



Intertek Fisheries Certification (IFC)

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INTERTEK FISHERIES CERTIFICATION

June 2015

Ref: 82088

Eastern Canada Offshore Scallop Fishery

FINAL DETERMINATION REPORT

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GLOSSARY

CPUE	Catch per unit effort
CSLP	Clearwater Seafoods Limited Partnership
DFO	Fisheries and Oceans Canada
DMP	Dockside Monitoring Program
EA	Enterprise allocation
EAC	Ecology Action Center
EBSA	Ecologically and biologically significant area
ENGO	Environmental non-governmental organisation
ESSIM	Eastern Scotian Shelf Integrated Management (Initiative/Project)
ETP	Endangered, threatened or protected (species)
FSC	Food, social and community (purposes)
ICJ	International Court of Justice
ICNAF	International Commission for the Northwest Atlantic Fisheries
IFMP	Integrated fisheries management plan
JPA	Joint project agreement
LOMA	Large ocean management area
LRP	Limit reference point
MPA	Marine protected area
MSC	Marine Stewardship Council
MSY	Maximum sustainable yield
NAFO	Northwest Atlantic Fisheries Organization
NFMA	Northern Fishery Management Area
OSAC	Offshore Scallop Advisory Committee
PARL	Parliament of Canada
PBGBLOMA	Placentia Bay and Grand Banks Large Ocean Management Area
RAP	Regional advisory process
RDG	Regional Director-General (DFO)
SAR	Science advisory report
SCC	Supreme Court of Canada
SPANS	Seafood Producers Association of Nova Scotia
SSB	Spawning stock biomass
SSR	Stock status report
TAC	Total allowable catch
TMGC	Transboundary Management Guidance Committee
TRAC	Transboundary Resources Assessment Committee
TRP	Target reference point
VME	Vulnerable marine ecosystem

1 EXECUTIVE SUMMARY

This report sets out the results of the reassessment of the Seafood Producers of Nova Scotia (SPANS) Eastern Canada Offshore Scallop Fishery (ECOSF) against the Marine Stewardship Council (MSC) Principles and Criteria for Sustainable Fishing. The fishery was previously certified as sustainable in March 2010, and so this is the second assessment of the fishery.

This reassessment was conducted using the MSC Certification Requirements (CR) version 1.3 (MSC 2013a), and with the MSC Full Assessment Reporting Template version 1.3. The default assessment tree was adopted, with no changes made to the text of any default Performance Indicator (PI). The risk-based framework (RBF) was not used.

This version of the reassessment report is the Final Determination Report, such that the report has already proceeded through the peer review and public consultation phases. The ECOSF will therefore be recertified if no objections are raised to its recertification in the final 15 day stakeholder consultation period.

This reassessment of the fishery was undertaken by Dr. Andy Brand, Dr. Rob Blyth-Skyrme and Mr. John Angel, who covered Principle 1 (target stock), Principle 2 (environment) and Principle 3 (management) components of the MSC Standard respectively. Dr. Rob Blyth-Skyrme led the reassessment. A site visit to Dartmouth, Nova Scotia, was undertaken in June 2014 to meet with scientists, fishery managers and stakeholders, as well as representatives of SPANS. No other stakeholders requested to meet with the assessment team during the site visit.

The ECOSF targets sea scallop (*Placopecten magellanicus*). This bivalve mollusc can reach a size of 200 mm shell height, but more commonly reaches a size of 100-150 mm shell height. It is widely distributed in the Northwest Atlantic, with a geographical range that extends from Pistolet Bay, Newfoundland and the north shore of the Gulf of St Lawrence to Cape Hatteras, North Carolina. The sea scallop has been exploited throughout its geographical range for more than 120 years.

The ECOSF is conducted in Canadian Scallop Fishing Areas (SFAs) 10, 11 and 12 (St Pierre Bank), 25 (Eastern Scotian Shelf), 26 (Browns and German Banks) and 27 Georges Bank. The historic fishery on Georges Bank was competitive between Canadian and US boats, but in 1984 the International Court of Justice adjudicated on a boundary line (the so-called Hague line) separating the exclusive fishing grounds of the two countries. The north-eastern portion of the Georges Bank (acknowledged to be the most productive area of the Bank for scallops) was awarded to Canada.

The ECOSF fleet in 2013 consisted of 8 wetfish vessels landing iced product and 4 freezer vessels landing frozen product. All the vessels are greater than 27.4m (90'), with the freezer vessels reaching lengths of up to 40 m (130'). Crew complements range from 17-19 on wetfish trawlers and 25-32 on freezer vessels, depending on size. The total crew complement for the fleet is around 350 people, and the jobs are mostly full-time and year-round (freezer vessels are double-crewed, such that crews work one trip on, one off). The vessels deploy steel scallop drags or dredges (known as the New Bedford rake) along the seabed to catch scallops. There are no regulations on scallop dredge dimensions in the ECOSF, but vessels typically employ two dredges (sometimes three), each varying in width from 4 m to 6.1 m. Annual total allowable catches (TACs) are set for each offshore Bank fished.

For Principle 1, key strengths include that the TACs for Georges Bank 'a' and Browns North, the two most productive Banks in the fishery, are set using analytical assessments. The stocks on these Banks are at or above their long-term median fully-recruited biomass levels. The biologically based reference points for Georges Bank 'a' have been incorporated into a formal Precautionary Approach Framework used to set the TAC and a similar approach has been proposed for Browns Bank North.

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For the other Banks (accounting for <10% of the ECOSF catch), a number of indices including survey biomass, recruitment, catch per unit effort (CPUE), meat weights and counts and size structure provide proxy measures with similar intent to biological reference points and these have been applied effectively to determine the status of the stocks.

The harvest strategy employed by the ECOSF aims to direct effort to fully-recruited adult scallop and to minimise the harvest of fast-growing, lower value, juvenile scallops by means of voluntary closed areas and meat count regulations. The size composition of the catch confirms the success of this strategy. Together, these approaches have protected the fishery's productivity over a long timeframe.

There were no particular weaknesses in P1.

For Principle 2, key strengths include that, in combination with the use of TACs, the ECOSF vessels utilise highly detailed habitat maps, created using multibeam bathymetry, to target the most productive fishing grounds for scallops. This has the effect of minimising bottom contact time, and therefore minimising any collateral impacts of the gear on non-target species, ETP species, and benthic habitats and communities. Habitats in the fished area are generally gravel or a gravel-sand mix, and the tops of the Banks where the fishing occurs (and therefore the habitats and communities of the fished area) are subject to natural disturbance from tidal currents and storm waves. Recovery of the seabed habitats and communities following dredging is predicted to occur in about 10 years (Collie *et al.* 2005).

There were no particular weaknesses in P2.

The Maritimes Region of the Fisheries and Oceans Canada (DFO) is responsible for the management of the ECOSF. For Principle 3, key strengths include an extensive legislative and policy framework along with an integrated fishery management plan for the fishery, outlining the stock assessment approach, stock status, fishery-specific objectives, management issues and measures, and research needs. Consultative mechanisms also exist and are employed, with the Offshore Scallop Advisory Committee being composed of the major stakeholders, including representatives of the Enterprises involved in the ECOSF, and DFO officials. Native groups are notified of meetings of the Committee and may attend at their option. Any party who expresses an interest is permitted to sit as an observer to the Committee meetings and may address the group with the consent of the Chair.

There were no particular weaknesses in P3.

The SPANS Eastern Canada Offshore Scallop Fishery achieved overall scores of 91.3 for Principle 1, 88.7 for Principle 2, and 91.9 for Principle 3, and there were no Conditions of Certification placed on the fishery. As such, it is recommended that the fishery is recertified according to the MSC standard as being sustainable.

One non-binding recommendation was made by the reassessment team. This was that the ECOSF IFMP (DFO 2000) is updated to reflect the latest available information and understanding of the fishery and its management system, and that this is then kept up to date as appropriate.

2 AUTHORS AND PEER REVIEWERS

2.1 Assessment team

Nominations for the assessment team for this reassessment were consulted on for 10 days from the 10th of April, 2014. No comments were received on the proposed team and, following the consultation, the assessment team was confirmed as the three assessors listed below:

Principle 1 – Dr. Andy Brand

Andy worked for 40 years on the academic staff of the Port Erin Marine Laboratory, Isle of Man, retiring in 2006 as Director of the Laboratory. During this time he developed large, well-funded, research programmes on the biology, ecology, aquaculture and fisheries of bivalve molluscs, especially scallops, and on the environmental impact of scallop dredging. He has had extensive fishery management and environmental assessment consultancy experience, including contracts with government departments and industry, and has been a member of ICES Working Groups on herring, scallops and ecosystem effects of fishing. In addition to work in the Irish Sea he has studied, and advised, on scallops and fisheries management in Alaska, Argentina, Australia, Bermuda, Chile, Ireland, France and the Philippines. He is now an Honorary Senior Fellow of the University of Liverpool and works as an independent consultant on shellfisheries. He has recent experience as an assessor and independent reviewer for Marine Stewardship Council certifications for scallop, mussel, clam and oyster fisheries in the Irish Sea, Faroes, Denmark, the Netherlands, Spain, India, USA and Canada.

Principle 2 and Lead Assessor – Dr. Rob Blyth-Skyrme

Rob has worked in aquaculture and then in marine fisheries science, management and policy since 1996. Rob started his career in finfish mariculture, before switching to a focus on wild fisheries. Following his PhD which focused on fisheries management and the environmental effects of fishing, he moved to Eastern Sea Fisheries Joint Committee, the largest inshore fisheries management organization in England, where he became the Deputy Chief Fishery Officer. He then became a senior advisor to the UK Government on marine fisheries and environmental issues, leading a team dealing with fisheries policy, science and nationally significant fisheries and environmental casework. Rob now runs Ichthys Marine Ecological Consulting Ltd., a marine fisheries and environmental consultancy. Rob has undertaken all facets of MSC work as a Lead Assessor, expert team member and peer reviewer, across varied fisheries including those for Japanese scallop, Alaska pollock, Pacific cod, Oregon pink shrimp, Alaska salmon, North Pacific albacore, Grand Bank yellowtail flounder, Arctic surfclam and European mussels.

Principle 3 – Mr. John Angel

John worked with the federal Department of Justice before moving to the Department of Fisheries and Oceans as head of legal and regulatory affairs in 1983. His last position in government (1994) was as Regional Director of Fisheries Management for the Scotia-Fundy Region. After ten years as Executive Director of the Canadian Association of Prawn Producers, a trade association representing offshore northern shrimp interests in Eastern Canada, John retired from full time employment. He has extensive experience in the development of integrated resource management plans and fishing strategies as well as a background in Canadian fisheries law. He continues to provide consulting services to the fishing industry through his firm, Angel Consulting Services, located in St. Margaret's Bay, Nova Scotia, Canada. John has been involved as a Principle 3 assessor for MSC certification of several Atlantic Canada species as well as consulting work with the MSC on the Standard review.

2.2 Peer reviewers

Dr. Terry Holt

Dr. Holt has a broad experience of marine ecology spanning more than 35 years, with particular expertise in benthic ecology including biogenic reef features, and especially with reference to a variety of human impacts. He has ten years of experience in commercial aquaculture, primarily seaweeds but also mussels and scallops, and has been involved in numerous surveys and assessments involving commercial fisheries, including whelks, scallops, crabs and lobsters.

Dr Holt has been involved in assessments of fisheries to the Marine Stewardship Council (MSC) standards for sustainable and well managed fisheries from 2001 until the present. He has been involved in pre-assessments, annual re-assessments and full assessments of mollusc and finfish fisheries in UK, the sub-Antarctic, Vietnam, Denmark, the Faeroe Islands and the Isle of Man, and peer review of mollusc fishery audits in Canada and the Netherlands. He contributed to development of generic scoring guidelines for the MSC and took part in a workshop aimed at refining assessment methods. He carried out preliminary assessment of a number of U.S. aquarium fish wholesalers and retailers against sustainability standards on behalf of MAC (Marine Aquarium Council) in order to investigate appropriateness of draft standards, and has also carried out assessments of fishing vessels/crew under the Sea Fish Industry Authority's Responsible Fishing Scheme.

Dr. Howard Powles

Dr. Powles 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 emphasis on invertebrate fishery resources and on ecosystem impacts of fishing. As a policy advisor and manager at Canada's Department of Fisheries and Oceans (DFO) (1993-2000), he participated in peer reviews of the Arctic surf clam fishery and other molluscan and crustacean fisheries, and led a review of the Department's stock assessment program.

As Director of Fisheries Science and of Biodiversity Science (1998-2004) at DFO Headquarters, Dr. Powles was active in developing ecosystem-based approaches to ocean management, in particular approaches based on defining ecosystem objectives and indicators, and was the Department's lead on developing and implementing new Canadian endangered species legislation. Dr. Powles has been a member of MSC assessment teams for 7 fisheries.

3 DESCRIPTION OF THE FISHERY

3.1 Unit(s) of Certification and Scope of Certification Sought

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)" The fishery proposed for certification is therefore defined as:

Species: Sea scallop (*Placopecten magellanicus*)

Geographical Area: The Eastern Canada Offshore Scallop Fishery (ECOSF) operates within the Canadian EEZ, in the following Scallop Fishing Areas (SFAs):

- St Pierre Bank (SFAs 10, 11, & 12)
- The Eastern Scotian Shelf (SFA 25)
- Browns and German Bank (SFA 26)
- Georges Bank (SFA 27)

Method of Capture: New Bedford scallop rakes / dredge

Stock: The ECOSF is restricted to Scallop Fishing Areas 10, 11, 12, 25, 26 & 27.

Management System: Fisheries and Oceans Canada (DFO) undertakes the management of the ECOSF, through their Maritime Region.

Client Group: Successful certification of the fishery will apply to the following companies and their vessels:

- Adams and Knickle Limited
- Clearwater Seafoods Limited Partnership
- Comeau's Sea Foods Limited
- LaHave Seafoods Limited
- Ocean Choice International Limited Partnership

The Seafood Producers Association of Nova Scotia (SPANS) is acting as coordinator for the five companies in the Client Group. In the course of the certification it is possible that further companies may join the client group. This would be in accordance with the MSC's stated desire to allow fair and equitable access to the certification.

3.1.1 Scope of Assessment in Relation to Enhanced Fisheries

The sea scallop stock targeted in the ECOSF is not enhanced and is dependent entirely on wild spawning and growth. As such, enhanced fishery considerations do not apply to the ECOSF.

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

Placopecten magellanicus is native to the Northwest Atlantic. As such, introduced species based fisheries considerations do not apply to the fishery under assessment.

3.2 History and Overview of the Fishery

The ECOSF of Atlantic Canada is managed through the use of geographical zones called Scallop Fishing Areas (SFAs) ranging from north east Newfoundland to Georges Bank off south west Nova Scotia (Figure 1). The fished area includes waters within the Canadian EEZ of NAFO Divisions 3Ps, 4VWX and 5Ze (Figure 2).

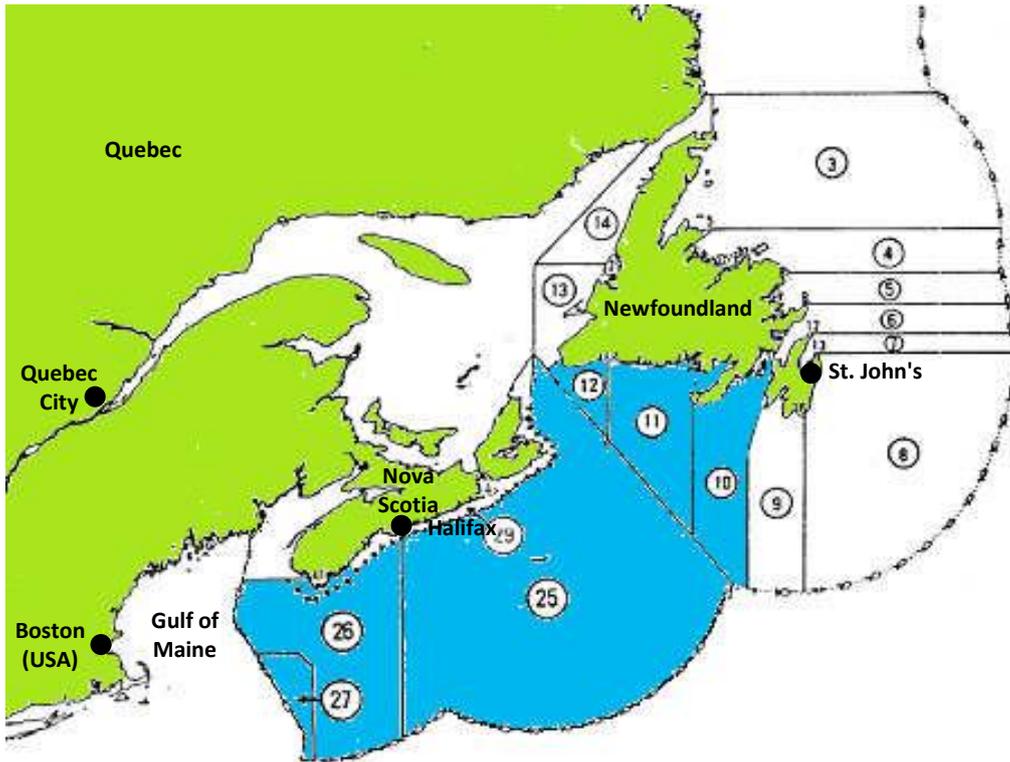


Figure 1: Scallop Fishing Areas (SFA) targeted by the ECOSF. The blue shaded areas represent the SFAs under assessment. (Source: DFO)

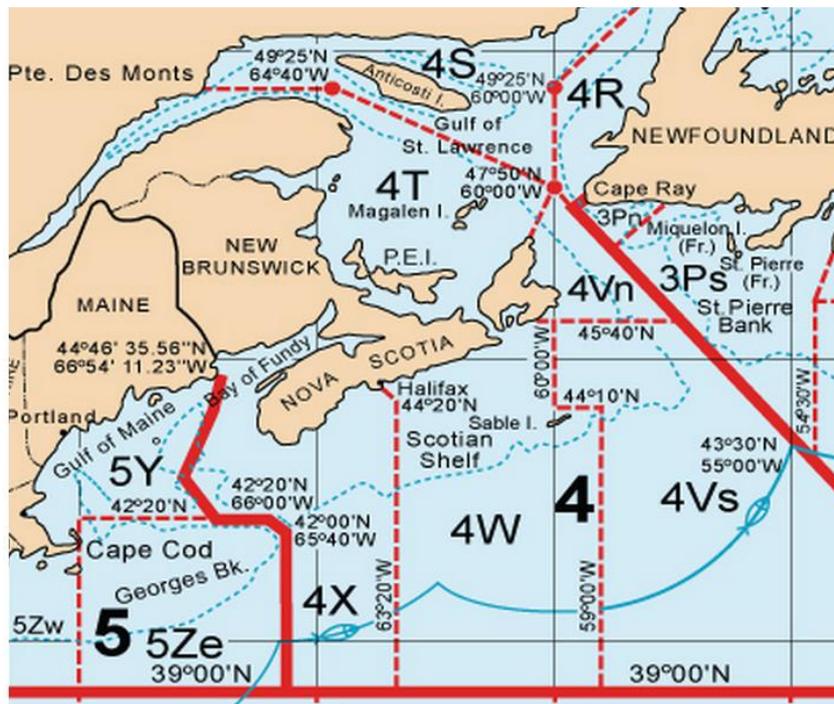


Figure 2: The Northwest Atlantic region, showing the NAFO Divisions in which the ECOSF occurs. (Source: NAFO website: <http://www.nafo.int/about/frames/area.html>)

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The sea scallop has been exploited throughout its geographical range for more than 120 years. In both Canada and the USA, the first recorded landings were in the 1880's, and for more than 50 years the fisheries in both countries exploited only inshore grounds. The offshore beds on Georges Bank were discovered in the early 1930's (O'Brien 1961), and with increasing demand for scallops after World War II, Canadian boats moved increasingly offshore onto Georges Bank and other offshore banks so that, by 1954, landings by the Canadian offshore fleet exceeded those of the inshore fleet (Bourne 1964). With Canadian effort on Georges Bank mainly on the very productive Northern Edge and Peak, by 1965, 75% of the annual removals from Georges Bank were taken by the Canadian fleet. The Canadian fishery subsequently expanded to Browns, German and St. Pierre Banks as well as in areas of the eastern Scotian Shelf, and limited entry was introduced in 1976 to cap fishing capacity.

The competitive fishery on Georges Bank by Canadian and US boats required a joint management regime, set up under the auspices of the International Commission for the Northwest Atlantic Fisheries (ICNAF). This continued to operate with very limited success until 1984 when the International Court of Justice (ICJ) in the Hague adjudicated on a boundary line (the so-called Hague line) separating the exclusive fishing grounds of the two countries and restricted the Canadian, and US offshore fleets to their respective national zones (Figure 3). The north-eastern portion of the Georges Bank (acknowledged to be the most productive area of the Bank for scallops) was awarded to Canada. Since then, two very different systems for stock assessment and management have developed on either side of the Hague line. A comparative assessment of the consequences of this on the scallop stocks, the fisheries and the management regime over the first 15 years after the Hague line had been established has been made by Repetto (2001).

Prior to the ICJ decision, fishing interests from both countries conducted intensive fishing on a competitive basis. The result was a severe drop in scallop abundance, with Canadian scallop landings falling to less than 2,500 t of meats. This provided the incentive for the Canadian government and the fishing industry to develop a management strategy to rebuild and maintain scallop stocks and address fleet replacement.

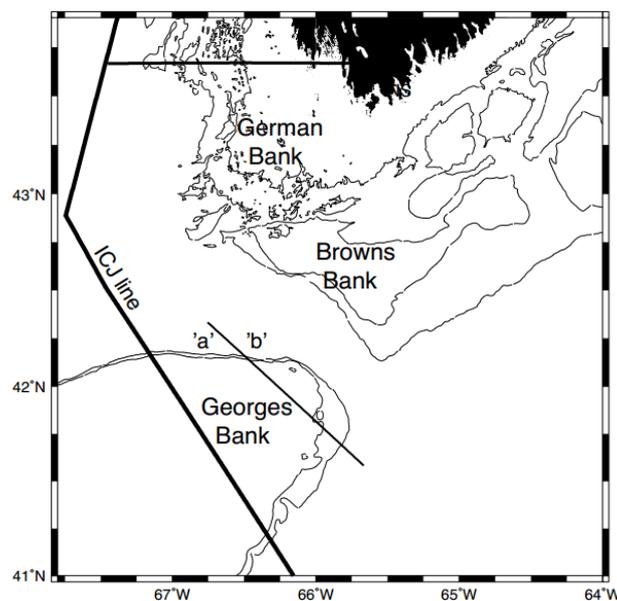


Figure 3: Zones 'a' and 'b' on Georges Bank, the international boundary between Canada and the USA indicated by the ICJ Line, and the 43°40' North latitude inshore-offshore separation line.

Source: (Jonsen *et al.* 2009).

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Perhaps the most important turning point for the Canadian offshore scallop fishery after the establishment of the Hague line was the introduction of a rights-based enterprise allocation (EA) program in 1986. Owing to concerns from those employed within the industry that this would compromise their jobs, a trial period was incorporated into the program. Following a review in 1989, the participants considered the trial to be a success and the program was made permanent. Since then, there has been a rationalization of the fleet with the number of active vessels having been decreased from 68 to 12 and the number of enterprises holding licences from 9 to 6. Today, traditional “wetfish” vessels land fresh scallop meats and a modern fleet of freezer trawlers capable of shucking and individually quick freezing (IQF) scallops within 1 hour of being caught has been introduced.

An agreement between the Canadian inshore and offshore fleets was also made in 1986 to separate their fisheries by a line drawn at latitude 43° 40’ north in the Bay of Fundy (Figure 3). This allowed both fleets to manage their fisheries separately for the benefit of its participants.

By 1998, the Canadian offshore scallop fleet had expanded its EA program to include all Banks on which offshore scallop fishing occurred. Fishing in the ECOSF is still principally focused on the Georges Bank, but Browns Bank and German Bank also contribute significant quantities of scallops in most years, while the Eastern Scotian Shelf, Banquereau and St. Pierre Banks are typically fished at a low level of intensity, although fishing effort can increase in years following infrequent pulse recruitment events (Figure 4 and Table 1).

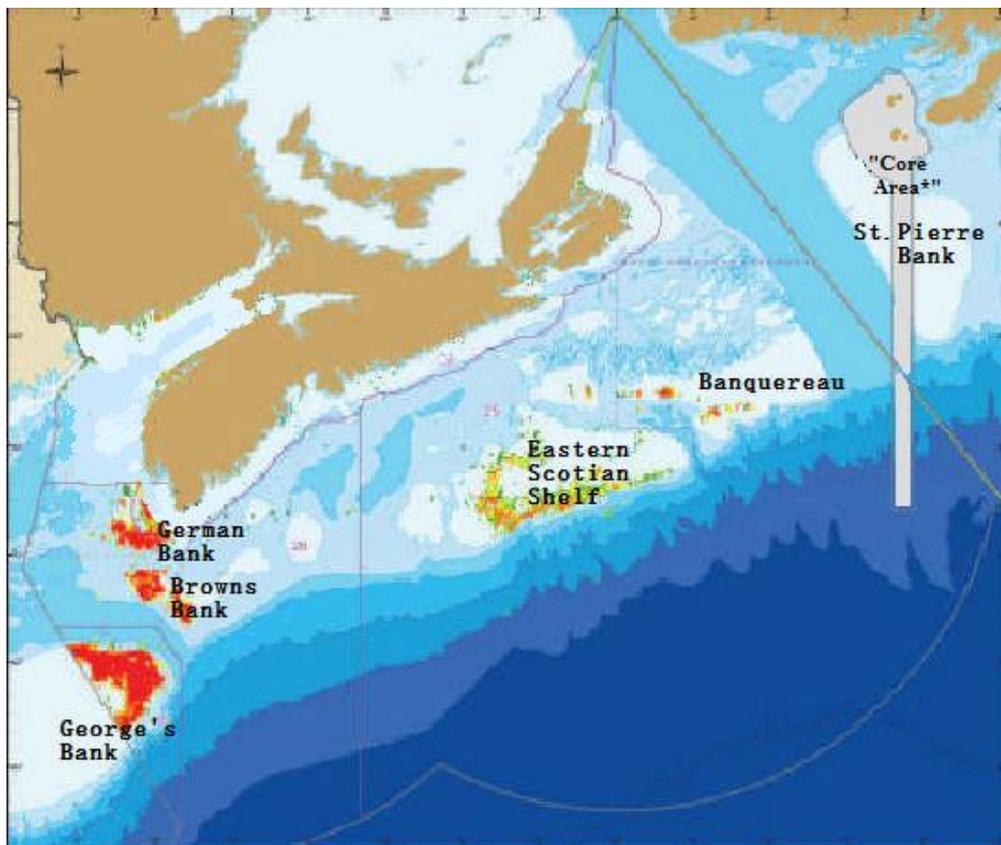


Figure 4: The offshore areas where fishing for scallops was concentrated between 1999 and 2003 (except for St Pierre Bank).

NB: The red shading indicates the areas where the highest landings were taken. The “core area” indicates French Maritime Waters.
(Source: DFO 2009)

Table 1: TACs and catches from the ECOSF Scallop Fishing Areas (SFAs), 2008 – 2013. (Data from DFO 2014b).

SFA		2008		2009		2010		2011		2012		2013		Mean	
		TAC	Catch												
10, 11, 12	St. Pierre Bank**	0	36	0	51	0	101	0	109	0	143	0	0	0	73
25	Eastern Scotian Shelf	125	87	75	33	75	31	75	0	75	61	100	88	88	50
25	Banquereau	50	0	0	0	0	0	0	0	10	10	0	0	10	2
26	Browns Bank North	400	393	0	0	200	201	1,000	1,027	500	476	750	749	475	474
26	Browns Bank South	0	0	0	0	0	0	0	0	0	0	10	0	2	0
26	German Bank	400	394	200	200	200	170	150	126	150	152	150	144	208	198
27	Georges Bank 'a'	5,500	5,498	5,500	5,521	5,500	5,291	4,500	4,517	4,000	4,002	5,000	4,999	5,000	4,971
27	Georges Bank 'b'	400	358	350	260	200	66	0	0	50	47	100	108	183	140
ECOSF total		6,875	6,766	6,125	6,065	6,175	5,860	5,725	5,779	4,785	4,891	6,110	6,088	5,966	5,908
% from Georges Bank 'a' only		80.0	81.3	89.8	91.0	89.1	90.3	78.6	78.2	83.6	81.8	81.8	82.1	83.8	84.1
% from Browns Bank North only		5.8	5.8	0.0	0.0	3.2	3.4	17.5	17.8	10.4	9.7	12.4	12.3	8.0	8.0
% total for Georges 'a' + Browns Bank North		85.8	87.1	89.8	91.0	92.3	93.7	96.1	95.9	94.0	91.6	94.1	94.4	91.8	92.2
% total for Georges Bank ('a' + 'b')		85.8	86.6	95.5	95.3	92.3	91.4	78.6	78.2	84.6	82.8	83.5	83.9	86.9	86.5
% total for Georges ('a' + 'b') + Browns (N + S) + German Banks		97.5	98.2	98.8	98.6	98.8	97.7	98.7	98.1	98.2	95.6	98.4	98.6	98.4	97.9

** Catches reported from St. Pierre Bank are for the inshore scallop fishery; there was no TAC and no catch in the ECOSF.

3.2.1 Boats and Gear

The ECOSF is conducted by towing steel scallop drags or dredges (known as the New Bedford rake) along the seabed. There are no regulations on scallop dredge dimensions in the ECOSF, but vessels typically employ two dredges (sometimes three), each varying in width from 4m to 6.1m (Photo 1). The forward opening of the standard dredge, supported by shoes that skid along the bottom, has a cutting bar on the bottom and a pressure plate on top (Photo 2).

Behind the frame of the dredge is mounted a bag consisting of steel rings, which have an internal diameter of 7.2- 10.2 cm (Photo 3). On the roof of the bag, immediately behind the pressure plate, is the rope back, an area of large mesh netting (generally 12-15 cm) to allow the escape of fish (Photo 3). The bottom of the bag does not start until well back from the cutting bar. Sometimes, a pair of rollers is used at the front to keep the nose from digging into the substrate (Photo 1). Towing speed ranges from 3 to 5.5 knots and tow duration commonly ranges from 20 to 30 minutes.



Photo 1: A 17-foot (5.2m) New Bedford Rake, showing the diving plate and the front end of the rake that is attached to a towing warp and two wheels designed to stop the rake from digging into the substrate.



Photo 2: The shoe of the rake and the diving plate.



Photo 3: The rear of the rake with the catching bag made up of 3-inch steel rings and the 5-inch square mesh rope back panel to allow groundfish to escape.

Walsh (2008) provided a useful summary of how the dredge works: The capture process is thought to be initiated when scallops swim up in reaction to, or are lifted vertically by, the hydrodynamic effect of the cutting bar. The cutting bar of the dredge usually rides at or just above the sea floor depending on substrate. Scallops can pass under the bar, collide with the bar and tumble over, or swim over it. Some of the scallops entrained in the water turbulence may pass out of the dredge through the overhead rope back. The sweep chain, which forms the leading edge of the ring bag, passes beneath the scallops when they rise and the scallops fall into the bag and are captured. Tickler chains mounted ahead of the sweep chain or in front of the cutting bar may also cause some vertical swimming reaction and thereby increase catch. Scallops smaller than the inside diameter of the rings that comprise the bag may pass through, unless the rings are clogged. Scallops have also been observed swimming over the dredge's pressure plate. The efficiency (i.e. percentage of available scallop caught) of the current east coast USA New Bedford scallop dredges is estimated to range from 20-55%, with an average of 46%, although seabed type and weather conditions (the seabed contact of the gear is reduced in rougher seas) can affect this figure considerably (Walsh 2008).

While the bottom contact by any wheels, shoes and the cutting bar may be limited, the bottom of the chain bag (on the order of 3-4 m long) is in contact with the seabed for much of the tow and extends the full width of the gear. Its weight also increases as a tow progresses as it picks up rocks and other substrate material as well as scallops. The disturbance caused to the seabed includes displacement of sediment clasts, flattening out of microhabitat features and re-suspension of fine sediment. Organisms are impacted as well, especially larger and attached forms of epifauna when present. In typical scalloping grounds, this type of seabed disturbance is readily detected subsequently by acoustic tools such as sidescan sonar or towed video cameras.

3.2.2 The Fleet

The ECOSF fleet in 2013 consisted of 8 wetfish vessels landing iced product and 4 freezer vessels landing frozen product. All the vessels are greater than 27.4m (90'), with the freezer vessels reaching lengths of up to 40 m (130'). Vessel replacement is restricted to 44.8 M (147') by licensing policy and industry guidelines for the EA program. Crew complements range from 17-19 on wetfish trawlers and 25-32 on freezer vessels, depending on size. The total crew complement for the fleet is around 350 people, and the jobs are mostly full-time and year-round (freezer vessels are double-crewed, such that crews work one trip on, one off).

Trips by wetfish vessels typically last up to 12 days, port to port, with freezer vessels staying at sea for up to 22 days. Fishing is conducted year round with the duration of the season limited by the EA and the overall TAC. Fishing on some of the smaller Banks is adjusted by the fleet depending on production in any given year. Winter fishing rarely occurs on St. Pierre Bank due to extreme weather conditions.

3.3 Principle One: Target Species Background

3.3.1 Biology of the Target Species

There is a very large body of literature on the biology and fisheries of the Atlantic sea scallop, *Placopecten magellanicus* (Gmelin), with excellent reviews by Stewart & Arnold (1994), Hart & Chute (2004) and Naidu & Robert (2006).

Placopecten magellanicus is a large scallop that commonly reaches 100–150 mm shell height but individuals >200 mm have occasionally been reported (Naidu & Robert, 2006). The species occurs in the Northwest Atlantic, with a geographical range that extends from Pistolet Bay, Newfoundland and the north shore of the Gulf of St Lawrence to Cape Hatteras, North Carolina (Posgay 1957, Squires 1962, Naidu & Robert 2006).

All scallop species have a highly aggregated (i.e. contagious) spatial distribution within their geographical range (Brand 2006). Localized, dense aggregations are referred to as beds. Some beds are essentially permanent, being fairly precise in their location and separated by clearly demarcated areas that are unsuitable for scallops, while others vary in their location from year to year, resulting from sporadic settlement or differences in early survival. The more permanent beds appear to be in areas where oceanographic features ensure a regular larval supply but suitable temperatures, food availability and substrate are also important (Sinclair *et al.* 1985, Thouzeau *et al.* 1991; Tremblay & Sinclair 1992). Not all suitable substrates support high densities of scallops. The major aggregations of sea scallops that support commercial fisheries are the inshore populations in coastal bays and estuaries along the coast of Maine in the USA and in the Bay of Fundy and southern Gulf of St Lawrence in Canada and offshore populations on the Mid-Atlantic Shelf, Georges Bank, Browns Bank, German Bank, Lurcher Shoals, Grand Manan, around Sable Island, Middle Ground, Banquereau Bank and on St Pierre Bank (Serchuk *et al.* 1982, Hart & Chute 2004, Naidu & Robert 2006). Of these, the Georges Bank fishing grounds, a resource shared between the USA and Canada, have traditionally been by far the most productive and have been exploited consistently for more than 50 years (Serchuk *et al.* 1979, Sinclair *et al.* 1985, Murawski *et al.* 2000). However, in recent years, the Mid-Atlantic grounds have increased in importance, sometimes contributing more than half of the USA total scallop catch (Naidu & Robert 2006). This rise in the Mid-Atlantic region is due in part to the closure of large areas of Georges Bank since December, 1994 to protect groundfish stocks (Murawski *et al.* 2000).

Sea scallops have separate sexes that can be differentiated by the colour of the gonads, which is creamy white in males and red in females. The onset of sexual maturity occurs at a very young age with mature gametes having been observed in one-year old females (Langton *et al.* 1987) and sea scallops have been reported to spawn during the second year (Naidu, 1970, MacKenzie 1979). Fecundity is high, with females producing 1-270 million eggs per individual (Langton *et al.* 1987), increasing rapidly with shell height. Individuals less than four years old contribute little to total egg production (MacDonald & Thompson 1985). Fecundity is generally greater in scallops from shallow water (10-20 m), where the food supply is typically greater and temperatures higher than in deep water (170-180 m) (MacDonald & Thompson 1986, MacDonald *et al.* 1987, Barber *et al.* 1988).

Spawning in Canadian waters generally occurs as a single peak in late summer or early autumn (August to October), but there is evidence of some additional winter or early spring spawning on Georges Bank (Almeida *et al.* 1994, Dibacco *et al.* 1995). The timing of spawning can vary with latitude, starting in summer in southern areas and in autumn in the northern areas but there are exceptions to this pattern with scallops off New Jersey spawning up to two months later than scallops from Newfoundland (MacDonald & Thompson 1988).

Sea scallops are broadcast spawners. At spawning, eggs and sperm are released into the water column

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where fertilization takes place. A rapid change of temperature, the presence of gametes from other scallops in the water, physical agitation, or tides may trigger sea scallop spawning (Parsons *et al.* 1992), which is often closely synchronised between individuals so that all scallops on a bed may go from completely ripe to completely spent in a few days (Posgay & Norman 1958, Posgay 1976). However, “dribble spawning”, where gametes are released over an extended period of time, has been reported in some sea scallop populations (Naidu 1970, Langton *et al.* 1987, MacDonald & Thompson 1988). Langton *et al.* (1987) suggest that year-class strength may correlate with the degree of spawning synchrony, rather than the absolute level of egg production.

The fertilized eggs develop first into ciliated trophophore larvae, then veliger larvae that continue to swim and filter feed in the water column for some 4-7 weeks, depending on temperature and food supply (Hart & Chute 2004). They then develop a foot and byssus gland and enter the pediveliger stage, searching the seabed for somewhere suitable to settle. Pediveligers can delay settlement for up to a month until a suitable substrate is encountered (Culliney 1974) when they secrete a number of byssus threads and attach to the seabed as spat (attached juveniles), rapidly taking on the adult characteristics of morphology, feeding and locomotion. Initial settlement of sea scallops can be on gravelly sand, small pebbles or shell fragments (Langton & Robinson 1990), or on filamentous plants and animals, many of which colonise the shells of adult scallops (Stokesbury & Himmelman 1995). Close associations have been reported with algae (Naidu 1970), hydroids and amphipod tubes (Larsen & Lee 1978) and bryozoans (Baird 1953, Caddy 1972), while Parsons *et al.* (1993) conclude that settling larvae actively select substrates with a high biofilm coverage. The availability of suitable settlement surfaces seems to be a primary requirement for successful scallop reproduction (Hart & Chute 2004) and spat settlement, and the period immediately after is considered to be a critical period in the formation of scallop beds (Posgay 1953) and in determining year-class strength (Bourne 1965, Caddy 1975).

Juvenile sea scallops retain the ability to secrete a byssus for several years, though they can detach the byssus, move and re-settle elsewhere. However, the proportion that is byssally-attached declines with age and the maximum size for frequent byssal attachment is about 110 mm shell height (5-6 years) (Caddy 1972). Sea scallops are very good swimmers when young, swimming actively to avoid predators or fishing gear (Brand 2006). While swimming, young scallops can be carried long distances downstream by currents (Baird 1954) but there is no evidence of mass migrations in this or any other scallop species (Hart & Chute 2004, Brand 2006). Since byssal attachment inhibits swimming (Caddy 1972), the retention of a functional byssus until the animal reaches quite a large size may serve to reduce dispersal of the highly mobile sea scallop away from favourable settlement areas (Minchin 1992).

Scallops are opportunistic filter feeders, utilizing food of both pelagic and benthic origin. Adult sea scallops filter sedimenting phytoplankton and microscopic zooplankton, resuspended benthic diatoms and organic detritus and bacteria from the bottom of the water column (Shumway *et al.* 1987). They are unable to efficiently filter very small particles (<about 7 µm) but can pump large volumes of water at relatively low metabolic cost, hence their preference for areas with relatively high current velocities and low suspended sediment concentrations. However, low concentrations of inorganic particles in the diet may be important in enabling sea scallops to utilize phytoplankton cells efficiently (Cranford & Gordon 1992). Scallop larvae filter feed but it has been suggested that they also utilize dissolved organic matter, absorbed through the tissues, as an additional minor source of nutrition (Marshall & Lee 1991).

Many populations of sea scallops can be reliably aged from prominent concentric growth rings on the left (upper) shell valve, which have been verified as annual in various studies (Stevenson & Dickie 1954, Posgay 1962, Naidu 1969, Tan *et al.* 1988). However, in some deeper water southern populations, and on heavily exploited grounds where frequent contact with fishing gears causes

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additional shock rings on the shell (Naidu 1975), the interpretation of shell rings can be difficult or sometimes impossible and it may be necessary to use growth bands in the resilium (hinge ligament) (Merrill *et al.* 1966). The oldest sea scallop recorded was 29 years old (Naidu & Robert 2006) but this is exceptional and was from an unexploited population; for exploited populations the maximum age is typically much lower. Sea scallops are first detected in surveys at 2 years old (about 40mm shell height) and now recruit to the commercial fishery at 4-5 years (90-105 mm shell height). The size and age at recruitment has increased somewhat in recent years, due to the introduction of 4-inch belly rings and the controlled exploitation of older scallops, but prior to the mid-1990s 3-year-old (70-90 mm shell height) scallops were common in landings. Growth rates of sea scallops are fast and between the ages of 3 to 5 years old shell height can increase 50-80% and meat weights can quadruple (NEFSC 2004, NEFSC 2007). Growth rates vary on different grounds; they are positively correlated with temperature and food supply and negatively correlated with depth, latitude and age.

When abundant, sea scallops can dominate the benthic biomass. Species groups with similar environmental requirements include molluscs, crustaceans, annelids and echinoderms (Thouzeau *et al.* 1991). A species of sea snail and juvenile red hake can live inside the shells of sea scallops, apparently without harm to the hosts. The gravel areas that commonly contain scallop beds are also important habitat for demersal fish such as yellowtail, haddock, cod and skate (Robert 2013b).

Sea scallops have numerous predators. During the pelagic phase, the larvae are eaten by larger zooplankton and planktivorous fish. After settlement, the principal predators are starfish, crabs, lobsters, predatory snails, octopus and various bottom feeding fish species (including cod, American plaice, wolffish and winter flounder) (Elner & Jamieson 1979, Barbeau & Scheibling 1994a, Barbeau & Scheibling 1994b). These animals prey particularly on smaller scallops and individuals >70 mm shell height are rarely preyed upon (Hart & Chute 2006).

3.3.2 Stock Assessments

3.3.2.1 Management Units

The offshore scallop fishery is managed by means of the geographical zones called Scallop Fishing Areas (SFA) shown in Figure 1, above. These are associated with the offshore banks as follows:

- St Pierre Bank (SFA 10, 11, and 12);
- Eastern Scotian Shelf (SFA 25);
- Browns and German Banks (SFA 26); and
- Georges Bank (SFA 27).

For Georges Bank, two sub-areas are distinguished: the shallower and more productive Georges Bank Zone 'a' and the deeper Zone 'b' (Figure 3). Since 1998, Brown's Bank has also been subdivided into the more productive North management area and the marginal South.

Genetic studies of scallops in the region (Beaumont & Zouros 1991, Kenchington *et al.* 2006) have suggested that the populations on the banks cannot be considered as a single randomly mating unit but the genetic differentiation is weak due to gene flow. Overall, these studies conclude that the geographic patterns of genetic variation are primarily due to currents promoting either retention or mixing of larvae, and the available data seem to indicate some genetic differences across the geographic area targeted by the ECOSF. However, because the fishery covers a large area, with regional variations in recruitment and growth, together with the practicalities of management, the beds are assessed and managed separately, with the major research effort dedicated to the main productive population on Georges Bank 'a'.

The scallop stocks on Georges Bank straddle the international boundary between the USA and

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Canada set up in 1984 and, since then, two very different systems for stock assessment and management have developed on either side of the boundary. Comparing the two management systems, Repetto (2001) concluded that the Canadian resource had been better maintained with lower fishing effort, and that the Canadian fishing industry had become more prosperous and innovative relative to that in the U.S. The extent to which scallop stocks in the Canadian fishery depend on the settlement of larvae arising in USA waters (and *vice versa*) has not been thoroughly established (Kenchington 2006). This could potentially be a management problem, but as both management systems have been successful in restoring stocks to high levels, it is not currently an issue.

3.3.2.2 Surveys and Reporting

With the exception of the Banquereau and St Pierre Banks the offshore scallop beds are surveyed annually by DFO with collaboration and funding from the fishing industry. Banquereau and St Pierre are considered to be marginal fisheries subject to sporadic pulse recruitment. As a result they are only exploited periodically and are surveyed less frequently than the other grounds.

Two annual surveys are funded by the fishing industry, in May and August; these gather information to assess the abundance and composition of the scallop stocks. Meat weight and shell height data obtained from scallop samples collected on the survey are used to convert from scallop numbers observed on the survey to scallop biomass. Additional data is also collected for studies of discards, scallop growth, condition and non-harvest mortality (see below).

The survey designs for Georges and Browns Bank for the 2014 stock assessments are described in detail in Hubley *et al.* (2014). For Georges Bank 'a', the main survey is carried out every August, and is augmented by monitoring some stations in May. The August survey was redesigned for the 2009 framework to be a stratified random design, where the strata are defined by the historical survey index from 1981 to 2008 (Hubley *et al.* 2009). The annual dredge survey on Browns Bank generally takes place in May or June. There has been some survey coverage on this Bank since the early 1980s but coverage on Browns North has only been consistent since 1990 (Hubley *et al.* 2011). The survey designs were initially stratified random designs with strata based on the commercial catch rates of the previous nine months (Robert and Butler 1998). In 2001, the stratification scheme was changed to bottom types based on analysis of multibeam data (Kostylev *et al.* 2001, Kostylev *et al.* 2003). However, following a review, it was changed again in 2013 to a design using fixed strata based on the historical commercial catch rate from 2002 to 2012. The surveys are used to provide in-season advice, and to identify areas where 2-year-old seed scallops are concentrated so that these can be protected until they have grown to a commercially viable size. The surveys of Georges Bank cover Zones 'a' and 'b', but the assessment is only conducted using data from Zone 'a'.

Estimating year-class strength at age 2 is problematic since these small scallops are not consistently retained in the survey due to their low catchability. However, in addition to surveys, the status of the resource is evaluated from trends in catch per unit effort (CPUE) from logbook and observer data, a meat weight index derived for standard 100 mm size scallops, and from meat counts and 100% landings coverage by dockside observers. In addition, since VMS systems are now installed on each vessel, accurate information on positions fished is also available.

Information on stock status for the various banks is presented to the DFO Regional Advisory Process (RAP) enabling peer review and opportunity for fishery managers and industry representatives to provide their information and knowledge (while the RAP is typically internally reviewed it can also include external review depending on the circumstances). For Georges Bank and Browns Bank, this information is the output of the quantitative stock assessment. A full stock assessment is conducted every three years, the last having been completed in 2013. In the interim years, a Science Advisory Report (SAR) is issued (e.g., DFO 2013a, DFO 2013b), the purpose of which is to update the key results from the previous assessment with data from the recent year in order to provide science advice

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for the management of the following year's fishery. The outcome of the science assessment is presented to the Offshore Scallop Advisory Committee (OSAC) and their informed views are taken into account.

DFO undertakes "framework assessment reviews", commonly on a five-yearly basis, within which they review, among other things, stock assessment methodology and data as well as ecosystem management considerations (e.g. Robert *et al.* 2000). Within this process external peer review is used to help ensure rigour, transparency and impartiality. The last framework assessment review was undertaken in February 2009.

3.3.2.3 Catch and Effort

Total landings from each of the fishing banks for the period 1990 to 2013 are shown in Table 2, together with the TAC in operation for that year. Since all scallops taken in the Canadian offshore fishery are shucked at sea, the weights given in this table and throughout this report, together with the TACs, are quoted as meat weights (adductor muscle only). From 1998 onwards, Georges Bank and Browns Bank were each divided into two different fishing areas, based on their productivity and historic fishing patterns, with Georges Bank 'a' and Browns Bank North being the more productive grounds and Georges Bank 'b' and Browns Bank South identified as marginal, lower productivity grounds. At the same time, Banquereau Bank was separated from the rest of the East Scotian Shelf. In addition to an annually set TAC, each of these fishing areas also has a set meat count regulation, reviewed annually, to account for differences in growth rates and condition between the grounds. Although there is considerably variation from year to year, Georges Bank 'a' is by far the most important area, accounting for an average of 84% of the annual ECOSF landings, with Browns Bank North providing an average of 8%, and the rest of the grounds together making up less than 10% on average in recent years.

Total catch, effort and catch per unit effort (CPUE) for the Georges Bank 'a' fishery for the period 1982 – 2012 is shown in Figure 5. Over this 30-year period, catches have varied in a cyclical manner, building up to highs of some 6,000t during periods of good recruitment, then falling to less than 2,000 t in period of average or poor recruitment. However, through this period, total effort has fallen substantially, while CPUE (expressed as kilograms of scallop meat per hours fished x width of gear in metres, kg/hm) has risen appreciably as scallop-fishing boats have become more efficient, mainly through technological developments that enabled them to target areas of seabed containing high density scallop aggregations. The spatial distribution of the fishery in 2012, expressed as tons of meats landed per one minute square is shown in Figure 6. The greater proportion of the catch comes from the northern portion of the bank, while the two industry-managed closed areas are clearly evident. Variability in the spatial distribution of catch, together with vessel differences and targeted fishing are factors that contribute to the high degree of within-year variability in catch rates evident in the standard errors in Figure 5.

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Table 2: Canadian scallop TACs and landings (meat weight in tons) for the different management units for the period 1990-2013.

(NB: Values here may be slightly different from those in Table 1 due to rounding errors).

Year	Georges Bank				Browns Bank				German Bank	
	TAC	Landed			TAC	Landed			TAC	Landed
1990	5,200	5,219			200	207				
1991	5,800	5,800			220	215				
1992	6,200	6,151			450	454				
1993	6,200	6,191			600	575			200	200
1994	5,000	5,003			1,400	1,403			600	600
1995	2,000	1,984			2,000	2,002			400	399
1996	3,000	2,995			750	743			100	91
1997	4,250	4,259			500	500			100	100
	Georges Bank 'a'		Georges Bank 'b'		Browns Bank (North)		Browns Bank (South)			
	TAC	Landed	TAC	Landed	TAC	Landed	TAC	Landed		
1998	3,200	3,191	800	800	500	500	100	99	300	301
1999	2,500	2,503	1,200	1,196	200	200	300	293	600	597
2000	6,200	6,212	600	601	750	748	200	200	600	599
2001	6,500	6,480	400	395	1,000	999	100	99	600	599
2002	6,500	6,469	200	192	650	649	100	98	800	797
2003	6,000	5,985	200	199	1,000	1,003	100	97	400	399
2004	3,500	3,518	200	200	2,000	2,007	200	185	400	401
2005	2,500	2,484	200	201	1,075	1,068	100	38	200	199
2006	4,000	3,931	200	162	1,050	912	100	14	600	601
2007	4,000	4,000	400	400	1,200	1,198	50	1	600	599
2008*	5,500	5,496	400	359	400	389	0	0	400	394
2009	5,500	5,524	350	261	0	0	0	0	?	?
2010	5,500	5,291	200	66	200	201	0	0	200	170
2011	4,500	4,517	0	0	1,000	1,027	0	0	150	126
2012	4,000	4,001	50	47	500	476	0	0	150	152
2013	5,000	4,999	100	108	750	749	10	0	150	144

Year	East Scotian Shelf				St. Pierre Bank		Totals for all SFAs	
	TAC	Landed			TAC	Landed	TAC	Landed
1990		434			150	152	5,550	6,012
1991		389			150	134	6,150	6,538
1992		524			150	67	6,800	7,196
1993		250			150	115	7,150	7,331
1994	150	116			150	49	7,300	7,171
1995	150	150			150	68	4,700	4,603
1996	175	175			50	18	4,075	4,022
1997	175	174			50	3	5,075	5,036
	East SS excluding Banquereau		Banquereau					
	TAC	Landed	TAC	Landed				
1998	355	265	50	51	50	0	5,355	5,207
1999	350	277	150	148	50	0	5,350	5,214
2000	200	195	150	147	50	4	8,750	8,706
2001	200	199	100	89	50	0	8,950	8,860
2002	250	178	100	5	50	0	8,650	8,388
2003	250	229	50	0	50	0	8,050	7,912
2004	250	246	50	0	250	251	6,850	6,808
2005	250	235	100	10	250	42	4,675	4,278
2006	150	140	100	0	195	5	6,395	5,766
2007	150	150	50	25	0	0	6,450	6,372
2008*	125	87	50	0	0	0	6,875	6,725
2009	75	33	0	0	0	51	6,125	6,065
2010	75	31	0	0	0	0	6,175	5,759
2011	75	27	0	0	0	0	5,725	5,697
2012	75	61	10	10	0	0	4,785	4,747
2013	100	88	0	0	0	0	6,110	6,110

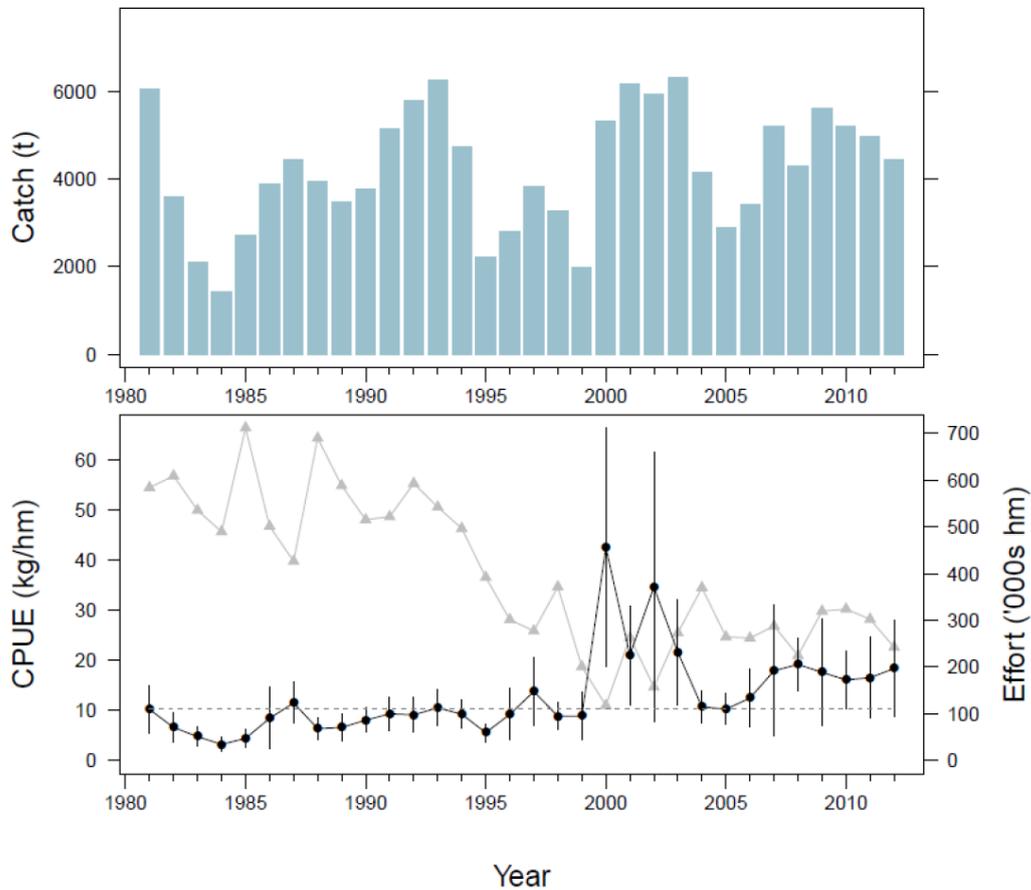


Figure 5: Catch, Effort and CPUE for Georges Bank 'a' during the survey year (September to August), for the period 1982 – 2012.
 NB: Upper graph shows annual landings in tons of meat (adductor muscle). Lower graph shows catch per unit effort (CPUE, black filled circles) and total effort (Effort, grey filled triangles). Vertical lines are ± 1 S.E. from the jackknife estimates of CPUE.
 (Source: Hubley *et al.* 2014).

