem topics in the Maritimes are peer reviewed before being placed on the DFO website. The Canadian Regional Advisory Process (RAP), which was established in 1993, uses a formal process and structure to identify issues/topics to be reviewed and to timetable meetings. It works with managers to organise documentation and attendance by the responsible scientists and managers, stakeholders, and reviewing experts (including those external to the originating department, and sometimes from overseas).</p>
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		<p>The DFO Maritimes RAP website page lists the RAP meetings and topics reviewed since 2000, and the resulting publication (Research Documents, Science Advisory Reports, and the official meeting records taken by rapporteurs and published as a Proceedings The following are examples of Principle 1 and Principle 2 topics that passed through the Maritimes RAP process relevant to the Scotian Shelf and the shrimp fishery in 2012 and 2010:-</p> <p>DFO. 2010a. Gully Marine Protected Area Monitoring Indicators, Protocols and Strategies. Can. Sci. Advis. Sec. Sci. Advis. Rep. 2010/066.</p> <p>DFO. 2012a. Assessment of Northern Shrimp on the Eastern Scotian Shelf (SFAs 13-15). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/001.</p> <p>DFO. 2012b. Reference points consistent with the precautionary approach for a variety of stocks in the Maritimes Region. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/035.</p> <p>DFO. 2012c. Conservation Priorities, Objectives, and Ecosystem Assessment Approach for the St. Anns Bank Area of Interest (AOI). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/034.</p> <p>DFO. 2012d. Marine Protected Area Network Planning in the Scotian Shelf Bioregion: Objectives, Data, and Methods. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/064.</p> <p><u>Science published in Journals</u> When advice or policy depends on scientific work published in journals, the papers will have been subject to formal peer review to international standards.</p>
	b	<p>Y</p> <p>The fishery-specific management system is subject to regular internal and external review.</p> <p><i>The shrimp fishery has regular internal and external reviews, and meets the criteria at the SG 100 standard.</i></p> <p>Many of the reviews described under Issue A are internal. The assessors are not aware of any formal mechanism to ensure that the Maritimes management system is reviewed by experts from outside Canada or the Maritimes, but under guidance note GCB4. 11.1, it is apparent that several of the review processes within Canada qualify as having external components outside the originating body e.g. the Advisory Committee (non-DFO stakeholders), the RAP (national experts from other departments, plus occasional international experts), as well as reviews by scientific journals (international referees).</p>
	References	Anon.,1999; Curran et al 2012; DFO 2007b; DFO 2010f; DFO 2011a; DFO 2012a; DFO 2012b; DFO 2012c; DFO 2012d.
OVERALL PERFORMANCE INDICATOR SCORE:		100
CONDITION NUMBER (if relevant):		

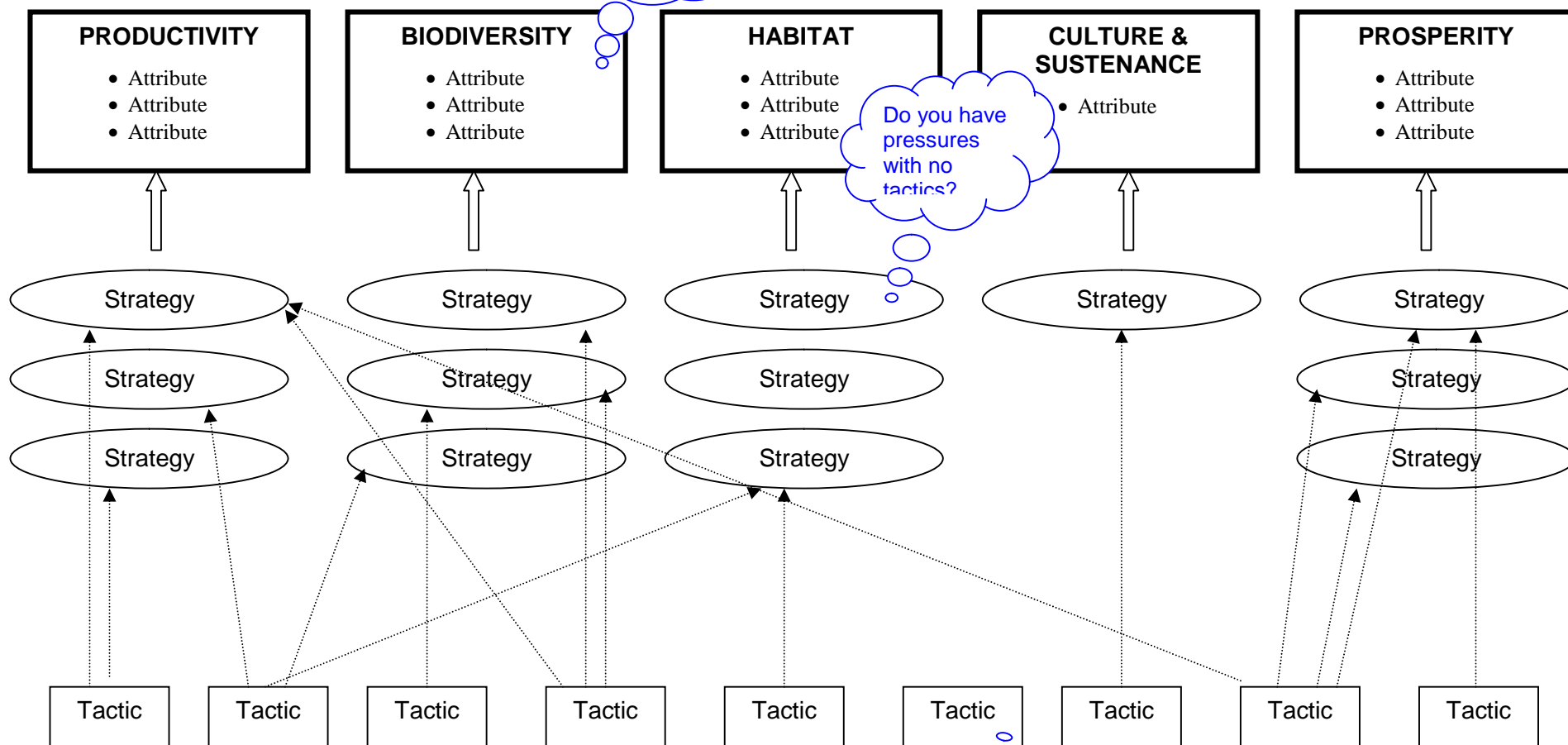
Annex 1a: Framework for an Ecosystem Approach to Management (Resource Management, Maritimes Region)

ATTRIBUTES	OBJECTIVES • STRATEGIES with associated pressures	MANAGED ACTIVITIES				TACTICS
		Groundfish Fishery	Herring Fishery	Salmon Aquaculture	etc.	
<div>EXPANSION OF ATTRIBUTES CONSIDERED</div> <div> air quality biomass breeding behavior community assemblage genetic structure habitat structure organism health population richness forage predators primary production recruitment sediment quality size spectrum size/age structure spatial extent spatial occupancy 'special places' 'special species' trophic structure water quality yield traditional Aboriginal use efficiency market access </div>	Productivity: Do not cause unacceptable reduction in productivity so that components can play their role in the functioning of the ecosystem					
	<ul style="list-style-type: none"> Keep <u>fishing mortality</u> moderate Allow sufficient <u>escapement from exploitation</u> for spawning Limit <u>disturbing activity</u> in important reproductive areas/seasons Control <u>alteration of nutrient concentrations</u> affecting primary production 		<div>↑</div> <div>PRESSURES CONSIDERED</div>			
	Biodiversity: Do not cause unacceptable reduction in biodiversity in order to preserve the structure and natural resilience of the ecosystem					
	<ul style="list-style-type: none"> Control unintended <u>incidental mortality</u> for all species Distribute population <u>component mortality</u> in relation to component biomass Minimize unintended <u>introduction and transmission</u> of invasive species Control <u>introduction and proliferation</u> of disease/pathogens Minimize <u>aquaculture escapes</u> 					
	Habitat: Do not cause unacceptable modification to habitat in order to safeguard both physical and chemical properties of the ecosystem		<div>←</div> <div>CUMULATIVE EFFECTS</div> <div>→</div>			
	<ul style="list-style-type: none"> Manage <u>area disturbed</u> of habitat Limit <u>introduction of pollutants</u> Minimize <u>introduction of debris</u> Control <u>noise disturbance</u> Control <u>light disturbance</u> 					
	Culture & Sustenance: Respect Aboriginal and treaty rights to fish		<div>↓</div> <div>EXPANSION OF</div>			
	<ul style="list-style-type: none"> Provide <u>access</u> for food, social and ceremonial purposes 					
	Prosperity: Create the circumstances for economically prosperous fisheries					
	<ul style="list-style-type: none"> Limit <u>inflexibility</u> in policy & licensing among individual enterprises/license holders 					
	<ul style="list-style-type: none"> Minimize <u>instability</u> in access to resources and allocations 					
	<ul style="list-style-type: none"> Limit inability for self-adjustment to <u>overcapacity</u> relative to resource availability 					
	<ul style="list-style-type: none"> Support <u>certification</u> for sustainability 					

Note: Elements associated with culture & sustenance and prosperity are provisional and at present are being applied only in fisheries management

Annex 1b: EAM Worksheet-Flowchart

Are there attributes you're failing to protect?



Do you have pressures with no tactics?

Do you have tactics with no strategy?

Annex 2: Excerpts from Framework, Policy and Plan documents

- **A Policy Framework for the Management of Fisheries on Canada's Atlantic Coast**

Vision for the Management of the Atlantic Fisheries

The Vision

Objectives

Principles

Conservation and Sustainable Use

Policy Strategies

Developing and Adopting a Comprehensive Risk Management Framework that Incorporates Precaution

Developing and Adopting Ecosystem-based Management

Conducting Fisheries within an Enforceable Regulatory Framework

Promoting a Conservation Ethic and Responsible Harvesting Operations

Self-reliance

Policy Strategies

Clarifying the Role of Fisheries and Oceans Canada in Supporting Viable Coastal Communities

Providing Resource Users with a Greater Role in Shaping Social and Economic Objectives

Stable and Transparent Access and Allocation Approach

Policy Strategies

Uses

Establishing Decision-making Guidelines for Commercial Access and Allocation

Stabilizing Sharing Arrangements in Established Commercial Fisheries

Shared Stewardship

Adopting a More Inclusive Approach to Policy Planning

Enabling Resource Users to Assume More of a Role in Operational Decisions

Facilitating Aboriginal Participation in Policy Planning and Decision Making

Building Capacity to Enable Resource Users to Take on New Responsibilities

- **Sustainable Fisheries Framework**

"The Sustainable Fisheries Framework provides the bases for ensuring Canadian fisheries are conducted in a manner which supports conservation and sustainable use.... The Sustainable Fisheries Framework provides the foundation of an ecosystem-based and precautionary approach to fisheries management in Canada. The Framework comprises two main elements:

(1) **Conservation and Sustainable Use policies** incorporate precautionary and ecosystem approaches into fisheries management decisions to ensure continued health and productivity of Canada's fisheries and healthy fish stocks, while protecting biodiversity and fisheries habitat.

