MOODY MARINE LTD

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Final Report for the

EASTERN CANADA OFFSHORE LOBSTER FISHERY

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SUMMARY

Clearwater Seafoods Limited Partnership contracted Moody Marine Ltd to undertake a Marine Stewardship Council (MSC) fisheries assessment of their offshore lobster (*Homarus americanus*) trap fishery against the MSC environmental standard for sustainable fishing.

The fishery operates within the Canadian EEZ, in Lobster Fishing Area (LFA) 41 off the Eastern seaboard of Nova Scotia, Canada. Clearwater Seafoods Limited Partnership holds all of the available licences for the fishery and presently operates two vessels in the fishery.

The assessment was undertaken in accordance with the MSC Fisheries Certification Methodology (Version 6) which sets out the assessment and certification process. As a result the following steps have been undertaken:

- Announcement of the assessment
- Appointment of a specialist assessment team
- Development and consultation of the Performance Indicators and Scoring Guideposts in the form of an "assessment tree" against which the fishery was assessed
- The notification and undertaking of a site visit to the fishery
- The production of a report that describes the background to the fishery, the fishery management operation and the evaluation procedure and results.
- The nomination and stakeholder consultation of peer reviewers
- Peer review of the report
- Stakeholder consultation of the report

The specialist assessment team that Moody Marine Ltd appointed were: Dr. Colin Bannister, Dr Howard Powles and John Angel.

The assessment team undertook a site visit to Nova Scotia and included meetings with Federal scientists and managers; individual fishermen; representatives from fishermen's organisations; and, representatives from environmental/conservation organisations. Following the information gathering phase the assessment team undertook a rigorous review and scoring of the fishery against the MSC Criteria and Principles for Sustainable Fishing.

Throughout the process stakeholders were invited to provide input. Written comments submitted during the course of the Public Comment Draft Report consultation are appended to this report and their key points for consideration are included along with the assessment team's response.

The strengths and weaknesses of the fishery under each MSC Principle include:

Principle 1 - A conservative harvest strategy that is aimed at maintaining a good fishing pattern, a low harvest rate, a minimum size, prohibition on landing berried and v-notched females and a limit on the number of licensed enterprises. However, the assessment team did highlight that there was limited information on the level of discarding of lobsters and decision making rules needed to be informed by appropriate limit and precautionary reference points, or proxy measures.

Principle 2 - There is good knowledge of benthic habitats and species within the fishing area. However, there is limited information on non target species bycatch, most notably Jonah crab, and on interactions with protected, endangered and threatened species, notably right whales.

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 assessment team concluded that the fishery achieved an overall average score of above 80 for each MSC Principle and scored below 80 against fourteen Performance Indicators. As a result it is

recommended that the Clearwater Seafoods Limited Partnership Eastern Canada Offshore Lobster Fishery be certified according to the MSC Principles and Criteria for Sustainable Fisheries subject to the following Conditions of Certification:

Condition 1 – Discards and Bycatch

The client is required to ensure that by the first annual audit:

- Discards of adult and juvenile lobsters are well estimated and the significance interpreted;
- Quantitative information is available on the bycatch of non target species. If obtained by sampling, this is considered sufficient to provide adequate information.

This Condition refers to Performance Indicators 1.1.2.3, 2.1.2.1 and 2.1.2.2.

Condition 2 – Indicators, Reference Values, Uncertainty and Decision Rules

The client is required to ensure that by the fourth annual audit appropriate limit and precautionary reference points, or proxy measures with similar intent or outcome, are implemented and used to inform fully documented decision making rules. These shall take into account, stock biology, exploitation history and major uncertainties in the data and functional relationships.

This Condition refers to Performance Indicators 1.1.3.2, 1.1.3.4, 1.1.3.7 and 3A.6.2.

Condition 3 – Ecosystem Impacts, PET Species

The client is required to ensure that by the first annual audit, measures are in place to record information on any interactions with PET species such that estimates of the effects of these interactions can be made.

This Condition refers to Performance Indicators 2.2.1.2 and 2.2.1.3

Condition 4 – Management System and Strategies

The client is required to ensure that by the first annual audit the management system includes explicit:

- Short and long term resource and environment objectives that are subject to appropriate procedures for evaluating their performance;
- Formalised management strategies to detect and reduce ecosystem impacts, including impacts on PET species.
- Formalized measures to apply a precautionary approach in the development and application of operational procedures when there is an absence of sufficient information.

This Condition refers to Performance Indicators 2.2.2.1, 2.1.4.5, 3A.3.1, 3A.3.3 and 3A.3.4

Clearwater Seafoods Limited Partnership has formally agreed to meet these Conditions within the specified timescales and has set out an Action Plan detailing how they will do this.

1 INTRODUCTION

This report sets out the results of the assessment of the Eastern Canada Offshore Lobster Fishery against the Marine Stewardship Council (MSC) Principles and Criteria for Sustainable Fishing.

1.1 The fishery proposed for certification

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:	Lobster (*Homarus americanus*)
Geographical Area:	The offshore lobster fishery operates within the Canadian EEZ, in Lobster Fishing Area (LFA) 41, extending from the International Court of Justice (ICJ) or "Hague" line on Georges Bank to the Laurentian Channel off Cape Breton and outside of the offshore boundary line which extends 50 miles out from the coast.
Method of Capture:	Traditional lobster trap design, constructed of wire.
Stock:	The "Eastern Canada Offshore Lobster Fishery" is restricted to Lobster Fishing Area 41.
Management System:	Department of Fisheries and Oceans (DFO) led management, through their Maritime Region.
Client Group:	Clearwater Seafoods Limited Partnership

Clearwater Seafoods is the only participant in this fishery therefore no further clients are expected to join the client group.

1.2 Report Structure and Assessment Process

The aims of the assessment are to determine the degree of compliance of the fishery with the MSC Principles and Criteria for Sustainable Fishing, as set out in Section 8.

This report sets out:

- the background to the fishery under assessment and the context within which it operates in relation to the other areas where lobsters (*Homarus americanus*) are fished
- the qualifications and experience of the team undertaking the assessment
- the standard used (MSC Principles and Criteria)
- stakeholder consultation carried out. Stakeholders include all those parties with an interest in the management of the fishery and include fishers, management bodies, scientists and environmental Non-Governmental Organisations (NGO's)
- the methodology used to assess ('score') the fishery against the MSC Standard.
- a scoring table with the Scoring Indicators adopted by the assessment team and Scoring Guidelines which aid the assessment team in allocating scores to the fishery. The commentary in this table then sets out the position of the fishery in relation to these Scoring Indicators.

The intention of the earlier sections of the report is to provide the reader with background information to interpret the scoring commentary in context.

Finally, as a result of the scoring, the Certification Recommendation of the assessment team is presented, together with Conditions and Recommendations.

The report has been subject to critical review by appropriate, independent, scientists ('peer review'). The comments of these scientists are appended to this report. The response of the assessment team is also be appended.

The report has been posted on the MSC website for 30 days allowing for stakeholder comment.

The comments that were received are appended to the report along with the response of the assessment team. The report and the certification recommendation have been considered by the Moody Marine Governing Board (a body independent of the assessment team) and they have determined that the fishery should be certified.

This report represents the final report and will be released for a further 15 working days for stakeholder scrutiny.

1.3 Information sources used

Information used in the main assessment has been obtained from interviews and correspondence with stakeholders in the offshore lobster fishery, notably representatives from:

- The client group;
- The fishing industry;
- The Department of Fisheries and Oceans (DFO); and
- Environmental Non Government Organisations

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2 GLOSSARY OF ACRONYMS AND ABBREVIATIONS USED IN THE REPORT

CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CL	Carapace Length
COSEWIC	Committee on Status of Endangered Wildlife in Canada
CPUE	Catch Per Unit Effort
CSLP	Clearwater Seafoods Limited Partnership
CW	Carapace Width
DEFRA	Department of Environment, Food and Rural Affairs
DFO	Department of Fisheries and Oceans or Fisheries and Oceans Canada
EA	Enterprise Allocation
EAC	Ecology Action Centre
EBSA	Ecologically and biologically sensitive area
EEZ	Exclusive Economic Zone
EPR	Egg production per recruit
FAO	Food and Agriculture Organisation
F_{max}	The rate of fishing mortality for a given exploitation pattern rate of growth and natural mortality, that results in the maximum level of yield per recruit. This is the point that defines growth overfishing.
FRCC	Fisheries Resource Conservation Council
FSRS	Fishermen Science Research Society
GPS	Global Positioning System
IFMP	Integrated Fisheries Management Plan
ICES	International Council for the Exploration of the Seas
ICJ	International Court of Justice
LCA	Length cohort analysis
LFA	Lobster Fishing Area
LTRT	Leatherback Turtle Recovery Team
MML	Moody Marine Limited
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield
NGO	Non-governmental Organization
NAFO	Northwest Atlantic Fisheries Organisation
NAO	North Atlantic Oscillation
NARWC	North Atlantic Right Whale Consortium
NEFSC	Northeast Fisheries Science Center
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OLAC	Offshore Lobster Advisory Committee
OLJCAC	Offshore Lobster and Jonah Crab Advisory Committee
OLJCMB	Offshore Lobster and Jonah Crab Management Board
PI	Performance Indicator
RAP	Regional Assessment Process
RAPD	Random amplified polymorphic DNA profiles
RV	Research Vessel
SARA	Species At Risk Act
SAR	Scientific Advisory Report
SE	Southeast
SG	Scoring Guidepost
SPA	Sequential Population Analysis
SW	Southwest
TAB	Technical Advisory Board (for the MSC)
TAC	Total Allowable Catch
TRAC	Transboundary Resource Assessment Committee
UN	United Nations
US	United States

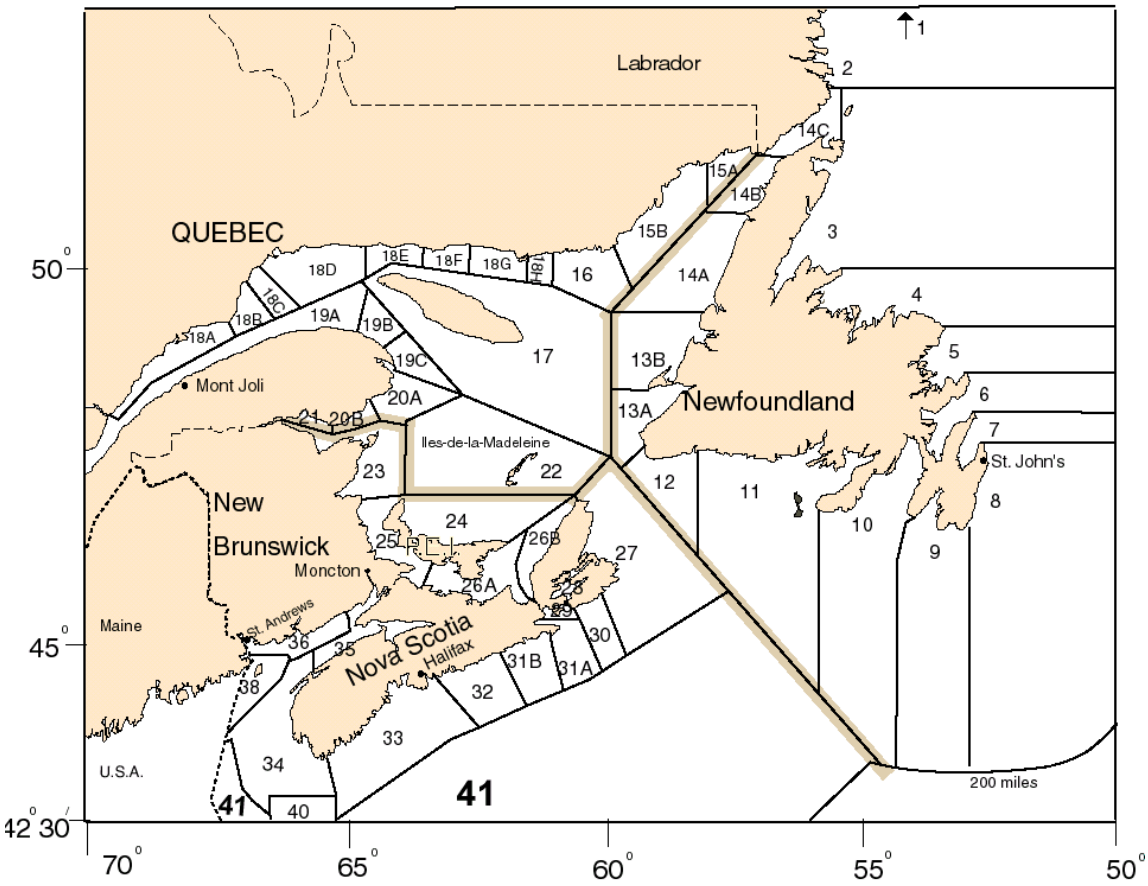
VDC	Virtual Data Centre
VMS	Vessels Monitoring System
WWF	World Wildlife Fund
YPR	Yield per recruit

3 BACKGROUND TO THE FISHERY

3.1 Introduction

The lobster fishery of Atlantic Canada is managed through the use of geographical zones, called Lobster Fishing Areas (LFA) ranging from north east Newfoundland to George's Bank (see Figure 1). The offshore lobster fishery takes place in LFA 41 which is the area seaward from the offshore lobster boundary line (50 nautical miles from the geographical base line for the 12 mile limit) to the upper continental slope. While LFA 41 extends along the entire outer portion of the Scotian Shelf and includes the Northwest Atlantic Fisheries Organisation (NAFO) divisions 4VWX and 5, historically fishing only occurs in 4X and 5Ze (see Figure 2). The offshore lobster fishery occurs entirely within Canada's 200 mile limit, and is managed by federal legislation, policies and practices. Scientific and management advice is provided by staff of the Department of Fisheries and Oceans (DFO).

Figure 1. Canadian Lobster Fishing Areas (LFAs)



(Source DFO 2009a)

3.2 Biology of the target species

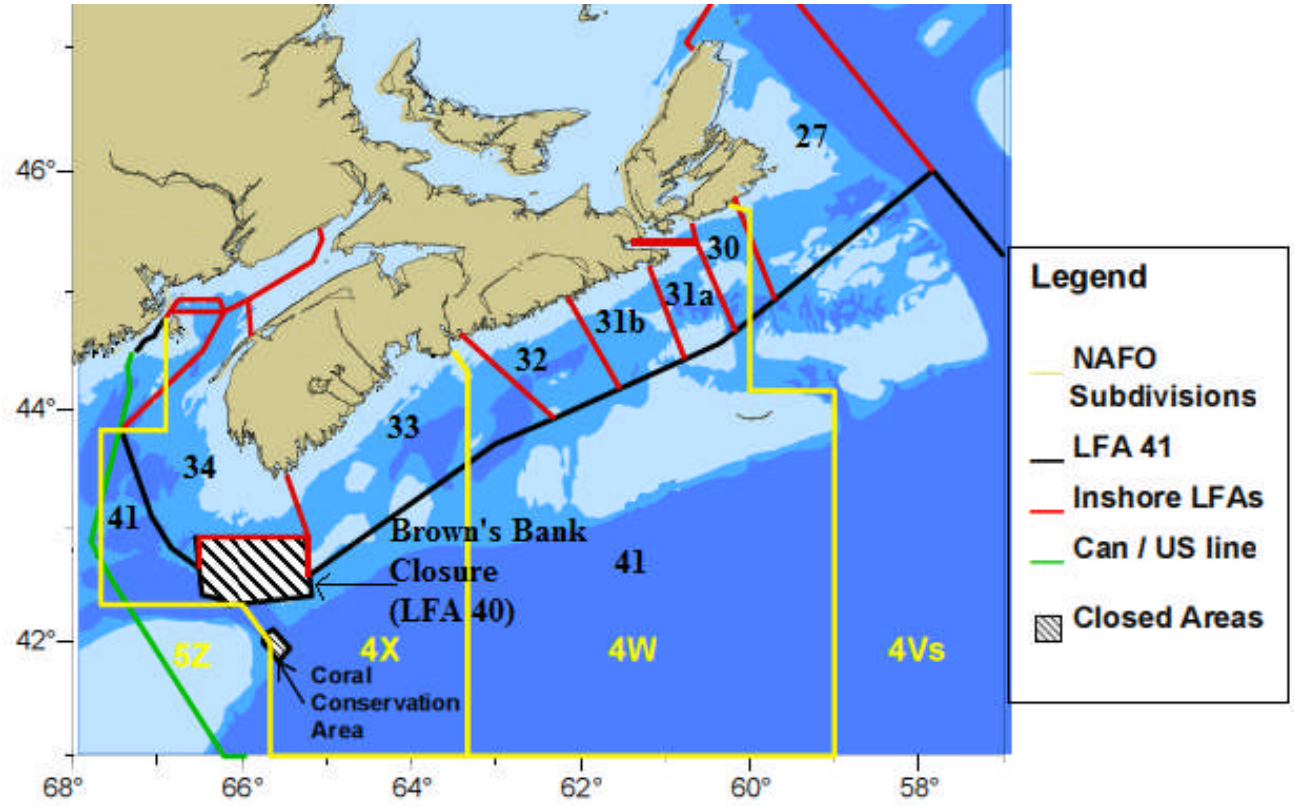
3.2.1 Overview of lobster biology

The biology, ecology and population dynamics of lobster in the regional fishing areas of the US and Canada have been studied in considerable detail for over a century (Herrick 1911, Cobb & Phillips 1980, Factor 1995). The following paragraphs summarise aspects of general lobster biology relevant to the LFA41 assessment. Later sub-sections evaluate issues particular relevant to stock structure and assessment in LFA41 (and LFA34), and to issues raised by the scoring table used to assess this fishery (see Appendix A).

Lobsters are generally most abundant, and support the most productive fisheries, in coastal waters,

embayments and basins that receive a regular supply of pelagic larvae (Wahle et al 2004, Incze et al 2006) prior to their settlement on the cobble/ boulder substrates that are the preferred habitat of clawed lobster (Wahle & Steneck, 1991 & 1992, Wahle & Incze, 1997).

Figure 2. Scotia Fundy Lobster Fishing Areas



(Source DFO 2009a)

Shelter provides protection from predators in the juvenile phase, and at critical life history events such as moulting, reproduction, and egg-extrusion. In rocky terrain juvenile lobsters remain in their shelters for 3 to 4 years before they emerge to feed or migrate. After emergence, lobsters exhibit olfactory responses that lead them to enter baited traps, especially at night.

To explain spatial and temporal variations in juvenile abundance in coastal waters, there have been many studies of larval distribution and juvenile benthic ecology in the Gulf of Maine (Incze et al., 2006), as well as in the Gulf of St Lawrence (Hudon,1987) and Newfoundland (Ennis, 1995).

Larval supply in the Gulf of Maine is influenced by complex interactions between river inflow, coastal currents, gyres, advection, temperature-dependent stage duration, and larval behaviour (Section 3.4.2). Post-larval settlement and survival are mediated by sequences of behaviour that achieve substrate selection and cryptic avoidance of predators (Cobb et al 1989, Wahle & Steneck, 1992).

Some larval work is specific to the offshore fishery, since it describes the production and distribution of lobster larvae offshore around Georges Bank and the outer basins of the Gulf of Maine (Drinkwater et al 2001, Harding et al 2005), but although much is known about the benthic ecology of juveniles along the coast of Maine (Wahle & Incze, 1997), little is known about settlement and benthic ecology of juvenile through to adult stages in offshore waters, where shelter may be less readily available (Pezzack, pers comm.) but where there are also presumably fewer predators.

Adult lobster typically grow slowly to a potentially large size (extreme specimens of 20 to 40 lb weight captured many years ago occur in several North American museums), and in Nova Scotia they do not mature until about eight years of age or more. They have a one or two-year reproductive cycle, and low individual fecundity. There are marked differences in growth rate, moult frequency, and fecundity in different lobster fishing areas, tending to be higher in warmer coastal waters than in

cooler offshore waters (Aiken, 1980, Aiken & Waddy, 1986).

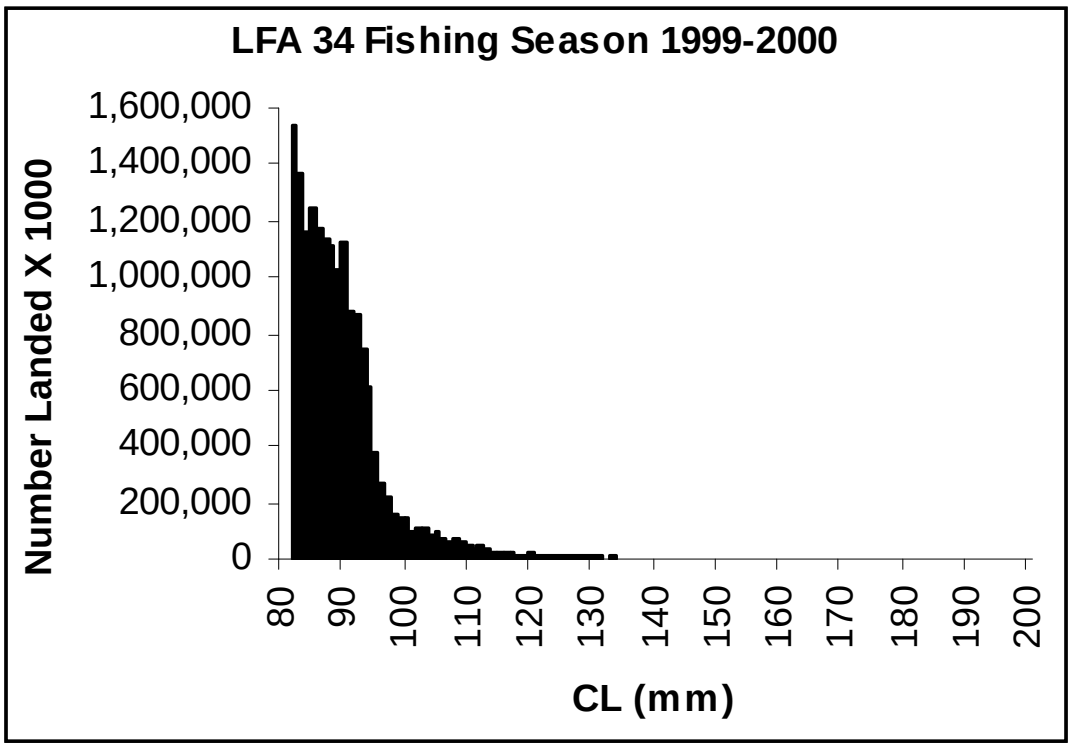
Moulting lobsters increase in size by about 15% in length and 50% in weight, and the frequency of moult decreases from 3 or 4 times a year as juveniles, to once a year or less as they grow larger. Off SW Nova Scotia lobsters are estimated to require 8 or more years to reach the LFA 41 legal size of 82.5 mm carapace length (CL) (about 1lb or 0.45kg) (DFO, 2000). They moult annually up to 120 mm CL, decreasing to once every 3-4 years at 150 mm CL, and once every 8-15 years above 170-180 mm CL (Pezzack and Duggan, 1990). This is a steeper reduction in moult frequency than in the Bay of Fundy for example, where a 200mm CL lobster still moults once every 3-4 years.

In warmer waters some lobsters mature at 60 mm CL, but females off SW Nova Scotia first reach maturity at 90-120 mm CL. Average fecundity ranges from 5-10 000 eggs at first maturity to 130-150,000 eggs at 200mm CL (compared to 350,000 or more at 200 mm CL off Cape Breton) (Pezzack & Macquire, 1995). Mature females are inseminated in midsummer, usually when soft-shelled after moulting. Eggs are either extruded the same year or a year later, and they hatch and detach a further 10-12 months later in July or August. Prior to settlement, larvae spend 30-60 days feeding in the neuston layer, during which temperature strongly influences development and survival rates (Caddy, 1979).

3.2.2 Size structure and egg production in LFA41 and LFA34

There is an important difference in the size frequency of lobsters caught offshore in LFA 41compared to LFA 34 in the inshore fishery. As with most heavily fished coastal lobster fisheries in North America, the catch composition in LFA 34 is typical of a 'recruitment' fishery, with a high frequency of lobsters in the range 80 to 95 mm CL (moult group 1), and very few lobsters above 130 mm CL (see Figure 3).

Figure 3. LFA 34 size catch composition for the 1999-2000 fishing season



(Source: Pezzack et al 2001).

In LFA 41, however, the catch is dominated by lobsters of 100 to 130 mm CL (moult groups 3 +), and there is a significant proportion of large lobsters up to 170-180 mm CL (see Figure 4).