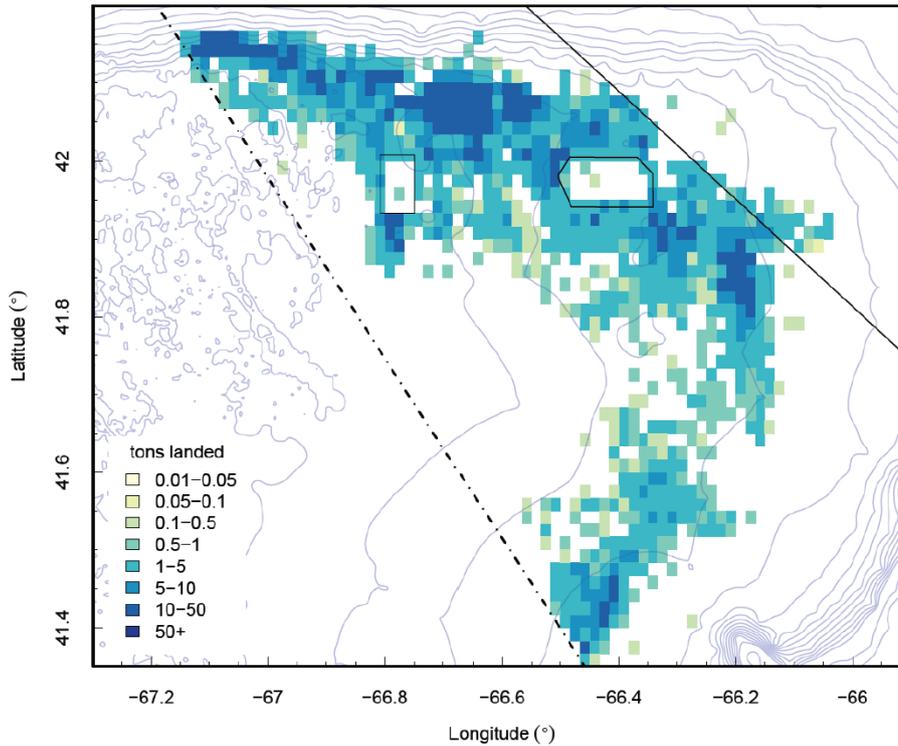


Figure 6: Georges Bank, 2012. Spatial distribution of commercial landings reported in fishing logs, summed for each one minute square.
 NB: Industry-managed closed areas in place in 2012 are also shown. Dashed diagonal line = ICJ line, solid diagonal line = Georges Bank 'a' and B dividing line.
 (Source: Hubley *et al.* 2014).

Catch, effort and CPUE on Browns Bank North over the period 1991 – 2012 followed a similar pattern to Georges Bank but with greater variability from year to year (Figure 7). Very high peak catches of more than 2,000t in 1995 and 2004 were followed by falling catches over the next 4 or 5 years to lows of some 200t. The spatial pattern of the fishery in 2012, expressed as tons of meats landed per one minute square (Figure 8), shows fishing concentrated in specific areas of high abundance around the former industry-managed closure areas. High levels of variability in catch rates are illustrated by the high standard errors, especially when low levels of effort resulted in high catch rates, i.e., 2003 and 2007 (Figure 7).

The fisheries on the other banks are generally much smaller than on Georges Bank 'a' and Browns Bank North (Table 1). On these grounds, catches show even greater variability between years, with occasional peaks following the recruitment of strong year-classes. In some years there have been substantial fisheries on Georges Bank 'b' (1,196t in 1999), German (797t in 2,002) and the East Scotian Shelf (524 in 1992), while Browns Bank South had a small but fairly regular fishery up until 2005, but thereafter there have been almost no landings (0.22 t in 2013). Banquereau and St Pierre are marginal fisheries subject to very sporadic pulse recruitment followed by a short period of exploitation.

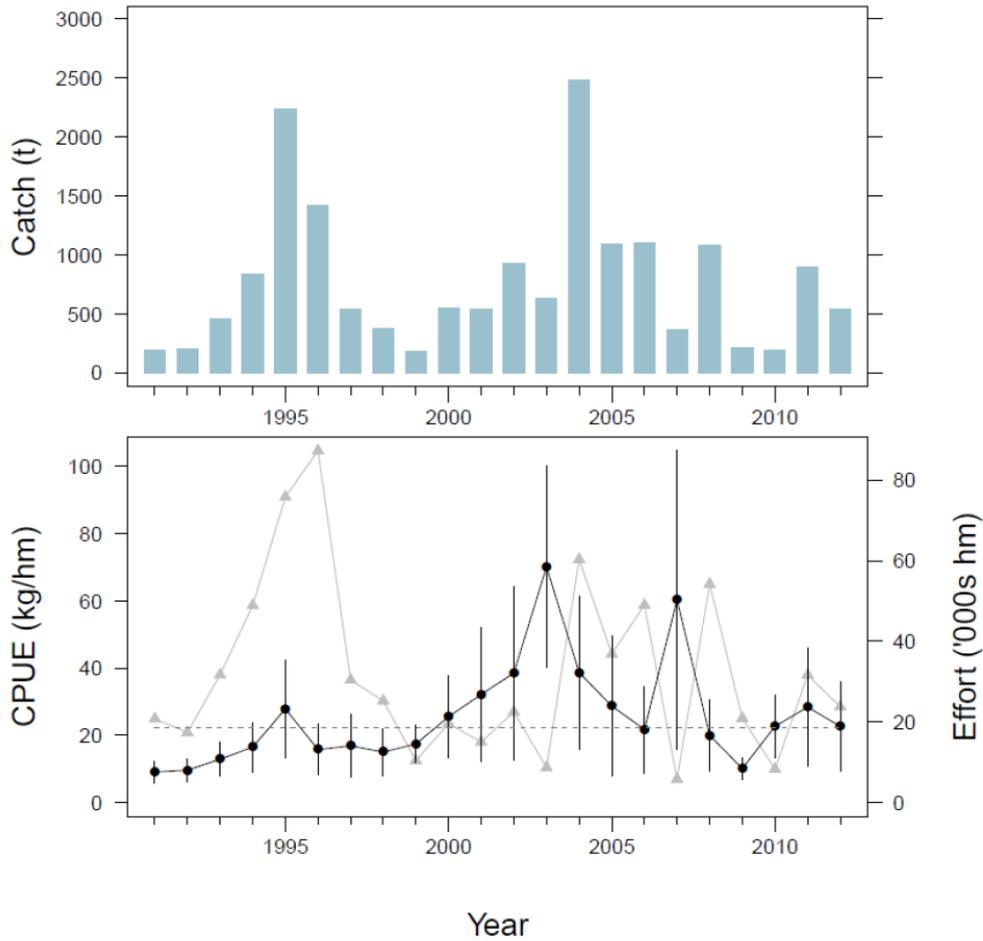


Figure 7: Catch, Effort and CPUE for the Browns Bank scallop fishery, during the survey year (June-May) for the period 1985-2012.
 NB: Upper graph shows annual landings in tons of meat (adductor muscle). Lower graph shows catch per unit effort (black filled circles) and total effort (grey filled triangles). Vertical lines are ± 1 S.E. from the jackknife estimates of CPUE.
 (Source: Hubley *et al.* 2014).

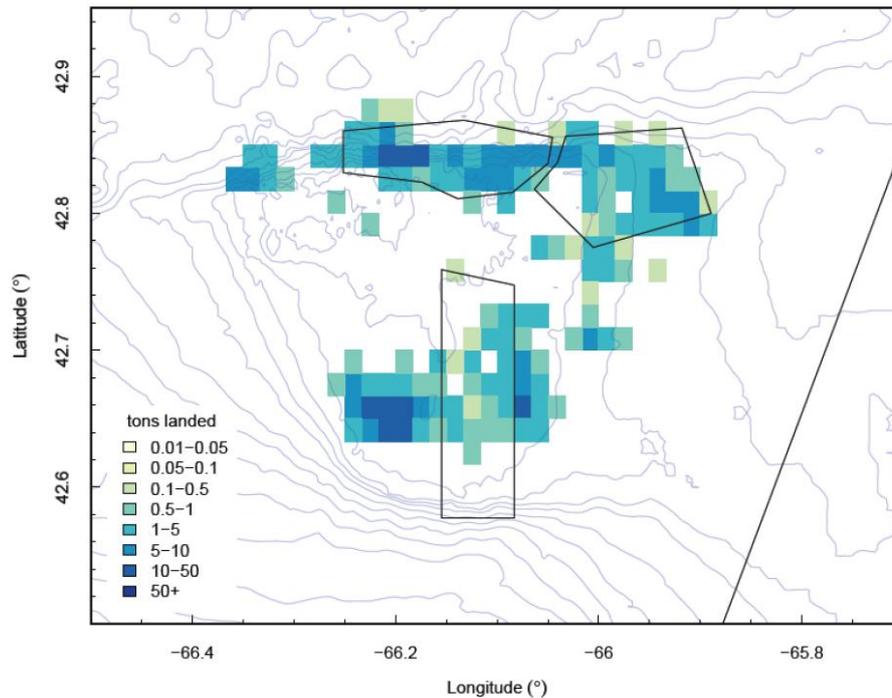


Figure 8: Browns Bank, 2012. Spatial distribution of landings reported in commercial fishing logs, summed for each one minute square.
 NB: Industry-managed closed areas that were in place in the past are also shown.
 (Source: Hubley *et al.* 2014).

Survey Biomass and Abundance Trends

Scallop biomass on the offshore banks is determined from the annual dredge surveys. The August survey on Georges Bank was redesigned in the 2009 framework to be a stratified random design, where the strata are defined by the historical survey index from 1981 to 2008 (Hubley *et al.* 2009). The historical survey index was used to create four strata indicating low, medium, high and very high abundance, and the latter three strata were further divided into north and south of Latitude 41°50' so that in total there are seven strata. These strata have remained unchanged with the exception of the low strata, which was modified to represent areas where the historical survey index was between 50 and 115 scallops per tow as opposed to its original definition of 10 to 115 scallops per tow. This was done to reduce the amount of sampling that was done in areas where scallop density was too low to support a fishery. Scallop abundance for the August 2012 Georges Bank 'a' survey (Figure 9) shows the typically patchy distribution on a large spatial scale.

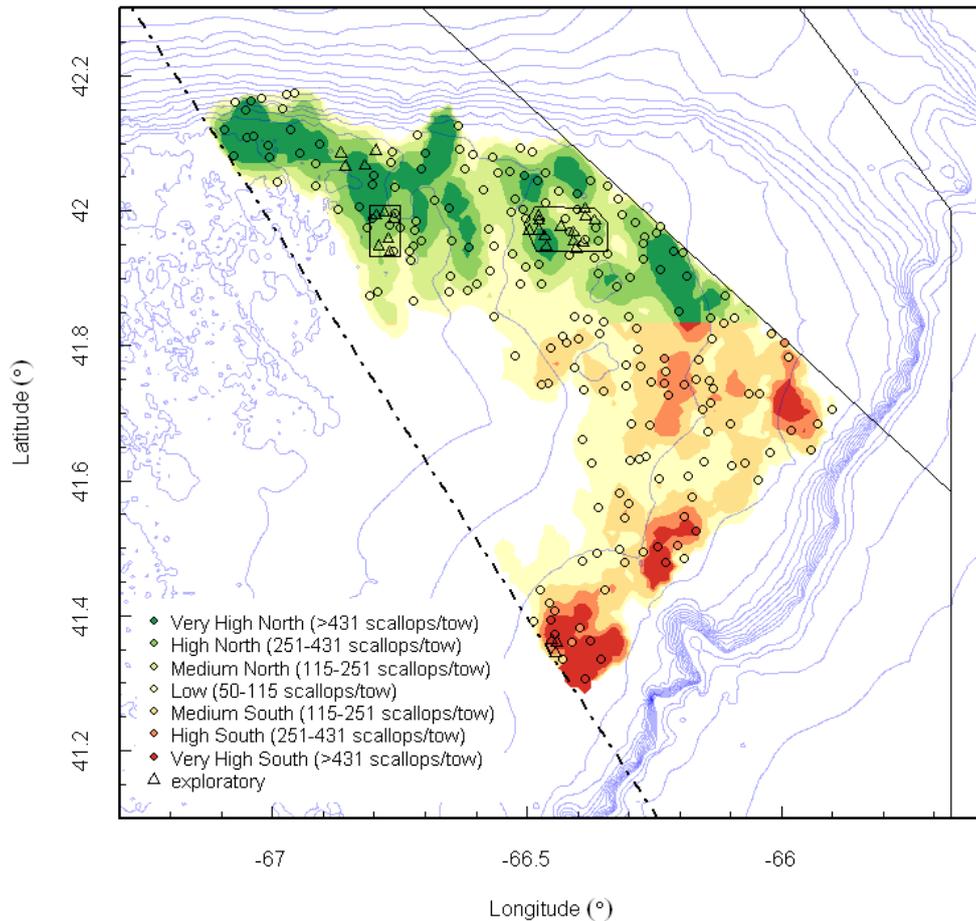
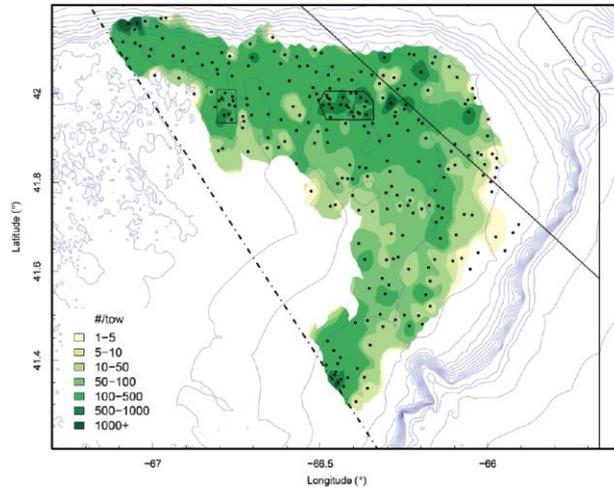
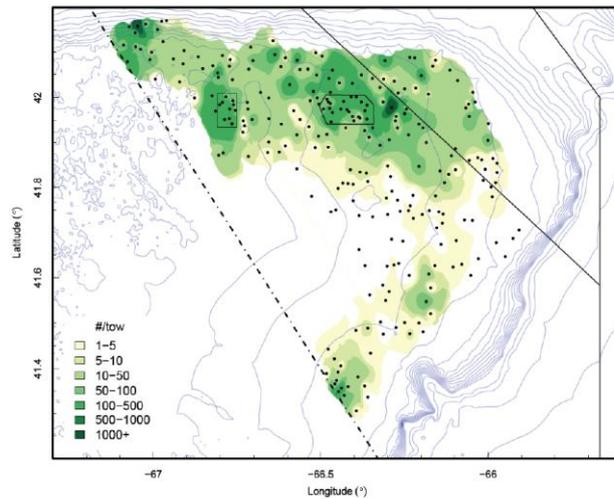


Figure 9: Scallop abundance for Georges Bank 'a' in August 2012. NB: Main survey stations (open circles) were allocated using a random stratified design based on the historical survey index. Exploratory survey stations (open triangles) and industry-managed closed areas are also shown. (Source: Hubley *et al.* 2014).

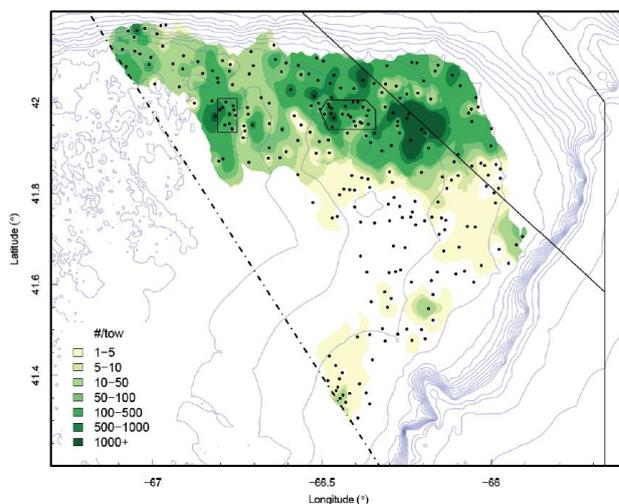
When the distribution patterns from the 2012 survey are analysed for scallops of different size groups (Figure 10), fully-recruited scallops (>95 mm shell height) were found throughout the survey area with moderately higher abundances in the northern portion of the bank (Figure 10A). There were also a few small, localized patches of very high abundance (>500 scallops per tow) in the industry-managed closure areas, northwest corner and near the Georges a/b line. The recruit scallop (85-95 mm shell height) distribution pattern shows a concentration in the northern portion with only a few patches of recruits in the south (Figure 10B). Again, the highest concentrations were found in the industry-managed closure areas, in the northwest corner and near the a/b dividing line. Similarly, the pre-recruits (<85 mm shell height) were found almost exclusively in the northern portion of the bank with very high concentrations located near the a/b line (Figure 10C). These distribution patterns show that while the northern part of Georges Bank consistently maintains high scallop abundance, there is considerable spatial and temporal variability in recruitment.



A). Fully recruited (≥ 95 mm shell height) scallops



B). Recruit (85-95 mm shell height) scallops



C). Pre-recruit (<85 mm shell height) scallops

Figure 10: Distribution of scallops from the survey of Georges Bank, August 2012. A). Fully-recruited (≥ 95 mm shell height), B). Recruit (85-95 mm shell height), C). Pre-recruit (<85 mm shell height). NB: Inverse distance weighted interpolation was used on the standardized number of scallops per tow to produce a contoured colour image. Industry-managed closure areas that were in place during 2012 are shown. (Source: Hubley *et al.* 2014)

3.3.2.4 Condition, growth, recruitment and non-harvest mortality

Following the implementation of an analytical population model for Georges Bank considerable efforts have been made in recent years to improve the quality of data inputs for the model, particularly with regard to scallop condition, growth, recruitment and non-harvest mortality.

With catches in the offshore scallop fishery recorded as meat weights, the condition factor (simplified by Hubley *et al.* (2011) to the meat weight divided by the cube of shell height) is useful because it expresses the changing weight-height relationship in a single metric that can be compared across various potential factors such as year, depth and location. The spatial pattern of condition on Georges Bank shows a strong correlation with depth, with the highest conditions found in the shallower areas of the northwest part of the bank and lowest conditions found in the deeper areas of Georges Bank 'b' (Figure 11). These show a very similar spatial pattern to the bottom temperature data, which shows overall colder temperatures in 2011 compared with 2012 (Figure 12). The time series of changes in condition from 1985-2012 (Figure 13) vary considerably from year to year, with relatively consistent trends in both the May and August survey samples.

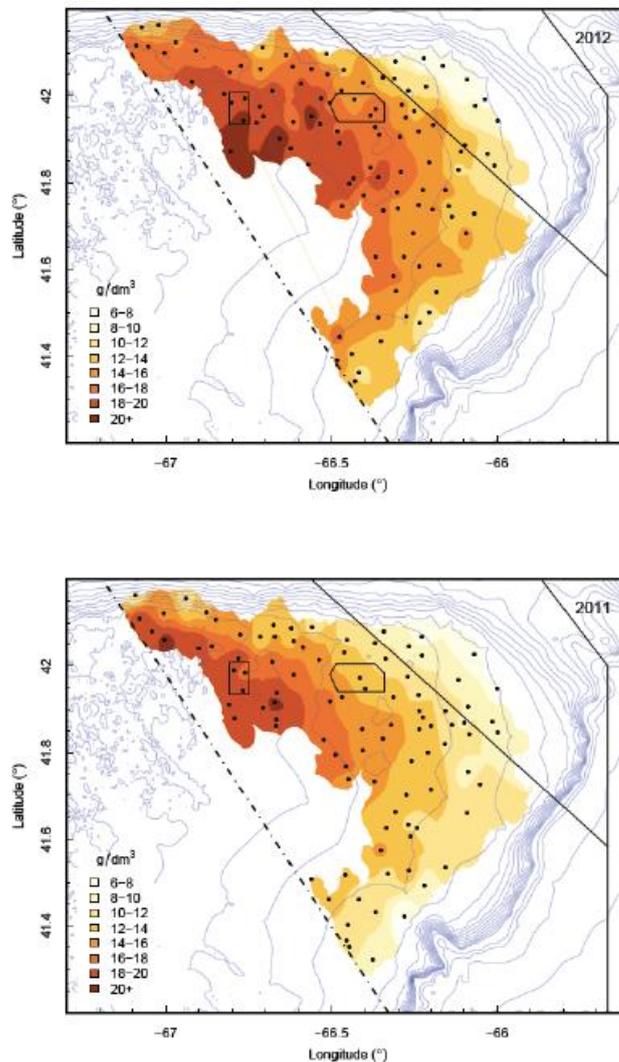


Figure 11: Spatial distribution of condition factor (g/dm³) from the August survey on Georges Bank for 2012 (upper figure) and 2011 (lower figure). (Source: Hubley *et al.* 2014).

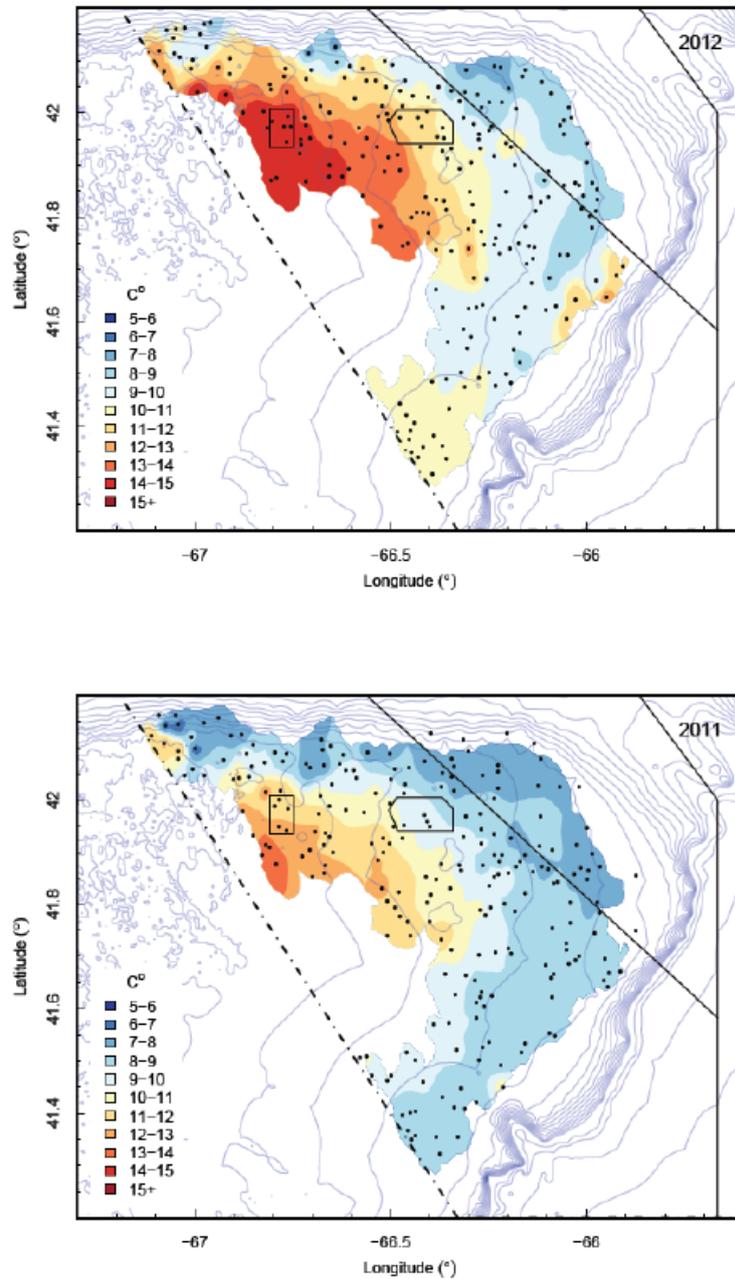


Figure 12: Spatial distribution of bottom temperature (C°) from the August survey on Georges Bank for 2012 (upper figure) and 2011 (lower figure). (Source: Hubley *et al.* 2014).

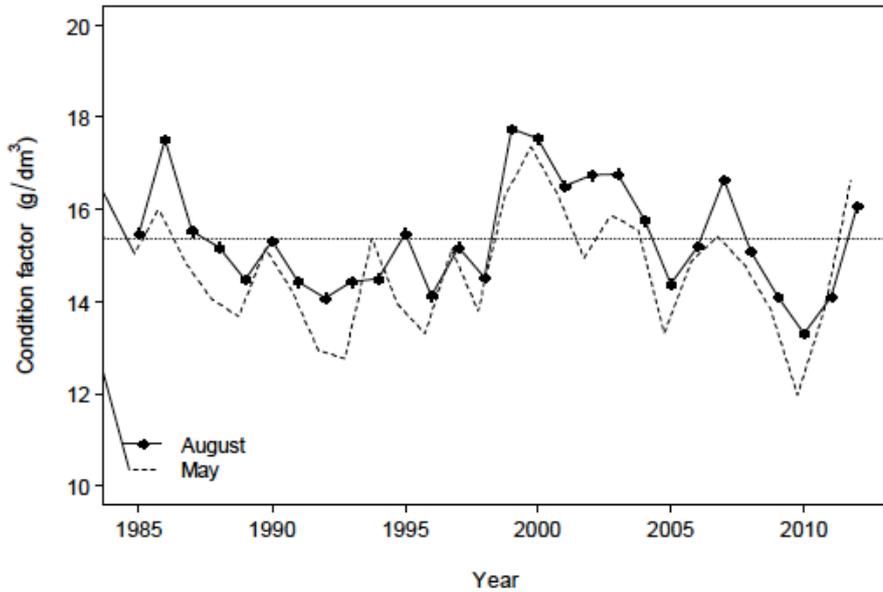


Figure 13: Trends in condition factor (g/dm^3) from the annual August and May surveys of Georges Bank, from 1985 – 2012 (Source: Hubley *et al.* 2014).

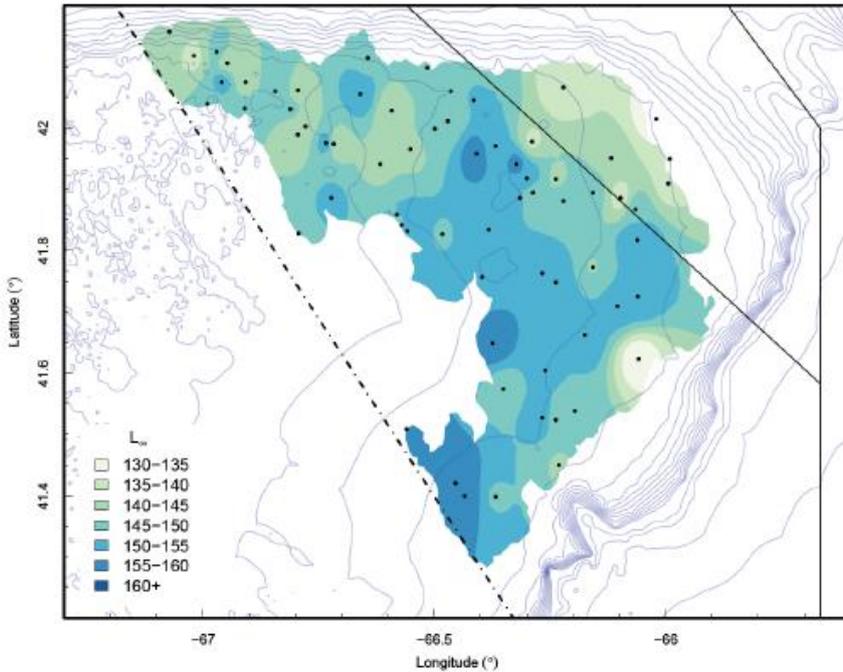


Figure 14: Spatial pattern of the asymptotic shell height parameter (L_{∞}) from age data collected on the August survey on Georges Bank for 2009-2012, showing growth to a greater maximum length in the south. (Source: Hubley *et al.* 2014).

Growth also varies substantially, both spatially and temporally. Rather unexpectedly, shell growth on Georges Bank did not mirror the pattern of condition, which closely matched the spatial patterns of temperature and depth. Unlike condition, shell growth appears to be slower in the north than in the south (Figure 14). Previous assessments for Georges Bank (Robert *et al.* 2000, Jonsen *et al.* 2009) used the von Bertalanffy growth parameters from Brown *et al.* (1972), but these were not directly applicable as they were out-dated, derived from limited samples from the US side of Georges Bank and estimated without the use of modern nonlinear statistical methods. Following the 2009 framework meeting (DFO 2009c) a new ageing programme was established that included the recording of shell height at each annulus. A non-linear mixed effects model fitted to the new data resulted in a significantly different growth curve (Figure 15).

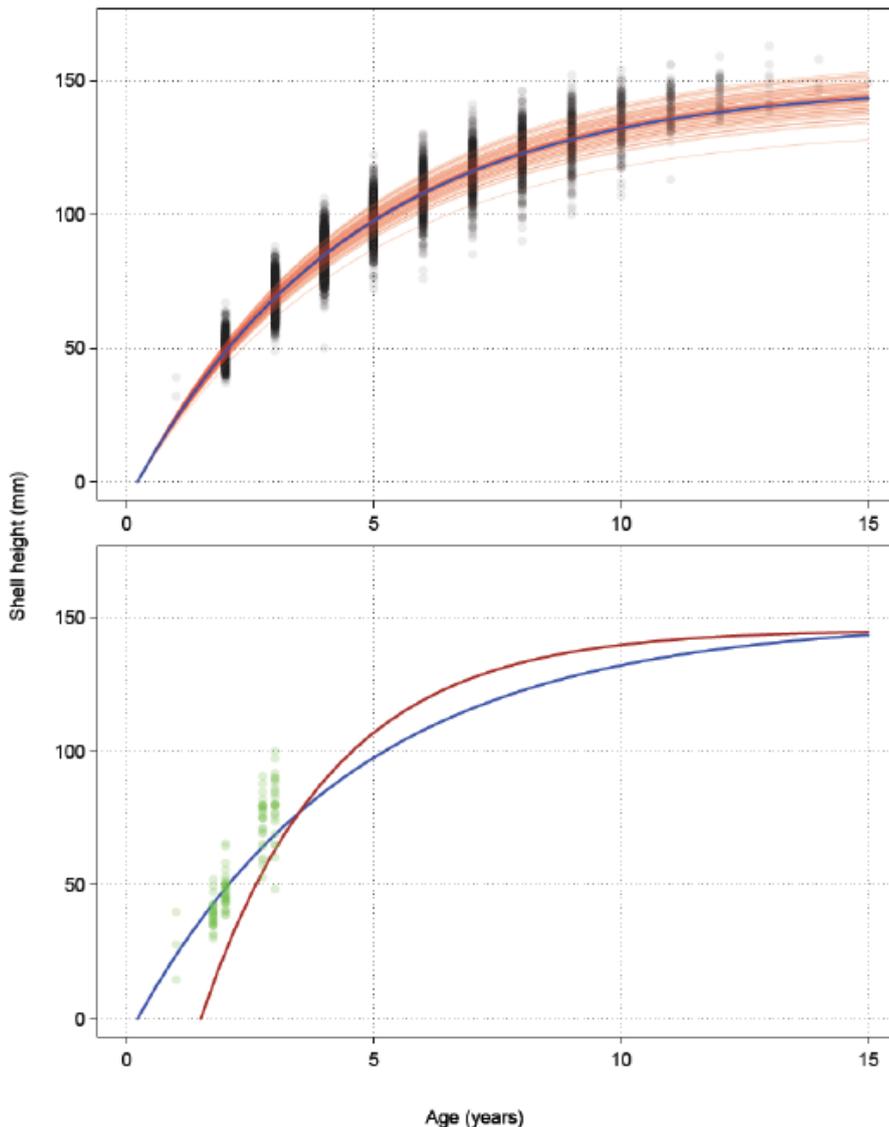


Figure 15: Von Bertalanffy model fitted to scallop shell height data (ages 1-15) for scallops collected from Georges Bank, 2009 – 2012.

NB: Georges Bank August survey data for 2009-2012 (blue line), with station as a random effect (upper) compared to shell height frequency modes at age (green points) and a growth curve from Brown *et al.* (1972) (red line). (Source: Hubley *et al.* 2014).

The new growth parameters are now used for input into the population model but, because they differ so strongly from the old parameters for scallops of less than commercial size, their use has important implications for the definition of the recruit shell height size range. The recruit size range is generally defined as the scallops that will reach commercial size within one year. With the old parameters this was considered to be scallops with shell heights of 75-95 mm but, under the new parameters, the recruit size range is now 85-95mm. The consequences on recruitment are illustrated by the shell height frequencies in Figure 16, where the old definition of recruits is shown by the red dashed line.

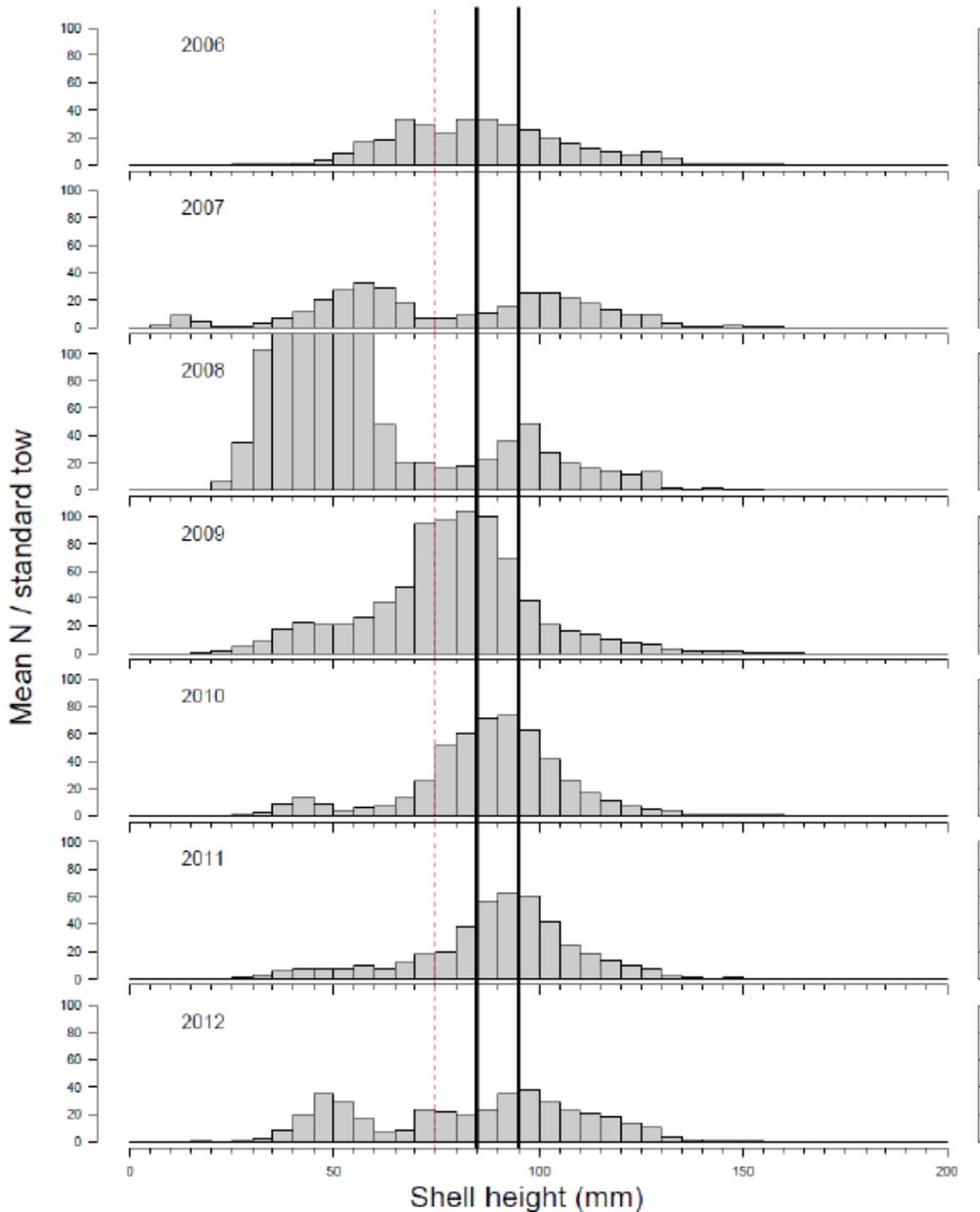


Figure 16: Shell height (mm) frequency plot showing the mean number (N) of scallops per standard tow (800 m x 2.44 m drag) from August survey of Georges Bank 'a' (2006-2012) for each 5 mm bin. NB: Vertical lines divide the pre-recruit, recruit and fully-recruited size classes. Red dashed line is for recruitment defined using the old growth parameters from Brown *et al.* (1972). (Source: Hubley *et al.* 2014).

A smaller size range for recruit scallops means that there is an overall decrease in the numbers of recruits in the time series as those scallops are now considered to be pre-recruits, while the number of commercial size scallops does not change (Figure 17).

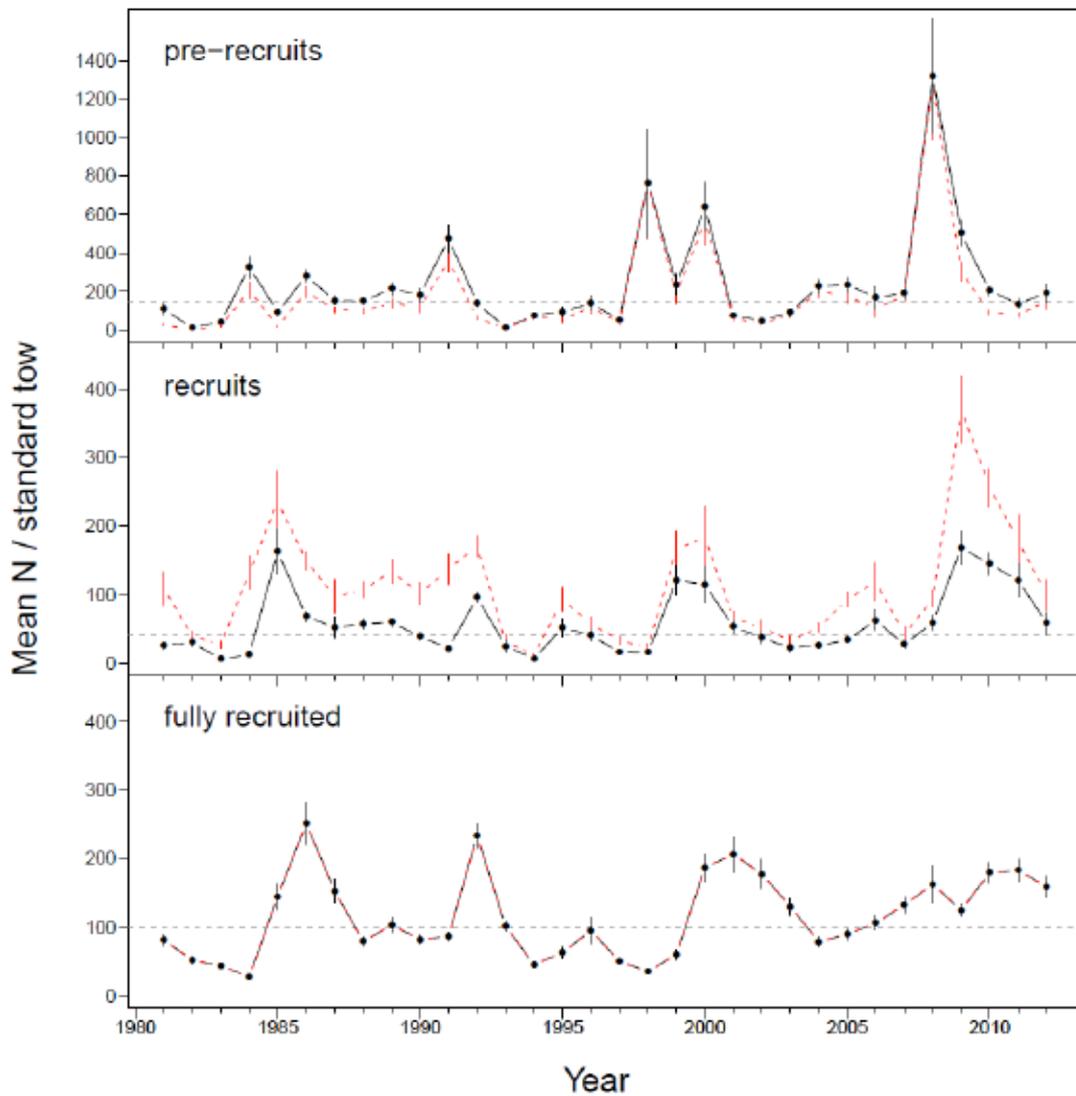


Figure 17: Stratified mean abundance per standard tow (800 m x 2.44 m drag) of scallops from Georges Bank 'a' (1981 – 2012) for pre-recruits (upper graph), recruits (middle graph) and fully-recruited (lower graph).
 NB: Horizontal dashed lines are the long-term medians and vertical lines are 1 S.E. Red dashed line is for the recruitment defined using the old growth parameters from Brown *et al.* (1972).
 (Source: Hubley *et al.* 2014).

Intertek Fisheries Certification (IFC)

Similar data on condition, growth and recruitment are collected on the annual Browns Bank surveys for input into the population model for this bank. The spatial pattern of condition on Browns Bank is not as strongly correlated with depth as it is on Georges Bank, for while high condition scallops were found in the central part of the bank where it is relatively shallow, significantly higher conditions were found along the northern edge compared to areas of similar depth along the southern edge (Figure 18).

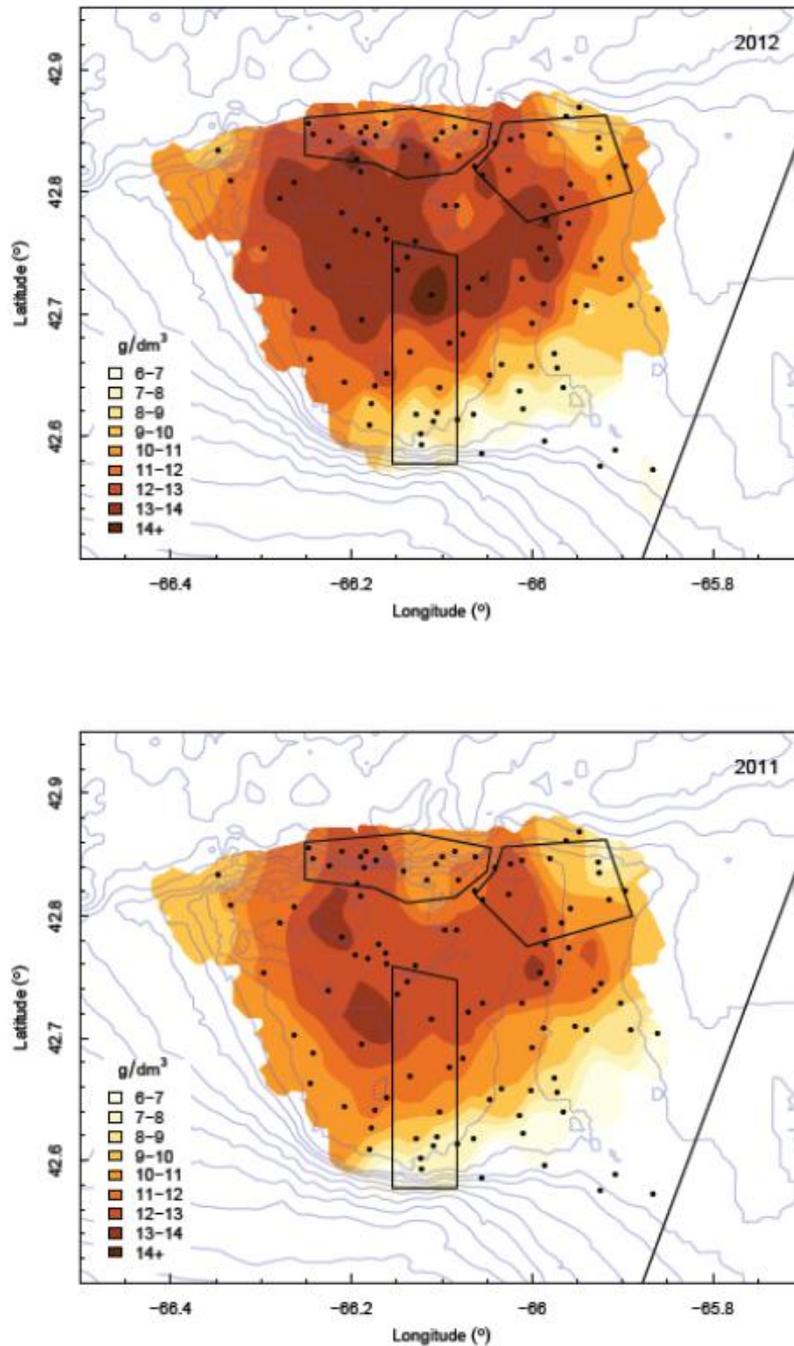


Figure 18: Spatial distribution of condition factor (g/dm³) from the May survey on Browns Bank north for 2012 (upper figure) and 2011 (lower figure). (Source: Hubley *et al.* 2014).

Intertek Fisheries Certification (IFC)

Bottom temperature data collected on the survey did not show any pattern consistent with depth or condition so the factors controlling condition on Browns Bank appear to be more complex than for Georges Bank. The time series of annual changes in condition (1991 – 2012) show considerable variation over time, with peaks in 1994 and 2000, but condition has remained below the long-term mean since 2007 (Figure 19).

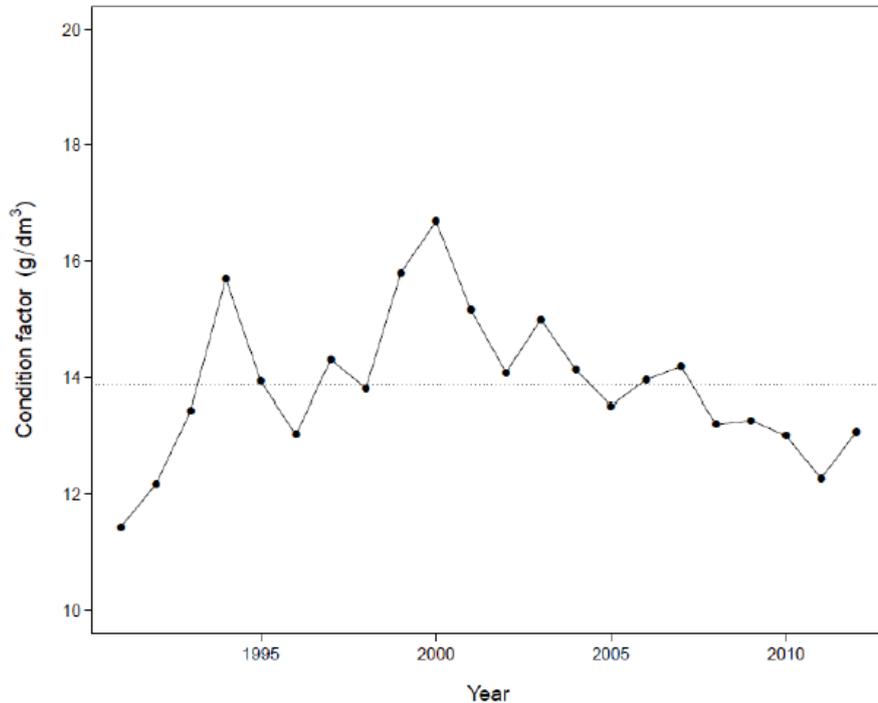


Figure 19: Browns Bank North trend in condition factor (g/dm³) from the annual May surveys (1991 – 2012).

NB: Horizontal dotted line is the long-term mean.

For Browns Bank the von Bertalanffy growth parameters used in the 2013 stock assessment (Hubley *et al.* 2014) differed from those used previously (Hubley *et al.* 2011) as they were based on new samples taken in 2012 but both data sets produced similar growth curves so using the new data had negligible effect on the model. The annual shell height frequencies for the period 2007 – 2012 show the very strong 2005 year-class in the 15-50 mm size range in 2007, starting to recruit in 2009 and mainly in the fully-recruited 85-115 mm size range in 2012 (Figure 20).

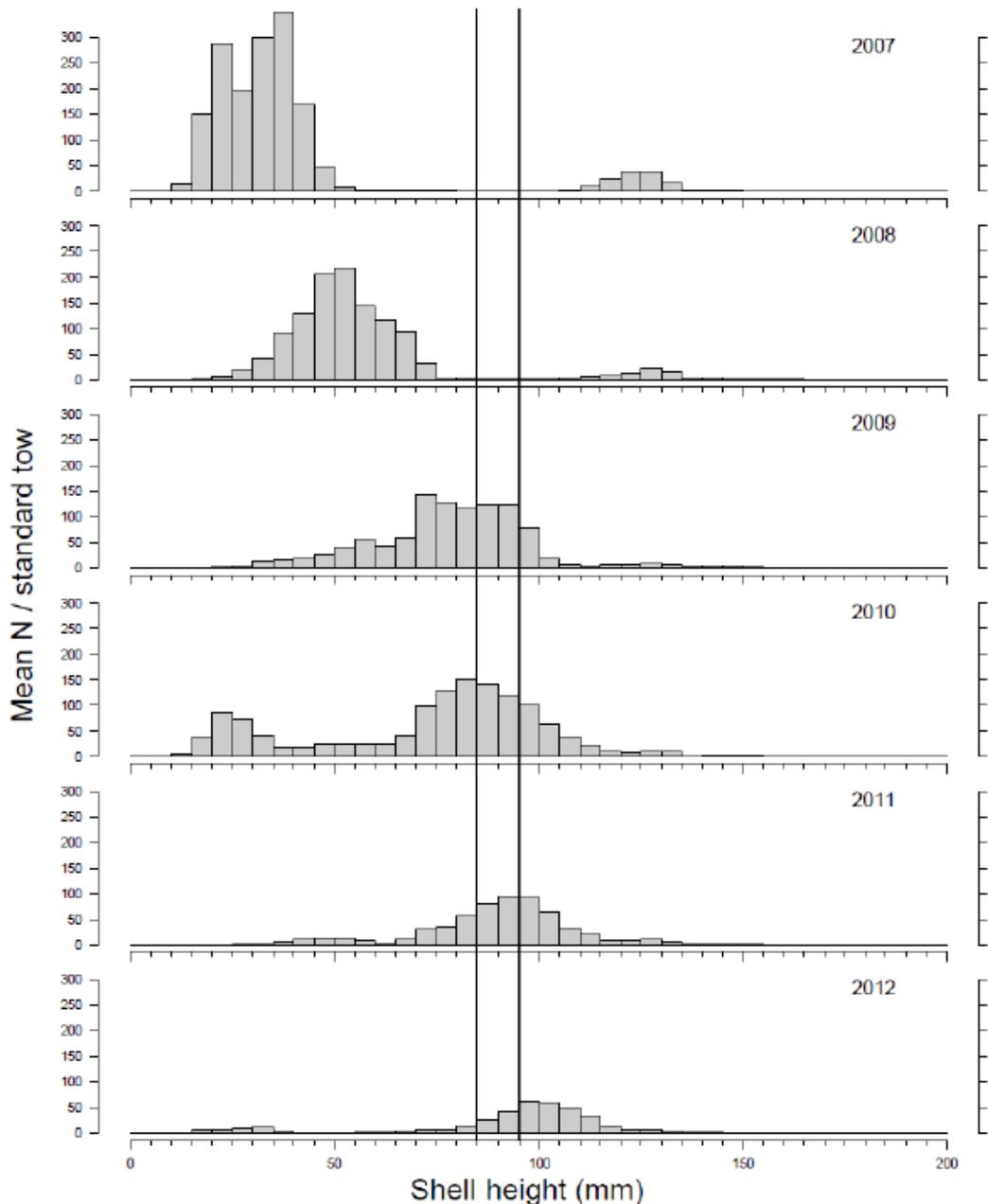


Figure 20: Shell height (mm) frequency plot showing the mean number of scallops per standard tow (800 m x 2.44 m drag) from the spring survey of Browns Bank North (2007-2012) for each 5 mm size group.

NB: Vertical lines divide the pre-recruit, recruit and fully-recruited size classes.

(Source: Hubley *et al.* 2014)

The change in stratification scheme used for the Browns Bank surveys resulted in some minor changes to the survey indices of abundance for pre-recruits, recruits and fully recruited scallops (Figure 21). There have been three major recruitment events on Browns Bank North since 1991, each leading to a peak in commercial biomass that has sustained the fishery until the next recruitment. The abundance of fully-recruited scallops has remained fairly stable since 2010 at just above the long-term median level.