(2) The application of such policies will be implemented into the fisheries management process through various **Planning and Monitoring Tools**. Integrated Fisheries Management Plans identify goals related to conservation, management,

enforcement, and science for individual fisheries; and they describe access and allocations among various fish harvesters and fleet areas. The plans also incorporate biological and socio-economic considerations that are factored into harvest decisions.

The Framework and its policies will be implemented progressively over time. The phased-in approach will be done according to the priorities identified through fishery planning sessions held across DFO regions beginning in 2009. The implementation of the framework, including changes to harvest arrangements, will be the subject of engagement with Aboriginal groups. The Framework will also continue to evolve as new policies and tools are created. The Framework and its policies will be implemented progressively over time.

- **Policy for Managing the Impact of Fishing on Sensitive Benthic Areas**

1.0 Introduction

2.0 Purpose and Scope

3.0 Guiding Principles

4.0 Description of Process

5.0 Data and Information Assembling and Collection

6.0 Identification of Sensitive Benthic Areas and Risk Analysis

7.0 Management Decision-Making Process

8.0 Monitoring and Evaluation

The policy is guided by the following principles:

- An ecosystem approach, which considers all of the components of an ecosystem, including benthic populations, communities and habitat, and their linkages, is fundamental to the conservation and sustainable use of Canada's fisheries.
- Conservation of fisheries resources and fish habitat – defined as sustainable use that safeguards ecological processes and genetic diversity for present and future generations – is a key priority of fisheries management decision making.
- The precautionary approach is a fundamental component of an effective risk management strategy. It recognizes that if there is both high scientific uncertainty and a risk of serious or irreversible harm, a lack of adequate scientific information will not be used as a reason for failing to take, or for postponing, cost effective measures for the conservation or protection of fish or fish habitat that are considered proportional to the likely severity of the risk.
- Management decisions should be based on the best science available – where adequate scientific data are unavailable, efforts should be made to acquire such data;
- The fishery is a common property resource to be managed for the benefit of all Canadians, consistent with conservation objectives, the constitutional protection afforded Aboriginal and treaty rights, and the relative contributions that various uses of the resource make to Canadian society, including socio-economic benefits to communities.
- Benthic ecosystems support aquatic species that play an important social, cultural and economic role in the lives of Canadians and others. Not all benthic areas require equal levels of protection, as not all areas are equally ecologically or biologically significant or vulnerable to particular stressors.
- Shared stewardship is an important part of managing Canada's fisheries resources. As such the Department will promote collaboration, participatory decision-making and shared responsibility with resource users and other stakeholders.
- Integrated management is an essential aspect of ensuring commercial and non-commercial interests are considered in the planning and management of oceans activities, such as fishing.

- Management decisions should also take it into consideration, as may be available, Aboriginal traditional knowledge and other local and traditional knowledge
- **Coral Conservation Plan, Maritimes Region (2006-2011), Oceans and Coastal Management Report 2006-01.**

About 25 to 30 species of corals occur off the Atlantic coasts of Nova Scotia and New Brunswick. There are about 8 species of stony corals (Scleractinia), including the reef-building coral *Lophelia pertusa* (spider hazards). About 19 species of soft corals, leather corals and sea fans (octocorals) are known to occur, including the large gorgonian corals *Paragorgia arborea* (bubblegum coral) and *Primnoa resedaeformis* (sea corn).

Conservation Objectives

- Conserve the health and integrity of coral communities
- Minimize the impacts from human activities on coral communities
- Protect and, where necessary, restore important coral habitats

Management Objectives

- Integrate coral conservation requirements into existing management processes.
- Where necessary, build capacity to address management requirements.
- Implement a flexible and adaptive approach to management and decision making.
- Base decision-making on coral conservation on the best available information.
- Consider and evaluate resource use activities when carrying out coral conservation planning & management.
- Provide information to the public on corals and coral conservation measures.
- Collaborate with the international community on cold water coral issues.

Research Objectives

Support and promote scientific research on corals, including research on:

- Understanding and assessing the impacts of human activities on corals
- Distribution of corals
- Evaluating current and proposed management measures to conserve corals
- Continue to identify research priorities for corals.
- Foster information-sharing and collaboration on coral research.
- Support socioeconomic research related to coral conservation.

High priority actions for conservation and management

- Ensure Coral Conservation Areas and the Gully MPA are incorporated into ocean use planning and management processes, such as fisheries management plans and environmental assessments.
- Continue activity monitoring of the Coral Conservation Areas and the Gully
- Marine Protected Area, including surveillance and enforcement of management measures and working with affected users to address compliance issues associated with area restrictions
- Apply appropriate management measures to protect important coral habitats, if the site evaluation process determines this is necessary.
- Provide opportunities for input to decision-making on coral conservation
- Disseminate information on corals and coral conservation, particularly to affected activity sectors

High priority actions for research

- Secure funding for benthic habitat and cold-water coral research, including building core capacity within DFO Science and pursuing funding opportunities with external funding bodies.
- Conduct research to evaluate the effectiveness of conservation measures, such as Coral Conservation Areas.
- Conduct research on impacts of human activities on corals and sensitivity of different coral taxa, including types of damage and recovery rates, which will require research on coral reproduction and recruitment
- Identify important coral areas in the region, which will require building capacity to conduct deep-water research and surveys on benthic habitats (i.e. below 500 metres).

Annex 3: MSC Variation Request and Response regarding IPI Application and Exemption

Appendix 1.2: Conditions

Three conditions, as described below, were raised in the reassessment. The fishery was previously certified based on an old style (pre-MSC FAM) assessment tree. These conditions do relate to similar conditions from the initial assessment however, the specific outcomes required for these two performance indicators are different than those initially described in first MSC assessment tree.

Fisheries and Oceans Canada has agreed to support the client in their action plan. A copy of the letter of support can be seen in Appendix 4.

Table A1.2: Condition 1

Performance Indicator	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
Score	60
SG 80a	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.
Rationale	<p>A partial strategy to ensure habitat outcome 80, is not in place in this fishery; in particular there has not been analysis to develop an understanding of how the existing measures work to achieve an outcome and no analysis of potential requirements to change measures should this become necessary has been conducted.</p> <p>DFO has put in place a Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas, which focuses on identifying vulnerable marine ecosystems (areas of concentration of cold-water corals, sponge-dominated communities, hydrothermal vents and seamounts) and protecting these from impacts of fishing. Distribution of such areas has been mapped on the eastern Scotian Shelf (DFO 2010) and it has been determined that the fishery area does not overlap with these.</p> <p>The Scotian Shelf Shrimp Advisory Committee, following a recommendation from its MSC Working Group, concluded in 2012 that no further measures were necessary to protect habitats in this fishery. Although the SSSAC considered relevant issues in making this determination (the distribution of the fishery in relation to habitat types and the existence of closed areas to protect habitat types on the eastern Scotian Shelf), a detailed justification was not provided for making the determination. In particular, an analysis of the seasonal and areal distribution of fishing in relation to habitats, and a consideration of potential impacts of the gear on habitats in its area of operation, would have been important in making a determination that no further measures were necessary.</p>
SG 80b	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.
Rationale	Given that no partial strategy is in place, and that no detailed justification having been developed that no further measures are necessary to protect habitat, this SG issue is not met.
SG 80c	There is some evidence that the partial strategy is being implemented successfully.

Condition	<p>By the 3rd surveillance audit, the client must provide evidence that a partial strategy, if necessary, has been implemented and is expected to achieve the Habitat Outcome 80 level of performance, i.e. the fishery is <u>highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm</u>.</p> <p>In addition, by the 4th surveillance audit, the client must provide evidence to demonstrate that there is some objective basis for confidence that the partial strategy, if necessary, will work, based on information directly about the fishery and/or habitats involved.</p>
Milestones	<ul style="list-style-type: none"> For the first annual surveillance audit, the client will have defined the terms of reference for the analysis of how existing measures achieve the Habitat Outcome 80 level of performance, i.e. the fishery is <u>highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm</u> and contracted a suitable scientist/group for the analysis. The milestone associated with the first surveillance audit has been defined as a means to monitor progress. Meeting this milestone would likely not result in a change in score at this surveillance audit. For the second annual surveillance audit, the client will provide evidence that the analysis is underway, and provide a written report to update the Audit Team. The milestone associated with this surveillance audit has been defined as a means to monitor progress. Meeting this milestone would likely not result in a change in score at this surveillance audit. For the third annual audit, the client will provide the full analysis as well as confirm the implementation of the partial strategy necessary, if necessary, for the fishery to achieve the Habitat Outcome (PI 2.4.1) SG80 level of performance. Meeting this milestone should demonstrate that SG 80a has been met and would likely result in a score of 70 for this performance indicator. By the fourth surveillance audit, the client will provide evidence to demonstrate that there is some objective basis for confidence that the partial strategy, if necessary, will work, based on information directly about the fishery and/or habitats involved. Meeting this milestone will demonstrate that all scoring issues of the SG 80 have been met and would result in a score of 80 for this performance indicator.
Client action plan	<p>The Client working in conjunction with DFO as the resource manager and other stakeholders will:</p> <ul style="list-style-type: none"> Provide an analysis to develop an understanding of how the existing measures work to achieve a SG 80 outcome for PI 2.4.1, and; Provide an analysis of potential requirements to change measures should this become necessary. <p>The Client will also provide a detailed justification for the determination of the MSC Working Group in November 2012 related to the necessity of further measures to protect the habitats in this fishery, including:</p> <ul style="list-style-type: none"> an analysis of the seasonal and areal distribution of fishing in relation to habitats; and a consideration of potential impacts of the gear on habitats. <p><u>Deliverables</u></p> <p>First Annual Audit – The client will provide the written terms of reference to the analysis of how existing measures achieve the Habitat Outcome SG 80 level of</p>

	<p>performance, i.e. the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm; evidence that a suitable contractor has been engaged; and, a brief synopsis of work to date.</p> <p>Second Annual Audit – The client will provide evidence that the analysis is underway, and provide a written report to update the Audit Team.</p> <p>Third Annual Audit - The client will provide the full analysis indicated above, as well as confirm the implementation of the partial strategy necessary, if necessary, for the fishery to achieve the Habitat Outcome (PI 2.4.1) SG80 level of performance.</p> <p>Fourth Annual Audit - The client will provide evidence to demonstrate that there is a partial strategy, if necessary, in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types and that there is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.</p>
Consultation on condition	<p>IMM has received confirmation of support of the CAP from the client, formal written confirmation of support from Fisheries and Oceans Canada is forthcoming.</p>