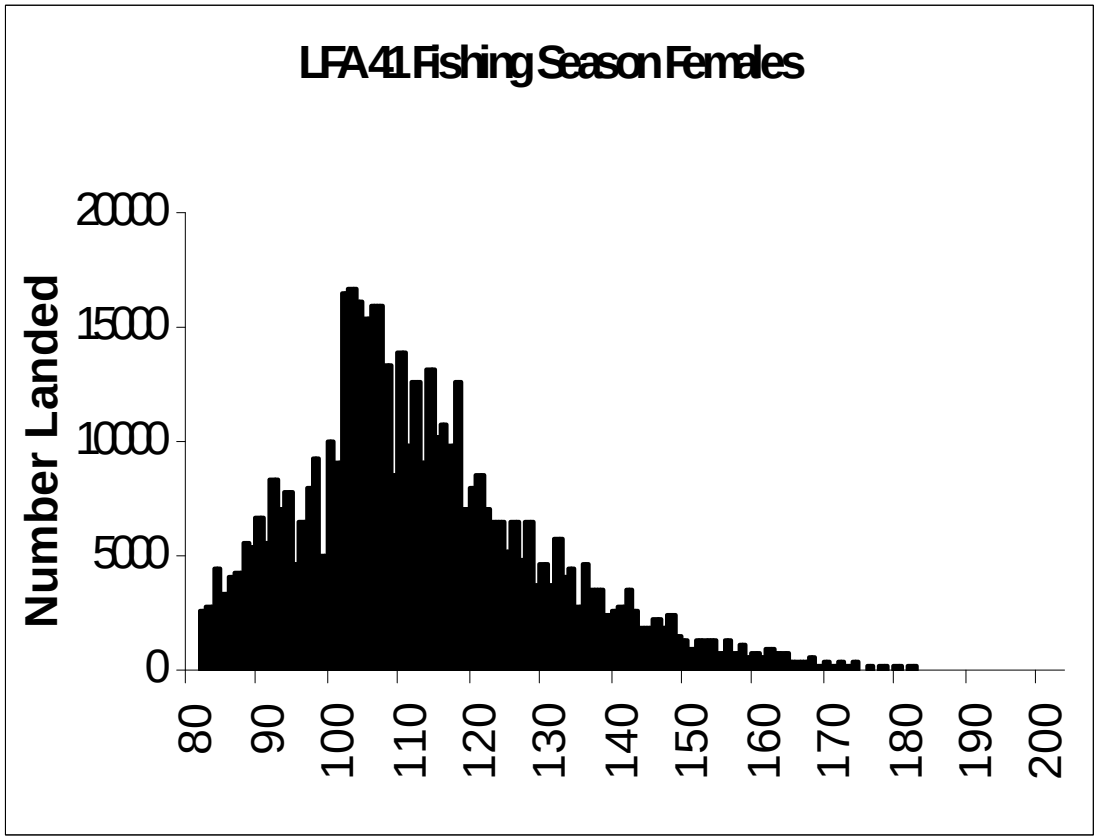
This difference is considered to be due to the high exploitation rate in LFA34 and the low exploitation rate in LFA41, rather than an effect of selectivity. Large lobsters have been present throughout the

duration of the LFA41 fishery, whereas in LFA34 large lobsters were caught at the start of the fishery a century ago, but decreased rapidly as fishing effort increased (Pezzack & Duggan, 1995). Also, comparison between lobster size frequencies in the LFA41 trap fishery and in US NMFS bottom trawl surveys, shows very similar size frequencies on the right hand side of the trap and trawl distributions (see Figure 5) implying that offshore traps likely represent the frequency of large lobsters, and shows that the traps under-represent the frequency of the smaller sizes found in the bottom trawl survey. This suggests that they under-represent the recruit size classes, but this should not contribute to a difference between the two lobster areas, since the traps used in LFA 41 and 34 are similar in size and design, and should affect both size distributions to a similar degree.

The large lobsters in LFA 41 are important for egg production. Most are larger than the mean size of maturity of 97 mm CL (Pezzack & Macquire, 1995), and will have spawned more than once before capture. Fishing removes fewer females and mature females in LFA41 compared to LFA34 (Figure 6), and removes a small fraction of the potential LFA 41 egg production (Figure 7).

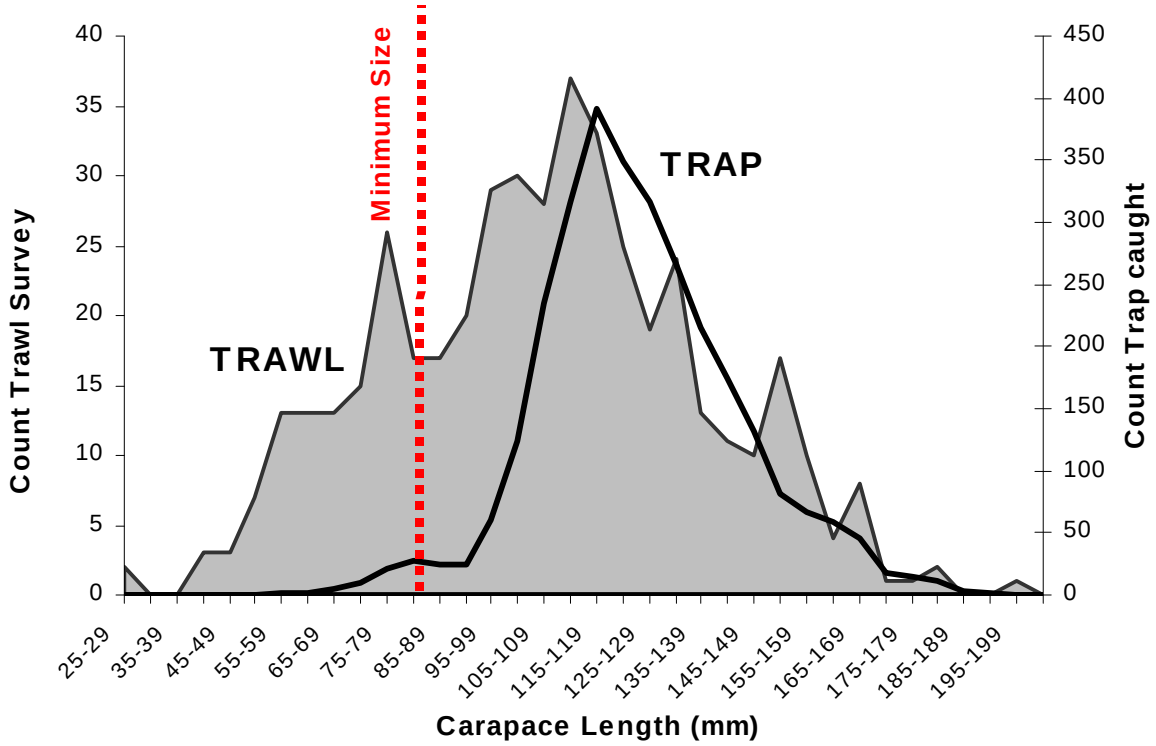
The high relative abundance of large lobsters in LFA41 is particularly important given that the minimum legal minimum size is 82.5 mm CL, well below the size of first maturity.

Figure 4. LFA 41 female lobster catch composition for the 1999-2000 fishing season



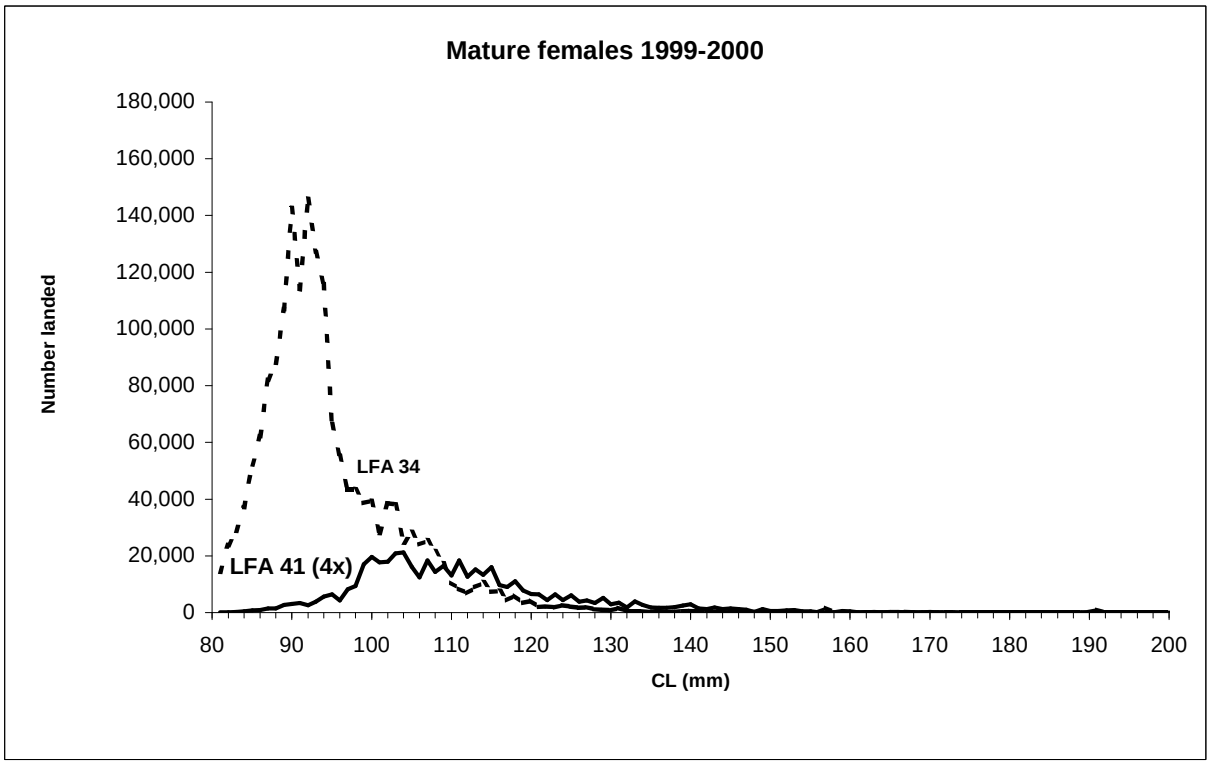
(Source: Pezzack et al 2001).

Figure 5. Northeastern Georges Bank lobster size frequency from NMFS trawl survey (1980-98) and Canadian LFA 41 commercial lobster catch from at sea sampling



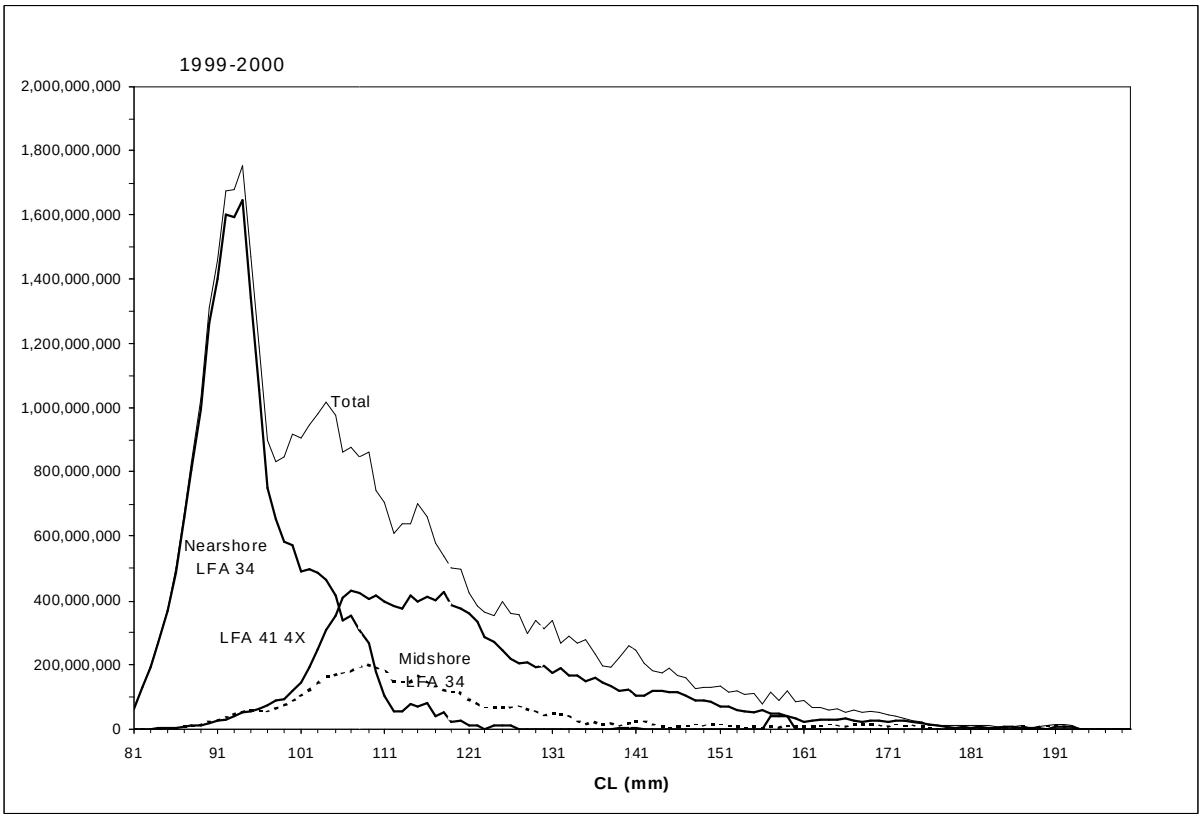
(Source: DFO 2000a)

Figure 6. The number of mature females landed at size in LFAs 34 and 41 in the 1999-2000 fishing season



(Source: Pezzack et al 2001)

Figure 7. The number of eggs that could have been produced the next season if not captured in the 1999-2000 fishing season.



(Source: Pezzack et al 2001)

3.3 Stock relationships

This section presents information about stock structure and connectivity in the Gulf of Maine and offshore, based on studies of migration, larval distribution and transport, and genetics.

3.3.1 Tagging

Lobster tagging in the USA and Canada dates mainly from the 1970s and 1980s.

In inshore and midshore areas, tag recaptures are consistent with seasonal movements either along the shore, or to shallower waters in summer and towards deeper water in winter (DFO 2000). In most localities such movements rarely exceed a few kilometres, although some lobsters tagged in the Bay of Fundy and off SW Nova Scotia disperse to offshore fishing grounds and to US fishing grounds (DFO, 2000).

Recaptures of lobsters tagged offshore are consistent with migration over much longer distances from the upper continental slope to shallower areas of Georges Bank and the outer Scotian Shelf prior to the summer spawning season, followed by a return to deeper water in winter (Uzmann et al 1977, Campbell et al 1984, Campbell 1986, Pezzack & Duggan, 1986). There is a corresponding time-space progression in the location of the offshore fishery, which follows lobsters from and to the offshore waters (Skipper D Poole, pers comm.). Pezzack & Duggan (1986) reported movements of 200km or more between tagging and multiple recapture events from SW to SE Browns and back, and found some lobsters that returned to within 9-42 km of their release sites, suggesting a homing capability, which was later confirmed by displacement experiments undertaken by Duggan (1991).

Except for an experiment in Jordan Basin, which yielded 6% of the recaptures inshore, few lobsters tagged offshore have been recaptured by inshore fishermen (Pezzack et al 1992), although since the peak inshore lobster fishery is in winter, any offshore lobsters that had migrated inshore could well

have left for deeper water by then.

The question of the relationship between lobsters in LFA41 and LFA34 was discussed at length in Pezzack et al (1992). On balance, tagging suggests that the exchange of lobsters between LFA 41 and LFA34 is limited (Wilder, 1974, Pezzack et al, 1992), and is most probably in favour of inshore to offshore. LFA41 is therefore more likely to be an importer of recruits *from* inshore rather than an exporter of recruits *to* inshore.

3.3.2 Production and transport of larvae

Work in the Gulf of Maine indicates that lobster larvae mainly hatch either near-shore at less than 30 m depth, or over offshore banks at 40-100 m depth. Settling stage IV larvae are widely distributed, but there are concentrations off the northern edge of Georges Bank, the warm side of a cold front between Browns Bank and Lurcher Shoal, and to a lesser extent in the localised Lobster Bay area of SW Nova Scotia (DFO 2000a). Questions about the stock relationships that might underlie this distribution were examined by Drinkwater et al (2001) and Harding et al (2005).

To study where lobster larvae originate, Harding et al (2005) reviewed the distribution of temperature and pelagic larvae sampled over Georges Bank and Browns Bank in summer 1987-89, and then used a circulation model to infer where larvae might have hatched, assuming that they behaved as passive particles without biological behaviour.

Different stages of larvae found on the banks at different times are likely to have different origins, since hatching peaks in May-June in warmer coastal waters off Cape Cod and the inshore Gulf of Maine, whereas in cooler offshore water over Georges, Browns and German Banks larvae were not found until July-August.

On Browns Bank the time when stage IV larvae reached the settlement stage, coupled with modelling, suggested an earlier origin near Cape Cod, or the mid-coast of Maine near Penobscot Bay, whereas stage III and IV larvae over Georges Bank were most likely to have originated in Massachusetts (except in 1989 when wind fields indicated a strong source on the coast of Maine).

At Georges Bank larvae that were stage I and II at the time of sampling could have originated locally because they were too young to have travelled from the coasts of New England and Maine.

Drinkwater et al (2001) used models to study the most likely destination of larvae during the pelagic phase. As with Harding et al (2005), this modelling did not consider vertical migration, directional swimming, wind dynamics, or the effect of temperature on stage duration, although some of these behaviours are likely to be most influential at rather local scales, and may not affect the big picture too much.

On northern Georges Bank, larvae in the upper 5 m are most likely be advected offshore, whereas those at 10 m are most likely to remain on the Bank, and few larvae were predicted to reach SE Nova Scotia or the central Gulf of Maine.

At Browns Bank, larvae in the upper 5m can be advected offshore or east to the Scotian Shelf, but at 10m larvae are more likely to travel inshore into LFA 34 towards the 60 m isobath.

On German Bank, larvae at 5m would be advected inshore to St Mary's Bay, and at 10 m to the Bay of Fundy and south westwards to the mid coast of Maine.

For the productive Lobster Bay in SW Nova Scotia, modelled larvae remained within the area, or were advected along the coast to St Mary's Bay, suggesting that this coastal area is locally self sustaining because few larvae reach here from offshore.

Summarising, there is some degree of offshore containment in the tagging results; larvae around the offshore banks includes stages that could have originated locally, and that have a chance of either being retained there or advected offshore, depending on depth and conditions; whereas on the inner banks larvae are more likely to be transported towards SW Nova Scotia or the inner Gulf, again

depending on depth and conditions. There are connections between different parts of the Gulf of Maine system, but there is also scope for time and space separation of larval transport prior to settlement, depending on location, timing, depth, and the wind fields.

3.3.3 Genetics

Two studies illustrate what has been deduced to date about the patterns of gene flow in lobsters along the coast of Canada (Harding et al 1997, Kenchington et al, 2009).

Harding et al (1997) compared lobster samples from three distinct areas, the southern Gulf of St Lawrence, a coastal bay in SW Nova Scotia, and a deep sea canyon off Georges Bank, using random amplified polymorphic DNA profiles (RAPD). Lobsters from the Gulf were more distinct than those from Georges Bank and SW Nova Scotia, but none of the locations were genetically isolated. A migration rate of only five lobsters in every generation was postulated for the low level of genetic differentiation found in this study.

In a more recent and wider ranging study, Kenchington et al (2009) analysed DNA from 2500 lobsters, mainly egg bearing females, from 34 sites across the geographic range and from coastal and deep waters, and found two important results:

Firstly, northern samples centred in the Gulf of St Lawrence, with low genetic differentiation, differed from southern samples taken from Fundy to Cape Cod, in which genetic differentiation is higher. This is postulated to result from a shelf-edge post-glacial colonisation process, in which lobsters forced onto the southern continental slopes by low temperature and falling water level during the last ice age later re-colonised northwards along the slope and into newly available embayments as the ice retreated, thus creating a south-north genetic difference that is now maintained by contemporary patterns of bathymetry, temperature, and circulation. Deep water lobster populations along the shelf could then be a relic of this post-glacial expansion.

Secondly, when data were screened to identify areas of low gene flow between neighbouring samples, only a single barrier was found in the northern area, but, somewhat unexpectedly, seven areas of reduced gene flow were found in the southern area. These are located at Grand Manan, Lobster Bay (NS), Boothbay (ME) plus Crowell Basin, Buzzards Bay (MA), Long Island Sound, Cape Cod to Georges Bank, Georges Basin, and south of Browns Bank (Figure 4 in Kenchington et al, 2009). Such areas of low gene flow could suggest that complex larval production and transport systems have permitted sufficient time-space separation to maintain a degree of genetic differentiation over post-glacial time. The implications of this for assessment and management are not yet determined.

3.3.4 Predicting recruitment

The long term studies of early life history stages in the Gulf of Maine aim to predict recruitment to the lobster fishery by linking time-space patterns in the transport and abundance of pelagic post-larvae (Wahle & Incze, 1997, Incze et al, 2006) to patterns in young-of- year along the coast (Wahle & Steneck, 1992), and thence to recruitment to the fishable stock (Steneck & Wilson, 2001, Wahle, Incze & Fogarty, 2004). As part of this process, Xue et al (2008) are studying connectivity by modelling particle delivery pathways from real time oceanographic and wind inputs in the Gulf. Long term this work may help to identify the relative importance of density-independent (larval supply) and density-dependent (settlement and benthic ecology) processes in lobster recruitment, with potentially important implications for lobster management (Steneck and Acheson, 1997), including questions about stock and recruitment, and hence resilience to exploitation.

Interesting though it is, the relevance of this work for the offshore lobster fishery in LFA 41 is unclear, because juvenile ecology has not been studied in the much deeper and less structured habitats offshore, and could obviously be different. This underlines the importance of maintaining a precautionary management strategy in LFA41 to prevent deterioration of the size structure to the point where the fishery becomes critically dependent recruitment from a system that is not understood.

3.4 History of the fishery

The Canadian offshore lobster fishery began in July 1971 as Lobster District A". The new fishery was an attempt to provide an alternative fishery for swordfish longline fishermen who lost their market due to United States government restrictions on the importation of swordfish due to newly established levels of mercury in food products. Few of the 56 swordfish licence holders opted for an offshore lobster licence and, by 1972, only six swordfish vessels had entered the new fishery, with two additional licences entering in 1976. The fishery initially occurred on the known lobster grounds of southern Georges Bank but quickly spread to concentrations of lobster along the eastern and south-western portion of Browns Bank. Catches rose to 678 metric tonnes (mt) by 1976.

From the outset, the inshore lobster fishermen in southwest Nova Scotia expressed concern that the offshore fishery would impact the viability of the inshore lobster fishery. In response the DFO applied additional restrictions on the offshore fishery including freezing the number of participants at 8, imposing a 1000 trap/vessel limit, a ten month season (at choice of licensee) and a 408 ton TAC on the 4X portion of LFA 41of Browns Bank. Only six of the eight licences were permitted to fish in this part of the offshore area, with the remaining two licences restricted to Georges Bank. All eight licences had fishing access to Georges Bank with no quota limits. In 1979, DFO established a rectangular closed area (LFA 40) in those parts of Brown's Bank < 50 fathoms in an attempt to protect lobster brood stock. The area remains today and is closed to all lobster fishing but remains open to other fisheries. The conservation benefit of the closure has never been ascertained but it is widely supported by the industry in neighbouring LFAs.

In 1984, the International Court of Justice (ICJ) released its decision on the Canada-U.S. boundary in the Gulf of Maine (referred to as "the Hague Line" after the Dutch city location of the Court). The newly imposed line displaced the American offshore lobster effort from some areas of Crowell Basin, Georges Basin and the northeast peak of Georges Bank. As a result the DFO established the Canadian TAC based on (1) the 4X 408t TAC; (2) the average annual Canadian 5Z lobster catches; and (3) 100t from the estimated American catch from Crowell and Georges Basin and Georges Bank.

By 1984, the offshore lobster fishery was marginally profitable. Conservation and economic concerns continued from inshore fishermen and in response, the DFO and the offshore lobster industry embarked on a collaborative conservation strategy. It began with the formation of the Offshore Lobster Advisory Committee (OLAC) in 1985 which was comprised of the offshore lobster licence holders, the Nova Scotia Department of Agriculture and Fisheries and DFO.

In 1986, OLAC recommended an initial three-year trial Enterprise Allocation (EA) Offshore Lobster Management Plan which provided licence holders with the equivalent of transferable quotas. The sharing formula was based on a DFO economic analysis which indicated that an allocation of 12.5% of the TAC (90t) to each of the 8 vessel licences was sufficient to support a vessel replacement program. The TAC was set at 720t and each of the licences was assigned an EA of 90 mt.

The EA Program was renewed by the Department in 1989/90 for a five year period. By this time additional licences had been transferred such that a single company held seven of the eight licences. The total number of vessels actively fishing had decreased to six and the trap limit had been removed on a trial basis.

The EA program was made permanent in 1995 and trap limits were eliminated. Also, in 1995, a proposal from the offshore Lobster industry to land Jonah crab on a regular basis was approved, with licences being issued and a TAC of 720 tonnes established. Furthermore, DFO announced the development of an Integrated Fisheries Management Plan (IFMP)

Since then the IFMP has undergone a redraft and has changed its name to the "Offshore Lobster and Jonah Crab Integrated Fishery Management Plan 2006-2011" in recognition of the Jonah crab fishery. Over the years Clearwater Seafoods Limited Partnership (CSLP) has acquired all eight offshore lobster licences, obtaining the one outstanding licence in 2006. As the single enterprise in the fishery, it presently uses two vessels to fish both the lobster and Jonah crab quotas of 720t. Currently, Jonah crab is being released at sea due to a combination of poor markets and low catch rates.

3.5 Lobster fishing and fleets

3.5.1 Lobster fishing

The offshore lobster fishery is strictly a commercial one and is conducted using rectangular wire coated lobster traps measuring 48" long, 16" wide and 11" tall. Traps are set in strings, or trawls, of 120-150 and are joined by a ground line approximately 14 fathoms apart. Traps are constructed in panels connected by biodegradable clips and all traps are fitted with escape vents for small lobsters. Strings are anchored at each end with a surface line attached to a buoy and high flyer. Vessels set about 30 strings at a time stretching about 1.2 miles with a 4-5 day soak time. Trips typically last 4 to 5 days. Depths fished are 100-320 m.

Rope used is the Polysteel brand of polypropylene, and is neutrally buoyant. No weak links are used.

Purpose	Rope diameter	Weight of a 1200 ft coil	Tensile Strength
Painters	3/8 inch (10 mm)	37 lb	3,700 lbf
Buoy lines	5/8 inch (16 mm)	95 lb	10,640 lbf
Ground rope	¾ inch (18 mm)	138 lb	13,570 lbf

The quota year runs from January to December but the company restricts fishing from January to June and from October to December. The fleet is inactive from July to September to allow the lobster to moult and grow during the warm summer months. Gear is stored at sea (i.e. left in place) in the off season without endlines.

3.5.2 The fishing fleet

The Canadian offshore lobster fleet presently consists of 2 vessels ranging in length from 90 to 140 feet. Vessels are equipped with vivier salt water holding tanks and can carry up to 45,000 lbs of live lobster. Crew complement ranges from 15-18 depending on the vessel.