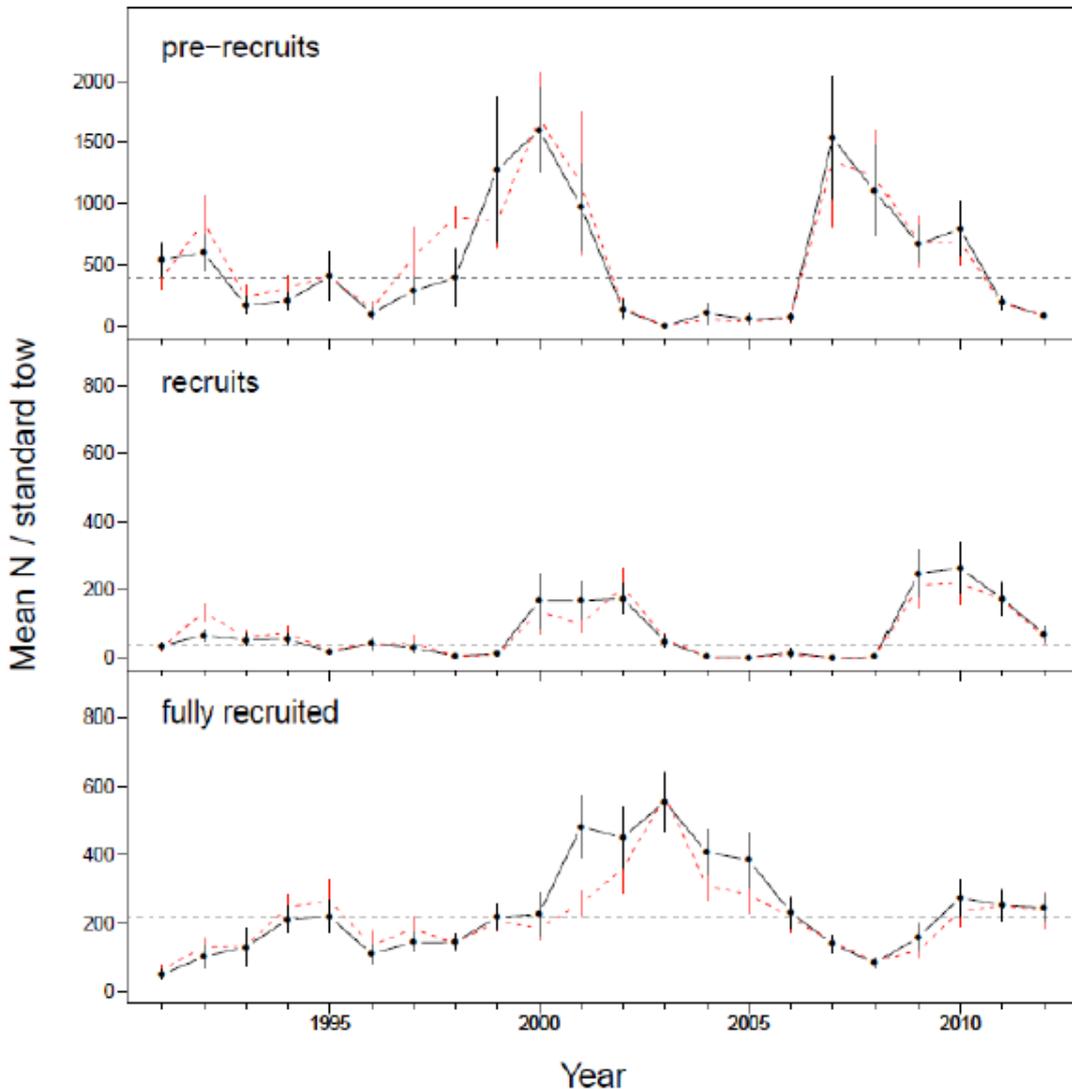
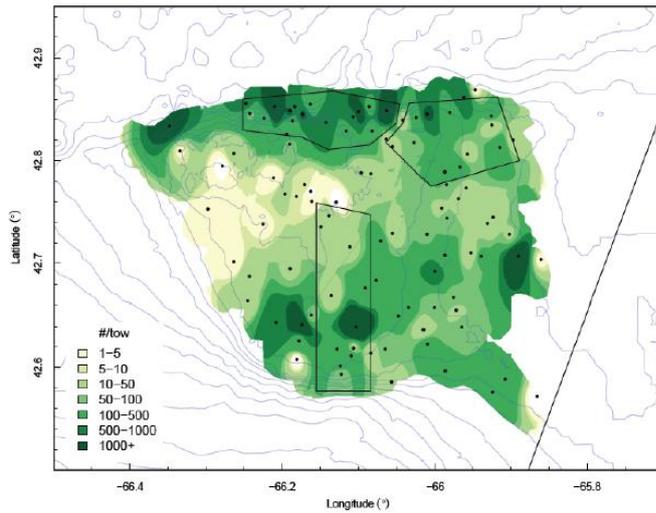
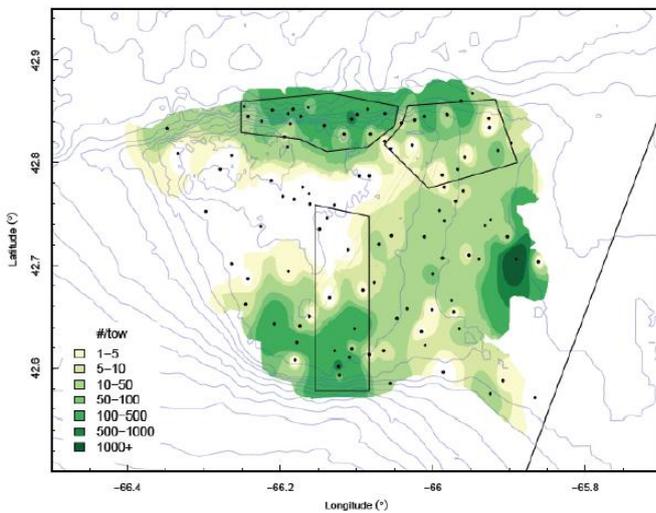


Figure 21: Stratified mean abundance per standard tow (800 m x 2.44 m drag) of scallops from Browns Bank North (1991 – 2012) for pre-recruits (upper graph), recruits (middle graph) and fully-recruited (lower graph).
 NB: Horizontal dashed lines are the long-term medians and vertical lines are 1 S.E. Red dashed line represents the indices using the bottom type stratification scheme used previously
 (Source: Hubley *et al.*, 2014)

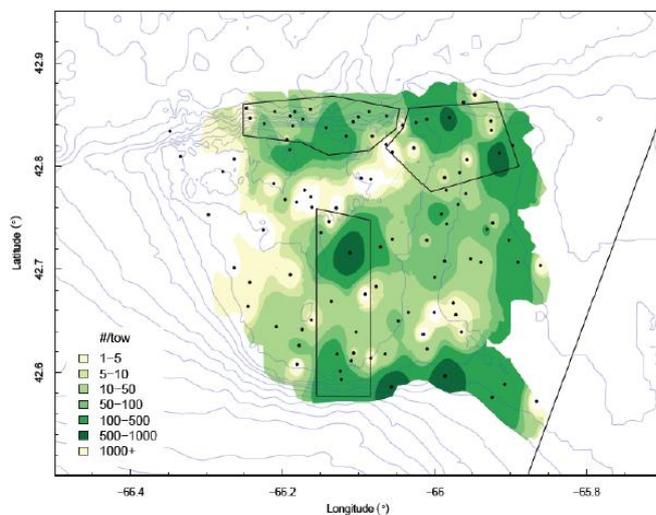
Scallop distribution patterns from the 2012 survey show high abundances of fully-recruited scallops (>95 mm shell height) in areas noted for historically higher catch rates and recent fishing activity (Figure 22A). Substantial abundances of recruits were found in the southern area, in the northwestern box known as ‘Happy Valley’ and in one tow to the east, but no recruits were present in the central part of the bank (Figure 22B). Pre-recruits were found in isolated patches on the southern edge, in the middle of the bank and in the box east of ‘Happy Valley’ but there were no large concentrations (Figure 22C).



A). Fully-recruited (>95 mm shell height)



B). Recruit (85-95 mm shell height)



C). Pre-recruit (<85 mm shell height)

Figure 22: Distribution of scallops from the survey of Browns Bank North, May 2012. A). Fully-recruited (≥ 95 mm shell height), B). Recruit (85-95 mm shell height), C). Pre-recruit (<85 mm shell height).

NB: Inverse distance weighted interpolation was used on the standardized number of scallops per tow to produce a contoured colour image. Recent industry-managed closed areas are shown. (Source: Hubley *et al.* 2014)

Intertek Fisheries Certification (IFC)

The rate of natural mortality is one of the most difficult parameters to estimate and in past assessments in the Canadian offshore scallop fishery it has been assumed to be 0.1 (Jonsen *et al.* 2009, Robert *et al.* 1994, Robert *et al.* 2000). However, as pointed out by Hubley *et al.* (2014), the term ‘natural mortality’, as used in population modelling studies, is really a catch-all term that includes discard mortality resulting from undersized scallops returned to the sea and incidental mortality associated with contact with gear on the seabed but not being retained in the catch, as well as mortality from predators and other ‘natural’ causes. For this reason, natural mortality that includes these other factors is more accurately termed non-harvest mortality.

Failure to account for all the major sources of fishery related mortality resulted in a condition being placed on the fishery in the 2010 MSC certification assessment (Caddy *et al.* 2010). To meet this condition the client was required to ensure that by the 4th annual audit all major sources of fishery related mortality, including landings, fishing effort, discards, incidental mortality and mortality of juveniles are accurately recorded/estimated for most fleets and most parts of the stock. New studies were commenced on discard rates, and non-harvest mortality was estimated using an index of dead scallop shells still attached at the hinge (the so-called ‘clapper’ index) the collection of which was incorporated into the surveys so that, in the event, the MSC condition was met at the 3rd annual audit. Non-harvest mortality, and its uncertainty, has now been incorporated into the assessment models for Georges Bank 'a' and Browns Bank North, the two main fisheries (DFO 2013a, DFO 2013b), so these assessment models now account for the lack of reliable information with regard to mortality resulting from discards, incidental fishing and natural sources. However, work still needs to be done for some of the offshore grounds where there has been little or no fishing in recent years.

3.3.2.5 Analytical Model

Until 2007, the status of the Georges Bank scallop stock was assessed using a cohort analysis tuned to a commercial catch rate-stratified survey index and a commercial catch per unit effort index (DFO 2006a). This model suffered both from strong retrospective effects, which resulted in inconsistent estimates of biomass from year to year, and from a lack of recent, reliable ageing data, that were required to construct the catch-at-age matrix. Georges Bank scallops are difficult to age reliably, due primarily to the high prevalence of shock marks that are difficult to distinguish from annual growth rings. Consequently, an alternate population model that placed less reliance on ageing data was thought to be required for assessment of this stock.

At the framework meeting in February 2009 a new stock assessment model, based on the delay-difference model of Quinn and Deriso (1999), was reviewed and accepted (Jonsen *et al.* 2009). Delay-difference models have separate parameters to describe growth, recruitment and mortality and thus retain much of the biological realism contained in fully age-structured models (DFO 2009). With recent improvements described in Hubley *et al.* (2013, 2014), the model has been fitted to the annual survey and commercial catch rate indices for Georges Bank 'a' from 1986 to 2013 to estimate commercial biomass and exploitation, as well as to provide current biomass projections and harvest scenarios. The improvements include considering fishery data between surveys (September in year t to August in year $t+1$), and incorporating standard errors from the indices into estimates of observation error in the model. Non-harvest mortality, and its uncertainty, is now estimated using an index of dead scallops (paired shells or ‘clappers’) from the survey, effectively accounting for the lack of reliable information with regard to mortality resulting from discards, incidental fishing and natural sources. Temporal and spatial variability in growth and condition are also included in the growth estimates, along with new growth parameters from recent age data. The aim of these modifications is to improve the assessment by incorporating more of the available data. The improved data inputs and the way in which error is now carried through from the survey into the model (Hubley *et al.* 2014) has led to the model for both Georges Bank 'a' (Figure 23) and Browns Bank North (Figure 24) fitting very closely to the survey data and less so to the commercial catch rate due to their much larger standard errors.

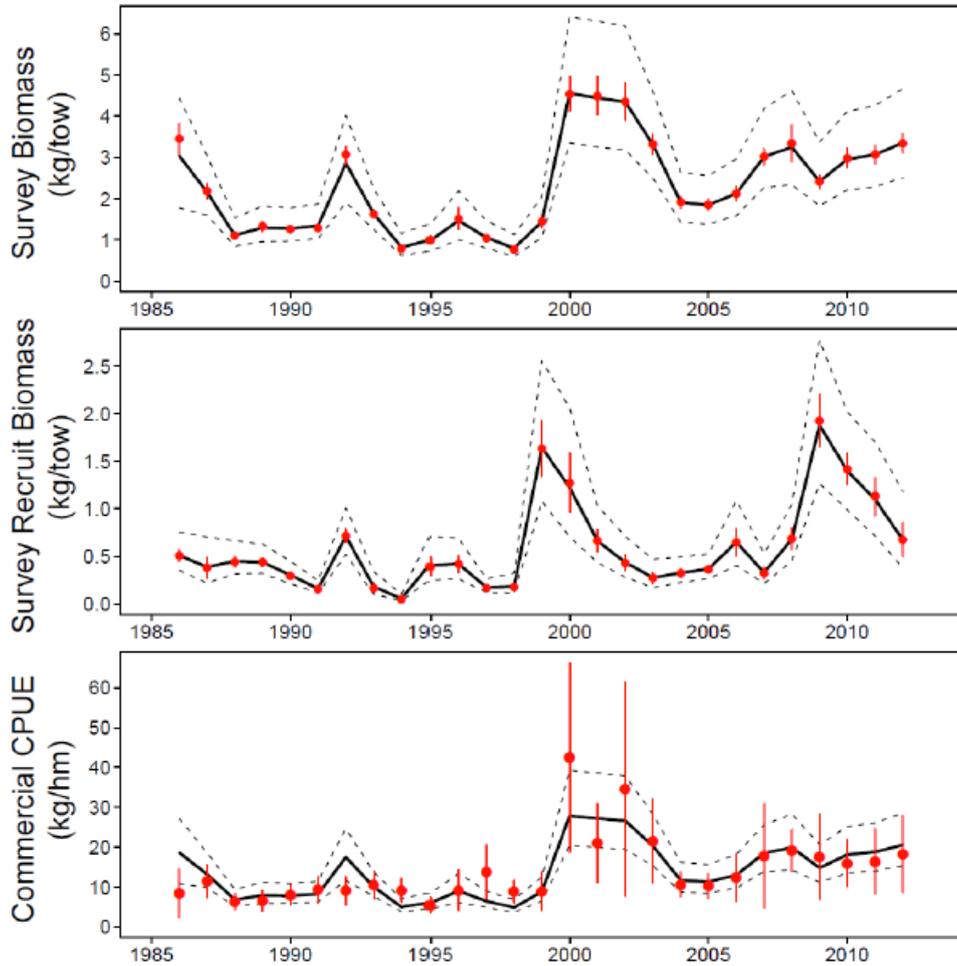


Figure 23: The stock assessment model fitted to observed biomass indices for Georges Bank 'a'
 NB: Top graph = survey biomass, kg/tow, middle graph = survey recruitment biomass, kg/tow,
 lower graph = commercial CPUE, kg/hm. Dotted lines represent 95% credible limits and vertical
 error bars are ± 1 S.E. Red dots are observations, while the black line represents the model output.
 (Source: Hubley *et al.* 2014).

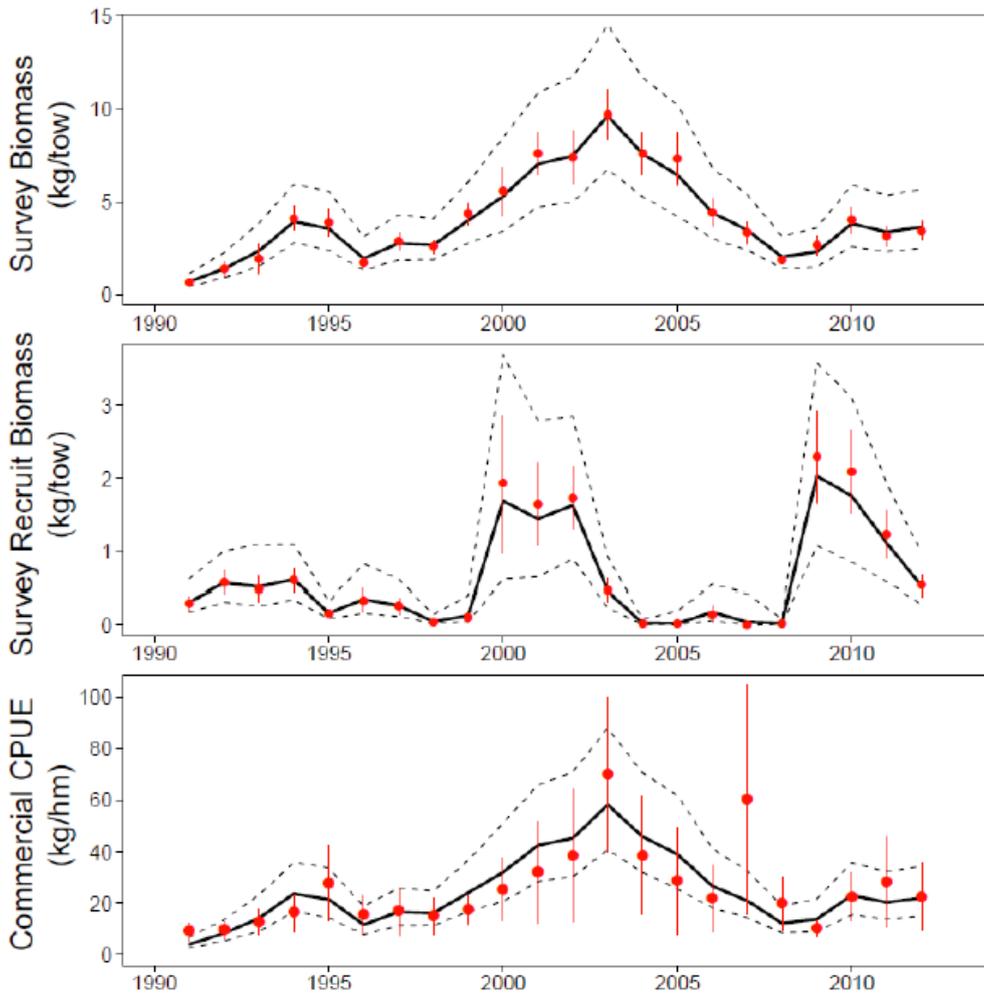


Figure 24: The stock assessment model fitted to observed biomass indices for Browns Bank North NB: Top graph = survey biomass, kg/tow, middle graph = survey recruitment biomass, kg/tow, lower graph = commercial CPUE, kg/hm. Dotted lines represent 95% credible limits and vertical error bars are ± 1 S.E. Red dots are observations, while the black line represents the model output. (Source: Hubley *et al.* 2014).

The assessment model accepted at the framework meeting in February 2009 (Jonsen *et al.* 2009) has been used for all subsequent assessments on Georges Bank (DFO 2010, DFO 2013a, Hubley *et al.* 2014) and the same analytical model was later applied with appropriate input data to Browns Bank North in 2011, the first formal assessment of that fishery since 1998 (Hubley *et al.* 2014).

3.3.2.6 Reference Points

The DFO policy on the application of the precautionary approach to fisheries management includes the use of reference points linked to stock and ecosystem indicators (DFO 2009a). The policy states that these reference points will usually be determined using standard biomass and harvest metrics (e.g., fishing mortality or exploitation). If these metrics are not available then some other measure related to the productive potential and harvest should be used so that the objective of avoiding serious harm to reproductive capacity of the stock can be realized.

Intertek Fisheries Certification (IFC)

For the case where biomass is used, reference points are to be defined for the biomass level below which reproductive capacity will be impaired (the Limit Reference Point, or LRP), at a biomass level below which removals must be progressively reduced in order to avoid reaching the LRP (the Upper Stock Reference, USR) and a removal reference point indicating the maximum harvest rate (as fishing mortality or exploitation). To comply with the terms of the United Nations Fishing Agreement (UN 1995), this rate must be less than that associated with the maximum sustainable yield (e.g., F_{MSY} or E_{MSY} if exploitation rate used). A target biomass reference point (TRP) is a required element of the United Nations Fishing Agreement, and can be set equal to or greater than the USR. The recommended levels for the LRP and USR biomass reference points in the DFO policy are 40% and 80%, respectively, of the biomass that results in the maximum sustainable yield (B_{MSY}).

Canada started to introduce the precautionary approach with reference points to all suitable fisheries, following the Atlantic Fisheries Policy Review in 2004 (DFO 2004a). For the ECOSF, the process was hastened by the Marine Stewardship Council (MSC) certification of the fishery in 2010, with a condition that formalized measures to show how the precautionary approach is applied to the management system should be described and implemented by the 1st annual audit. Accordingly, the ECOSF industry proposed a precautionary approach framework in February 2011 using proxies for biomass-based reference points for the most important fishing area, Georges Bank 'a' (Smith & Hubley 2012). Consistent with the DFO policy, the industry set B_{MSY} equal to the mean biomass over the period 1981 to 2009 from the delay-difference model. The USR was set at 80% of B_{MSY} and 30% of B_{MSY} was used for the LRP (note that 30% of B_{MSY} corresponds to 50% MSY, assuming the Shaefer model for surplus production (NAFO 2004)).

The industry proposal also defined the mean exploitation of 0.25 as a removal target. This rate is very close to the 0.27 reported by Jonsen *et al.* (2009) as the exploitation rate that resulted in no change in biomass (1981 – 2007). This definition of a removal reference, along with the biomass reference points mentioned above, are then used to construct a Harvest Control Rule (HCR) with healthy, cautious and critical zones defined (Figure 25, noting that the URP = the USR), and this definition and the initial reference point values for Georges Bank have been incorporated in the updated IFMP (DFO 2011b). However, Smith & Hubley (2012) stress that it is important to note that when reference points are defined, the emphasis should be on the approach or method used and not on the actual values proposed. One reason for this is that estimates of biomass may change from year to year with changing definitions of survey area or as new information is added to the assessment. Thus, subsequent annual assessments of the fishery (e.g., DFO 2014g, Hubley *et al.* 2014) have utilized different growth data and calculated mean biomass over longer periods using the latest data; this process produces different values for the target and limit reference points and affects the definition of healthy, cautious and critical biomass zones (see Figure 27, where the reference point values used to define the biomass zones are substantially higher than those defined in the IFMP).

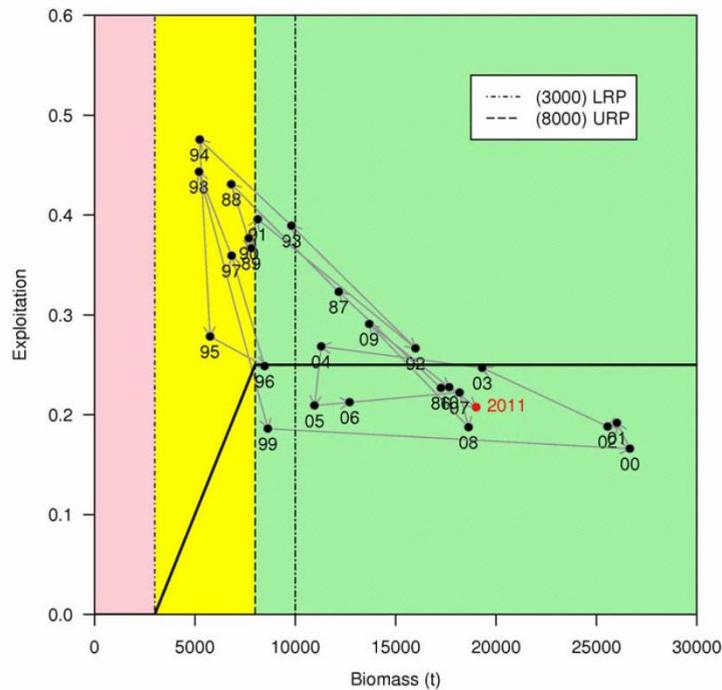


Figure 25: Reference points and harvest control rules for scallop on Georges Bank 'a' based on the Marine Stewardship Council accepted proposal from the offshore scallop industry. (Source: Smith & Hubley 2012)

The industry also proposed actions to be taken when biomass was in a given zone:

- When biomass is above the UR:
 - Measures should promote the fully-recruited biomass remaining above the UR.
 - The target exploitation rate will be 25% of fully-recruited biomass. Above the UR point there is flexibility in increasing the exploitation rate.
 - The TAC can be increased despite projected decline in the biomass, provided it is not expected to reduce the fully recruited biomass significantly below the UR.
- When biomass is between the LRP and the UR:
 - Measures should generally promote the rebuilding of biomass towards the UR, subject to natural fluctuations that may be expected to occur in biomass and survey results.
 - The Total Allowable Catch (TAC) should not be increased if this can reasonably be expected to result in declining trend in the fully-recruited biomass.
- When biomass is below the LRP:
 - Measures must explicitly promote an increase in the biomass.
 - The exploitation rate must be in the context of a rebuilding plan.
 - If the stock falls below the proxy LRP, research may be undertaken to better determine the true LRP for this stock, the level below which reproductive success would be seriously impaired.

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Using a similar approach to that laid out above for Georges Bank 'a', Smith & Hubley (2012) have proposed a precautionary approach framework for Browns Bank North, thus:

- the USR is defined as 80% of the mean biomass over a productive period (7,281t from 1991-2010).
- the LRP is defined as 30% of the mean biomass (2,730t, which corresponds to the lowest biomass observed, 1991).
- the removal reference is defined as the exploitation rate that results in no change in biomass (0.1).

These reference points were then used to construct a proposed HCR for Browns Bank North (Figure 26, noting that the URP = the USR).

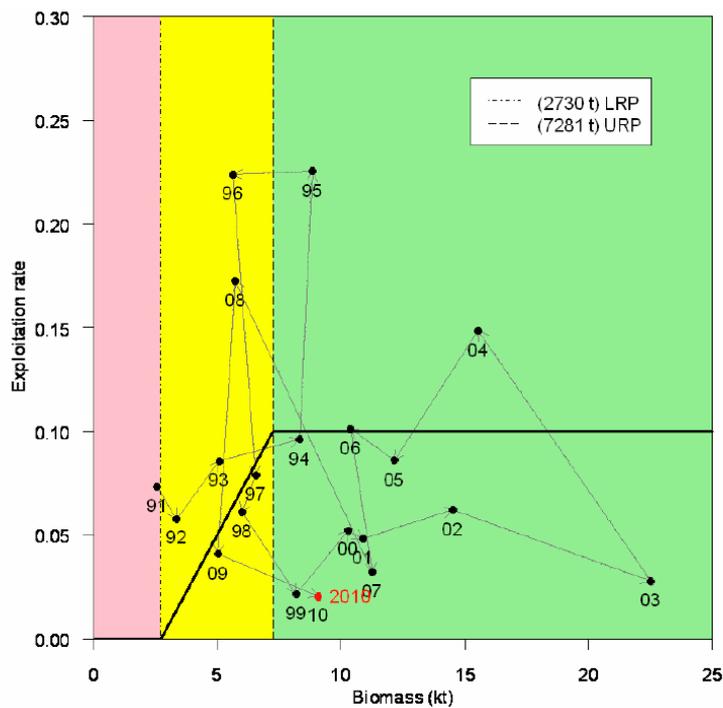


Figure 26: Reference points and harvest control rules proposed for Browns Bank North scallops, based on the MSC accepted rules for Georges Bank. (Source: Smith & Hubley 2012).

Reference points, and the harvest control rules based on them, have therefore been proposed for the two main fishing areas, Georges Bank 'a' and Browns Bank North, which together make up some 90% of the catch. For the other offshore SFAs, the information available is either not suitable for constructing an analytical population model at present (e.g., German Bank) or the current fishery has little impact on the population (e.g., Sable Bank).

3.3.2.7 Stock Status

The stock status for Georges Bank 'a' and Browns Bank North was updated at a Science Special Response Process (SSR) held on 1st May 2013. The outputs were published as Assessment Updates (DFO 2014g, DFO 2014h), while details of the analytical assessments used in these fisheries are described in detail in Hubley *et al.* (2014). There was little fishing on the other banks in 2013, where

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stocks remain low. However, an overview Powerpoint presentation to OSAC showing the status of all stocks was produced in November 2013 (OSAC 2013) and has been utilized here to provide the latest information on stock status.

Georges Bank 'a'

Fully recruited biomass, estimated to be 29,080t in 2013, increased from the 2012 estimate of 24,570t and is well above the 27-year median biomass of 15,580 t (DFO 2014g). Recruit biomass, estimated to be 4,419 t in 2013, declined slightly from the 2012 estimate of 4,805 t but is still well above the 27-year median biomass of 3,175 t (Figure 27).

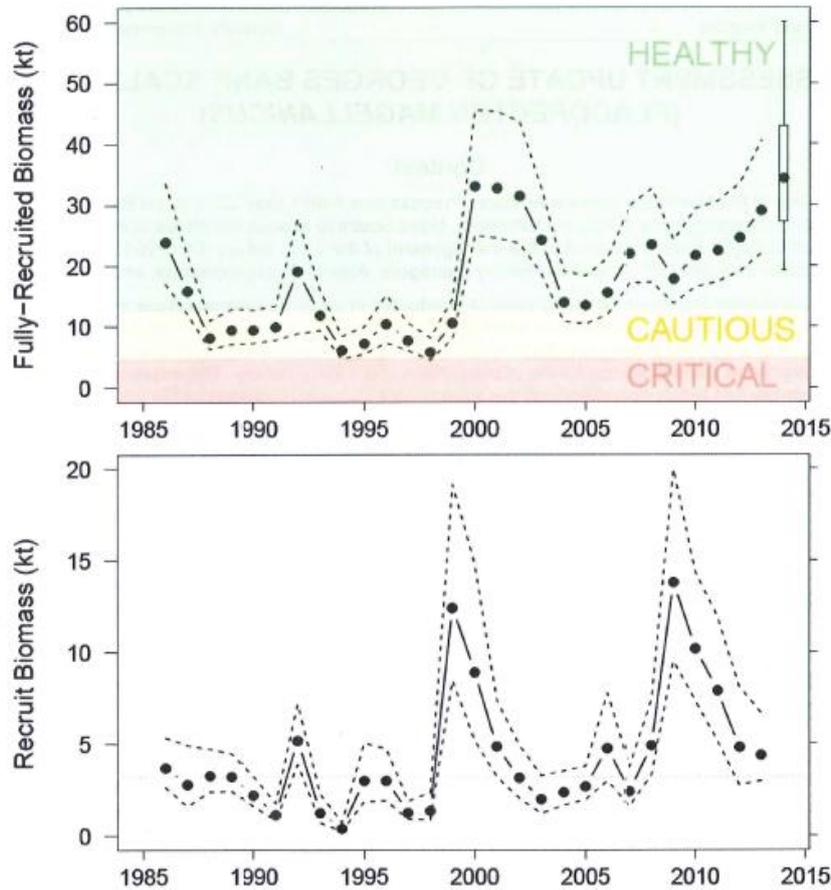


Figure 27: Biomass estimates for recruit and fully recruited scallops from the stock assessment model fitted to the Georges Bank 'a' survey and commercial data.

NB: Dashed lines are the upper and lower 95% credible limits on the estimates. Coloured regions represent the healthy (green), cautious (yellow) and critical (red) zones when reference points are calculated as 80% and 30% of mean biomass and the dotted line (lower graph) indicates the 27-year median for recruitment. The forecasted fully recruited biomass for 2014 is displayed as a box plot with median (solid circles), 50% credible limits (box) and 80% credible limits (whiskers). (Source: DFO 2014g).

There is an extremely high probability (>0.99) that the 2013 biomass is currently above the upper stock reference (USR) and in the healthy zone, as it has been since 2000. Harvest scenarios for Georges Bank 'a' in 2014 are shown in Table 3, below. The probability that biomass will remain in the healthy zone was very high (>0.97) for all harvest scenarios from 3,000 – 7,000 t.

Table 3: Harvest scenarios for Georges Bank 'a' in terms of exploitation and expected changes in fully-recruited biomass.

NB: Potential catches in 2014 are evaluated in terms of probability of a decline in biomass and exceeding reference points. These probabilities account for uncertainty in the biomass forecasts. (Source: DFO 2014g).

Catch (t)	Exploitation rate	Probability of Biomass Decline	Expected Change in Biomass (%)	Probability Biomass will exceed USR	Probability Biomass will exceed LRP
3000	0.09	0.29	24.07	0.99	>0.99
3500	0.10	0.30	22.44	0.99	>0.99
4000	0.11	0.32	21.06	0.98	>0.99
4500	0.13	0.34	18.54	0.98	>0.99
5000	0.14	0.35	16.66	0.98	>0.99
5500	0.15	0.37	14.16	0.98	>0.99
6000	0.17	0.39	12.12	0.98	>0.99
6500	0.18	0.40	10.66	0.98	>0.99
7000	0.19	0.42	8.23	0.97	>0.99

The model’s forecast for 2014 biomass is 34,264 t, assuming a catch of 5,000 t (the interim TAC), for there to be no change in condition, and for natural mortality rates to be similar to 2013. This represents an estimated 17% increase in biomass from 2013. An interim TAC of 5,000 t would result in an exploitation rate of 0.14 for 2014, and incoming recruitment is expected to be above the median. During the year the industry agreed two voluntary closures to protect younger age-classes of scallops.

Georges Bank 'b'

Georges Bank zone B is a marginal growth area for scallops and has separate management measures. The TAC of 100 t was landed from this area in 2013, with a CPUE of 28.81 kg/hm, which was considerably higher than last year (17.85 kg/hm) and well above the median level. Very high abundances of pre-recruits were observed in some areas, while fully-recruited abundance, biomass and condition all increased.

Browns Bank North

The main scallop fishery on Browns Bank is conducted on the northern part of the bank. There was an increase in CPUE in 2013, which remains above the long-term median. While recruit and fully-recruited abundance was near the long-term median (Figure 28), very large abundances of pre-recruits were observed throughout the bank. The scientific advice for this stock is provided using the model described in Hubley *et al.* (2014). Fully recruited biomass, estimated to be 5,912 t in 2013, was similar to the 2012 estimate of 5,858 t and just below the 22-year median biomass (6,762 t) (DFO 2014h). Recruit biomass, estimated to be only 206 t in 2013, was considerably lower than the 2012 estimate (887 t), and well below the 22-year median biomass of 590 t. However, biomass is expected to remain relatively stable at the current TAC. Harvest scenarios ranging from 200 t to 1,000 t were examined and all had moderate (0.38 – 0.55) probability of decline in commercial biomass for 2014 (Table 4). Biomass change ranged from 10 to -5 % for the range of catches considered. Assuming a catch of 750 t (the interim TAC), no change in condition and natural mortality rates similar to 2013, the model forecast the biomass to remain relatively stable for 2014 at 6,028 t, with an exploitation rate of 0.12.

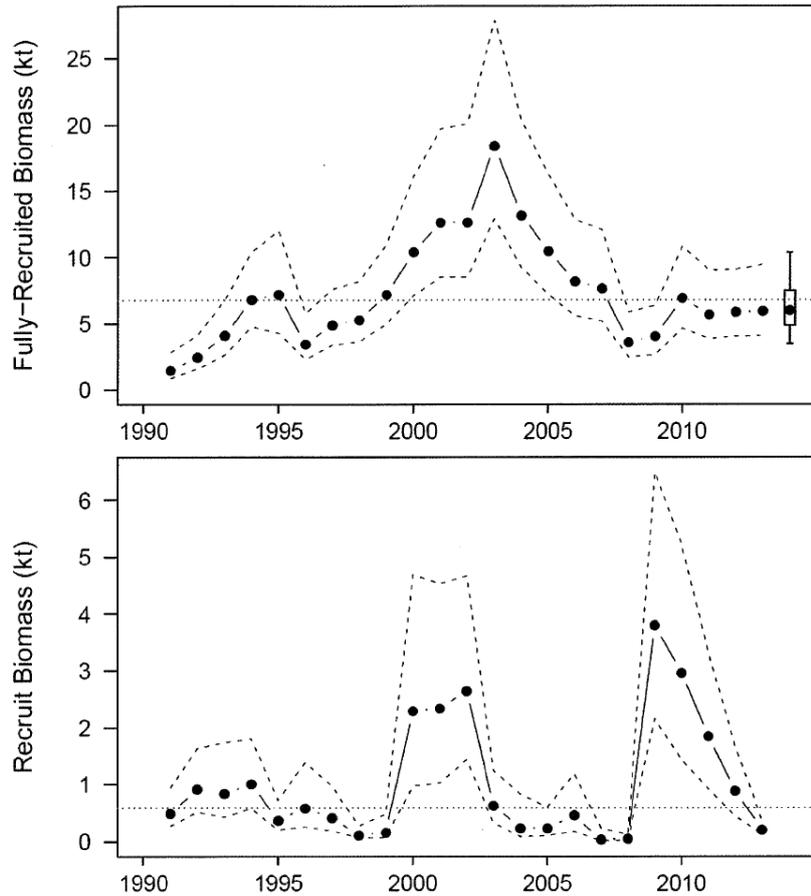


Figure 28: Biomass estimates for recruit and fully recruited scallops from the stock assessment model fitted to the Browns Bank North survey and commercial data.

NB: Dashed lines are the upper and lower 95% credible limits on the estimates. The dotted line represents the 22-year median. The forecasted fully recruited biomass for 2014, assuming a catch of 750t, is displayed as a box plot with median (Solid circles), 50% credible limits (box) and 80% credible limits (whiskers).

(Source: DFO 2014h).

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Table 4: Harvest scenarios for Browns Bank North in terms of exploitation and expected changes in fully-recruited biomass.

NB: Potential catches in 2014 are evaluated in terms of probability of a decline in biomass. These probabilities account for uncertainty in the biomass forecasts.

(Source: DFO 2014h).

Catch (t)	Exploitation rate	Probability of Biomass Decline	Expected Change in Biomass (%)
200	0.04	0.38	10.41
300	0.06	0.39	9.56
400	0.07	0.42	7.33
500	0.09	0.44	5.14
600	0.10	0.46	3.53
700	0.11	0.48	1.57
750	0.12	0.49	1.00
800	0.13	0.51	-0.45
900	0.14	0.53	-2.48
1000	0.16	0.55	-4.53

Browns Bank South

Browns Bank South is a marginal growth area for scallops and has separate management measures. No fishery has occurred on Browns Bank South since 2007 and an interim TAC of 10 t was set for 2013. In the event only one fishing trip was made and the total catch was only 0.22 t, with a catch rate of 1.54 kg/hm.

German

The TAC for 2013 was 150 t, of which the fishery landed 144 t. CPUE was 11.9kg/hm, a little lower than last year and just below the long-term median level, while the condition factor was near to the mean for recent years. There has been little change in recruitment, size and abundance over the last 5 years. However, a high abundance of pre-recruits (20 – 40mm) was observed in 2013, more extensive than the patch of pre-recruits observed in this area in 2012. These juvenile scallops may provide increased landings in future years.

Eastern Scotian Shelf

The Eastern Scotian Shelf grounds include the Sable/ Western Banks, together with the Middle grounds. On the Sable/Western banks there was low effort and a small decrease in CPUE to 5.5kg/hm, although this remained above the long-term median level. Commercial abundance, recruit abundance, biomass and condition were all near the long-term median but pre-recruit levels were low. On the Middle ground abundance was low and there was no fishing in 2013.

Banquereau Bank

There has been little or no fishing for sea scallop on Banquereau since 2010, and abundance remains very low, mainly of fully-recruited scallops. In 2012, the Iceland scallop *Chlamys islandica* occurred in higher abundance and was found throughout the survey area (OSAC 2013a).

St Pierre Bank

This is a small pulse fishery that follows very sporadic recruitment events. There have been no landings since 2006 (NB: the data showing landings in this area in Table 1 were from the inshore scallop fishery operating in that area).

Based on this information, the assessment team concludes that the stock status remains very good on the Georges Banks 'a', as the ground that traditionally provide the bulk of the Canadian offshore scallop landings, with pre- and post-recruit abundance above average, recruitment good and small increases in growth and condition. Stock status on Browns Bank North is also good, with pre- and post-recruit abundance close to the average. Small stocks of pre-recruit, recruit and commercial sized scallops are present on the other grounds but this is not unusual as these grounds depend on occasional good recruitments. An indication of future good recruitment is now evident on both German Bank and Georges Bank 'b' where there are high abundances of pre-recruits that may provide improved landings in future years.

3.3.2.8 Harvest Strategy

The harvest strategy for the ECOSF is set out in the IFMP (DFO 2000), together with recent amendments contained in two companion documents that will be incorporated into the IFMP when a new revision has been completed (DFO 2011b).

The overarching conservation objectives of the strategy are:

- To not cause unacceptable reduction in productivity so that components can play their role in the functioning of the ecosystem;
- To not cause unacceptable reduction in biodiversity in order to preserve the structure and natural resilience of the ecosystem;
- To not cause unacceptable modification to habitat in order to safeguard both physical and chemical properties of the ecosystem.

The management of the scallop fishery aims to keep fishing mortality of sea scallop moderate by targeting an exploitation rate of 25% in the healthy zone (DFO 2011b). It achieves this by means of TACs and meat count regulations for each scallop fishing area. The TACs for Georges Bank 'a' and Browns Bank North, the most productive areas, are set using analytical assessments. The stocks on these Banks are at or above their long-term median fully-recruited biomass levels. A formal Precautionary Approach framework has been implemented for Georges Bank 'a', which accounts for 70-90% of the fishery, based on biologically-based reference points. This framework utilizes the best available knowledge with respect to biomass-based proxy reference points and will be updated as new knowledge becomes available. A similar framework has been proposed for Browns Bank North (Smith & Hubley 2012). As models are developed for the other areas the application of precautionary approach frameworks will be considered.

In the past the offshore fishery on the minor fishing grounds has been managed responsibly using harvest control rules based on a number of indicators such as size mix, incoming recruitment expectations, scallop growth, catch rates and scallop quality, and the TAC's set have protected their productivity over a long period of time. These other indicators will continue to be considered as they can provide a more robust understanding of the stock status than biomass alone.

The harvest strategy also aims to direct effort to fully-recruited adult scallop and to minimise the harvest of fast-growing, lower value, juvenile scallops. This is achieved through meat count regulations and voluntary area closures by the industry to improve the subsequent yield from large aggregations of juvenile scallops.

The harvest strategy is continuously evaluated by gathering information that can be used to assess the productivity, spatial distribution and other aspects of the performance of the management system.



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3.3.3 Other fisheries affecting the target stock

All commercial fishery removals from the Canadian sea scallop stock are monitored and recorded, while the distance from land and exposed nature of the fishery area mean that the stocks are not harvested by recreational fishermen. There is some evidence that the stocks of sea scallops in Canadian and USA waters are genetically linked but the fisheries on either side of the boundary are assessed and managed separately because after settlement the stocks do not move.

3.4 Principle Two: Ecosystem

3.4.1 Background

The ecosystem of the Georges Bank and the Scotian Shelf are relatively well-known as a result of extensive studies having been undertaken by government and university scientists in Atlantic Canada on seabed geology, physical oceanography, chemical oceanography, plankton ecology, benthic ecology, fisheries, seabirds and marine mammals. Reviews of current understanding of the Scotian Shelf ecosystem are provided by Breeze *et al.* (2002), Zwanenberg *et al.* (2002) and Zwanenberg *et al.* (2006). A thorough review of the Georges Bank ecosystem was prepared by Backus (1987), but later work has added to our understanding of the system (e.g., Wieber *et al.* 2002, Steele *et al.* 2007). A broad-scale study of physical and biological factors affecting fisheries productivity on the Browns Bank ecosystem was conducted by DFO (Dickie and Smith 1989). There have also been a number of studies on the ecosystem effects of fisheries on the Scotian Shelf and Georges Bank (e.g., Fisher & Frank 2002, Fogarty & Murawski 1998, Garrison & Link 2000, Tsou & Collie 2001). Therefore, the geographic area and systems addressed by this assessment are data rich.

Depending on quota allocations, in any given year, scallops may be targeted by the ECOSF in NAFO Divisions 3Ps (St. Pierre Bank), 4VWX (Scotian Shelf, including Browns Bank and German Bank) and 5Zjm (Georges Bank). However, an average of 98% of the fishery has occurred on Georges Bank and the Western Scotian Shelf (German and Browns Bank) in recent years (Table 1), and so these areas are the focus of the following sections on the environmental effects of the ECOSF fishery.

3.4.2 Retained and Bycatch Species

A variety of species other than scallop are taken in the ECOSF. However, under licence conditions, the only species other than scallop that may be retained in the fishery is monkfish (*Lophius americanus*). Even so, little or no monkfish is retained as the fishery is focused on scallops. As such, there are considered to be no retained species for the purpose of the assessment, and all other catch is considered under the bycatch PIs (2.2.1, 2.2.2 and 2.2.3).

Bycatch data are collected by an industry-funded observer program. Observers are requested to record all species caught. Weights are recorded for all species of fish and larger invertebrates observed. Number and length are also measured for some groundfish species. All observer reports are filed with DFO and data are entered into the DFO Virtual Data Centre (VDC). The observer program was limited to Georges Bank until 2011, but was then expanded to other areas. There was limited observer coverage between 1991 and 2004 but, beginning in 2005, one scallop trip per month was observed (accounting for approximately 5% of the fishing effort). The observer coverage was increased to two trips per month from July 2007 (accounting for approximately 10% of the fishing effort).

A detailed analysis of ECOSF bycatch data from Georges Bank was conducted in the course of the 2010 MSC assessment of the ECOSF (Caddy *et al.* 2010). It was reported that, on average, 27% of the catch was composed of rocks, sand, foreign articles, garbage and old shells while 73% was composed of scallops and other marine species. Scallops accounted for 94% by weight of the organisms captured by the dredges. Of the remaining 6%, fish species made up 5.4% of the total while all invertebrate taxa together made up 0.6% of the total. Approximately 150 taxa were recorded in the data.

The records analysed for the 2010 assessment showed that most common fish caught in the ECOSF, in decreasing abundance, were monkfish, winter skate (*Leucoraja ocellata*), little skate (*Leucoraja erinacea*), yellowtail flounder (*Pleuronectes ferruginea*), longhorn sculpin (*Myoxocephalus octodecimspinosus*), sea raven (*Hemitripterus americanus*), winter flounder (*Pseudopleuronectes americanus*), Atlantic cod (*Gadus morhua*), thorny skate (*Amblyraja radiata*), haddock (*Melanogrammus aeglefinus*), barndoor skate (*Dipturus laevis*), spiny dogfish (*Squalus acanthias*), ocean pout (*Zoarces americanus*) and American plaice (*Hippoglossoides platessoides*). The most

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common invertebrates caught, in decreasing abundance, were starfish (Asteroidea), hermit crabs (Paguroidea), American lobster (*Homarus americanus*), razor clams (*Bivalvia*), crabs (*Brachyura*), sponges (*Porifera*), sea urchins (*Echinoidea*), gastropods and shrimp (*Decapoda*).

For this new reassessment, only the Georges Bank bycatch data from 2008 onwards are reported and considered. This is because the targeted frequency of observed trips had increased to two per month by that year, and because earlier data are increasingly historic in nature (Table 5). Also, while bycatch sampling from other locations fished by ECOSF vessels does now occur, this additional sampling only started in 2011, and has been relatively infrequent because fishing only occurs in these areas sporadically. Nevertheless, on average, for the last six years the catches from Georges Bank have comprised almost 87% of the total catch from the fishery, while almost all of the remaining catch has been derived from the Browns and German Banks, which are located very close to Georges Bank (Table 1 and Figure 4). As such, it is considered that the Georges Bank bycatch data are likely to be largely indicative of the impact of the fishery as a whole.

Detailed analyses of recent Georges Bank bycatch data were conducted for this assessment (DFO 2014a, Robert 2014a). These analyses were focused on Atlantic cod (cod), yellowtail flounder, haddock, skate species, monkfish and invertebrates. Together, the commercially-targeted fish species have accounted for an average of 3.45% of the total annual catch from Georges Bank from 2008 – 2013 (Table 5). Given the small quantities that are recorded for the fish species listed in Table 5, any other fish species would be expected to make up a small or negligible percentage of the total catch (e.g., Atlantic wolffish made up an average of approximately 0.006% (range 0.001 – 0.017%) of the catch over the period Oct 2011 – April 2013).

Overall, while excluding rocks, shells, garbage and other non-biological materials, the available data show that scallops have made up almost 97% of the total ECOSF catch. This indicates that the New Bedford scallop rake/dredge, as currently used in the ECOSF, is selective for scallops. This selectivity is also linked positively to the steps taken by industry in recent years to minimise fuel use and benthic impact by targeting areas of high scallop abundance through the use of multibeam bathymetry, and through the use of a rope-mesh back in the dredge to allow fish to escape (Walsh 2008).

Table 5: Georges Bank 'a' + 'b' bycatch estimates for fish and invertebrate species, 2008 – 2013.

		2008	2009	2010	2011	2012	2013	Mean
Total catch	T	49,016	49,552	46,869	39,271	35,431	43,404	43,924
Scallop	Round weight (t)	48,605	48,007	44,538	37,491	33,598	42,396	42,439
	% of total catch	99.16	96.88	95.03	95.47	94.83	97.68	96.62
Cod	T	37	69	44	30	44	18	40
	% of total catch	0.08	0.14	0.09	0.08	0.12	0.04	0.09
Yellowtail flounder	t	117	84	200	53	48	39	90
	% of total catch	0.24	0.17	0.43	0.13	0.14	0.09	0.21
Haddock	t	33	54	14	16	30	10	26
	% of total catch	0.07	0.11	0.03	0.04	0.08	0.02	0.06
Skate spp.	t	224	1,338	2,073	1,538	1,489	532	1,199
	% of total catch	0.46	2.70	4.42	3.92	4.20	1.23	2.73
Monkfish	t	-	-	-	143	222	103	156
	% of total catch	-	-	-	0.36	0.63	0.24	0.40
Invertebrates	t	-	-	-	-	-	306	306
	% of total catch	-	-	-	-	-	0.71	0.71
% of the ECOSF total scallop catch taken from Georges Bank 'a' + 'b'		86.6	95.3	91.4	78.2	82.8	83.9	83.8

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As Table 5 shows, no species other than scallops makes up more than 5% of the total catch, and therefore no other retained or bycatch species would qualify as a ‘main’ retained or bycatch species based on quantity taken (GCB3.8.2, MSC 2013b). Nevertheless, MSC (2013b) indicates that species may be considered to be ‘main’ if they have a particular vulnerability, and so yellowtail flounder is considered to be main bycatch species on the basis of stock status. More information on this approach is provided in the following paragraphs.

3.4.2.1 Atlantic Cod (Cod)

The ECOSF takes place principally on Georges Bank, and so the Atlantic cod (cod) taken as bycatch comes mainly from the Division 5Zjm stock component. This stock managed jointly by Canada and the US through the Transboundary Resource Assessment Committee (TRAC). Together, the 5Zjm and Canadian 4X5Yb cod stock components are known as the Southern Designatable Unit. Due to a significant decline in abundance and evidence of an unexplained increase in natural mortality in the 4X portion of the 4X5Yb stock, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated the Southern Designatable Unit as ‘endangered’ in April 2010 (DFO 2011d).

For all Canadian fisheries combined, DFO set total allowable catches (TACs) of 1173 t, 1012 t, 850 t and 513 t for the 5Zjm cod stock component from 2009 – 2012. TACs of 3,000 t, 3,000 t, 1,650 t and 1,650 t were also set for the 4X5Y cod stock component in the same years. In comparison, during the period 2009 – 2012, the annual ECOSF cod bycatch from Georges Bank (A + B) was estimated to average 47 t, or 0.11% of the fishery’s total catch from the Georges Bank (Table 5). Bycatch data from the ECOSF are routinely incorporated into the assessments of the 4X5Yb and 5Zjm cod stocks (DFO 2011a), and the very small quantities of cod taken in the ECOSF mean that this species is considered to be a minor bycatch species for this assessment of the fishery.

3.4.2.2 Yellowtail Flounder

There has been no recent full assessment of yellowtail flounder on the Scotian Shelf, and so the status of the stock in NAFO Division 4X, which includes Browns Bank and German Bank, is unclear. However, biomass indices derived from a DFO Maritimes research vessel (RV) summer trawl survey that has been undertaken since 1970 indicate that while the stock in this area is below the historic mid-term level, it is relatively healthy and fluctuating near to the long-term level (DFO 2013c).

The yellowtail flounder stock on the Georges Bank is joint Canada-US managed through the TRAC, and directed yellowtail flounder fisheries occur in both countries. In 2012, including discards from the ECOSF, Canadian catches from all fisheries totalled 91 t, while US catches totalled 631 t. The stock is in poor condition, with spawning stock biomass and recruitment in 2012 being the lowest in the time series (TRAC 2013). In response, the TAC (including discards) has been reduced substantially in recent years, with the Canadian allocation dropping quickly from 855 t – 72 t over the 2011 – 2014 period. The ECOSF catch of yellowtail flounder has also dropped substantially from an average of 134 t over the 2008 – 2010 period, to an average of 47 t over the last three years. While this comprises a very small percentage of the ECOSF catch, this recent average still represents over half of the 2014 Canadian allocation for Georges Bank yellowtail flounder. As such, yellowtail flounder is considered to be a main bycatch species for this assessment of the ECOSF.

3.4.2.3 Haddock

A major haddock stock exists within the Southern Scotian Shelf and Bay of Fundy area (Showell *et al.* 2013). This stock supports a significant fishery, with TACs of 5,100 t for both the 2013/14 and 2014/15 fishing years. In 2011, the biomass index of this stock, as determined from the DFO Maritimes RV summer trawl survey, was below the short, mid and long term average, although the biomass index had been relatively stable over the proceeding eight years (DFO 2013c). Good year classes were produced in 2009 and 2010, and the stock was estimated to be above the proposed upper

stock reference level in the latest assessment in 2011 (Showell *et al.* 2013).

The eastern Georges Bank haddock stock is managed jointly between Canada and the USA through the TRAC, and is the stock from which most haddock are likely to be taken in the ECOSF. The total catch of eastern Georges Bank haddock in 2013 was estimated to be 5,066 t, with 4,631 t of that being taken by Canadian fisheries. The adult biomass of this stock has fluctuated considerably in recent years, but a number of good to exceptional year-classes were produced in 2010, 2011 and 2013. There are a number of other positive signs for eastern Georges Bank haddock productivity, including expanded age structure, broad spatial distribution and large biomass (TRAC 2014a). The very small quantities of haddock taken in the ECOSF in comparison to the large catches taken in other fisheries together with the stock's strong performance in recent years, means that haddock is considered to be a minor bycatch species for this reassessment.