Table A1.2: Condition 2

Performance Indicator	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.
Score	60
SG 80a	There is a partial strategy in place, if necessary.
Rationale	<p>With respect to the strategy (Hardie 2012ppt; IFMP v 1.5.2) for ensuring that removals of the target species do not negatively impact trophic relationships, this meets the definition of a partial strategy (MSC GCB 3.3.1c) in that it is a cohesive arrangement based on an understanding of how the measures will work to achieve an outcome, and awareness of the need to change the measures if required. The LRP is set at a level based on a previous ecosystem status during which shrimp played a role in trophic relationships, while the removal reference is set at a level consistent with that in a wide range of other pandalid fisheries in which trophic relationships have been maintained.</p> <p>For non-catch impacts on benthic biodiversity and community structure, no partial strategy is in place, as the potential impacts of the fishery on these ecosystem components has not been explicitly considered and measures have not been put in place explicitly to address potential impacts. The Scotian Shelf Shrimp Advisory Committee (SSSAC) concluded, following a consideration of ecosystem impacts of this fishery, that no further measures were necessary to address ecosystem impacts, following a recommendation from its MSC Working Group (SSSAC MSC WG October 2012), but the basis for this conclusion was not presented in detail.</p> <p>DFO has put in place a Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas, which focuses on identifying vulnerable marine ecosystems (areas of concentration of cold-water corals, sponge-dominated communities, hydrothermal vents and seamounts) and protecting these from impacts of fishing. Distribution of such areas has been mapped on the eastern Scotian</p>

	Shelf (DFO 2010) and it has been determined that the fishery area does not overlap with these.
SG 80b	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.
Rationale	<p>The strategy to ensure that removals of the target species do not prejudice trophic relationships is based on information from the fishery area (LRP set at a level at which shrimp were playing a role in trophic relationships) and from pandalid fisheries in other areas (removal reference). The strategy is expected to maintain shrimp at abundance levels which will allow the species to continue to play its trophic role, and thus to ensure that serious or irreversible harm is not caused to the ecosystem.</p> <p>As noted (SG 80a) no partial strategy based on available information is in place to ensure that impacts on benthic biodiversity and community structure are within acceptable limits.</p>
SG 80c	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).
Rationale	<p>(From SG60c) The measures to protect trophic relationships are based on experience with pandalid fisheries in other parts of North America, and on past experience in the fishery area, and thus are considered likely to work. There has been no indication from the extensive work on ecosystem changes on the Scotian Shelf over more than two decades that fishery removals of shrimp are a significant factor in ecosystem changes (see references in 2.5.3).</p> <p>The measures in place to protect benthic biodiversity and community structure are considered likely to work based on knowledge of the distribution of the fishery and of benthic communities in the fishery area (see references in 2.5.3). Leaving portions of benthic communities unimpacted by fishing, and allowing time for recovery between fishing periods, are generally considered to be appropriate means of reducing trawl non-catch impacts on bottom communities (NEFMC 2011).</p>
SG 80d	There is some evidence that the measures comprising the partial strategy are being implemented successfully .
Rationale	<p>TACs (the principal measure for implementing the strategy to protect trophic relationships) are closely adhered to in this fishery, based on a comprehensive catch monitoring and surveillance and protection system.</p> <p>As noted (SG 80a) there is no partial strategy to manage non-catch impacts on benthic biodiversity and community structure.</p>
Condition	By the 4 th surveillance audit, the client must provide evidence that a partial strategy, if necessary, has been successfully implemented which 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 client must provide evidence to demonstrate that the partial strategy, if necessary, is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).</p>
Milestones	<ul style="list-style-type: none"> • By the first annual audit, the client must provide a written report of activities to identify whether measures in place are adequate such that shrimp removals do not negatively impact trophic relationships. If it is concluded that a partial strategy is needed the client will report on what additional measures are being considered. The milestone associated with the first surveillance audit has been defined as a means to monitor progress, meeting the milestone would likely not result in a change in score at this surveillance audit. • By the second annual surveillance audit, the Client will provide evidence, if necessary, that measures have been identified and agreed that will comprise the partial strategy for ensuring that removals of the target species do not negatively impact trophic relationships. The milestone associated with the second surveillance audit has been defined as a means to monitor progress, meeting the milestone would likely not result in a change in score at this surveillance audit. • By the third surveillance audit, the client will provide evidence that a partial strategy has been successfully implemented that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem outcome defined in the SG80 of PI 2.5.1, i.e. 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. • Meeting this milestone should demonstrate that SG 80b and 80d have been met and would likely result in a score of 70 for this performance indicator. • By the fourth surveillance audit, the client will provide evidence to demonstrate that the partial strategy, if necessary, is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). Meeting this milestone will demonstrate that all scoring issues of the SG 80 have been met and would result in a score of 80 for this performance indicator.
Client action plan	<p>The client, working in conjunction with DFO as the resource manager and other stakeholders, will:</p> <ul style="list-style-type: none"> • Provide the basis for the conclusion reached by the MSC Working Group of the Scotian Shelf Shrimp Advisory Committee of November 2012; • Develop an appropriate partial strategy re. non-catch impacts on benthic biodiversity and community structure. The potential impacts of the fishery on these ecosystem components will be considered and if necessary measures put in place to address potential impacts; • Ensure a partial strategy based on available information is in place to ensure that impacts on benthic biodiversity and community structure are within acceptable limits; and • Ensure a partial strategy is in place to manage non-catch impacts on benthic biodiversity and community structure. <p><u>Deliverables</u></p> <p>First Annual Audit – The client will provide a written report which provides the basis for the conclusion reached by the MSC Working Group of the Scotian Shelf Shrimp Advisory Committee of November 2012.</p>

	<p>Second Annual Audit – If a partial strategy is found necessary, the client will develop an appropriate partial strategy re. non-catch impacts on benthic biodiversity and community structure. The potential impacts of the fishery on these ecosystem components will be considered and if necessary measures put in place to address potential impacts.</p> <p>Third Annual Audit - The client will apply DFO's <i>Ecological Risk Assessment Framework</i> identified within the <i>Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas</i> and the client will provide written evidence to confirm a partial strategy, based on available information, is in place to ensure that impacts on benthic biodiversity and community structure are within acceptable limits.</p> <p>Fourth Surveillance Audit - The client will provide evidence to confirm a partial strategy is in place to manage non-catch impacts on benthic biodiversity and community structure; and that the partial strategy is considered likely to work, based on plausible argument.</p>
Consultation on condition	IMM has received confirmation of support of the CAP from the client, formal written confirmation of support from Fisheries and Oceans Canada is forthcoming.

Table A1.2: Condition 3

Performance Indicator	The fishery has a research plan that addresses the information needs of management
Score	70
SG 80a	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.
Rationale	<p>At the site visit it was advised that ongoing research in support of managing shrimp stocks, including those on the Eastern Scotian Shelf, were routinely identified and reviewed by DFO assessment scientists, as well as at meetings of the joint NAFO/ICES Working Group on Pandalid Shrimp, but no strategic research plan document along the lines of MSC Guidance note CB4.10.3 was available for scrutiny. It was also made clear that planning was in a state of transition following a move to a two-year assessment cycle. After the site visit, a draft list of research topics and priorities (Hardie, pers comm) for the EScSh shrimp fishery was sent to the assessment team by the DFO Regional ecocertification coordinator. This plan, has the following priorities, which at that time had yet to be presented to and discussed by the SSSAC:</p> <ul style="list-style-type: none"> • Restore funding (industry) for continuation of the trawl survey^[1] • Improve survey design (consider adaptive survey design and/or redistribution of sampling effort among SFAs by area) • Test survey gear changes to address the fact that commercial gear has evolved while the survey gear has remained constant (swept area method is predicated on assumption of maximum gear efficiency). • Explore the scientific and economic costs/benefits of changing to a beam-trawl survey (currently otter trawl), as has been suggested by some industry representatives. • Provide variance estimates on Traffic Light indices including biomass indices, in particular those used in the Precautionary Approach Framework. • Explore model fits to shrimp data (Surplus Production and explore

	<p>Delay Difference and Bayesian Biomass Dynamic model with explicit predation and temperature terms).</p> <ul style="list-style-type: none"> • Provide a complete justification, including literature review, for the inclusion of all Traffic Light Indicators for the 2014 Framework. • Extend the analysis of shrimp trap data in the assessment. Currently it is considered in terms of biomass only, whereas the catch composition and temporal/spatial nature of the fishery is very different. Now that the trap fishery is more fully developed, further analysis of the details of the size and sex distribution as well as catch rate trends are needed. • Develop an index of egg production • Explore evidence for shifts in the timing of shrimp life history (Industry indicates that the timing of reproduction has shifted earlier in recent years). • Test new methods of shrimp aging (eye stalks) for this stock and compare to modal analysis of length classes (additional funding required – currently not available). • Compare Traffic Light results from high-productivity period only (as used in the Precautionary Approach) to the current analysis (using the entire data time-series). • Evaluate the influence of a reduced survey schedule on the provision of science advice (for TESA workshop – Ottawa 2013). <p>This list was accompanied by caveats and comments (Hardie, pers comm.) that can be summarised as follows:</p> <ul style="list-style-type: none"> ○ The research plan is dependent on the allocation of resources, and the effect of conflicting work demands. Time lines cannot be allocated until survey and staffing uncertainties are resolved. The list assumes the continuation of the survey time-series, but the DFO-Industry cooperative shrimp survey on the Eastern Scotian Shelf Shrimp is currently unfunded for 2013, since the DFO portion of the funding has been cancelled. If the survey is terminated or changed dramatically, the Research Plan will need to change too. ○ Results of this research will appear in Research Documents, Science Advisory Reports, and RAP Proceedings published by the Canadian Science Advisory Secretariat, but under the new two year assessment cycle, the first expected peer-review of some of the work items listed will not be until the next full shrimp assessment (RAP/Framework) in the fall/early winter of 2014. ○ The plan is focussed on survey, modelling and population issues that are the principal priorities among DFO managers in the current time horizon. <p>This information shows that research planning is in progress to meet the ongoing challenges of assessing and managing the Eastern Scotian Shelf shrimp stock during the current transition into the two year assessment cycle, but because of the draft nature of the document, and the uncertainties cited, the criteria for issue 80a are not met, particularly for Principle 2.</p>
SG 80b	Research results are disseminated to all interested parties in a timely fashion.
Rationale	Research results are disseminated in the form of Research Documents, Science Advisory Reports, RAP Proceedings, and Technical Reports on shrimp and ecosystem topics, both for the Maritimes and other waters in Eastern Canada, many of which are included in the publications listed under issue 60a. After peer