3.5.3 Market information

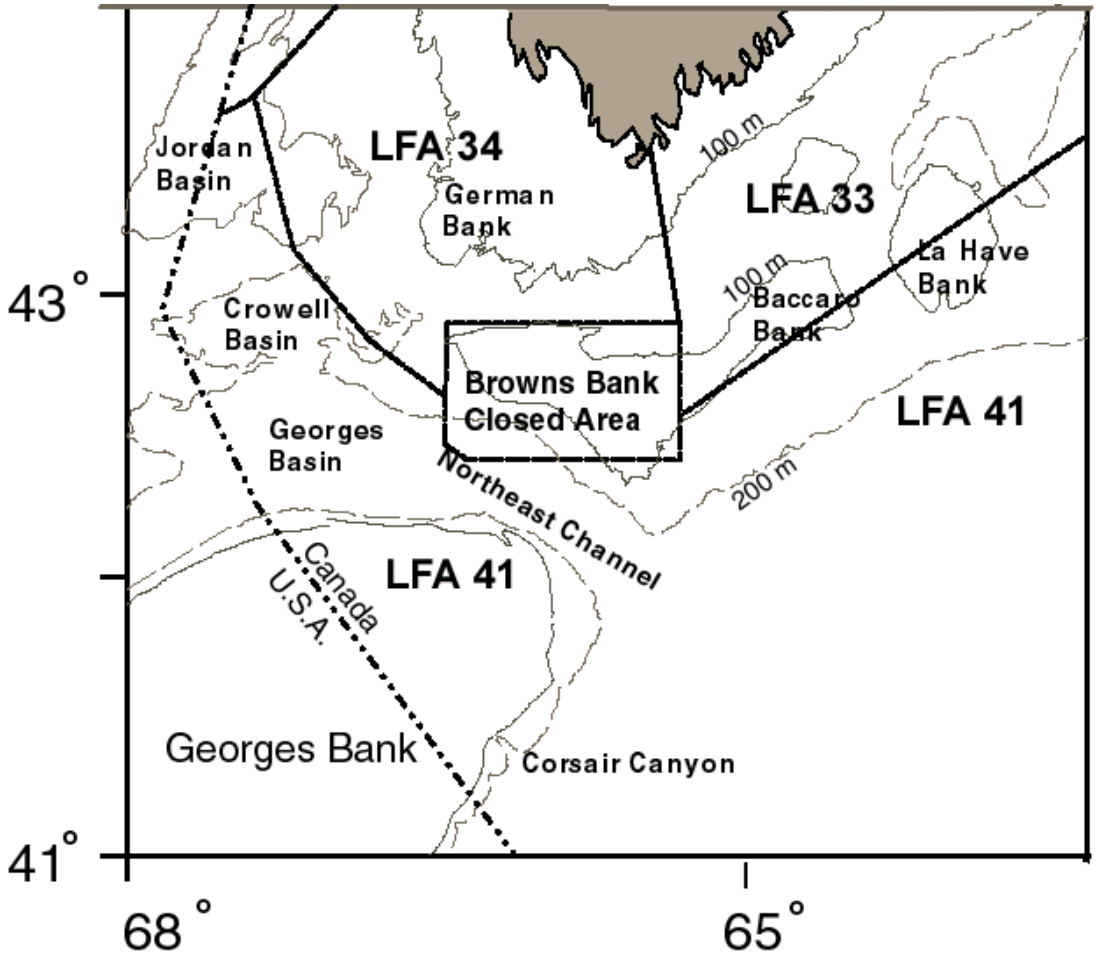
Offshore lobsters are landed whole and generally sold in the live market. Value added products include raw frozen lobster in shell or meat. Approximately 95% of the landed catch is exported, with the United States being the largest market (approximately 75% of the catch). Other important export markets for live lobster are Europe, followed by Japan. Fluctuations in the exchange rate of the Canadian dollar have a continuing impact on prices and markets.

4 FISHERY LOCATION, ADMINISTRATIVE BOUNDARIES, AND RESPONSIBILITIES

Lobster Fishing Area 41 is situated on the Scotian Shelf from Georges Bank to the Laurentian Channel (see Figure 8) but the fishery takes place on five major grounds:

- Georges Bank (outer shelf and upper slope);
- Georges Basin;
- Crowell Basin;
- Southeast Browns Bank (outer shelf and upper slope east of the Northeast Channel); and,
- West Browns.

Figure 8. The major lobster fishing grounds on the Scotian Shelf and Georges Bank



All of the above fishing grounds are within the NAFO Divisions 4X and 5Ze (see Figure 2). Fishing for lobster and Jonah crab is restricted to the NAFO Divisions 4X and 5Ze within LFA 41.

4.1 Administrative context and legislation

The Atlantic region is divided into four regional fishery management areas. The offshore lobster fishery is administered by the Maritimes Region of the DFO through a staff of scientific, management and enforcement personnel. While most decisions concerning the management of the fishery are made in the region, there is oversight and referral of some matters to the department at the national level in Ottawa.

The legislative authority for the management of seacoast and inland fisheries in Canada falls under the

exclusive jurisdiction of the Parliament of Canada. There are several pieces of legislation that apply to the fishing industry, the major one being the *Fisheries Act*. That *Act* grants wide discretionary authority to the Minster 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* are the main regulations governing the fishery. Table 1 shows these and some other important Acts and policy documents.

These regulations outline a legal framework for the management of fisheries and for the licensing and registration of participants. IFMPs are developed outlining the fisheries management objectives and management measures by stock and area.

Table 1. Major legislative and regulatory instruments

Principal Acts and Policy Documents	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 seasons, minimum size, landing of berried females, trap dimensions and the requirement to tag traps.
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.

While the *Act* assigns the ultimate responsibility and discretion for the management of fisheries to the Minister of Fisheries and Oceans, most of these powers are delegated to officials through the organizational structure of the department.

Advisory Committees composed of the major stakeholders serve as the forum for the formulation of management measures and recommendations to the regulator (DFO). The main management body for the offshore lobster fishery is the Offshore Lobster and Jonah Crab Advisory Committee (OLJCAC). The committee is supported by the advice of regional DFO managers, scientists and monitoring and surveillance staff. A second committee called the Offshore Lobster Jonah Crab Management Board (OLJCMB) is comprised of the licence holders and DFO personnel. The purpose of the OLJCMB is to oversee and direct the implementation of the Offshore Lobster and Jonah Crab IFMP. The Terms of Reference outlining the functions and responsibilities of the OLJCMB are contained in the IFMP.

5 STOCK ASSESSMENT

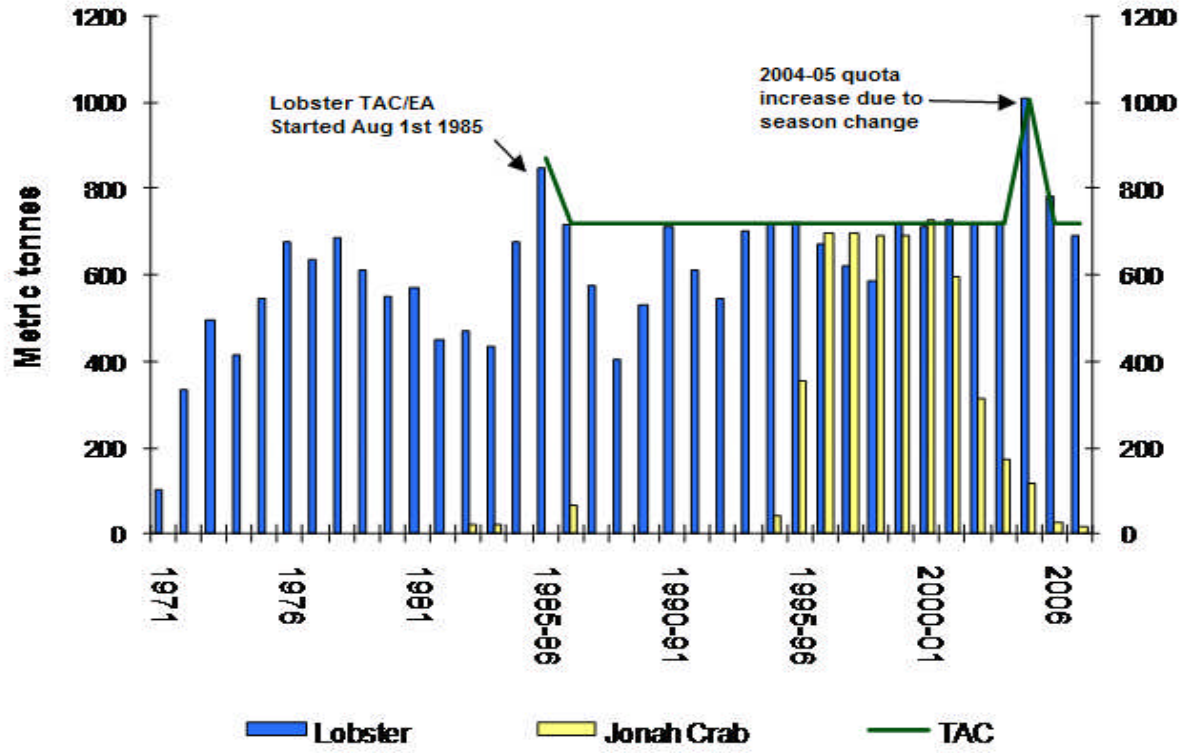
5.1 Management unit

The management and assessment unit for the Eastern Canadian Offshore Lobster Fishery is LFA 41, where the fishery began in 1971.

5.2 Assessment background

As background, Figure 9 below shows the trend in lobster landings in LFA 41, and Figure 10 illustrates how this compares to landings from the neighbouring inshore fishery in LFA34 and in the Bay of Fundy. In Figure 9, lobster landings from LFA41 increase up to the introduction in 1985 of the 720t TAC, which has since been maintained unchanged. The only deviations in landings are a downturn in 1997-1999, attributed to a brief surge of cold water 2-4^{o}C below normal, emanating from Labrador, and an increase in 2004-5 due to a change in the quota season. The TAC was not calculated analytically, but was introduced at the then current catch level in order to impose a conservative harvest strategy.

Figure 9. Seasonal offshore lobster and Jonah crab landings in 4X and 5 including the lobster TAC



(Source: DFO 2009a)

The effect of this is demonstrated in Figure 10 where LFA41 landings are seen to be a very small proportion of the landings from Bay of Fundy and LFA34, which increased markedly during the 1980s and 1990s as elsewhere in North America. The 8 licences in LFA41 compare with the 937 vessel licences and 30 communal licences in the large LFA34 fishery.

5.3 Assessment tools

Since crustacea moult and cannot be aged routinely, scientists cannot apply age structured analytical models directly to estimate fishing mortality (F) and stock biomass (B). Alternatives include:

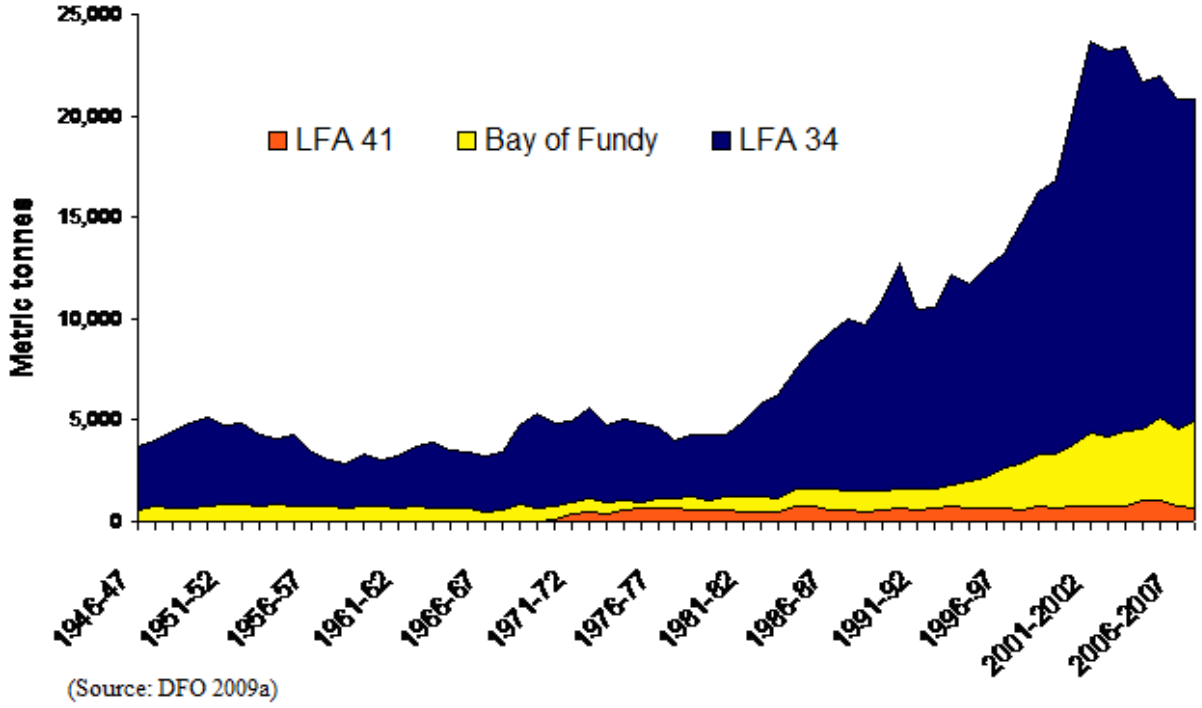
- Life history models - e.g. length-based yield per recruit (YPR) and egg production per recruit (EPR), (Campbell,1985, Fogarty & Idoine, 1988), the latter being used in conjunction with

the F10% EPR reference point in the USA and Canada, as reviewed by the Fisheries Resource Conservation Council (FRCC) (1995) and Fogarty & Gendron (2004).

- Length cohort analysis (LCA) - which has been used for lobsters in the USA (e.g. Cadrin & Estrella 1996) and in Europe (Addison, 1999), and which estimates fishing mortality by partitioning size distributions into putative ages using growth data.
- Depletion methods - e.g. as in Collie & Sissenwine, 1983, who used a modified de Lury model that is still used in the US Gulf of Maine lobster assessment (Anon, 2009).
- A traffic light approach - based on the trends in a range of fishery, resource, and ecosystem indicators (as recommended in the FRCC Sustainability Framework for Atlantic Lobster, 2007, and the Maritimes Region Lobster Conservation Strategy, 2004-2008).

The resource in LFA 41 was evaluated on an exploratory basis in 1990 (Pezzack & Duggan, 1990), 1995 (Pezzack & Macquire, 1995, Pezzack & Duggan, 1995) and 2001 (jointly with LFA34, Pezzack et al, 2001), and as part of the Regional Advisory Process in 2000 and 2009 (DFO 2000a, DFO 2009b).

Figure 10. Gulf of Maine lobster landings by area



(Source: DFO 2009a)

5.3.1 Data sources for LFA 41

The following data are available for assessing stock status in LFA41 (DFO 2009b):

- Biological data - Data on growth, maturity and fecundity from historical studies (Pezzack & Duggan, 1990, Pezzack & Macquire,1995).
- Fishery dependent data - Log books (1981-2008) provide daily landings records (1982-2000), and string-by-string records of catch, effort and location since 2001.
  At-sea sampling by on-board observers provides records of size distribution and sex ratio (1972-2008)
- Fishery independent data -Stratified random DFO Research Vessel (RV) bottom trawl surveys in summer (1999-2008) and winter (2007-8), and the US NMFS fall RV bottom trawl survey (since 1968) provide estimates of abundance and recruitment.

5.4 Historical assessments for LFA 41

Historical assessments modelled curves of yield per recruit (Pezzack & Duggan, 1990) and egg per

recruit (Pezzack and Macquire, 1995) against F; evaluated key trends in the fishery in LFA41 (Pezzack & Duggan, 1995); and compared exploitation rate and reproductive potential between LFA41 and LFA 34 using size frequency data (Pezzack et al., 2001), as follows:

- The YPR analysis (Pezzack & Duggan, 1990) used growth data (molt increment and frequency) from tag recaptures of offshore lobsters and found that Fmax was about F=0.2-0.3. The fishery in LFA 41 appeared to be at Fmax, based on an estimate of F=0.2-0.4 derived from size frequency analysis by Miller et al., (1987).
- The EPR analysis (Pezzack & Macquire, 1995) used growth, maturity and fecundity data for a range of lobster fishing areas in Canada. Assuming that F in LFA41 was in the range F=0.2-0.4, as cited by Miller et al (1987), EPR was close to 10% of EPRmax (EPRmax is EPR at zero F), compared to < 3.5% of EPRmax for the other lobster fishing areas, where F was in the range 0.6-1.8. The lobster stock in LFA41 was therefore not overfished according to the $F_{10\%}$EPR criterion (FRCC, 1995).
- Pezzack & Duggan (1995) described the historic development and distribution of the LFA41 fishery and the long term trends in size distribution of the catch. Despite various changes in offshore fishing patterns during earlier decades, the size distribution was stable and contained a high proportion of multi-parous females. The US bottom trawl survey found that lobster abundance in the Gulf of Maine and Georges Bank was increasing. Pezzack et al (1999 and 2001) examined similar features for LFA34, where the size distribution of the catch was skewed towards the recruiting molt group (Section 3.2 2), and they applied length cohort analysis to the 1998-2000 size composition data for the two areas (Pezzack et al 1999). They estimated F=1.14 for LFA34, and F=0.89-0.98 for LFA34 + LFA41 combined, suggesting that by difference F=0.2-0.3 in LFA41. There was uncertainty about combining size frequencies from two different areas and fisheries, without knowing transfer rates, but a low F value for LFA41 is consistent with the low TAC.
- Pezzack et al (2001) also used the size frequency from LFA 34 and LFA41 to estimate the number of mature females removed from the fishery, and the egg production that they would have produced the following summer. Fishing removed far fewer females and mature females in LFA41 compared to LFA34 (Figure 6), and removed a much smaller fraction of the potential egg production (Figure 7), and it was concluded that the LFA 41 fishery was not threatening reproductive potential.

Summarising, F appeared to be low, relative to other Canadian lobster fishing areas, and was close to Fmax and F10%EPR, and the size distribution contained an adequate proportion of mature females, so there was no evidence that harvesting in LFA41 had any negative impact on the stock.

5.5 Recent assessments

As part of the DFO Regional Advisory Process, assessments were carried out in 2000 and 2009 (DFO 2000a, DFO 2009b).

5.5.1 The 2000 assessment

The 2000 assessment summarised developments in the understanding of larval distribution and transport, and reviewed the spatial distribution of the fishery, trends in landings, CPUE from daily log books for the main fishing areas, and size structure and sex ratio of the commercial catch from at-sea sampling. The trend in recruitment was evaluated using the US NMFS groundfish survey.

Fishing was distributed at Georges Bank, Georges Basin, and Crowell Basin, but with an increase at SE Browns in pursuit of the Jonah Crab by-catch (Pg 4 in DFO 2000). CPUE was relatively stable (Pg7 in DFO 2000a) up to 1996, followed by a decrease during a cold water intrusion in 1997-99.

The size distribution, with its wide size range and relatively high proportion of multi-parous females, continued to show long term stability and the sex ratio had shifted in favour of females during the 1980s, implying that reproductive potential continued to be good. The source of offshore recruitment is uncertain, but was relatively constant at Georges Bank, and has not increased to the degree shown elsewhere in the Gulf of Maine or numerous other inshore fisheries in the USA and Canada.

F was not estimated directly, but it was concluded that there was no impact of the offshore fishery on either the offshore stock or the inshore fishery in LFA34. It was not clear how a recent spatial expansion of the LFA34 fishery into the midshore area alongside LFA41 might impact the LFA41 fishery.

5.5.2 The 2009 assessment

The 2009 assessment follows the Maritime Lobster Conservation Strategy (2004-2008) by using a range of indicators to monitor resource status. Trends were evaluated for 2000-2007 compared to 1995-99 (Appendix A of DFO 2009b).

Since 2000, the fishery has mainly occurred in SE Browns, SW Browns, Georges Basin and Georges Bank (Table 2, DFO 2009b).

The following indicators and data sources were used:

- Abundance indicators
    - Landings;
    - Commercial CPUE (unadjusted, or adjusted by log-linear model for season, vessel, and trip interval); and,
    - Catch per tow from trawl surveys - these are either stable, or increasing since 1999.

- Fishing Pressure indicators
    - Fishing effort - trap hauls have decreased recently due to fewer vessels, and a reduced fishery for the Jonah Crab by-catch.
    - Canadian/US landings in adjacent fisheries - both have increased in line with the general increase in lobster abundance elsewhere.
    - Size structure - shows long term stability, except for a reduced median size in Crowell Basin.
    - Sex ratio - prolonged increase in the proportion of females, which are protected, implying a reduction in male abundance.
    - Exploitation rate - not measured, but inferred to be the same as a US 2006 assessment of F=0.3 for a similar size structure in the US Georges Bank fishery.

- Production and Recruitment indicators
    - Proportion of mature and multi-parous females - these are high and stable over time, except for a decrease in Crowell Basin (P9 in DFO 2009b).
    - Sex ratio - the likely reduction in the proportion of males is not thought to be a problem owing to the polygymous behaviour of male lobsters.
    - Recruitment - the LFA 41 fishery does not sample the recruit sizes, but recruit and post-recruit catch rates in US trawl survey results for Georges Bank and Gulf of Maine are stable.

- Environment/Ecosystem indicators
    - Predators and food sources - considered to be neutral, with no trend at present
    - Trap impact - there are no specific studies in LFA41 but trap density is low (12000 traps compared to 387000 traps in LFA 34).
    - Lost gear - incidence is low, fishers will attempt recovery, and traps have biodegradable panels.
    - By-catch - recorded during observer trips.
    - Right whales - No trend. Trap density is low and does not overlap known whale routes, although specific information on the latter is poor for the offshore areas. No entanglements reported to date in offshore lobster gear.

5.6 Current stock status in LFA 41

There are no direct estimates of fishing mortality, and no forecast capability, but most key indicators for abundance, fishing pressure, egg production and recruitment, are stable, or increasing. Except for the decreasing proportion of males, and the slight fall in size in Crowell Basin, there has been little

change in stock status since the 1980s. It is concluded that the current TAC of 720t in place since 1985 has had little or no negative impact on the lobster stock in LFA41 and at present appears to be a sustainable harvest strategy that meets the needs of the Lobster and Jonah Crab Integrated Fishery Management Plan 2006-2011 (DFO 2009a), whose objectives are to:

- harvest lobsters in LFA 41 at a conservative sustainable level in order to protect the offshore lobster resource and adjacent inshore lobsters that may be affected by offshore fishing to protect offshore lobsters from the effects of fishing in adjacent inshore areas (Canada and USA)
- to keep within acceptable levels any adverse environmental effects of trap fishing, in accordance with the Fisheries Act, the Oceans Act and the DFO Ecosystem Approach to Fisheries Management,
- to address by-catch issues, gear conflicts, and socio economic issues including co-management and economic viability.

5.7 Reference points and decision rules

In 1995 Canadian lobster fisheries were reviewed against a limit reference point (the $F_{10\%}$ EPR threshold for overfishing), and apart from LFA41 most fisheries were well below the threshold, and were therefore overfished by definition (FRCC, 1995). The only lobster stock-recruitment curve known from field data, for Arnolds Cove, Newfoundland (Fogarty & Idoine,1986), has a steep slope near the origin, implying that recruitment becomes impaired only at very low egg production, but it was clear that a precautionary approach to egg production was highly desirable in order to reduce the risk of recruitment failure (FRCC 1995). FRCC therefore recommended that EPR should be doubled (using a "tool box" of potential measures, e.g. by raising minimum legal size to the mean size of first maturity, or by introducing a female v-notching programme). Some progress was made, but the target was not generally achieved (FRCC 2007, Figure 6) and EPR was seen as a concept that did not relate to real egg production on the ground, especially in a regime of rising recruitment. Lobster management therefore moved away from a decision rule based on a defined EPR reference point.

DFO remains committed to the Precautionary Approach (DFO, 2006c), and FRCC has since identified the generic features of a healthy lobster population (FRCC 2007, P16), and compiled a toolbox of indicators for stock evaluation (FRCC 2007, Appendix IV), as used in the 2009 LFA41 assessment described earlier.

These indicators can in principle be used as proxies for a reference point approach, but there appear to be two concerns about their implementation in LFA 41. Firstly, it is not clear from the 2009 assessment whether a quantitative function of the indicator trends has been developed as specified target, trigger, or threshold reference values. These could either be some statistical function of the indicator trend (compare current thinking in the assessment of the US lobster fishery in Maine, Anon 2009), or a semi-quantitative criterion, such as 'X consecutive years of decline in a recruitment index'. Secondly, the domains of stock status defined by target, trigger or threshold reference values of the indicators should have pre-agreed decision rules for corresponding management actions, but this does not appear to be the case. Whilst it is clear that harvesting is in the hands of only one enterprise with a vested interest in maintaining economic viability, and that management is currently successful, in that F is low, and the size distribution satisfies the criteria of a healthy lobster population, there are inherent risks in operating without a framework of reference values and decision rules, especially when there may be a reversal in the current high recruitment regime sometime in the future. In these respects the framework in LFA41 appears to be deficient.

5.8 Uncertainties and deficiencies

DFO 2000 and 2009b identified a number of uncertainties in LFA41, to which several have been added based on previous sections of this report, as follows:

- Uncertainties identified by DFO 2000a and 2009b:
    - No direct estimate of F for LFA41 (although it is clear from the size distribution that F must be low)

- Possible bias in CPUE, size composition and sex ratio due to spatial variations in fishing pattern between years
- The effect of variations in oceanographic or ecosystem conditions that could introduce uncertainty into the trends in abundance.
- Uncertainty about the relationship between lobsters in LFA41 and LFA34, and hence about the reciprocal effects of effort changes in the two fisheries, such as the rising effort in the midshore region of LFA34.

Although identified, these uncertainties are not accounted for explicitly in the evaluation of indicators, and there are no quantitative forecasts exploring the effects of uncertainty on future stock status (compare Chen & Wilson, 2002, and Chen et al, 2005, for the US lobster fishery in Maine).