3.4.2.4 Skate Species

The largest proportion of the ECOSF bycatch is made up of skate species at a combined annual average of 2.73% over the 2008 – 2013 period. Up to seven separate species of skate may be included within these data, but identification between some species can be difficult (Robert 2013). Based on distributions as reported by Sosebee (2006), the most likely species to be included are thorny skate, barndoor skate, winter skate, little skate and smooth skate (*Malacoraja senta*). This is consistent with the species recorded in comprehensive bycatch data analysed for the 2010 assessment (Caddy *et al.* 2010), when winter skate, little skate, thorny skate and barndoor skate were reported in decreasing order of abundance, with smooth skate not listed. All skates taken in the ECOSF must be returned to the water as a licence condition; being elasmobranchs, these fish do not suffer lethal barotraumas when the gear is hauled from the seabed to the surface, and examination of skates taken in the southern Gulf of St. Lawrence scallop dredge fishery suggests that the post-release survival rate of skates from the ECOSF will be good (Benoît *et al.* 2010). The short tow times (20-30 minutes, typically) employed in the ECOSF should support high levels of survival, post release. Some additional information on the status of skate stocks in NAFO Divisions 4X and 5Zjm is provided below.

The winter skate biomass index for Division 4X has fluctuated considerably and without trend over the last 40 years, as determined through the DFO Maritimes RV summer trawl survey; the most recent data indicate that the stock is now well above the short, mid and long term average (DFO 2013c). The biomass index of the Georges Bank winter skate population has also been fluctuating without trend since the early 1990s, as determined through the DFO Maritimes RV winter trawl survey (DFO 2013d). The most recent data for this stock indicate that it is above the short and long term average.

The little skate biomass index for Division 4X has been fluctuating considerably but with an increasing trend since the late 1970s; the latest indication is that the biomass in this area is above the short, medium and long term average (DFO 2013c). The biomass index for little skate on the Georges Bank may have declined somewhat in the last 15 years, but has fluctuated considerably over that period (DFO 2013d).

Thorny skate is amongst the most widespread and abundant demersal fish species in Canadian waters, occurring on most of the Northwest Atlantic continental shelf. However, DFO Maritimes RV summer trawl survey data show a decline in the biomass index of thorny skate in Divisions 4X and 4VW, such that these components are now at their lowest in the time series (DFO 2013c). A similar pattern of decline has been seen on Georges Bank (Simon *et al.* 2012). Thorny skate was listed by COSEWIC as special concern' in 2012 and, beginning in April 2013, license conditions now require all thorny skate caught in NAFO divisions 4VWX+5 be returned to the water (Government of Canada 2013). Some evidence suggests that there is significant connectivity between thorny skate populations in different areas (Simon *et al.* 2012). At present, this species is most densely concentrated along the southern

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Grand Banks off Newfoundland and on the eastern portion of the Scotian Shelf. While the abundance in the south of its range has been declining, there has been a recent increase in abundance in the middle and northern parts of their range (COSEWIC 2012).

Barndoor skate is most common in Canadian waters on Georges Bank and the western Scotian Shelf. Numbers declined in the 1960s, likely due to bycatch in fisheries directed at other species (COSEWIC 2011), but the species has made a strong recovery in recent years. The biomass indices for the 4X and 4VW areas indicate that the abundance of mature barndoor skate is now above the mid and long term averages (DFO 2013c). Data from US surveys suggest that the abundance of barndoor skate on Georges Bank declined precipitously in the late 1960s and remained low until the late 1990s, but that the species then made a strong recovery, with an abundance that approaches that seen in the 1960s (Simon *et al.* 2009).

Smooth skate abundance generally declined across the Scotian Shelf in the 1980s and 1990s, but has increased in Division 4X in recent years because of an increase in the number of juveniles in this area (Simon *et al.* 2012). Smooth skate is uncommon on the Georges Bank, with negligible numbers being taken in the DFO Maritimes RV winter trawl survey in any year (DFO 2013d).

Overall, available evidence indicates that the stocks of most species of skate that may be taken by the ECOSF are in relatively healthy condition. Thorny skate stocks on the Georges Bank and Scotian Shelf are less healthy, but it appears that emigration may have been a factor in the decline, while it also appears that the overall impact of the ECOSF is likely to be low - the fishery is selective, and any skates that are taken appear likely to have a high post-release survival. Overall, there is sufficient evidence that the ECOSF is not causing a significant impact to allow all skate species to be considered as minor bycatch species for the purpose of this reassessment.

3.4.2.5 Monkfish

There is no directed fishing for monkfish in NAFO Division 4VWX, and landings are permitted as bycatch only, including in the ECOSF. However, monkfish is not generally retained in the ECOSF and it is considered to be a bycatch species for this reassessment. The DFO Maritimes RV summer trawl survey shows a decline in the biomass indices for both 4X and 4VW monkfish over the full 40 years time series, although the 4X index has been relatively stable for the last 10 years, and the 4VW stock has been relatively stable for the last 20 years (DFO 2013c). The DFO Maritimes RV winter trawl survey also shows a decline in the Georges Bank monkfish biomass index across the entire time series. However, the data indicate that the stock has been lower in the early 1990s than was recorded in the most recent survey, and that there has been a steady improvement in the monkfish biomass index over the last three years (DFO 2013d). The latest monkfish assessment for the US Northern Fishery Management Area (NFMA), which includes Georges Bank, estimated monkfish biomass in this area to be 25% above B_{TARGET} (NEFSC 2010). The 2014 monkfish TAC for the US NFMA was 5,854 t (NOAA 2014). Overall, while the 4VW component appears to be poor, the vast majority of the ECOSF effort occurs in 4X and 5Y where the monkfish stocks appear to be healthier. Given the relatively small quantities taken in the ECOSF, monkfish is therefore considered to be a minor bycatch species for this assessment.

3.4.2.6 Invertebrates

Invertebrate bycatch data were aggregated for the analysis of bycatch undertaken for this reassessment. Data were only available for the 2013 year, when invertebrates accounted for just 0.7% of the catch (Robert 2014b). This is essentially the same as was found in the analysis for the 2010 assessment of the ECOSF, when invertebrates were found to make up 0.6% of the catch (Caddy *et al.* 2010). The low quantities of invertebrates taken mean that these species together are considered to be a minor bycatch component of the fishery.

3.4.3 Endangered, Threatened and Protected (ETP) Species

Species that need to be considered against the endangered, threatened and protected (ETP) performance indicators include any that are protected under international law, as well as those listed under the Canadian Species At Risk Act (SARA 2002). The listing of a species by the COSEWIC does not result in a species being considered under ETP species PIs for MSC assessments. As such, winter skate and cod do not qualify as ETP species.

The ECOSF has the potential to interact with a number of ETP species; specifically, North Atlantic right whale – *Eubalaena glacialis*, loggerhead turtle – *Carreta carreta* and leatherback turtle – *Dermochelys coriacea*, all of which are listed as Endangered on Schedule 1 of SARA; and northern wolffish – *Anarhichas denticulatus* and spotted wolffish - *Anarhichas minor*, which are listed on Schedule 1 as Threatened. Atlantic wolffish is not considered to be ETP as it is listed as Special Concern under SARA, when the basic prohibitions against harming a species or its residence and the prohibition against destruction of critical habitat do not apply (Smallwood 2003). More information on the interactions or potential interactions between the ECOSF and these species is provided in the following sections.

3.4.3.1 North Atlantic Right Whale

North Atlantic right whales occur in a single population which moves seasonally between Canada and the USA; the population is at a critically low level of abundance.

Although information on right whale occurrence on the Scotian Shelf and Georges Bank is limited, information is available on the general patterns of seasonal and areal distribution and abundance of right whales in Canada. Areas of right whale concentration occur in the summer and autumn in Grand Manan Basin (at the mouth of the Bay of Fundy) and in Roseway Basin (between Browns Bank and Baccaro Bank), and right whales are known to transit the ECOSF fishery area while moving between these areas and other sites (Baumgartner & Mate 2005). The Roseway Basin and Grand Manan Basin were designated as conservation areas for right whales in 1993 (DFO 2014d). Passive acoustic observations have also shown that right whales are present on the Scotian Shelf from July to December (Mellinger *et al.* 2007), but it appears that right whales may be present in the ECOSF fishery area at any time during the year.

While entanglement in fishing gear is identified as one of the principal threats to the North Atlantic right whale population, this is an issue associated with static fishing gears (e.g. gillnets, long lines and traps). The mouth opening of a scallop dredge is far too small to accommodate a right whale, and no interactions between the fishery and right whales have been reported by observers or in official SARA logbooks that ECOSF fishers are required to submit annually. Necropsies have determined that some right whale mortalities have been caused by collision with ships (Knowlton & Kraus 2001 and New England Aquarium unpublished data, as reported in DFO 2014d), but there is no indication that ECOSF vessels were involved or are likely to be involved in future.

3.4.3.2 Loggerhead Turtle

Loggerhead turtles are considered to occur routinely in Atlantic Canadian waters, occurring on the Scotian Shelf, Scotian Slope, Georges Bank and the Grand Banks, most commonly in Spring, Summer and Autumn (COSEWIC 2010). The distribution of this species in Canadian waters appears to be closely linked to the course of the Gulf Stream, and loggerhead turtles prefer water temperatures above 14°C (Hawkes *et al.* 2007). Bycatch in Canadian offshore pelagic longline fisheries is concentrated when water temperature exceeds 22°C; no animals were captured in these fisheries when the water temperature was less than 15°C (Brazner & McMillan 2008). Notably, water temperatures on the Georges Bank typically range from 5°C to 15°C (USGLOBEC 1992).

Significant numbers of loggerhead turtles are captured in the US Mid-Atlantic sea scallop fishery (Merrick & Haas 2008). However, this fishery occurs further to the south and in typically warmer waters than the ECOSF. The primary known threat to loggerhead turtles in Canadian waters is the offshore pelagic longline fleet; other fisheries are not considered to pose a threat given the distribution of loggerhead turtles in Canadian waters (COSEWIC 2010). No interactions with loggerhead turtles have been reported by ECOSF observers or in official SARA logbooks.

3.4.3.3 Leatherback Turtle

Leatherback turtle exists in a single north Atlantic population which migrates seasonally between Canadian waters and waters to the south (LTRT 2006). Leatherback turtles can be found throughout Canadian Atlantic waters, but are often concentrated in what are thought to be important foraging habitat. Some data suggest that key concentrations occur in deep water outside the 1000 m contour off the southern part of the Scotian Shelf, around the northern tip of Nova Scotia into the southern Gulf of St. Lawrence, and off the south coast of Newfoundland (DFO 2012a). Leatherback turtles are most abundant in Canadian waters in summer months (LTRT 2006).

Entanglement in fishing gear is the main identified threat to leatherback turtles in Canadian waters, both in pelagic longline gear along the edge of the Scotian Shelf and further offshore, and in coastal fishing gear (LTRT 2006). Since 2005, one hundred (100) interactions between leatherback turtles and fishing gear have been reported in SARA logs from Canadian fisheries other than the ECOSF, with 99 of those reports coming from pelagic longline gear and one from a lobster trap fishery (DFO 2012a). No interactions with leatherback turtles have been reported by observers of the ECOSF, or in official SARA logbooks that ECOSF fishers are required to submit annually.

3.4.3.4 Northern and Spotted Wolffish

The distribution of northern wolffish is centred off northeast Newfoundland and the Labrador Shelf, and this species is considered to be rare on the Scotian Shelf (Kulka *et al.* 2007). It has been found on all seabed types and is most common between 500 m and 1000 m, although slightly shallower in the warmer months. The distribution of spotted wolffish is similar to that of northern wolffish, although this species is found most commonly between 200 m and 750 m depth. (Kulka *et al.* 2007).

Both species of ETP wolffish may be taken in the ECOSF, but the quantities have been very small. Northern wolffish was observed on just two out of the 14 trips in the ESOCF from October 2011 – April 2013, when it made up 0.008% and 0.022% of the catches, while spotted wolffish was observed on just one of those trips, when it made up 0.001% of that trip's catch (Robert 2013).

3.4.4 Habitats and Ecosystem

The general distributions of bottom sediments on the Georges Bank, the Scotian Shelf and St. Pierre bank have been mapped (Breeze *et al.* 2002; NL Seabed Atlas (<http://www.seabed-atlas-nl.ca/mapguide/NLSeabed2011/>), and see Figure 29). However, very detailed maps of the key scalloping grounds of Georges Bank, Browns Bank and German Bank have also been produced using multibeam bathymetry (e.g., Figure 30, Figure 31, Figure 32). The efforts to map these Banks have been proactive, and have been completed through a partnership between the Canadian Government and the fishing companies active in the ECOSF.

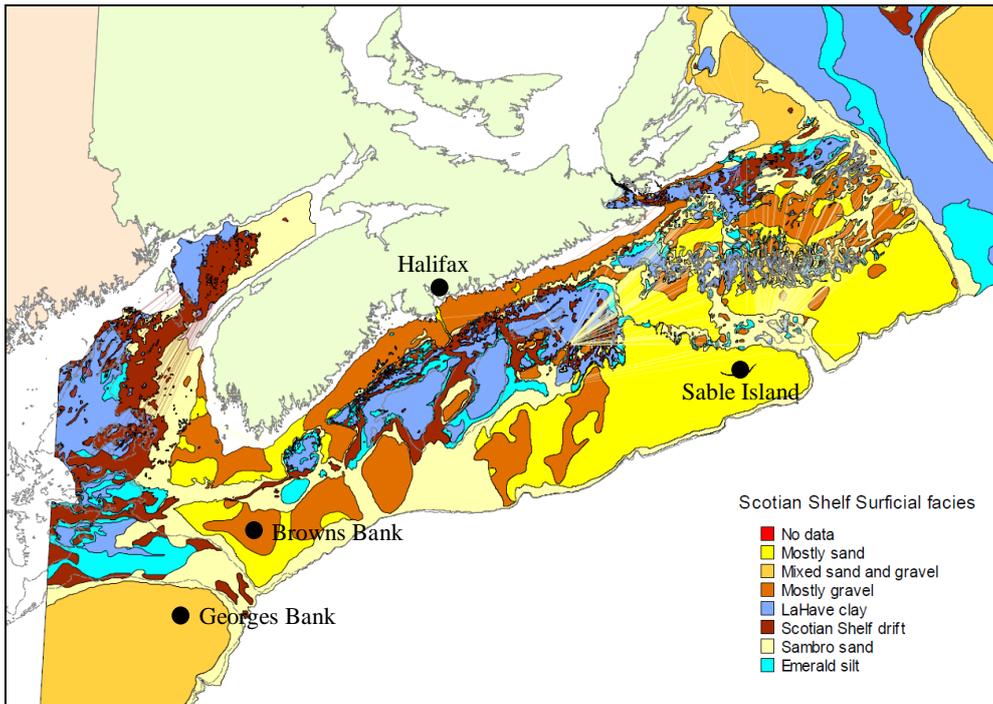


Figure 29: Surficial sedimentary facies on the Scotian Shelf.
(Source: NR Canada official publication, adapted from Kostylev 2004).

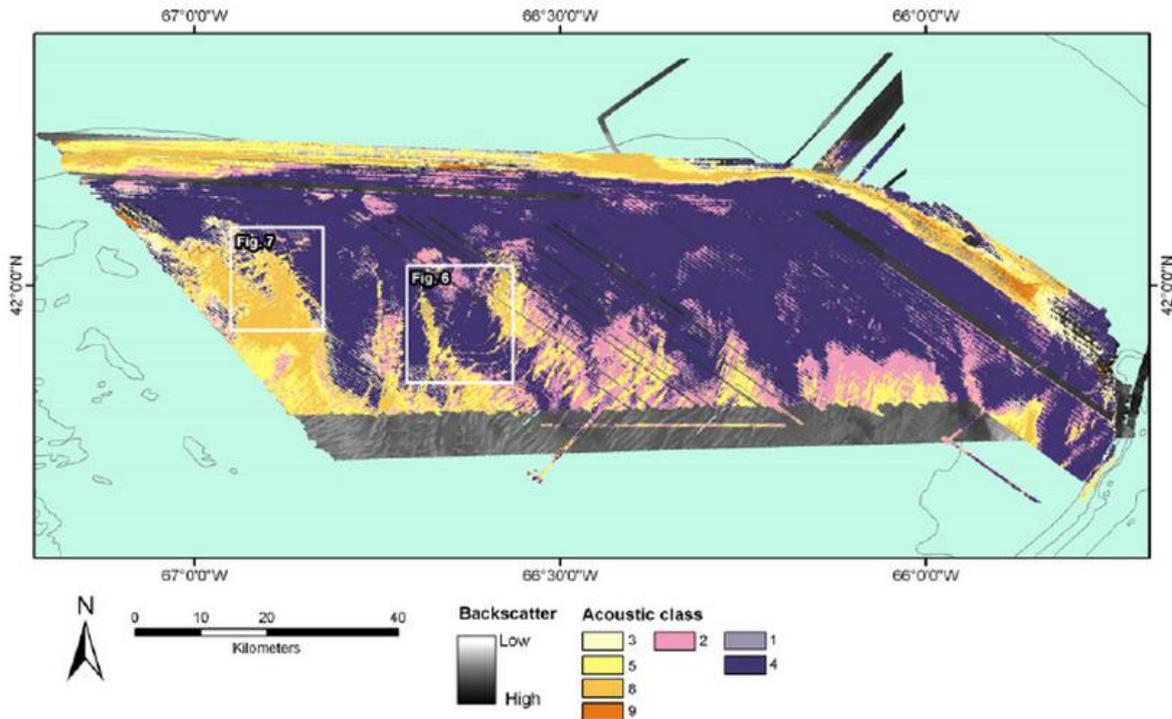


Figure 30: Interpolated QTC-Multiview classification for the Canadian northeastern portion of the Georges Bank.
NB: The interpolated raster is displayed overlying the multibeam bathymetric echosounder backscatter mosaic. Acoustic classes 1 and 4 corresponded to substrates dominated by gravels, class 2 corresponded to very coarse sand, and classes 3, 5 and 8 corresponded to coarse sand. Class 9 was unknown. (Source: Brown *et al.* 2011).

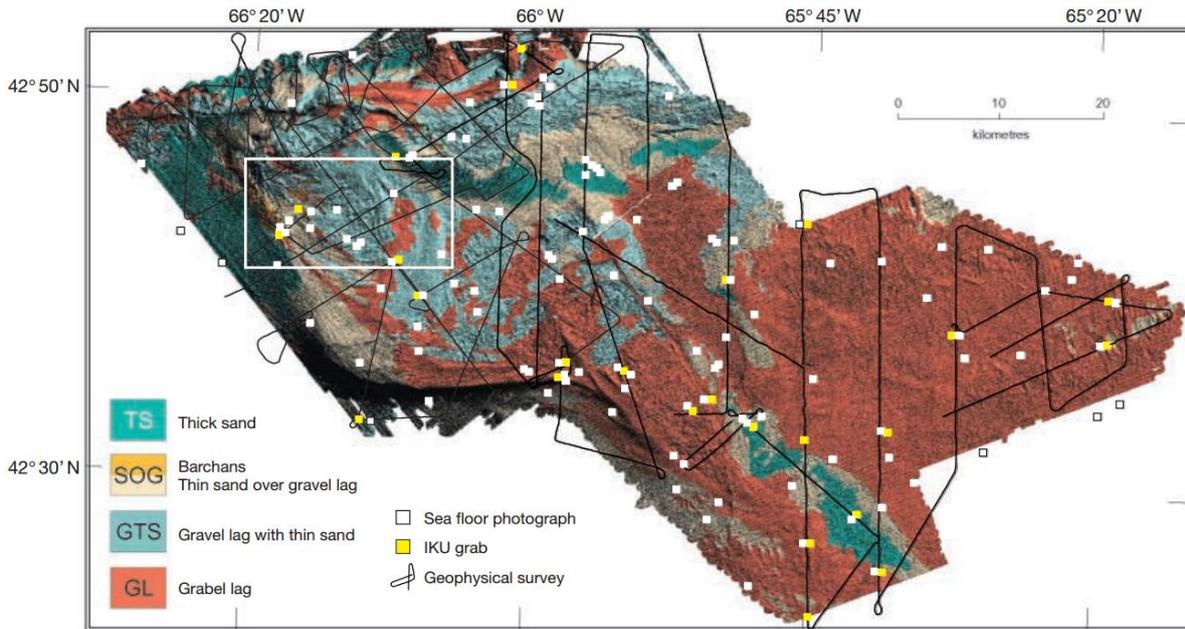


Figure 31: Interpretation of the distribution of surficial sediment type, thickness and bedforms on Browns Bank.

NB: Geophysical survey tracks are shown by black lines, sea floor photograph stations are indicated by white squares, and grab stations by yellow squares.
(Source: Kostylev *et al.* 2001).

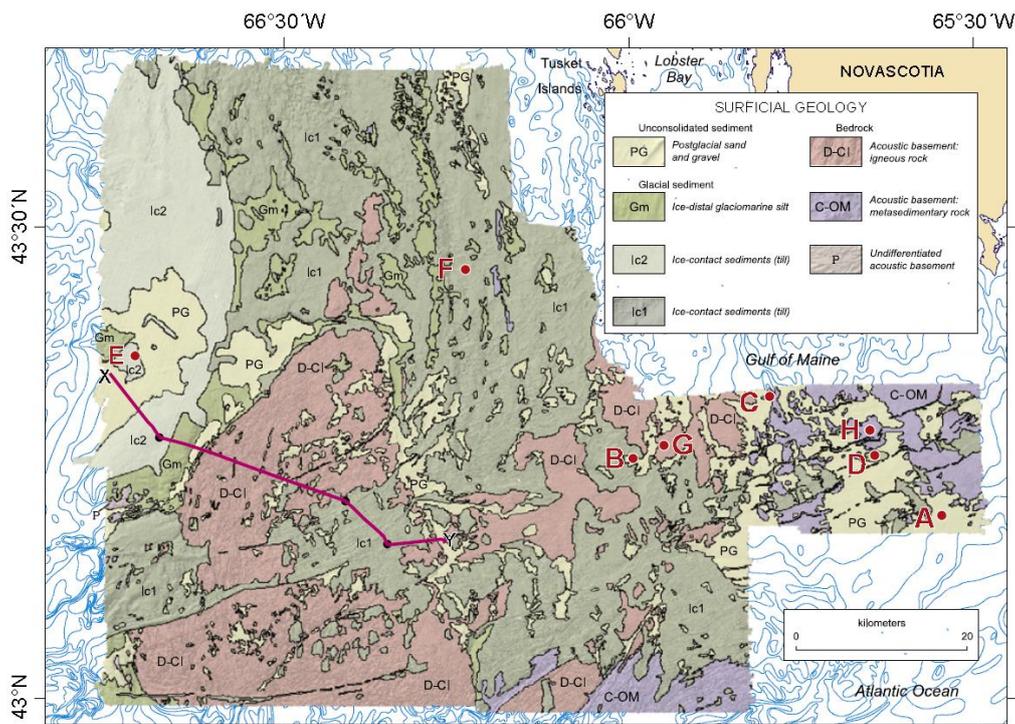


Figure 32: Map showing the surficial geology of the German Bank study area.

NB: Locations of seabed photographs are indicated by labelled red dots on the map.
(Source: Todd & Kostylev 2011).

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The benthic invertebrate species and communities of the areas fished by the ECOSF are also known in general terms, with more detailed studies in some areas (Breeze *et al.* 2002). Fauna associated with scallops on the eastern Georges Bank include the boreal sea star (*Asterias vulgaris*), hermit crab (*Pagurus pubescens*) and the Arctic lyre crab (*Hyas coarctatus*), all of which are likely to predate upon juvenile scallops (scallops >70 mm shell height are thought to be rarely preyed upon (Hart & Chute 2006). Other species that inhabited or were attached to the sediment in the same area included Atlantic surf clam (*Spisula solidissima*), little cockle (*Cerastoderma pinnulatum*) green sea urchin (*Strongylocentrotus droebachiensis*), rock crab (*Cancer irroratus*), spiny sunstar (*Crossaster papposus*), whelks (*Bucinum undatum*, *Colus stimpsoni* and *Neptunea lyrata decemcostata*) and polychaete worms (*Nereis zonata* and *Nephtys caeca*) (Thouzeau *et al.* 1991). Kostylev *et al.* (2001) found a similar suite of species associated with scalloping grounds on Browns Bank.

As well as there being knowledge of the typical species and communities associated with scalloping grounds on the offshore Banks, within the general picture of gravel-sand-mud sediments, there are known to be some areas (and others could occur) where erect sessile fauna occur, such as sea pens, sponges, tunicates and corals (Breeze *et al.* 2002). The distribution of corals has been mapped through collating scientific and local forms of knowledge (Cogswell *et al.* 2009). While erect fauna, such as corals, increase habitat and community complexity, they also have high sensitivity to impacts from bottom fishing gear. However, they are also almost exclusively found off the shelf edge, in waters that far exceed the depth range fished by the ECOSF.

In recognition of the importance of such systems, a number of different studies and processes have taken place to identify ecologically and biologically sensitive areas (EBSAs) on the Scotian Shelf and Georges Bank; these efforts were summarised recently by King *et al.* (2013). Various methods have been employed to identify EBSAs across the fished area, including through compiling expert scientific opinion or local ecological knowledge, or by adopting data-driven approaches. King *et al.* (2013) reported that a comparison of areas identified through expert scientific opinion and local ecological knowledge revealed 17 general areas that were identified through both processes. To date, the Gully MPA (>2300 km²), the Northeast Channel Coral Conservation Area (424 km²) and the *Lophelia* Coral Conservation Area (15 km²) have been established, and which protect coral communities by restricting bottom fishing and other activities in the most significant areas for these species (DFO 2006c). These sites designated for corals and other deepwater fauna are all located in water depths that far exceed those targeted by the ECOSF. The St. Pierre Bank is also an EBSA, having been listed for its benthos as part of the Placentia Bay and Grand Banks Large Ocean Management Area (PBGBLOMA). This listing includes fished areas, although no areas of the PBGBLOMA were considered to be degraded (DFO 2007).

Apart from their significance for scallops, the gravel regions of the Georges Bank are known to be important for other species, including the early life stages of various gadoids (Lough *et al.* 1989) and for herring spawning. A key component of their importance is the structural complexity that is formed by the substrate and its associated epifauna (Tupper & Boutilier 1995). However, scallop dredges are widely considered to be among the fishing gears that are most impacting to benthic habitats (e.g., Auster *et al.* 1996, Collie *et al.* 2000, Jenkins *et al.* 2001, Jennings & Kaiser 1998). The immediate effects of towed demersal gears include mobilisation of sediments, reduction in seabed complexity and removal or destruction of biota (Kaiser *et al.* 2006). Over longer periods, this can lead to a general reduction in species richness, biomass, and productivity (Hiddink *et al.* 2006).

There is clearly potential for habitats and the ecosystem of the ECOSF be significantly adversely affected by scallop dredging. It is critical, therefore, that use of the very detailed habitat maps, described above, has meant that the area of ground that is fished annually by the ECOSF fleet to catch the TAC has been greatly reduced in recent years in comparison to historic figures. Essentially, the habitat types that are preferred by scallops are known, and these habitats can now be accurately

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targeted (e.g., Kostylev *et al.* 2003). Maximising the ECOSF fleet's efficiency has reduced costs to the fishing companies, but will also have reduced the collateral impact of the dredges on the seabed and associated communities. An average of 16.5% of the Georges Bank is now fished annually, but much smaller areas of the other Banks are fished annually (Table 6).

Table 6: Harvested area (square nautical miles and %) of each Bank, 2008 - 2013.
(Source: Sarty 2013)

	Georges Bank		Browns Bank		German Bank		Sable/Western Bank	
	Sq. NMile Harvested	% of Bank						
2008	404	18.4	70	7.9	54	4.6	123	2.6
2009	404	18.4	0	0.0	35	3.0	56	1.2
2010	389	17.8	21	2.4	35	3.0	41	0.9
2011	348	15.9	64	7.3	25	2.1	44	0.9
2012	340	15.5	65	7.4	22	1.9	64	1.3
2013	284	13.0	35	4.0	26	2.2	68	1.4
Mean	362	16.5	43	4.8	33	2.8	66	1.4

The immediate effects of scallop dredging on habitats and benthos can be considerable, but important considerations in determining the overall impact of a fishery on seabed habitats and communities are the sensitivity of the system to disturbance, and its subsequent speed of recovery. Species and communities in areas that are subject to high levels of natural disturbance are required to be adapted to regular perturbation, and so are likely to recover more quickly from anthropogenic disturbance than those in areas where natural disturbance is low (Kaiser *et al.* 2006).

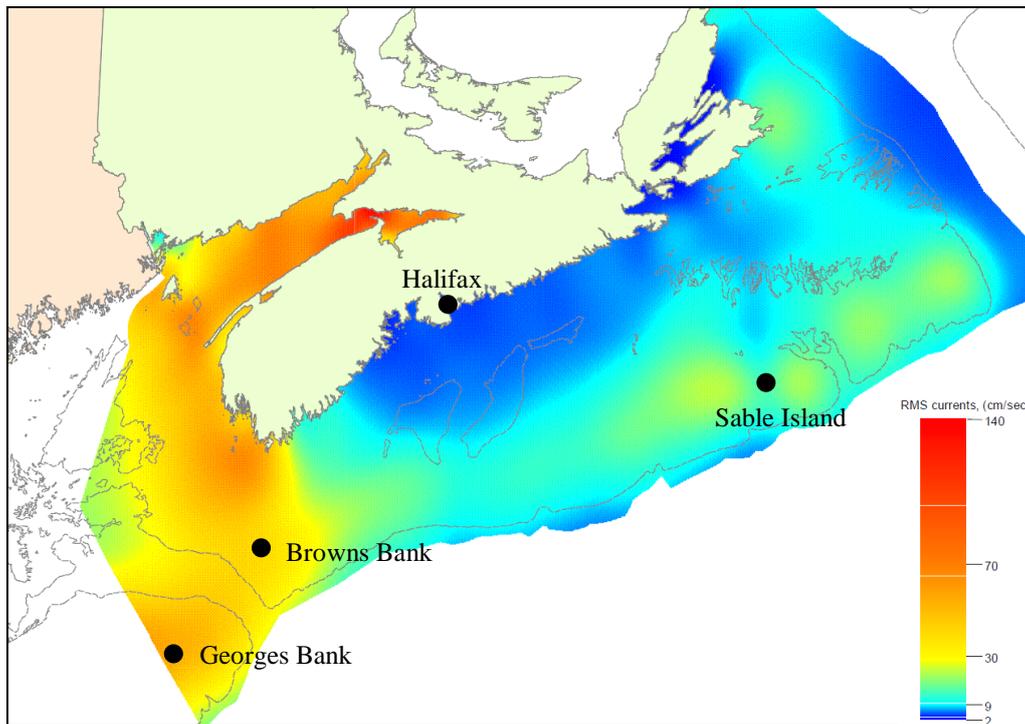


Figure 33: Bottom tidal current velocities. Red- strong tidal currents, blue- weak tidal currents
(Source: adapted from Kostylev 2004).

Natural disturbance is generated routinely through tidal currents or storm events. Tidal currents can be swift across the area fished by the ECOSF, in particular around Georges Bank and the Banks on the southwestern Scotian Shelf (Figure 33), but sediment transport is highly likely to be initiated by tidal currents on all of the offshore Banks targeted by the fishery (Kostylev 2004).

The maximum significant wave height on the offshore Banks across the region, generated during storm events, may also be considerable. Figure 34 indicates that the wave heights on the top of the Banks may approach 14 m (Kostylev 2004). While the author thought this may have been something of an over-estimate, benthic disturbance effects from fully developed waves of this height can extend to a water depth of up to 100 m (Kostylev 2004). As the ECOSF targets scallop beds on the offshore Banks at depths of approximately 50 – 100 m, the current and wave data together suggest that the bottom habitats in areas fished by the ECOSF are likely to be subject to considerable levels of natural disturbance.

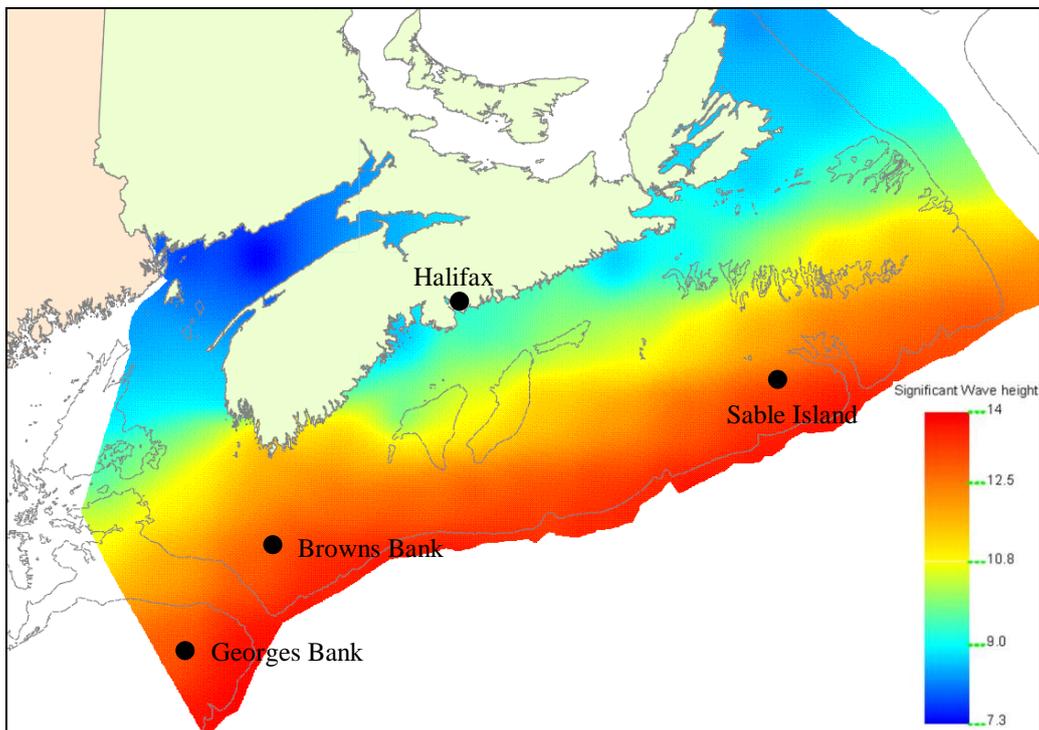


Figure 34: Maximum significant wave height (m) occurring on Scotian Shelf 1958 – 1999. The pattern shown here is a result of several major storms. (Source: adapted from Kostylev 2004).

Using axes of disturbance (which generally decreases with increasing water depth and decreasing current speeds) and scope for growth (which generally increases with increasing primary productivity, temperature and salinity) a habitat template of the Scotian Shelf and adjacent areas has been produced (DFO 2006b). Overall habitat sensitivity would increase with increasing stability and decreasing scope for growth. Based on this approach, habitats in the fishery area off southwest Nova Scotia and Georges Bank are predicted to be of relatively low sensitivity (DFO 2006b and Figure 35).

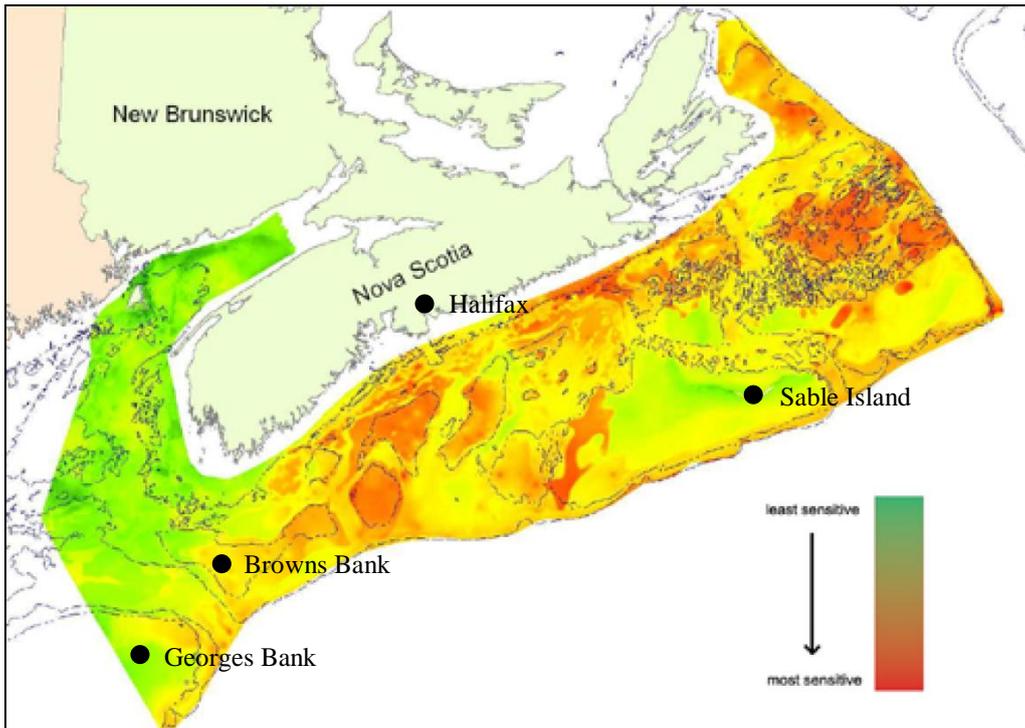


Figure 35: Scotian Shelf habitats, mapped by Euclidean distance from stable-adverse corner. (Source: DFO 2006b).

With respect to assessing the actual recovery potential of the specific gravel substrates and associated communities targeted by the ECOSF following scallop dredging, Collie *et al.* (2005) reported the findings of a very useful study. Over the period 1994 - 2000, they collected dredge samples and photographs from sites within a gravel area on the northern edge of the Canadian Georges Bank that were known to have different levels of fishing (trawling and scallop dredging) activity. Over the course of the study, a lightly fished site (84 m depth) was found to support a significantly higher number and biomass of benthic megafauna than a comparable, heavily fished site (80 m depth). The community at the lightly fished site was also characterised by fragile species, including shrimps, polychaetes, brittle stars and colonial epifauna, which were not present at the heavily fished site. Importantly, the study also monitored recovery at a site (47 m depth) that was closed to fishing in January 1995. Although the community biomass was initially lower in the closed area, by 2000 the average community biomass inside the closed area was 18 times higher than in a nearby fished area. Significant increases were also observed in species abundance and production, as well as in epifaunal cover, while the abundance of large and/or sensitive animals that are vulnerable to being caught or damaged by fishing activities had increased significantly. The abundance and biomass of some taxa were still increasing at the end of the study, but the results suggested that recovery times for the gravel habitats and communities would be in the order of 10 years. Similar recovery rates were observed by Bradshaw *et al.* (2000) during 10 years of sampling another gravelly scallop ground of similar depth off the Isle of Man.

Trophic relationships for species and communities on the western Scotian Shelf and Georges Bank areas have been modelled through the Maritime Region Ecosystem Research Initiative (Araújo & Bundy 2011). The models include consideration of species groupings including phytoplankton, zooplankton, cetaceans, seals, pelagic and demersal fish species, scallops and other benthic invertebrates.

3.5 Principle Three: Management System Background

3.5.1 Jurisdiction

The legislative authority for the management of seacoast and inland fisheries in Canada falls under the exclusive jurisdiction of the Parliament of Canada pursuant to the *Constitution Act, 1867*. It is an exclusive single jurisdiction system. Section 35(1) of the *Constitution Act, 1982* recognizes and affirms existing Aboriginal and treaty rights and any legislation must not infringe on those rights.

There are several pieces of legislation that apply to the fishing industry, the major one being the *Fisheries Act, 1985*. That *Act* grants wide discretionary authority to the Minister of Fisheries and Oceans and provides the authority for the enactment of regulations respecting the management of the fishery. The *Atlantic Fishery Regulations, 1985* and the *Fishery (General) Regulations 1993* are the main regulations governing the management of the fishery. *The Species at Risk Act, 2002* is important when fishing near populations of designated vulnerable species. *The Oceans Act, 1996* is an overarching piece of legislation of general application that adopts the precautionary approach as a major tool. The *Coastal Fisheries Protection Act, 1985* applies to foreign vessels and can come into play in this fishery as George’s Bank abuts the Canada-US jurisdictional line, and because of the Canada-France lines around Saint Pierre-Miquelon. The *Fish Inspection Act* governs the processing of scallops on the factory-freezer trawlers, which are designated as processing plants for the purposes of the *Act*.

Table 7: Principal acts and policy documents relevant to the ECOSF.

Principal Acts and Regulations	Description
The Fisheries Act, 1985	Provides for the absolute authority of the Minister and for the establishment of fishing licences, fishery regulations, reporting requirements, powers of fishery officers, protection of fish habitat and pollution prevention.
The Atlantic Fishery Regulations, 1985	Prescribes conditions for the operation of the fishery including quotas and seasons. Legal instruments called 'Variation Orders' are issued to increase or decrease quotas and to shorten or lengthen the fishing season as appropriate.
The Fishery (General) Regulations, 1993	Provides for the issue of licences and the authority to specify conditions in a fishing licence, e.g. allocations, vessel monitoring systems, hail-in/hail-out requirement, observer coverage, dockside monitoring, etc.
The Coastal Fisheries Protection Act, 1985	Prescribes conditions under which foreign vessels are permitted to fish in Canadian waters.
The Species at Risk Act, 2002	Authorises actions aimed at managing species of special concern, preventing the extirpation or extinction of endangered marine species, or promoting their recovery.
The Oceans Act, 1996	Prescribes the Canadian oceans management strategy, including sustainable development, the precautionary approach, and the implementation of integrated management of marine activities.
The Fish Inspection Act	Governs processing operations aboard vessels in Canadian waters.
The Aboriginal Communal Fishing Licences Regulations, 1993	Provides for the issue of licences to Aboriginal organizations pursuant to the <i>Aboriginal Communal Fishing Licences Regulations</i> for participation in commercial fisheries.

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

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biologically and economically sustainable. The '*Sustainable Fisheries Framework*' is composed of conservation and sustainable use policies and planning and monitoring tools. It also incorporates the precautionary and ecosystem approaches into fisheries management decisions. Finally, the '*Aboriginal Fisheries Strategy*' is aimed at ensuring that aboriginal entitlements are respected in the development of stable fisheries management regimes for aboriginal peoples.

3.5.2 International Implications

The ECOSF takes place in Canadian waters adjacent to the Exclusive Economic Zones of two other nations - the United States of America in the George's Bank area and the Republic of France in the St. Pierre Miquelon area off Newfoundland. As a result, special arrangements have been developed to ensure an orderly exploitation of the fishery resources in these areas.

In the Canada-US case, after an International Court of Justice determined the Georges Bank maritime boundary in 1984, the two countries entered a resource sharing agreement on yellowtail flounder, cod and haddock stocks. While scallops are not included in the agreement, any mortality of these three species during any fishing must be accounted for against each country's share of the established TACs. Discards in the offshore scallop fishery are calculated for the entire fleet based on observed coverage (2 trips per month). Canada has set aside certain reserves from its share of the TACs to cover bycatches of fish species on Georges Bank; the reserves are 30% for yellowtail flounder, 12% for cod and 1.03% for haddock from Canada's share.

Following the decision in 1984, incursions across the boundary by scallop fishing vessels occurred regularly, and resulted in high-seas chases, vessel seizures and forfeitures. Finally, in 1990, Canada and the USA signed an enforcement agreement that supports efforts to prosecute unauthorized fishing on both sides of the boundary effectively curtailing the incursions.

Cooperation and information exchanges between the two countries now characterise the relationship through the Transboundary Resource Sharing Understanding (created in 1995). The agreement is implemented by the the Transboundary Management Guidance Committee (TMGC), responsible for developing guidelines for harvesting groundfish resources on Georges Bank and the Transboundary Resources Assessment Committee (TRAC), the scientific arm of the TMGC, which conducts peer reviews of the stock status. Both committees are comprised of government and industry representatives from Canada and the United States

Similarly, in 1992 a court of arbitration handed down its decision for the delimitation of maritime areas between Canada and the Republic of France in the St. Pierre and Miquelon (SPM) area in NAFO Divisions 3Ps and 4Vs. An agreement now commonly called the '*Procès Verbal*' followed, which designated a 'Core Area' where there was mutual interest in managing common fisheries resources, including Icelandic scallops. The parties agreed that the resource was to be shared between the inshore scallop fleet of Newfoundland and Labrador and the French fleet. As a result, the ECOSF fleet is prohibited from fishing in French waters in the Core Area and, when operating in Canadian waters in the Core Area, must release all Icelandic scallops.

3.5.3 Recognized Interest Groups

The five companies that make up the client group and one other offshore fishing company, Mersey Seafoods Ltd, prosecute the fishery under assessment. Other interest groups include representatives from First Nations who have constitutionally protected aboriginal and treaty rights, the Seafood Producers Association of Nova Scotia, representing the interests of the licence holders; the Grand Manan Fishermen's Association and the Full Bay Scallop Association representing the interests of adjacent fisheries; environmental non-government organizations, primarily focused on sustainable fishing, protection of other fish and the environment; trade unions representing the interests of the

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vessel crew and plant workers; the provinces of Nova Scotia and Newfoundland and Labrador representing the interests of the provinces in which the companies reside, and the Canadian Food Inspection Agency, the federal regulator for the food processing component of the operation aboard the factory vessels.

3.5.4 Consultative Mechanisms

In 2004, DFO released its 'Consultation Framework for Fisheries and Oceans Canada'. The purpose of the document is to “...provide DFO officials with mechanisms and direction in support of a common understanding and coordinated approach to ensure enhanced consultation”. The Consultation Framework is organized under three broad themes – planning and evaluating, building mutual respect, and improving consultation culture. Each of these themes is followed by a set of principles. They require DFO officials to undertake consultation “...in order to improve departmental decision-making processes, promote understanding of fisheries, oceans and marine transport issues and strengthen relationships.”

The Consultation Framework document is very comprehensive and outlines in considerable detail how consultations should be carried out. However, it is more a set of guidelines than a binding requirement that could be enforced by stakeholders. Nevertheless, there are some statutory requirements to consult. For example, s.37 of the Fisheries Act requires the minister to consult provinces on undertakings that impact provincial habitat, the Oceans Act obliges the Minister to consult with provinces on the development of strategies for marine ecosystems and the Species at Risk Act requires consultation with aboriginal organizations and provincial ministers concerning species at risk residing on their land.

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

- In the 1990 Sparrow decision the court found that aboriginal groups have a right to fish for “food, social and community” (FSC) purposes and furthermore, that it takes priority, after conservation, over other uses of the resource. In other words, aboriginal peoples are first in line for access to the resource.
- In the 1999 Marshall case, the SCC ruled that the Mi’kmaq people had the right to fish in order to “produce a moderate livelihood” for its people. This decision expanded upon Sparrow and elevated fishing rights of aboriginal peoples to that of economic pursuit, albeit a limited one.
- In 2004, the SCC in its Taku/Haida decision concluded that government has a duty to consult and, where appropriate, accommodate the interests of aboriginal peoples where government has knowledge of the potential existence of Aboriginal title or rights. This duty is grounded in what the Court called “the honour of the Crown” finding that exploiting a resource during the resolution of an aboriginal claim was neither proper reconciliation nor honourable.

In summary, aboriginal groups have a constitutional right to fish for specific purposes and Canada has a constitutional, contractual and common-law obligation to ensure that right is protected. The nature and degree of consultation is an important factor in fulfilling this obligation and may include consent in some cases. While there is no participation of aboriginal groups in the offshore scallop fishery, they continue to be consulted and form a part of the advisory committee system.

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The Maritimes Region of DFO is responsible for the management of the offshore scallop fishery. Fishery Managers at DFO consult with stakeholders on the development of integrated fishery management plans (IFMPs), which outline goals and management measures by stock and area. The major consultative forum for the development of the annual Offshore Scallop IFMP is the Offshore Scallop Advisory Committee (OSAC), composed of the licensed, participating companies and the interested parties noted above. OSAC provides input and advice to DFO on the conservation, protection and management of the offshore scallop resource in the unit of certification. Various personnel from the science, fisheries management/enforcement and policy administrations from DFO provide support and advice to the OSAC in their respective areas. Marine ENGOs do not usually attend OSAC meetings but are consulted on environmental issues through the DFO-Marine ENGO Dialogue Forum, a stand-alone body with terms of reference touching on marine issues crossing all fisheries.

OSAC meetings are held at least once annually, and more often should issues arise during the fishing season. The Committee provides advice on annual fishing plans, regulatory measures, seasons, licensing policies, size limitations and gear restrictions. It makes recommendations on annual TACs, quotas, the administration of the Enterprise Allocation (EA) rights-based fishing strategy and on the introduction of new fishing technologies into the fishery that may affect existing management measures. The Committee reviews and considers DFO science advice for the fishery in the formulation of the annual fishing plan. Unless a majority of Committee members say otherwise, the proceedings of the OSAC are open to the public and media representatives. It is understood that this clause has never been used to exclude members of the public from attending meetings of the OSAC. A DFO official chairs the committee with an industry co-chairman at the discretion of committee members.

The Regional Advisory Process (RAP) is a science advisory process that is an integral component of the management of the fishery. That process begins with proceedings to develop assessment frameworks for the conduct of stock assessments in all fisheries. These assessment framework meetings take place every few years, the last of which for offshore scallops was held in February of 2009. The objectives of the meeting were to determine methodologies for estimating the current state of the stock, for characterizing stock productivity including reference points, for providing advice on harvest levels and to provide advice on next steps including research recommendations.

During framework meetings, scientific papers are presented with the intent of using the information and the expertise present to propose a new assessment framework for the conduct of the Georges Bank scallop assessment including changes to the scallop survey design and the use of a new population models. Information presented is thoroughly reviewed by meeting participants. The 2009 meeting on scallops included scientists from Brazil, the United States and other regions of DFO as well as a representative of an ENGO and industry players from the ECOSF.

Step two in the scientific process is to use the framework to assess the status of the offshore scallop stocks to support the management of the fishery. A full stock assessment is conducted every three years, the last having been completed in 2013. DFO scientists, fishery managers, Aboriginal organizations and the fishing industry attend conduct a full peer review of the available information. A Science Advisory Report (SAR) is produced that is used to formulate the fishing plan for the upcoming years. In the interim years, a Stock Status Report (SSR) is issued, the purpose of which is to update the key results from the previous assessment with data from the recent year in order to provide science advice for the management of the subsequent year's fishery.

Consultations with ENGO's are held within the context of the *"Fisheries and Oceans Canada, Maritimes Region and Marine Environmental Non-Governmental Organizations Dialogue Forum"*, a

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mechanism established between DFO and the Ecology Action Center (EAC), a Halifax based ENGO. It is the primary body for discussion between DFO and ENGOs on overarching policy issues regarding the sustainable development and conservation of Canada's marine resources. The Forum is co-chaired by the Regional Director General of DFO and a member of the EAC, with the Canadian Wildlife Federation, Canadian Parks and Wilderness Society, and the World Wildlife Fund comprising the other members. The Forum is not a decision making body, its goal being to conduct discussions at the strategic level. Specific operational issues can be used to clarify policy objectives and provide for a more relevant and useful discussion. It is a stand-alone body and does not report to a higher level. In order to ensure consistency, each of the Parties has agreed to have no more than four Forum members at one time following a selection process outlined in the terms of reference that are designed to include ENGOs with a broad, marine-focused mandate.

3.5.5 Decision Making Process

Policy guidelines have been developed to guide decision-making in the management of fisheries in Canada. The "*Policy Framework for the Management of Fisheries on Canada's Atlantic Coast*" envisions robust fisheries that include all stakeholders and which are biologically and economically sustainable. The "*Sustainable Fisheries Framework*" and the "*Fishery Decision-Making Framework Incorporating the Precautionary Approach*" ensures that the precautionary is built into fisheries management decisions. Finally, the "*Aboriginal Fisheries Strategy*" which is aimed at ensuring that aboriginal entitlements are respected in the development of stable fisheries management regimes for aboriginal peoples.

The legislative structure and policy guidelines establish the fundamental rules under which the fishery is governed, including the TAC and EA system. The fishery is managed through a combination of fishing seasons, closed areas, an annual TAC and a 'meat count' (a selected number of scallop meats per 500 g).

The annual decision-making process begins with a meeting of all interested parties through the OSAC to discuss TACs and management measures for the various fishing areas. Science, including the use of the precautionary approach is the basis for decision-making regarding removal levels in the fishery.

The model is one of collaborative co-management, with public review and consultation being an integral part of the scientific advice and the management measures adopted. Surveillance approaches are, by necessity, less open, but opportunities do arise for cooperation in monitoring, reporting and refining of methods including joint DFO-industry approaches, which may involve cost sharing.

The IFMP and the annual fishing plans are approved by the Regional Director-General (RDG), Maritimes Region. In 2006, the Nova Scotia based offshore scallop fleet and the Newfoundland and Labrador inshore scallop fleet were geographically separated in terms of their access to sea scallops beds on St. Pierre Bank. While each Region has the authority to approve the fishing plans for their respective fleets, there is a written agreement between the RDGs to keep each other informed on all management recommendations that could impact the sea scallop fishery on St. Pierre Bank.

The fishery is monitored closely by VMS, dockside monitoring, port sampling and observer coverage. Should emergencies arise, a meeting of OSAC can be called to consider an appropriate course of action. Legal instruments called Variation Orders may be issued quickly by DFO under the authority of the *Fisheries Act* to change any of the conditions for managing the fishery, including increasing/decreasing meat counts, shortening or lengthening the fishing season, or closing the fishery on short notice to provide time to react to contingencies and emergencies. Considering the small number of participants in the fishery, adjustments to the fishing plan can be implemented in a matter of hours if necessary.

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3.5.6 Objectives of the Fishery

Objectives for the ECOSF have been incorporated into the IFMP, effective for the 2011 and following fishing years. These are reproduced in Table 8, below.