	review they become available quickly on the web pages of the Canadian Science Advisory Secretariat, which are open to public access via the Fisheries and Oceans web site. Papers are also published, but on a slower time scale, in scientific journals. This scoring issue is met.
Condition	By the 2 nd surveillance audit the client must provide evidence that a documented and approved research plan has been completed to provide the management system with a strategic approach to research, and reliable and timely information sufficient to achieve the objectives consistent with both MSC Principle 1 and Principle 2.
Milestones	<ul style="list-style-type: none"> • By the first annual surveillance audit, the client will provide a draft strategic research plan that is required to achieve the objectives consistent with MSC Principles 1 and 2. The milestone associated with the first surveillance audit has been defined as a means to monitor progress, meeting the milestone would likely not result in a change in score at this surveillance audit. • By the second annual surveillance audit, the client will provide evidence that the documented strategic research plan required to achieve the objectives consistent with MSC Principles 1 and 2 has been completed and adopted. Meeting this milestone will demonstrate that all scoring issues of the SG 80 have been met and would result in a score of 80 for this performance indicator.
Client action plan	The client, working with DFO as a contributor to the draft Research Plan, will provide the document for approval in the winter 2015 ESSSAC meeting.
Consultation on condition	IMM has received confirmation of support of the CAP from the client, formal written confirmation of support from Fisheries and Oceans Canada is forthcoming.

Appendix 2: Peer Review Reports

Peer Reviewer 1

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	Yes	Conformity Assessment Body Response
<u>Justification:</u> This is a comprehensive assessment of the Scotian Shelf <i>Pandalus borealis</i> fishery in SFAs 13, 14 and 15 and I agree with the overall conclusion drawn by the assessment team that the fishery should be certified. The fishery was previously certified with a range of conditions raised that covered all three principles. All of these conditions had been met by the fourth surveillance report, and the improvement in fishery performance subsequent to these conditions being met is reflected in this re-assessment which concluded that the fishery achieved a score of 80 for all but two PIs. P1 In general I agree with the assessment team’s conclusions that there is a comprehensive set of information available for this fishery, a detailed IFMP with well-defined reference points and HCRs, and an assessment approach which assesses stock status in relation to the reference points backed up with a large range of auxiliary information. The assessment team highlighted the uncertainty surrounding the future of the annual DFO/Industry survey. The discontinuation of this survey would be likely to result in changes to the scores for PIs under Principle 1. The main weakness of the fishery under P1 is that the confidence intervals for biomass estimates from the annual surveys are not used in the assessment of stock status in relation to reference points. The assessment team concluded that 100b for PIs 1.2.2 and 1.2.3 were not met therefore, but it could be argued that 80c for PI 1.2.4 is also not met and that there should be a condition raised in relation to this issue. As detailed in my general comments below, the sparseness of the background information for P1 made it difficult to evaluate the conclusions drawn by the assessment team for P1 without reverting to the source material. P2 I agree with the assessment team’s conclusions that the fishery has negligible impact on retained and discarded bycatch species, that impact on ETP species is non-existent because no ETP species are taken in the fishery, that the fishery does not cause serious or irreversible harm to habitats and trophic relationships, and that it is highly unlikely that the fishing gear impacts on benthic biodiversity and community structure.		Detailed responses to issues raised against specific performance indicators (PI) are addressed below within the context of the appropriate PI. Additional detail has been added to Section 3.3 to provide better context of certain aspects of stock health evaluation.

P3
In general I agree with the scores allocated to the PIs under P3, although the lack of a formal agreed research plan suggests that a condition should be raised under PI 3.2.4.

<i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i>	Yes	Conformity Assessment Body Response
<p><u>Justification:</u> The two conditions raised both relate to putting in place strategies to ensure that the fishery does not cause serious or irreversible harm to habitats and the ecosystem.</p> <p>Condition 1 requires that a partial strategy must be implemented that ensures that the fishery is highly unlikely to reduce habitat structure and function to the point where there would be serious or irreversible harm. The assessment team acknowledged that such serious or irreversible harm was unlikely but concluded correctly that the SSSAC did not provide sufficient evidence that no further measures were necessary to protect habitats. The condition is appropriately written and should be achievable within the specified time frame and milestones.</p> <p>Condition 2 relates to the implementation of a partial strategy to ensure that the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function. The rationale for raising this condition is appropriate as is the condition itself. However there appears to be an error in the first two milestones. The assessment team highlighted that there are two components to the potential impact on ecosystem structure and function – the potential impact of fishery removals on trophic relationships, and the non-catch impacts on benthic biodiversity and community structure. The rationale notes that there is a partial strategy in place for the former, but not the latter. However the first two milestones require evidence that there is a partial strategy implemented to ensure that the fishery removals do not negatively impact trophic relationships. I assume that this is a simple typo, and therefore does not change my view that the conditions raised are appropriately written to achieve the SG80 outcome within the specified timeframe. (The Client Action Plan correctly addresses the need to develop a partial strategy in relation to non-catch impacts on benthic biodiversity and community structure.)</p>		<p>No additional response required.</p> <p>The section providing details on Condition 2 (Appendix 1.2) has been edited to ensure that only the impacts on benthic biodiversity and community structure are addressed</p>

If included:

<i>Do you think the client action plan is sufficient to close the conditions raised?</i>	Yes	Conformity Assessment Body Response
<u>Justification:</u>		

The Client Action Plan should be sufficient to close the two conditions raised. However, the Client will be heavily dependent on DFO to provide the resources to deliver the required programme of work, so the CAB will need to ensure at each annual surveillance audit that such collaboration between the client and DFO continues.

The Client Action Plan for meeting Condition 1 on developing a strategy for ensuring that the fishery does not cause serious or irreversible damage to the habitat is comprehensive. Whilst a series of measures is already in place, it is important that the client has recognised the potential need to change these measures should this become necessary.

Providing that the client receives appropriate cooperation and resources from DFO, the Client Action Plan should be sufficient to meet Condition 2.

General Comments on the Assessment Report (optional)

The background information in the report is generally comprehensive and provides references to a wide range of source material used in evaluating the fishery. However the background information for P1 issues was relatively sparse with the result that the reader is required to revert to the original DFO assessment documents (Hardie et al. CSAS Res. Docs. and the 2012 SAR) to evaluate the scores attributed by the assessment team. It would be helpful to have at least a brief summary of the data sources and assessment process in the background information. For example, the annual DFO-industry trawl survey is a critical component of assessing stock status against reference points, but there is no information on the methodology of the survey, the uncertainties underlying the results of the survey and any time series of stock biomass estimates that can be viewed in relation to the reference points.

Some of the documents used in the scoring of PIs under P3 are not generally available. The assessment team describe a draft research plan which is clearly still at the development stage, and does not appear to be in the public domain yet. Future agreement and implementation of this plan should improve the performance of the fishery. In addition it is unfortunate that the fishery checklists used by DFO Resource Advisors in decision-making are not available for review.

Performance Indicator Review

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

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
<i>Example: 1.1.2</i>	<i>No</i>	<i>No</i>	<i>NA</i>	<i>The certifier gave a score of 80 for this PI. The 80 scoring guidepost asks for a target reference point that is consistent with maintaining the stock at Bmsy or above, however the target reference point given for this fishery is Bpa, with no indication of how this is consistent with a Bmsy level.</i>	
1.1.1	Yes	Yes	N/A	I agree with the rationale given for all the scoring issues.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.2	No	Yes	N/A	Whilst I agree with the score of 90, i.e. the fishery does not meet 100c for this PI, more information is required under 80c. The rationale states that the removal reference rate must be "less than or equal to the removal rate associated with MSY". The DFO "Fishery Decision-Making Framework incorporating the Precautionary Approach" advises that, in the absence of an estimate of F_{msy} from an explicit model, one option for a F_{msy} surrogate is the fishing mortality equal to natural mortality inferred from life history characteristics. This is clearly the approach used for the shrimp fishery, but the rationale notes that "... this approach has been shown to overestimate potential yields." Clarification of the suitability of this approach should be provided.	The suitability of the removal reference (RR) was debated prior to its inclusion in the IFMP. The conclusion was that the surrogate F_{msy} , inferred from natural mortality, frequently overestimated yields. Therefore, the removal reference for Scotian Shelf shrimp was set at 20% female exploitation (actual female catch/SSB) when above the USR. This was considered to be on the conservative side of the approximate range of natural mortality (in this case 25-33%). Moreover, 20% female exploitation had not been exceeded during the modern fishery, during which CPUE and biomass remained high. The rationale for this PI now includes additional references, describing the origin of the RR.
1.1.3	N/A	N/A	N/A		

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.1	Yes	Yes	N/A	I agree with the rationale given for all the scoring issues. The harvest strategy is underpinned by the Precautionary Approach adopted as part of the Sustainable Fisheries Framework and the Scotian Shelf shrimp IFMP.	No response required
1.2.2	Yes	Yes	N/A	The main uncertainties relating to estimates of SSB from the annual trawl survey are not taken into account when assessing the status of the stock (SSB) in relation to reference points, and therefore the fishery does not meet SG100b.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.3	Yes	Yes	N/A	<p>I agree with the rationale given for all the scoring issues. There is a good understanding of uncertainty in the key stock indicator, the estimate of SSB from the annual trawl survey, but “..the robustness of assessment and management to this uncertainty” is not considered. Therefore 100b is not met and a score of 90 for this PI is appropriate.</p> <p>Minor point – the figure for trap landings in 2012 given in 80c does not match up with Table 1 and so the subsequent calculation of the percentage of the global TAC appears to be incorrect.</p>	Base on Table 1 (official DFO quota report), 111 t was taken in the trap fishery in 2011, not 2012. The text for P1 1.2.3 has been revised accordingly.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.4	Yes	No	N/A	It could be argued that the assessment does <u>not</u> take uncertainty into account and that the fishery does not therefore achieve a score of 80 for this PI. Whilst confidence intervals are estimated for biomass and abundance estimates from the surveys, these confidence intervals are not taken into account when assessing stock status relative to reference points.	<p>It has been clarified that confidence limits for the survey results relate to the survey CPUE and abundance, not the spawning stock biomass (SSB) estimates and the text (SG 80c) has been amended.</p> <p>Although point estimates of SSB are assessed relative to reference points, the SARs report the unresolved sources of uncertainty, including high variance and biases in survey results, spatial and temporal variability in shrimp distribution. Furthermore, indicators within the traffic light framework address uncertainties (albeit not statistical) related to abundance, production, fishing mortality and the ecosystem. For example, although the stock was assessed as healthy relative to the URP, TAC reductions for both 2011 and 2012 were advised based on uncertainty from traffic light indicators that reflected decreases in shrimp size, poor recruitment, a temporal shift in fishing effort, and unfavourable ecosystem indicators. The text at SG80c has been expanded accordingly but the score is unchanged.</p>