Other uncertainties that could be considered and addressed are:

- Statistical uncertainty around the indicator trends, and how this would affect the definition of any threshold, trigger or target reference value
- Unknown implications of the declining sex ratio, and of the lower median size in Crowell Basin
- No knowledge on the source of offshore recruitment, or the ecology of settlement and adolescent stages, and no early warning index
- Uncertainty whether the LFA41 has benefited from the long term recruitment change, and is at risk from a reversal

In the short term, these uncertainties may be of limited concern, since F appears to have been low for many years, the size distribution is buffered by a high proportion of multi-parous females, and most trends to date are positive or neutral and do not appear to pose any immediate threat.

Longer term, a question arises whether the indicators are sufficiently precise or sensitive to show a measurable and timely response to changes in stock status, especially if caused by the oceanographic regime, the recruitment regime, or effort changes in adjacent LFA34. This appears to be a weakness that should be addressed, whether by finding methods to make quantitative estimates of uncertainty that can be incorporated into decision rules, or by testing the sensitivity of the indicators to controlled changes.

6 FISHERIES MANAGEMENT FRAMEWORK, PROCESSES AND INTERACTIONS

6.1 Integrated Fishery Management Plans (IFMP)

Long-term Integrated Fishery Management Plans are created and published by DFO, in collaboration with stakeholders, describing the fishery, its management objectives, and processes. These plans are comprehensive documents outlining all aspects of a fishery including an overview, stock status, long-term objectives, management objectives, current management issues and management measures employed in the fishery. The current 2006-2011 IFMP for offshore lobster was introduced with a five-year "evergreen" provision that ensures that the plan always has a five year horizon. At the end of each year the plan is updated and a subsequent year is added. This allows government and industry participants to plan for the longer term while being assured stability in the short term.

In addition annual fishing plans outline specific measures to achieve short and medium term objectives. These plans are developed by the DFO in close cooperation with the OLJCAC.

6.2 Management objectives

The long-term objectives for this fishery are outlined in the IFMP:

1. to harvest at a conservative, sustainable level, based on sound scientific advice that will continue to protect the offshore lobster and Jonah crab resources;
2. to harvest at a level that will continue to protect the adjacent inshore lobster stocks that may be biologically linked to the offshore stock(s);
3. to protect the offshore lobster and Jonah crab fishery from exploitation pressures arising in adjacent LFAs (inshore Canadian and American) which may affect the LFA 41 fishery;
4. to maintain the long-term financial viability of the existing fleet;
5. to further increase industry's level of participation in the management of this resource to benefit Canadians by actively including the industry in ongoing research and fishery management;
6. to maintain within acceptable levels any adverse environmental effects of the fishing methods in accordance with DFO's *Ecosystem Approach to Fisheries Management*;
7. to address other domestic considerations including:
    - the exploration of the lobster resources in the unfished portion of LFA 41 to determine whether there is a commercial abundance of lobster; and
    - the resolution of real and potential gear conflicts with other domestic fisheries.
8. to address international considerations including:
    - the effects of direct and bycatch fisheries on offshore lobster and Jonah crab by various gear sectors on the US side of the Hague line;
    - gear conflicts detrimental to the Canadian offshore lobster and Jonah crab fishery as a result of foreign vessel operation in LFA 41 waters; and
    - the assurance that the elements of the IFMP for LFA 41 will continue to support the marketing initiatives for offshore Canadian lobster wherever possible.

6.3 Advisory committee roles and consultations

The Offshore Lobster and Jonah Crab Advisory Committee (OLJCAC) is the major management mechanism for the fishery. The committee is composed of the major stakeholders, including licence holders, a representative of the adjacent LFAs 34 and 33 and the provincial government of Nova Scotia. OLJCAC provides input and advice to DFO on the conservation, protection and management of the offshore lobster resource, including annual fishing plans, regulatory measures, fishing seasons, licensing policies, and gear restrictions. The OLJCAC makes recommendations on the administration of the enterprise allocation program and the introduction of new fishing technologies that may affect existing management measures.

OLJCAC is chaired by the Manager, Invertebrate Fisheries, Resource Management Branch, DFO. The committee meets at least once per year with additional meetings held as required. The Committee is

supported by DFO officials who consolidate scientific, economic and management advice into draft fishing plans for the Committee's consideration.

In addition to the advisory committee the Offshore Lobster and Jonah Crab Management Board (OLJCMB), composed of representatives of the licence holder and DFO, oversees and directs the implementation of the IFMP, ensures that its principles and provisions IFMP are respected, reviews scientific advice and recommends industry/DFO funded research programs. This committee reports to and recommends conservation and protection measures to OLJCAC.

6.4 Fisheries management methodology

The offshore lobster fishery is managed by:

- Harvest restrictions - The lobster harvest is restricted by the setting of a catch limit through a TAC of 720 mt, an amount that has not changed since 1986 (see Table 2 below).
- Limited entry – an enterprise allocation program of management of the offshore lobster fishery was made permanent in 1995 at which time the percentage shares for each of 8 the enterprises was fixed at 12.5% or 90 mt per licence. The licence also includes access to 720 mt of Jonah crab using the same formula. As noted above, Clearwater Seafoods Limited Partnership has acquired all eight offshore lobster licences over the past twenty years and is currently entitled to fish the entire allocations of both offshore lobster and Jonah crab.
- Fishing season - the offshore lobster fishery is open year round from January 1 to December 31 of each year subject to the quota being caught. For market and quality reasons, the industry has chosen not to pursue the fishery in the summer/early fall from July to September in order to allow the lobster to moult and grow.
- Conservation, Protection, and Compliance - there are a variety of monitoring and enforcement measures in place in the offshore lobster fishery, including:
    - quotas and individual EA limits on catch
    - minimum size limit
    - individual trap tags issued by DFO
    - escape panel(s) on all traps
    - illegal to have on board
        - less than 2-clawed females
        - berried lobsters
        - v-notched lobsters
    - all by-catch must be returned
    - a hail-in requirement 6 hours before landing
    - mandatory satellite vessel monitoring equipment (VMS) on all vessels
    - on-board observers at choice of DFO
    - an industry funded 100% dockside monitoring to weigh all lobster landed
    - random at-sea boarding by Fishery Officers
    - aerial surveillance
    - mandatory completion of an extensive Offshore Lobster Monitoring Document

The compliance record in the offshore lobster fishery is excellent. There is very little incentive to cheat as the licence holders focus on the long-term economic return from the fishery. There have been no infractions in the fishery in the last 10 years.

In the event of breaches, sanctions in the form of heavy fines and forfeiture of catch are provided in the *Fisheries Act* and regulations serve to deter non-compliance with licence conditions and fishery regulations. Charges can be laid and formal court proceedings are pursued for offences.

6.6 Representation and consultation

As noted above, the OLJCAC, with a broad membership, is the main consultative body in this fishery along with the OLJCMB which oversees annual fishing plans. Meetings are open to the public. There is a very close working relationship between the industry and DFO resulting in cooperative approaches to research, data collection and monitoring programs.

Table 2. Offshore lobster and Jonah crab landings and TAC for NAFO Divisions 4X and 5.

	Lobster		Jonah Crab			Lobster		Jonah Crab	
Year	**TAC**	**Landings**	**TAC**	**Landings**		**TAC**	**Landings**	**TAC**	**Landings**
1971-80[a]	-	504	-	-	**1999-00**[c]	720	720	720	690
1981-90[a]	-	569	-	-	**2000-01**[c]	720	718	720	727
1990-94[b]	720	640	-	-	**2001-02**[c]	720	726	720	597
1994-95 [c]	720	723	720	39	**2002-03**[c]	720	718	720	313
1995-96[c]	720	722	720	356	**2003-04**[c]	720	721	720	172
1996-97[c]	720	673	720	708	**2004-05**[d]	1008	1008	1008	119
1997-98[c]	720	621	720	702	**2006**[e]	720	780	720	25
1998-99[c]	720	590	720	698	**2007**[e]	720	691	720	14
					2008 [e]	720	692	720	6

Notes: a. Average landings per year for the time period based on Jan 1 – Dec 31 season.
b. Average landings per year for the time period based on Oct 16 – Oct 15 season.
c. Seasonal landings based on Oct 16 – Oct 15 season.
d. Quota increase due to change in season changes (Oct 16, 2004 – Dec 31, 2005).
e. Seasonal landings based on Jan 1 – Dec 31 season.

The lower landings between 1997 and 1999 corresponded to an influx of cold water down the slope and into the basins causing temperatures to drop by 2-4 degree Celsius. This type of cold water event has been recorded before and is associated with the North Atlantic oscillation (NAO).

7 ECOSYSTEM CHARACTERISTICS

7.1 Ecosystem considerations

The offshore lobster fishery is conducted in areas outside 92 km (50 nm) on the southwestern Scotian Shelf (slopes of Brown's Bank), Crowell Basin, George's Basin, and northern and northeastern slopes of Georges Bank (see Figure 2). Depths fished are 100-320 m. Bottom sediments in these areas are generally gravel, sand or mud or mixtures of these sediments, with occasional mixture of larger sediments (boulders) and occasional local areas of rocky relief and rocky outcrops in cliffs at the continental edge (Breeze et al 2002; Fader 2008a, b). The general distribution of bottom sediments has been well mapped, although local detail may be sparse. Two areas of interest to the fishery, Browns Bank and the eastern portion of George's Bank, have been mapped using multi-beam sonar, and benthic habitats have been classified and mapped (Kostylev et al 2001, 2005). The Brown's Bank study was mainly in areas shallower than the offshore lobster fishery (less than 100-120 m), although some conclusions might be applicable to greater depths; the George's Bank study covered depths and areas of interest to the offshore lobster fishery. Available information on sediments in the fishery area are consistent with fishermen's reports that the fishery is primarily conducted in areas of gravel, sand and mud, and with configuration of the gear which uses long groundlines of non-floating rope groundlines (which might be problematical on irregular rocky grounds).

Currents on the Scotian Shelf are predominantly southwesterly, due to the Nova Scotia current (formed by the Labrador Current and outflow from the Gulf of St. Lawrence) and a shelf edge current (Breeze et al 2002). Southwesterly flow continues to Georges Bank and beyond. Tidal currents are significant particularly around banks on the Scotian Shelf. Available information suggests that both Browns Bank and Georges Bank are areas of gyre currents which may be important for retention of plankton, including larvae of macrofauna such as lobster. The Scotian shelf is also influenced by warm eddies from the Gulf Stream which bring warm, high-salinity water to the shelf. The resulting relatively warm water and limited variation between summer and winter (Breeze et al. 2002) may be reasons for the presence of lobster in the relatively deepwater areas in this fishery area. Variations in the inflow of warm deep water may influence the fishery, for example, the turning off of this deep water in 1999 resulted in lower temperatures and a decline in CPUE.

Based on information on environmental parameters, a habitat template of the Scotian Shelf and adjacent areas has been produced based on axes of stability (which generally increases with increasing water depth and decreasing current) and adversity (which generally increases with decreasing primary productivity and increasing temperature and salinity) (O'Boyle ed 2006). Habitat sensitivity would increase with decreasing stability and adversity. Based on this approach, habitats in the fishery area off southwest Nova Scotia and in Crowell Basin would be of relatively low sensitivity, while on the edges of Georges Bank and slopes of Browns Bank habitats would be of low to intermediate sensitivity.

Benthic invertebrate species and communities of the fishery area are known in general terms, with more detailed studies in a few areas. On the Scotian shelf, large parts of the deeper areas on sediments characteristic of the fishery operations have been reported to be inhabited by four main groups: echinoderms (brittle stars, sea stars, sea cucumbers, sea urchins), molluscs, annelid worms (sessile and mobile) and crustacea (Breeze et al 2002). Species within these groups are generally known (Breeze et al 2002). In areas of gravel sediment greater than 100 m depth on Brown's Bank, several community types have been identified based on underwater photography and relationships with sediment types, two characterised by *Terebratulina* (a brachiopod) and subcharacterised by high macrobenthos diversity and abundance, or by sponges; a deposit-feeder community with high abundance of polychaetes was also identified in these areas (Kostylev et al 2001). Within the general picture of gravel-sand-mud sediments with the above epifauna and infauna, areas are known (and others could occur) where erect sessile fauna occur, providing greater habitat and community complexity, and with greater sensitivity to impacts from bottom fishing gear. Sea pens, sponges, tunicates and corals have been recorded in publications on invertebrate fauna (Breeze et al 2002). Ecologically and biologically sensitive areas (EBSAs) with concentrations of corals (northeast channel), tube worms (northern edge of Georges Bank) and a variety of sessile invertebrates (Jordan

Basin) have been identified in an expert consultation (Horsman and Doherty 2007). Corals, including hard corals, octocorals (sea fans, sea whips, sea pens and gorgonians) and soft corals, are found in the Scotian Shelf/Gulf of Maine area, particularly on hard bottom areas along the shelf edge (gulleys and canyons) and probably in other areas where hard bottom allows their establishment (soft corals may also occur on soft bottoms) (DFO 2006). A Coral Conservation Area has been closed to fishing in the northeast channel and a coral conservation plan has been developed for the Scotian shelf (DFO 2006).

7.2 Lobster in the ecosystem

Lobsters inhabit planktonic and benthic habitats during their life cycle. Larvae released from eggs carried by the females are planktonic for 1-2 months, and juveniles are highly dependent on shelter for the first months of benthic life. With increasing size, lobsters become less shelter-dependent and more mobile.

Although studies of trophic relationships of lobster have not been conducted in the fishery area, these are relatively well known from studies in other areas. Very young shelter-dwelling juveniles may be suspension feeders, and suspension feeding may continue with growth (Lawton and Lavalli 1995) but suspension feeding has been found not to be important in one detailed study (Sainte-Marie and Chabot 2001). Juveniles and adults generally prey on the same species, but proportions change with growth: a wide variety of prey items has been reported including gastropods, crabs, polychaetes, fish, echinoderms and other benthic invertebrates (Lawton and Lavalli 1995). Unidentified flesh may be important in the diet, which may come from dead fish, trap bait, or live-captured fish (Lawton and Lavalli 1995, Sainte-Marie and Chabot 2001). Lobsters may also consume plant material (Lawton and Lavalli 1995). Diet may vary seasonally, with the moult cycle (higher calcium prey may be sought after the moult) and area. Earlier reports that lobsters are scavengers, unspecialised feeders or opportunistic omnivores appear unsupported based on recent studies which suggest that lobsters are selective feeders. Crab may be a particularly important part of the diet because of its high protein content, and was found to be a high proportion of the diet, particularly of adults, in one study in eastern Canada (Sainte-Marie and Chabot 2001). Juvenile lobsters are preyed on by a variety of inshore species including crabs (Cancer), sculpins, flounders, cunners and other lobsters, and predation is particularly concentrated on shelter-dwelling juveniles and in the period after moulting (Lawton and Lavalli 1995). Commercial groundfish (for example cod, pollock) have been reported to prey on lobsters but there is little support for this (Lawton and Lavalli 1995). Rates of predation decrease with growth and it appears that adult lobsters are not a significant prey species (Lawton and Lavalli 1995).

Northwest Atlantic lobster populations have undergone a substantial increase in abundance since the 1980s, apparently as a result of environmental changes, but the relationships of abundance to environmental conditions are not understood. Predation release with decline in groundfish populations at the end of the 20th century is one hypothesis to explain the increase in lobster, but this has not been demonstrated clearly. Fishery production throughout the northwest Atlantic remains very high relative to conditions from about 1920-1980, despite very high fishing pressure, suggesting that productivity of lobster populations is elevated relative to conditions which prevailed during most of the 20th century.

7.3 Protected, endangered and threatened species

Canada's *Species at Risk Act* (SARA) was enacted in 2003 with the purpose of protecting wildlife at risk and ensuring its recovery. Species of concern are evaluated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Species assessed by COSEWIC are eligible for listing on SARA Schedule 1 under one of the following categories: extinct, extirpated, endangered, threatened, or, of special concern. It then qualifies for legal protection under SARA and a recovery strategy is implemented.

Three identified protected, endangered or threatened species may interact with offshore lobster fisheries, the North Atlantic right whale (Endangered), the northern bottlenose whale, Scotian Shelf population (Endangered) and the leatherback turtle (Endangered), all of which are included on Schedule 1 of Canada's *Species at Risk Act* (SARA). For all three species, entanglement in fishing gear is one of the principal identified threats.

North Atlantic right whales are present in a single population which moves seasonally between Canada and the USA, and are at a critically low level of abundance. The Scotian Shelf population of northern bottlenose whale is concentrated at the Gulley and other canyons at the edge of the Scotian Shelf to the north of the fishery area, and individuals have occasionally been reported at the shelf edge near the fishery area (Wimmer and Whitehead 2004). Leatherback turtle exists in a single north Atlantic population which migrates seasonally between Canadian waters and waters to the south (Leatherback Turtle Recovery Team 2006).

Right whales are known to have been entangled in lobster fishing gear (NMFS 2009), and entanglement in fishing gear is one of the principal identified threats to survival of the species (Brown et al. 2008; DFO 2007). Entanglement in lobster gear has not been reported for leatherback turtle or northern bottlenose whale but is possible. Leatherback turtle has been reported as entangled in other kinds of coastal and pelagic fishing gear (Leatherback Turtle Recovery Team 2006). Fishing gear entanglement is a recognised threat for northern bottlenose whale, and many individuals of the Scotian Shelf population show signs of encounters with fishing gear (COSEWIC 2002).

For each species, the team attempted to assess risks from the offshore lobster fishery relative to the total threat environment, given available information. The assessment considered risk factors, mitigating factors, the state of information, and potential modifications to fishing practices which would be required if risks were deemed to be unacceptably high under the current conditions. Overlap of the distribution of the species with the fishery and the mode of operation of the fishery are key issues in assessing risks. Final results with respect to scoring the fishery are contained in the scoring table and text but an overall description of the risk assessment is provided below for each species.

Right whale

The situation of the North Atlantic right whale is of particular concern because of the critically endangered level of the population and the fact that any increase in mortality could prejudice survival of the species.

With respect to risk factors, entanglement in fishing gear is a documented threat to this species and a high proportion of individuals in the population show signs of past entanglements (NMFS 2009). Ship strikes are the other principal identified threat (DFO 2007). The population is extremely small relative to historic levels and has not shown signs of recovery despite many years of protection efforts. There is some overlap between the distribution of the species and the distribution of the fishery both in time and in space. Areas of concentration are adjacent to the fishery area, in the mouth of the Bay of Fundy and in Roseway Basin, and right whales move between these areas particularly during the summer months. In the winter an area of concentration has recently been discovered in the Jordan Basin off the northeast USA, again relatively close to the fishery area. Right whales have been recorded to move through the fishery area in a study of individuals satellite tagged in the area of concentration in the mouth of the Bay of Fundy (Baumgartner and Mate 2005), while passive acoustic observations have shown right whales to be present on the Scotian Shelf from July to December (Mellinger et al 2007). In the Baumgartner and Mate (2005) study, of 18 whales tagged in the mouth of the Bay of Fundy which could be followed for more than 6 days, 4 individuals transited the area categorised as Brown's Bank, for a total of 6 occurrences, while for Georges Bank a single individual showed 4 occurrences. The tagged whales tended to show high site fidelity to the mouth of the Bay of Fundy and to move through other areas visited. Average speed of movement was 79 km/day. While information is limited, based on existing observations, the assessment team believes right whales could be present in the fishery area at any time during the year and there is some risk of entanglement in the gear used in this fishery.

Several mitigating factors are in operation which suggested to the team that risks posed by this fishery were relatively low in the context of the overall threat environment. With respect to overlap in distribution of right whales and the fishery, the fishery does not operate in an area of concentration of right whales, although it is near such areas. Current knowledge indicates that right whales congregate in two areas in Canada, the mouth of the Bay of Fundy and the Roseway Basin (Brown et al. 2008; Johnston et al 2007). Seasonal distributions of right whales and of the fishing gear are such as to reduce overlap. Available sightings information (see figures 11 and 12 below and note comments on

limitations of this information) indicates that right whales are most abundant in Canadian waters from June to November. The offshore lobster fishery does not operate during the months of July-September, the period of maximum occurrence of right whales in Canadian waters; at this time, although traps and groundlines are left in the water, endlines are removed and gear is not hauled.

The fishery operates such as to reduce risks from entanglement in endlines and groundlines. Long strings of traps are used (ca. 100 per string) with two endlines per string, such that a maximum of some 240 endlines would be in the water over the entire fishery area at any time (12,000 traps used, in strings of 100 traps, with two endlines per string). In most lobster fisheries the proportion of endlines to traps is much higher. Groundlines are of neutrally buoyant rope such that floating loops of groundline (which would increase risk of entanglement) do not occur. Groundlines have been observed from submersibles and found to be lying flat on the bottom (D. Pezzack, pers. comm.).

The team was advised that there have been no entanglements of this species observed by fishermen in the offshore lobster fishery. This does not mean that such entanglements have not occurred, since unobserved entanglements could have occurred, but provides useful information for assessing risk of entanglement.

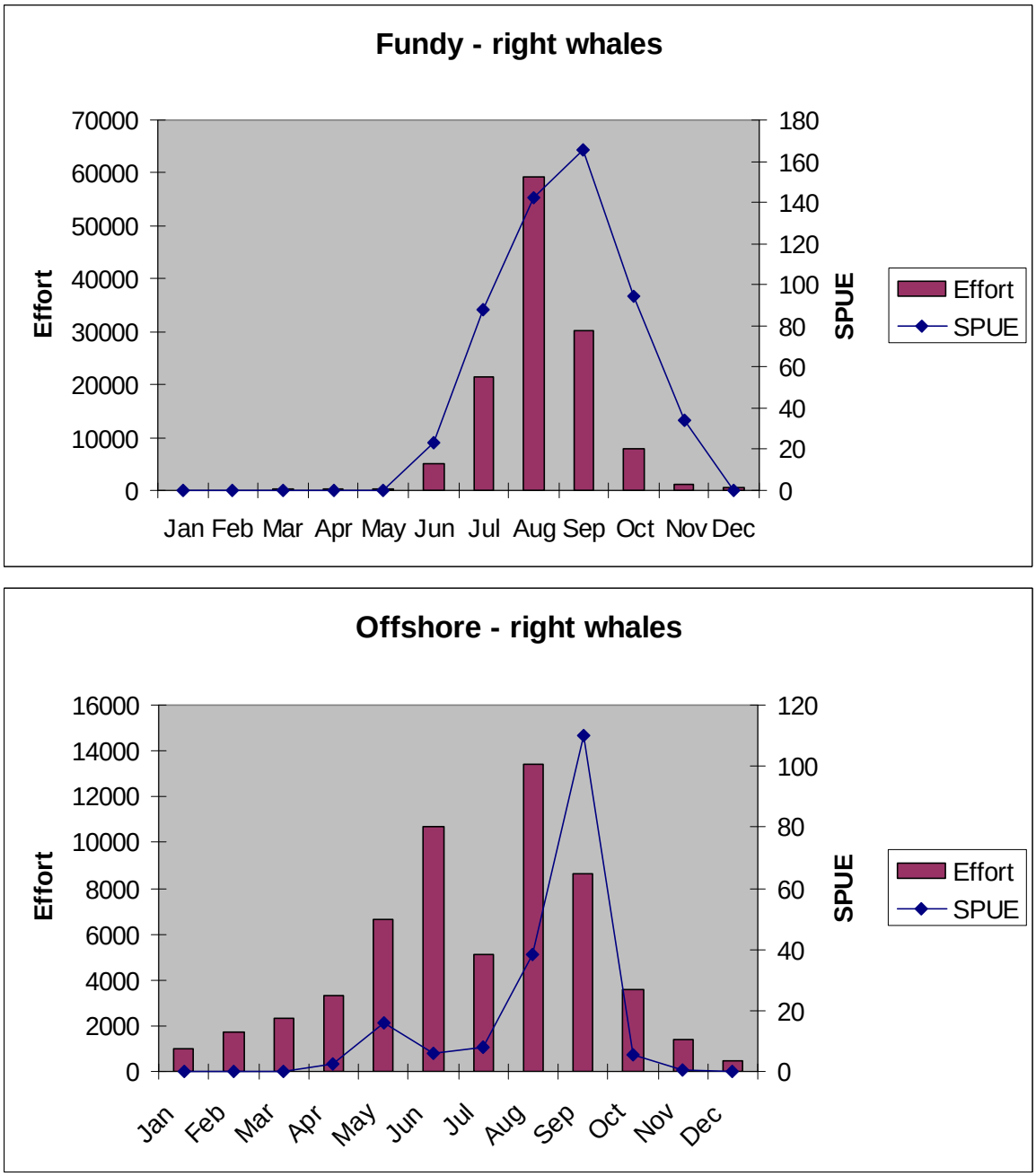
With respect to the overall threat environment for right whales, entanglement in fishing gear and ship strikes are identified as the principal threats (Brown et al 2008; DFO 2007). Lobster gear in inshore and midshore areas near the Bay of Fundy in Canada (although these operate in November to April, outside the season of concentration of right whales in Canada), and in inshore, midshore and offshore areas of the USA are other sources of potential entanglement, as are anchored gear of other types such as bottom longlines and anchored gillnets (Johnston et al 2007) in Canada and the USA. Ship strikes off Canada and the USA are a potential threat. A Canadian recovery strategy has been developed (Brown et al 2008) and specific measures to reduce ship strikes in the Bay of Fundy have been taken; however no specific measures to regulate fishing activities to reduce whale entanglement risk are yet in place. Mandatory measures to reduce ship strike and fishery threats have been put in place in the USA under the US Take Reduction Team (NMFS 2009).

With respect to the quality of information for assessment of risks, the information on seasonal and areal distribution and abundance in the fishery area is considered poor due to the lack of survey effort in this area. Surveys for right whales tend to focus on areas of known concentration of the whales, for example in the mouth of the Bay of Fundy and in Roseway Basin, so observations in the fishery area are relatively rare. The “offshore” area for which observations are shown in Figure 11 partly overlaps with the fishery area but does not provide detailed information on the fishery area, and the level of effort is much lower than in the Bay of Fundy (note difference in scales in the two parts of Figure 11). Sighting effort is strongly biased to seasons when right whales concentrate in Canada (red bars in Figure 11). As noted in the caption to Figure 11, raw sightings data from the NARWC database are not effort-corrected; distribution patterns based on these data are likely to be biased by where and when surveys were conducted. It is known that right whales transit the fishery area (Baumgartner and Mate 2005).