Table 8: Long, medium and short term management objectives for the ECOSF.
(Source: DFO 2011b)

Long term objectives	Medium/short term objectives (strategies)	Tactics	Monitoring & evaluation framework
1. Do not cause unacceptable reduction in <u>productivity</u> so that components can play their role in the functioning of the ecosystem	Keep fishing mortality of sea scallop moderate by targeting an exploitation rate of 25% in the healthy zone	TAC, meat counts, area closures, PA framework	<u>Monitoring Data:</u> Logbooks, port sampling, annual science/industry abundance survey <u>Evaluation:</u> Annual regional advisory process (RAP)
	Keep fishing mortality of bycatch stocks and species moderate.	Mandatory release, bycatch caps (cod, haddock, yellowtail), time/area closures (cod, YT flounder)	<u>Monitoring Data:</u> At-sea observation, logbooks for Monkfish landings, VMS <u>Evaluation:</u> Annual RAP, Annual Canada-US Transboundary Resource Sharing Understanding
2. Do not cause unacceptable reduction in <u>biodiversity</u> in order to preserve the structure and natural resilience of the ecosystem	Keep fishing mortality of relevant SARA listed stocks moderate (wolffish)	Mandatory release of wolffish	<u>Monitoring Data:</u> SARA logs <u>Evaluation:</u> Species recovery strategies
3. Do not cause unacceptable modification to <u>habitat</u> in order to safeguard both physical and chemical properties of the ecosystem	Manage area disturbed of coral habitat by allowing no fishing in sensitive coral hotspots	NE Channel Coral Conservation Area, Lophelia Closure, Gully MPA	<u>Monitoring Data:</u> VMS <u>Evaluation:</u> DFO review of Coral Closures in the context of Sensitive Benthic Areas policy implementation
	Manage area disturbed of other bottom habitat	Bottom mapping,	<u>Monitoring Data:</u> Monitor the spatial/temporal footprint of the fishery
4. Create the circumstances for <u>prosperous fisheries</u>	Promote stability in access to resources and allocations	Enterprise allocations	<u>Monitoring Data:</u> Landings (EA) <u>Evaluation:</u> Offshore Scallop Advisory Committee, individual enterprises

3.5.7 Regulatory Measures

As noted above, the *Fisheries Act* is the major legislative instrument for the management of Canada's fisheries. Section 7 (1) of that *Act* grants absolute discretion to the Minister (of DFO) to "...*issue or authorize to be issued leases and licences for fisheries or fishing, wherever situated or carried on.*" Section 43(1) grants the power to the Governor in Council (the cabinet) to "*make regulations for carrying out the purposes and provisions of this Act.*" Regulations governing the offshore scallop

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fishery can be found in the *Atlantic Fishery Regulations (AFR)*, 1985 and the *Fishery (General) Regulations (FGR)*. The *Oceans Act*, in both the preamble and in section 30, Part II adopts the precautionary approach as a mandatory national strategy.

These acts and regulations form the foundation of the TAC and EA system and establish the fundamental rules under which the fishery is governed, notably meat counts, fishing seasons, and licence conditions that specify in detail the restrictions under which the fishery must be conducted.

A Precautionary Approach Framework has been implemented in the offshore scallop fishery for the most important fishing area, Georges Bank, which represents 70-80% of the fishery. Upper (target) and Lower (Limit) reference points have been created and a set of harvest control rules developed to guide decision-making when the stock approaches the lower limit. It is the intention of DFO and the industry to consider the application of precautionary approach frameworks to the other fishing areas as models are developed. Other proxy-based frameworks may be considered as appropriate.

3.5.8 Education and Shared Stewardship

In order to achieve effective management of the fishery, all licence holders are issued a fishing licence outlining an extensive list of conditions and obligations, covering such things as areas authorized to fish, a hail-in requirement, a fully functioning VMS providing data to the DFO operations centre, on-board observer upon request, 100% dockside monitoring of landed weight and the mandatory completion of log books containing catch and effort information.

Information on fisheries legislation, scientific research, assessment reports and the Offshore Scallop IFMP is either available on the DFO website or upon request.

The OSAC provides a forum for an exchange of information on the goals and detailed management measures of the fishery among the licence holders, other stakeholders and regional managers and scientists on all aspects of the management system.

A well-developed spirit of co-management between the fishing participants and the regulator characterizes the ECOSF. Post seasonal analysis of the fishery is conducted through the OSAC process to assess the effectiveness of enforcement activities, to develop recommendations for the upcoming season and to determine expectations in relation to monitoring, control and surveillance activities. Informal interaction with all parties involved in the fishery takes place on the wharf, during patrols and in the community to promote conservation.

Stewardship initiatives consist of industry funding and/or participation in a wide range of annual activities, including:

- The provision of a commercial scallop fishing vessel and crew to carry out research surveys in SFAs 25, 26 and 27 under the direction of a DFO biologist;
- The funding of an independent third party dockside monitoring program;
- The funding of port sampling of the size distribution of meats in the catch;
- The administration of the 'Protocol for marketing of roe-on scallops' including responsibility for Paralytic Shellfish Poisoning and Domoic Acid analysis;
- The monitoring of meat counts for the purpose of protecting juvenile scallops;
- The funding of the collection of scientific data;
- The provision of analytical support for offshore scallop data bases used for development and assessment of the fishery;
- The summarizing of results of gear experiments to minimize incidental catches;

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- The carrying out of 3D seabed mapping in a number offshore scallop fishing areas to increase catch rates while at the same time reducing incidental catches and the amount of bottom towed

3.5.9 Monitoring, Control and Surveillance

The DFO is the responsible enforcement agency for fishing in Canadian waters through its Conservation and Protection Branch (C&P). It has a staff of land-based and seagoing Fishery Officers and a complete system of monitoring, control and surveillance (MCS) for the offshore scallop fishery, including:

- At-sea observations by patrol vessels and fixed-wing aircraft
- Industry-funded on-board observer coverage with protocols to monitor fishing operations
- 100% dockside monitoring of landings through the Dockside Monitoring Program (DMP)
- Submission of vessel fishing log books
- Catch and Effort database to track catch to EA
- Electronic VMS on each vessel
- A ticketing system for minor offences
- A court-based system for more serious offences which can result in fines up to \$500,000, jail terms and forfeiture of catch and gear
- Detailed conditions for each licence in the fishery including gear to be used, species authorized to fish, area restrictions, observer requirements, approved/operational VMS on board, hail-in provisions for catch, mandatory dockside weighing and provision of detailed catch logs at trip's end

In September, 2013 C&P presented an overview of its planning and reporting system for monitoring, control and surveillance to the Scotia Fundy Fishing Sector Roundtable Forum. The presentation consisted of an overview of the compliance program, compliance and enforcement considerations, the current planning process and highlights, results and future direction of the program.

The approach signalled a shift in compliance and monitoring activities toward a more 'intelligence-led' process consisting of an analysis of past enforcement data against the requirements of the upcoming season in an attempt to identify risks to conservation and problem areas. Stakeholders are engaged and DFO staff meet to discuss priorities and develop enforcement plans. An 'integrated risk management' approach is employed that plots risk according to likelihood and impact. Plans are adjusted mid-year to reflect unforeseen risks and planned results are assessed against actual outcomes.

Changes for the fall of 2013 included the addition of two Mid-Shore Patrol Vessels based in Dartmouth to serve the Atlantic area (Newfoundland, Gulf and Maritimes Regions).

For 2013, DFO recorded a total of 13 active vessels in the ECOSF. VMS issues were identified on one of the 13 vessels in 2013, but as soon as the vessel was notified, it promptly switched from the main unit to a backup. There were 19 Observer deployments in 2013, for a total of 243 observed sea days, all without recorded irregularities. Routine surveillance flights continued to be conducted in the fishery area in 2013. Other forms of patrol are summarized below. Only one violation was identified for this fleet in 2013 - lack of registration (personal fishing licence) for a crew member resulting in a warning.

DFO reports that for 2012 there was no change in compliance patterns for this fishery and overall compliance remained very good. In 2012, 79.75 fishery officer hours were dedicated to the ECOSF with no violations. This coverage was supplemented through VMS on every vessel, observer coverage

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at a rate of two deployments per month and surveillance flights several times a week. There were also 104 vessel checks in 2012 (mostly from aerial surveillance).

An enforcement and compliance summary table is provided below (Table 9). A total of 10 suspected violations were recorded in the ECOSF over the period 2009 – 2013. Three of these resulted in warnings, two resulted in charges not being pursued, and five resulted in charges laid of which only one of these in turn resulted in a conviction. The five charges laid were associated with one identical occurrence in 2009 relating to fishing in a closed area. It is noteworthy that these latter violations were not detected by DFO but were reported to DFO by the vessel once the captain realized that they were fishing in the prohibited area (DFO 2014j). The remaining suspected violations pertain to fishing in US waters (2), failure to produce a personal fishing licence (2) and failure to comply with licence conditions –fishing in an area without quota (1). The fact that only five charges were laid, all relating to the one incident which was self reported by the Captain, indicates that there is no pattern of systematic non-compliance in the ECOSF.

Table 9: Enforcement report for the ECOSF, 2009 – 2013.

	2009	2010	2011	2012	2013
Enforcement (hrs)	225.75	219	112	127.5	148.25
Patrol (hrs)	101.5	96.5	75.5	60.25	75.25
Number of violations	6	1	1	0	1
Number of convictions*		1			
Penalties*		\$37,556			

*reflected in the year the conviction or penalty occurred

3.5.10 Research Plan

Research activities for offshore scallops begins with the assessment framework process outlined in Section 3.5.4, above that establishes methodologies for determining stock status, stock productivity, reference points and advice on harvest levels. It also includes research recommendations. The last framework process (2009) recommended longer-term research on investigation of discard and incidental mortality, changes in natural mortality and growth and the use of the Catch At Size Analysis (CASA) model for comparative purposes.

The 2014-2015 offshore scallop research work plan (DFO 2014k) outlines three five-year research objectives:

- Forecasts for most of the scallop fishing areas provide reasonable short-term (1 year) predictions of biomass based on observed recruitment but using median recruitment for long-term estimates of equilibrium yield results in more pessimistic estimates of productivity than experience indicates.
- Testing hypotheses about how habitat, temperature, and other environmental factors control the spatial distribution of scallop abundance, condition, and recruitment over a broad geographic range will provide the bases for longer-term (10-50) predictions.
- With additional resources we would incorporate camera surveys to test finer scale habitat associations, increase understanding of scallop dynamics and provide information on other benthic species.

The scope of the work plan is to support annual decision making by fishery managers as well as DFO's precautionary approach and long-term fishery management strategies by linking reference

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points to long-term scallop dynamics. The study of links between benthic habitat and scallop productivity contributes to MPAs, benthic habitat, and the Region's EAM decision-making. The plan seeks to take a proactive approach by participating in a partnership with management and the industry to manage the scallop fisheries and to keep industry up-to-date with changes in DFO policies that will affect them. The aim is to produce high quality analyses of fishery and survey data that reduce advice uncertainty and provide data at a habitat scale that allows the fishing industry to identify with the scientific approach adopted.

Annual stock surveys are carried out throughout all major production areas with more detailed surveys on Georges Bank 'a' and Browns Bank North, the two most productive areas. These surveys enable biomass and annual productivity of the stock to be estimated and support the harvest control rules. Full stock assessments are conducted every three years with updates in the intervening years. The work plan projects staff requirements at one research scientist, three biologists and two biological technicians.

On Georges Bank, a biomass-based population model is used to assess the impact of the fishery and evaluate the future catch level for Georges Bank 'a'. This approach is being adapted for part of the Eastern Scotian Shelf (Sable/Western Bank), Georges Bank 'b', and Browns Bank North scallop areas.

Current research is focused on refining the models for those areas where they are used, re-establishing an ageing program for Georges Bank and understanding the spatial and temporal patterns of growth.

4 EVALUATION PROCEDURE

4.1 Harmonised Fishery Assessment

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

The MSC specifies the following (MSC 2013a):

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

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

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

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

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

CI3.2.3.4 The team responsible for the new assessment shall consider the findings of the surveillance report(s) produced for the overlapping certified fishery, if any.’

As of October 2014, a number of non-*Placopecten* scallop fisheries are either in assessment or are MSC certified. Two other *Placopecten magellanicus* fisheries in the Northwest Atlantic are also MSC certified. These are listed in Table 10, below. With respect to Principle 3 outcomes, it is considered that harmonisation should be considered between the ECOSF and the FBSA Canada Full Bay sea scallop fishery, but not between the ECOSF and the US Atlantic sea scallop fishery in the USA. It is useful to compare the Principle 1 and Principle 2 scoring for both of the other fisheries, but harmonisation is not considered to be required as the target stocks are different (Principle 1) and the performance of the three fisheries in the wider environment may be very different because of local considerations (Principle 2).

Table 10: *Placopecten magellanicus* fisheries in the MSC system.

Lobster Fishery	Gear Type	Location	MSC Status
FBSA Canada Full Bay sea scallop	Dredge	The Bay of Fundy and Canadian Scallop Fishing Area 29, West of 65° 30' W longitude.	Certified
US Atlantic sea scallop	Dredge	FAO Statistical Area 21, off shore from Maine to Cape Hatteras, North Carolina.	Certified

A comparison of outcomes (scores and conditions) between the different Northwest Atlantic scallop fisheries within the MSC system is provided in Table 11, below. A brief indication of any differences of ≥ 15 in the score between the ECOSF and another fishery is provided. Any difference of 5-10 in the score between the ECOSF and another fishery may be due to interpretation of the assessment teams, and has been ignored unless it resulted in a condition being set on one fishery but not the other.

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Table 11: PI scores for scallop fisheries considered for harmonisation with the ECOSF.

NB – Only the P3 scores between the ECOSF and the FBSA Canada Full Bay Sea Scallop Fishery is considered to require harmonisation; other comments are provided for comparison only.

NB – **Yellow highlighted cells** indicate where there was a difference in score of ≥ 15 between the ECOSF and the FBSA Canada Full Bay Sea Scallop Fishery for P3 elements, as considered for harmonisation.

PI	Fishery			Rationale for any differences of ≥ 15 in scoring
	ECOSF	FBSA Canada Full Bay Sea Scallop (FBSA)	US Atlantic Sea Scallop (USASS)	
1.1.1	80	80	100	USASS – The status of all the different stock components of the fishery are clearly above established reference points.
1.1.2	100	75	100	FBSA – No limit reference point in place.
1.1.3	n/a	N/A	N/A	N/A
1.2.1	95	85	95	N/A
1.2.2	100	75	90	FBSA – Harvest control rules do not ensure that exploitation rates are reduced as limit reference points are approached.
1.2.3	90	100	90	N/A
1.2.4	85	95	95	N/A
2.1.1	100	100	80	USASS – Yellowtail flounder is retained.
2.1.2	100	80	95	FBSA – Monkfish is landed.
2.1.3	100	80	90	FBSA – There is not 100% dockside monitoring across all vessels.
2.2.1	80	80	80	N/A
2.2.2	100	80	90	FBSA – Higher levels of bycatch are observed in the fishery, and a partial strategy is considered to be in place to manage impacts.
2.2.3	80	75	75	FBSA – Not all species identified in research vessel surveys or in bycatch data. USASS – There is limited information on the stock status of winter flounder as a main bycatch species.
2.3.1	90	80	90	N/A
2.3.2	85	90	90	N/A
2.3.3	80	75	80	FBSA – No observer data recording bycatch of ETP wolffish for some regions.
2.4.1	80	60	60	FBSA – Known beds of emergent epifauna (<i>Modiolus modiolus</i>) impacted by fishing (scalloping dredging and/or trawling), and sponges comprise large proportion of the bycatch. USASS – Area swept by the fishery is extensive on a regional and bioregional basis.
2.4.2	80	60	70	FBSA – No partial strategy to manage habitat impacts in place yet. USASS – No partial strategy to manage habitat impacts in place yet.
2.4.3	90	95	90	N/A
2.5.1	80	80	60	USASS – Area swept by the fishery is extensive on a regional and bioregional basis.
2.5.2	90	80	80	N/A
2.5.3	95	85	95	N/A
3.1.1	95	95	95	N/A

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3.1.2	90	95	100	N/A
3.1.3	100	100	100	N/A
3.1.4	90	80	100	N/A
3.2.1	100	60	90	FBSA – No clearly defined short and long-term objectives for the fishery.
3.2.2	90	90	100	N/A
3.2.3	100	85	80	FBSA – Some violations, such as fishing in closed areas, have been observed. USASS – Insufficient evidence on enforcement capacity, cooperation and compliance to meet the SG100 level.
3.2.4	80	90	100	USASS - There is a comprehensive research plan in place.
3.2.5	80	70	90	FBSA - No review of performance against P2 elements is undertaken.

4.2 Previous Assessments

The Eastern Canada Offshore Scallop Fishery was assessed previously against the MSC Standard, and was certified as sustainable on the 22nd March 2010. This report therefore presents the results of the second assessment of this fishery against the MSC Standard.

In 2010, the strengths and weaknesses of the ECOSF were considered to be the following (from Caddy *et al.* 2010):

Principle 1 - A conservative harvest strategy that is aimed at maintaining a good fishing pattern, a low harvest rate, maximum meat counts, and a limit on the number of licensed enterprises. However, the assessment team did highlight that there was limited information on the incidental and discard mortality of scallops.

Principle 2 - The industry has invested in seabed mapping thereby reducing the impact of the gear on the sea bed. There is good knowledge of benthic habitats and species within the fishing area. However, analysis has not been completed to judge whether the observed impacts of scalloping on habitat and biological diversity, community structure and productivity are within acceptable limits.

Principle 3 - The institutional and operational management of the fishery is considered overall to be very good. However, the fishery management system lacks: explicit short and long term resource and environment objectives; procedures for measuring performance relative to the objectives; formalised measures to apply a precautionary approach; and, management strategies to detect and reduce ecosystem impacts.

The 2010 certification was based on a pre-Fishery Assessment Methodology assessment tree, and so it is not possible to conduct a direct comparison between the results of this reassessment (based on the default assessment tree) and the previous one. Nevertheless, the 2010 assessment team concluded that the fishery achieved an overall average score of above 80 for each MSC Principle and scored below 80 against eight Performance Indicators (PIs).

There were five conditions of certification set against the fishery in 2010. These were as detailed in Table 12, below:

Table 12: Summary of the Conditions set at the 2010 certification.

Condition	PI	Closed? (Y/N)	Justification
<p>1: <u>Incidental and Discard Mortality</u></p> <p>The client is required to ensure that by the fourth annual audit all major sources of fishery related mortality, including landings, fishing effort, discards, incidental mortality and mortality of juveniles are accurately recorded/estimated for most fleets and most parts of the stock. To achieve this outcome, it is recommended that:</p> <ul style="list-style-type: none"> • By the second annual audit a program is developed to assess the incidental and discard mortality of scallops. • By the fourth annual audit information from this program is formally taken onto account within the management of the fishery. 	1.1.2.3	Y (closed at 3 rd Audit)	<p>At the 3rd audit, the Client provided the audit team with two draft SAR reports (DFO 2013a, DFO 2013b) that document improvements in the model that estimates non-harvest mortality (NB: these reports are now published). Non-harvest mortality, and its uncertainty, was estimated using an index of dead scallops (paired shells) from the survey, effectively accounting for the lack of reliable information with regard to mortality resulting from discards, incidental fishing and natural sources.</p> <p>As a result, this PI was rescored at 80 and the condition was closed. See Brand <i>et al.</i> (2013) for more information.</p>
<p>2: <u>Bycatch and Discards</u></p> <p>The client is required to ensure that by the second annual audit sufficient information on discarded scallops and non target species is gathered in order to evaluate the impact of the fishery on the scallop stock, non target species and/or ecological systems. To achieve this outcome, it is recommended that:</p> <ul style="list-style-type: none"> • By the first annual audit, bycatch monitoring is expanded to cover all of the Banks that are fished. The same level of bycatch monitoring should be maintained on Georges Bank and at least one trip per season should be monitored on the other named Banks that are fished in the Unit of Certification. • By the first annual audit, methods for collecting under-sized scallop discard data are reviewed and improvements implemented where warranted. • By the second annual audit, all bycatch and under-sized scallop discard data are processed and reported on an annual basis. 	2.1.2.1, 2.1.2.2 and 2.1.4.2	Y (closed at 2 nd Audit)	<p>The three issues required by this Condition and listed in the Client Action Plan were all addressed by the 2nd audit. Although there was little fishing on grounds other than Georges Bank in 2011, observer coverage was extended to two grounds that were fished, German and Browns, with one trip that covered both grounds. The reports for these grounds showed by-catches similar to Georges Bank. There was no coverage on the Eastern Scotian Shelf grounds in 2011 but landings from these grounds were again very low (27t). Methods for collecting undersized scallop data were reviewed with DFO. By-catch data are now reported on an annual basis and the analyses for 2010 and 2011 confirmed that there are no other main by-catch species, other than cod, haddock and yellowtail flounder, and these are all analysed and recorded in the TRAC reports.</p> <p>As a result, all three PIs were rescored at 80 and the condition was closed. See Brand <i>et al.</i> (2012) for more information.</p>
<p>3: <u>Biological Diversity, Community Structure and Productivity</u></p> <p>The client is required to ensure that by the third annual audit sufficient information is available on the consequence of the fishery to suggest it is not having unacceptable impacts on habitat and biological diversity, community</p>	2.1.4.3 and 2.1.4.4	Y (closed at 3 rd Audit)	<p>In recent years there has been a considerable amount of scientific study relevant to Condition 3 and this has been collated and made available to the auditors. The comprehensive GIS analysis of the spatial and temporal footprint of the fishery over the period 2007-2012 is both impressive and useful. With six years' of</p>

<p>structure and productivity. If any unacceptable impacts are identified by the fourth annual audit the client shall implement measures to ensure they are addressed. To achieve this outcome, it is recommended that:</p> <ol style="list-style-type: none"> By the second annual audit determine the spatial distribution of fishing disturbance of the seabed for all banks fished on an annual basis. This analysis should be done for as many past years as possible. Compare the spatial distributions of fishing disturbance for successive years to determine the time intervals between disturbances for all areas fished. By the second annual audit, use existing information to map the seabed habitats, and, where possible, communities of the scalloping areas for which multibeam data are not available. By the third annual audit, based on (a) and (b) above, develop a program to fill key knowledge gaps. By the third annual audit, review existing information on the sensitivity of the identified seabed habitats and associated species and the expected rates of recovery from disturbance by scallop fishing. By the third annual audit, use the above information to evaluate the likely impacts of the fishing disturbance on habitat and community structure, biological diversity and productivity as well as the risk of creating irreversible changes. Assess the acceptability of likely impacts that are identified. If unacceptable impacts are identified, by the fourth annual audit, new management strategies should be outlined and measures implemented to detect and manage the ecosystem impacts of the fishery and ensure that key elements of the ecosystem are protected. 			<p>data now available it can be used to determine detailed changes in the annual footprint of the fishery and the return rate to different grounds. The studies show that the average annual footprint of the fishery is a relatively small proportion of the banks fished (varying from 16% for Georges Bank down to 2% for Sable) and that the core fishing areas on which the fishery concentrates represents less than 1% of each bank on an annual basis. For the core areas the return rate is greater than 6 years. Used in conjunction with knowledge of the communities and species present this analysis is a powerful tool for assessing the benthic impacts of the fishery on habitats, biological diversity, community structure and productivity. With this GIS analysis, the detailed review of literature relevant to the impact of New Bedford dredges on these fishing grounds and elsewhere, and the DFO confirmation that sensitive habitats lie outside the footprint of the offshore fishery, the issues required by this Condition and listed in the Client Action Plan have all been addressed</p> <p>As a result, both PIs were rescored at 80 and the condition was closed. See Brand <i>et al.</i> (2013) for more information.</p>
<p>4: <u>Management Objectives</u></p> <p>The client is required to ensure that by the first annual audit explicit short and long-term resource and environment objectives and procedures for measuring performance relative to the objectives are incorporated into the management system. To achieve this outcome, it is recommended that:</p> <ul style="list-style-type: none"> By the first annual audit explicit short and long-term resource and environment objectives and review of milestones are 	<p>3A.3.1 and 3A.3.4</p>	<p>Y (closed at 1st Audit)</p>	<p>At the 1st audit, it was confirmed that the Offshore Scallop IFMP was under review and was expected to be revised in a form that follows the DFO IFMP template. DFO and the Offshore Scallop Advisory Committee also developed and agreed new long, medium and short term objectives for the fishery. These were presented in a tabular form set out in a “companion document” to the existing management plan. A letter from DFO to the client and provided to the audit team confirmed that,</p>

<p>incorporated into the management system.</p> <ul style="list-style-type: none"> By the first annual audit appropriate procedures are implemented for measuring performance relative to the objectives. 			<p>as such, they have the same status as the IFMP. The table of objectives summarises:</p> <ul style="list-style-type: none"> Long-term, high-level objectives related to target species and ecosystem management issues; Medium/short term objectives, tactics or measures to achieve the medium/short term objectives, and; Monitoring and evaluation methods for each medium/short term objective. <p>As a result, both PIs were rescored at 80+ and the condition was closed. See Brand <i>et al.</i> (2011) for more information.</p>
<p><u>5: Formalisation and Implementation of a Precautionary Approach</u></p> <p>The client is required to ensure that by the first annual audit formalised measures are implemented to apply a precautionary approach in the development and application of operational procedures in the absence of sufficient information. To achieve this outcome, it is recommended that:</p> <ul style="list-style-type: none"> By the first annual audit formalised measures are described and implemented to show how the precautionary approach is applied in the management system. 	<p>3A.3.3</p>	<p>Y (closed at 1st Audit)</p>	<p>The audit team were provided with a “companion document” to the offshore scallop IFMP detailing the application of DFOs precautionary approach framework for scallops on Georges Bank. The PA framework reflects the best available knowledge with respect to biomass based proxy reference points at this point in time and may be updated as new information becomes available. With respect to scallops on Georges Bank, Reference Points were developed:</p> <ul style="list-style-type: none"> Upper (or Target) Reference Point - is set at 80% of the mean fully recruited biomass (>95 mm) from 1981 – 2009. This equates to 8,000 mt. Lower (or Limit) Reference Point is set at 30% of the mean fully recruited biomass from 1981 – 2009. This equates to 3,000 mt. <p>As a result, this PI was rescored at 80 and the condition was closed. See Brand <i>et al.</i> (2011) for more information.</p>

All the conditions of certification from the 2010 certification were closed out during or before the 3rd audit. As a result, the fishery entered the reassessment process in 2014 with no conditions outstanding.

After the conditions placed on the ECOSF at the first certification were closed and the PIs rescored, the overall Principle scores for the fishery were P1: 91.2, P2: 83.9, and P3: 89.7. These scores are generally consistent with the scores attained by the ECOSF for this new assessment (see section 6.1).

4.3 Assessment Methodologies

This assessment of the ECOSF was conducted using the CR version 1.3 (MSC 2013a), and with the MSC Full Assessment Reporting Template version 1.3. The default assessment tree was adopted, with no changes made to the text of any default Performance Indicator (PI). The risk-based framework (RBF) was not used.

4.4 Evaluation Processes and Techniques

4.4.1 Site Visit

Notifications of each key step in the assessment process were provided to the MSC, uploaded by the MSC to their website, and advertised through the MSC’s bi-weekly ‘Fisheries Update’. Known stakeholders were also contacted by e-mail and advised of the key steps. The known stakeholders were asked to forward the notifications on to any other person who they considered to be a stakeholder but who was not listed in the group e-mail, or to send the Lead Assessor the other person’s details so that they could be contacted.

Table 13: Meetings conducted during the 2014 reassessment site visit.

Date	Attending	Organisation	Issues Discussed
16 th June 2014	John Angel	Intertek Fisheries Certification (IFC)	<ul style="list-style-type: none"> • Reassessment process • Status of 2012 IFMP • Stock status and TAC changes • Links between Canadian and US stocks • Catches of retained and discarded species • Information on ETP species interactions • Habitat information • Monitoring and enforcement of the ECOSF • Management process
	Rob Blyth-Skyrme	IFC	
	Andy Brand	IFC	
	Christine Penney	CSLP – client	
	Catherine Boyd	CSLP – client	
	Roger Stirling	SPANS - client	
17 th June 2014	John Angel	IFC	<ul style="list-style-type: none"> • Any recent changes to the assessment model and process, including frequency of assessment. • The stock assessment review process, including participation by external reviewers. • Trends in the stock on different Banks, and near-term future outlook. • Collection of information on non-harvest mortality. • Availability of bycatch/discard data across the different Banks. • Availability of habitat data across the Banks, and figures for use in the report. • Confirmation of absence of ETP species interactions in the fishery, apart from wolffish (for which data are available). • Current IFMP version and update process. • Existence of a research plan. • The risk-based enforcement process. • Stakeholder engagement in and openness of the science and management of the fishery. • The OSAC process. • Enforcement and compliance in the fishery. • Any recent changes to relevant legislation.
	Rob Blyth-Skyrme	IFC	
	Andy Brand	IFC	
	Christine Penney	CSLP – client	
	Roger Stirling	SPANS – client	
	Ginette Robert	SPANS – client	
	Steven Smith	Fisheries and Oceans Canada (DFO)	
	Greg Stevens	DFO	
	Odette Murphy	DFO	
	Tammy Rose-Quinn	DFO	
	Brad Hubley	DFO	
Scott Coffen-Smout	DFO		
20 th June	John Angel	Intertek Fisheries Certification (IFC)	<ul style="list-style-type: none"> • Retained and bycatch catch figures • Nature of pre-recruit box closures • Bycatch of scallops in other mobile gear
	Rob Blyth-Skyrme	IFC	



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2014	Andy Brand	IFC	<ul style="list-style-type: none"> • Availability of minutes from the OSAC meetings • Client wrap-up
	Christine Penney	CSLP – client	
	Catherine Boyd	CSLP – client	
	Roger Stirling	SPANS - client	

The site visit was conducted in Halifax, Nova Scotia, with the team being available for meetings from the 16th to the 20th of August, 2014. At least 30 days prior to the site visit, notification of the site visit was made through the MSC’s Fisheries Update, while notification of the assessment was also provided in the June edition of the ‘Navigator’ magazine (Appendix 2). The Navigator is a monthly magazine serving the fishing and marine industries in Atlantic Canada and the Eastern United States, and has been used frequently by IFC to advertise assessments in the past. It is selected for these advertisements because of its widespread distribution and substantive reader base.

A brief description of the meetings held during the site visit is provided in, Table 13 above; the attendees are listed, together with the topics covered during the discussions. More details and a note of the meeting with DFO are provided as Appendix 3.

4.4.2 Evaluation Techniques

Several sources of information provided the basis of the conclusions of this assessment, including a review of information and references provided by the client prior to the site visit, information and data sourced during site visit meetings held with stakeholders involved with the fishery (see Table 13), and review of literature and information provided following site visit meetings. Peer review and stakeholder comment on the draft report also provide a very important contribution to the assessment process.

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 (PIs) and Scoring Issues (SIs), by the MSC and its advisory boards, which have been used in the assessment of this fishery.

Each SI may be scored at three scoring guideposts (SGs), which define the level of performance that is required to achieve 100, 80 (the passing score), and 60 scores; 100 represents a theoretically ideal level of performance and 60 a measurable shortfall. If a fishery does not meet the minimum SG60 level of performance for any SI, the fishery would fail its assessment.

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 SI 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 SI to assess the evidence is present to assess the level of performance that the fishery achieved. Justification of the scoring 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.

The elements that were scored for each PI under Principle 1 and 2 are listed in **Table 14**, below.

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Scores allocated for each PI were entered into the MSC Fishery Assessment Scoring Worksheet in order to attain the overall Principle scores; these scores are shown in Section 6 of this report.

Table 14: Scoring elements for Principle 1 and Principle 2 PIs.

Component	Scoring elements	Main/Minor	Data-deficient?
P1: Outcome	<ul style="list-style-type: none"> ECOSF sea scallop (<i>Placopecten magellanicus</i>) 	Main	N
P2: Retained	<ul style="list-style-type: none"> None 	N/A	N/A
P2: Bycatch	<ul style="list-style-type: none"> Yellowtail flounder (<i>Pleuronectes ferruginea</i>) 	Main (<5%, vulnerable)	N
	<ul style="list-style-type: none"> Atlantic cod (<i>Gadus morhua</i>) 	Minor	N
	<ul style="list-style-type: none"> Haddock (<i>Melanogrammus aeglefinus</i>) 	Minor	N
	<ul style="list-style-type: none"> Skate species complex (in order of catch quantity, winter skate – <i>Leucoraja ocellata</i>, little skate – <i>Leucoraja erinacea</i>, thorny skate – <i>Amblyraja radiata</i>, barndoor skate – <i>Dipturus laevis</i>, and smooth skate – <i>Malacoraja senta</i>) 	Minor	N
	<ul style="list-style-type: none"> Monkfish (<i>Lophius americanus</i>) 	Minor	N
	<ul style="list-style-type: none"> Invertebrates (combined) 	Minor	N
P2: ETP	<ul style="list-style-type: none"> North Atlantic right whale (<i>Eubalaena glacialis</i>) 	N/A	N
	<ul style="list-style-type: none"> Loggerhead turtle (<i>Caretta caretta</i>) 	N/A	N
	<ul style="list-style-type: none"> Leatherback turtle (<i>Dermochelys coriacea</i>) 	N/A	N
	<ul style="list-style-type: none"> Northern wolffish (<i>Anarhichas denticulatus</i>) 	N/A	N
	<ul style="list-style-type: none"> Spotted wolffish (<i>Anarhichas minor</i>) 	N/A	N
P2: Habitats	<ul style="list-style-type: none"> Habitats of the ECOSF management area, specifically in depths of 30 – 120 m, comprising gravel, sand, or mixed sediments, with occasional patches of boulders or bedrock that may host deepwater coral or sponge aggregations. 	N/A	N
P2: Ecosystem	<ul style="list-style-type: none"> The ECOSF ecosystem, specifically scallop as a benthic filter feeding and prey species, yellowtail flounder as a ‘main’ bycatch species, other bycatch species, ETP species that are vulnerable to capture in the ECOSF, and sensitive epibenthic habitats and species as structuring habitat within Division 4VWX and 5Zjm. 	N/A	N

5 TRACEABILITY

5.1 Eligibility Date

The target eligibility date for this fishery is 22nd March 2015. This would allow for an unbroken certification between the existing certificate and a new certificate.

5.2 Traceability within the Fishery

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

Those companies identified in Section 3.1 and their vessels fishing with New Bedford scallop rakes / dredge gear will be eligible to sell MSC certified scallop (as and when the fishery is certified). Existing fisheries management requirements include the clear identification of species, quantity, fishing method and area of capture by all vessels landing fish from the fishery. All catches of scallop are reported in logbooks and on landing tickets. On board observers also monitor, cross check and verify their reports with the vessels' logbooks. All scallop landings are required to be overseen by an independent dockside monitor, and the weights of all fishery products are verified at that time. Random landing and processing plant inspections by enforcement officers are also conducted to ensure that administrative details associated with species, area and capture and quantity are in order.

Cross referencing of VMS data with logbooks, observer and aerial and at-sea surveillance reports also ensures that fish is reported from the correct area of capture, thus minimising any risk of vessels fishing outside of the geographical extent of the unit of certification.

One EA holder remains outside of the client group. Given the high level of monitoring associated with the fishery (VMS + observers) and scallop landings (100% of the landings are monitored by dockside sampling) the risk of scallops from vessels not belonging to the client group being sold as MSC certified is considered to be very low.

Scallops are shucked and either individually quick frozen (IQF) or chilled and landed as fresh scallop meats. All traceability and segregation systems as appropriate for products are already in place for this fishery as part of the existing MSC certification.

5.3 Eligibility to Enter Further Chains of Custody

The scope of this certification ends at the points of landing. For product to be eligible to carry the MSC logo, separate chain of custody certification will be required for storage, handling and outlet facilities downstream of the point of landing. The current home ports for vessels in the client group are Shelburne, Lunenburg, Comeauville, Riverport and LeHave, all in Nova Scotia. Vessels typically land to these ports but may use other ports from time to time in the event of bad weather or breakdowns. In any case, 'hail-ins' are required prior to landing and landing cannot take place until dockside monitoring is ready.

To be eligible to carry the MSC logo, product from the certified fishery must enter into separate Chain of Custody certifications.

5.4 Eligibility of IPI stock(s) to Enter Further Chains of Custody

Iceland scallop (*Chlamys islandica*) is closely related to the sea scallop (*Placopecten magellanicus*) that is targeted by the ECOSF. While sea scallops are found from Cape Hatteras (North Carolina,

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USA) to the northern tip of Newfoundland (Canada), Iceland scallops are circumpolar, and the bulk of the stock and the directed Canadian fishery for this species occur along the northern shore of the Gulf of St. Lawrence, the Strait of Belle Isle, the Labrador Coast and St. Pierre Bank (Black *et al.* 1993).

The great majority of the ECOSF occurs on the Georges, German and Browns Banks located off the southwestern tip of Nova Scotia (Table 1). Estimates are that Iceland scallops make up less than 1 in 50,000 of the harvestable scallops in parts of these Banks, but they are otherwise absent in this area (CSLP, pers. comm.). However, on St. Pierre Bank and Banquereau, the two northernmost Banks fished by the ECOSF, Iceland scallops can make up a larger proportion of the harvestable biomass.

Iceland scallop is distinguishable from sea scallop in the shell, but it is very difficult to sort small quantities of Iceland scallops from catches made up predominantly of sea scallops. At the level of the fishery, the meats of the two species are indistinguishable once shucking has occurred.

By regulation, Iceland scallops are not required to be sorted from sea scallop catches of vessels operating in the ECOSF, except when fishing in a part of the St. Pierre Bank that is designated as the 'Core Area'. This 'Core Area' is related to an inshore Iceland scallop fishery that is predominantly targeted by vessels operating from the French islands of St. Pierre and Miquelon.

The ECOSF has only operated on St Pierre Bank twice in the last 10 years, in 2005 and 2006 (Table 2). The total meat weights for all scallops (i.e., both sea scallops and Iceland scallops) landed in those two years were 42 tonnes in 2005 (from 4,278 tonnes total in ECOSF = 0.98%) and 5 t in 2006 (from 5,766 t = 0.09%).

The ECOSF has landed scallops from Banquereau in only three out of the last 10 years, in 2005, 2007 and 2012 (Table 2). The total meat weights for all scallops landed from Banquereau in those three years were 10 t in 2005 (from 4,278 t = 0.23%), 25 t in 2007 (from 6,372 t = 0.39%), and 10 t in 2012 (from 4,747 t = 0.21%).

These figures represent the highest possible Iceland scallop harvest, if no sea scallops were taken. In 2005, when catches were taken on both Banquereau and St. Pierre Bank, this would have meant that Iceland scallop made up 1.21% of the total ECOSF catch. However, the most recent (2012) scallop research survey on the western part of Banquereau indicated that approximately two thirds of the harvestable (>100 mm) scallops were sea scallops. An observer from a 2012 fishing trip on Banquereau then noted that 20% of the catch was Iceland scallop, although it is not clear if this was a quantified or qualitative estimate (CSLP, pers. comm.). There are no data available from 2005 and 2006 to quantify the proportion of Iceland scallop in the harvest from St. Pierre Bank, but it is noted that the ECOSF is a sea scallop fishery and it is expected that sea scallops were the dominant species.

In any case, the percentage of the ECOSF harvest made up of Iceland scallops would be less than the totals shown for Banquereau and St. Pierre Bank in each of the years above, and less than the 2005 total of 1.21% for both Banks combined. The quantity of Iceland scallop in the harvest from the main Banks off the southwestern tip of Nova Scotia would add a negligible amount to the total.

It is considered that the ECOSF meets the IPI requirements of CR1.3 Section 27.4.9.1, but because the total harvest of Iceland scallop is less than 2% of the ECOSF catch, an exemption to the IPI requirements was requested in a variation request submitted to the MSC on 6th March 2015 (see <http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/Eastern-Canada-offshore-scallop/reassessment-downloads>).

The variation request to the MSC was accepted, such that Iceland scallops and Iceland scallop products from the ECOSF are eligible to enter further chains of custody (see Appendix 6).

6 EVALUATION RESULTS

6.1 Scoring

The final scores for the three Principles are provided in Table 15, below, while the final scores for the thirty Performance Indicators that were scored are provided in Table 16, also below.

Table 15: Final Principle scores

Principle	Score
Principle 1 – Target Species	91.3
Principle 2 – Ecosystem	88.7
Principle 3 – Management System	91.9

Table 16: Final Performance Indicator scores

Principle	Component	Performance Indicator (PI)	Score
1	Outcome	1.1.1 Stock status	80
		1.1.2 Reference points	100
		1.1.3 Stock rebuilding	n/a
	Management	1.2.1 Harvest strategy	95
		1.2.2 Harvest control rules & tools	100
		1.2.3 Information & monitoring	90
		1.2.4 Assessment of stock status	85
2	Retained species	2.1.1 Outcome	100
		2.1.2 Management	100
		2.1.3 Information	100
	Bycatch species	2.2.1 Outcome	80
		2.2.2 Management	100
		2.2.3 Information	80
	ETP species	2.3.1 Outcome	90
		2.3.2 Management	85
		2.3.3 Information	80
	Habitats	2.4.1 Outcome	80
		2.4.2 Management	80
		2.4.3 Information	90
	Ecosystem	2.5.1 Outcome	80
		2.5.2 Management	90
		2.5.3 Information	95
3	Governance and policy	3.1.1 Legal & customary framework	95
		3.1.2 Consultation, roles & responsibilities	90
		3.1.3 Long term objectives	100
		3.1.4 Incentives for sustainable fishing	90
	Fishery specific management system	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	80
		3.2.5 Management performance evaluation	80

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6.2 Summary of Condition

No Conditions of Certification were set against the ECOSF at this reassessment.

6.2.1 Recommendations

It is recommended that the ECOSF IFMP (DFO 2000) is updated to reflect the latest available information and understanding of the fishery and its management system, and then is kept up to date as appropriate.

6.3 Determination, Formal Conclusion and Agreement

The assessment team is in agreement that the ECOSF fishery should be recertified against the MSC Standard as a sustainable fishery, having met all PIs at the SG80 level or above, such that there are no conditions of certification and the average score for each Principle is at least 80.

(REQUIRED FOR PCR)

1. The report shall include a formal statement as to the certification action taken by the CAB's official decision-makers in response to the Determination recommendation.

6.4 Changes in the Fishery Prior To and Since Pre-Assessment

This report presents the results of the second assessment of this currently certified fishery. As such, this section is not relevant.

7 REFERENCES

7.1 General

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- Constitution Act, 1982 Part II.
- Fisheries Act (R.S. 1985, c. F-14C).
- Fishery (General) Regulations, SOR 93/53.
- Fish Inspection Act (R.S.C. , 1985, c. F-12.
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7.3 Case Law

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APPENDIX 1: SCORING AND RATIONALES

Principle 1 Evaluation Tables

Evaluation Table for PI 1.1.1

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	Met?	Y	Y	N
	Justification	<p>The sea scallop, <i>Placopecten magellanicus</i>, is found only in the Northwest Atlantic, and has a wide distribution from Cape Hatteras to Labrador. Scallops are aggregated on suitable sandy gravel bottoms in depths of 35 to 120m, and harvestable concentrations are called beds. In Canadian waters the major aggregations that support offshore fishing activity are Georges Bank, Browns Bank, German Bank, the Eastern Scotian Shelf (Middle Bank, Sable and Western Banks), Banquereau Bank, and St. Pierre Bank (south of Newfoundland). Adult scallops are capable of short distance movement but are unable to move far so they cannot move between Banks. There is some mixing of the long-lived planktonic larvae, however, so genetic differentiation of scallops on the different Banks is weak due to gene flow.</p> <p>Although recruitment on some grounds is notably sporadic, on other beds it is more consistent and overall the risk of recruitment overfishing for scallops is low due to the very high fecundity. Time series information going back to the early 1980's shows no predictive stock/recruitment relationship for the offshore stock.</p> <p>The ECOSF is a large and complex fishery with a correspondingly large and complex assessment and management programme. For Georges Bank 'a' (accounting for 80-90% of the ECOSF catch), abundance surveys are carried out twice a year and the fishery is assessed annually with a sophisticated analytical model that fits annual survey and commercial catch data to estimate commercial biomass and exploitation, as well as providing current biomass predictions and harvest scenarios. Recent improvements to the model have been to incorporate data on condition, growth rates, recruitment and non-harvest mortality. Proxy biomass-based reference points have been set with the Upper Stock Reference (USR) (= TRP) set at 80% of B_{MSY} and the LRP at 30% of B_{MSY}. A target exploitation rate of 25% of fully-recruited biomass has also been defined as a removal target.</p> <p>The biomass reference points, together with the removal target have then been used in a Precautionary Approach framework to construct a HCR with healthy, cautious and critical zones defined. The current (2013) stock status on Georges Bank 'a' is very good, with fully-recruited and recruit abundance well above the 27-year median biomass levels. There is an extremely high probability (>0.99) that the 2013 biomass is currently above the upper stock reference (USR) and in the healthy zone, as it has been since 2000.</p> <p>Browns Bank North (accounting for 5-15% of the ECOSF catch) has been surveyed annually since 1990. It was subject to an analytical assessment for the first time in 2011, using a similar approach to that developed for Georges Bank, and a precautionary approach framework has been proposed (Smith & Hubley 2012). This defines the USR as 80% of the mean biomass over a productive period (e.g., 7,281 t from 1991-2010) and the LRP as 30% of the mean biomass (2,730 t, corresponding to</p>		

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
		<p>the lowest biomass observed, in 1991) but the removal reference is defined as the exploitation rate that results in no change in biomass (currently 0.1). In addition to the analytical model, HCRs are based on a number of other indicators such as scallop size frequency, incoming recruitment expectations, scallop growth, catch rates and scallop quality, to provide a more robust understanding of stock status than biomass alone. The current stock status on Browns Bank North is good and near the 22-year mean, with very large abundances of pre-recruits throughout the bank: biomass is expected to remain relatively stable at the current TAC.</p> <p>For Georges Bank 'a' and Browns Bank North, together accounting for an average of 92.2% of the ECOSF catch in recent years (Table 1), there is therefore very good evidence from the analytical models and other data that the stocks are above the point at which recruitment would be impaired so the SG100 level of performance is attained.</p> <p>The other Banks (accounting for <10% of the ECOSF catch) support small concentrations of commercial sized scallops and depend on pulses of good recruitment. It is not currently feasible to use analytical models to determine reference points for these areas. However a number of indices including survey biomass, recruitment, CPUE, meat weights and counts and size structure provide proxy measures with similar intent to biological reference points, with the objective of avoiding serious harm to the reproductive capacity of the stock, and these have been applied effectively to determine the status of the stocks based on historical trends in the fishery.</p> <p>Through the EA scheme, the industry has a strong interest in maintaining profitability and these fisheries have a history of precautionary management. Annual TACs are set for each ground, with interim reviews of TAC uptake through the season, while monitoring CPUE, providing a means to monitor and restrict exploitation if required. At the same time, meat count regulations ensure that scallops are not taken until they reach a viable size. The assessment and management of these fisheries is therefore appropriate to the nature and scale of these small, irregular fisheries, and TACs have been set to keep fishing mortality moderate.</p> <p>Given the very wide, patchy, distribution of sea scallops, with large areas at densities too low to be commercially exploited, low fishing effort with only 2-3% of the catch coming from the minor banks each year, a long larval life that allows wide dispersal, together with early sexual maturity and a very high fecundity, it is likely that the stocks on these minor grounds are also above the point where recruitment would be impaired, but the information available does not provide the high degree of certainty required to meet the SG100 requirements. The ECOSF meets the SG80 level of performance for this SI.</p>		
b	Guidepost		The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.
	Met?		Y	N

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PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
	For Georges Bank 'a' and Browns Bank North, which together account for some 92% of the ECOSF catch, there is a high degree of certainty that the stock has been fluctuating around, or over, their TRP in recent years. For the other grounds that make up <10% of the fishery in any year, no TRP has been set, but they use proxy measures of similar intent to biological reference points, based on survey biomass, recruitment, CPUE, meat weights and counts, and size structure. Fisheries on these minor banks have been well managed and these proxy indices have fluctuated around the required target levels in recent years, so meeting the SG80 requirements but not providing the high level of certainty required for the SG100 score.		
References	Black <i>et al.</i> 1993, Bourne 1964, DFO 2013a, DFO 2013b, DFO 2014g, DFO 2014h, Naidu & Robert 2006, OSAC 2013a, OSAC 2013b, Sinclair <i>et al.</i> 1985, Smith & Hubley 2012, Stevens <i>et al.</i> 2008.		
Stock Status relative to Reference Points			
	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	Georges Bank (a) 80% of B_{MSY} . (B_{MSY} equal to the mean biomass, 1981 - 2009)	8,000 t (meats) fully-recruited biomass	$29,080/8,000 = 3.6$
	Browns Bank North 80% of B_{MSY} (B_{MSY} equal to the mean biomass, 1991 - 2010)	7,281 t (meats) fully recruited biomass	$5,912/7,281 = 0.81$
Limit reference point	Georges Bank (a) 30% of B_{MSY}	3,000 t (meats) fully-recruited biomass	$29,080/3,000 = 9.7$
	Browns Bank North 30% of B_{MSY}	2,730t (meats) fully-recruited biomass	$5,912/2,730 = 2.9$
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			N/A

Evaluation Table for PI 1.1.2

PI 1.1.2		Limit and target reference points are appropriate for the stock		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	
	Met?	Y	Y	
	Justification	<p>Reference Points have been established for Georges Bank 'a' and incorporated in the IFMP (DFO 2011b), and proposed for Browns Bank North (Smith & Hubley 2012). Together, these two Banks have accounted for an average of 92.2% of the ECOSF catch in recent years (Table 1). For both Banks, the LRP is 30% of the mean fully recruited biomass from 1981 – 2009 (1991 – 2010 for Browns Bank North), periods that reflect a broad range of fluctuations in productivity. It is noted that 30% of B_{MSY} corresponds to the biomass level for 50% MSY, assuming the Schaeffer model for surplus production.</p> <p>For both Banks, the USR (target) reference point is 80% of the mean fully recruited biomass for the period. The target exploitation rate (consistent with B_{MSY}) is 25% of fully recruited biomass for Georges Bank and defined as the level that results in no change in biomass for Browns Bank. Above the USR there is flexibility for increasing the exploitation rate.</p> <p>On the other Banks, a number of indices including survey biomass, recruitment, CPUE, meat counts, and the size structure of scallops in the survey, provide proxy measures with similar intent to biological reference points: trends in these are tracked in relation to the historical performance of the fishery and appropriate protocols for each are utilised to determine stock status and formulate fishing plans. For each bank the annual fishing plan is only confirmed after consideration of the latest survey data in relation to historic indices, and with 100% observer coverage the fishing plan can be rapidly modified during the year (e.g., the TAC reduced or the fishery closed) if monitoring suggests that the fishery is failing to meet management objectives.</p> <p>The reference points for Georges Bank 'a' and Browns Bank North are appropriate for the stock and can be estimated. The approach taken on the other Banks is of similar intent: it is appropriate for the nature and scale of these fisheries, provides measureable indices, and has a demonstrated history of reducing harvest levels when the resource declines. The fishery therefore meets the SG80 level of performance for this SI.</p>		
b	Guidepost		The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.
	Met?		Y	Y

PI 1.1.2		Limit and target reference points are appropriate for the stock		
	Justification	Sea scallop is a widespread, early maturing, high fecundity, bivalve mollusc species. The limit reference points for Georges Bank 'a' and Browns Bank North (and surrogate values for the minor grounds) are set above the level at which there is any appreciable risk of impairing reproductive capacity following consideration of precautionary issues for a high fecundity, spatially aggregated bivalve stock. Figure 25 and Figure 26 show that the stock has demonstrated the capacity to rebuild from levels between the LRP and USR, providing justification that the LRP is set at a high enough level, so the fishery meets the SG100 requirements for this SI. For the minor banks, the precautionary management policy of setting annual interim TACs based on survey estimates of biomass and recruitment, which are then monitored and adjusted if necessary to maintain CPUE and meat count levels, maintains the stock above the level at which there is an appreciable risk of impairing reproductive capacity, thus also meeting the SG100 level of performance.		
c	Guidepost		The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.
	Met?		Y	Y
	Justification	The USR or TRP for Georges Bank 'a' and Browns Bank North is set at 80% of B_{MSY} . This takes into account relevant precautionary issues concerning growth, condition and incoming recruitment with a high degree of certainty. As a result the stocks have been maintained at higher levels than the USR in recent years. For the minor banks the proxy measures in place act as reference points for the fishery that are appropriate for the stock and can be estimated. Thus the TAC acts as a proxy TRP that accounts for relevant precautionary issues by limiting exploitation rate to levels that have been shown over time to consistently support stock recovery. The fishery meets the SG80 and SG100 levels.		
d	Guidepost		For key low trophic level stocks, the target reference point takes into account the ecological role of the stock.	
	Met?		N/A	
	Justification	Sea scallop, <i>Placopecten magellanicus</i> , is not considered to be a key low trophic level species, as it does not meet the criteria set out in paragraph CB2.3.13 of the MSC Certification Requirements v1.3 (MSC 2013a).		
References		DFO 2000, DFO 2011b, DFO 2013a, DFO 2013b, DFO 2014g, DFO 2014h, Hubley <i>et al.</i> 2013, MSC 2013a, NAFO 2004, OSAC 2013, Smith & Hubley 2012.		
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 1.1.3

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Where stocks are depleted rebuilding strategies, which have a reasonable expectation of success, are in place.		Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.
	Met?	N/A		N/A
	Justification	The stock is not depleted, and so this PI is not scored.		
b	Guidepost	A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock.
	Met?	N/A	N/A	N/A
	Justification	The stock is not depleted, and so this PI is not scored.		
c	Guidepost	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within a specified timeframe.	There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.	
	Met?	N/A	N/A	
	Justification	The stock is not depleted, and so this PI is not scored.		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				N/A
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 1.2.1

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.
	Met?	Y	Y	Y
	Justification	<p>The harvest strategy aims to keep fishing mortality of sea scallop moderate by targeting an exploitation rate of 25% in the healthy zone.</p> <p>Input controls limit the number of boats permitted to operate in the fishery. Separate TACs are set for Georges (a and b), Browns (North and South), and one for each of the other Banks. TACs for Georges Bank 'a' and Browns Bank North, the most productive areas, are set using analytical assessments. The stocks on these Banks are above or near their long-term median fully-recruited biomass levels. The biologically based reference points for Georges Bank 'a' have been incorporated into a formal PA now used to set the TAC and a similar approach has been proposed for Browns Bank North (Smith & Hubley 2012). This analytical model was used in the 2011 and 2012 fishery assessments for Browns Bank (Smith & Hubley 2012, Hubley <i>et al.</i> 2014), although it has not yet been incorporated in the IFMP, which is awaiting an update. The TACs set for other Banks, which account for less than 10% of the fishery, have been managed responsibly by the industry, acting together with DFO, using HCRs based on the analysis of trends in a number of indicators such as size mix, incoming recruitment expectations, scallop growth, catch rates and scallop quality in relation to the historic performance of the fishery and adjusting TACs appropriately. This process is of similar intent to the use of biological reference points, is responsive to the state of the stocks and has protected the productivity of these Banks over a long timeframe.</p> <p>The harvest strategy also aims to direct effort to fully-recruited adult scallop and to minimise the harvest of fast-growing, lower value, juvenile scallops by means of closed areas and meat count regulations. The size composition of the catch confirms the success of this strategy.</p> <p>Stock status on all grounds is evaluated annually (except for Banquereau Bank and St Pierre Bank where recruitment and the subsequent fishery are sporadic) and responds to changes by variations in the TAC, meat count and closed area regulations in order to achieve management objectives. The practice of setting interim TACs, which can then be confirmed or changed later in the year, provides a mechanism for controlling exploitation within a season. The fishery thus clearly meets the requirements for this SI at the SG100 level of performance.</p>		
b	Guidepost	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	Y	Y	N
	Justification	The fishery has a high level of scientific input and a history of responsible and cautious management. On all the banks the strategy of directing effort on to fully-recruited adult scallop and minimising the harvest of fast-growing, juvenile scallops by means of closed areas		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		and meat count regulations has been successfully implemented. However, the analytical model, setting of reference points and adoption of the Precautionary Approach is relatively new. It was implemented for Georges Bank 'a' in 2009 and proposed for Browns Bank in 2011. While the evidence shows that it is achieving its objectives, including being clearly able to maintain stocks at target levels for Georges Bank, it has not been fully implemented for other banks and cannot be said to have been fully evaluated. For the other banks the harvest strategy based on a number of stock indicators, and the setting of interim TACs that can be confirmed or adjusted later in the year, has a well-established history of achieving its objectives. The ECOSF therefore meets the SG80 requirements for this SI, but does not fully comply with SG100 level of performance.		
c	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	Landings from the fishery and fishing effort, along with the location of fishing activity and quality of the catch are closely monitored. The surveys and scientific assessment of the fishery is published through SARs for the main fisheries. The harvest strategy is continuously monitored and evaluated at the DFO Regional Advisory Process (RAP), the output of which is then presented to the OSAC and their informed views are taken into account. These three processes provide a wide forum for determining whether the harvest strategy is working, fully meeting the requirements of this SI at the SG60 level of performance.		
d	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Y
	Justification	In addition to the annual monitoring and evaluations, DFO undertakes “framework assessment reviews”, commonly on a five-yearly basis, within which they review, among other things, stock assessment methodology and data as well as ecosystem management considerations. The last framework review for the ECOSF was in 2009. This process is subject to external peer review to help ensure rigour, transparency and impartiality. These reviews ensure that the performance of the harvest strategy is evaluated and improved if necessary, fully meeting the SG100 requirements.		
e	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	N/A	N/A	N/A
	Justification	Sharks are not target species, and so this SI does not apply.		
References		DFO 2000, DFO 2011b, DFO 2013a, DFO 2013b, DFO 2014g, DFO 2014h, OSAC 2013a, OSAC 2013b, OSAC 2014, DFO 2013f, DFO 2014i, Smith & Hubley 2012, Hubley <i>et al.</i> 2014.		