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.1	Yes	Yes	N/A	MSC agreed that <i>Pandalus montagui</i> is an IPI stock and should be assessed therefore under 2.1 Retained species.	No response required
2.1.2	Yes	Yes	N/A	I agree with the rationale given for all the scoring issues.	No response required
2.1.3	Yes	Yes	N/A	I agree with the score of 100. There is good quantitative information on the total catch of the only potential retained species which allows a quantitative estimate of outcome status.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.2.1	Yes	Yes	N/A	There are some bycatch species (American plaice and redfishes) which are outside biologically based limits. However, the estimated bycatches in the shrimp fishery are extremely low in relation to landings of these species in other fisheries, and so it can be concluded that the bycatch in the shrimp fishery does not hinder recovery of these species. I agree therefore with a score of 80 for this PI.	No response required
2.2.2	Yes	Yes	N/A	I agree with the rationale given for all the scoring issues. Gear trials using the Nordmore grate and the very low bycatch levels recorded from the observer program provide evidence that the strategy is being implemented successfully and is achieving its objective.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.2.3	Yes	Yes	N/A	The score of 100 is justified. Based on the quality of the data from the observer program and on the availability of peer-reviewed stock assessments for 5 of the 6 most abundant bycatch species, it can be concluded that the bycatch levels are so low that there is negligible impact on the population status of bycatch species.	No response required
2.3.1	Yes	Yes	N/A	I agree with the rationale given for the score of 100.	No response required
2.3.2	Yes	Yes	N/A	Knowledge of the distribution of ETP species and operational aspects of the fishery, and the fact that no interactions with ETP species have ever been reported justify the score of 100.	No response required
2.3.3	Yes	Yes	N/A	I agree with the rationale given for the score of 100	No response required
2.4.1	Yes	Yes	N/A	I agree that the lack of specific evidence means that the fishery does not achieve a score of 100.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.2	Yes	Yes	Yes	The pattern of fishing activity primarily in mud bottom habitats and outside areas of vulnerable habitats identified by DFO, the fishery being effectively seasonal in nature, and the observed changes in distribution of the fishery within the mud bottom habitats over time justify a score of 60 for this PI. However with increasing emphasis on identifying vulnerable marine ecosystems and the need to manage the impacts of fishing, I agree that there is a lack of a strategy in place to change current measures should they become necessary in the future. The raising of a condition against this PI is therefore appropriate.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.3	Yes	Yes	N/A	I agree with the rationale given for all the scoring issues. There is very good information available on the nature, distribution and vulnerability of the main habitats, and on the spatial extent of the interaction between habitats and the fishery through detailed information on the timing and distribution of the fishery. Continual monitoring of the fishery will identify any changes in the distribution of the fishery so that changes in the spatial extent of the interaction with the vulnerable habitats would be detected.	No response required
2.5.1	Yes	No	N/A	The assessment team identify two potential ecosystem impacts not covered previously within other PIs under Principle 2. They present information to justify that one of these impacts (removal of the target species on trophic relationships) meets the SG100, and therefore a score of 80 seems harsh in that it could be argued that the SG100 is partially met.	Because of the way in which scores are assigned when there are multiple issues identified, we are obliged to use the score for the lowest-scoring issue - thus a score of 80 is required here even though one of the two issues identified meets 100.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.2	Yes	Yes	Yes	Whilst there can be considered to be a partial strategy in place to ensure that shrimp fishing does not negatively impact trophic relationships, I agree that the absence of any strategy to ensure that there are no adverse impacts on benthic biodiversity and community structure means that the fishery does not meet the SG80 for this PI. The raising of a condition is therefore appropriate. Note: there appears to be an error in the first two milestones required to meet condition 2.	The milestones (Appendix 1.2) have been edited to ensure that only impacts on benthic biodiversity and community structure are addressed.
2.5.3	Yes	Yes	N/A	I agree with the rationale given for all the scoring issues.	No response required
3.1.1	Yes	Yes	N/A	I agree with the rationale given for all the scoring issues.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.2	Yes	Yes	N/A	I agree that the fishery does not meet all issues at the SG100 level. Whilst the Canadian management system may often explain how information is used, it does not systematically explain how information is <u>not</u> used.	No response required.
3.1.3	Yes	Yes	N/A	There are clear long term objectives that are explicitly stated within and required by management policy which are consistent with both P1 and P2 and the SG100 is met therefore.	No response required.
3.1.4	Yes	Yes	N/A	The management system includes a range of incentives which are consistent with achieving P1 and P2 outcomes, but there are clearly no explicit regular reviews of incentives within the management policy, so I agree that the SG100 is not met.	No response required.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.1	Yes	Yes	N/A	I agree that the fishery meets the SG100 for this PI. The IFMP includes short and long term objectives that are consistent with the outcomes expressed by P1 and P2.	No response required.
3.2.2	Yes	Yes	N/A	The SSSAC and the RAP report provide the mechanisms for formal reporting to all interested stakeholders, but I agree that decision-making processes do not respond to <u>all</u> issues, and so a score of 90 is appropriate for this PI.	No response required.
3.2.3	Yes	Yes	N/A	I agree with the rationale given for all the scoring issues.	No response required.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.4	Yes	No	N/A	The assessment team state that a new draft five year research plan has recently been made available to them. Whilst the summary of this plan presented in the rationale would appear to meet some of the needs of SG80a, this research plan is clearly only in draft and has not yet been agreed, and it does not appear to cover research issues consistent with achieving P2 outcomes. I do not agree therefore that SG80a has been met. A condition should therefore be raised against this PI.	Given the long list of documented research that has been carried out in support of managing the shrimp stock on the Eastern Scotian Shelf, and the draft plan supplied after the site visit, these comments might seem somewhat harsh, but the assessment team accepts that an actual formal strategic research plan has not been published, and that the current draft list of priorities covers Principle 1 only, and not Principle 2, so that SG80a has not been met. The text for this PI has therefore been fully amended, the score revised to 60, and a condition set.
3.2.5	Yes	Yes	N/A	On the understanding that the SSSAC and the RAP include members that are considered external to the management process, it can be concluded that all parts of the management system are subject to regular external review. I agree therefore that the fishery meets the SG100 for this PI.	No response required.

Any Other Comments

Comments	Conformity Assessment Body Response

Peer Reviewer 2

Overall Opinion

<i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i>	Yes/No Yes	Conformity Assessment Body Response
<u>Justification:</u> This assessment report provides a sound basis for the team's recommendation in the Executive Summary that the fishery be recertified against the MSC standard.		

<i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i>	Yes/No Yes	Conformity Assessment Body Response
<u>Justification</u> Regarding Condition 1, the team could indicate whether the references provided in 2.4.3 (80a/b) as well as in 3.2.4 (60a) provide the basis for a consideration of potential impacts of the gear on habitats as well as information directly about the fishery and/or habitats involved sufficient to close the condition. Similarly for Condition 2, the team could indicate whether a detailed presentation/consideration based on available information on non-catch impacts on biodiversity and community structure (references provided in 2.5.2/2.5.3) would be sufficient to close the condition. See highlighted text in Condition 2 in Section 6.3 requiring editing.		Discussions at the site visit indicated that the available literature, including habitat and benthic references cited in 3.2.4 under 60a, provide a framework for identifying the partial strategy required to meet the condition, but the team cannot say categorically that other information will not become necessary <u>Condition 1 and 2</u> In line with MSC policy on wording conditions, the team does not consider it appropriate to be directive on how best to meet the condition. The references noted would be helpful in working toward meeting the condition. Identified text in Section 6.3 has been edited.

If included:

<i>Do you think the client action plan is sufficient to close the conditions raised?</i>	Yes/No	Conformity Assessment Body Response
<u>Justification:</u>		

General Comments on the Assessment Report (optional)

The report represents a sound, comprehensive assessment of this fishery against the MSC standard and the recommendation to recertify is well founded.

Comments provided are relatively minor in nature, but their consideration should provide for greater clarity on a number of fairly important points. Text in the body of the report as well as the evaluation tables requiring minor editing is highlighted – note, however, that the review did not attempt to be thorough in this regard.

Performance Indicator Review

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

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
<i>Example: 1.1.2</i>	<i>No</i>	<i>No</i>	<i>NA</i>	<i>The certifier gave a score of 80 for this PI. The 80 scoring guidepost asks for a target reference point that is consistent with maintaining the stock at Bmsy or above, however the target reference point given for this fishery is Bpa, with no indication of how this is consistent with a Bmsy level.</i>	
1.1.1	Yes	Yes	NA	The 2012 SSB point estimate is virtually the same as the URP. Even though the statement re fluctuating around the URP is valid, it wouldn't hurt to reiterate the weakness flagged in Executive summary and provide the CIs to highlight the uncertainty here.	Text has been added to PI 1.1.1 (SG100b) to reiterate the weakness stated in the Executive Summary. Accordingly, the original text has been moved to SG80b and the score revised to 90. Regarding CI's, these are only calculated for the survey CPUE and abundance, not the the SSB estimate.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.2	Yes	Yes	NA	It isn't clear in 80c why 80% of the average SSB should represent a conservative URP. In this kind of situation, 80% would be considered the norm, 90-100% would clearly be conservative. Also, the 30% for the LRP is not especially conservative.	The assessment team accepted DFO's rationale that the "upper reference point (URP) has been selected as it maintains a sufficient gap between the LRP and URP to account for uncertainty in the stock and removal reference values, and to provide sufficient time for real biological changes in the population to be expressed, detected and acted upon." This metric, complemented by the traffic light framework, is considered to be sufficiently conservative. The LRP is also considered conservative, recognizing that the shrimp stock previously increased from a low level during the transition from low- to high-productivity. It is likely that the stock would again recover from this low level given appropriate environmental conditions and fishing pressure. The LRP is also supported by indicators within the traffic light framework.
1.1.3	NA	NA	NA		No response required.
1.2.1	Yes	Yes	NA	No further comment.	No response required.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.2	Yes	Yes	NA	<p>100b – It appears that the fishery targets SSB only, i.e. SSB and fishable biomass are the same – this should be made clearer in 1.1.1/1.1.2. If this is the case, it makes non use of CIs in decision making, which is contrary to general practice, a bit concerning. This seems to be rationalized in 80b by a conservative approach to selection of reference points and harvest rate, but see comment for 1.1.2 above.</p> <p>There is also no risk analysis (<i>p</i> of max. harvest rate being exceeded etc for a range of catch options) to aid decision making, which is more or less expected in a p.a. framework. The traffic light framework (described in 1.2.4 100d) is probably more useful (or a reasonable substitute) in decision making, if so, a point worth making.</p>	<p>The fishery targets both larger (older) males and females but it is the female biomass (SSB) that is monitored within the PA framework. Text has been added under Assessment Methods (Section 3.3 2) to clarify this.</p> <p>The traffic light framework and its use in decision making is stated in PI 1.2.2 SG100c.</p>
1.2.3	Yes	Yes	NA	No further comment.	No response required.
1.2.4	Yes	Yes	NA	No further comment.	No response required.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.1	Yes	Yes	NA	See note in 80a heading – the Y for 80c should be NA.	Text has been changed.
2.1.2	Yes	Yes	NA	No further comment.	No response required.
2.1.3	Yes	Yes	NA	No further comment.	No response required.
2.2.1	Yes	Yes	NA	<p>Rationales/scores for 80a/b are a bit confusing. The 80 score is certainly justified but technically cannot be provided with N for 80a. I would think Y could be provided for 80a as long as 80c is satisfied for those species that are outside biological limits, or, based on the note in the 80a heading, consider 80a not applicable.</p> <p>The two species in question are considered main by virtue of their depleted status. Values re the 5% rule should be provided here. Primary references for depleted status should be the DFO SARs.</p>	<p>The information has been presented consistent with other certification reports. Scoring issue 80a is indicated as not having been met, thus scoring of issue 80b has occurred.</p> <p>The % values relative to the 5% guideline have been added. Although the DFO references show that these species are at low levels relative to historical values, the COSEWIC assessments provide an explicit statement that they are “depleted” so we prefer to retain them here.</p>