Although information is poor in the fishery area, good information is available on the general patterns of seasonal and areal distribution and abundance of right whales in Canada.

To summarise, entanglement of right whales in gear of the offshore lobster fishery is possible and any such entanglement would represent a threat to this critically endangered population. Risks from this fishery appear to be low in the context of the overall threat environment, particularly because of the low number of endlines in the water (ca 240) relative to the total vertical lines used by fisheries operating in the area of distribution of right whale (tens to hundreds of thousands), and because of the seasonal and areal distribution of the fishery. Information on presence and abundance of right whales in the fishery area is sparse, and new information on movement patterns and areas of concentration continues to come to light, although good information on areas of concentration is available.

Figure 11. Seasonal pattern in right whale sighting survey effort ("Effort") and sightings per unit effort ("SPUE") in two Canadian areas where this species occurs. "Fundy" is the mouth of the Bay of Fundy. "Offshore" is off southwest Nova Scotia and partially overlaps the fishery area.



Source: data provided by North Atlantic Right Whale Consortium (NARWC). Raw sightings data from the NARWC database are not effort-corrected; distribution patterns based on these data are likely to be biased by where and when, surveys were conducted.

Northern bottlenose whale (Scotian Shelf population)

Fishing gear entanglement is a recognised threat for northern bottlenose whale, and many individuals of the Scotian Shelf population show signs of encounters with fishing gear (COSEWIC 2002). There are several recorded observations of northern bottlenose whales in the fishery area, but this species concentrates in canyon areas further east on the Scotian Shelf (Wimmer and Whitehead 2004). The

mode of operation of the fishery (as above; limited number of endlines, neutrally buoyant groundline) may be such as to reduce risk of entanglement but no risk assessment is possible in the absence of more detailed information.

Leatherback turtle

Entanglement in fishing gear is the main identified threat, both in pelagic longline gear along the edge of the Scotian Shelf and further offshore, and in coastal fishing gear (Leatherback Turtle Recovery Team 2006). There is apparently no information on distribution of leatherback turtles in the fishery area, although the species is present on the Scotian Shelf and in coastal waters of Nova Scotia and New Brunswick. Leatherback turtles are most abundant in Canadian waters in summer months, to which they seasonally migrate, when the lobster fishery does not operate (LTRT 2006). As above, relatively low number of endlines and neutrally buoyant groundlines may be aspects of the gear operation which would reduce threats. However in the absence of information, no risk assessment for this fishery is possible.

7.4 Depleted species

Depleted species identified in this assessment, which interact with this fishery, are cusk and Atlantic cod. Cusk have been assessed by COSEWIC as Threatened and are a candidate for SARA Schedule 1. Atlantic cod (Maritimes population) are currently at low abundance relative to historical levels and continue to decline. Cusk bycatch has been estimated at 22 t/yr, compared to bycatches of 800-1500 t/yr in groundfish fisheries and 225 t/yr of bycatch in inshore lobster fisheries; total removals lower than these levels would be required to ensure rebuilding of the population (DFO 2008), but in general the removals in the offshore lobster fishery are small compared to other sources of mortality. The amount of Atlantic cod taken in the fishery has been estimated at 2.8 tons during 81 observed trips from 1988 to 2008 (Pezzack et al 2009), which would be equivalent to some 34 kg per trip. Total landings of Atlantic cod off Nova Scotia from all fisheries have been several thousand tons in recent years, so as with cusk, the offshore lobster fishery would be contributing a small proportion of total mortality.

Other whale species occur on the Scotian shelf and in the Gulf of Maine, which could potentially interact with the fishery, but these are either not considered depleted or are little known in the fishery area. Humpback whales are assessed by COSEWIC as Not at Risk in Canada, but are considered at risk in adjacent waters of the USA and can be entangled in fishing gear. Little is known of other whale species which might occur in the fishery area: fin whale (Special Concern), sperm whale (Not at Risk), blue whale (Endangered), minke whale (not assessed by COSEWIC).

7.5 Bycatch and discarding

Bycatch in the offshore lobster fishery has been estimated from observed trips undertaken between 1988 and 2008 (Pezzack et al 2009). Bycatch was recorded for 18 trips in 13 years during this period. Bycatch observations have been made annually since 1999 and during 3 years prior to that. On average 6 trips were observed per year, varying from 2 to 9 trips per year.

The analysis provided by Pezzack et al (2009) does not include lobster discards (undersize or berried female) or Jonah crab bycatch and discards which are covered in the Jonah crab assessment (DFO 2009jc).

Jonah crab are considered “bycatch” in this assessment; although they have been retained through much of the history of this fishery, they are not part of the unit of certification. Jonah crab abundance has declined since the 1990s and are currently at very low levels (DFO 2009jc). Fishing regulations for Jonah crab include a requirement to discard all females, and a minimum size limit of 130 mm for males (DFO 2009jc). Size at 50% maturity for males has recently been estimated at 128 mm (formerly estimated at 110 mm). The regulations should have the effect of at least partially protecting reproduction since harvesting of females and some mature males is prohibited. All Jonah crabs taken in this fishery are currently discarded due to low market demand and survival is expected to be high. Although Jonah crab were not identified as a depleted species for the purposes of this assessment, the current low abundance of the harvested fraction (large males) following a period of fishing appears to

be a cause for concern.

Discard survival of Jonah crab is expected to be relatively high, based on good survival of similar Cancer crabs in tagging programs (Fahy et al 2004). Discard survival of cod and cusk is unknown but probably relatively low.

Both invertebrates and finfish are taken as bycatch and discarded (Pezzack et al 2009). The principal invertebrate species taken is Atlantic rock crab, 33.2% by weight of all bycatch and with an estimated weight of 4.0 t over the 81 trips observed for an average of 0.05t per trip. Very low amounts (approximately 136 kg) of other crab species e.g. red deepsea crab and northern stone crab, were caught taken in the 81 trips. Starfish and molluscs were also taken in very low quantities.

All rock crab taken as bycatch are discarded and survival is expected to be high.

The principal finfish species taken is cusk, with an estimated weight of 20.4 t in the 81 trips (an estimate of annual catch of 22 t/yr is provided above, from a different analysis). Cod (2.8 t in 81 trips), red hake (2.3 t), unspecified hakes (1.9 t), white hake (1.6 t), spiny dogfish (0.6 t), haddock (0.2 t) and redfish (0.2 t) are next in order of importance. Over 20 other finfish species have been taken occasionally as bycatch. Overall, it appears that finfish bycatch is low in this fishery.

Discard mortality rate for finfish taken as bycatch in this fishery is unknown but would likely be higher than for invertebrates.

7.6 Other fisheries relevant to this assessment

Intensive fisheries for lobster occur in inshore and mid-shore (out to 50 nm) waters off southwestern Nova Scotia. Lobster throughout the Gulf of Maine/Scotian shelf area probably form a metapopulation, so the fishery being assessed is exploiting part of a larger population entity. Mid-shore and offshore fisheries exploit adjacent grounds along the 50 nm line off southwest Nova Scotia at certain seasons.

No other fisheries exploit lobster in this area. There may be limited bycatch in mobile gear (trawl) fisheries for groundfish but by regulation this cannot be retained.

8 STANDARD USED

The MSC Principles and Criteria for Sustainable Fisheries form the standard against which the fishery is assessed and are organised in terms of three principles. Principle 1 addresses the need to maintain the target stock at a sustainable level; Principle 2 addresses the need to maintain the ecosystem in which the target stock exists, and Principle 3 addresses the need for an effective fishery management system to fulfil Principles 1 and 2 and ensure compliance with national and international regulations. The Principles and their supporting Criteria are presented below.

8.1 Principle 1

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery. [1]**:**

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

Criteria:

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

8.2 Principle 2

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

Criteria:

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.

2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.

3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

[1] The sequence in which the Principles and Criteria appear does not represent a ranking of their significance, but is rather intended to provide a logical guide to certifiers when assessing a fishery. The criteria by which the MSC Principles will be implemented will be reviewed and revised as appropriate in light of relevant new information, technologies and additional consultations

8.3 Principle 3

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

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

A. Management System Criteria:

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

The management system shall:

2. Demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishing-dependent communities shall be addressed as part of this process.

3. Be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings.

4. Observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability.

5. Incorporates an appropriate mechanism for the resolution of disputes arising within the system[2].

6. Provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing.

7. Act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty.

8. Incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion.

9. Require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted.

10. Specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:

    a) setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;

[2] Outstanding disputes of substantial magnitude involving a significant number of interests will normally disqualify a fishery from certification.

b) identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
c) providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;
d) mechanisms in place to limit or close fisheries when designated catch limits are reached;
e) establishing no-take zones where appropriate.

11. Contains appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

B. Operational Criteria

Fishing operation shall:

12. Make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive.

13. Implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas.

14. Not use destructive fishing practices such as fishing with poisons or explosives;

15. Minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch etc.

16. Be conducted in compliance with the fishery management system and all legal and administrative requirements.

17. Assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

9 BACKGROUND TO THE EVALUATION

9.1 Evaluation Team

Lead Assessor: Paul Knapman - Paul is a lead assessor with Moody Marine and is responsible for Moody Marine operations in North America. He has extensive experience of the fishing industry in North America and Europe. He was previously Head of an inshore fisheries management organisation, a senior policy advisor to the UK government on fisheries and environmental issues, a fisheries officer and a fisheries consultant working in Europe and Canada.

Expert Advisor (Principle 1): Dr Colin Bannister - Colin is the former Head of the Shellfish Resource Group at Lowestoft in the UK and from 2001 until retirement in 2004 was the Senior Fisheries Science Advisor at the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) providing high level advice to the UK government's Department of Environment, Food and Rural Affairs (DEFRA) and the fishing industry on all aspects of the assessment and management of finfish stocks. He has extensive knowledge and experience of the management of wild shellfish stocks, both crustacean and molluscan, and of scientific research and advice on the same, including detailed studies on lobster stock enhancement. He has been a scientific member of the Canadian Review Panel for the Snow Crab fishery in the Gulf Region of Canada, and is a member of the Committees and Council of the Shellfish Association of Great Britain. In 2006 he completed a report "Towards a Development Strategy for the Shellfish Industry in England" for the DEFRA Inshore Group, summarising the state of the shellfish stocks, their assessment and management needs, and the scope for development of new fisheries. He has participated in three other accreditation assessments.

Expert advisor (Principle 2): Dr Howard Powles - Howard has worked in fishery science, stock assessment, and conservation and management of fishery resources since the mid-1960's, as a working scientist, science manager, program manager, and consultant, with a recurrent focus on crustacean resources. His M. Sc. thesis (1966) was on distribution and biology of snow crab in the southern Gulf of St. Lawrence in relation to a rapidly-developing fishery for this species. During the early 1990s he worked with the FRCC lobster team as principal DFO scientific contact and contributed to the FRCC (1995) review of lobster conservation. Following this he worked closely with DFO Fisheries Management to implement FRCC recommendations and coordinated an Atlantic-wide program of research to fill in knowledge gaps identified in the FRCC study. As Director of Fisheries Science and of Biodiversity Science (1998-2004) at DFO, Howard was active in developing ecosystem-based approaches to ocean management, in particular approaches based on defining ecosystem objectives and indicators, and led DFO's activities related to the new *Species at Risk Act*.

Expert Advisor (Principle 3): 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. He served as Executive Director of the Canadian Association of Prawn Producers, a trade association representing offshore northern shrimp interests in Eastern Canada until 2004. He has extensive experience in the development of integrated resource management plans and fishing strategies as well as a background in Canadian fisheries law and is currently a member of the Fisheries Resource Conservation Council (FRCC), an independent advisory body to the Canadian Minister of Fisheries and Oceans.

9.2 Previous certification evaluations

The fishery has not been previously assessed against the MSC standard.

9.3 Fishery site visit

The site visit focused on the practicalities of fishing operations, the impact of the gear on seabed habitat, communities and other commercial species, the mechanisms and effectiveness of management agencies and the scientific assessment of the fishery.

Meetings were held as follows. Some of the key issues discussed have been identified for each meeting.

Table 3. A list of individuals and/or organisations that were interviewed or provided information in the course of the site visit to the fishery.

Name	Affiliation	Date	Key Issues
Brian Giroux	Scotia Fundy Mobile Gear Fishermen's Association	22/01/09	Bycatch of groundfish, trap limits, gear conflicts, ghost fishing
Rob Johnson, Susanna Fuller	Ecology Action Centre (EAC)	22/01/09	Habitat and species interactions, observer coverage, transparency, protected species
Tonya Wimmer Sean Brilliant Bob Rangely	World Wildlife Fund (WWF)	22/01/09	Habitat, bycatch, entanglement, transparency, protected species, marine spatial planning
Chris Taggart Angelia Vanderlaan	Dalhousie University	22/01/09	Whale distribution, information sources, entanglement
Sharon Young	US Humane Society	22/01/09	Entanglement, protected species
Vicki Cornish, Susan Little-Olcott	Ocean Conservancy	22/01/09	Entanglement, protected species
Jooke Robbins	Provincetown Center for Coastal Studies	22/01/09	Entanglement, protected species
Regina Asmutis Silvia	Whale and Dolphin Conservation Society	22/01/09	Entanglement, protected species
Moe Brown	New England Aquarium & Canadian Whale Institute.	22/01/09	Entanglement, protected species
Kerri Graham	DFO, Policy and Economic Branch	20/01/09	Fisheries management & science, environmental interactions, operational aspects.
Chris Jones	DFO, Manager Invertebrate Fisheries	20/01/09	Fisheries management & science, environmental interactions, operational aspects.
John Tremblay	DFO, Inshore and Offshore Lobster Biologist	20/01/09	Fisheries management & science, environmental interactions, operational aspects.
Melanie MacLean	DFO, Coastal Management Coordinator	20/01/09	Fisheries management & science, environmental interactions, operational aspects.
Doug Pezzack	DFO, Inshore and Offshore Lobster Biologist	20/01/09	Fisheries management & science, environmental interactions, operational aspects.
Christine Penney Catherine Boyd	Clearwater Seafoods Limited Partnership	20 & 21 /01/09	Fisheries management & science, environmental interactions, operational aspects.
Jim Mosher		21/01/09	Fishery operation, management and gear /vessel operation
Doug Poole (Capt.)			
Randall Scott (Mate)			
Rick Haley (Shore manager)			

10 STAKEHOLDER CONSULTATION

10.1 Stakeholder consultation

A total of 23 stakeholders / groups/ organisations were identified and consulted specifically by Moody Marine in the course of the assessment. Information was also made publicly available at the following stages of the assessment:

Table 4. Stakeholder consultations held

Date	Purpose	Media
6th August 2008	Notification of confirmation of assessment	Direct E-mail/letter Notification on MSC website
1st November 2008	Notification of confirmation of assessment	Advertisement in press - November '08 edition of "The Navigator"
29th August 2008	Notification of Assessment Team nominees	Direct E-mail Notification on MSC website
18th September 2008	Confirmation of Assessment Team	Direct E-mail Notification on MSC website
29th September 2008	Consultation on draft Performance Indicators and Scoring Guideposts	Direct E-mail Notification on MSC website
6th November 2008	Release of final Performance Indicators and Scoring Guideposts	Direct E-mail Notification on MSC website
1st December 2008	Notification of assessment visit and call for meeting requests	Direct E-mail Notification on MSC website
19th - 23rd January 2009	Assessment visit	Meetings
10th November 2009	Notification of Proposed Peer Reviewers	Direct E-mail Notification on MSC website
13th January 2010	Notification of Public Comment Draft Report	Direct E-mail Notification on MSC website
TBC	Notification of Final Report	Direct E-mail Notification on MSC website

10.2 Stakeholder issues

Feedback from stakeholders has assisted in the selection of the assessment team and refinement of the Performance Indicators and Scoring Guideposts.

Stakeholder comments were also submitted in the course of the Public Comment Draft Report consultation. The following organisations submitted comments:

- New England Aquarium
- Ecology Action Centre
- The Humane Society of the United States
- The Whale and Dolphin Conservation Society

- WWF Canada
- Canadian Whale Institute

The key points from the stakeholder comments and the team's response is set out in the table below and the complete stakeholder submissions are presented in Appendix E.

Table 5. Stakeholder comments and assessment team response

Section of Report	Stakeholder comment	Response
Introduction	The area is data poor for right whale distribution and seasonality.	The draft report indicated that "specific information on the latter *(i.e. whale routes)* is poor for the offshore areas". The assessment team have attempted to make the wording in the introduction more precise, confirming that information in the fishery area is sparse.
Introduction	Baumgartner and Mace 2005 data have not been included in the report	The assessment team have now included information from this publication in the report. The information confirms the NARWC sightings information provided in the draft, indicating that right whales may occur in the fishery area during summer and fall.
Introduction	More information is needed on the details of how this fishery is prosecuted to properly assess the level of entanglement potential. Specific detail was requested on: • specific gravity of groundline • diameter and breaking strength of lines used • any weak links used? • how gear is stored during the off season (July-September)	A detailed description of how the fishery operates was provided in the draft report (p. 26). Information on specific requests has been added, where available. No weak links are used in the gear and we do not have information on breaking strength or specific gravity.
Introduction	There are right whales in the vicinity south of Nova Scotia through December as demonstrated by Mellinger et al 2007.	The assessment team has included the information from Mellinger et al 2007 in the report. This information confirms the statement in the draft report (p 40) "a risk of entanglement remains since both species *(i.e. right whales and leatherback turtles)* have been recorded throughout the year in Canadian waters, and could occur in the offshore lobster fishery area." The potential for these species to be present in the fishery area throughout the year has been clarified in the report.
Introduction	In at least November through January, it is possible that there are right whales in the area of the fishery migrating between Roseway Basin and Jordan Basin.	Confirms the statement from the draft report, cited above, that right whales may be present in the fishery area at any time of year. Report redrafted to address this.
Introduction	There is no recognition of possible entanglement impacts on endangered right whales	No entanglements of right whales have been reported by fishermen or observers in this fishery and this has been clarified in the report; however as noted in the report this does not mean that no entanglements have occurred.

Section of Report	Stakeholder comment	Response
		The report notes that entanglement is a key source of mortality for whales and that entanglement in this fishery is possible, although the assessment team have assessed the risk from this fishery low in the context of the overall threat environment. Measures to report on and mitigate impacts are to be developed under Conditions 3 and 4.
Conditions	It is not clear why the issue of right whale entanglement has not been given greater considerations in the Client Action Plan	The team reconsidered this issue in light of stakeholder comments and made a number of changes, including providing more detail on the basis for its risk assessment, reducing scores on two PIs, and expanding the scope of conditions. A condition (3) to report on entanglements of marine mammals is included (this has been changed from the Public Comment Draft Report, where the condition was to report mortalities of protected, endangered and threatened species). A condition (4) to include explicit management strategies to detect and reduce ecosystem impacts is also included. This includes impacts on PET species and has been amended from the Public Comment Draft report.
Introduction	The Department of Fisheries and Oceans does not have any activities ongoing in the area of this fishery to reduce the risk of entanglement of right whales. To date, DFO has not initiated an Action Plan on the issue, as required under SARA.	Condition 4 recommends that the client work with others under the framework of the Canadian Recovery Strategy to implement the conditions .
Introduction	Survey effort for right whales in areas south of Nova Scotia is not regular, in many years there has been no survey effort at all in the Roseway Basin Critical Habitat.	In the draft report, a caveat was placed with the figures on right whale SPUE that sightings data were likely to be biased by effort distribution. Further clarification on the weaknesses in the sightings information has been added to the text.
Introduction	The potential effects of this fishery on right whale entanglement are not well estimated by even the most basic standards. Low density of endlines does not preclude an entanglement risk. The absence of endlines would eliminate risk of entanglement of right whales in that segment of the gear. The certification body and Clearwater should not assume that risk of entanglement is minimal.	The assessment team consider that the risk of entanglement in this fishery has been weighed appropriately, using the available information, including consideration of the weaknesses in the information. The team found the risks posed by this fishery to be relatively low, in the context of the overall threat environment and recognises that the risks are not zero.
Conditions	Request the client incorporate into their fishing practices the recommended measures for addressing the threat of	This would refer to Objective 2 (relative to entanglement in fishing gear), pp 34-35 in the Recovery Strategy, and its related strategies. The

Section of Report	Stakeholder comment	Response
	entanglement to right whales *(referring to the Right Whale Recovery Strategy).*	assessment team have amended Condition 4 to recommend that action be taken within the context of the Right hale Recovery Strategy.
General	Recommended action for Client. A number of recommendations were provided by a stakeholder group which would help to improve information and further reduce risks, including having crews and observers record marine mammal sightings, familiarising crews with disentanglement procedures, ensuring that sinking groundline is used, eliminating endlines using new technology, supporting systematic marine mammal surveys and encouraging DFO to become more involved and provide resources to industry to switch to gear that is less likely to cause entanglements. The commenter expresses willingness to work with Clearwater to develop fishing practices to mitigate entanglement impact.	As noted above, the team believe that the two conditions to certification deal with the level of risk of this fishery to right whales and other marine mammals. The team encourage the client to consider the recommendations on how to achieve the Conditions, however, MSC guidance requires that Conditions are not too prescriptive but should follow the narrative or metric of the PI and SG.
Section 7.5	*Jonah crab the most notable bycatch:* we do not believe the statement adequately reflects the impact of the fishery on endangered and/or protected species including large whales. We are confused as to why, on page 39, the document states that there is no indication that right whales have been entangled in the "offshore area" when this is far from clear	Jonah crab is the most notable bycatch species. PET species are dealt with in a separate section (7.3) and in the context of this fishery are not considered to be a bycatch species. Fishermen and observers report no entanglements. This does not mean there has never been an entanglement; it could have happened and not been observed by fishermen. We have clarified this in the text.
Reviewer comments	Some comments by reviewers are critiqued	The assessment team have focused their response on clearly defined comments related to the assessment.
Section 7.3	The risk to other species, specifically humpback whale, which is listed in the USA,, should not be discounted simply because they are not listed under Canada's Species at Risk Act. Since the majority of consumers are US citizens, they should not be misled by an "eco-certification" label that disregards the risk to listed US endangered species.	The MSC standard requires an assessment team to assess interactions with species listed under the national legislation under which the fishery operates, in this instance, Canada (Section 7.1.1 of the MSC Fisheries Assessment Methodology states that endangered, threatened or protected (ETP) species are, "...those that are recognised by national legislation and/or binding international agreements (e.g. CITES) to which the jurisdictions controlling the fishery under assessment are party.") The measures outlined in the conditions would reduce entanglement risks to other species in addition to PET species listed in Canada.