Intertek Fisheries Certification (IFC)

PI 1.2.1	There is a robust and precautionary harvest strategy in place	
OVERALL PERFORMANCE INDICATOR SCORE:		95
CONDITION NUMBER (if relevant):		N/A

Evaluation Table for PI 1.2.2

PI 1.2.2		There are well defined and effective harvest control rules in place		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Generally understood harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	
	Met?	Y	Y	
	Justification	<p>Harvest controls in the ECOSF include a restriction on the number of boats permitted to operate in the fishery, area specific TACs at the Bank and sub-Bank level, meat count regulations, area closures and the PA framework. Conservatively set TACs are allocated according to EA shares to each licence holder. Meat counts are set annually for each fishing area.</p> <p>Closely monitored blended meat count rules are used to support the strategy of directing effort away from fast-growing, low value, juvenile scallops and on to beds of fully-recruited scallop. Closed areas (voluntary seed bed closures) are applied to protect concentrations of juvenile scallops and to target fishing to areas and beds with fully-recruited scallops.</p> <p>Exploitation rates have been maintained at low levels on all grounds. For the main components of the ECOSF (Georges Bank 'a' and Browns Bank North) the removal target exploitation rate (25% of fully-recruited biomass for Georges Bank 'a' and 10% for Browns Bank North), together with the biomass reference points, has been used to define healthy, cautious and critical zones. The management actions to be taken when biomass is determined to be in the healthy, cautious and critical zones respectively are set out in Section 3.3.2.6 (Page 44). These HCRs set out how TACs, meat count regulations and other measures should be utilized to ensure that exploitation rate is reduced as the LRPs are approached. On the other Banks, trends in a number of indices including survey biomass, recruitment, CPUE, meat counts, and the size structure of scallops in the survey, are evaluated to determine stock status and formulate fishing plans that reduce exploitation as stock size falls, based on historic performances. The setting of interim TACs that can be confirmed or adjusted later in the season provides a flexible mechanism for reducing exploitation rate as stock indices fall. These HCRs ensure that the exploitation rate on all fishing banks is reduced as the reference points or their surrogates are approached, meeting the SG80 level of performance for this SI.</p>		
b	Guidepost		The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules takes into account a wide range of uncertainties.
	Met?		Y	Y

PI 1.2.2		There are well defined and effective harvest control rules in place		
	Justification	<p>The main uncertainties for the Banks targeted by the ECOSF are the unpredictability of recruitment, the mortality of post-recruits (primarily due to predation, discard and incidental mortality), and variations in scallop growth and condition. These can all vary considerably, both spatially and from year to year.</p> <p>All of these factors are assessed in the annual surveys, and the information derived is utilized so that management can take appropriate actions. The stock surveys give an early warning of pre-recruit year-class strength, which is used to close areas until juveniles have reached a viable size for exploitation and to plan the deployment of fishing resources. Information on growth, condition and non-harvest mortality is utilized in the assessment models to set and adjust TAC and meat count regulations. Uncertainty in the survey results is also taken into account with survey error now carried through into the new assessment model used for Georges Bank ‘a’ and Browns Bank North (see Section 3.3.2.5). Figure 17 and Figure 21 show that uncertainty in the survey results is low for Georges Bank ‘a’ but rather higher for Browns Bank North. Connectivity between the banks can contribute to the uncertainties relating to stock structure. However, the available evidence from studies of scallop larval distribution and water currents (Trembley & Sinclair 1992) and population genetics (Kenchington <i>et al.</i> 2006) is that the Canadian offshore banks are predominantly self-recruiting, but with a relatively low level of gene flow between banks sufficient to prevent genetic divergence. Many of the minor banks, like St Pierre and Banquereau, depend on sporadic pulses of recruitment and it is not clear to what extent these pulses depend on the influx of larvae from other banks. However, whatever the origin of the larvae, any influxes of larvae, if they survive, will be manifest in the subsequent recruitment, and be assessed in the annual stock surveys. Thus, uncertainty due to connectivity between the banks is assessed as a (probably small) component of recruitment variability. The numerous harvest controls in place for all the fishing beds allow the ECOSF to meet the SG100 level of performance for this SI.</p>		
c	Guidepost	There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
	Met?	Y	Y	Y
	Justification	Evidence from the fishery shows that the input and output controls in place have been effective at maintaining exploitation at a moderate level on all grounds as required under the HCRs. The evidence available indicates that the ECOSF meets the SG100 level of performance for this SI.		
References	DFO 2000, DFO 2011b, DFO 2013a, DFO 2013b, DFO 2014g, DFO2014h, OSAC 2013, Trembley & Sinclair 1992, Kenchington <i>et al.</i> 2006.			
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER (if relevant):				NA

Evaluation Table for PI 1.2.3

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Y	Y	N
	Justification	<p>There is very good information available on stock structure, productivity and fleet composition for all management units of the fishery. Annual surveys on Georges Bank 'a' and Browns Bank North are conducted to determine the abundance of recruits, pre-recruits and fully-recruited scallops. Shell heights at age from the survey are measured to estimate growth parameters. Shell height and meat weight data from the survey are analyzed to determine spatial and temporal variations in scallop condition. Detailed commercial and survey information on the other stock areas is presented annually at OSAC. For Georges Bank 'a' and Browns Bank North (together accounting for >92% of the ECOSF catch in recent years, Table 1), the latest analytical stock assessment model is fitted to historical annual survey and commercial catch rate indices to estimate commercial biomass and exploitation, as well as to provide biomass projections and harvest scenarios. Non-harvest mortality is estimated using an index of dead scallops (paired shells) from the survey, effectively accounting for mortality resulting from discards, incidental fishing and natural sources.</p> <p>The fleet consists of 8 wetfish and 4 freezer vessels (2013). All vessels use one type of gear – the New Bedford rake.</p> <p>A comprehensive range of information is available on the stocks, fishery removals and various environmental factors likely to affect the fishery. Seabed maps have been developed that identify topography and bottom type from multi-beam bathymetric surveys. Bottom temperatures are routinely monitored during the surveys.</p> <p>A comprehensive GIS analysis of the spatial and temporal footprint of the fishery has been developed. This information, available to DFO and industry, is important for the analysis of the impacts of the fishery.</p> <p>The range and quality of the information collected for all fishery management units is sufficiently extensive to meet the SG60 and SG 80 requirements but with the concentration of data collection on the Georges Bank 'a' and Browns Bank North the information available for the other grounds cannot be said to be comprehensive, so the SG 100 level is not attained</p>		

PI 1.2.3		Relevant information is collected to support the harvest strategy		
b	Guidepost	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Y	Y	Y
	Justification	<p>Annual stock surveys are carried out throughout all production areas (except Banquereau Bank and St Pierre Bank where they are less frequent) but with more detailed surveys on Georges Bank 'a' and Browns Bank North, the two most productive areas. These surveys enable biomass and annual productivity of the stock to be estimated and support the harvest control rules.</p> <p>Fishery removals are documented with a high frequency and a high degree of certainty. 100% VMS on all vessels confirms their hourly locations to DFO and industry. Landings are subject to 100% dockside monitoring to confirm landing weights. 100% port sampling records the detailed weight and size distribution of every landing. A bi-weekly port sampling report is compiled by DFO. Area of capture is known for all scallops harvested. At sea observers cover all Banks but with emphasis on Georges Bank. Data from observer trips are used to estimate discard levels. Logbooks record catch, effort and location by watch for each vessel trip. There is evidence of a good understanding of inherent uncertainties in the data collected and in the robustness of the assessments.</p> <p>All the information required by the HCR is monitored at a high frequency and high degree of certainty for Georges Bank 'a' and Browns Bank North, and at a level appropriate to the scale and nature of the fisheries on the other Banks. The ECOSF therefore meets the SG100 level of performance for this SI.</p>		
c	Guidepost		There is good information on all other fishery removals from the stock.	
	Met?		Y	
	Justification	All commercial fishery removals from the stock are monitored and recorded, while the distance from land and exposed nature of the fishery area mean that the stocks are not harvested by recreational fishermen. There is some evidence that the stocks of sea scallops in Canadian and USA waters are genetically linked but the fisheries on either side of the boundary are assessed and managed separately because after settlement the stocks do not move. There is, in any case, good information available about the USA fishery removals. The SG80 requirements for this SI are therefore met.		
References		DFO 2013a, DFO 2013b, DFO 2014b, DFO 2014e, DFO 2014g, DFO 2014h, Naidu & Robert 2006, OSAC 2013b, OSAC 2014, Sarty 2013.		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 1.2.4

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG60	SG80	SG100
a	Guidepost		The assessment is appropriate for the stock and for the harvest control rule.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
	Met?		Y	Y
	Justification	<p>There is an annual assessment of the scallop stocks on all the Banks fished (except Banquereau Bank and St Pierre where fishing activity and the assessment process is less frequent due to very irregular recruitment). The surveys provide information that determines the harvest controls (output limits and spatial restrictions) on all the Banks fished. Detailed and reliable quantitative information on the fecundity, size at maturity, recruitment, growth rates, condition and factors causing non-harvest mortality, and their uncertainties, provide indices of stock and fishery status on all banks. These are most comprehensive for Georges Bank and Browns Bank and are incorporated in assessment models for these fisheries. For the other Banks, the information available is appropriate to the scale of these fisheries. The annual stock assessments for each Bank are documented, through DFO Science Advisory Reports (SARs) or Stock Status Reports (SSRs) and/or in presentations of commercial and scientific information to the OSAC.</p> <p>Scallops settlement is primarily on gravel substrates. Knowledge of environmental factors affecting distribution, survival and year-class strength allows detailed estimation of effects on stock dynamics. Time series information going back to the early 1980's indicate no predictive stock /recruitment relationship for the offshore scallop stock.</p> <p>The assessments takes account of major features relevant to the biology of the species and the nature of the fishery by accounting for the high spatial and temporal variability in the abundance and productivity of commercially exploitable scallop aggregations,</p> <p>The assessments are used to compare scallops at different life stages for abundance and biomass against time series. Scallop shell height, meat weight, condition, CPUE and distribution are assessed. The assessments are used to generate advice consistent with the harvest strategy for management consideration.</p> <p>Uncertainties arising from discard and incidental mortality estimates have been accounted for in the assessment model for the main fishing stocks (Georges A and Browns North). Annual changes in condition and shell growth are also estimated in the assessment. The assessments for these two Banks generate harvest scenarios and probabilities for catch, exploitation and biomass for the major stocks of interest to the ECOSF.</p> <p>The analytical assessments for Georges Bank 'a' and Browns Bank North are peer reviewed through DFO's Regional Advisory Process (RAP); assessments for the remaining areas are reviewed at the OSAC advisory process.</p> <p>The fishery meets the SG100 level of performance for this SI.</p>		
b	Guidepost	The assessment estimates stock status relative to reference points.		
	Met?	Y		

PI 1.2.4		There is an adequate assessment of the stock status		
	Justification	<p>Stock status relative to formal reference points is estimated for Georges Bank 'a' and Browns Bank North, which have together accounted for an average of 92% of the ECOSF catch (Table 1). The other banks, which account for <10% of the fishery in any year, are assessed and responsibly managed using various stock indices of similar intent, together with a precautionary approach to the setting of annual TACs.</p> <p>The ECOSF meets the SG60 requirements for this SI.</p>		
c	Guidepost	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	Y	Y	N
	Justification	<p>Since its introduction for Georges Bank 'a' in 2009, the analytical assessment model has been improved in a number of ways that take uncertainty in data inputs into account. Uncertainty in recruitment, growth and condition are incorporated directly into the analytical model and standard errors from the survey indices are now incorporated into estimates of observational error in the improved model. Non-harvest mortality, and its uncertainty, is estimated from an index of dead scallop shells, joined together at the hinge, and this effectively accounts for the lack of reliable information regarding mortality resulting from discards, incidental fishing and natural sources. The improved analytical model enables stock status to be evaluated relative to reference points in a probabilistic way for the two main fisheries, Georges Bank 'a' and Browns Bank North (together accounting for 92% of the catch from the ECOSF – Table 1) but cannot yet be applied to the stocks on the other Banks where reference points have not yet been estimated. The ECOSF meets the SG80 level of performance for this SI.</p>		
d	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			N
	Justification	<p>Prior to the implementation of the Delay-Difference analytical model, the fishery was assessed using a Virtual Population Analysis model, and there is evidence that the Schaefer Surplus Production and other models were rigorously explored and compared with the Delay-Difference model during the 2009 Framework Review process. However, the analytical model, setting of reference points and adoption of the Precautionary Approach is relatively new to the ECOSF. These measures were implemented for Georges Bank 'a' in 2009 and proposed for Browns Bank in 2012. While the evidence shows that they are achieving their objectives, including being able to maintain stocks at target levels for Georges Bank, the approach has not been fully implemented for other Banks and its robustness cannot be said to have been fully tested, even for Georges Bank. The fishery therefore does not fully comply with SG100 requirement, here.</p>		
e	Guidepost		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		Y	N



Intertek Fisheries Certification (IFC)

PI 1.2.4		There is an adequate assessment of the stock status	
	Justification	<p>An annual assessment of stock status for the various banks, including the output of the quantitative stock assessment for Georges Bank 'a' and Browns Bank North, is presented to the DFO RAP, providing an opportunity for fishery managers and industry representatives to provide their information and knowledge. The RAP is typically internally reviewed but it can also include external review depending on the circumstances. The outcome of the RAP is presented to the OSAC, which has wide representation, and this constitutes a regular internal review. There is no regular external review but occasionally <i>ad hoc</i> external reviewers are appointed, as occurred during the 2009 Assessment Framework which was attended by DFO scientists external to the fishery specific management system as well as scientists external to DFO, including participants from Brazil and the USA.</p> <p>The fishery therefore meets the SG80 requirements, but in the absence of a regular external review it fails to achieve the SG100 level of performance.</p>	
References		DFO 2013a, DFO 2013b, Hubley <i>et al.</i> 2013, OSAC 2013.	
OVERALL PERFORMANCE INDICATOR SCORE:			85
CONDITION NUMBER (if relevant):			N/A

Principle 2 Evaluation Tables

Evaluation Table for PI 2.1.1

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).	There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.
	Met?	Y	Y	Y
	Justification	<p>Apart from scallops, only monkfish may be retained in the ECOSF by regulation. However, it is understood that monkfish is rarely, if ever, retained, due to the ECOSF vessels being focused on and solely equipped to process scallops. It is noted that landings are 100% dockside monitored.</p> <p>If any species other than scallops began to be retained during the period of certification, then this PI would have to be reassessed. At the present time, though, there are considered to be no retained species in the ECOSF, and so the fishery scores 100 for this SI.</p>		
b	Guidepost			Target reference points are defined for retained species.
	Met?			Y
	Justification	There are no retained species in the ECOSF, and so the fishery meets the SG100 level of performance for this SI.		
c	Guidepost	If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.	If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	Y	Y	
	Justification	There are no retained species in the ECOSF, and so the fishery meets the SG80 level of performance for this SI.		



Intertek Fisheries Certification (IFC)

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	
d	Guidepost	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.	
	Met?	Y	
	Justification	There are no retained species in the ECOSF, and so the fishery meets the requirements of this SI.	
References			
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			N/A

Evaluation Table for PI 2.1.2

PI 2.1.2		There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing retained species.
	Met?	Y	Y	Y
	Justification	<p>Apart from scallops, only monkfish may be retained in the ECOSF by regulation. However, it is understood that monkfish is rarely, if ever, retained, due to the ECOSF vessels being focused on and solely equipped to process scallops. It is noted that landings are 100% dockside monitored.</p> <p>If any species other than scallops began to be retained during the period of certification, then this PI would have to be reassessed. At the present time, though, there are considered to be no retained species in the ECOSF, and so the fishery scores 100 for this SI.</p>		
b	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	Y
	Justification	There are no retained species in the ECOSF, and so the fishery meets the SG100 level of performance for this SI.		
c	Guidepost		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y
	Justification	There are no retained species in the ECOSF, and so the fishery meets the SG100 level of performance for this SI.		

Intertek Fisheries Certification (IFC)

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		
d	Guidepost			There is some evidence that the strategy is achieving its overall objective.
	Met?			Y
	Justification	There are no retained species in the ECOSF, and so the fishery meets the SG100 level of performance for this SI.		
e	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Y	Y	Y
	Justification	<p>Various small, demersal shark species may be taken in the ECOSF during normal operations. However, apart from scallops, only monkfish may be retained in the ECOSF by regulation; there have been no violations of any kind with respect to this rule in the last five years at least (DFO 2013e, DFO 2014f), and there is 100% dockside monitoring of all landings from the ECOSF.</p> <p>There is a high degree of certainty that shark finning is not taking place, and so the fishery meets the SG100 level of performance for this SI.</p>		
References		DFO 2013e, DFO 2014f		
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 2.1.3

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Qualitative information is available on the amount of main retained species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.
	Met?	Y	Y	Y
	Justification	<p>Apart from scallops, only monkfish may be retained in the ECOSF by regulation (DFO 2014e). However, it is understood that monkfish is rarely, if ever, retained, due to the ECOSF vessels being focused on and solely equipped to process scallops. It is noted that landings are 100% dockside monitored.</p> <p>If any species other than scallops began to be retained during the period of certification, then this PI would have to be reassessed. At the present time, though, there are considered to be no retained species in the ECOSF, and so the fishery scores 100 for this SI.</p>		
b	Guidepost	Information is adequate to qualitatively assess outcome status with respect to biologically based limits.	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.
	Met?	Y	Y	Y
	Justification	There are no retained species in the ECOSF, and so the fishery meets the SG100 level of performance for this SI.		
c	Guidepost	Information is adequate to support measures to manage main retained species.	Information is adequate to support a partial strategy to manage main retained species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	Y
	Justification	There are no retained species in the ECOSF, and so the fishery meets the SG100 level of performance for this SI.		

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		
d	Guidepost		Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
	Met?		Y	Y
	Justification	There are no retained species in the ECOSF, and so the fishery meets the SG100 level of performance for this SI.		
References	DFO 2014e			
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 2.2.1

PI 2.2.1		The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below).	Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below).	There is a high degree of certainty that bycatch species are within biologically based limits.
	Met?	N (Go to SIb)	N (Go to SIb)	N
	Justification	<p>With respect to bycatch species, MSC guidance states “<i>Main’ for this PI allows consideration of the catch size or vulnerability of species caught. For instance, a species that comprises less than 5% of the total catch by weight may normally be considered to be a minor species (i.e., not ‘main’) in the catch, unless it is of particular vulnerability or if the total catch of the fishery is large, in which case even 5% may be a considerable catch. On the other hand a species that normally comprises 20% or more of the catch by weight would almost always be considered a ‘main’ bycatch species.</i>” (GCB3.8.2, MSC 2013b).</p> <p>The availability of bycatch data from Banks targeted in the ECOSF other than Georges Bank is limited by the amount of trips taken to these areas, and the historic levels of observer coverage. However, Georges Bank accounts for 86.5% of the catch from the ECOSF from 2008 – 2013, while Georges Bank and the nearby Browns and German Banks have together accounted for 97.9% of the catch over the same time period (Table 1). As such, although bycatch data for the Scotian Shelf and St. Pierre Bank have not been presented, it is considered that there is sufficient information available to assess and score the fishery.</p> <p>No species other than scallops makes up more than 5% of the total catch of biota from Georges Bank, and therefore no other retained or bycatch species would qualify as a ‘main’ retained or bycatch species based on quantity taken. Yellowtail flounder has made up an average of 90 t or 0.21% of the ECOSF catch from Georges Bank over the last six years (Table 5), and made up just 39 t or 0.09% of the ECOSF catch in 2013. However, the Georges Bank stock is depleted and the entire Canadian allocation (including bycatch) for this stock is just 72 t. As such, yellowtail flounder is considered to be main bycatch species on the basis of vulnerability (stock status), and SIb must be scored.</p> <p>Other bycatch species taken in small quantities include cod, haddock, various skate species and monkfish, but these are considered to be minor bycatch species. A wide variety of other fish and invertebrate species are also taken in negligible quantities (Caddy <i>et al.</i> 2010).</p> <p>Because yellowtail flounder is considered to be a main bycatch species and is depleted, SIb is scored rather than this SI.</p>		
b	Guidepost	If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding.	If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	Y	Y	

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		
	Justification	<p>This SI is scored on the basis of the vulnerability (stock status) of yellowtail flounder on Georges Bank. See SIa for more information.</p> <p>The yellowtail flounder stock on the Georges Bank is joint Canada-US managed through the TRAC, and directed yellowtail flounder fisheries occur in both countries. The stock is in poor condition, with spawning stock biomass and recruitment in 2012 being the lowest in the time series (TRAC 2013). The Canadian and US combined quota (including bycatch) for 2013 was reduced to 500 t, a level at which there was estimated to be a high probability that adult biomass would increase from 2014 to 2015. However, in the event, restrictive management measures meant that the 2013 total catch was limited to 218 t (TRAC 2014b).</p> <p>There is a strategy in place which works to minimise the ECOSF's catch of groundfish, including yellowtail flounder (see definition of 'strategy', MSC 2013b). Primarily, no groundfish other than monkfish can be retained in the ECOSF, so eliminating any incentive to target yellowtail flounder. Then, the Canadian allocation for the Georges Bank yellowtail flounder stock includes counts of bycatch, so there is a strong incentive for the ECOSF fleet to minimise bycatch of this stock. The use of multibeam bathymetric data to focus on areas of the highest scallop biomass maximises the selectivity of the gear for scallops, minimising both the time spent fishing and the potential for groundfish bycatch. The gear is also equipped with a rope mesh back that is intended to allow groundfish to escape. Finally, and very specific to yellowtail flounder, since 2007 there has been a June closure on a part of the Georges Bank where higher catches of yellowtail flounder were identified, coinciding with the latter part of the yellowtail flounder spawning period (DFO 2014c).</p> <p>The evidence from the bycatch data is that the annual ECOSF catch of Georges Bank yellowtail flounder has fallen steadily over time (Table 5). Although this may in part be due to the declining stock status, the measures in place together constitute at least a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding. The stock biomass of the Georges Bank yellowtail flounder is projected to rise under the prevailing management and catch regime (TRAC 2013). The ECOSF meets the SG80 level of performance, here.</p>		
		Guidepost	<p>If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.</p>	
		Met?	<p>Y</p>	
	Justification	<p>The stock statuses of yellowtail flounder (DFO 2013c, TRAC 2013) as the single main bycatch species, and cod (DFO 2011d), haddock (Showell <i>et al.</i> 2013, TRAC 2014a), skates (DFO 2013c, DFO 2013d) and monkfish (DFO 2013c, DFO 2013d) as minor bycatch species, are known in sufficient detail to meet the SG60 requirements.</p>		
References		DFO 2011d, DFO 2013c, Showell <i>et al.</i> 2013, TRAC 2013, TRAC 2014a, TRAC 2014b.		
OVERALL PERFORMANCE INDICATOR SCORE:			80	
CONDITION NUMBER (if relevant):			N/A	

Evaluation Table for PI 2.2.2

PI 2.2.2		There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing and minimizing bycatch.
	Met?	Y	Y	Y
	Justification	<p>No species other than scallops makes up more than 5% of the total catch of biota from the Georges Bank component of the ECOSF. The Georges Bank yellowtail flounder stock is depleted, though, and in 2013 the ECOSF accounted for more than half of the Canadian allocation (including bycatch) for this stock. As such, yellowtail flounder is considered to be main bycatch species on the basis of vulnerability (stock status). Other bycatch species taken in small quantities include cod, haddock, various skate species (primarily winter skate and little skate, with thorny skate and barndoor skate) and monkfish, but these are considered to be minor bycatch species. A wide variety of other fish and invertebrate species are also taken in negligible quantities (Caddy <i>et al.</i> 2010).</p> <p>As noted in PI 2.2.1, SIb, there is a strategy in place which works to minimise the ECOSF's catch of groundfish and other bycatch species (see definition of 'strategy', MSC 2013b). Primarily, no species other than monkfish can be retained in the ECOSF, so eliminating any incentives to target these species (accepting that monkfish may be retained, but currently isn't). Then, the Canadian allocations for the Georges Bank stocks of cod, haddock and yellowtail flounder include counts of bycatch, so there is a strong incentive for the ECOSF fleet to minimise bycatch of these species. The use of multibeam bathymetric data to focus on areas of the highest scallop biomass maximises the selectivity of the gear for scallops and, together with the use of a scallop TAC, therefore minimises both the bottom contact time and the potential for bycatch of other species. The gear is also commonly equipped with a rope mesh back that is intended to allow groundfish to escape, while the short tow times employed in the fishery should contribute to improved rates of post-release survival in bycatch species (not including fish of species with swim bladders). License conditions now require that all thorny skate taken NAFO divisions 4VWX+5 are returned to the water. Finally, since 2007, there has also been a June closure on a part of the Georges Bank where higher catches of yellowtail flounder were identified, coinciding with the latter part of the yellowtail flounder spawning period (DFO 2014c).</p> <p>Overall, catches of yellowtail flounder in the ECOSF are low (39 t in 2013), and the combined US-Canada catches from the Georges Bank yellowtail flounder stock are well below the level at which it is considered there is high probability that adult biomass will increase from 2014 to 2015 (TRAC 2013, TRAC 2014b).</p> <p>The measures described above, and in particular the use of multibeam bathymetric data on the main Banks fished by the ECOSF to target effort on to scallop-holding grounds, together represent one of the most proactive and demonstrably effective approaches to minimising bycatch that the assessment team is aware of in any demersal towed-gear fishery. It is considered that together these measures constitute a strategy to managing and minimising bycatch, and so the fishery meets the SG100 level of performance for this SI.</p>		

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		
b	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	Y
	Justification	<p>The various parts of the strategy to minimise bycatch have been tested. The ban on the retention of groundfish, and counting bycatch quantities against the Canadian allocation for cod, haddock and yellowtail flounder provides a strong incentive to minimise catches. The use of different gear modifications has also been tested, and using the rope mesh back (and increasing the mesh size) was considered to be the most effective and practical way to reduce groundfish bycatch (Walsh 2008). In particular the use of multibeam bathymetric data to target effort on to scallop-holding grounds, over time has reduced the amount of bycatch of the key commercial species taken on Georges Bank (Table 5), and this can be regarded as testing that supports high confidence that the strategy to minimise bycatch will work. The catches of yellowtail flounder from the Georges Bank stock are also well below the level from which it is considered there is a high probability that adult biomass will increase from 2014 to 2015 (TRAC 2013, TRAC 2014b).</p> <p>The ECOSF meets the SG100 level of performance for this SI.</p>		
c	Guidepost		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y
	Justification	<p>All fishing vessels that participate in the ECOSF are monitored with VMS, and fishing statistics are collated annually, providing information on the areas and amount of ground fished by the fleet (Sarty 2013). These data show that the area of Georges Bank that is harvested by the fleet annually has declined over time, although this is in general proportion to the TAC with the exception of the most recent year, in which the fishing was particularly efficient (Table 6). The harvested area data for the other Banks are more variable, but this is to be expected given that the TAC for those Banks has been more variable over time.</p> <p>The ban on retaining species other than monkfish, and the area closure for yellowtail flounder on Georges Bank, are required by regulation, and there is no indication that these measures are not being adhered to. The use of a rope mesh back in the dredge is voluntary, but it is understood that this gear design is widely used, and that large mesh panels are preferred, aiding to minimise groundfish bycatch. The ECOSF meets the SG100 level of performance for this SI.</p>		
d	Guidepost			There is some evidence that the strategy is achieving its overall objective.
	Met?			Y



Intertek Fisheries Certification (IFC)

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	
	Justification	<p>The strategy described in SIa, above, and in particular the use of multibeam bathymetric data to target effort on to scallop-holding grounds, over time has reduced the amount of bycatch taken on Georges Bank (Table 5). The quantities of non-scallop species taken are now very small, and so this can be regarded as evidence that the strategy is achieving its overall objective.</p> <p>The ECOSF meets the SG100 level requirement for this SI.</p>	
References		DFO 2014a, DFO 2014c, Robert 2014a, Sarty 2013, TRAC 2013, TRAC 2014b, Walsh 2008.	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			N/A

Evaluation Table for PI 2.2.3

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Qualitative information is available on the amount of main bycatch species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery.	Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations.
	Met?	Y	Y	N
	Justification	<p>No species other than scallops makes up more than 5% of the total catch of biota from the Georges Bank component of the ECOSF. The Georges Bank yellowtail flounder stock is depleted, though, and in 2013 the ECOSF accounted for more than half of the Canadian allocation (including bycatch) for this stock. As such, yellowtail flounder is considered to be main bycatch species on the basis of vulnerability (stock status). Other bycatch species taken in small quantities include cod, haddock, various skate species and monkfish, but these are considered to be minor bycatch species. A wide variety of other fish and invertebrate species are also taken in negligible quantities (Caddy <i>et al.</i> 2010).</p> <p>Bycatch data are collected by an industry-funded observer program. Observers are requested to record all species caught. Weights are recorded for all species of fish and larger invertebrates observed, and the number and length are also measured for some groundfish species. All observer reports are filed with DFO.</p> <p>The observer program was limited to Georges Bank until 2011, but was then expanded to other areas. There was limited observer coverage between 1991 and 2004 but, beginning in 2005, one scallop trip per month was observed (accounting for approximately 5% of the fishing effort). The observer coverage was increased to two trips per month from July 2007 (accounting for approximately 10% of the fishing effort).</p> <p>The majority of the ECOSF fishing effort is directed at the Georges Bank, and so it is consistent that the majority of the observer effort is focused there, too. The amount of data available for the other Banks is limited, in part because of the relatively recent expansion of the observer programme, but also because very few trips have been taken to Banks other than Georges (in particular, Banquereau and St. Pierre Bank) since 2011.</p> <p>Overall, it is considered that qualitative information and some quantitative information is available on the amount of main bycatch species taken by the fishery, and so the ECOSF meets the SG80 level of performance for this SI. More data on the Banks other than Georges Bank would be needed to score higher.</p>		
b	Guidepost	Information is adequate to broadly understand outcome status with respect to biologically based limits	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.
	Met?	Y	Y	N

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		
	Justification	<p>Fishing effort in the ECOSF is directed with the benefit of very detailed seabed maps generated through multibeam bathymetry, and this allows the fishery to focus on the areas of the Banks with the densest aggregations of scallops (Sarty 2013). In turn, this helps to minimise bottom contact times and to keep bycatch to very low levels in general (DFO 2014a, Robert 2013, Robert 2014a, Robert 2014b).</p> <p>On Georges Bank, for the bycatch species that are commercially targeted, including yellowtail flounder, cod, haddock, skates and monkfish, bycatch data are collected routinely and estimates of the fleet-wide totals generated. These data are use in subsequent stock assessments and/or status reviews for these species (i.e, yellowtail flounder – TRAC 2014b, cod – DFO 2011a, haddock – Showell <i>et al.</i> 2013, skates and monkfish – DFO 2013c, DFO 2013d). For other, non-commercial species, and particularly on Banks other than Georges, there is less detail in the data, but the quantities taken are very small to negligible in any case.</p> <p>It is considered that information is sufficient to estimate outcome status with respect to biologically-based limits, and so the fishery meets the SG80 level of performance. Full stock assessments are not undertaken for all species taken as bycatch in the ECOSF, and so a score of 100 cannot be attained.</p>		
c	Guidepost	Information is adequate to support measures to manage bycatch.	Information is adequate to support a partial strategy to manage main bycatch species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	N
	Justification	<p>The ECOSF is considered to have a strategy in place which works to minimise the ECOSF's catch of groundfish and other bycatch species. The components of the strategy include that:</p> <ol style="list-style-type: none"> 1) No species other than monkfish can be retained in the ECOSF, 2) Canadian allocations for the Georges Bank stocks of commercial species include counts of bycatch from the ECOSF, 3) Multibeam bathymetric data are used to maximise the efficiency of the vessels, which together with the use of a scallop TAC minimises the potential for bycatch, 4) The gear is equipped with a rope mesh back to allow groundfish to escape (Walsh 2008), 5) A June closure is in place on a part of the Georges Bank where higher catches of yellowtail flounder were identified (DFO 2014c). <p>Information to support the strategy is collected through the C&P programme for the fishery, which includes the use of fishery observers, at-sea enforcement (overflight and vessel-based) monitoring, VMS monitoring and 100% dockside monitoring of landings.</p> <p>The fishery's predominant focus on the Georges Bank means that the ability to evaluate the effectiveness of the strategy, by looking at the quantities of all bycatch taken across the entire fishery, is limited. As such, the fishery does not meet all of the elements of SG100, and the fishery scores 80 for this SI.</p>		
d	Guidepost		Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).	Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
	Met?		Y	N

Intertek Fisheries Certification (IFC)

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	
	Justification	<p>The observer programme for the ECOSF was expanded in 2011, and approximately 10% of the trips are now observed. The existing data and the ongoing observer coverage are most comprehensive for Georges Bank, where the majority of the fishing effort occurs, but are more limited for the other Banks because of the shorter time series of data, and because fewer trips are taken to those sites. As such, any change to the bycatch profile of the fleet would be most readily detected on Georges Bank. Nevertheless, the ECOSF fleet is monitored 100% with VMS, and any significant changes to fishing patterns would become apparent quickly.</p> <p>It is clear that sufficient data continue to be collected to detect any increase in risk to the main bycatch species, but not in sufficient detail to assess ongoing mortalities to all bycatch species. The ECOSF meets the SG80 level of performance for this SI.</p>	
References		DFO 2014a, DFO 2014c, Robert 2013, Robert 2014a, Robert 2014b, Sarty 2013, Walsh 2008.	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			N/A

Evaluation Table for PI 2.3.1

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.	There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.
	Met?	Y	Y	N
	Justification	<p>Species that need to be considered against the endangered, threatened and protected (ETP) performance indicators include any that are protected under international law, as well as those listed under the Canadian Species At Risk Act (SARA 2002). The listing of a species by the COSEWIC does not result in a species being considered under ETP species PIs for MSC assessments. As such, winter skate and cod do not qualify as ETP species.</p> <p>Based on distribution, the ECOSF has the potential to interact with a number of ETP species; specifically, North Atlantic right whale – <i>Eubalaena glacialis</i>, loggerhead turtle – <i>Carretta carreta</i> and leatherback turtle – <i>Dermochelys coriacea</i>, all of which are listed as Endangered on Schedule 1 of SARA; and northern wolffish – <i>Anarhichas denticulatus</i> and spotted wolffish - <i>Anarhichas minor</i>, which are listed on Schedule 1 as Threatened.</p> <p>The mouth opening of a scallop dredge is far too small to accommodate a right whale, and no interactions between the fishery and right whales have been reported by observers or in the official SARA logbooks that ECOSF fishers are required to submit annually.</p> <p>Loggerhead turtles are considered to occur routinely in Atlantic Canadian waters, including on the Scotian Shelf and Georges Bank (COSEWIC 2010), but these animals prefer water above 14°C and their distribution in Canada is closely linked to the course of the Gulf Stream (Hawkes <i>et al.</i> 2007), which typically runs well outside the tops of the Banks where the ECOSF is prosecuted. No interactions have been recorded with loggerhead turtles by ECOSF observers or in official SARA logbooks.</p> <p>Leatherback turtles can be found throughout Canadian Atlantic waters, where entanglement in pelagic fishing gear is the main identified threat (LTRT 2006). While interactions between leatherback turtles and fishing gear have been reported from other Canadian fisheries (DFO 2012a), no interactions with leatherback turtles have been reported by ECOSF observers or in official SARA logbooks.</p> <p>Both species of ETP wolffish are taken in the ECOSF in small or very small quantities. Northern wolffish and spotted wolffish were recorded in just two and one of 14 observed trips, respectively, between October 2011 and April 2013. These occurrences are consistent with the species' distributions, as northern and spotted wolffish are typically found well to the north of the Banks that account for the vast majority of the ECOSF scallop catch. In any case, both species are most commonly found in waters much deeper than those targeted by the ECOSF (500-1000 m depth for northern wolffish, 200-750 m depth for spotted wolffish, compared with the typical fishery depth of 50-100 m), and most typically on boulder or bedrock substrates (Kulka <i>et al.</i> 2007).</p> <p>It is considered that the effects of the fishery on ETP species are known, and are highly likely to be within limits of national and international requirements for protection of ETP species. As such, the ECOSF scores 80 for this SI. A higher score would be awarded with more comprehensive observer coverage.</p>		

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		
b	Guidepost	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	Met?	Y	Y	N
	Justification	<p>Direct effects of the fishery relate to the capture or entanglement of ETP species in the fishing gear. There has been no observed capture of any cetacean or leatherback turtle in ECOSF fishing gear, and the levels of bycatch of the two ETP wolffish species are very low, and are essentially negligible in the context of the quantities taken in other fisheries.</p> <p>The ECOSF scores 80 for this SI. A higher score would be awarded with a more comprehensive observer programme</p>		
c	Guidepost		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	Met?		Y	Y
	Justification	<p>Indirect effects of the fishery relate to impacts on the behaviour, habitats or feeding opportunities and efficiencies of ETP species. The scallop species that is targeted by the ECOSF is not a key prey or predator of any ETP species, and there is no indication that fishing activities significantly impact upon ETP species indirectly in any way.</p> <p>There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species, and so the ECOSF scores 100 for this SI.</p>		
References		COSEWIC 2010, DFO 2012a, Hawkes <i>et al.</i> 2007, Kulka <i>et al.</i> 2007, LTRT 2006, Robert 2013.		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 2.3.2

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. 		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	Y	Y	N
	Justification	<p>There is no evidence that the ECOSF interacts directly or indirectly with the ETP cetacean or turtle species that may occur in the areas fished.</p> <p>For the two ETP wolffish species that are taken in the ECOSF, there is a Recovery Strategy in place (Kulka <i>et al.</i> 2007) that provides recommendations on the approach that fisheries, including the ECOSF, must take when interacting with wolffish. Specifically, wolffish may not be retained in the ECOSF, and fishers are provided with information and identification sheets for wolffish, and are required to release them as quickly and carefully as possible when caught.</p> <p>An important additional measure is the use of the multibeam bathymetric maps by ECOSF vessels. This allows the most productive scallop beds to be targeted accurately, helping to minimise the bottom contact time and the potential to fish off productive gravel substrate. This limits the potential for wolffish to be taken, or for their favoured boulder and rock habitats to be impacted. The use of a net back with large mesh on the dredges should also help to minimize impacts on wolffish, although this measure is voluntary and benefits to wolffish species are not quantified to the knowledge of the assessment team.</p> <p>It is considered that there is a strategy in place for managing the ECOSF's impact on ETP species, consistent with the SG80 level of performance. A comprehensive strategy would require more detail and specificity with respect to the ECOSF, and so the fishery does not meet the SG100 level of performance.</p>		
b	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	Y	Y	N

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. 		
	Justification	<p>The wolffish Recovery Strategy is based on information directly about the species. Wolffish are known to be relatively robust to capture and handling, and evidence from other fisheries (Grant <i>et al.</i>, 2005) suggests that post-release survival from the ECOSF is likely to be good. The practice of using the multibeam bathymetric maps of the seabed is also very effective at minimising bycatch in general. There is an objective basis for confidence that the strategy will work, and so the ECOSF meets the SG80 level of performance. Quantitative analyses have not been undertaken, however, so the fishery does not meet the SG100 level of performance.</p>		
c	Guidepost		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N
	Justification	<p>Landings from the ECOSF are monitored 100%, and there have been no violations with respect to landings in at least the last five years (DFO 2014j). Approximately 10% of the trips are also observed, and no violations of ETP wolffish requirements have been reported. The bycatch data show that northern and spotted wolffish are almost absent from the catch (Robert 2013).</p> <p>These information sources provide evidence that the strategy is being implemented successfully, and so the ECOSF meets the SG80 level of performance. A higher level of observer coverage, and in particular from Banks other than Georges Bank, would be required to meet the SG100 level of performance.</p>		
d	Guidepost			There is evidence that the strategy is achieving its objective.
	Met?			Y
	Justification	<p>The evidence that the strategy is achieving its objective is the available information on ETP species interactions. No evidence exists to show that the ECOSF has impacted any individual cetaceans or turtles, and catches of the two ETP wolffish species are at very low levels (Robert 2013). The ECOSF therefore meets this requirement.</p>		
References		DFO 2014j, Grant <i>et al.</i> 2005, Kulka <i>et al.</i> 2007, Robert 2013.		
OVERALL PERFORMANCE INDICATOR SCORE:				85
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 2.3.3

PI 2.3.3		Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. 		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
	Met?	Y	Y	N
	Justification	<p>There is no evidence that the ECOSF interacts directly or indirectly with the ETP cetacean or turtle species that may occur in the areas fished.</p> <p>The observer programme provides quantitative information on the catches of the two ETP wolffish species taken in the ECOSF. The data show that very small quantities are caught; northern wolffish was observed on just two out of 14 observed trips from October 2011 – April 2013, when it made up 0.008% and 0.022% of the catches; spotted wolffish was observed on just one of the same 14 trips, when it made up 0.001% of that trip’s catch (Robert 2013). Based on scaling those catches to the entire fishery, it is estimated that these figures mean that the annual catch of northern wolffish is approximately 860 kg, and the annual catch of spotted wolffish is approximately 40 kg. These figures indicate that the impact of the ECOSF on these species is essentially negligible, in particular because post-discard survival is likely to be high.</p> <p>Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species, and so the ECOSF meets the SG80 level of performance for this SI. A greater level of observer coverage would be needed to score higher</p>		
b	Guidepost	Information is adequate to broadly understand the impact of the fishery on ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.	Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Y	Y	N
	Justification	<p>The only ETP species which data show the ECOSF interacts with are the two wolffish species. The ECOSF is known to be prosecuted at a much shallower depth range than the core depth range over which these wolffish species are distributed.</p> <p>The information available on the interaction between the ECOSF and ETP species, in terms of catch data collected by observers and reported in SARA logbooks, then shows that northern and spotted wolffish are caught in the ECOSF very rarely.</p> <p>It is considered that information is sufficient to determine whether the fishery may be a threat to the protection and recovery of ETP species, and the ECOSF therefore scores 80 for this SI. A greater level of observer coverage would be required for the ECOSF to score higher.</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. 		
c	Guidepost	Information is adequate to support measures to manage the impacts on ETP species.	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
	Met?	Y	Y	N
	Justification	<p>Fishers are required to submit an official SARA logbook annually, detailing interactions with ETP species. The ECOSF is also covered by an observer program, which was limited to Georges Bank until 2011, but was then expanded to other areas. There was limited observer coverage between 1991 and 2004 but, beginning in 2005, one scallop trip per month was observed (accounting for approximately 5% of the fishing effort). The observer coverage was increased to two trips per month from July 2007 (accounting for approximately 10% of the fishing effort).</p> <p>Information derived from these sources is considered sufficient to measure trends and support a full strategy to manage impacts on ETP species, such that the ECOSF scores 80 for this SI. A greater level of observer coverage would be needed in order for the fishery to score higher.</p>		
References		Robert 2013.		
OVERALL PERFORMANCE INDICATOR SCORE:				80
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 2.4.1

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
	Met?	Y	Y	N
	Justification	<p>The MSC guidance states: “<i>For the Habitats and Ecosystem components, the concept of ‘serious or irreversible harm’ refers to change caused by the fishery that fundamentally alters the capacity of the component to maintain its function or to recover from the impact</i>” (MSC 2013b).</p> <p>Scallop dredges are widely considered to be among the fishing gears that are most impacting to benthic habitats (e.g., Collie <i>et al.</i> 2000, Jennings & Kaiser 1998). The immediate effects include mobilisation of sediments, reduction in seabed complexity and removal or destruction of biota (Kaiser <i>et al.</i> 2006), which over longer periods can lead to a more general reduction in species richness, biomass, and productivity (Hiddink <i>et al.</i> 2006). However, natural disturbance and community recovery are important considerations in determining the overall impact of a fishery on the seabed habitats and communities. The offshore Banks targeted by the ECOSF are all subject to strong tidal currents and, at a depth of 50 - 100m, are sufficiently shallow that storm-generated waves will disturb the seabed (Kostylev 2004); this means that the species and communities in the fished areas will be adapted to relatively high levels of natural perturbation, and are predicted to have a relatively low sensitivity to disturbance (DFO 2006a).</p> <p>The fished areas of Georges Bank, Browns Bank North and German Bank (accounting for 97.9% of the catch from the ECOSF in recent years - Table 1) have also been mapped in detail using multibeam bathymetry. Efforts to map the Banks have been proactive, and have been completed through a partnership between the Canadian Government and the fishing companies active in the ECOSF. In combination with the use of TACs to limit catches, these maps have greatly reduced the amount of ground that is fished annually in comparison to historic levels. Over the last six years, the average area of the Canadian Georges Bank that has been fished is 16.5%, while the areas of Browns Bank, German Bank and Sable/Western Banks that are fished annually is 4.8%, 2.8% and 1.4%, respectively (Sarty 2013).</p> <p>Recovery of the epibenthic community, including structuring species, at a heavily fished site on Georges Bank that was subsequently closed to fishing was estimated to occur over approximately 10 years (Collie <i>et al.</i> 2005). The area fished annually by the ECOSF fleet on Banks other than Georges Bank is very small, and a 10-year recovery period would allow for recovery of sites fished initially to occur well before those areas were fished again, even if fishing occurred systematically across those Banks. The average area fished annually on the Georges Bank is sufficiently large that, in theory, the entire Canadian portion could be fished before the community succession had stabilised at sites fished initially. However, fishing does not occur systematically, and for reasons including catch rates, gear safety and skipper knowledge, some areas will be fished repeatedly, while other areas very close by will never be fished. This limits the impact of the gear to particular lanes, while creating islands of greater diversity amongst even the more heavily fished areas. Such islands support community recovery in fished areas through emigration and by acting as source locations for new recruits to other areas.</p> <p>The data on seabed habitats and fishing activity on the main Banks fished are excellent, and are as detailed as are ever likely to be available for any fishery. There is limited information on the minor Banks, though. The limited areas of the different Banks that are fished, together</p>		



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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	
	with the relatively low predicted sensitivity to disturbance, mean that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. As such, the ECOSF meets the SG80 level of performance for this PI. More evidence of recovery following impact would be needed to achieve the SG100 score.	
References	Collie <i>et al.</i> 2000, Collie <i>et al.</i> 2005, DFO 2006a, Hiddink <i>et al.</i> 2006, Jennings & Kaiser 1998, Kaiser <i>et al.</i> 2006, Kostylev 2004, MSC 2013b, Sarty 2013.	
OVERALL PERFORMANCE INDICATOR SCORE:		80
CONDITION NUMBER (if relevant):		N/A

Evaluation Table for PI 2.4.2

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of the fishery on habitat types.
	Met?	Y	Y	N
	Justification	<p>The fished areas of Georges Bank, Browns Bank and German Bank (accounting for 97.9% of the catch from the ECOSF in recent years - Table 1) have been mapped in detail using multibeam bathymetry (i.e., Brown <i>et al.</i> 2011, Kostylev 2001, Todd & Kostylev 2011, and see Figure 29 to Figure 32). In combination with the use of TACs to limit catches, these maps have greatly reduced the amount of ground that is fished annually in comparison to historic levels because fishers are now able to specifically target only the most productive grounds. Over the last six years, the average area of the Canadian Georges Bank that has been fished is 16.5%, while the annual areas of Browns Bank, German Bank and Sable/Western Banks that are fished is 4.8%, 2.8% and 1.4%, respectively (Sarty 2013).</p> <p>The use of multibeam bathymetric maps and TACs together comprise a partial strategy to achieve the Habitat Outcome 80 level of performance, and the fishery therefore meets the SG80 level of performance for this SI. For the fishery to meet the SG100 level of performance, a specific strategy to manage habitat impacts would be required.</p>		
b	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
	Met?	Y	Y	N
	Justification	<p>The information available on the likely levels of natural perturbation on the offshore Banks around Nova Scotia is such that the areas fished by the ECOSF are predicted to have a relatively low sensitivity to disturbance. Together with the detailed information available on the habitats targeted by the ECOSF, and the area of the Banks that is fished annually, there is some objective basis for confidence that the partial strategy will work to achieve the Habitat Outcome 80 level of performance. The ECOSF scores 80 for this SI, but cannot score higher in the absence of a specific 'habitat strategy'.</p>		
c	Guidepost		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N

Intertek Fisheries Certification (IFC)

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		
	Justification	All vessels in the ECOSF are equipped with VMS, and there are detailed data on the areas of each Bank fished by the ECOSF (Sarty 2013). Detailed habitat maps of the main Banks are available to the participants in the fishery, and the annual TACs for each Bank are clearly being upheld. The fishery scores 80 for this SI, but cannot meet the SG100 level of performance in the absence of a specific 'habitat strategy'.		
d	Guidepost			There is some evidence that the strategy is achieving its objective.
	Met?			N
	Justification	There are detailed data on the areas of each Bank fished by the ECOSF (Sarty 2013), but the requirements of this SI cannot be met in the absence of a specific 'habitat strategy'. The ECOSF therefore does not meet the SG100 level of performance, here.		
References		Sarty 2013.		
OVERALL PERFORMANCE INDICATOR SCORE:				80
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 2.4.3

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	There is basic understanding of the types and distribution of main habitats in the area of the fishery.	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
	Met?	Y	Y	Y
	Justification	<p>The general distribution of bottom sediments on the Georges Bank, Scotian Shelf and St. Pierre Bank have been mapped, and the sediments across the fished areas are generally gravel, sand and mud, or mixtures of these sediments, with occasional larger sediments (boulders) and local areas of rocky relief and rocky outcrops (Breeze <i>et al.</i> 2002; NL Seabed Atlas). Detailed maps of the main Banks, based on multibeam bathymetry, are also available, having been produced with the support of the ECOSF participants (e.g., Brown <i>et al.</i> 2011, Kostylev 2001, Todd & Kostylev 2011, and see Figure 29 to Figure 32). The distribution of corals has been mapped through collating scientific and local forms of knowledge (Cogswell <i>et al.</i> 2009), but areas of greater importance for corals occur off the shelf edge in waters exceeding 200 m depth, which are deeper than the grounds targeted by the ECOSF. The most important areas for coral are protected in coral MPAs (DFO 2006c).</p> <p>It is considered that the distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. As such, the ECOSF meets the SG100 level of performance for this SI.</p>		
b	Guidepost	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.	The physical impacts of the gear on the habitat types have been quantified fully.
	Met?	Y	Y	N
	Justification	<p>The nature of the impacts of scallop dredges on scallop habitats has been studied and reviewed extensively (e.g., Auster <i>et al.</i> 1996, Collie <i>et al.</i> 2000, Howarth. & Beukers-Stewart 2014, Jenkins <i>et al.</i> 2001, Jennings & Kaiser 1998).</p> <p>All vessels in the ECOSF are equipped with VMS, and there are detailed data on the areas of each Bank fished by the ECOSF (Sarty 2013) such that there is reliable information on the spatial extent of interaction, and the timing and location of use of the dredge gear.</p> <p>The ECOSF clearly meets the SG80 level of performance for this SI. An absence of detailed knowledge of the habitats on the Banks that are fished only rarely prevents the ECOSF from meeting the SG100 level of performance.</p>		

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		
c	Guidepost		Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Changes in habitat distributions over time are measured.
	Met?		Y	N
	Justification	All vessels in the ECOSF are equipped with VMS, and there are detailed data on the areas of each Bank fished by the ECOSF (Sarty 2013). Changes in habitat distributions are not measured over time, however, and so the fishery meets the SG80 but not the SG100 level of performance for this SI.		
	References	Auster <i>et al.</i> 1996, Breeze <i>et al.</i> 2002, Brown <i>et al.</i> 2011, Cogswell <i>et al.</i> 2009, Collie <i>et al.</i> 2000, DFO 2006c, Howarth. & Beukers-Stewart 2014, Jenkins <i>et al.</i> 2001, Jennings & Kaiser 1998, Kostylev 2001, NL Seabed Atlas (http://www.seabed-atlas-nl.ca/mapguide/NLSeabed2011/), Sarty 2013, Todd & Kostylev 2011.		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 2.5.1