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.2.2	Yes	Yes	NA	No further comment.	No response required.
2.2.3	Yes	Yes	NA	80a, 4 th paragraph – rather than “species of particular vulnerability” (SARA or COSEWIC kind of designation), it would be more correct and accurate to say that stocks of these species in the area are considered depleted. Primary references should be the DFO assessments. COSEWIC designations are fine to include, but some context is needed. Their designations are all too easily confused with SARA designations. 80a, last paragraph – this is the info needed in 2.2.1.	The “particular vulnerability” terminology is that of the MSC, one of the criteria used to identify “main” bycatch species (MSC Guidance GCB 3.8.2). We believe that the COSEWIC assessments are useful here in that they provide an explicit statement on vulnerability. These have been used in this way in past assessments. Under the MSC system SARA listed species are dealt with in the 2.3.x series. Information has been added in 2.2.1.
2.3.1	Yes	Yes	NA	100a does not mention marine turtles.	We have added marine turtles to the species which do not interact with this fishery.
2.3.2	Yes	Yes	NA	No further comment.	No response required.
2.3.3	Yes	Yes	NA	100a, 2 nd paragraph, end of 3 rd line – mammals should be turtles.	Text has been corrected.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.1	Yes	Yes	NA	No further comment.	No response required.
2.4.2	Yes	Yes	Yes	<p>60a, 1st paragraph, 5th line – “component” doesn’t sound like the intended word.</p> <p>It will seem peculiar to some that this fishery was previously certified with no condition related to habitat impact – a brief explanation here would be helpful.</p> <p>In 80a, real direction is provided re analysis of seasonal and areal distribution of fishing but it isn’t made clear what might constitute a “consideration” of potential impacts of the gear on habitat. See further comment on Condition 1 above.</p>	<p>“Component” is MSC terminology - we have added “habitat” in parentheses to clarify.</p> <p>True - this is a function of a change in the specifics of the assessment tree. Consistent with other assessments, we have not provided an explanation here.</p> <p>Given the requirement not to be directive on how conditions should be met, we believe that the text is adequate to provide guidance to the client on this point.</p>
2.4.3	Yes	Yes	NA	No further comment.	No response required.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.1	Yes	Yes	NA	Rationales should be reorganized to provide a brief statement, with reference to the Outcome PI in which details can be found, for all ecosystem components, i.e. the big picture. Rationale could be removed from 60a and brief statements inserted at the beginning of 80a.	We have revised the text in line with this suggestion.
2.5.2	Yes	Yes	Yes	60a - same comment as above for 2.5.1. Some guidance whether a detailed presentation of the basis for the conclusion regarding non-catch impacts, as per 2 nd paragraph of 80a rationale, would suffice here should be provided.	We have referenced the 2.5.1 text here in order to clarify. As earlier, we feel that the level of direction provided on meeting the conditions is consistent with MSC policy.
2.5.3	Yes	Yes	NA	No further comment.	No response required.
3.1.1	Yes	Yes	NA	No further comment.	No response required.
3.1.2	Yes	Yes	NA	No further comment.	No response required.
3.1.3	Yes	Yes	NA	No further comment.	No response required.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.4	Yes	Yes	NA	A mere pass on this PI because of the kind of hair-splitting, all-or-nothing interpretation of the wording in the 100a scoring element that appears to be required seems unreasonable. Management of this fishery appears to have evolved to the point where there has been no need in recent times for further "explicit" consideration of incentives. Development of incentives as per 80a rationale would have required a great deal of explicit consideration.	This is a fair point, and the scoring comment has therefore been modified to read:- "There are regular operational reviews of management policy at the SSSAdvisory Committee and within DFO Branches. The team heard no evidence that in the present era the question of incentives is explicitly raised in these reviews, although since the development of the incentives described under 80a must originally have required explicit consideration, it is very likely that management of the fishery has now evolved to the point where such explicit consideration is no longer needed routinely". Although we have amended the comment in order to accept the point, we do not think that the score needs to be revised, as the fishery has clearly passed this PI at the 80 level, and the overall score for Principle 3 is also a good pass.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.1	Yes	Yes	NA	No further comment.	No response required.
3.2.2	Yes	Yes	NA	Why not omit the two lines at the beginning of the 80b rationale, where it is not relevant? It is included in 100b rationale where it is relevant.	Agreed, and text revised.
3.2.3	Yes	Yes	NA	No further comment.	No response required.
3.2.4	Yes	Yes	NA	No further comment.	No response required.
3.2.5	Yes	Yes	NA	No further comment.	No response required.

Any Other Comments

Comments	Conformity Assessment Body Response

Appendix 3: Stakeholder submissions

Site Visit - Stakeholder Meeting Checklist

- State purpose of meeting - To collect information and identify issues relevant to the fishery assessment.
- Introduce or have the Assessment Team introduce themselves and their backgrounds.
- Invite stakeholders to introduce themselves and who they represent.
- Provide a written or verbal summary of MSC Principles & Criteria.
- Describe the Assessment Process being followed: Default Assessment Tree / Amended Assessment Tree / RBF and confirm which version of the Certification Requirements is being used.
- Confirm the Unit of Certification (and also explanation of the client /client group).
- Affirm that Intertek Moody Marine is an independent Conformity Assessment Body (CAB) accredited to carry out MSC assessments.
- Stakeholders to note that:
 - Stakeholder comments should, where possible, be substantiated with evidence.
 - Information that stakeholders provide will be taken into account in the assessment.
 - Any information that stakeholders cannot share with all stakeholders, even under confidentiality agreement, will not be referenced in the assessment, used in determining the assessment outcome, used as the basis for an objection to a certification.
- Confidentiality of information is restricted to:
 - Financial transactions about certification; the financial affairs of individual companies or information that may lead to this information being known; Information that is the subject of relevant national privacy or data protection legislation in the client's country.
 - If the CAB wishes to use information that the owner requires to be kept confidential, the CAB shall: Apply to the MSC for approval to keep the information confidential to the client, the CAB and the MSC
- Access to information:
 - The CAB shall ensure that un-published key information necessary to enable a stakeholder who is not party to this information to be able to properly review the logic used by the team in their conclusion about a particular PI score is made available electronically, in printed form or otherwise for viewing by stakeholders
 - The CAB shall make un-published (non confidential) key information available before the posting of the Public Comment Draft Report, and shall ensure that the information is available throughout the subsequent stages of the assessment process

- MSC require a record of the meeting to be kept and explicit responses from the team to stakeholder verbal and written submissions to be sent to stakeholders prior to publication of the Public Comment Draft Report.
- Confirm that stakeholder comments are considered to be non-attributable unless stakeholders request otherwise.
- Provide an estimate of the timescale for completion of the assessment , including further opportunities for stakeholder input

Stakeholder Interview Record

Assessment Team	Names
Lead Assessor	Steve Devitt
P1 Team Member	Don Parsons
P2 Team Member	Howard Powles
P3 Team Member	Colin Bannister

Meeting Location	Gully Boardroom, Bedford Institute of Oceanography, Dartmouth, NS	
Date	14 November 2012	
Stakeholders Name	Affiliation	
Tara McIntyre	DFO Policy & Economics	
Sara Quigley	DFO Resource Management	
David Hardie	DFO Science	
Bryan Wood	DFO Conservation & Protection	
Scott Coffen-Smout	DFO Oceans & Coastal Management	
Jennifer Ford	DFO Policy & Economics	
Derek Butler (via teleconference)	Association of Seafood Producers (Client)	

Comments:

The lead assessor conducted introductions, explained MSC evaluation process for current stage of assessment and described the objectives of the day's meeting, which were:

- Update the team's understanding of the current status of the fishery
- Discuss and understand status of remaining conditions from the existing certification
- General discussion of current DFO approaches to stock assessment; fishery bycatch, habitat and ecosystem interactions research and fishery management.
- DFO responses to specific questions from team members about individual performance indicators.

2. Status

What is the nature of the organisations interest in the fishery (e.g. client / science / management / industry / ENGO etc)

Fisheries and Oceans Canada (DFO) is the unique fishery management and science agency for the candidate fishery.

Association of Seafood Producers is the client for the fishery, representing members in Newfoundland and Labrador.

3. Stakeholder Key Issues

What, if any, specific substantive issues or concerns are identified regarding the fishery? (P1 – P2 – P3) and what information is available to allow us to determine the status of the fishery in relation to each issue?

The meeting was conducted in a semi-formal manner, where DFO representatives provided introductory comments about their specific area of responsibility, this was followed by questions from team members in relation to specific MSC performance indicators.

Principle 1

David Hardie (DFO Science, Population Ecology Division)

David Hardie reviewed a Powerpoint presentation initially used for the 2012 Regional Advisory Process meeting.