Section of Report	Stakeholder comment	Response
Section 7.3	The limited sightings data available for area 41 should not be considered an adequate basis for concluding that right whale distribution does not overlap the fishery effort. Additional sightings data from OBIS indicate that large baleen whales, including North Atlantic right whales, are found in the area *(a map from OBIS was provided)*.	Additional information on passive acoustic observations (Mellinger et al 2007) and satellite tags (Baumgartner and Mace 2005) was communicated by M. Brown of New England Aquarium and has been included in the report. The assessment team do not argue that there is no overlap between the fishery area and baleen whales; there is certainly a potential for some overlap. The team's risk assessment indicates that the overlaps are reduced by seasonal and spatial distribution and that risks of interaction are relatively low.
Section 3.5.1	Additional measures to reduce entanglement risk are available but are not mandated Is "non-floating" line neutrally buoyant or sinking? There is no requirement to use sinking groundline or weak-links as in the US lobster fisheries.	Further information on line used has been included in the report. There is some discussion on the efficacy of sinking groundlines and weak links in the US fishery. Sinking groundlines in this fishery could increase risk of impact on bottom communities. The Right Whale Recovery Strategy for Canada does not mandate specific gear adaptations. A condition (4) has been set to require explicit strategies to address ecosystem impacts of the fishery, including impacts on PET species, which should help ensure that appropriate measures are taken.
PET species	The threat to the critically endangered right whale... must (be) given precedence over the management of the target species or any fish bycatch.	The MSC methodology weights the relative merits of such issues based on the scores given in the PIs.
Section 7.3	This assessment (that the fishery poses a low risk to North Atlantic right whale) does not appear to take into consideration the movements of animals between critical habitats, nor that the animals can be in Canadian waters in May, June, October and November	The assessment team do not mean to imply that right whales would not be in the fishery area at any given time; clearly, they could be in the fishery area throughout the year (as indicated on p. 40 of the draft report). However fishery times and areas do not overlap with known areas of concentration of right whales. The wording on distribution of right whales in the report has been clarified and additional information provided by New England Aquarium added.
Section 7.3	There is new information regarding distribution and movements of North Atlantic right whales... Maps from modelling work by Sean Brillant were provided	The team was grateful to see this work in progress. At the time of writing, this was considered preliminary. The work confirms that right whale distribution and movements could overlap with gear in this fishery during the second half of the year. Our impression is that this work does not indicate a higher risk of entanglement than we had considered being likely. Certified fisheries are subject to annual surveillance audits. If new information comes to light about the

Section of Report	Stakeholder comment	Response
		fishery it will be taken into account in the course of these audits.
Section 7.3	One of the reasons this fishery is considered a low risk to entangling right whales is because gear from the offshore lobster fishery has not been identified on entangled whales.	The assessment team did not mean to imply this, the team are well aware of the difficulties of tracing gear entangled on right whales to source. The basis for the statement was that no fishermen in this fishery have ever reported an entanglement. This has been clarified in the report, and we indicate that this does not mean that there has never been an entanglement, since unobserved entanglements could have occurred.
	There needs to be better reporting of incidents ... and participation of industry in the identification of gear which has been involved in entanglements.	Condition 3 has been reworded to require reporting of entanglements rather than mortalities. Gear labelling is obviously an important measure with respect to whale conservation. Putting this in place requires broad cooperation among lobster fishermen from all Atlantic areas in Canada and the USA. The team has made this a recommendation with respect to Condition 4.
PI 2.1.3.2	Ghost fishing – no consideration appeared to be given for elements of the gear which pose a risk such as ropes ... could pose a significant threat to marine mammals and sea turtles.	Effects of lost gear on marine mammal and turtle entanglements are considered to be low since all efforts are made to retrieve lost gear, and because line used is not buoyant
Conditions	This fishery does not have specific management measures in place to identify the impact of this fishery on marine mammals... nor have measures specifically meant to address/mitigate entanglements been developed or implemented	Condition 3, requiring reporting of entanglements, is intended to improve information on impacts. Condition 4, to include strategies to address ecosystem impacts on the management plan, is intended to address marine mammal interactions.
Conditions	Condition 3 states... requirement to record and report all incidental mortalities. It is crucial that all incidents involving these species be recorded and reported.	The Condition has been re-worded in this way.
Section 7.3	Northern bottlenose whale, Scotian Shelf population, should be considered a PET species, not a depleted species. There have been several sightings of this species in the vicinity of this fishery.	The report has been modified accordingly.
General	In order to determine the amount of observer coverage needed it is recommended that a power analysis be undertaken to estimate the number of trap hauls needed to accurately estimate bycatch in the lobster fishery.	Condition 1 highlights the need for the client to demonstrate the adequacy of the bycatch monitoring programmes. In-line with MSC guidance assessment teams cannot be so prescriptive that they tell clients how to meet the condition rather; clients have to demonstrate that they have taken actions that provide the required outcome. These will be the subject of review during annual surveillance audits if the fishery is successfully certified.
Conditions	Overall, the report gives a cursory view	Condition 1 highlights the need for the client to

Section of Report	Stakeholder comment	Response
	to addressing the impact of the lobster fishery on groundfish bycatch, particularly COSEWIC listed species (cod & cusk). Condition 3 states " The client is required to ensure that by the first annual audit there is a requirement to record and report all incidental mortalities of PET species." The client should be required to report all incidental catches of all bycatch species, in addition to PET species which should include COSEWIC listed species. Recording mortalities is not an accurate assessment of bycatch nor of ecosystem considerations, particularly as many mortalities occur when species are thrown back. Accurate estimates of mortality rates should be sought. Groundfish mortality in the lobster fishery should then be included as fishing mortality in the stock assessments for these species.	demonstrate the adequacy of monitoring non target species bycatch. With respect to including COSEWIC species as PET species, the MSC introduced their new Fisheries Assessment Methodology (FAM) version 1 on 22 July 2008 and subsequently issued a revised version on 31 July 2009. In Section 7.1.1 (c) of the new guidance it states that endangered, threatened or protected (ETP) species are, "...those that are recognised by national legislation and/or binding international agreements (e.g. CITES) to which the jurisdictions controlling the fishery under assessment are party." For this reason performance indicator 2.2.1.1 only applies to those species listed under Canadian legislation, i.e. the Species at Risk Act.
Section 7.5	Given that Jonah crab fishery is now a commercial fishery, all crab bycatch should be recorded, and mortality quantified for use in stock assessments.	Condition 1 highlights the need for the client to demonstrate the adequacy of the bycatch monitoring programmes. This includes Jonah crab.
Section 7.5	Following quantitative recording of bycatch of groundfish and Jonah crab, efforts should be made to experiment with gear modifications to reduce bycatch if necessary.	The team consider that this is implicit and if mitigation measures are necessary they will be reviewed in the annual audits.
Conditions	We recommend that one of the conditions be a reduction in the maximum size kept for both male and female lobsters. Lobsters in the Maine fishery must be thrown back if >5inches in carapace size. Given that LFA 41 has larger lobsters, some of which likely are a source of new recruits to the inshore fishery, precautionary size limits are advised.	The offshore lobster fishery, which has a low harvest rate and an acceptable pattern of exploitation, does not fail any PI that justifies or requires the Moody Assessment to specify a condition on maximum size limit. This is a matter for scientists and managers from DFO and the Atlantic States Marine Fisheries Commission, especially as the relationships between inshore and offshore lobster stocks in Canada and the USA are the subject of intense ongoing studies that are not yet conclusive.
Section 7.3	The suggestion that research done by the National Marine Fisheries Service (7.3.6) on whale entanglements in lobster gear in the offshore areas is not an issue of concern is misleading. The NMFS nor for that matter has the Department of Fisheries and Oceans has ever carried out any research in Atlantic Canadian waters in relation to the offshore lobster fishery and its impacts on endangered whale species.	It was not the intent to mislead. Section 7.3 has been amended.

Section of Report	Stakeholder comment	Response
Section 7.3	It is alluded to that the offshore lobster fishery will not overlap significantly with the seasonal presence of right whales in the areas of concern. This in some small way may be true, however this assumption is based on what?, there is a significant lack of research activity or information on which to base this claim. In fact right whales are known to be in the general area (Jordan Basin, Bay of Fundy) year round.	In light of further information provided to the team (Mellinger *et al* 2007) the potential for these species to be present in the fishery area throughout the year has been clarified in the report.
Section 3.5.1	It may be true that the fishery only occurs in the periods January through June and then from October to December, what is not mentioned however is that the gear remains in the water during the intervening period. The document suggests that by virtue of not fishing during the intervening period (July -Sept) the threat of entanglement is removed, however, by their own acknowledgement it would suggest that its is recognised that there is a potential threat of entanglement. Although not technically "fishing". the vertical and bottom lines still poses a major threat of entanglement to the survival of the right whale and to other marine mammals and sea turtles.	The report has been amended to confirm that the gear is stored at sea in the off season. The endlines are removed and as indicated the neutrally buoyant line has been observed as lying flat on the seabed thus reducing the potential for marine mammal and turtle entanglement.
Section 7.3	Reference is made in the document to the Humpback whale and its listed "Endangered" status in the United States as well as its presence in the US waters adjacent to LFA 41, although Humpback is not given the same protected status in Canada the potential for Humpback whales to become entangled in Canadian offshore gear should be recognized and given the same value and consideration in this report as that of the Right whale.	Section 7.3 has been amended and makes note of this potential.
General	There is no indication that the crews of these vessels have any knowledge of marine mammals or able to identify species. Although it is indicated in Clearwater Seafood's Client Action plan (Condition 3) that DFO will revise licence conditions and log books to accommodate recording PET interactions, there is no indication that Clearwater Seafood's is prepared to develop mitigation strategies to address the entanglement (i.e. gear research) and disentanglement issues either with	Condition 3 and 4 have been amended and take account of these points.

Section of Report	Stakeholder comment	Response
	DFO or any other non-government organization.	
	Throughout the report and in several elements of the scoring of Principle 2 (e.g. 2.1.1.2, 2.2.1.1, 2.2.1.2 and 2.2.1.3), it is reiterated that the offshore lobster fishery poses a low risk to NARWs because it is not conducted within the identified critical habitats or during the months of July to September and because offshore lobster fishing gear has not been identified on entangled right whales. This assessment does not appear to take into consideration the movements of these animals between these critical habitats, which have clearly been documented, nor that the animals can be in Canadian waters in May, June, October and November.	In light of further information provided to the team (Baumgartner and Mate 2005, Mellinger *et al* 2007) the potential for these species to be present in the fishery area throughout the year has been clarified in the report.
PI 2.1.4.5	Item 2.1.4.5 was given a score of 75 for having management strategies in place to address impact identification and avoidance/reduction. This seems inappropriately high. The lowest scoring criteria of 60 would be given for a fishery that has "management strategies that include some appropriate consideration of ecosystem impact identification and avoidance reduction but may not be tested." But it would seem that the fishery does not even meet this score for protected species interactions.	This PI is not specific to PET species but to ecosystem effects of the fishery as a whole. Thus the score is raised above the minimum score of 60. As indicated in the scoring rationale meeting the 80 scoring guideline requires that strategies be in place to detect and reduce ecosystem impacts of the fishery. Developing these would include consideration of the potential impacts of the fishery on the ecosystem and either identification of measures to address these or a determination that such measures were not necessary. This is set out in a revised Condition 3.
PI 2.2.1.1	Though the fishery was given a score of 90 on "information on presence and populations of PET species," and the assessment says that right whales are "regularly monitored," it also admits that sighting effort is concentrated where whales are already known to congregate so data "may not provide an unbiased picture of distribution." Indeed the score of 60 would not even seem to have been met, as that minimal score requires a "programme in place to identify [PET] species directly related to the fishery" and "periodic monitoring of the trends…"	The assessment team have reviewed the score for this PI and have amended it to 80. Populations of PET species have been clearly identified and they are regularly monitored.
PI 2.2.1.2	Item 2.2.1.2 scored 75. We believe that this too is inappropriate. Right whales potentially become entangled in areas of the fishery's operation (see comment on the entanglement of right whale #1424...) and entanglement in lobster	The assessment team consider their risk assessment is reasonable given the information available and its weaknesses. Two conditions, on improving reporting of interactions and on improving management strategies for ecosystem impacts, will help to improve information and reduce risks.

Section of Report	Stakeholder comment	Response
	gear, including offshore gear, is an important source of mortality. We vehemently disagree that the risk of entanglement low. At best it is unknown	
PI 2.2.1.3	Item 2.2.1.3 (p. 96) scored 80 (i.e., Direct and indirect effects are well estimated and do not threatened protected, endangered or threatened species). Though the assessment states that it is possible right whales could become entangled, the risk is considered low particularly relative to other types of coastal (trap/net) and offshore (longline) gear. In fact the origin of most entangling gear is unknown. Again, we point to the entanglement of a whale in Crowell Basin in 2007 and to the statement in Johnston et al (2007) that states "due to lack of SPUE data in these offshore areas, the risk of overlap cannot be assessed."	The team have revised the score for this PI and have scored it at 75, on the grounds that the effects should not be considered well estimated. As a result Condition 3 has been amended to take account of the weakness.
PI 2.2.2.1	Item 2.2.2.1 scores 70 on the grounds that strategies have been developed to address and restrain significant impacts on threatened and endangered species. This seems to be counteredmanded by the admission in this section that "formal management objectives have not been set, nor have management strategies been formalized in fishery management plans."	PI 2.2.2.1 is scored against the scoring guideposts and not the sub-criteria. The assessment team considered that the fishery was deficient against the 80 scoring guidepost but above the 60. The scoring rationale has been amended.
Principle 3 – scoring table	This category says the fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable. It was given an overall score of 88. Again this seems too high when considering the lack of management and mitigation for bycatch of humpbacks which are listed as endangered under the U.S. Endangered Species Act, and for right whales, that are protected both in Canada and the U.S. and for which both countries acknowledge the proximal threat of entanglement.	The text referred to relates to the overall MSC Principle. The score of 88 is the average, weighted score for all the PIs under the Principle. With respect to PET species, as indicated above, the MSC Fisheries Assessment Methodology, Section 7.1.1 (c) states that endangered, threatened or protected (ETP) species are, "...those that are recognised by national legislation and/or binding international agreements (e.g. CITES) to which the jurisdictions controlling the fishery under assessment are party."
PI 3B.1.1	...3B.1.1 was given a score of 80 for having management measures that include practices to reduce impacts on non-target species. As noted above there are no mandated measures and the	This PI relates to Management Measures not to Management Objectives or Strategies. The team notes a variety of management measures that reduce impacts sufficient to justify the 80 score. Others also exist including the closure of areas of coral

Section of Report	Stakeholder comment	Response
	MSC evaluation itself acknowledges in section 2.2.2.1 "formal management objectives have not been set, nor have management strategies been formalized in fishery management plans." Thus this fishery does *not* meet the criteria of having management measures to reduce impacts to endangered whales.	concentration to mitigate the impact of the gear on these deep water corals. There is no requirement that all the measures be mandated. The team is of the view that the totality of the measures (mandated and non-mandated) are sufficient to avoid or reduce any major impacts on non-target species.
General	...the management standards in Canada for the offshore fishery are *not* consistent with U.S. standards even though the fishery imports its product into the U.S. Risks and potential for fatal interactions with whales are not mitigated as they are in the U.S.	The MSC assessment methodology requires that the management regime under which the assessed fishery operates is subject to scrutiny and is not based on comparison with other fisheries and their management.

11 OBSERVATIONS AND SCORING

11.1 Introduction to scoring methodology

The MSC Principles and Criteria set out the requirements of certified fishery. The certification methodology adopted by the MSC involves the interpretation of these Principles and Criteria into specific Performance Indicators against which the performance of fishery can be measured according to pre-specified guideposts.

The Performance Indicators developed by the Moody Marine assessment team have been identified on the MSC website (Performance Indicators and Scoring Guideposts). In order to make the assessment process as clear and transparent as possible, these guideposts identify the level of performance necessary to achieve 100, 80 (a pass score), and 60 scores for each Performance Indicator.

These generic Performance Indicators and Scoring Guideposts have been the subject of stakeholder consultation and have been confirmed or modified following this process based on the judgement of the assessment team. Prior to scoring, the Indicators are also 'weighted' in relative importance according to the nature of the fishery undergoing certification.

At the top level, no weightings are assigned in terms of each MSC Principle; a fishery must 'pass' each of Principles 1, 2 and 3 in order to achieve certification and these are of equal importance.

Within each Principle, and related to each MSC Criterion, Sub-criteria and Performance Indicators are grouped in a hierarchy. Each level represents separate areas of important information (e.g. Indicator 1.1 requires a sufficient level of information on the target species and stock, 1.2 requires information on the effects of the fishery on the stock and so on).

At the level of the Performance Indicators, the performance of the fishery is assessed as a 'score'. In order for the fishery to achieve certification, an overall weighted average score of 80 is necessary for each of the three Principles and no Indicator should score less than 60. Accordingly, 100 represents a theoretically ideal level of performance and 60 a measurable shortfall. As it is not considered possible to allocate precise scores, a scoring interval of five is used in evaluations. As this represents a relatively crude level of scoring, weighted average scores are rounded to the nearest whole number.

Weights and scores for the Fishery are presented in the scoring table. Weights for criteria, sub-criteria and Performance Indicators add to a total of 100 at each level of the hierarchy. Scores are allocated relative to the Scoring Guideposts.

11.2 Evaluation Results

Observations are presented in the scoring table, together with any weighting applied to the Fishery and the scores allocated.

12 LIMIT OF IDENTIFICATION OF LANDINGS FROM THE EASTERN CANADA OFFSHORE LOBSTER FISHERY

12.1 Traceability

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.

12.2 Traceability requirements within the fishery

The client identified in 1.1 and their vessels fishing with traps will be eligible to sell MSC certified lobster (as and when the fishery is certified).

12.3 At-Sea processing

Product is landed live.

12.4 Points of landing

The limit of identification of landings is the landing of lobster by the client's vessels at recognised ports where appropriate recording and monitoring of landings may take place.

12.5 Eligibility to enter Chain of Custody

To be eligible to carry the MSC logo, product from the certified fishery, as defined in 1.1, must enter into separate Chain of Custody certifications.

12.6 Target eligibility date

In accordance with MSC Policy Advisory 4 v3 MSC product eligibility date may be up to a maximum 6 months prior to the publication of the Public Comment Draft Report (PCDR). The PCDR was published on 13th January 2010. The client was confirmed that they wish to gain the maximum benefit from the eligibility date hence, the eligibility date extends back to 13th July 2009.

13 CERTIFICATION RECOMMENDATION

13.1 Certification recommendation

The Performance of the fishery in relation to MSC Principles 1, 2 and 3 is summarised below:

MSC Principle	Fishery Performance	
Principle 1: Sustainability of Exploited Stock	Overall : 88	**Pass**
Principle 2: Maintenance of Ecosystem	Overall : 80	**Pass**
Principle 3: Effective Management System	Overall : 88	**Pass**

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any Performance Indicators. It is therefore recommended that the Eastern Canada Offshore Lobster Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

13.2 Scope of Certification

This assessment relates only to the fishery defined in Section 1.1 up to the point of landing as defined in Section 12.

Monitoring and control of fishing locations and methods is considered sufficient to ensure fish and fish products invoiced as such by the fishery originate from within the evaluated fishery:

- 100% satellite tracking based on mandatory VMS transponders, plus aerial surveillance;
- At-sea inspections;
- Completion and submission of vessel log books and landing declarations allowing cross-referencing of position with the VMS, aerial surveillance and at-sea inspection reports;
- Observer coverage of 1 trip sample per area fished per quarter.
- 100% Dockside Monitoring Program; and,
- Random landing and processing plant inspections by enforcement officers.

This will allow lobster and lobster products from this fishery to enter into further chains of custody subject to appropriate assessment and certification.

The client group has confirmed that the following facilities will be receiving lobster from the named vessels in appendix D and these will be subject to chain of custody certification.

Table 6 Client group associated processing/packing/dispatch plants.

Company	Processing Plants
Clearwater Seafoods Limited Partnership	**Bedford** 757 Bedford Highway Bedford, NS Canada, B4A 3Z7 **Arichat** Cape Auget P.O. Box 2000 Arichat, NS Canada, B0E 1A0 **Clark's Harbour** 92 Courtney St. P.O. Box 209 Clark's Harbour, Shelburne, NS Canada, B0W 1P0

Company	Processing Plants
	Louisville 3904 G Produce Road Louisville, Kentucky USA, 40218 **Pierce** 68 Water Street, P.O Box 250 Lockeport, NS Canada, B0T 1L0

13.3 Conditions associated with certification

13.3.1 Conditions

As a standard requirement of the MSC certification methodology, the fishery shall be subject to (as a minimum) annual surveillance audits. These audits shall be publicised and reports made publicly available.

The fishery attained a score of below 80 against fourteen performance indicators. The assessment team has therefore set conditions for continuing certification that Clearwater Seafoods Limited Partnership, as the client for certification, is required to address. Conditions are applied to improve performance to at least the 80 level within a period set by the certification body but no longer than the term of the certification.

As a standard condition of certification, the client shall develop an 'Action Plan' for Meeting the 'Conditions for Continued Certification'. This Action Plan is required to be approved by Moody Marine Ltd.

The Conditions, associated timescale and relevant performance indicator are set out below.

Condition 1 – Discards and Bycatch

The routine recording, analysis and reporting of discarded lobsters and non target species is limited in the fishery. As a result the following Condition has been set:

The client is required to ensure that by the first annual audit:

- Discards of adult and juvenile lobsters are well estimated and the significance interpreted; and,
- Quantitative information is available on the bycatch of non target species. If obtained by sampling, this is considered sufficient to provide adequate information.

It is recommended that to achieve this outcome:

a) The number of discarded lobsters is recorded routinely, analyzed, reported and the significance interpreted.
b) The level of sampling of discards and bycatch is shown to be adequate.

This Condition refers to Performance Indicators 1.1.2.3, 2.1.2.1 and 2.1.2.2.

Condition 2 – Indicators, Reference Values, Uncertainty and Decision Rules

There is a lack of formalised quantitative reference values that take account of uncertainty and are used in conjunction with clear decision making rules. As a result the following Condition has been set:

The client is required to ensure that by the fourth annual audit appropriate limit and precautionary

Condition 2 – Indicators, Reference Values, Uncertainty and Decision Rules

reference points, or proxy measures with similar intent or outcome, are implemented and used to inform fully documented decision making rules. These shall take into account, stock biology, exploitation history and major uncertainties in the data and functional relationships

To achieve this outcome, it is recommended that:

a) By the second annual audit, indicators with adequate data should be analysed quantitatively to identify their statistical variability in order to establish their suitability to measure changes in stock status.
b) By the third annual audit quantitative threshold, trigger and target reference values should be formalised for each indicator considered suitable to measure changes in stock status in order to define the framework and domains for a set of decision rules.
c) By the third annual audit qualitative reference values should be established for indicators with qualitative trends (e.g. "the recruitment trigger will be a declining trend for X successive years") for those indicators for which trend data are available. (See Anon 2009).
d) By the third annual audit uncertainty should be quantified wherever possible, whether for the indicators or for other attributes or questions, and should be specifically taken into account in the assessment of current stock status, and of the risks associated with different harvest strategies.
e) By the fourth annual audit decision rules should be established for different reference value domains.

This Condition refers to Performance Indicators 1.1.3.2, 1.1.3.4, 1.1.3.7 and 3A.6.2.

Condition 3 – Ecosystem Impacts, PET Species

The assessment team found the risk of interaction with PET species to be low but information to determine risk of interactions is limited. The scoring guidepost for 80 refers to a requirement to record and report all incidental mortalities and this is not presently the case. As a result the following Condition has been set:

The client is required to ensure that by the first annual audit, measures are in place to record information on any interactions with PET species such that estimates of the effects of these interactions can be made.

To achieve these outcomes it is recommended that this is made a condition of the fishing licence and, in addition to the observers already being trained in marine mammal identification, crews on the client vessels also receive identification training.

This Condition refers to Performance Indicators 2.2.1.2 and 2.2.1.3

Condition 4 – Management System and Strategies

The assessment team identified a number of weaknesses in the management system against the standard. The management system does not have explicit:

i. short and long term resource and environment objectives;
ii. evaluated procedures for measuring performance relative to the objectives;
iii. formalised measures to apply a precautionary approach; and,
iv. management strategies to detect and reduce ecosystem impacts.

For these reasons the following Condition is set:

The client is required to ensure that by the first annual audit the management system includes explicit:

- Short and long term resource and environment objectives that are subject to appropriate procedures for evaluating their performance;
- Formalised management strategies to detect and reduce ecosystem impacts, including

Condition 4 – Management System and Strategies

impacts on PET species.

- Formalized measures to apply a precautionary approach in the development and application of operational procedures when there is an absence of sufficient information.

To achieve these outcomes it is recommended that within the integrated fisheries management plan:

a) Short and long term resource and environment objectives are described along with formalized review mechanisms and milestones for measuring performance;
b) Management strategies to detect and where appropriate reduce ecosystem impacts are described and implemented. This should include gear marking measures such that sources of entanglements can be better identified and collaborative work with DFO, NGOS, and other industry players in the context of the Canadian Right Whale Recovery Strategy.
c) There is a formal commitment to apply the precautionary approach and formalized measures are described and implemented to show how they are applied.

This Condition refers to Performance Indicators 2.2.2.1, 2.1.4.5, 3A.3.1, 3A.3.3 and 3A.3.4

14 APPENDICES

Appendix A: Scoring Table

Appendix B: Peer Review Reports
1. Peer Reviewer Biographies
2. Peer Review Report A
3. Peer Review Report B

Appendix C: Client Action Plan

Appendix D: Stakeholder Comments

Appendix E: Registered vessels belonging to the client fishing for lobster (*Homarus americanus*) in DFO lobster fishing area 41 (LFA 41).

APPENDIX A

Scoring Table

SCORING INDICATORS	Comments	Weight	Score
Principle 1	**A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.**	**33.3**	**88**
1.1 *(MSC Criterion 1)*	**The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.**	**50**	**87**
1.1.1	There should be sufficient information on the target species and stock separation to allow the effects of the fishery on the stock to be evaluated.	**25**	**85**
Weighting Commentary	No weighting is applied to the MSC Principles – these are equally weighted and each must attain a weighted score of 80 or more for certification to be granted. The three MSC criteria are considered of equal importance. The four sub-criteria under 1.1 (MSC Criterion 1) and the Performance Indicators under sub-criterion 1.1.1 are also considered of equal importance.		
1.1.1.1	Is the species readily identified as adults and juveniles?	**14.3**	**100**
60 Misidentification is possible and increases recording errors of catches, but this does not compromise monitoring to unacceptable levels.	*Homarus americanus* is readily identifiable by scientists at all relevant stages of the life history, and by fishers, observers, and enforcement officers when captured. There are no species with which it can be confused.		
80 The target species are unlikely to be confused with any other species and/or any misidentification is demonstrably insignificant in the monitoring of catches.			
100 The species is readily identified by fishers and by regulators and is recorded appropriately.			

SCORING INDICATORS		Comments	Weight	Score
1.1.1.2		Is the life history of the species understood and the spawning and nursery areas well described?	**14.6**	**85**
60	There are gaps in information but the basis of the life history is understood sufficient to support a comprehensive qualitative evaluation of the effects of the fishery. Spawning and nursery areas/times are well established.	Section 3 of the report summarises key aspects of the biology and ecology of lobsters generally, and in LFA41 <u>Lobsters generally</u> The general distribution, habitat preference, life history and demography of the lobster have been studied extensively for many years in numerous coastal fishing areas of the United States and Canada (Long Island, New Hampshire, Gulf of Maine, Bay of Fundy, Gulf of St Lawrence, Newfoundland (Herrick (1911), Cobb and Phillips (1980), Factor (1995), coupled with detailed laboratory reviews of growth and reproduction for aquaculture purposes (Aiken & Waddy, 1980, Waddy, Aiken & de Klein, 1995). The connections between the pelagic phase, settlement in the early benthic phase, behaviour in the adolescent phase, and later recruitment to the fishery, have been studied extensively in the Gulf of Maine, and there are numerous regional studies of movement, growth, maturity, fecundity, and genetics. As a result significant progress has been made towards understanding the principal features of lobster biology and dynamics, aspects of stock structure and identity, and the likely role of oceanographic processes and settlement dynamics in recruitment. <u>Offshore lobsters in LFA 41</u> Studies carried out periodically since the inception of the fishery in 1972 provide relevant data on distribution, migration, growth, maturity, size distribution and sex ratio, and larval production and dispersion (summarised in Pezzack & Duggan, 1995, Pezzack & Macquire, 1995, Pezzack et al, 2001, DFO 2000a and DFO 2009b). Larvae studies suggest that lobsters spawn quite widely in LFA 41, but that the main concentrations are on Georges Bank and Browns Bank (Harding et al 2005). Browns Bank is a known breeding area, and for this reason a significant portion has been closed to lobster fishing since 1979 to protect brood stock. Section 3.3.2 of the Report shows that lobster larvae in the Gulf of Maine may settle in coastal waters, at locations determined by the particular circulation and wind patterns observed each year (Harding et al., 2005, Incze et al., 2006, Xue et al., 2008), but larvae produced over Georges Bank may be retained there, or dispersed along the edge of the Bank, or advected offshore, depending on timing and local wind conditions (Harding et al, 2005). Very little is known about the location of offshore settlement sites or nursery areas, however, but it has been shown that larvae found at Georges Bank are most likely to have been produced there, or to have originated from Cape Cod and the mid coast of Maine. . Despite the extensive studies on recruitment in the inner Gulf of Maine, knowledge of the source of recruitment in LFA41 is clearly incomplete, but is enough to facilitate basic assessments independent of those in LFA34 (Pezzack & Duggan, 1995, DFO 2000a, DFO 2009 b).		
80	Critical factors in the life history of the species are clearly documented and understood, sufficient to support a comprehensive qualitative evaluation of the effects of the fishery. Spawning and nursery areas/times are well established.			
100	The life history of the species is clearly documented and well understood including behaviour and ecological interactions. Spawning and nursery areas are sufficiently well documented to support closed area / seasons where this is deemed necessary.			