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Y	Y	N
	Justification	<p>Key elements of the ECOSF ecosystem are considered to be scallop as a dominant component of the biomass of the biota, and as a potential prey species, where it occurs in commercial beds, yellowtail flounder as a ‘main’ bycatch species, other bycatch species that prey upon scallops, the two ETP wolffish species that are vulnerable to capture in the ECOSF, and gravel and cobble habitats and associated sensitive epibenthic species that act as structuring habitat on the offshore Banks fished by the ECOSF. These elements are considered in turn:</p> <p>Management of the scallop stocks on the offshore Banks targeted by the ECOSF is undertaken in a precautionary manner, and the stocks on the Georges Bank and Browns Bank, accounting for the majority of the ECOSF catch, are healthy (DFO 2013a, DFO 2013b). The other Banks, accounting for <10% of the ECOSF catch, support small concentrations of commercial sized scallops and depend on pulses of good recruitment.</p> <p>Only very small amounts of yellowtail flounder are taken in the ECOSF, but the yellowtail flounder stock on the Georges Bank is depleted. The quota for this stock for 2013 was set at a level that allowed for stock growth, but restrictive management measures meant that the Canadian catch was lower than the TAC in any case (TRAC 2014b). Other species that prey upon scallops are taken in the ECOSF as bycatch, including various gadoids, skates, crabs and lobsters. However, no species is taken in anything other than very small quantities, and no bycatch species depends upon scallops as a prey item. In addition, scallops are rarely consumed when they reach a shell height of >70 mm (Hart & Chute 2006), which is below the size at which scallops are harvested by the ECOSF, so the fishery would not limit prey availability.</p> <p>No cetacean or turtle species has been recorded as being captured in the ECOSF. ETP northern and spotted wolffish are taken in the ECOSF, but the distribution of these species is centred at much greater depths than those fished, and further to the north than the Banks that account for the majority of the ECOSF scallop catch.</p> <p>The impact of scallop dredges on benthic habitats and communities, including epibenthic structuring species, is known to be considerable, including reducing the structural complexity of habitats (e.g., Collie <i>et al.</i> 2000, Jennings & Kaiser 1998). Juvenile cod and haddock are known to avoid predation pressure better when structural complexity is higher (Lough <i>et al.</i> 1989, Tupper & Boutilier 1995). Recovery is an important consideration when looking at the effect of impacts on communities, however, and Collie <i>et al.</i> (2005) estimated that Georges Bank-specific gravel communities, at depths fished by the ECOSF, would recover following intensive fishing within approximately 10 years. Only small percentages (<5%) of the Banks other than Georges Bank have been fished annually by the ECOSF fleet in recent years (Sarty 2013). On average, 16% of the Georges Bank has been fished annually by the ECOSF fleet since 2008, and a 10-year recovery timescale is sufficiently long that if the ECOSF fishing activity occurred systematically across the Canadian Georges Bank, sites fished initially would not have recovered prior to fishing activity returning. However, fishing does not occur systematically, and some areas will be fished repeatedly, while other areas very close by will never be fished. This limits the impact of the gear, while creating islands of greater diversity</p>		



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PI 2.5.1	The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function	
	<p>within the fished areas that can aid recovery of impacted areas nearby.</p> <p>Knowledge of the key elements of the ECOSF ecosystem, including on the natural disturbance and community recovery in fished areas, together with information on the areas of the different offshore Banks that are fished annually by the ECOSF, is considered to be sufficient to confirm that the ECOSF is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. The ECOSF therefore scores 80 for this PI, but there is insufficient evidence of habitat recovery for the ECOSF to score 100.</p>	
References	Collie <i>et al.</i> 2000, Collie <i>et al.</i> 2005, DFO 2013a, DFO 2013b, Hart & Chute 2006, Jennings & Kaiser 1998, Lough <i>et al.</i> 1989, Sarty 2013, Tupper & Boutilier 1995, TRAC 2014b.	
OVERALL PERFORMANCE INDICATOR SCORE:		80
CONDITION NUMBER (if relevant):		N/A

Evaluation Table for PI 2.5.2

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	There are measures in place, if necessary.	There is a partial strategy in place, if necessary.	There is a strategy that consists of a plan, in place.
	Met?	Y	Y	N
	Justification	<p>Management of the scallop stocks on the offshore Banks targeted by the ECOSF is undertaken in a precautionary manner (DFO 2011b), and the USR or TRP for Georges Bank 'a' and Browns Bank North (and surrogate values for the minor grounds) is set at 80% of B_{MSY}, taking into account relevant precautionary issues concerning growth, condition and incoming recruitment. Temporary closed areas are also established voluntarily by the ECOSF fleet to protect young scallops.</p> <p>Impacts on Georges Bank yellowtail flounder, cod and haddock are carefully managed, and any bycatch is counted against the Canadian allocations for these stocks (TRAC 2014a, TRAC 2014b). A small, seasonal closed area on Georges Bank is introduced annually to avoid an area that is known to be used by higher densities of adult yellowtail flounder (DFO 2014c). The approach to minimising bycatch generally includes the use of rope mesh backs on the dredge (Walsh 2008), and the use of detailed habitat maps, together with a scallop TAC, to minimise bottom contact time. Minimising the bottom contact time through focusing on the most productive grounds also has the effect of minimising the potential for any ETP wolffish catch.</p> <p>The production of highly detailed habitat maps for the main Banks fished, in order to target the fishing effort to only the most productive areas for scallops, together with the use of bank-specific TACs, has worked to reduce bottom contact times considerably (Sarty 2013). Maximising the efficiency of the gear is the most effective way to minimise collateral impacts on habitats, species and communities.</p> <p>Overall, there is considered to be a partial strategy in place such that the ECOSF 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. As such, the ECOSF scores 80 for this SI,, but cannot score higher in the absence of a specific strategy to manage ecosystem impacts.</p>		
b	Guidepost	The measures take into account potential impacts of the fishery on key elements of the ecosystem.	The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	<p>The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem.</p> <p>This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.</p>

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		
	Met?	Y	Y	N
	Justification	All the elements of the partial strategy detailed in SIa are based on and continue to utilise the best available information. The ECOSF meets the SG80 level of performance for this SI, but cannot score higher without a specific 'ecosystem strategy'.		
c	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.
	Met?	Y	Y	Y
	Justification	All the elements of the partial strategy are based on information directly from the fishery and ecosystem of the ECOSF, and have been tested in the ecosystem or in other comparable fisheries. The ECOSF meets the SG100 level of performance for this SI.		
d	Guidepost		There is some evidence that the measures comprising the partial strategy are being implemented successfully.	There is evidence that the measures are being implemented successfully.
	Met?		Y	Y
	Justification	Scallop stock status is assessed on all the Banks at a frequency appropriate to the level of exploitation, and data clearly show that the stocks are not overfished (DFO 2013a, DFO 2013b). Measures to protect small scallops are also evidently effective. Bycatch data are also available, and show that the amounts of non-scallop species taken in the catch are small, and below levels required for species with allocation limits. The ECOSF vessels are required to be equipped with VMS, and detailed data on the areas fished are available, together with data on the overall annual fished area of the Banks (Sarty 2013). It is considered that there is evidence that the measures are being implemented successfully, and so the ECOSF meets the SG100 level of performance for this SI.		
References	DFO 2011b, DFO 2013a, DFO 2013b, DFO 2014c, Sarty 2013, TRAC 2014a, TRAC 2014b, Walsh 2008.			
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Y	Y	
	Justification	<p>Key elements of the ECOSF ecosystem are considered to be scallop as a dominant component of the biomass of the biota, and as a potential prey species, where it occurs in commercial beds, yellowtail flounder as a ‘main’ bycatch species, other bycatch species that prey upon scallops, both ETP wolffish species that are vulnerable to capture in the ECOSF, and gravel and cobble habitats and associated sensitive epibenthic species that act as structuring habitat on the offshore Banks fished by the ECOSF.</p> <p>Assessments and/or updates of the status of scallop stocks on Georges and Browns Bank North are produced annually (e.g., DFO 2013a, DFO 2013b, DFO 2014a, DFO 2014b), while data on the size mix, scallop growth, catch rates and scallop quality are also collected routinely for the other Banks. Used together, these data have ensured a high productivity of the scallop stocks over a long period of time.</p> <p>Bycatch data for all species, including yellowtail flounder as the single main bycatch species for this assessment, and the two ETP wolffish species, are collected routinely by observers and estimated for the ECOSF fleet (DFO 2014a, Robert 2013, Robert 2014a, Robert 2014b). Any interactions with other ETP species would also be recorded by observers, while an official SARA logbook is required to be returned annually by fishers, recording interaction with ETP species.</p> <p>The benthic habitats of Georges Bank, Browns Bank North and German Bank, which together account for almost 98% of the ECOSF catch, have been mapped in detail (e.g., Brown <i>et al.</i> 2011, Kostylev 2001, Todd & Kostylev 2011, and see Figure 29 to Figure 32), while there is general knowledge of the surficial sediments of the other areas (Breeze <i>et al.</i> 2002, NL Seabed Atlas). The benthic invertebrate species and communities of the areas fished by the ECOSF are also known in general terms, with more detailed studies in some areas (Breeze <i>et al.</i> 2002). The distribution of corals has been mapped through collating scientific and local forms of knowledge (Cogswell <i>et al.</i> 2009). There is some information on the distribution of sponges across the Scotian Shelf and surrounds (Campbell & Simms 2009).</p> <p>Information is adequate to broadly understand the key elements of the ecosystem, and so the ECOSF meets the SG80 level of performance.</p>		
b	Guidepost	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail.	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.	Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.
	Met?	Y	Y	Y

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
	Justification	<p>The impact of the ECOSF on the scallop stocks targeted by the ECOSF are well researched (DFO 2013a, DFO 2013b, DFO 2014a, DFO 2014b).</p> <p>The impact of the ECOSF on commercially targeted groundfish species taken as bycatch is assessed through incorporating the bycatch data into formal stock assessments (e.g., TRAC 2014a, TRAC 2014b). Bycatch data in general are routinely collected, and show that only small quantities of non-scallop species, including ETP wolffish, are caught in the ECOSF.</p> <p>The role and importance for juvenile groundfish of structural complexity in gravel substrates has been investigated (Tupper & Boutilier 1995, Langton <i>et al.</i> 1998). The impact of scallop dredges on benthic habitats and communities, including epibenthic structuring species, has then been investigated in detail (e.g., Collie <i>et al.</i> 2000, Howarth. & Beukers-Stewart 2014, Jenkins <i>et al.</i> 2001, Jennings & Kaiser 1998). Recovery over time has also been investigated on the Georges Bank (Collie <i>et al.</i> 2005).</p> <p>Overall, the main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated, therefore meeting the requirements for SG100.</p>	
c	Guidepost	The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.	The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood.
	Met?	Y	N
	Justification	<p>Catch and bycatch data are collected routinely in the ECOSF. The assessments of the main targeted scallop stocks (DFO 2013a, DFO 2013b) provide an important insight to the impact of the ECOSF on these ecosystem elements. The same is true for the commercially targeted groundfish species and ETP wolffish species that are caught in the ECOSF. The impacts of dredging on habitats and communities have been researched, including specifically on the Georges Bank as the main offshore Bank targeted by the ECOSF.</p> <p>The main functions of the target, retained, bycatch and ETP species as predators and prey in the ecosystem are known (e.g., Araújo & Bundy 2011), and the role and importance of gravel habitats for shelter and survival of some groundfish is known. However, it is not possible to confirm that the main functions of these components are 'understood'. As such, the ECOSF scores 80 for this SI, but does not meet the SG100 level of performance.</p>	
d	Guidepost	Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.	Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?	Y	Y

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
	Justification	<p>Catch and bycatch data are collected routinely in the ECOSF. The assessments of the main targeted scallop stocks (DFO 2013a, DFO 2013b) provide an important insight to the impact of the ECOSF on these ecosystem elements. Bycatch data and stock assessments for the commercially targeted groundfish species and ETP wolffish species that are caught in the ECOSF also allow the main consequences for these elements to be inferred. The impacts of dredging on habitats and communities have been researched, including specifically on the Georges Bank as the main offshore Bank targeted by the ECOSF.</p> <p>The roles of the target, retained, bycatch and ETP species as predators and prey in the ecosystem are known, and the role and importance of gravel habitats for shelter and survival of some groundfish is known. 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. As such, the ECOSF scores 100 for this SI.</p>	
e	Guidepost	Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Information is sufficient to support the development of strategies to manage ecosystem impacts.
	Met?	Y	Y
	Justification	<p>Data are collected routinely in the course of the ECOSF fishing activities, including on scallop catches, sizes, densities and growth, and on bycatch species, quantities and sizes (of the larger megafauna taken in the bycatch). Approximately 10% of the fishing trips are not covered by observers, and landings are monitored 100%.</p> <p>The substrates in the fished areas on the three most important Banks (Georges Bank, Browns Bank North and German Bank) are known in detail, while knowledge of the substrates on the other Banks is less precise. The impacts of dredging on habitats and benthic communities, as well as subsequent recovery, have been researched (e.g., Collie <i>et al.</i> 2000, Collie <i>et al.</i> 2005, Howarth. & Beukers-Stewart 2014, Jenkins <i>et al.</i> 2001).</p> <p>The vessels fishing in the ECOSF are monitored continuously with VMS, and so the areas fished are known in detail (Sarty 2013).</p> <p>Information on the fishery's ecosystem and on the activities of the ECOSF vessels is sufficient to support the development of strategies to manage ecosystem impacts, and so the fishery meets the SG100 level of performance for this SI.</p>	
References		<p>Araújo & Bundy 2011, Breeze <i>et al.</i> 2002, Brown <i>et al.</i> 2011, Campbell & Simms 2009, Cogswell <i>et al.</i> 2009, Collie <i>et al.</i> 2000, DFO 2014a, Howarth. & Beukers-Stewart 2014, Jenkins <i>et al.</i> 2001, Jennings & Kaiser 1998, Kostylev 2001, NL Seabed Atlas (http://www.seabed-atlas-nl.ca/mapguide/NLSeabed2011/), Robert 2013, Robert 2014a, Robert 2014b, Sarty 2013, Todd & Kostylev 2011, TRAC 2014a, TRAC 2014b, Tupper & Boutilier 1995.</p>	
OVERALL PERFORMANCE INDICATOR SCORE:			95
CONDITION NUMBER (if relevant):			N/A

Principle 3 Evaluation Tables

Evaluation Table for 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; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. 		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	There is an effective national legal system and a <u>framework for cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and <u>organised and effective cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and <u>binding procedures governing cooperation with other parties</u> which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Y	Y	N
	Justification	Canadian fisheries management has a well-established legislative framework. As noted Section 3.5.1, above, the federal government has jurisdiction for seacoast and inland fisheries in Canada, and it has enacted several pieces of legislation that govern fisheries, notably the <i>Fisheries Act</i> . That act grants authority for fisheries management to the Minister of Fisheries and Oceans as well as providing the power to enact regulations governing a wide variety of management measures of which the <i>Atlantic Fishery Regulations, 1985</i> and the <i>Fishery (General) Regulations</i> are the main legal instruments governing the fishery. Management measures are developed under the authority of the <i>Act</i> and the regulations and ministerial powers are delegated to officials of the DFO. There is an effective national legal system and organized and effective cooperation with other parties through the OSAC. While there is a constitutionally binding requirement to consult with aboriginal peoples and provinces on some issues, there is no general requirement governing cooperation with all parties. The ECOSF therefore meets the SG80 level of performance for this SI.		
b	Guidepost	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.	The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.
	Met?	Y	Y	Y

<p>PI 3.1.1</p>	<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; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. 			
<p>Justification</p>	<p>There is an elaborate sanction and penalty structure in the <i>Fisheries Act</i> and regulations. The <i>Federal Court Act</i> provides a mechanism for parties to challenge decisions of administrative bodies or tribunals and receive a hearing before a justice of that court. Legal disputes respecting fishing violations are adjudicated quickly, fairly and transparently in a public forum following procedures outlined in the <i>Criminal Code of Canada</i> and have been shown to be effective. The legal and policy framework has been otherwise tested on several occasions at the Supreme Court of Canada (SCC) in such areas as licensing (<i>Saulnier v The Royal Bank</i>), fishing rights and allocation practices (<i>Larocque v. Canada (Minister of Fisheries and Oceans)</i>) in an open and transparent process. The system implements binding legal decisions quickly. The management system is subject to an open, transparent mechanism provided through federal legislation in open, public courts and has been tested numerous times and proven to be effective. The ECOSF meets the SG100 level of performance for this SI.</p>			
<p>d</p>	<p>Guidepost</p>	<p>The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>
<p>Met?</p>	<p>Y</p>	<p>Y</p>	<p>Y</p>	<p>Y</p>
<p>Justification</p>	<p>The <i>Constitution Act, 1982</i> recognizes and confirms aboriginal and treaty rights of the aboriginal peoples of Canada including the guarantee of legal rights to fish for food and livelihood. This section has been litigated and confirmed by the SCC on several occasions and constitutes a formal commitment to the rights of aboriginal peoples. Disputes regarding aboriginal fishing rights have been fairly resolved (<i>R.v Sparrow, R.v Marshall</i>) and have led to current policy initiatives that ensures the protection of aboriginal rights, namely the “<i>Aboriginal Fisheries Strategy</i>” which is aimed at ensuring that aboriginal entitlements are respected in the development of fisheries management regimes for aboriginal peoples.</p> <p>The Canadian constitution and subsequent SCC judgements provide a tested and proven mechanism to formally commit to the legal rights of aboriginal peoples to fish for food and livelihood. This SI is met at SG100.</p>			
<p>References</p>	<p>DFO 2004a, DFO 2012d, <i>Constitution Act, 1982 (Part II)</i>; <i>Fisheries Act</i>; <i>Oceans Act</i>; <i>Criminal Code of Canada</i>; <i>Atlantic Fishery Regulation</i>; <i>Fishery (General) Regulations</i>; <i>Aboriginal Communal Fishing Licences Regulations</i>; <i>R. v. Sparrow</i>; <i>R. v. Marshall</i>; <i>Haida Nation v. British Columbia (Minister of Forests)</i>; <i>Saulnier v. Royal Bank of Canada</i>; <i>Larocque v. Canada (Minister of Fisheries and Oceans)</i>.</p>			
<p>OVERALL PERFORMANCE INDICATOR SCORE:</p>				<p>95</p>
<p>CONDITION NUMBER (if relevant):</p>				<p>N/A</p>

Evaluation Table for PI 3.1.2

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	Y	Y	Y
	Justification	<p>The Offshore Scallop IFMP identifies all organizations and individuals involved in the management process including fishing enterprises, inshore and offshore fishing associations, aboriginal organizations, provincial governments and the Canadian Food Inspection Agency. The structure, purpose, scope and administration of the consultative process is defined in terms of reference and the process is clearly defined.</p> <p>ENGOS participate via the Dialogue Forum, the primary body for discussion between DFO and ENGOS on overarching policy issues of relevance to all organizations involved in the forum, regarding the sustainable development and conservation of Canada’s marine resources. ENGOS are also able to attend meetings of the OSAC at any time.</p> <p>All organisations and individuals in the management process have been identified and functions, roles and responsibilities are explicitly defined in the IFMP and the ENGO Forum guidelines and are well understood by all parties. The ECOSF meets this SI at the SG100 level of performance.</p>		
b	Guidepost	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.
	Met?	Y	Y	N

<p>PI 3.1.2</p>	<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>			
	<p>Justification</p>	<p>The OSAC meets at least twice per year. The year-end review meeting includes a comprehensive presentation made by DFO Science on research priorities and recommendations regarding fishery removals for the following year. The Committee then discusses TAC levels and fishing plans for the start of the fishery on the relevant Banks. Additional meetings are held throughout the fishing year to set interim TACs as the performance of the fishery is assessed. All meetings seek and accept relevant information on the performance of the fishery from participants at the meetings representing a diverse range of interests from harvesters and inshore fishermen to trade unions and First Nations people.</p> <p>The minutes of meetings reflect the decisions reached by the committee but do not explain how information is used or not used in reaching conclusions. Consultations are ongoing throughout the year to resolve issues and meetings are called to address unforeseen issues.</p> <p>The Canadian Science Advisory Secretariat coordinates the peer review of scientific issues for DFO. The Regional Advisory Process (RAP) provides the forum to review and update the scientific assessment. The process includes representatives from industry, scientists from DFO, fishery managers, aboriginal people and inshore fishermen. Scientific presentations are made and discussed and a consensus is reached on stock status, recommendations for harvest levels and future scientific programs. The SARs describe and provide rationales on how all information is used or not.</p> <p>No Aboriginal traditional knowledge is available for the areas where the ECOSF occurs, although First Nations groups often attend OSAC meetings.</p> <p>ENGO advice is received and discussed at the Dialogue Forum and considered when developing management plans.</p> <p>Traditional knowledge from fish harvesters exists for Georges Bank going back 65 years to the inception of that fishery. Knowledge on other offshore Banks is of shorter duration as most were discovered after the commercial exploitation of Georges Bank began in 1945.</p> <p>The management system has a good consultation process that seeks, accepts and demonstrates consideration of relevant information including local knowledge when available. However, there is no evidence that the OSAC process explains how the information is used or not used.</p> <p>The ECOSF meets this SI at the SG80 level of performance.</p>		
<p>c</p>	<p>Guidepost</p>		<p>The consultation process provides opportunity for all interested and affected parties to be involved.</p>	<p>The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.</p>
	<p>Met?</p>		<p>Y</p>	<p>N</p>



Intertek Fisheries Certification (IFC)

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>	
Justification	<p>Interested stakeholders have the opportunity to be involved in the consultation process. The main management body, OSAC, represents all direct and some non-direct stakeholders, including several outside fishing organizations, unions and First Nations representatives. Any party attending the meeting is permitted to address issues or make a presentation upon request. ENGOs actively participate through the ENGO Forum.</p> <p>However, the provision in the IFMP that a majority of Committee members may opt to exclude members of the public from an OSAC meeting. Although it is understood that this provision has never been used, it cannot be interpreted as encouraging and facilitating the participation of all interested and affected parties as required by the 100 SG.</p> <p>This SI is met at the SG80 level of performance.</p>	
References	DFO 2000, DFO 2004b, DFO 2011c, DFO 2011d, DFO 2012c, DFO 2012d, 2013a, 2013b.	
OVERALL PERFORMANCE INDICATOR SCORE:		90
CONDITION NUMBER (if relevant):		N/A

Evaluation Table for PI 3.1.3

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.
	Met?	Y	Y	Y
	Justification	<p>Canadian fisheries management has a solid legislative foundation through the <i>Fisheries Act</i>, <i>Oceans Act</i>, <i>Species at Risk Act</i> and several sets of associated regulations (see Section 3.5.1, above). From that legal framework flows an elaborate outline of policies, goals, objectives, processes and procedures. The following outlines the long-term policy objectives that are the most relevant to this assessment.</p> <p>Four overarching objectives for fisheries management are outlined in the <i>Atlantic Fisheries Policy Framework</i>: i) conservation and sustainable use of marine resources and habitat, ii) self-reliant fisheries contributing to the well-being of coastal communities, iii) shared stewardship involving participants in fisheries management decision-making processes, and iv) a stable and transparent access and allocation approach through a rules-based process.</p> <p>The preamble to the <i>Oceans Act</i> states that “Canada promotes the wide application of the precautionary approach to the conservation, management and exploitation of marine resources in order to protect these resources and preserve the marine environment” That commitment is followed up in the <i>Sustainable Fisheries Framework</i> that specifically focuses on the incorporation of the precautionary and ecosystem approaches to fishery management decisions while protecting biodiversity and fisheries habitat.</p> <p>The <i>Policy to Manage the Impacts of Fishing on Sensitive Benthic Areas</i> deals with the mitigation of the impacts of fishing on sensitive benthic areas or avoidance of impacts of fishing that are likely to cause serious or irreversible harm to sensitive marine habitat, communities and species.</p> <p>The <i>Emerging Species Policy</i> sets out the requirements and procedures for new fisheries that must be followed before the fishery can be initiated. A cornerstone of the policy is the establishment of a scientific base with which stock responses to new fishing pressures can be assessed.</p> <p>The <i>Aboriginal Fisheries Strategy</i> was developed to implement the SCC decision that aboriginal people have a right to fish for food, social and ceremonial purposes, a right that takes priority, after conservation, over other users of the resource. The policy seeks to provide stability where DFO manages the fishery and where land claims settlements have not already put a fisheries management regime in place.</p> <p>The overarching legislative and policy framework explicitly outline clear long-term objectives that guide decision-making. The application of the precautionary approach is statutorily required and clearly outlined in policy and practice in the ECOSF.</p> <p>The ECOSF fully meets this PI at the SG100 level of performance.</p>		
References		<i>The Oceans Act 1996, Fisheries Act, Species at Risk Act, DFO 2004a, DFO 2008a, DFO 2009a, DFO 2009b, DFO 2012d.</i>		



Intertek Fisheries Certification (IFC)

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
OVERALL PERFORMANCE INDICATOR SCORE:	100
CONDITION NUMBER (if relevant):	N/A

Evaluation Table for PI 3.1.4

PI 3.1.4		The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.
	Met?	Y	Y	Partial
	Justification	<p>The ECOSF is exclusive to the client group. It is in its best interests to ensure that the fishery is managed for the long-term. There are powerful economic, social and environmental incentives that contribute to sustainable fishing and ecosystem management.</p> <p>For example, the rights-based fishing strategy of Enterprise Allocations (EAs) provides an incentive to fish the stock for value and not volume, preserve the stock for future years, maximize yields without harming productivity, and to avoid harm to the habitat or other species that comprise the fishery's ecosystem. The fleet is particularly conscious of its impact on the environment, and has reduced the bottom contact of its gear dramatically in recent years.</p> <p>Management plans and strategies are monitored on a continual basis and thoroughly at least once per year at the OSAC. Any perverse incentives that may arise would be identified quickly and, due to the small number of harvesters organized into a single group, dealt with quickly and efficiently.</p> <p>The management system accordingly provides incentives consistent with achieving the outcomes of P1 and P2 and the system would readily identify any perverse incentives. The lack of an explicit provision in the management process that considers the role of incentives in the fishery prevents a 100 score.</p> <p>The ECOSF meets the first component of the SG100 level of performance, but not the second component, and therefore scores 90 for this PI.</p>		
References		DFO 2008b, DFO 2011c, DFO 2012c, Sarty 2013.		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 3.2.1

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system	Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.	Well defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.
	Met?	Y	Y	Y
	Justification	<p>Short and long term objectives are elaborated in tabular form (see Section 3.5.6 and Table 8, above). Four main objectives are enumerated:</p> <ol style="list-style-type: none"> 1) No unacceptable reduction in productivity, 2) No unacceptable reduction in biodiversity, 3) No unacceptable modification of the habitat, and 4) The creation of circumstances for the economic prosperity of the fishery. <p>Strategy and tactics are outlined for each objective and there is a monitoring and evaluation framework to evaluate whether the objective is being achieved.</p> <p>Short and long-term objectives, strategies and tactics are well defined, measurable and demonstrably consistent with achieving the outcomes in Principle 1 and Principle 2. The ECOSF therefore meets the SG100 requirements for this PI.</p>		
References		DFO 2000, DFO 2011b		
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 3.2.2

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Y	Y	
	Justification	<p>Decision-making processes are well established and outlined in several policy documents including the <i>Policy Framework for the Management of Fisheries on Canada's Atlantic Coast</i>, the <i>Sustainable Fisheries Framework</i>, and the <i>Aboriginal Fisheries Strategy</i> which ensures that aboriginal entitlements are respected in the development of stable fisheries management regimes for aboriginal peoples.</p> <p>Process wise, the OSAC discusses TACs and management measures and makes recommendations to DFO on the annual fishing plan and other measures for the ECOSF. The IFMP and the annual fishing plans for the various offshore Banks are approved by the RDG, Maritimes Region. To ensure orderly management the RDGs of the Maritimes Region and the Newfoundland and Labrador Region keep each other informed on all management recommendations that could impact the sea scallop fishery on St. Pierre Bank.</p> <p>These processes together create measures and strategies to achieve the stated objectives for the fishery, and so the ECOSF meets the SG80 level of performance for this SI.</p>		
b	Guidepost	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Y	Y	N
	Justification	<p>At least annually, the OSAC reviews all issues identified through research, monitoring, evaluation and consultation. A Scientific Advisory Report is presented every three years and a Stock Status Report updates the stock situation in the intervening years. C&P presents a monitoring report and Fisheries Management presents a report of the previous year's fishery. DFO and the industry are able to respond quickly to all serious and other important issues identified.</p> <p>Decision-making processes demonstrably respond to the majority of issues identified, but the SG100 level of performance requires that all issues are responded to. The ECOSF therefore meets the SG80 level of performance for this SI.</p>		

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
c	Guidepost		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	<p>The use of the precautionary approach in the exploitation of marine resources is legislatively enshrined in the <i>Oceans Act, 1996</i>. That obligation is detailed in the <i>Sustainable Fisheries Framework</i> and <i>Fishery Decision-Making Framework Incorporating the Precautionary Approach</i> to ensure that the precautionary approach is built into fisheries management decisions.</p> <p>A formal Precautionary Approach Framework has been implemented in the offshore scallop fishery for the most important fishing area, Georges Bank, which represents approximately 80-90% of the fishery. The plan is to consider the approach for the other fishing areas as models are developed. Other proxy-based frameworks may be considered as deemed appropriate. In the interim, precautionary TACs and meat counts are set for the other areas, and all landings are 100% monitored.</p> <p>The precautionary approach used is very detailed and based on the best available information. The ECOSF scores 80 this SI.</p>		
d	Guidepost	Some information on fishery performance and management action is generally available on request to stakeholders.	Information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Y	Y	N
	Justification	<p>Scientific assessments and stock status reports are published through the CSAS system and posted on the DFO website. Minutes of meetings and fishing plans containing management action are circulated to all participants and are available to all interested parties upon request.</p> <p>Information on fishery performance and management is presented to stakeholders at OSAC meetings in an open public forum. An extensive scientific stock status report is presented at the meeting including information on abundance, CPUE, recruitment and size distribution. Management options on TACs, meat counts and seasons are presented for each scallop fishing bank. The OSAC reviews the information presented and makes recommendations on management measures for the fishing year. The basis for actions or lack of actions arising from the findings emerging from research, monitoring, evaluation and review activity is clearly outlined in the meeting minutes.</p> <p>Final Fishing Plans are obtained through an internal process whereby the results of the OSAC consultations are provided, including where there may be conflicting advice, how the advice provided at OSAC aligns with the Science information presented, a DFO analysis of that advice and a recommendation for approval.</p>		

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
		The ECOSF meets the SG80 level of performance for this SI. As there is no formal reporting to all interested stakeholders that describe how the management system responds to findings and relevant recommendations, a score of 100 was not achieved.		
e	Guidepost	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Y	Y	Y
	Justification	The continual contact between the regulator and the industry during the fishing season, along with the open and transparent OSAC meeting process, acts proactively to avoid legal disputes. The system is structured to identify legal conflicts at an early stage. Judicial decisions arising from legal challenges are implemented without delay. The fishery meets the SG100 level of performance for this SI.		
References		DFO 2000, DFO 2004a, DFO 2009a, DFO 2011b, DFO 2011c, DFO 2012c, DFO 2012d, DFO 2013a, DFO 2013b, DFO 2013e, DFO 2013g, DFO 2014f, DFO 2014g, DFO 2014h, DFO 2014l.		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER				N/A

Evaluation Table for PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Y	Y	Y
	Justification	<p>The monitoring, control and surveillance program for the ECOSF includes electronic vessel monitoring systems (VMS) on each vessel, at-sea observations by patrol vessels and fixed-wing aircraft, 100% dockside monitoring of landings, catch and effort data to track catch to EA, on-board observer coverage with protocols to monitor fishing operations and mandatory submission of fishing vessel log books.</p> <p>C&P takes an intelligence-led evaluation approach to enforcement (see Section 3.5.9, above) in an attempt to focus on risks to conservation. DFO works closely with stakeholders to ensure understanding of the requirements. Detailed conditions of licence are outlined for each vessel in the fishery.</p> <p>Two mid-shore patrol vessels based in Dartmouth to serve the Atlantic area (Newfoundland, Gulf and Maritimes Regions) were added in the fall of 2013.</p> <p>The monitoring, control and surveillance system is comprehensive and has demonstrated a consistent ability to enforce management measures as is reflected in the low number of infractions over a long period. The ECOSF therefore meets the SG100 level of performance for this SI.</p>		
b	Guidepost	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	Met?	Y	Y	Y
	Justification	<p>The sanctions regime outlined in the <i>Atlantic Fishery Regulations</i> provides deterrents to unacceptable behaviour in the fishery. The <i>Fisheries Act</i> outlines a ticketing system for minor offences and a court-based system for more serious offences which can result in fines up to \$500,000, jail terms and forfeiture of catch and gear. The sanctions are consistently applied through a court-based system. The system has demonstrably provided effective deterrence as noted by the very low number of infractions over several years.</p> <p>The ECOSF meets the SG100 level of performance for this SI.</p>		

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery’s management measures are enforced and complied with		
c	Guidepost	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Y	Y	Y
	Justification	<p>The very low rate of violations described above indicates that fishers comply with the management system under assessment. The voluntary self-reporting incident noted above in Section 3.5.9 attests to the effectiveness of the system as well as attitude of the harvesters toward the resource. Fishers provide information through mandatory reporting as well as voluntarily through such programs as on-board and port sampling. Joint DFO/industry programs attest to responsible stewardship.</p> <p>The ECOSF meets the SG100 level of performance for this SI.</p>		
d	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		Y	
	Justification	The team found no evidence of systematic non-compliance, and so the ECOSF meets the SG80 level of performance for this SI.		
References		<i>Fisheries Act, Atlantic Fishery Regulations, DFO 2000, DFO 2013e, DFO 2014e, DFO 2014f.</i>		
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 3.2.4

PI 3.2.4		The fishery has a research plan that addresses the information needs of management		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	Research is undertaken, as required, to achieve the objectives consistent with MSC’s Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC’s Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC’s Principles 1 and 2.
	Met?	Y	Y	N
	Justification	<p>The Research Plan for the ECOSF begins with the assessment framework outlined in Section 3.5.4, above, that establishes methodologies for determining stock status, stock productivity, reference points and advice on harvest levels and research recommendations.</p> <p>There is then a written offshore scallop research plan for 2014-2015 (DFO 2014k) that outlines three five-year research objectives (see 3.5.10 above). The plan provides support for annual decision making by fishery managers as well as DFO’s precautionary approach and long-term fishery management strategies by linking reference points to long-term scallop dynamics. The plan takes a proactive approach by participating in a partnership with management and the industry, the aim being to produce high quality analyses of fishery and survey data that reduce advice uncertainty and allow the fishing industry to identify with the scientific approach adopted.</p> <p>Annual stock surveys are conducted throughout all major production areas with more detailed surveys on Georges Bank 'a' and Browns Bank North, the two most productive areas. Current research also focuses on refining the models for those areas where they are used, re-establishing an aging program for Georges Bank and understanding the spatial and temporal patterns of growth.</p> <p>The research plan and research activities provide 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. The ECOSF meets the requirements of this SI at SG 80. The work plan is a strategic document but it is rather cryptic and not considered sufficiently comprehensive to meet SG 100</p>		
b	Guidepost	Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.
	Met?	Y	Y	N
	Justification	<p>Research results are presented and distributed to all OSAC members and to others upon request in a timely fashion. All SARs and SSRs are posted on the DFO website. The fishery therefore meets the SG80 level of performance for this SI., but cannot meet the SG 100 level of performance as there is no evidence that the internal DFO research plan is distributed and widely and publicly available as required for a 100 score.</p>		
References		DFO 2000, DFO 2009c, DFO 2013a, DFO 2013b, DFO 2014g, DFO 2104h, DFO 2014k.		
OVERALL PERFORMANCE INDICATOR SCORE:				80
CONDITION NUMBER (if relevant):				N/A

Evaluation Table for PI 3.2.5

PI 3.2.5		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG60	SG80	SG100
a	Guidepost	The fishery has in place mechanisms to evaluate some parts of the management system.	The fishery has in place mechanisms to evaluate key parts of the management system	The fishery has in place mechanisms to evaluate all parts of the management system.
	Met?	Y	Y	N
	Justification	<p>The performance of the management system against the stated objectives is constantly monitored through the fishing season by the industry and DFO, and changes are made as required through regular meetings of the OSAC. A full review of the performance of the fishery against stated goals takes place at the annual year-end OSAC meeting that is attended by the interested parties noted in section 3.5.4, above. Presentations are made on the status of the stock, management measures used and operational issues, as well as on an overview of the monitoring of the fishery by the C&P surveillance program for the previous year; adjustments are made subsequently to the management system as required.</p> <p>Key parts of the management system are evaluated but there is no evidence that all parts of the management system are assessed against the stated objectives for the fishery. As such, the ECOSF meets the SG80 level of performance for this SI.</p>		
b	Guidepost	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Y	Y	N
	Justification	<p>The review conducted at the year-end OSAC meeting noted in a above is considered to be an internal review as it is not external to the fishery specific management system, as specified by CB4.11.1.</p> <p>The meetings held to develop the Assessment Framework (most recently in 2009) are attended by DFO scientists external to the fishery specific management system as well as scientists external to DFO. Formal external reviewers during the 2009 process included scientists from the Universidade Estadual de Maringá in Brazil, the US National Marine Fisheries Service at Woods Hole, MA, and a scientist from another region of DFO. A representative also attended the meetings from a local ENGO.</p> <p>The Canadian Auditor General (AG) also has the authority to conduct reviews of the fisheries management regime on an <i>ad-hoc</i> basis, and this has occurred on previous occasions. Occasionally, House of Commons and Senate standing committees of the Parliament of Canada conduct reviews of a fishery and require officials from DFO to appear as witnesses.</p> <p>Overall, there is considered to be regular internal review and occasional <i>ad hoc</i> external review. A score of 80 is therefore awarded to the ECOSF for this SI. A score of 100 cannot be achieved in the absence of a regular external review of the management system.</p>		
References	AGC1999a, AGC2005a, AGC2009a, AGC2011a, DFO 2009c, DFO 2011c, DFO 2012c, PAR 2005, PARL 2009. PARL 2012a, PARL 2012b, PARL 2013.			
OVERALL PERFORMANCE INDICATOR SCORE:				80
CONDITION NUMBER (if relevant):				N/A

APPENDIX 2: SITE VISIT NOTIFICATION

Site visit notification on the MSC website



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10A Victory Park
Victory Road
Derby
DE24 8ZF
UK

www.intertek.com/food/msc-certification

MSC Fisheries Certification Assessment

Seafood Producers Association of Nova Scotia (SPANS) Eastern Canada Offshore Scallop (*Placopecten magellanicus*) Fishery

Certification Body: Intertek Fisheries Certification

Stakeholder Consultation: Site Visit Announcement

This fishery is now entering the 'information gathering' stage of the reassessment against the Marine Stewardship Council (MSC) Principles and Criteria for Sustainable Fishing. Information will be collected, in part, during a Site Visit. A key purpose of this stage is to collect information on the fishery and speak to stakeholders with an interest in the fishery under assessment. We therefore encourage any stakeholders with experience or knowledge of the fishery to participate in these stakeholder meetings.

The Site Visit will be carried out by the following team members:

Lead Assessor and Principle 2: Dr. Rob Blyth-Skyrme
Principle 1: Dr. Andy Brand
Principle 3: Mr. John Angel

Meetings will take place in **Halifax, Nova Scotia, Canada** during the week of the 16th – 20th June 2014.

We will be available over this period to meet with stakeholders; private meetings can be arranged if required. If you would like to arrange a meeting, please contact the Lead Assessor by the 10th June 2014, and advise us of:

- a) your name and contact details
- b) your association with the fishery
- c) the issues you would like to discuss (in order for us to arrange appropriate representation)
- d) where and when you would like to meet

Written information can be provided to the assessment team as an alternative, or in addition, to a meeting. If you wish to provide comment at any stage of the assessment process the MSC have provided a template for stakeholders to complete and submit their comments. This can be downloaded from the following link:

<http://www.msc.org/documents/scheme-documents/forms-and-templates/msc-template-for-stakeholder-input-into-fishery-assessments/view>

Intertek Fisheries Certification will notify identified stakeholders of key steps in the assessment process directly through email. If you know of anyone who may be interested in this notification please forward to them and notify us so we may add them to our list of stakeholders. It should be noted that because email is not a fool-proof way of transmitting notifications, we ask that stakeholders also subscribe to the free notification service provided by the MSC at: <http://www.msc.org/newsroom/updates>

Should you wish to obtain further information on the MSC, this is available on their web site at <http://www.msc.org>.

As a conformity assessment body, Intertek Fisheries Certification has dispute resolution procedures available should these prove necessary. These are available by contacting the Lead Assessor below.

Dr. Rob Blyth-Skyrme
rob@ichthysmarine.com

The Intertek logo consists of the word "Intertek" in white, bold, sans-serif font, centered within a dark blue rounded rectangle.

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Site visit notification in 'The Navigator' magazine, June edition.

The Intertek logo consists of the word "Intertek" in white, bold, sans-serif font, centered within a dark blue rounded rectangle.

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Marine Stewardship Council Certification

**Eastern Canada Offshore Lobster Fishery
Easter Canada Offshore Scallop Fishery**

Intertek Fisheries Certification Ltd is currently undertaking a re-assessment of the above fisheries against the Marine Stewardship Council's Principles and Criteria for Sustainable Fishing. We would welcome the views of interested parties on the suitability of this fishery for re-certification. Please forward any comments to: Dr. Rob Blyth-Skyrme rob@ichthysmarine.com or contact Paul Knapman at +1 902 422 4511



APPENDIX 3: RECORDS OF STAKEHOLDER MEETINGS

Note of meeting: DFO, Halifax, Nova Scotia, 17th June 2014.

MSC Fishery Assessment Stakeholder Interview Record

Assessment Team	Names
Lead Assessor	Rob Blyth-Skyrme
P1 Team Member	Andy Brand
P2 Team Member	Rob Blyth-Skyrme
P3 Team Member	John Angel

Meeting Location	SPANS Office, Dartmouth, NS	
Date	17th June 2014	
Stakeholders Name	Affiliation	
Christine Penney	Clearwater Seafoods LP	
Roger Stirling	SPANS	
Ginette Robert	SPANS	
Stephen Smith	DFO	
Greg Stevens	DFO	
Odette Murphy	DFO	
Tammy Rose-Quinn	DFO	
Brad Hubley	DFO	
Scott Coffen-Smout	DFO	

1. Comments

This was a science and management meeting with DFO and the client, to review information relevant to the 4th audit of the existing certification of the Eastern Canada Offshore Scallop Fishery, and to the reassessment of the same fishery.

2. Status

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

DFO has the science and management responsibility for the fishery.

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?

DFO identified no substantive issues or concerns regarding the fishery.

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4. IFC Assessment Team Questions

Assessment team questions for stakeholders

A range of questions were posed by the assessment team to clarify information that was made available across the three Principles. Key areas of interest included:

Principle 1:

- Any recent changes to the assessment model and process, including frequency of assessment.
- The stock assessment review process, including participation by external reviewers.
- Trends in the stock on different Banks, and near-term future outlook.
- Collection of information on non-harvest mortality.

Principle 2:

- Availability of bycatch/discard data across the different Banks.
- Availability of habitat data across the Banks, and figures for use in the report.
- Confirmation of absence of ETP species interactions in the fishery, apart from wolffish (for which data are available).

Principle 3:

- Current IFMP version and update process.
- Existence of a research plan.
- The risk-based enforcement process.
- Stakeholder engagement in and openness of the science and management of the fishery.
- The OSAC process.
- Enforcement and compliance in the fishery.
- Any recent changes to relevant legislation.

5. Other issues

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

DFO and the client together committed to provide additional information as follows.

- 2009 Res Docs (Johnson *et al.*, Hubley *et al.*) detailing the stock assessment framework.
- 2014 Special Science Response/s.
- 2014 Smith and Hubley.
- A summary of quantities of all bycatch/discarded.
- DFO internal science programme planning document (research plan).
- Description of DFO approach to risk/intelligence-based enforcement.
- DFO policy around the checklist.
- Description of what the charges were in the previous five years, and what the resolutions were.
- Any documentation indicating where the minister accepted the Hooley recommendations.
- OSAC 94/95 and 2005 minutes showing decision process around quota cuts.

6. Closing

- All participants were offered the opportunity to ask further questions.
- It was noted that the 4th audit report must be submitted within 30 days, while the reassessment was a complete assessment process and would come later - it was anticipated that the PCDR would be consulted on just before Christmas 2014.
- It was agreed that this brief note of the meeting would be provided to the client and DFO for review.

7. Confirmation of record of meeting:

This note was sent as a draft to CSLP for forwarding to DFO on the 18th June, 2014. No comments were received back.

APPENDIX 4: PEER REVIEW REPORTS

Peer Review Report 1

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 Response	Assessment	Body
<i>Justification:</i> Generally, the report is very well written, the information is comprehensive, and the scores are well justified. A few queries on the latter are highlighted in the comments on the scoring table. This is obviously a well-managed fishery which has notably dealt with potentially significant issues related to impacts of the gear on bottom habitats and ecosystems. Stock is in good shape, the harvesting strategy is sound, and there is a strong legal and management framework.		Thank you and noted. CAB responses are made against the specific points raised in the sections, below. Thank you and noted.		

<i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i>	Yes/No NA	Conformity Response	Assessment	Body
<i>Justification:</i> No conditions are raised		Confirmed, thank you.		

If included:

<i>Do you think the client action plan is sufficient to close the conditions raised?</i>	Yes/No NA	Conformity Response	Assessment	Body
<i>Justification:</i> No conditions are raised		Confirmed, thank you.		

General Comments on the Assessment Report (optional)

1. The Introduction sections are very good and comprehensive, there are occasions in the scoring table where these should be referenced to justify statements about availability of information and other issues (these are flagged in the scoring table comments).

IFC Comment: Thank you, and noted. Comments are provided against specific points, below.

A few editorial comments.

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2. Page 22, 4 lines from bottom - the name of the document issued in interim years is a “Science Response” not a Stock Status Report.

IFC Comment: Thank you. A check of the Canadian Science Advisory Secretariat website (<http://www.isdm-gdsi.gc.ca/csas-sccs/applications/publications/search-recherche-eng.asp>) indicates that the annual updates on stock status are provided in Science Advisory Reports (SARs). The assessment document has been adjusted to reflect this.

3. Figure 14, page 32, caption - strictly the figure does not show “greater growth” but growth to a greater maximum length.

IFC Comment: Thank you, and noted. A change has been made to the caption for Figure 14..

4. Figure 23 page 41. Caption should indicate that red dots are observations, black line is model output (I think)

IFC Comment: Thank you, and yes, you are correct. We have added this information to the caption for Figure 23.

5. Page 49 para before “3.3.2.8 Harvest Strategy”. The team concludes that stock status remains very good on the two principal grounds - however from the figures, things are much better on Georges a than on Browns North - the former well above the long-term mean or median, the latter at the long-term median. Also it would appear that survey uncertainty (confidence intervals) is greater on Browns North. I would not characterise these two areas as equally good, based on these figures, although both are in good enough shape to justify the proposed scores.

IFC Comment: Thank you, and agreed. A change has been made to the text to reflect that the status of the Georges Bank ‘a’ stock is very good in comparison to the long term average, while the status of the Browns Bank North stock is close to the long term average.

6. Page 57, 3.4.3.4 on wolffishes. As noted in comments on the scoring table, Atlantic wolffish should not be considered an ETP species for MSC, as it is listed as “Special Concern” - as such it is not “protected” (there are no automatic prohibitions on killing or harming individuals) and neither “endangered” nor “threatened”. It should be considered as a bycatch species (2.2 series) not an ETP species. The other two wolffish species are ETP species.

IFC Comment: Thank you and agreed – if a species is listed ‘Special Concern’ under SARA, the basic prohibitions against harming a species or its residence and the prohibition against destruction of critical habitat do not apply (Smallwood, 2003). As such, Atlantic wolffish is now considered a bycatch species of negligible importance to the assessment, having made up an average of approximately 0.006% (range 0.001 – 0.017%) of the catch over the period Oct 2011 – April 2013.

7. Figure 30, page 58. As shown, it is not possible to interpret this in terms of bottom sediments. Does “acoustic class” relate to sediment type somehow? The correspondence between acoustic class and sediment type should be provided or some other way of showing bottom sediment distribution on the Bank - as I believe the purpose here is to show bottom sediments.

IFC Comment: Thank you, and noted. The figure shows the sediment type on the Georges Bank based on acoustic class, where acoustic class was defined on the basis of groupings of similar backscatter returns from a multibeam bathymetric echosounding system. The groupings were confirmed by groundtruthing. An explanation of the key is now provided, showing that the majority of the Bank is made up of gravel or very coarse sand.



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NB

DFO 2011 (cited in comment on 2.5.3). The marine environment and fisheries of Georges Bank, Nova Scotia..... Can. Tech. Rep. Fish. Aquat. Sci. 2945. xxxv+492 pp. Available at <http://www.dfo-mpo.gc.ca/Library/344232.pdf>

IFC Comment: Thank you, and noted.



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Performance Indicator Review

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
1.1.1	Yes with one exception	Yes	NA	<p>The only information missing is HOW the “number of indices” is used to ensure precautionary management on the small stocks. I would assume this means tracking these and adjusting TACs based on some kind of protocol. This point comes up often in the P1 section.</p> <p>The text notes the large dispersal capability of scallop larvae - there is a good chance that the small stocks are seeded from the large stocks with effective PA frameworks which further supports the conclusion and score.</p> <p>As in some other P1 PIs there is a lot of text here not directly related to the SGs so one needs to read carefully to get to the relevant points.</p>	<p>Noted, thank you. The text has been modified to reflect that trends in the indices are tracked in relation to the historical performance of the fishery, and appropriate protocols for each are utilised to determine stock status and formulate fishing plans.</p> <p>Agreed, thank you.</p> <p>Noted, thank you. The assessment team considered the text to be useful in guiding the reader through the available information in order to justify the scoring.</p>
1.1.2	Partly	Partly	NA	S1a - although this is mostly well explained,	The text has been modified, as indicated in



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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
				<p>again the detail of HOW the “number of indices” relates to reference points is needed. Presumably this involves inspection of trends in indices and adjustment of TACs or other measures following some protocol.</p> <p>SIb - the explanation is brief and does not show WHY we believe the LRP is high enough. Figs 25 and 26 show that the stock has shown the capacity to rebuild from levels between the LRP and USR, which provides the necessary justification.</p> <p>Also, WHY “consideration of precautionary levels” is met for 100 is not explained – I would expect something explicit on this to justify the score.</p> <p>SIc - the explanation is certainly adequate for 80 but it is not clear how the “relevant precautionary issues” are met for 100.</p>	<p>the comment above.</p> <p>Noted, thank you. The text has been modified to include this point of justification.</p> <p>It was noted that scallops are a widespread, early maturing, high fecundity bivalve species, but additional justification has been added, linking this to the demonstrable capacity for the stock to rebuild from low levels.</p> <p>Noted, thank you. The text has been modified to point specifically to the USR/TRP being set at 80% of B_{MSY}. This takes in to account relevant precautionary</p>



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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
					issues.
1.1.3	Yes	Yes	NA	The PI is not scored since stock is not depleted.	Thank you.
1.2.1	Almost entirely	Yes	NA	Well justified except that the use of the “number of indicators” (SIa) is not explained.	Noted, thank you. The text has been modified to clarify that analysis of trends in a number of indicators in relation to the historic performance of the fishery all the TACs to be adjusted appropriately, and that this process has protected the productivity of the Banks over a long timeframe.
1.2.2	Mainly	Partly	NA	SIa - “Exploitation rates...at low levels” - the levels of exploitation rates should be specified. In this para, for Georges a and Browns, some a more comprehensive description of the actual rules related to the PA framework would help reinforce the argument. Many of these are very well described on page 47, after Fig. 25, and could be summarised here with a reference to that section.	Thank you. The text has been modified accordingly.



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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
				<p>The use of the “number of indices” should be briefly described.</p> <p>SIb - the text refers to the “numerous harvest controls” as justifying 100, however, this is not the wording of the PI and it is not clear how the design of the HCRs takes into account a wide range of uncertainties, so the score may need to be reconsidered unless further detail is available.</p> <p>One uncertainty not mentioned, and often important in fisheries, is uncertainty in the survey results - based on Figs 17 and 21 this is quite low for Georges a but higher for Browns.</p>	<p>The text has been modified to reflect that trends in indices are utilised to determine stock status and formulate fishing plans.</p> <p>Noted, thank you. The team considers that the design of the HCRs does take in a wide range of uncertainties and that the score of 100 is appropriate. More information on the design of the HCRs has been added.</p> <p>Noted, thank you. The text has been modified to include this information.</p>
1.2.3	Yes	Yes	NA	SIa - Given the range of information available, covering >90% of the landings, this is scored conservatively, but I agree the score is appropriate.	Thank you. The team agrees with this comment but considers that, with the concentration on Georges Bank ‘a’ and Browns Bank North, the information available is very extensive but cannot be said



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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
					to be comprehensive.
1.2.4	Yes	Yes	NA	Well justified.	Noted, thank you.
2.1.1	Yes	Yes	NA	No retained species	Thank you.
2.1.2	Yes	Yes	NA	No retained species	Thank you.
2.1.3	Yes	Yes	NA	No retained species	Thank you.
2.2.1	Mostly (suggest an addition)	Yes	NA	Interesting that in determining percent weight of bycatch species relative to target species catch weight, and applying the MSC 5% guideline for “main” bycatch species, we are (I think) using meat weights for the denominator, not whole or gutted weight as in other fisheries. As such, the percents provided are overestimates relative to other “normal” fisheries and the %’s are “precautionary” relative to the 5% guideline. SIb final para.	The calculation to determine the percentage of the catch made up of the different bycatch species was based on whole round weight of the scallops, not on the meat weights (see Table 5).