- DFO uses an empirical traffic light approach using up to 25 different indicators to evaluate the shrimp stock status.
- The stock reference point is a point estimate of stock biomass, removal reference point is female exploitation.
- remaining 23 of 25 indicators are considered secondary, used to provide a broad description of the stock status, used to direct DFO's response to management of stock
- one summary indicator which summarizes the 25 indicators/ 4 characteristics, summary indicator is an average of the 25 indicators as per the protocol for determining
 - the 25 indicators provide a holistic summary of the overall health of the ESS shrimp stock including abundance, productivity, effects of fishing and environmental factors
 - stock reference – conservative, <20% of SSB annual exploitation limit
 - decreases in TAC in last 2 years
 - Fishery characterized by 3 productivity periods, most recent is 2000 to present – modern fishery, relatively high productivity

Reference Points

Limit Reference Point set at 30% of the average point estimate of spawning stock biomass (SSB). 5,460mt.

Upper stock reference point set at 80% of the 2000 – 2010 average (14,558 mt). 80% based on MSY.

CSAS Science Advisory Report is available from the Regional Advisory Process, a CSAS Research Document to be posted in the near future.

Management Responses (as defined in IFMP)

Critical zone – lower than the LRP, shrimp set at level where it has been previously estimated to rebuild from.

Caution zone – negotiated TAC between 0 & 20% female SSB, TAC to be negotiated based on all indicators when the stock is in this zone and arriving at consensus.

Healthy zone – avoid exceeding 20% exploitation of female SSB. Why this level? Idea that conservative exploitation is that $F < M$ (which is estimated at 0.25 – 0.33), hence the cap set at 20%.

No Management Strategy Evaluation currently planned

Science advice will be provided annually to set the TAC. All data will be analysed every year, but the peer review of science advice is moving to a biannual process. In off years, advice will be provided in a shorter, internally reviewed summary of key indicators and the PA. Should information dictate a change in status, information is available to support management decisions.

Larocque funding has been cancelled, DFO is trying to bring forward “use of fish” funding, however the Association (Atlantic Canadian Mobile Shrimp Harvesters Association) does not support a “use of fish” funding option, their opinion is survey funding should be paid for from licensing fees.

2009 survey gear problems, Nordmore grid was not correctly installed. This was identified and its impact has been explored through the assessment process.

Calculation of the female biomass exploitation rate does not depend solely on the survey per se, however does depend on the Larocque funding, which has funded the port sampling biological data collection.

Sara Quigley – PA policy would continue to be applied, if risk increases, removal RP would be adjusted down to ensure that the fishery isn't the cause of a decline in stock status.

Don Parsons (DP) – CPUE is standardized, accounts for seasonality, area fished, power of vessels, can account within the standardized model, could use as a proxy for the short term.

Howard Powles (HP) - Do at-sea observers get length frequency data?

David Hardie (DH) – no, observer coverage is low, 3 trips in 2012.

Some possibility to use existing science work (at-sea coverage, port sampling, most recent survey) to provide short term solutions which will continue to provide an acceptable level of confidence in relation to the stock assessment requirements.

Target Reference Point

DP -How is trophic level accounted for in the upper stock reference level? Was the ecological role considered in setting the upper stock reference?

DH - chosen based on 80% MSY, DFO PA framework - and to maintain a gap between LRP and URP to allow time to respond to significant change in stock.

4300mt lowest abundance observed in the low shrimp productivity/ high groundfish productivity regime, stock recovered from that point.

HP – Upper Stock Reference point – 10 year average accepted as MSY, no Target reference point, up to science to decide, may be higher than the USR point.

No estimate of uncertainty on spawning stock biomass.

DP - Confidence limits on the survey results for SSB?

DH - no confidence limits on SSB, but there is on the survey abundance.

Confidence limits on survey CPUE, pretty wide in most years.

DH working on developing measures of uncertainty on indicators, currently already have five developed.

Sara Quigley (SQ) – DFO activities in relation to Sensitive Habitat over the last 12 months

Ottawa has identified key features for investigation to be Sensitive Benthic Areas: sponge dominated communities, cold water coral, seamounts, hydrothermal vents.

Some coral conservation measures in place in the region, shrimp fishery reviewed.

Have good data on sponge and coral distribution, fishing footprint does not appear to overlap with the significant sponge or coral concentrations.

DFO is considering closing areas with high concentrations of Russian Hat sponges. The closures would be added to the shrimp licence conditions because technically they're authorized to fish there.

Developing fishing effort maps for area and landings, validating maps for use by fishermen and for marine spatial planning purposes. 2007 – 2010 by 2 minute square.

Scott Coffen-Smout (SCS) - Another project is currently mapping Vessel Monitoring System (VMS) track lines for bottom contact gear to correlate gear type and log book data, looking to classify % area impacted within a 2 minute grid by gear type.

Two sets of map products being developed but need to validate the maps with harvesters, comprehensive maps will allow calculation of cumulative impacts of all fleets.

Draft maps could be available in first weeks of 2013.

CSAS SAR 2010-041, Occurrence, susceptibility to fishing, and ecological function of corals, sponges, and hydrothermal vents in Canadian waters and related research documents, as well as CSAS SAR 2011/048, Science-based encounter protocol framework for corals and sponges and related research documents are available for review.

Updated SAR will come from the MPA network planning process, region wide initiative to identify ecologically and biologically significant areas.

Fishing maps - want to use them under sensitive area policy, want industry acceptance, no hard fast deadlines - want to integrate maps of fishing footprints into management to and validate cumulative impacts.

Steve Devitt (SD) – Are there any on-going gear conflicts between snow crab and shrimp?

SQ - Work out shrimp boxes between the gear groups to define areas where crab fishermen will avoid so that the shrimp fishery does not interact with the gear

1.1.1 – Stock Status

DP – Is there any indication of current stock status?

DH - At time of site visit, half of survey samples and half of port samples are completed, still in the healthy zone, below removable reference, traffic light overall summary is still red, predation index has increased

Length frequency distribution index suggests that there may be a change coming, raising possibility that the stock may dip into the cautious zone.

1.1.2 – Reference Points

DP - Well described in the SAR, Res Doc and IFMP.

Ecological role of stock was implicitly taken into account when developing the upper stock reference but is explicit in the lower stock reference

In compliance with federal guidelines on PA approach.

New doc should be available soon: Res Doc - Results of National PA application 2012 – 117

Technical Guidelines for provision of science advice on PA for Cdn fish stocks.

1.1.3 – Does not apply, no evidence of depletion, exploitation rate was below 20%

1.2.1. – Harvest Strategy

DP - IFMP is descriptive about the process.

DP - At SG100 level – requirement for evaluation of harvest strategy. Has the Harvest Strategy been evaluated? Any MSE plan for shrimp.

DH -No current plans for a MSE evaluation. New assessment framework to be introduced in 2014, which will cover multi-year assessments. Discussions about how the new assessment framework will be conducted are on-going but details are not currently available.

Colin Bannister (CB) – How is the assessment framework reviewed when it is finalized.

DH - Still not sure how the review process will be implemented, the practical process of how meetings will be conducted and how the reviews will be done has not been finalized.

1.2.2 – HCR

DP - Covered in IFMP, main rule is the PA framework and tool is changes to the TAC. Also limited entry, mesh size, etc...

1.2.3 – Information and monitoring

DP - Other than trap fishery, no other fishery? – correct? Removals from this fishery are well estimated.

DH - 111 tonnes of 336t quote - 8% of the global TAC.

- 20% dockside monitored
- Fishery performance is evaluated in the exploitation evaluation is included in the exploitation in terms of the TAC.
- 14 licenses - 6 -7 active - fall winter fishery, inshore migration period of berried females.
- The single exploratory trap license is not being fished

1.2.4 Assessment

DP – Confirmed that the assessment has not been subjected to an external peer reviewed.

Principle 2

2.1.x – Retained Species

HP - *Pandalus montagui* is the only “other shrimp” that is retained?

DH - yes there is some in the samples, only ballpark estimate- 55 of 60 sets, no *P. montagui* seen.

Table 7 of the 2011 Res Doc – other shrimp listed, this is observer data recorded as "other shrimp" other source - captured on deck sheets during the survey.

No Shrimp fishing area 17 – inshore strata from the survey design. There is no SFA 17. Survey strata 13, 14, 15 - match SFA 13, 14, 15. Other shrimp in Table 7 is summarized by strata from the survey and not from the fishery.

No other species can be retained, prohibited - see conditions of license

PI 2.2.x – Bycatch species

HP - Everything else is discarded. See table 7 in 2011 Res Doc.

Observer coverage has increased (119 sets, up from the 2006 Res Doc).

DH - Port sampling program – harvesters collect a fish pan from the last set of each trip for the port sample.

2.2.2 Strategy

Nordmore grate – 25mm spacing maximum.

HP - No mention of requirement to move in the IFMP to avoid snow crab gear. Toggle chain length in the survey is 30 cm, it is now higher in the commercial fishery. No regulation re: toggle chain length.

SQ - There is no formal “move on” requirement to avoid bycatch, but there is an informal protocol whereby harvesters warn one another away from areas where bycatch of small pelagics is likely to be high.

Gear conflicts have occurred between snow crab and shrimp. Have a mechanism to work out “shrimp boxes” which snow crab harvesters will stay out of.

Sidebar - Seasonality of shrimp. There is an indicator for % of shrimp taken during the ovigerous period, has been contested in the assessment. Dye (from egg production) leaches into the meat, causing colour changes, hence lower quality. Ovigerous period appears to be shifting earlier.

2.3.x – ETP species.

HP - No ETP species interacted.

Additional closure in the Gully for protection of bottlenose whale .

ETP species - no allowable harm permits issued for the fishery.

PI 2.4.x - Habitat - information – (EBSAs – Corals, deal with under ecosystem).

HP - Information - Atlas has been developed by the client and shared with DFO - distribution of habitat is known. Not a lot of specific information on species distribution, atlas focused more on substratum description.

Breeze et al - sponge/ coral - EBSAs in the Res Doc.

Vulnerability of shrimp fishing areas has been partially assessed.

SQ - Formally assessed the risk of interaction of the fishery with the Russian Hat sponges. The fishery was not found to present a risk (though, as stated above, any closures would be included in their licence conditions) -

- sea pens, large gorgonians and sponges have been looked at informally. Does not appear that the fishery overlaps with concentrations of these, but will look at this more closely over time.

- small Gorgonians - have not looked at the shelf wide distribution.

Derek Butler (DB) - Scott Grant referenced national meeting for corals and sponges.

Scott Coffen-Smout (SCS)- Vlad Kostylev's - natural disturbance layer - could overlay fishery effort and look at the natural disturbance layer to see how the fishery overlays with higher disturbance layers. The soft mud bottoms are typically low disturbance.