SCORING INDICATORS		Comments	Weight	Score
1.1.1.3		Is the geographical range of the target stock(s) known and any seasonal movements described?	**14.6**	**85**
60	There is sufficient scientific and anecdotal information to allow a robust estimation of the geographical range and biological characteristics of the target stock.	The wide geographic range of North American lobster from southern Labrador to Cape Hatteras is well described (Cobb & Phillips,1980, Factor, 1995). Within LFA41, the seasonal distribution and pattern of availability of fishable lobsters is reasonably well described from tagging, and from data on the seasonal distribution of the fishery, as summarised by Pezzack & Duggan, 1995, DFO 2000a, and the IFMP (DFO 2009a). The stock relationship between offshore fishing area LFA41, and the inshore and midshore fishing areas in LFA34, has been investigated and although the understanding is incomplete it is possible to arrive at a working hypothesis sufficient for present purposes (e.g. Pezzack et al, 1992, and Section 3.3 of this report): • Tagging shows that lobsters in both coastal and offshore waters move closer inshore for the summer, and then move offshore for the winter, but whereas coastal lobsters generally move only a few kilometres, offshore lobsters move large distances between the continental slope and the shallower banks and basins fringing the Gulf of Maine and the Scotian Shelf. Movements up to 200 km have been recorded, and there is some evidence of homing (e.g. Pezzack & Duggan, 1986). The tagging results are sufficient to explain the seasonal changes observed in the distribution of the offshore fishery. • As described in Section 3.3 several studies have explored the likely relationships between the offshore and inshore populations based on tagging experiments, larvae studies on Georges Bank, observations and modelling of circulation and advection, and genetic studies. Although lobsters tagged in LFA 34 have been recaptured in LFA 41, and some lobsters tagged at Browns Bank and Jordan Basin have been recaptured in coastal waters, on balance more lobsters appear to move offshore than inshore, at least under current fishing patterns. • As noted under 1.1.1.2 connectivity within the Gulf of Maine and between the Gulf and the offshore area is complex and variable depending on the annual conditions. Some larvae found on the offshore banks are spawned and retained there, whilst others are most likely to have originated from the Cape Cod area and the mid coast of Maine. Larvae on Georges Bank can be retained there, or advected offshore, depending on the conditions (Harding et al., 2005, Drinkwater et al., 2001, Xue et al., 2008). Although lobsters in Scotia-Fundy, Georges Bank, Gulf of Maine, and southern New England are regarded as a meta - population with varying degrees of mixing (DFO 2000a), Section 3.3.of this report concludes that lobsters in LFA41 also show some biological and demographic independence from those inshore, especially as there is a marked difference in size distribution in the two areas that has persisted for several decades.		
80	A reliable estimate of the geographic range and biological characteristics of the target stock(s) is available including seasonal patterns of movement and availability.			
100	The complete geographic range and biological characteristics of the stock(s), including seasonal patterns of movement /availability, are demonstrably understood and verified.			

SCORING INDICATORS		Comments	Weight	Score
1.1.1.4		Is information collected on the abundance/density of the stock(s)?	**14.6**	**80**
60	Either fishery dependent or fishery independent indices are available on the abundance/density of the stock biomass. Qualitative information exists on the appropriateness of the indices as proportional indicators of stock status.	The following data sources were used by recent DFO assessments (Pezzack & Duggan, 1995, DFO 2000a, and DFO 2009b): Fishery dependent data: • Log books (1981-2008) provide daily landings records (1982-2000), and string-by-string records of catch, effort and location since 2001. • At-sea sampling by on-board observers provides records of size distribution and sex ratio (1972-2008) Fishery independent data: • Stratified random DFO RV bottom trawl surveys in summer (1999-2008) and winter (2007-8), and the US NMFS fall RV bottom trawl survey (since 1968) provide estimates of abundance and recruitment. • The abundance data are used as follows:Landings and CPUE data are worked up for LFA 41 as a whole, and for five principal fishing areas (SE Browns, Georges Bank/Corsair Canyon, Georges Basin, SW Browns, Crowell Basin) • LPUE is used in unadjusted form, but uncertainty has also been examined using a log-linear model to adjust for area, trip, vessel, and fishing season (Pezzack et al 2009). • US NMFS trawl survey data provide an index of abundance and recruitment.This is a stratified random survey that provides estimates of sampling error and variance that describe the uncertainty. • The DFO summer bottom trawl survey is a stratified random survey, and provides an abundance indicator in the form of adjusted mean number of lobsters (all sizes) per tow. Work on the uncertainty of these estimates by calculating variances requires resolution of ongoing issues of catchability and area trawled (DFO, 2009b). In the most recent assessment,landings, LPUE and trawl survey data are used as indicators or proxies for abundance. Uncertainty has been analysed for the LPUE and USNMFS trawl survey, and is under investigation for the DFO trawl survey data, sufficient to justify the current interpretation that LPUE and RV survey data show common trends that are considered proportional to abundance, which has been increasing or stable (DFO, 2009b).		
80	Fishery dependent and/or fishery independent indices are available on the abundance/density of the stock. Uncertainties have been analysed and those uncertainties are such that trends can be determined from indices.			
100	Fishery dependent and fishery independent indices are available on the abundance/density of the stock. Indices are consistent and there is clear evidence that they are proportional to the stock status.			

SCORING INDICATORS		Comments	Weight	Score
1.1.1.5		Is there information on fecundity, size at maturity, recruitment, growth and factors causing natural mortality?	**14.6**	**85**
60	There is sufficient information available, for key areas of the stock distribution, on the fecundity, size at maturity, growth and natural mortality to support a basic assessment.	For various LFAs in the Gulf, Newfoundland, and Scotia-Fundy regions, including LFA41, Pezzack & Macquire (1995) assembled data on lobster growth from tagging (moult increment and moult frequency, Pezzack & Duggan, 1990), fecundity at size, and maturity at size. The data were used to model the relationship between fishing mortality and both yield per recruit (YPR) and egg production per recruit (EPR). Fecundity is size related. Maturity and growth rates vary regionally and in North America are temperature dependent. Growth and fecundity-at-size are similar everywhere and maturity at 97mm CL is at the larger end of the size at maturity (70mm in PEI and 104 in the Bay of Fundy). . Mortality in the early benthic phase is being studied as part of the comprehensive juvenile ecology programme in coastal Maine (Wahle & Steneck, 1992, Incze et al, 1997) but as with most stocks of fish and shellfish there is no specific estimate of natural mortality for adult lobsters in the exploited phase. Lobsters rely on shelter, however, to avoid predators during vulnerable life history phases such as settlement (Wahle & Steneck, 1991 and 1992), moulting, mating and egg extrusion (Karnofsky et al., 1989), and it is inferred that this strategy is successful since lobster fecundity is low (3000 to 300000 eggs per female). The assumption that, as for many species in fisheries science, adult natural mortality averages 0.1-0.15 may therefore be fairly realistic for lobster.		
80	Quantitative estimates are available of fecundity and maturity at size, growth rates and natural mortality, for most parts of the stock distribution, sufficient to inform a robust evaluation of stock status.			
100	There is comprehensive and reliable quantitative information on the fecundity/size at maturity/recruitment, growth rates and factors causing natural mortality, for all parts of the stock distribution, which can be incorporated into assessment models.			

SCORING INDICATORS		Comments	Weight	Score
1.1.1.6		Is information available on environmental influences on the stock dynamics?	**14.6**	**80**
60	Some relevant studies have been undertaken to identify the most important environmental influences on the stock. Research is encouraged and ongoing.	As described below, the main environmental factors that affect the distribution and dynamics of lobsters are habitat, temperature, and the conditions that determine the distribution and transport of the pelagic stages. 1) In lobster stocks in North America and Europe generally, variations in temperature are considered to explain periodic fluctuations in landings (Dow, 1977, Flowers and Saila, 1972) and adult activity and catchability (Fogarty, 1988). In LFA 41, a specific cold-water event caused a decrease in lobster landings and CPUE in 1997-1999, when temperatures fell 2-4^{o}C below normal during an incursion of Labrador slope water, which reached the outer slope of LFA41 in 1997, moved into the basins in 1998, and disappeared in late 1999 (DFO 2000a). 2) The importance of cobble and boulder habitat to settling young-of-year has been extensively studied in coastal Maine (Wahle & Steneck, 1991, 1992, Wahle & Incze, 1997, Wahle et al., 2004), although there is little comparable knowledge for the offshore stocks in deeper water, where juvenile ecology could be different. 3) As summarised in Section 3.3.2 of this report, environmental factors affecting distribution and transport of lobster larvae in the Gulf of Maine, and their potential to influence recruitment, have been studied extensively, including: • studies of the distribution of larvae in relation to temperature and wind conditions in the Gulf, including the LFA 41 part of Georges Bank (Harding et al., 2005) • models of the effects of circulation on year to year variability in larval transport throughout the Gulf of Maine (Drinkwater et al., 2001, Harding et al., 2005, Xue et al.,2008) • benthic sampling for variations in settlement in the inner Gulf (Incze & Wahle,1991, Incze et al., 1997, Wahle et al.,2004) • importance of these studies for predicting recruitment (Wahle et al., 2004, Incze et al., 2006) 4) A widespread surge in lobster landings and recruitment through the 1980s and 1990s in many areas of N America is so far unexplained, but postulated factors include temperature (Drinkwater et al., 2006), changing groundfish biomass, or unknown factors affecting survival and growth in the pelagic phase (Anon,2000). Although few of the above studies have been carried out in the offshore area other than George's Bank, managers of the LFA 41 fishery are fully aware of the results and the need to be alert for signs of a backward shift in the present recruitment regime.		
80	There is sufficient knowledge of the main environmental factors affecting distribution, and year class strength to allow an estimation of effects on stock dynamics.			
100	There is sufficient knowledge of environmental factors affecting distribution, survival and year class strength to allow detailed estimation of effects on stock dynamics			

SCORING INDICATORS		Comments	Weight	Score
1.1.1.7		Is the size and sex ratio of landings and discards measured.	**14.6**	**80**
60	Data on size structure and sex ratio of catches are known well enough tom support a rudimentary evaluation of the fishery.	The size distribution and sex ratio of the catch, including sub-legal and egg bearing females that are returned to the sea, are recorded periodically at sea by independent on-board observers (Pezzack & Duggan, 1995), and this is supported by records of the distribution of the landings into market size groups recorded during 100% dockside monitoring of landings. At-sea samples measure the lobsters from every trap, or every second or third trap, depending on abundance. The location of at-sea samples depends on the location of the fishery, and sampling of individual areas is not necessarily uniform from year to year, contributing to uncertainty (DFO 2009b and Pezzack et al 2009). Since January 2006 the goal of the LFA 41 sea-sampling strategy has been to sample 1 vessel-trip per quarter in each grid grouping (Pezzack et al, 2009, para 2.2). The sampling level achieved in practice has been on average 6 trips per year in recent years. Despite the uncertainty, the size distribution of the catch has been very stable since the inception of the fishery. The legal size limit is considered to be well enforced.		
80	Data on the size structure and sex ratios of catches in the main fishery are of adequate accuracy and measured for enough years to support a high degree of confidence in the evaluation of the fishery.			
100	There is comprehensive and reliable data on the size, structure and sex ratios of all significant catches (including any recreational catches) to support a very high degree of confidence in the evaluation of the fishery.			

SCORING INDICATORS		Comments	Weight	Score
1.1.2		**There should be sufficient information on the fishery to allow its effects on the target stock to be evaluated**	**25**	**88**
Weighting Commentary		All Performance Indicators within this sub-criterion are considered of equal significance.		
1.1.2.1		Are fleet descriptions, fishing methods and gear types known throughout the fishery?	**33**	**100**
60	Main fishing methods and gear types are known for the fishery with some information on geographical areas of use. Information is available on the size and composition of the fleet, but is not regularly updated.	The fishing fleet and fishing methods/gear used for lobster fishing in LFA41 are well known. A maximum of 8 licenses and quota shares is permitted, and the working fleet is currently reduced to 2 vessels. The gear comprises wire side-entrance traps of known construction and pattern, with an escape vent and biodegradable panel, fished in strings (usually of 100 traps) on polysteel rope. Individual traps are not weighted, but the strings are anchored by a 200 lb weight at each end to maintain position in areas affected by the strong tidal flows (28 feet rise and fall). The principal bait is salted herring. There is no trap limit, but vessels fish 25-30 strings, and a total of 12000 traps are deployed. Most traps have single parlours, but about 1000 traps with double parlours have recently been introduced (C.Penney, pers comm.). Fishers keep all legal sized lobsters up to a size of about 6lb. Vessels are subject to mandatory VMS that reports vessel position hourly. Skippers record their own fishing positions string by string in the vessel log book, and these data are transcribed to the DFO-MARIS data base during dockside monitoring. Gear is fished at depths ranging from 60-120 fathoms (D Poole pers comm.). Some pots or part strings are lost occasionally, but the significant cost associated with lost gear provides strong motivation to retrieve lost gear by grappling. A large licensed fleet (937 Category A vessel based licences and 30 Communal based first nation licences) operates in the adjacent inshore area LFA34, using similar types of traps fished on shorter strings or individually. The fishing season there is from November through to May, with an individual trap limit of 375 per vessel from November to March and 400 from March to May. Traditionally these vessels fished grounds close inshore but over the last decade effort has moved into the midshore part of LFA34 right up to the boundary with LFA41. Since 1998, LFA34 log books provide daily records of catch and effort by 10 minute grids. While other fleets fishing in the area may catch lobsters they are required to return them to the water.		
80	Main fishing methods and gear types are known and information is available on the geographical areas of use. Recorded information is available on the size and composition of the fleet. This is updated at appropriate intervals. Seasonal and geographical variations are known.			
100	All fishing methods and gear types employed in the fishery are known. In-situ observations are made of fishing practices. Information on the size and composition of the fleet, and seasonal and geographical variability, is recorded and regularly reviewed.			

SCORING INDICATORS		Comments	Weight	Score
1.1.2.2		Is gear selectivity and composition of landing known for the fishery?	**33**	**90**
60	Appropriate information is available on selectivity and qualitative changes in selectivity. Data on the composition of catches are sufficient to support a rudimentary evaluation of the fishery.	The fishing gear is well described, the size composition of the landings is measured at the dockside and during periodic at-sea sampling by on-board observers, and the selectivity of the trap is illustrated by comparing the size distribution from traps in LFA41 with that measured by the US NMFS trawl survey in the Georges Bank area. The size distribution from traps in LFA 41 has also been compared to that from similar traps in LFA34. The time series of trap size distribution data permit an effective evaluation of the fishery The gear comprises wire traps of known construction and pattern, with an escape vent suited to the minimum legal size of 82.5 mm CL, and a biodegradable panel to reduce ghost fishing in the case of gear loss. Size distributions are measured at sea by independent on-board observers, and the distribution of lobsters landed at the dockside is recorded by cull groups during 100% dockside monitoring. Size selection at the lower end is achieved by the escape vent, supported by selection on deck aided by use of a gauge, and it is considered that size selection at the minimum size is knife edged (C. Penney, pers comm.).It is company policy to return all lobsters > 6lb to the sea. The long time series of size frequency data available for most sub-areas shows very little change over time (DFO 2009b), and contains a wide size range comprising more than 10 molt groups, including a high proportion of mature multi-parous females.. It is suggested that very large lobsters > 165 mm CL are under-sampled due to physical constraints of the traps, because when top-entry traps with large hoops were used they caught more very large lobsters than the present side-entry traps (Pezzack & Duggan, 1995). However, comparison between the size frequency of lobsters from LFA41 traps and from US NMFS trawl survey stations for Georges Bank shows very similar size frequencies on the right hand sides of their distributions, but under-representation of lobsters below 110 mm CL in traps compared to the trawl (Figure 5 in Section 3.2.2 of this report). Since the trawl probably also under-samples small lobsters to some extent it is clear that trap data in LFA41 do not sample the recruit size groups very well, but they give adequate information on the breeding stock.		
80	Selectivity of gear types are well estimated for key locations and times. Data on the composition of catches in the main fisheries affecting the target stock are adequate to support confidence in the evaluation of the fishery.			
100	The selectivity for all gear types have been accurately estimated for all locations and times of fishing over a suitable timeline.. There is comprehensive and reliable data on the size structure and sex ratio of all significant catches; sufficient to support a high degree of confidence in the evaluation of the fishery.			

SCORING INDICATORS		Comments	Weight	Score
1.1.2.3		Are all major sources of fishery related mortality recorded/ estimated, including landings, fishing effort, discards, incidental mortality and mortality of juveniles?	**33**	**75**
60	Sufficient information is recorded to allow accurate estimates to be made of landings and effort. Estimates of discards and incidental mortality are available for key fleets.	Good information on landings and fishing effort is recorded daily on a string-by-string basis in vessel log books that are checked by 100% dockside monitoring. Vessel fishing time and positions are also monitored by VMS. As noted under 1.1.2.2, lobster are discarded below the minimum size of 82.5 mm CL, where selection is assisted by escape vents and is believed to be knife-edged. It is company policy to discard lobsters > 6lb. It is believed that discard and incidental mortality are likely to be very low. Discards are believed to survive well based on evidence from the survival of multiple recaptures of tagged lobsters (Pezzack, pers comm.). It is also company policy, supported by training, to encourage gentle handling of lobsters to assist survivability. The company also identifies batches of lobsters from individual vessels and trips in the holding facility, where the effects of poor handling would be identified and followed up. Other types of fishing vessel do not land lobsters from LFA41, and any incidental by-catch must be returned to the sea, although this is not considered to represent a significant threat to the stock (C Penney, pers comm.). Discard data recorded during at-sea sampling by on-board observers provide periodic information about the quantity and size distribution of discards, but the discard rate is not recorded routinely in the vessel log book when observers are not present. The score would be higher if it had been demonstrated that the periodic discard sampling data are fully representative of the discard rate for the fishery as a whole. .		
80	Landings and effort are accurately recorded, and trends described. Discards and incidental mortality of adults and juveniles are well estimated, but monitoring does not extend to the entire fleet and / or stock.			
100	Landings, effort, discards and incidental mortality are accurately monitored for all fleets and parts of the stock.			

SCORING INDICATORS		Comments	Weight	Score
1.1.3	**There is a well-defined and effective stock assessment procedure and harvest strategy for managing the target stock.**		**25**	**79**
Weighting Commentary				
1.1.3.1		Are assessment methods used to provide advice on stock status?	**12.5**	**85**
60	An empirical approach to assessing stock status is used. This is generic but does take account of some specific characteristics of the biology of the species and the nature of the fishery.	As detailed in Section 5 of this report, the effect of the LFA41 fishery on stock status has been evaluated intermittently since 1990 using several different assessment methods, resulting in advice to maintain the current conservative harvesting strategy. Historical assessments 1990-2001 These modelled curves of YPR (Pezzack & Duggan, 1990) and EPR (Pezzack and Macquire, 1995) against F; evaluated key trends in the LFA41 fishery (Pezzack & Duggan, 1995); and compared F and reproductive potential between LFA41 and LFA 34 using size frequency data and length cohort analysis (Miller et al, 1987, Pezzack et al., 2001), as follows: • F was low (0.2-0.4, Miller et al, 1987, Pezzack et al., 2001), and was close to Fmax on the Y/R curve (Pezzack & Duggan 1995) and $F_{10\%}$ EPR (Pezzack & Macquire 1995). There was a high proportion of mature and multi-parous females in the stock compared to LFA 34, and the fishery removed far fewer females and potential eggs than in LFA34 (Pezzack et al 2001).There was no evidence that the LFA41 fishery had any negative impact on the stock or its reproductive potential. It was advised to maintain the conservative harvesting strategy Recent assessments, 2000 and 2009. These were carried out as part of the DFO Regional Advisory Process (DFO 2000a, DFO 2009b, Pezzack et al 2009). They do not use models, but evaluate trends in key data regarded as indicative of the health of the fishery and the stock. • In 2000, the assessment reviewed the spatial location of the fishery; trends in landings & CPUE from daily log books by fishing area; size structure & sex ratio of the catch from at-sea sampling; and recruitment using US NMFS groundfish survey data. The fishery and its demographics remained stable, except for a shift in sex ratio towards females. Recruitment was constant at Georges Bank. F was not estimated directly. Overall, there appeared to be no impact of the offshore fishery on the stock in LFA41 or LFA34. • In 2009, the assessment reviewed trends in a suite of indicators for abundance, fishing pressure, egg production, recruitment, and the ecosystem, in conformity with the Maritime Lobster Conservation Strategy (2004-2008). Trends were evaluated for 2000-2007 in comparison to 1995-99. There are no direct estimates of fishing mortality, and no forecasts. As shown in Appendix A of DFO 2009b, the key indicators mainly have stable or increasing trends. Except for a decreasing proportion of males, and a slight fall in size in Crowell Basin, there has been little change in stock status since the 1980s, and fishing appears to have no negative effects on the stock to date. The 2000 and 2009 evaluations are semi-quantitative rather than analytical, but they conclude that the 720t TAC in place since 1985, and the protection of berried and v-notched females, represent a sustainable harvest strategy that meets the objectives of the Lobster and Jonah Crab Integrated Fishery Management Plan 2006-2011 (DFO 2009a), and it is advised that this strategy be continued.		
80	Assessment methods are used. Major criteria are related to the species and/or fishery, but there are some areas of the assessment that are generic			
100	Assessment models are used and capture all major features appropriate to the biology of the species, the nature of the fishery, and the management. The models are statistically robust and incorporate all relevant information and data.			

SCORING INDICATORS		Comments	Weight	Score
1.1.3.2		Are there appropriate reference points based on stock biomass and/or fishing mortality?	**12.5**	**70**
60	Appropriate limit and precautionary reference points or proxy measures with similar intent or outcome, have been chosen and are justified and are appropriate to achieve long-term sustainability.	In the past, FRCC assessed the status of Canadian lobster fisheries, including that in LFA 41, using the $F_{10\%}$ EPR max reference point adopted by the USA as a formal definition of overfishing (FRCC, 1995). F was found to be < $F_{10\%}$ EPR max in all fisheries except that in LFA 41, where F= $F_{10\%}$ EPR max i.e. LFA41 was not overfished. Subsequently, FRCC felt that EPR did not relate to real egg production on the ground, the EPR reference point was later abandoned (FRCC, 2007). Currently, there are no analytical age or length based assessment for LFA41, and no formal quantitative limit and precautionary reference points for F (fishing mortality) or B (biomass). Instead the assessment follows the Maritimes Lobster Conservation Strategy (2004-08) by adopting a suite of indicators for abundance, fishing pressure, egg production, recruitment, and the ecosystem, as described in Appendix A of DFO 2009b and section 5.5.2 of the report. These indicators clearly take into account stock biology, the effect of exploitation, and the limitations of the available data. As described in Section 5.5 and in DFO 2009b their trends are evaluated to form the basis for current scientific advice to maintain the long term low-harvest strategy. The use of indicators for LFA 41 conforms to the Maritimes Lobster Conservation Strategy, and they can be regarded as proxy measures that are evaluated with similar intent or outcome to reference points, but DFO 2009b contains no formal statement on what quantitative function or empirical values of the indicators are intended to be used as target, trigger or threshold reference points (compare the practice being evolved in the US Gulf of Maine assessment, Anon. 2009, where operational reference values of the indicators are under discussion). The indicator framework therefore fails to meet the 80 standard for reference points.		
80	Appropriate limit and precautionary reference points or proxy measures with similar intent or outcome are determined and implemented taking into account stock biology, exploitation history and the limitations of the available fishery and assessment data.			
100	Appropriate limit and precautionary reference points or proxy measures with similar intent or outcome are determined and implemented taking into account stock biology and statistical simulations of the variability and uncertainty of fishery and assessment data.			

SCORING INDICATORS		Comments	Weight	Score
1.1.3.3		Is the stock status and harvest strategy evaluated relative to reference points?	**12.5**	**80**
60	An approximated evaluation is made of the stock status and an appropriate harvest strategy is implemented relative to reference points or measures with similar intent or outcome.	Stock status and the impact of the current low-harvest strategy have been evaluated periodically using the following methods as detailed under 1.1.3.1. and Section 5.5 of the Report: <u>Historical assessments</u> • YPR (Pezzack & Duggan, 1990), • EPR (Pezzack & Macquire, 1995), • trends in the fishery and the size composition and comparison with LFA34 (Pezzack & Duggan, 1995, Pezzack et al 2001, DFO 2000a), <u>Current assessment</u> • trends in a suite of indicators (DFO 2009b). The current harvest strategy is to maintain a good fishing pattern and a low harvest rate using a low TAC of 720t (maintained since 1985), a minimum legal size, prohibition on landing berried and v-notched females, and, since 1976,the number of licenses has been frozen. This strategy has been in place for many years as a key objective of the IFMP ('to harvest at a conservative level in order to protect the lobster resource in LFA41 and LFA34, and to maintain economic viability of the fishery' (DFO 2009a). The 2009 assessment was carried out under the DFO Regional Advisory Process (DFO 2009b). In conformity with the advice from FRCC (2007), and the Maritimes Lobster Conservation Strategy, the assessment evaluated the state of the stock using indicators whose trends were stable, increasing, or neutral (Appendix A in DFO 2009b). It concluded that: 'Based on the current indicators of abundance, fishing pressure and production, the current TAC of 720 t, in place since 1985, does not appear to have had negative impacts on the lobster in LFA 41 overall <u>and is considered to represent an acceptable harvest strategy at this time</u>' (DFO 2009b, penultimate paragraph of p12). Stock status and harvest strategy were therefore recently been evaluated using indicator trends as proxies for reference points, in conformity with the last criterion in the guidelines for a score of 80. In the future, the evaluation should take into account the development of more robust pre-agreed reference values for the indicators, and associated pre-agreed decision rules, as specified under PI 1.1.3.2.
80	At appropriate intervals an adequate evaluation of stock status is made, and an appropriate harvest strategy identified and implemented relative to the reference points or measures with similar intent or outcome.	
100	There is an ongoing and appropriate evaluation of stock status relative to reference points or measures with similar intent or outcome using probabilistic methods that facilitate short and longer term forecasts that determine an appropriate harvest strategy.	