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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
				<p>The important point is not that the bycatch is declining but whether the bycatch amount under the current strategy would hinder stock recovery. Given that the Canadian allocation is 79t, of a TAC which is considered to allow rebuilding, that there appear to be no other Canadian fisheries on yellowtail (according to the latest TRAC update) and that the bycatch in the scallop fishery (the only source of fishing mortality) was 39 t or substantially less than the Canadian allocation of the TAC, it seems clear that the strategy in place should not hinder recovery. This does assume that things will continue.</p> <p>It may be useful to refer to the MSC definition of a “partial strategy” (GCB 3.3) as this fishery certainly meets it. S1b 3rd para - should start “There is a strategy..” not “There are various measures..” as the latter weakens the argument that this meets the 80 SG.</p>	<p>Agreed, thank you.</p> <p>Agreed, thank you. As noted in PI 2.2.1, S1b, and in PI 2.2.2, S1a, the assessment team considers that the ECOSF has a strategy in place to manage bycatch. We agree that the use of the language ‘There are various measures...’ at the start of the discussion weakens the argument, and so the language</p>



Intertek Fisheries Certification (IFC)

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
					has been changed to better reflect the assessment team's thinking.
2.2.2	Yes with minor additions suggested	Yes	NA	<p>SIa - well justified. However I think some reference to the partial strategy for Yellowtail (the only "main" bycatch species) showing that the strategy enables recovery may be needed to confirm meeting the 80 (could just refer to or reprise PI 2.2.1 sections).</p> <p>Also, a reference to the MSC definition of a "Strategy" could be included (GCB 3.3) as I think this clearly meets it.</p> <p>More accurate not to start the second para</p>	<p>Noted, thank you. A reference to the TRAC (2013) assessment report for Georges Bank yellowtail flounder is made, where it states that <i>'In order to achieve high probability that adult biomass will increase from 2014 to 2015, a 2014 quota of less than 500 t would be required'</i>. It is noted that the Canadian quota for 2014 was 72 t, and the US quota was 300 t (372 t combined). In 2013, the combined US and Canada catch was 218 t (TRAC 2014b), of which 39 t was taken in the ECOSF. Essentially, the ECOSF is not hindering recovery of Georges Bank yellowtail flounder.</p> <p>Agreed, thank you – the assessment team considers that there is a strategy in place to manage bycatch.</p> <p>Agreed, thank you – the sentence has been</p>



Intertek Fisheries Certification (IFC)

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				<p>with “various measures” because the report shows that this is a strategy, not a collection of measures.</p> <p>Use of short tows (10-30 min I believe) could also be part of a strategy for ensuring that resilient bycatch species (skates, wolffishes) are brought up in relatively good condition and help minimise discard mortality.</p>	<p>changed to reflect that the assessment team considers there to be a strategy in place.</p> <p>Agreed, thank you. The tow times are commonly 20-30 minutes, and short tows do help to ensure that fish (at least those without swim bladders) are brought up in good condition, potentially aiding post-release survival. However, this comprises a minor element of the overall strategy.</p>
2.2.3	No - info in report Introduction should be summarised and/or referenced in scoring table	Yes	NA	<p>SIa - reference should be made to the Table on p 52 providing the bycatch amounts, to support the statements here; a brief text summary of amounts would be useful here to clearly show how small they are.</p> <p>SIb - this section should summarise (and refer to) the information on pp 53-55 (with the references on the various stock assessments for bycatch species) to support the statements in the second para.</p>	<p>Noted, thank you. A short paragraph (as used in PI 2.2.2) noting bycatch amounts has been added to SIa.</p> <p>The relevant stock assessment or stock status information for main and minor bycatch species is now referenced. A brief note is also made that the fishery cannot meet the SG100 level of performance as stock assessments are not undertaken for all</p>



Intertek Fisheries Certification (IFC)

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				<p>SIId - in the concluding sentence, I think the word “main” may be missing in the first phrase - “to detect any increase in risk to the main bycatch species...” - since “main” vs “all” is the difference between 80 and 100.</p>	<p>species that are taken as bycatch in the fishery.</p> <p>Agreed, thank you – ‘main’ has been added to the sentence.</p>
2.3.1	No - a modification suggested	Yes (possibly higher?)	NA	<p>Atlantic wolffish is not an ETP species for MSC - species of “Special Concern” on SARA Schedule 1 are not subject to automatic prohibitions on killing or harming (thus are not endangered, threatened, or “protected”) and do not require a recovery plan (only a management plan). This species should be covered under 2.2. The other two wolffish species are indeed ETP but quite rare in this area.</p> <p>You might reconsider scoring in this light as the only potentially “significant” ETP species for this fishery would be the two northerly wolffishes and they appear to be</p>	<p>Agreed, thank you. Atlantic wolffish has been moved to the bycatch species provisions, where it is considered to be taken in negligible quantities.</p> <p>Noted, thank you. The scoring reflects the potential impact on ETP species, including whales and loggerhead and leatherback turtles. While there is no indication that the</p>



Intertek Fisheries Certification (IFC)

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
				<p>extremely uncommon and possibly negligible in amount.</p> <p>SIa, para on wolffishes - “commonly found in waters much deeper” - should specify the depths.</p>	<p>fishery does impact these species, there is not considered to be the high degree of certainty of no impact needed to score 100.</p> <p>The text has been modified to reflect that northern wolffish is most common at 500-1000 m depth, and spotted wolffish is most common from 200 m to 750 m (Kulka <i>et al.</i> 2007), compared with the typical fishery depth of 50-100 m..</p>
2.3.2	Mainly - an addition suggested	Yes	NA	SIa - would not the use of the netting bag to allow small fishes to exit the gear be an additional component of the strategy?	Agreed, thank you. The use of a net bag may help to reduce catches of wolffish, but the practice is voluntary and there were no data available to the assessment team on how successful the measure is at minimising wolffish bycatch. This is now mentioned in the text, but no change to scoring is justified.
2.3.3	Mainly - an addition suggested	Yes	NA	SIa - providing the actual numbers or weights caught instead of the % of the target species catch weight would be important as these are the significant figures for assessing impacts. Obviously the numbers for northern	The scaled-up values for 2012 for the entire fishery equate to approximately 860 kg of northern wolffish, and approximately 40 kg of spotted wolffish. This reflects that nine observed trips were taken in 2012, and that



Intertek Fisheries Certification (IFC)

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				and spotted w'fish are small (less than 300 kg/yr if my math is right).	each species was observed on just one of the observed trips (Robert 2013).
2.4.1	Yes	Yes	NA	<p>The justification is sound. I would not expect much development of structuring attached epibenthic species in this gravel habitat; in any case, the Collie et al (2005) reference would appear to provide good information on this habitat, its components, and recovery time.</p> <p>Possibly worth citing the MSC definition of "serious or irreversible harm" (GCB 3.2) to back up the rationale.</p>	<p>Agreed, thank you.</p> <p>Noted, thank you. A summary of the MSC approach and a reference to the guidance document (MSC 2013b) is now provided.</p>
2.4.2	Mostly, additions suggested	Yes	NA	<p>SlA. Text could use some additional detail. Mapping and TACs are mentioned, but it seems that HOW they use the maps is the main part of the strategy - they only target areas where mature scallops are abundant, right? thus the low percentages of total habitat fished.</p> <p>Also, they avoid areas where young scallops</p>	<p>Noted, thank you. A comment on how the data are used to target only the most productive grounds is now included.</p> <p>It is considered that the young scallop</p>



Intertek Fisheries Certification (IFC)

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				<p>are abundant, which would also leave some of the habitat unexploited in any given year. Finally, there are voluntary closed areas which would provide for habitat protection helping to avoid serious or irreversible harm (these might also be mentioned in SIs b-c).</p>	<p>closures and the other temporary closed areas are valuable for the management of the stock, and potentially provide some short-term habitat benefits. However, the main focus of those measures is stock management and bycatch management, respectively, rather than habitat management, and so they comprise only a very minor component of the partial strategy to manage habitat impacts. No change has been made to the report in this regard.</p>
2.4.3	Mostly	Yes	NA	<p>SIa. Should refer to the maps of sediments on banks in the Introduction (Figs 29-32).</p> <p>Re “corals occur in deeper water” - should provide the actual depths, although I agree that there would be very little overlap between depths of scallop habitat and corals.</p>	<p>Agreed, thank you. Reference to the maps has now been made.</p> <p>A new reference has been added to the document (Cogswell <i>et al.</i> 2009). The detailed maps contained in that document show that vulnerable habitats occur off the shelf edge, in waters exceeding 200 m depth, and typically in much deeper water. These depths are beyond those fished by the ECOSF.</p>



Intertek Fisheries Certification (IFC)

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				Sponge habitats should also be mentioned, as these are considered by DFO (and NAFO and others) as sensitive habitats. They are probably also mapped by Gass and Willison, and are probably even deeper than coral areas.	Sponge distribution on the Scotian Shelf and surrounds has been mapped by Campbell & Simms (2009), although these authors note that information on sponges has not been recorded systematically. Sponges occur widely on the Scotian Shelf and surrounds, but the highest concentrations appear to be found in areas of deeper water, such as in the Emerald Basin and on the shelf edge. Sponges have also been recorded from Goerges, Browns and German Banks, but Campbell & Simms (2009) provide no information on the quantities or species found, and it is highly likely that species found in shallow locations on the Socitan Shelf do not form important, structural significant reefs.
2.5.1	Yes	Yes	NA	No comment	Thank you.
2.5.2	Yes	Yes	NA	SIa. Para 2 is a good succinct description of the strategy for bycatch reduction and could be used in the 2.2 section as well. I am not	Noted, thank you. A short edit has been made to PI 2.2.2 to reflect this suggestion.



Intertek Fisheries Certification (IFC)

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				sure that minimising bottom contact time is highlighted so clearly there and that seems to me an important part of the strategy.	
2.5.3				<p>SIa - comments on 2.4.3 would also apply here.</p> <p>SIc - functions of species as predators and prey are known - should provide citation(s) on this, most likely there are appropriate trophic studies on Georges or similar nearby ecosystems (eg references in DFO 2011, citation provided in general comments, or possibly in Garrison and LInk or in Breeze et al. in your reference list).</p>	<p>Noted, thank you.</p> <p>A reference to a trophic modelling study from the western Scotian Shelf and Georges Bank is now provided (Araújo & Bundy 2011).</p>
3.1.1	Yes	Yes	NA	No comment	Thank you.
3.1.2	Yes	Yes	NA	Just a quibble, but I suggest deleting the first part of the sentence on Aboriginal traditional knowledge (“As the offshore...from shore”).	Agreed, thank you. The first part of the sentence has been deleted.



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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.3	Yes	Yes	NA	No comment	Thank you.
3.1.4	Yes	Yes	NA	No comment	Thank you.
3.2.1	Yes	Yes	NA	The objectives seem particularly well laid-out in this fishery.	Noted, thank you.
3.2.2	Yes	Yes	NA	It meets 1 of 3 SGs for 100 - shouldn't the score be 86.7 rounding to 85? but you are the experts on that.	MSC guidance on this point is somewhat ambiguous. It was the team's decision that the fairest score for this PI was 90, based on the MSC guidance that 90 is appropriate where "All elements meet SG80; some achieve higher performance at SG100, but some do not" (MSC 2013a).
3.2.3	Yes	Yes	NA	No comment	Thank you.
3.2.4	Yes	Yes	NA	No comment	Thank you.
3.2.5	Yes	Yes	NA	No comment	Thank you.



Intertek Fisheries Certification (IFC)

Any Other Comments

Comments	Conformity Assessment Body Response
	No comments noted, thank you.

Overall Opinion

<i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i>	Yes	Conformity Response	Assessment	Body
<i>Justification:</i> Yes. The stock status seems consistently good but there is clearly quite heavy fishing pressure on some beds and the information regarding some elements of bycatch and habitat effects would suggest a marginal pass in some cases.		Noted, thank you. Comments against specific points are made against the PI comments, below.		

<i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i>	NA	Conformity Response	Assessment	Body
<i>Justification:</i> NA		Confirmed, thank you.		

If included:

<i>Do you think the client action plan is sufficient to close the conditions raised?</i>	NA	Conformity Response	Assessment	Body
<i>Justification:</i> NA		Confirmed, thank you.		

General Comments on the Assessment Report (optional)

- a. 1. The report is very comprehensive and well written. Many of the figures especially maps) are of low resolution and difficult to interpret, however.

IFC Comment: Noted, thank you. With respect to the resolution of the figures, a number of the figures have been enlarged to aid interpretation. Also, the peer reviewers were provided with a PDF saved using the ‘minimum size’ option. Saving the file using the ‘standard’ option provides for much better resolution on the figures, and so this will be provided to readers of future versions of the report.



Intertek Fisheries Certification (IFC)

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
1.1.1	Yes	Yes	NA	I would have thought the fishery could justify a score higher than 80, although can understand why it does not approach 100.	There are two scoring issues in this PI, neither of which was scored at 100. Although the stock status for Georges Bank 'a' and Browns Bank North as the main Banks is known with a high degree of certainty, the score of 80 is appropriate for the fishery as a whole because of the more limited information available on stock status for the minor Banks.
1.1.2	Yes	Yes	NA	The score seems appropriate.	Noted, thank you.
1.1.3	NA	NA	NA	NA	Confirmed, thank you
1.2.1	Yes	Yes	NA	Although elements of the strategy are new it seems well thought out and the recent stock levels support this.	Noted, thank you.
1.2.2	Yes	Yes	NA	The score seems appropriate.	Noted, thank you.



Intertek Fisheries Certification (IFC)

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.3	Yes	Yes	NA	<p>The score seems appropriate, assuming that no TAC will be set for fishing areas where no recent survey information is available eg Banquereau or St Pierre. Also the report states that “There has been little or no fishing for sea scallop on Banquereau since 2010, and abundance remains very low, mainly of fully-recruited scallops. The Iceland scallop <i>Chlamys islandica</i> occurs in higher abundance and is found throughout the survey area.” Is there a fishery for Ci here, and if so, is <i>Placopecten</i> caught as a bycatch in it would such bycatch be taken into account in any Pm stock assessment?</p>	<p>Noted, thank you. There is no other directed fishery for <i>Chlamys islandica</i> in the ECOSF offshore area, although exploratory directed fishing was undertaken on Banquereau in the late 1990s. Also, rather than “<i>The Iceland scallop Chlamys islandica</i> occurs in higher abundance and is found throughout the survey area”, it is more correct to say “<i>In 2012, the Iceland scallop Chlamys islandica</i> occurred in higher abundance and was found throughout the survey area (OSAC 2013a)”. This edit has been made to the report in Section 3.3.2.7.</p> <p>However, this query raised the point that the ECOSF does harvest small quantities of Iceland scallop when fishing for sea scallops. Iceland scallop has a distribution centred to the north of the distribution of sea scallops. Negligible quantities of Iceland scallop are therefore present on Georges Bank, German Bank and Browns Bank (Iceland scallops <1 in 50,000 harvestable scallops in only some areas – CSLP pers. comm.).</p>



Intertek Fisheries Certification (IFC)

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
					<p>In any given year, Iceland scallops may represent a larger proportion of the harvestable scallop biomass on Banquereau and St. Pierre Bank. However, the ECOSF occurs rarely in these areas, and the maximum annual harvest of both scallop species from both Banks combined in the last 10 years was 1.21% in 2005 (Section 5.4).</p> <p>Given this new information, a variation request was submitted to the MSC on 6th March 2015, showing that Iceland scallop meets the IPI requirements (CR27.4.9.1) and requesting an exemption to the IPI requirements (CR27.4.10) such that Iceland scallop and Iceland scallop products are eligible to enter further chains of custody. More details can be found in Section 5.4.</p>
1.2.4	Yes	Yes	NA	The score seems appropriate.	Noted, thank you.
2.1.1	Yes	Yes	NA	The score is clearly appropriate.	Noted, thank you.



Intertek Fisheries Certification (IFC)

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2.1.2	Yes	Yes	NA	The score is clearly appropriate.	Noted, thank you.
2.1.3	Yes	Yes	NA	With 100% dockside monitoring of catch in place it is clear that the 100% guideline score is met.	Noted, thank you.
2.2.1	Yes	No	NA	It is not clear from the information presented whether there is sufficient information on skates to consider them as not being a main bycatch species since it is acknowledged that there is difficulty in identifying them to species. Skates are often slow to reproduce and vulnerable to overfishing and so the "5% of catch" rule may arguably not automatically be applicable. Moreover, there is no comparison with any biological limits or commercial catches for the banks to help assess the significance of the by-catches for thorny skate.	Noted, thank you. The skate complex as a whole, comprising seven species, made up a total of 2.73% of the catch over the period 2008 – 2013. The most common species reported in the 2010 detailed analysis of the bycatch data (Caddy <i>et al.</i> 2010) were winter skate and little skate, both of which are above the short, medium and long term averages of their biomass indices, as recorded from DFO research vessel winter surveys (DFO 2013c, DFO 2013d). Thorny skate was the third most commonly found skate species as reported by Caddy <i>et al.</i> (2010), and while the biomass index of the southern Scotian Shelf stock component is now at a low point in the time series, other components in the middle and north of the



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				<p>The main report does not mention whether the catches are taken into account during stock assessments for skate but this appears to be the case from the text in scoring table 2.2.3(b)?</p> <p>Skate survival is inferred to be high from studies of St Lawrence scallop fishery – does this fishery use sufficiently similar gear and fishing practices to be very confident about this?</p>	<p>range have increased (COSEWIC 2012). Given this information, which is now detailed more clearly in PI 2.2.1, the assessment team is content in making the skate complex a minor bycatch component.</p> <p>The text has been amended to reflect that the catch data are considered in stock assessments and/or status reviews, as well as in the development of management measures (for example, license conditions now require all thorny skate caught in NAFO divisions 4VWX+5 to be returned to the water).</p> <p>The St. Lawrence fishery is a dredge fishery, as is the ECOSF, and there is no reason to think that the survival rate will be greatly different between the two fisheries. Nevertheless, while a high survival rate is welcomed, given the low rate of capture for skates, this is a not a significant element of the strategy in place to manage bycatch.</p>



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				Further clarity would be useful to justify the score, particularly for thorny skate.	Noted, thank you. Some additional information is provided in the rationale, but the assessment team consider that no change to the score is warranted.
2.2.2	Yes	No	NA	Part of the stated strategy is the use of rope mesh backs in the gear (mentioned in the text and in the scoring table in PI 2.2.2a, b and c). It is stated that “The use of different gear modifications has also been tested, and using the rope mesh back (and increasing the mesh size) was considered to be the most effective and practical way to reduce groundfish bycatch (Walsh 2008)”, but also that use of rope mesh “is voluntary, but it is understood that this gear design is widely used, and that large mesh panels are preferred”. What size are the large panels as ten inch (US) and 16 inch (Canadian freezer trawlers) are mentioned in the Walsh report along with 5 and 6 inch? It is hard to see how a score of 100 is merited if use of mesh backs with large panels is not definitely universal,	Noted, thank you. While the rope mesh back is part of the strategy, the key element of the strategy is the use of multibeam bathymetric data to focus the fishery on the highest yielding parts of the Bank, thereby minimising bottom contact times. As noted in the report, the assessment team considers that this represents one of the most proactive and demonstrably effective approaches to minimising bycatch that we are aware of in any demersal towed-gear fishery. Even if rope mesh backs and short tow times were not employed, it is likely that the fishery would score 100 for this PI. We do not consider that a change of score is warranted.



Intertek Fisheries Certification (IFC)

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				although clearly the amount of bycatch for the fishery is low overall and the score should be high; the same argument applies to belly ring size since it is unclear whether 4-inch belly rings are now universal? (the text on page 21, top paragraph is slightly ambiguous in this respect), which might also have some bearing on this PI. Photo 3 shows 3 inch rings and 5 inch rope mesh.	
2.2.3	Yes	No	NA	As for 2.2.1: It is not clear from the information presented whether there is sufficient information on skates to consider them as not being a main bycatch species since it is acknowledged that there is difficulty in identifying them to species. Skates are often slow to reproduce and vulnerable to overfishing and so the "5% of catch" rule may arguably not automatically be applicable. Moreover, there is no comparison with any biological limits or commercial catches for the banks to help assess the significance of the by-catches for thorny skate. The main report does not	Noted, thank you. Please see comments as provided against PI 2.2.1.



Intertek Fisheries Certification (IFC)

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				<p>mention whether the catches are taken into account during stock assessments for skate but this appears to be the case from the text in scoring table 2.2.3(b)?</p> <p>Skate survival is inferred to be high from studies of St Lawrence scallop fishery – does this fishery use sufficiently similar gear and fishing practices to justify this?</p> <p>Further clarity would be useful to justify the score, particularly for thorny skate.</p>	
2.3.1	Yes	Yes	NA	Strong justification is provided for a lack of effect on ETP species present in the area.	Noted, thank you.
2.3.2	Yes	Yes	NA	The score seems appropriate. The justification states that “A comprehensive strategy would require more detail and specificity with respect to the ECOSF, and so the fishery does not meet the SG100 level of performance.” I agree with this and would suggest that this should include some feedback from the observer programme on	Noted, thank you.



Intertek Fisheries Certification (IFC)

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				whether in practise fishers observe the requirement wrt wolffish “to release them as quickly and carefully as possible when caught”.	
2.3.3	Yes	Yes	NA	Strong justification is provided for a lack of effect on ETP species present in the area.	Noted, thank you.
2.4.1	Yes	Yes	NA	A “Relatively low sensitivity to disturbance” (PI 2.4.1a) and a 10 year recovery period from fishing impacts on gravel areas (text in page 63) are contradictory and this should be acknowledged. It is difficult to deduce from the information presented how much gravel area is impacted on, say Browns Bank North). However, the fact that small areas of seabed overall are impacted and the fishery has successfully reduced the impacted areas by increased targetting of areas of high scallop densities works in its favour. It also appears that much of the fishery is prosecuted over sandy areas, especially on Georges “a”, but this is not as clear from the report as it might be. Overall the fishery	The Collie <i>et al.</i> (2005) reference, which looked specifically at the epifaunal community of the Georges Bank at sites subjected to different levels of dredging, estimated that recovery would occur within five to ten years. However, from the perspective of being precautionary, the assessment team chose to quote a ten year recovery period. Nevertheless, the fished areas are considered to be subject to high levels of natural disturbance, and the fishery has dramatically reduced bottom contact times through the generating multibeam bathymetric maps of the seabed and by focusing on areas yielding the highest scallop abundances. As noted in the report, over the



Intertek Fisheries Certification (IFC)

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
				probably just about deserves the score of 80%, particularly in light of the requirement for this to be considered on a regional level. Further clarity on the distribution of fishing on different habitats (especially the amount of more sensitive gravel areas that are and are not impacted) would be desirable to improve confidence in this.	last six years, the average area of the Canadian Georges Bank fished annually has been 16.5%, while the areas fished on the other Banks has been less than 5% annually. The assessment team confirms that the ECOSF should receive a score of 80, here.
2.4.2	Yes	Yes	NA	The score seems appropriate	Noted, thank you.
2.4.3	Yes	Yes	NA	Much detailed information clearly exists but some further interpretation would help as noted for 2.4.1 above. “The availability of suitable settlement surfaces seems to be a primary requirement for successful scallop reproduction (Hart & Chute 2004) and spat settlement, and the period immediately after is considered to be a critical period in the formation of scallop beds (Posgay 1953) and in determining year-class strength” (Page 20). Has any recent	Noted, thank you – please see response to comment on PI 2.4.1, above. The assessment team is not aware of any recent work having been done on the availability of suitable settlement surfaces on the different Banks fished by the ECOSF. However, it is noted that pre- and post-recruit abundance on Georges Bank ‘a’, the most heavily fished Bank in the ECOSF, is above average, with fully-recruited biomass



Intertek Fisheries Certification (IFC)

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
				<p>work been done on the availability of suitable settlement surfaces especially in regularly fished areas?</p> <p>Overall the score seems appropriate or possibly slightly generous dependent upon the response to the above query on settlement surfaces.</p>	<p>increasing relatively steadily between 2005 and 2014 (DFO 2014g). As such, there is no indication that the ECOSF is negatively impacting the availability of settlement surfaces to settling scallop spat.</p> <p>Noted, thank you. The assessment team confirms the score.</p>
2.5.1	Yes	Yes	NA	The score seems appropriate	Noted, thank you.
2.5.2	Yes	Yes	NA	The score seems appropriate	Noted, thank you.
2.5.3	Yes	Yes	NA	The score seems appropriate	Noted, thank you.
3.1.1	Yes	Yes	NA	The score seems appropriate	Noted, thank you.
3.1.2	Yes	Yes	NA	The score seems appropriate	Noted, thank you.



Intertek Fisheries Certification (IFC)

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.3	Yes	Yes	NA	The score seems appropriate	Noted, thank you.
3.1.4	Yes	Yes	NA	The score seems appropriate	Noted, thank you.
3.2.1	Yes	No	NA	The measures in respect of habitat change are not sufficiently clear and well defined as to warrant a score of 100%. It is not clear from Table 8 or elsewhere exactly what indicator of habitat change modification is really being used – i.e. what is an acceptable/unacceptable spatial or temporal footprint of the fishery? (Avoidance of coral areas is clear and measurable, albeit largely because the fishery does not overlap with this habitat since the main coral areas are deeper).	For habitat impacts (objective 3), the VMS monitoring in place (on every vessel in the ECOSF) allows for the footprint of the fishery to be calculated in detail. Annual changes in both the amounts and distribution of the fishing effort can therefore be calculated on each Bank. Using the high quality multi-beam survey data, this then allows for the impact on seabed habitats to be assessed. Where the amounts of habitat impacted remain the same or even decrease over time, the assessment team is satisfied that the data provide a reasonable proxy for assessing that no unacceptable modification of the habitat occurs.
3.2.2	Yes	Yes	NA	The score seems appropriate.	Noted, thank you.
3.2.3	Yes	Yes	NA	Monitoring control and surveillance seems	Noted, thank you.



Intertek Fisheries Certification (IFC)

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
				good and justifies the score of 100.	
3.2.4	Yes	Yes	NA	The justification of the score for this PI states that the work plan is “a strategic document but it is rather cryptic and not considered sufficiently comprehensive to meet SG 100”. This is supported by the observation that although there appears to be a plan to incorporate camera surveys to test finer scale habitat associations, increase understanding of scallop dynamics and provide information on other benthic species, it is not clear whether this will be funded. However, overall the score seems to be justified.	Agreed, thank you.
3.2.5	Yes	Yes	NA	The score seems appropriate	Noted, thank you.

Any Other Comments

Comments	Conformity Assessment Body Response
Some mostly minor points:	



Intertek Fisheries Certification (IFC)

Page 14 catches dropped to 2500 T during period of competitive US/Canadian fishing– compared to what? (not essential for this report but would be interesting).

General - Fishing appears to take place year round. There is a suggestion in the report that swimming of the scallops helps with catchability. Has any work been done on variation in swimming with temperature since in some other scallop fisheries trawl fishing is restricted to periods when water is warm because scallops swim more actively, so increasing catch rates and reducing amount of fishing needed to catch a set quantity of scallops?

Page 40 If Georges Bank scallops have such a high prevalence of shock marks presumably this indicates heavy fishing pressure?

Page 43 Some minor editing would help to clarify control rules. USR (in text) and URP (in figure 25) are presumably equivalent, and presumably the TPR for Browns Bank North is nominally set at the same as the USR whereas for Georges a the green dotted line in figure represents a TPR of 10,000T?

Page 45 formatting (appears to be an unwanted page break in text).

The catches dropped to 2,500 t from a maximum of approximately 12,000 t in 1978 (data from Van Eeckhaute, L., Gavaris, S. & H.H. Stone (2005). Estimation of cod, haddock and yellowtail flounder discards from the Canadian Georges Bank scallop fishery for 1960 to 2004. Transboundary Resource Assessment Committee, Reference Document 2005/02. 17 pp.).

No work has been done on catchability over different temperatures to the assessment team's knowledge.

Georges Bank 'a' is the most heavily fished Bank in the ECOSF, and an average of 16.5% of the Bank is fished each year, although some sites (those with higher scallop abundance) are likely fished more regularly than others. This is almost certainly reflected in the prevalence of shock marks on scallops from the Georges Bank.

Noted, thank you. The Upper stock reference (USR, in text) is the same as the upper reference point (URP, in figure). For Georges Bank, Figure 25 shows an additional line at 10,000 t, which represents the estimated value for B_{MSY} , based on the mean estimated biomass over the period 1981 to 2009 from the delay-difference stock assessment model for the Georges Bank.

Noted, thank you – the page break has been removed.



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APPENDIX 5: STAKEHOLDER SUBMISSIONS ON THE PCDR CONSULTATION

Stakeholder Submission 1: The Marine Stewardship Council

Date: 17/04/2015

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

Dear Rob Blyth-Skyrme

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

CAB	Intertek Fisheries Certification Ltd. (IFC)
Lead Auditor	Rob Blyth-Skyrme
Fishery Name	Eastern Canada offshore scallop
Document Reviewed	Public Comment Draft Report



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Ref	Type	Page	Requirement	Reference	Details	PI
13281	Major	123-124, 152-154	CR-27.10.6.1 v.1.3	Rationale shall be presented to support the team's conclusion	In PI 2.2.1 b, the report states that yellowtail flounder status continues to drop. The rationale does not explain why/how the fishery is not hindering the recovery. In PI 3.1.2 c, the rationale states that members of the public can be excluded from meetings if a majority of Committee members opt for this action. As such, this action would not allow "all interested and affected parties to be involved", as is required at the SG80 level. Additional information is required to demonstrate if this action of blocking the public is common place and provide reasons as to why such an action would occur.	2.2.1, 3.1.2



Intertek Fisheries Certification (IFC)

13283	Major	102-111	CR-27.10.6.1 v.1.3	Rationale shall be presented to support the team's conclusion	<p>CR 27.4.2.1 requires the CAB to confirm the unit of certification for the assessment to include the target stock(s). Four different banks (St Pierre, the Eastern Scotian Shelf, Browns and German Bank and Georges Bank) have been included in a single UoC. On the other hand, CR 27.10 requires to verify that each scoring issue is fully and unambiguously met. However, rationale presented in some PIs seem to only consider two of the four banks included (those representing up to 90% of the catch for the UoC).</p> <p>In PI 1.1.1 b, the team concludes that for the minor grounds (St Pierre and Eastern Scotian Shelf), available information does not provide the high degree of certainty required to meet the SG100. However no information is given showing that, for these grounds, the stock is at or fluctuating around to the target reference point.</p> <p>In PI 1.1.2 SG80 a, b, c for the St Pierre and Eastern Scotian Shelf banks, the team refers to "a number of indices including survey biomass, recruitment, CPUE, meat counts, and the size structure of scallops in the survey, provide proxy measures with similar intent to biological reference points". No specific information is given on these reference points (e.g. CPUE value for which some action should be taken).</p> <p>In PI 1.2.1 a for the St Pierre and Eastern Scotian Shelf banks (and noting comments about PI 1.1.2), the achievement of the management objectives reflected in the TRP and LRP are unclear. With respect to Browns Bank, the team states that the stock is at or above the long-term median fully recruited biomass level, while page 49 says that it is just near the long-term median. The team also says that an approach for Browns Bank, similar to the one for Georges Bank, has been proposed. It is unclear whether or not this precautionary approach has been formally</p>	1.1.1, 1.1.2, 1.2.1, 1.2.2, 1.2.3
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Intertek Fisheries Certification (IFC)

					<p>implemented by the fishery management. And again, in PI 1.2.1 b, it seems to say that the precautionary approach on which the scoring is based, is only fully implemented in Georges Bank.</p> <p>In PI 1.2.2 a, the HCRs for St Pierre and Eastern Scotian Shelf banks (e.g. how the exploitation rate is reduced when the reference points are approached) are unclear.</p> <p>PI 1.2.2 b requires that the selection and design of harvest control rules take into account the main/wide range of uncertainties. However, uncertainties relating to the stock structure (e.g. connectivity between the banks) seem not to be specifically addressed by the assessment team.</p>	
13284	Guidance	86	CR-27.12.1.1 v.1.3	<p>27.12.1 The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products:</p> <p>27.12.1.1 The systems in use.</p>	<p>The description of traceability and identification does not determine how, at landing, buyers can easily identify certified product (from a vessel in the client group) from uncertified product (from the EA outside the client group).</p>	

This report is provided for action by the Conformity Assessment Bodies 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)207 246 8934 for more information.

Best regards,
 Fisheries Oversight Director
 Dan Hoggarth
 Marine Stewardship Council

cc: Accreditation Services International

MSC – the best environmental choice In seafood

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IFC Assessment Team response to the MSC submission

Ref	Issue	MSC Comment	Assessment Team Response
13281	PI 2.2.1(b)	In PI 2.2.1 b, the report states that yellowtail flounder status continues to drop. The rationale does not explain why/how the fishery is not hindering the recovery.	<p>The requirement for PI 2.2.1 (B) at the SG80 level is as follows:</p> <p><i>“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.”</i></p> <p>As was noted in the report, the yellowtail flounder stock on the Georges Bank is joint Canada-US managed through the TRAC, and directed yellowtail flounder fisheries occur in both countries. In 2012, including discards from the ECOSF, Canadian catches of Georges Bank yellowtail flounder from all fisheries totalled 91 t, while US catches totalled 631 t. The stock is in poor condition, with spawning stock biomass and recruitment in 2012 being the lowest in the time series (TRAC 2013). In response, the TAC (including discards) has been reduced substantially in recent years, with the Canadian allocation dropping quickly from 855 t – 72 t over the 2011 – 2014 period. The ECOSF catch of yellowtail flounder has also dropped substantially from an average of 134 t over the 2008 – 2010 period, to an average of 47 t over the last three years.</p> <p>Although this decline may in part be due to the declining stock status, the measures in place (no retention of yellowtail flounder, 100% observer coverage, restrictive TAC, discards counting against the TAC, focusing the fishery on the most productive scallop grounds, rope mesh back to promote groundfish escape, and the June seasonal closure for yellowtail flounder) together constitute at least a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding. Importantly, <i>“the stock biomass of the Georges Bank yellowtail flounder is projected to rise under the prevailing management and catch regime (TRAC 2013).”</i></p> <p>This final sentence has now been added to the text against PI 2.2.1(b) to clarify that the ECOSF meets the SG80 level of performance for this PI 2.2.1(b).</p>
13281	PI 3.1.2(c)	In PI 3.1.2 c, the rationale states that members of the public can be excluded from meetings if a majority of Committee members opt for this action. As such, this action would not allow “all interested and affected parties to be involved”, as is required at the SG80 level. Additional information is required to demonstrate if this action of blocking the public is common place and provide reasons as to	<p>The assessment team was also concerned about this provision, and so confirmation was sought and received that it has never been used to exclude members of the public from attending meetings. While this may appear to be short of a full open process, the team did not consider it sufficient to merit a score below 80. The facts that OSAC membership includes several outside fishing organizations, unions and First Nations representatives and that no stakeholder expressed a concern about the provision were material considerations by the assessment team. Additional text is provided in Section 3.5.4 and in P 3.1.2(c) of the report.</p>

		why such an action would occur.	
13283	CR27.4.2.1 / CR27.10	CR 27.4.2.1 requires the CAB to confirm the unit of certification for the assessment to include the target stock(s). Four different banks (St Pierre, the Eastern Scotian Shelf, Browns and German Bank and Georges Bank) have been included in a single UoC. On the other hand, CR 27.10 requires to verify that each scoring issue is fully and unambiguously met. However, rationale presented in some PIs seem to only consider two of the four banks included (those representing up to 90% of the catch for the UoC).	Please see specific responses to each comment, below.
13283	PI 1.1.1(b)	In PI 1.1.1 b, the team concludes that for the minor grounds (St Pierre and Eastern Scotian Shelf), available information does not provide the high degree of certainty required to meet the SG100. However no information is given showing that, for these grounds, the stock is at or fluctuating around to the target reference point.	<p>For the fisheries on the minor banks, recruitment is irregular and stock biomass can fluctuate greatly from year to year. Apart from St Pierre, which is only surveyed periodically, the banks are surveyed annually and they are only fished when an exploitable biomass is available following the recruitment of a strong year class or classes. In other years there is no fishery (thus, St Pierre has not been fished since 2009, Browns South since 2006 and Banquereau since 2007, apart from a very small fishery in 2012). The data available for these small, very variable fisheries, which often cover a large geographical area, are not at present suitable for constructing an analytical model, so no target reference points can be set. Instead, these small fisheries are managed using proxy measures of similar intent to biological reference points, based on survey biomass, recruitment, CPUE, meat weights and counts, and size structure, with the aim of keeping exploitation moderate and preventing serious harm to the reproductive capacity of the stock (bearing in mind that scallops are highly fecund, broadcast spawners that form aggregated populations over large geographical areas on these grounds so they are not prone to recruitment overfishing).</p> <p>We consider that the measures taken to maintain CPUE and meat count levels through the strict application of cautiously set and closely monitored TAC's meet the SG80 requirements.</p> <p>The text in the PI 1.1.1 justification has been modified to make this clear.</p>
13283	PI 1.1.2	In PI 1.1.2 SG80 a, b, c for the St Pierre and Eastern Scotian Shelf banks, the team refers to "a number of indices including	Specific to the minor banks fished by the ECOSF, the report noted " <i>A number of indices including survey biomass, recruitment, CPUE, meat counts, and the size structure of scallops in the survey, provide proxy measures with similar intent to biological reference</i>

		<p>survey biomass, recruitment, CPUE, meat counts, and the size structure of scallops in the survey, provide proxy measures with similar intent to biological reference points”. No specific information is given on these reference points (e.g. CPUE value for which some action should be taken).</p>	<p><i>points: trends in these are tracked in relation to the historical performance of the fishery and appropriate protocols for each are utilised to determine stock status and formulate fishing plans.”</i></p> <p>Additional text has now been added to reflect that the annual fishing plan is confirmed only after consideration of the latest data for each bank in relation to the indices. For example, fully-recruited biomass, scallop condition and scallop distribution is monitored, and fisheries then proceed only when scallop meat counts exceeded a pre-agreed level (e.g., 45 meats per 500g on Banquereau in 2012), which is intended to ensure that only larger-size scallops that have already gone through at least one spawning-cycle are harvested. The annual fishing plan can be modified during the year (e.g., TAC reduced) if monitoring suggests that the fishery is failing to meet the management objectives. This includes that the fishery will be closed if the meat count requirements are not achieved.</p> <p>It is noted that the fisheries on the minor banks comprise a small or very small component of the overall ECOSF fishery annually and are reliant upon episodic recruitment events that are typical of scallop stocks. With this in mind, it is considered that the proxy measures in place do act as reference points for the fishery and are appropriate for the stock and can be estimated (SIa). It is also considered that the CPUE in combination with the meat count regulation act as a proxy, precautionary LRP (SIb), because the fishery is limited by economic viability long before the point at which the stock is likely to be limited by spawner biomass, while the meat count regulation prevents smaller scallops from being harvested (and all vessels are 100% observed, so monitoring and enforcement is conducted <i>in situ</i>). Finally, it is considered that the TAC acts as a proxy TRP that accounts for relevant precautionary issues by limiting the exploitation rate to levels that have been shown over time to consistently support stock recovery, and because monitoring is conducted <i>in situ</i> which allows for rapid adjustments to be made to the management regime.</p>
13283	PI 1.2.1(a)	<p>In PI 1.2.1 a for the St Pierre and Eastern Scotian Shelf banks (and noting comments about PI 1.1.2), the achievement of the management objectives reflected in the TRP and LRP are unclear. With respect to Browns Bank, the team states that the stock is at or above the long-term median fully recruited biomass level, while page 49 says that it is just near the long-term median. The team also says that an approach for Browns Bank, similar to the one for Georges</p>	<p>i). The text has been modified to clarify how the management objectives for the minor banks are achieved (see above).</p> <p>ii). The sentence has been modified to “<i>The stocks on these Banks are above or near their long-term median fully-recruited biomass levels</i>” to remove the discrepancy with page 49.</p> <p>iii). The current status of the precautionary approach on Browns Bank has been clarified in the PI 1.2.1(a) justification by adding the following sentence: <i>“and a similar approach has been proposed for Browns Bank North (Smith & Hubley, 2012). This analytical model was used in the 2011 and 2012 fishery assessments for Browns Bank (Smith and Hubley, 2012; Hubley et al.,</i></p>

		Bank, has been proposed. It is unclear whether or not this precautionary approach has been formally implemented by the fishery management.	<p>2014), although it has not yet been incorporated in the IFMP, which is awaiting an update”.</p> <p>It is noted that the assessment team has recommended that the IFMP is updated to reflect the latest available information and understanding of the fishery and its management system.</p>
13283	PI 1.2.1(b)	And again, in PI 1.2.1 b, it seems to say that the precautionary approach on which the scoring is based, is only fully implemented in Georges Bank.	The question about the implementation of the precautionary approach has been clarified in PI 1.2.1 (a) above. However, PI 1.2.1 (b) at the SG80 level is asking if there is evidence that the harvest strategy is achieving its objectives and the team conclude that this is the case for all the banks, including the minor banks where the harvest strategy is based on a number of stock indicators.
13283	PI 1.2.2(a)	In PI 1.2.2 a, the HCRs for St Pierre and Eastern Scotian Shelf banks (e.g. how the exploitation rate is reduced when the reference points are approached) are unclear.	<p>For St Pierre and the Eastern Scotian Shelf banks, and the other minor banks, there is no analytical assessment and no biological reference points are set. Instead, stock status for these fisheries is assessed using a number of stock indices (survey biomass, recruitment, CPUE, meat counts, size structures). These are evaluated in relation to the historic performance of the fishery and act as proxies for limit reference points. These indices are monitored through the fishing year and are used to trigger management action to reduce exploitation rate. The following sentence has been added to clarify how this is achieved.</p> <p><i>“The setting of interim TAC’s that can be confirmed or adjusted later in the season provides a flexible mechanism for reducing exploitation rate as stock indices fall.”</i></p>
13283	PI 1.2.2(b)	PI 1.2.2 b requires that the selection and design of harvest control rules take into account the main/wide range of uncertainties. However, uncertainties relating to the stock structure (e.g. connectivity between the banks) seem not to be specifically addressed by the assessment team.	<p>Connectivity between the banks can contribute to the uncertainties relating to stock structure. However, the available evidence from studies of scallop larval distribution and water currents (Trembley & Sinclair, 1992) and population genetics (Kenchington et al, 2006) is that the Canadian offshore banks are predominantly self-recruiting, but with a relatively low level of gene flow between banks sufficient to prevent genetic divergence. Recruitment on many of the banks is very variable from year to year, but this is a common feature of scallop populations worldwide. This is particularly so for many of the minor banks, like St Pierre and Banquereau, where the populations depend on sporadic pulses of recruitment and it is not clear to what extent these pulses depend on the influx of larvae from other banks. However, whatever the origin of the larvae, any influxes of larvae, if they survive, will be manifest in the subsequent recruitment, and be assessed in the annual stock surveys. Thus, uncertainty due to connectivity between the banks is already assessed as a (probably small) component of recruitment variability.</p> <p>The text has been modified to include comment on connectivity between banks as a source of uncertainty.</p>



Intertek Fisheries Certification (IFC)

13284	CR27.12.1	The description of traceability and identification does not determine how, at landing, buyers can easily identify certified product (from a vessel in the client group) from uncertified product (from the EA outside the client group).	<p>All scallop landings are overseen by an independent dockside monitor. All fishery products are observed being offloaded, and the declared weights are verified. This was inferred in the text previously, but is now clarified.</p> <p>It is also noted that there is only one company in the fishery not certified, and landings from their vessel would be clearly identified by customers purchasing from that company. If products from that company were to enter a supply chain that includes certified product, it would be covered by the COC processes of those companies.</p>
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APPENDIX 6: ICELAND SCALLOP INSEPARABLE / PRACTICALLY INSEPARABLE VARIATION REQUEST

Marine Stewardship Council - Variation Request Form V1.3

Date submitted to MSC	6 th March 2015
Conformity Assessment Body	Intertek Fisheries Certification
Fishery Name/CoC Certificate Number	Eastern Canada Offshore Scallop Fishery
Lead Auditor/Programme Manager	Rob Blyth-Skyrme / Paul Knapman
Scheme requirement(s) to vary from	CR1.3, Section 27.4.9 and 27.4.10
Is this variation sought in order to undertake an expedited P1 assessment (CR annex CL)?	No

1. Proposed variation

IFC proposes to apply an exemption to the IPI requirements, as permitted through Section 27.4.10, with respect to the small catch of Iceland scallops (*Chlamys islandica*) that is taken in the Eastern Canada Offshore Scallop Fishery (ECOSF) when targeting sea scallops (*Placopecten magellanicus*).

IFC also proposes that Iceland scallops or Iceland scallop products from the ECOSF fishery will be eligible to enter into chains of custody (B27.4.10.1).

2. Rationale/Justification

The ECOSF targets sea scallops, which are found from Cape Hatteras (North Carolina, USA) to the northern tip of Newfoundland (Canada). The vast majority (annual mean = 97.9% for the period 2008 – 2013, inclusive) of the sea scallop catch in the ECOSF is taken from the Canadian portion of the Georges Bank and German and Browns Banks, all located off the southwestern tip of Nova Scotia.

Iceland scallops are circumpolar, and the bulk of the stock and the directed Canadian fishery for this species occurs along the northern shore of the Gulf of St. Lawrence, the Strait of Belle Isle, the Labrador Coast and St. Pierre Bank.

On the Banks off the southwestern tip of Nova Scotia, Iceland scallops are rarely observed. Estimates are that Iceland scallops make up less than 1 in 50,000 of the harvestable scallops in only some areas of these Banks, with this species being absent in other areas (Clearwater Seafoods, pers. comm.). However, on St. Pierre Bank and/or Banquereau, the two northernmost Banks in the ECOSF, Iceland scallops can make up a larger proportion of the harvestable biomass.

By regulation, Iceland scallops are not required to be sorted from sea scallop catches of vessels operating in the ECOSF, except when fishing in an area of the St. Pierre Bank that is designated as the 'Core Area'. This 'Core Area' is related to an inshore Iceland scallop fishery that is predominantly targeted by vessels operating from the French islands of St. Pierre and Miquelon.

The ECOSF has only operated on St Pierre Bank twice in the last 10 years, in 2005 and 2006. The total meat weights for all scallops (i.e., both sea scallops and Iceland scallops) landed in those two years were 42 tonnes in 2005 (from 4,278 tonnes total in ECOSF = 0.98%) and 5 t in 2006 (from 5,766 t = 0.09%).

The ECOSF has landed scallops from Banquereau in only three out of the last 10 years, in 2005, 2007 and 2012. The total meat weights for all scallops landed in those three years were 10 t in 2005 (from 4,278 t = 0.23%), 25 t in 2007 (from 6,372 t = 0.39%), and 10 t in 2012 (from 4,747 t = 0.21%).

These figures represent the highest possible Iceland scallop harvest, if no sea scallops were taken. In 2005, when catches were taken on both Banks, this would have meant that Iceland scallop made up

1.21% of the total ECOSF catch. However, the most recent (2012) scallop research survey on the western part of Banquereau indicated that approximately two thirds of the harvestable (>100 mm) scallops were sea scallops. An observer from a 2012 fishing trip on Banquereau then noted that 20% of the catch was Iceland scallop, although it is not clear if this was a quantified or qualitative estimate. There are no data available from 2005 and 2006 to quantify the proportion of Iceland scallop in the harvest from St. Pierre Bank, but it is noted that the ECOSF is a sea scallop fishery and it is expected that sea scallops were the dominant species.

In any case, the percentage of the ECOSF harvest made up of Iceland scallops would be less than the totals shown for Banquereau and St. Pierre Bank in each of the years above, and less than the 2005 total of 1.21% for both Banks combined. The quantity of Iceland scallop in the harvest from the main Banks off the southwestern tip of Nova Scotia would add a negligible amount to the total.

It is considered that the ECOSF meets the IPI requirements of CR1.3 Section 27.4.9.1, as follows:

'a' or 'b'	a. The retained catch is practicably indistinguishable during normal fishing operations (i.e. the retained catch is the same species or a closely related species).	Iceland scallops are a closely related species to sea scallops, but the two species are distinguishable at the individual level when in the shell. The meats of the two species are practically indistinguishable post-shucking.
	b. When distinguishable, it is not commercially feasible to separate due to the practical operation of the fishery that would require significant modification to existing harvesting and processing methods.	At the scale of the fishery and when at a harvestable size, it is not commercially feasible to sort the harvestable catch and separate Iceland scallops from sea scallops.
And 'c', 'd' and 'e'	c. The total combined proportion of any catches from the stock(s) do not exceed 15% by weight of the total combined catches of target and IPI stock(s) within the unit of certification in the most recent annual fishing year prior to commencing assessment.	The ECOSF has operated on St. Pierre Bank in two out of the last 10 years, in 2005 and 2006. 2005 was the larger fishery, when 42 t of scallop meats (both scallop species) were taken (from 4,278 t = 0.98%). The fishery on Banquereau operated in three out of the last 10 years, in 2005, 2007 and 2012. The largest fishery was in 2007, when 25 t of scallop meats (both scallop species) was taken (from 6,372 t = 0.39%). The maximum combined total of both scallop species from both Banks was in 2005, when 52 t was taken (from 4,278 t = 1.21%). The actual quantity of Iceland scallops would be less than this maximum figure as the fishery targets sea scallops.
	d. The stocks are not ETP species.	<i>Chlamys islandica</i> is not an ETP species.
	e. The stocks are not certified separately.	There is no separate certification for <i>Chlamys islandica</i> in this area.

Intertek Fisheries Certification (IFC)

The difficulty of separating harvestable Iceland scallops from harvestable sea scallops after catching, and the very small quantities of Iceland scallops taken, means that IFC is seeking to apply the exemption to the IPI requirements to Iceland scallops (CR 27.4.10), such that Iceland scallops and Iceland scallop products would be eligible to enter in to chains of custody.

3. Implications for assessment (required for fisheries assessment variations only)

There are considered to be no implications for the assessment, other than that the small catch of Iceland scallop and Iceland scallop products from the ECOSF fishery will be eligible to enter into chains of custody.

4. Have the stakeholders of this fishery assessment been informed of this request? (required for fisheries assessment variations only)

No. Stakeholders will be made aware through the publication of the variation request and then through the subsequent publication of the PCDR.

5. Further Comments

None, thank you.

6. Confidential Information

None, thank you.



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Rob Blyth-Skyrme
Intertek Fisheries Certification
10A Victory Park
Victory Road
Derby
DE24 8ZF

Sent by email

Date: 12 March 2015

Subject: [Request for variation to the MSC Certification Requirement 27.4.9 and 27.4.10](#)

Dear Rob Blyth-Skyrme,

I write with reference to your submission on 6 March 2015 of a request for variation to the MSC Certification Requirement (CR) to allow the certificate for the Eastern Canada offshore scallop fishery to be exempt from the IPI requirements.

As you are aware, the CR procedures relating to IPI species are integral to ensuring all MSC accredited Conformity Assessment Bodies (CABs) operate in a consistent and transparent manner. The MSC intends that these requirements be met across all fisheries and CoC certificate holders, except in exceptional, well-justified circumstances, as part of the MSC programme.

MSC notes the factors presented in your letter supporting your request, including:

- The fishery has only operated on St Pierre Bank twice in the last 10 years, in 2005 and 2006. The total meat weights for all scallops (i.e., both sea scallops and Iceland scallops) landed in those two years were 42 tonnes in 2005 (from 4,278 tonnes total in ECOSF = 0.98%) and 5 t in 2006 (from 5,766 t = 0.09%).
- The fishery has landed scallops from Banquereau in only 3 out of the last 10 years, in 2005, 2007 and 2012. The total meat weights for all scallops landed in those three years were 10 t in 2005 (from 4,278 t = 0.23%), 25 t in 2007 (from 6,372 t = 0.39%), and 10 t in 2012 (from 4,747 t = 0.21%).
- An observer from a 2012 fishing trip on Banquereau noted that 20% of the catch was Iceland scallop, although it is not clear if this was a quantified or qualitative estimate. There are no data available from 2005 and 2006 to quantify the proportion of Iceland scallop in the harvest from



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St. Pierre Bank, but it is noted that the Eastern Canada scallop fishery is a sea scallop fishery and it is expected that sea scallops were the dominant species.

- The fishery's harvest of Iceland scallops would be less than the totals shown for Banquereau and St. Pierre Bank in each of the years above and less than the 2005 total of 1.21% for both Banks combined. The quantity of Iceland scallop in the harvest from the main Banks off the southwestern tip of Nova Scotia would add a negligible amount to the total.

Given the rationale provided, the MSC is willing to grant a variation to the CR in this case.

If you have any questions regarding this response, please do not hesitate to contact me.

Best regards,

A handwritten signature in black ink, appearing to read 'David Hoyle'.

Fisheries Oversight Director
Marine Stewardship Council

cc: ASI

APPENDIX 7: SURVEILLANCE FREQUENCY

(REQUIRED FOR THE PCR ONLY)

1. The report shall include a rationale for determining the surveillance score.
2. The report shall include a completed fishery surveillance plan table using the results from assessments described in CR 27.22.1

Table 17: Surveillance Score for the Fishery

Criteria	Surveillance Score	ECOSF
1. Default Assessment Tree		
Yes	0	
No	2	
2. Number of Conditions		
Zero Conditions	0	
1-5 Conditions	1	
>5 Conditions	2	
3. Principle Level Scores		
≥ 85	0	
<85	2	
4. Conditions on outcome PIs?		
Yes	2	
No	0	

Table 18: MSC Fishery Surveillance levels

Surveillance score	Surveillance level		Years after certification or re-certification			
			Year 1	Year 2	Year 3	Year 4
2 or more	Normal surveillance		On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit & recertification visit
1	Remote surveillance	Option 1	Off-site surveillance audit	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit & recertification visit
		Option 2	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit	
0	Reduced surveillance		Review new information	On-site surveillance audit	Review new information	On-site surveillance audit & recertification visit

Table 19: Fishery Surveillance Plan

Score from CR Table C3	Surveillance Category	Year 1	Year 2	Year 3	Year 4
[e.g. 2 or more]	[e.g. Normal Surveillance]	[e.g. On-site surveillance audit]	[e.g. On-site surveillance audit]	[e.g. On-site surveillance audit]	[e.g. On-site surveillance audit & recertification site visit]



Intertek Fisheries Certification (IFC)

APPENDIX 8: CLIENT AGREEMENT

(REQUIRED FOR PCR)

The report shall include confirmation from the CAB that the Client has accepted the PCR. This may be a statement from the CAB, or a signature or statement from the client.

(Reference: CR: 27.19.2)



Intertek Fisheries Certification (IFC)

APPENDIX 9: OBJECTIONS PROCESS

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

The report shall include all written decisions arising from an objection.

(Reference: CR 27.19.1)