DFO - going to create networks of MPAs, would expect that there should be protection of a representation of various areas.

HP – Confirmed no twin trawls used in the fishery.

2.4.2 - Habitat Management Strategy

SQ - Closed areas Lophelia coral area, Gully closed area - both have coral.

Jennifer Ford - St Annes Bank - Area of Interest to become a Marine Protected Area, currently negotiating the final boundaries, approach for zoning, regulatory package. Currently at least a year away from site designation as an MPA.

HP – Confirmed that rock hopper gear used on the foot gear of the trawl.

2.5.2 - Ecosystem Impacts

HP - impact on trophic relationships on removing shrimp - LRP set above harm level

SCS - Some possible Alida Bundy modeling of ecosystem, also the ESSIM materials.

Other non-catch impacts on benthic community structure and function.

Principle 3 – Fishery Management System

PI - 3.1.1 - legal disputes, challenges and binding legal

CB - IFMP covers of the Governance of the fishery.

SQ - Legal disputes - Advisory committees are the first place for license holders to raise concerns/ questions about fishery management. License holders can contact Sara Quigley directly for issues of quota allocation, licenses conditions issues in order to further understand their responsibilities.

SQ - One example, DFO suggested that crab and shrimp fleets work to resolve gear conflict between themselves, which they did. Groups work through DFO facilitation in order to define shrimp boxes.

Scotia Fundy Industry Roundtable – forum for higher level discussions, used as a mechanism to vet/ discuss forth coming changes (e.g. 2 yr implementation push for the PA framework, Russian Hat closures), not sure there is a shrimp license holder representative in the group.

ENGO Forum: co-chaired by ENGO rep appointed by RDG. Set terms of reference are available. Higher level environmental/ ecological impacts from fisheries in the regions.

Response to binding judicial decisions in relation to First Nations - Marshall Decision - Sparrow Decisions - There are communal licences, First Nations have a significant quota holding for shrimp.

Policy response, and reasonable response examples from the DFO.

Consultation processes - implementation of the fisheries policies and environmental policies

Advisory committee provides advice to the department, try and reach consensus on advice going to DFO. Ultimately, management decisions confirmed by department and Minister.

Recent discussions around TAC, previous discussions around allocation of quota. Advisory committee tries to provide context of current concerns from the various perspectives.

Roles - Advisory Committee is updating roles and membership. Meeting in Sept 2012 to review roles and membership. Advisory committee to be realigned to only look at the 4VW.

ENGOS - anyone can attend as an observer, ENGO do occasionally attend advisory committees generally, however they are not specifically invited or notified when advisory committee is taking place. ENGO Forum working to communicate management cycles.

Advisory committee meets formally once per year, working groups, in the past year 3 working groups, Larocque, trap tags, membership committees. WGs struck on ad-hoc basis to deal with an issue and disband upon completion.

CB - How are priorities for management set and are there formalized timelines established around setting priorities.

SQ - DFO Fisheries checklist - internally checklist on a fishery specific basis conducted for all major fisheries, it is used to generate a gap analysis which in turn is used for priority setting based on needs and resources available. Not all resource advisors are necessarily using the checklist as a monitoring or priority-setting tool.

Intention is to work on priorities from the Advisory Committee, through the IFMP review and update process, priorities for the fishery is updated.

Is it a planned approach or a haphazard responsive approach,

CB – requested action items from last Advisory meeting

SQ - Regional priorities - driven from on high.

More proactive discussions - Scott C-S - working on the cumulative benthic impacts

- EAM Framework - Sustainable Fisheries framework -

- DFO - Report to Treasury Board – reporting on Policy, Plans and Frameworks

PI 3.1.4 Incentives

CB – Confirmed incentives for sustainable fishing - nordmore grate, low profit margin - motivated to be efficient in the fishery operation, limited entry, consultative process provides predictability.

Review of management policy to consider incentives – Effectively ongoing through the Advisory Committee process, however, also Ecosystem approach to management (EAM) - review of linkages in between tactics and strategies in the fishery, to confirm whether there are possible opportunities for perverse incentives to be introduced into the management process.

PI 3.2.1 - Fishery specific objectives

CB - See section 6 (Strategies and Tactics) in IFMP.

CB – confirmed well defined and measurable - are there measures of success for the fishery management.

- checklist
- report to the treasury board
- involvement in the Advisory committee
- compliance

PI 3.2.2 – Decision making

CB - 100b requires formal reporting

SQ - reporting to Advisory Committee.

Post-season review - internal, may also be done at the Advisory Committee.

Science reporting - Attend the fall annual general meeting for harvesters, Peer Review meeting, RAP

State of the Oceans covers fishery - Scotian shelf – www.coinalantic.ca

PI 3.2.3 - MCS

CB - IFMP does define the system, compliance measures

Bryan Wood - Do have pirate activity, misreporting, but don't feel that the shrimp fishery is problematic. Examples of sanctions being effective do work, but DFO does not pursue all minor offenses through the court system, preferring to work via education on the wharf by officers.

Sanctions have increased in recent years, to higher dollar sanctions in the system and loss of fishing privileges via suspensions (e.g. groundfish conviction of \$100K, lobster conviction of \$25K).

Focusing more at conservation related events - size, bycatch species.

Respond to peace and good conduct in the fishery. 1 violation in this fishery over the past year

(e.g. VMS unit not pinging correctly)

- VMS - not pinging correctly - harvester corrected

CB - Do fishery officers have discretion about issuing warnings?

BW - FO - does have discretion, offences are triaged through a supervisor. Expensive to run cases through the courts.

MCS is reviewed in the checklist.

3.2.4 - Research plan - written document?

CB – Confirmed no specific research plan, research section in the IFMP, description of research priorities.

3.2.5 - Management system review

CB – What other review besides the internal sustainability checklist, and the IFMP review by the RAP? Any external reviewers involved.

SQ - Sustainability checklists - supposed to be systematic - monitor progress of DFO
IFMP - Annual review of the fishery - it is an internal process which is ongoing and annual - harvesters and ENGO review through the RAP.

Other than RAP, no external reviewers involved in process.

4. IMM Assessment Team Questions

Assessment team questions for stakeholders

See Section 3 for indications of team feedback.

5. Other issues

(e.g. any other stakeholders we should contact, any written submissions to follow?)

None identified.

6. Closing

IMM Lead Assessor:

- Summary of key points – stakeholder to confirm in writing (sign if hard copy)
- Are comments to be attributed?
- Timescale for completion, including further opportunities for stakeholder input

Appendix 4: Agency Support of Client Action Plan



Fisheries
and Oceans

Pêches
et Océans

P.O. Box 1035
Dartmouth, NS
B2Y 4T3

OCT 10 2013

Mr. Derek Butler
Association of Seafood Producers
10 Fort William Place
Suite 103, Baine Johnston Building
St. John's, NL
A1C 1K4

Dear Mr. Butler:

Re: Fisheries and Oceans Canada Support for MSC Certification Client Action Plan

This letter is to advise you that Fisheries and Oceans Canada (DFO), Maritimes Region, supports the Client Action Plan you have drafted for the Canada Northern Prawn fishery, with the caveat that DFO's contributions will be limited to actions that align with DFO's annual work plan activities.

We expect that in the coming months, a more detailed work plan will define timelines and accountabilities that touch on the areas of DFO authority. Please note that this work plan will be reviewed on an annual basis to assess its alignment with DFO's annual plans and priorities. As a result, additional internal review will be required in advance of DFO commencing activities to support the Client Action Plan.

I would like to take this opportunity to applaud the Association of Seafood Producers for its ongoing commitment to a sustainable fishery, and I wish you all the best in your efforts to become Marine Stewardship Council re-certified.

Yours sincerely,

Faith G. Scattolon
Regional Director-General
Maritimes Region

Canada

Appendix 5: Stakeholder Comments on PCDR and IMM Responses

Date 22/11/2013

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

Dear Steve Devitt

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

CAB	Intertek Moody Marine (IMM)
Lead Auditor	Steve Devitt
Fishery Name	Canada Scotian Shelf Northern prawn trawl
Document Reviewed	Public Comment Draft Report

Ref	Type	Page	Requirement	Reference	Details
3893	Minor	45	CR-27.12.1.2 v.1.3	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products: The possibility of vessels fishing outside of the unit of certification.	The report does not cover how fish products will be segregated from non-certified products. The report does not cover how licensees fishing with trawls will ensure methods of catch or release do not compromise certification.

IMM Response: Additional clarification text has been added to Section 5.3 to better explain product segregation measures. We do not purchase raw material from the trap fishery. Although there is no legal requirement for the licenses to be fished, we have confirmed that from a practical perspective, it would be difficult for a vessel equipped with trawl gear to be setting and releasing trap shrimp (larger, landed sooner) are serving a different market niche, it would not be beneficial to mix the trap shrimp in with trawl product is usually serving a fresh market, whereas the trawl caught shrimp are destined for the cooked and peeled shrimp market. Not similar. Other than trap and trawl fishing gears, there are no other legal catch methods for shrimp.

MSC – the best environmental choice In seafood

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3894	Minor	211	CR-27.11.3.1 v.1.3	27.11.3: The CAB shall not accept a client action plan if the client is relying upon the involvement, funding and/or resources of other entities (fisheries management or research agencies, authorities or regulating bodies that might have authority, power or control over management arrangements, research budgets and/or priorities) without: 27.11.3.1 Consulting with those entities when setting conditions, if those conditions are likely to require any or all of the following: a. Investment of time or money by these entities. b. Changes to management arrangements or regulations. c. Re-arrangement of research priorities by these entities.	The report does not provide proof that client has consulted with DFO on the client action plan.	
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IMM Response: Letter of support/ confirmation of consultation has been added to the FCR.

3895	Guidance	45	CR-27.6.1 v.1.3	The CAB shall nominate a date from which product from a certified fishery is likely to be eligible to bear the MSC ecolabel (the target eligibility date). This could be: The date of the certification of the fishery; or Any date prior to the certification of the fishery up to a maximum of six months prior to the publication of the most recent Public Comment Draft	The report does not make it clear if there will be a period of time where some catch from the unit of certification will not be MSC eligible, due to the recertification being delayed.	
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IMM Response: Section 5.2 Actual Eligibility Date and Initial Certification Expiration has been added to clarify this issue. Similar summary text has been added to the Executive Summary.

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 Jodi Bostrom on +44 (0)20 7246 8934 for more information.

Best regards,
Fisheries Oversight Director
Dan Hoggarth
Marine Stewardship Council

A handwritten signature in black ink, appearing to read 'Dan Hoggarth', written in a cursive style.

cc: Accreditation Services International