SCORING INDICATORS		Comments	Weight	Score
1.1.3.4		Does the evaluation take into account major uncertainties in data and have assumptions been assessed?	**12.5**	**70**
60	Major uncertainties are identified. Some attempt has been made to evaluate these.	A number of biological and statistical uncertainties have been identified, but not fully resolved. The 1995 evaluation (Pezzack & Duggan, 1995) identified uncertainty over moult frequency and natural mortality, but this is not critical for recent assessments, which have replaced YPR, EPR & LCA by indicators unaffected by parameter estimation. DFO 2000a and 2009b identified the following uncertainties that could affect the current assessment: • No direct estimate of F for LFA41 (although it is clear from the size composition that this must be low) • Possible bias in CPUE, size composition and sex ratio due to spatial variations in fishing pattern between years • The effect of variations in oceanographic or ecosystem conditions that cause confusing trends in abundance. • Uncertainty about the relationship between lobsters in LFA41 and LFA34, and hence about the reciprocal effects of effort changes in the two fisheries. These uncertainties were identified but not yet fully accounted for explicitly in the evaluation, and there are no quantitative forecasts that explore their potential effects on the risks posed by the current harvest strategy (compare Chen & Wilson, 2002, and Chen et al, 2005) Other uncertainties that could be considered and addressed are: • uncertainty around the indicator trends, and how this would be used in the definition of any threshold, trigger or target values, once these have been defined. • Unknown implications of the declining sex ratio, and of the lower median size in Crowell Basin. • No knowledge on the source of offshore recruitment, the ecology of the settlement and adolescent phases, and no early warning index. • Uncertainty whether LFA41 has benefited from the long term recruitment changes observed elsewhere, or is at risk from a reversal. In the short term, most of the uncertainties may be of limited practical concern, since the size distribution indicates that F appears to be low, and is buffered by a high proportion of multi-parous females, whilst most of the indicator trends to date are positive or neutral and do not appear to pose any immediate threat. The main weakness in the assessment is that except for the median-size plots illustrated in DFO 2009b, it is not clear if the statistical uncertainty of indicators with numerical trends has been evaluated, and until this is done there is no estimate of the sensitivity of the indicators to change. Also, as there are no explicit forecasts into which uncertainty is incorporated, there is no quantitative estimate of the level of risk associated with different harvest strategies, or different environmental regimes. The long term consequences of these weaknesses are unknown, but it is desirable that they be addressed, whether by finding methods to make quantitative estimates of uncertainty that can be incorporated into forecasts and decision rules, or by testing the sensitivity of the indicators adaptively to controlled changes.		
80	The evaluation takes into account major uncertainties in the data and functional relationships. The most important assumptions have been assessed and the consequences are known.			
100	The evaluation addresses all significant uncertainties in the data and functional relationships and evaluates the assumptions in terms of scope, direction and bias relative to management-related quantities.			

SCORING INDICATORS		Comments	Weight	Score
1.1.3.5		Are uncertainties and assumptions explored and reflected in management advice?	**12.5**	**80**
60	Major uncertainties are recognised and are reported in management advice and their possible management implications identified.	Uncertainties were identified in the Scientific Advisory Report (DFO 2009b, page 11), and others have been identified by this report (see Section 5.7, and question 1.1.3.4). Uncertainty has in practice been addressed over a long period by implementing scientific advice to maintain the precautionary long-term low-harvest strategy. Management decisions are therefore in line with commitments under the IFMP to protect lobster stocks in both LFA41 and 34 by adopting a conservative harvesting policy, and the stock in LFA41 undoubtedly appears to be healthy at present. A low-harvest strategy is also one that is most precautionary in relation to the major uncertainty about if or when there may be a decline from the high level of recruitment currently supporting most lobster fisheries in North America.		
80	Major uncertainties and assumptions are reflected in the management advice and limitations addressed through the appropriate management advice and decisions.			
100	All significant uncertainties and assumptions are addressed and reflected in the management advice and decisions.			

SCORING INDICATORS		Comments	Weight	Score
1.1.3.6		Does the stock evaluation include the consequences of current harvest strategies?	**12.5**	**80**
60	The assessment makes an appropriate initial approximation of the consequences of current harvest strategies.	The consequences of the current low-harvest strategy have been evaluated historically (Pezzack & Duggan, 1995, Pezzack & Macquire,1995) and by the recent assessment (DFO 2009b) • Historically, EPR modelling showed that at the low exploitation rate of F =0.2-0.3 estimated at that time, the LFA41 fishery was at or close to an $F_{10\%}$EPR reference point, and was not overfished (Pezzack & Macquire, 1995). • The current assessment shows that the stock and fishery are stable relative to the indicators, and that the size composition contains a wide range of sizes and a high proportion of mature, multi-parous females, especially compared to the much more heavily exploited stock in LFA34. It is concluded that despite uncertainties the current harvest strategy for LFA 41 has no negative impact on the stock there, and is unlikely to have any negative effect on the resource in LFA34. The reciprocal effect of the midshore fishery in LFA34 on the stock in LFA41 cannot yet be evaluated, however. There is currently no assessment model for LFA41 that forecasts or simulates the effect of the present or other harvest strategy on the stock or the effect of uncertainties, but since the current harvest strategy has been maintained since 1985, with the clear conclusions that there is no negative impact on the stock long term, it is reasonable to say that the consequences of the current harvest strategy are fully known.		
80	The evaluation includes a robust approximation of the consequences of current harvest strategies. Uncertainties are considered in harvest strategy evaluations.			
100	The evaluation includes the consequences of current harvest strategies, forecasts future consequences of these and evaluates stock trajectories under decision rules.			

SCORING INDICATORS		Comments	Weight	Score
1.1.3.7		Are clear and tested decision rules set out for effective management of the stock(s)?	**12.5**	**70**
60	Decision-making is logical and appropriate but decision rules have not necessarily been formally documented or tested.	There are conservative harvesting objectives in the IFMP which are met by the current harvest strategy that has been in place since 1985 and is fully consistent with scientific advice. It is maintained by agreement under current co-management arrangements between managers and stakeholders. The assessment indicates that, to date, this policy has been successful in terms of size composition, reproductive potential, and other indicators. To this extent, good decisions have been taken that are logical and appropriate to the fishery and the limitations of the assessment, and they are tested to the extent that the fishery has been stable and sustainable under this harvesting strategy for a long period. Despite the foregoing there do not appear to be pre-agreed decision rules that formally underwrite the low-harvest regime, or that state what management action should be taken if the stock moves from one reference point domain to another. It is accepted that the enterprise allocation programme, and the consolidation of the fishery into one company holding all the licences, mean that over-exploitation would have a direct effect on the economic viability of the company (C Penney, pers comm.) but of itself this does not prevent poor decision making at some time in the future. There is an absence of pre-agreed decision rules representing a formal framework for rational decision making.		
80	Clear decision making rules are used, are fully documented, but may not have been fully tested. Decision rules are reconciled with reference points and with data and assessment limitations.			
100	Clear, documented and tested decision rules are fully implemented, are fully consistent with reference levels and with data and assessment limitations. The decision rules are evaluated periodically.			

SCORING INDICATORS		Comments	Weight	Score
1.1.3.8		Are appropriate management tools specified to implement input and/or output controls?	**12.5**	**95**
60	Management tools exist to implement input and/or output controls. Some evidence exists to show that tools are implemented and are effective in achieving management goals.	The lobster fishery is comprehensively and conservatively managed by a mix of input and output controls. These comprise limited entry (8 licences), a very low TAC of 720t that has been unchanged since 1985 and which has not been exceeded (Figure 2 in DFO 2009b), an enterprise allocation of 90t per licence, and a prohibition on landing berried and v-notched females. A minimum legal size of 82.5 mm CL is implemented and supported by the use of escape vents in the traps, although it is below the mean size of maturity, whilst company policy returns large lobsters over 6lb to the sea. The management tools are supported by VMS, mandatory log-book records, at-sea sampling by observers, and 100% dockside monitoring. The coastguard also carries out over-flights, and boards vessels, periodically. The management tools therefore appear to be effective in achieving the IFMP objectives of harvesting conservatively and protecting the stocks in LFA 41 and LFA 34 because the 2009 Science Advisory Report concludes that: • the stock is stable relative to the current indicators, • the exploitation rate in LFA41 is low, has little or no negative impact on the stock in LFA 41, and is unlikely to have an impact on the stock in LFA34 • a high proportion of the size distribution comprises large mature multi-parous females that must contribute significantly to egg production The minimum size of 82.5mm CL is below the mean size of maturity for this region (97mmCL, Pezzak et al 2001).		
80	Management tools have been specified to implement input and/or output controls. These are generic although some attempt has been made to relate them to the specific fishery OR tools are lacking in some details but are specifically related to the fishery. Evidence exists to show clearly that tools are implemented and effective in maintaining the stock at or above appropriate reference levels.			
100	Management tools, appropriate to the species and fishery, have been specified to implement input and/or output controls. These tools are implemented in a responsive, relevant and timely manner. Performance of the tools has been evaluated and evidence exists to show clearly that the management system has a high probability of achieving its objectives.			

SCORING INDICATORS	Comments	Weight	Score

1.1.4		The stock is/are at an appropriate level to maintain long-term productivity.	25	95
1.1.4.1		Is there evidence that stock status is consistent with that providing long-term productivity? **[YES - Criteria 1 is complete. NO - Answer Criteria 2]**	**100**	**95**
60	The stock is likely to be above limit reference levels or their proxies and trends in the stock are stable or positive.	There is evidence that stock status is consistent with providing long term productivity. The status of the resource is unchanged since the inception of the fishery in 1972. There is no evidence that the fishery has adversely affected the resource, and the high proportion of large, mature, multi-parous females in the size distribution is consistent with maintaining reproductive potential. The harvest strategy is conservative, and the yield from the current level of recruitment appears to be sustainable, so that the stock and fishery are consistent with long term productivity. This conclusion is subject to the caveat that recruitment in many lobster fisheries has been at record levels in recent decades for reasons that are not fully understood, but that appear to be unrelated to the lobster fishery itself. Irrespective of the low harvesting rate in LFA41, a future reversal of the favourable recruitment regime for ecosystem or oceanographic reasons cannot therefore be excluded.		
80	The stock is likely to be above reference levels, including precautionary levels, consistent with data limitations.			
100	The stock is highly likely to be consistently above precautionary reference levels.			

SCORING INDICATORS	Comments	Weight	Score

1.3 *(MSC Criterion 3)*	**Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.**		**50**	**90**
1.3.1	**Fishing activity maintains the age, genetic structure or sex composition of the stock to a degree that does not impair reproductive capacity.**		**100**	**90**
Weighting Commentary				
1.3.1.1		Is the size/sex/genetic structure of the stock monitored to detect significant impairment of reproductive capacity?	**50**	**90**
60	Some monitoring of size/age/sex and/or sub-populations is conducted and evaluated periodically.	The size distribution and sex ratio of the catch is monitored at sea by observers, backed up by 100% dockside monitoring that records the proportion of different cull groups in the landings. Observer coverage is slated for 1 trip per sub area per quarter. As described under 1.1.3.2, the results provide strong evidence that reproductive capacity in LFA41 is not impaired. There have been significant programmes on migration, larval distribution and transport, in the Gulf of Maine as part of studies into stock relationships, which indicated varying degrees of connectivity but also some isolation in time and space. Lobsters are still available for capture in all known inshore and offshore grounds in the Gulf of Maine, Scotian Shelf, Georges Bank areas, where abundance and recruitment are generally at an all time high. Genetic studies have been carried out to inform about stock structure, including a recent comprehensive analysis of samples from 34 different locations between the Gulf of St Lawrence and Cape Cod (Kenchington et al., in press) as described under the next question 1.1.3.2.			
80	Estimates are available of the size and sex structure, based on adequate sampling and verification for this stock, and the relationship of these to reproductive capacity. Monitoring is continuing to collect such information on a time scale appropriate to the species and fishery. Genetic or sub-population studies have been carried out.			
100	There is comprehensive and reliable information on the sex/age/genetic structure of the stock, and the relationship of these to reproductive capacity. Population structure is well estimated with only insignificant errors.			

SCORING INDICATORS	Comments	Weight	Score

1.3.1.2		Does information indicate any changes in the genetic structure or demography of the stock that would alter reproductive capacity?	50	90
60	Changes in stock structure have been detected but there is no evidence of negative effect on recruitment of the stock. Or, potentially adverse changes in structure are identified and remedial measures are implemented, but their effectiveness may not be demonstrated.	Scientists consider that fishing has not had any negative impacts on lobster demography in LFA 41 where, as well noted previously, the size distribution includes a wide range of sizes and moult groups, and a high proportion of mature, multi-parous females that should maintain reproductive potential (DFO, 2009b). These features have been unchanged since the 1980s,and are in significant contrast to LFA34 where the size distribution is predominantly smaller lobsters in the first moult group above the legal size, and that are mainly immature. The sex ratio in LFA 41 is in favour of females, and this is attributed to the benefits of reduced female exploitation due to the ban on landing berried females. There are no obvious changes in the structure of the lobster stocks in the Gulf of Maine over the time period of studies dating from the 1980s. Lobsters are still available for capture in all traditional fishing areas in inshore and offshore waters in the Gulf of Maine-Georges Bank-Scotian Shelf areas, and in general recruitment and abundance are higher now than ever before.		
80	Evidence exists that the fishery has not caused changes in stock structure that would affect recruitment. Or, potentially adverse changes in structure are clearly identified and effective remedial measures are implemented.	There are no known changes in genetic structure. A recent study of samples from 34 different locations in the inshore and offshore fisheries from the Gulf of St Lawrence to Cape Cod (Kenchington et al., in press) shows considerable genetic uniformity in most parts of the Gulf, but greater genetic diversity south of the Gulf, with several areas of low gene flow between neighbouring samples across the Fundy-Scotia-Georges Bank-Gulf of Maine-Cape Cod complex. The authors consider that these genetic differences are most likely to be the relic of a post-glacial colonisation postulated to have occurred from south to north after the last ice age, and maintained since then by contemporary transport and recruitment mechanisms. Such long term persistence in genetic diversity implies that there has been no genetic deterioration in the face of the relatively recent exploitation in the principal fishing areas of the Gulf of Maine.		
100	Data strongly indicate a robust age, sex and genetic structure in the stock, such as would maintain reproductive capacity.			

SCORING INDICATORS		Comments	Weight	Score
Principle 2		**Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends**	**33**	**80**
2.1 *(MSC Criterion 1)*		**The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state change.**	**33**	**82**
2.1.1		**There is adequate determination of ecosystem factors relevant to the geographical scale and life history strategy of the target species.**	**25**	**83**
Weighting Commentary		The 3 MSC criteria are given equal weighting. All Performance Indicators within this sub-criterion are considered of equal significance.		
2.1.1.1		Is the nature and distribution of habitats relevant to the fishing operations known?	**25**	**85**
60	Some information exists on the habitats on the fishing grounds but it is neither detailed nor comprehensive. The general distribution of the benthic habitat that supports the targeted stock is known.	Nature and distribution of habitats on the fishing grounds (Crowell Basin and the continental shelf edge off southwest Nova Scotia; southern slope of Brown's Bank; northeast and north slopes of George's Bank) are relatively well known, as a result of mapping surveys in these areas (Fader 2008 a, b; Breeze et al 2002, Kostylev et al 2001, 2005). Sediments in the fishery areas are generally gravel, sand or mud or mixtures of these sediments. Some rocky areas exist in canyons at the shelf break, and boulders may be mixed with gravel. Fishermen's reports that most fishing is conducted on gravel, sand or sand/mud bottoms are consistent with knowledge from scientific studies. Lobster do not appear to depend on critical habitats in the fishery area; there appears to be a widespread distribution of lobsters over broad areas of the shelf and slope, and density is low relative to inshore rocky areas where lobster are more habitat dependent (Pezzack pers comm). Some rocky areas where lobsters congregate may exist at the shelf break but the fishery primarily operates over gravel, sand and mud bottoms. As such distribution of critical habitat can be considered to be known (not present) and monitoring is not required. Clearwater has also completed multibean mapping of all lobster grounds.		
80	The nature and distribution of habitat types on the fishing grounds are known in moderate detail. The distribution of the benthic habitat critical to the targeted species is known and monitored.			
100	The nature and distribution of habitat types on the fishing grounds has been mapped in detail. The distribution of benthic habitat critical to the targeted species fishing operations is monitored with high spatial precision.			

SCORING INDICATORS		Comments	Weight	Score
2.1.1.2		Is information available on non-target species which are incidentally caught or otherwise directly affected by the fishery?	**25**	**80**
60	The main non-target species affected have been identified.	Appropriate information is available on non-target species in the bycatch, including information on distribution and ecology of many of these. Relatively little information is available on species undergoing non-catch impacts by gear, but the impacts are considered to be low. Information on composition of the bycatch, including estimated weights for 81 observed trips between 1988 and 2008, has been compiled and published (Pezzack et al 2009). Information on distribution and ecology is available on bycatch species which occur in some numbers: Jonah crab (DFO 2009jc), cusk (DFO 2008, Harris et al 2002) and Atlantic cod (DFO 2006). A number of other species have been taken as bycatch but in low amounts. Bycatch amounts of Jonah crab are not clearly documented in available information; they are not included in the bycatch compilation for the lobster fishery (Pezzack et al 2009) and discards are not explicitly treated in the most recent Jonah crab assessment (DFO 2009jc). Detailed information on benthic species which might sustain non-catch impacts from gear is not available from most of this area, but existing studies provide lists of species found here (Breeze et al 2002) and one study has provided further detail on communities on Browns Bank (Kostylev et al 2001). Information on ecology of related species would be available from other areas. Impact of this gear on benthic species is considered to be low. Gear is set in gravel, sand or mud habitats, which may have relatively productive epifauna and infauna communities (Kostylev et al 2001), but whose species are unlikely to be highly sensitive to trap gear (Eno et al 2001). Sessile erect benthic species such as hard corals are unlikely to be common on these habitats. Impacts of lobster trap gear on benthic species are likely to be low in general (NEFSC 2002). No impacts have been reported on pelagic species although there is potential for interactions with endangered marine mammals (see later sections)		
80	Appropriate information is available on non-target species directly affected by the fishery including some information on their distribution and ecology.			
100	Information is available on all non-target species directly affected by the fishery including their distribution and ecology.			

SCORING INDICATORS		Comments	Weight	Score
2.1.1.3		Is information available on the trophic position, status and relationships of the target species within the food web?	**25**	**85**
60	Key prey, predators and competitors are known.	Good information is available on predator-prey relationships of lobsters of the sizes taken in this fishery, and for lobsters from benthic settlement through juvenile and adolescent stages, from studies in other areas whose results should be generally applicable to this area (Lawton and Lavalli 1995; Sainte-Marie and Chabot 2001). However no studies in this area, which has ecological characteristics unlike most lobster fishery areas, including those in which predatory-prey studies have been done, are available		
80	Information is available on significant aspects of the position, relationships and importance of target species in the food web at key life stages.			
100	Information is available on the position and importance of the target species and relationships within the food web at key life stages. Specific information is available on major interactions.			

SCORING INDICATORS		Comments	Weight	Score
2.1.1.4		Is there information on the potential for the ecosystem to recover from fishery related impacts?	**25**	**80**
60	Key elements of the functioning of the ecosystem, relevant to the fishery, are identified.	Main elements of the functioning of the ecosystem and ability to recover from fishery impacts are understood. For bycatch species, population status and trends, and ability to recover from overexploitation are well studied (see references in 2.1.1.2), although there are uncertainties related to the potential of some demersal fish species (cusk, Atlantic cod) to recover from current low population levels. Preliminary descriptions of benthic communities are available for some parts of the fishery area (Brown's Bank, Georges Bank) (Breeze et al 2002), along with a more detailed description of communities on Brown's Bank at depths less than 120 m (Kostylev et al 2001), which, along with information on population dynamics of the types of species in these communities (molluscs, echinoderms, annelids, brachipoods and others) would permit initial assessment of recovery ability of these communities. Ability of gravel, sand and mud habitats and communities to recover from impacts of fishing by mobile gears are generally known from studies in other areas (see summary in Rice 2006). Impact of this fishery on benthic habitats and communities is considered to be low.		
80	The main elements of the functioning of the ecosystem and its ability to recover from fishery related impacts are understood.			
100	Detailed information is available on the potential for affected elements of the ecosystem to recover from fishery related impacts.			

SCORING INDICATORS	Comments	Weight	Score

2.1.2	General risk factors are adequately determined.	25	82
Weighting Commentary	The PIs associated with bait, the potential for relocation of species and unobserved mortality were considered to be less significant and so given lower weightings.		
2.1.2.1	Is information available on the nature and extent of the by-catch (capture of non-target species)?	**30**	**75**
60 Appropriate qualitative information is available on by-catch species. This enables those species caught in significant numbers to be identified.	Quantitative information on most bycatch species is available (Pezzack et al 2009), including estimates of weights taken in 81 trips between 1988 and 2008. Observer coverage has been relatively low, although this is considered adequate to provide a reasonably accurate picture of incidental catch, and in particular, to indicate that bycatch in this fishery is quite low for most species. Bycatch information on Jonah crab is collected but is not reported in the most recent assessments. This species is not covered in the overall compilation of bycatch (Pezzack et al 2009) and discards are not explicitly addressed in the most recent Jonah crab assessment (DFO 2009jc) although the report notes that this information will be considered in the future. Information on distribution and ecology of the most common bycatch species (rock and Jonah crabs, cusk, Atlantic cod, some other fish species) is available. Although such information is not available for most other bycatch species, these are taken in very low numbers and impacts at the population level are likely to be very low. The target for observer coverage is 1 trip per quarter per fished area. The observer coverage has been an average of 6 trips in each of the 13 years in which trips have been observed. Annual coverage has ranged between 2 and 9 trips. The score would have been higher if information on a key bycatch species, Jonah crab, had been reported.		
80 Information is available on non-target species directly affected by the fishery including their distribution and/or ecology. Quantitative information is available on significant by-catch. If obtained by sampling, this is considered sufficient to provide adequate information.			
100 Accurate records are kept on the nature and extent of all by-catch species.			

SCORING INDICATORS		Comments	Weight	Score
2.1.2.2		Is information available on the extent of non-retained catch (discards)?	**30**	**75**
60	Information is available of the extent of major components of non-retained catch, sufficient to identify the likely significance of this.	Available information is adequate to assess likely significance of non-retained catch, and to allow preliminary estimates of quantities. Lobsters below legal size (82.5 mm carapace length) are discarded under regulations, while animals above 6 lbs are discarded for market reasons. Discarding is immediate upon trap hauling and animals are released in good condition. Few lobsters below legal size are taken in this fishery (DFO 2000, page 10) and all those taken are discarded. Quantities of undersized animals discarded are recorded by observers on observed trips. Survival of lobsters discarded at sea is probably quite high, since this species survives handling well and sinks rapidly. Recovery rates of tagged lobsters in offshore areas (Pezzack et al 1992) are similar to those in areas closer to shore (e.g. Campbell and Stasko 1986) at around 30%, indicating that survival of discards in offshore areas is similar to survival inshore. The score would have been higher if discards information was analyzed and reported.		
80	Adequate information is available to allow estimates of the non-retained catch to be calculated and its significance interpreted.			
100	Accurate and verifiable information is available on the extent of all non-retained catch, and the consequences of these. Or the entire catch is landed.			

SCORING INDICATORS		Comments	Weight	Score
2.1.2.3		Is there information on any unobserved fishing mortality (i.e. sources of mortality other than those above)?	**18**	**80**
60	Areas of potential unobserved fishing mortality are identified but no further information is available.	Available information from published work suggests that unobserved fishing mortality to the target species and other species would be low, but no estimates in this fishery area have been made. A preliminary review of potential impacts of the fishery on bottom habitats and species has been done (Pezzack et al 2009). Lobster are reportedly not taken in significant numbers in other fisheries; trawl fisheries in this area could take lobster as bycatch but quantities are considered to be low relative to recorded removals in fisheries and estimates of other sources of mortality. Unobserved mortality caused by fishing gear to benthic invertebrates could occur but is likely to be low, due to the configuration of gear, fishing methods, and the low overall density of fishing gear on the ground. The fishery mainly occurs on gravel, sand and mud bottoms which are unlikely to have high concentrations of sensitive invertebrate species. Traps are not weighted, which will reduce impact of traps on the bottom. The impact of lobster trap fisheries on gravel-sand-mud bottoms is considered to be generally low relative to other types of fishing gear (NEFSC 2002). Density of gear on the ground at the maximum would be 12,000 traps in a fishing area of 32,000 km^2. However, there could be cumulative effects of numerous gear hauls in the same areas. No studies of the impacts of American lobster fisheries on benthic invertebrate communities have been conducted in this area, or in other areas. Score would have been higher if a more detailed assessment of unobserved fishing mortality had been carried out, particularly if this was based on observations in this area.		
80	Information from existing work has allowed qualitative estimates of unobserved fishing mortality to be made.			
100	Research has been carried out on unobserved fishing mortality allowing quantitative estimates to be made (or it is known that significant unobserved mortality does not occur).			

SCORING INDICATORS		Comments	Weight	Score
2.1.2.4		Are the effects of supply and use of bait known?	**18**	**100**
60	Types of bait, extent of use and sources of supply are known. Although little information is known on the amounts used, their collection is unlikely to cause significant conservation problems.	Impacts of the supply and use of bait are well known and are negligible. Bait (salt herring) is purchased from a company which purse seines herring from the 4WX (southwest Nova Scotia) stock, consistent with fishery management plans and regulations (which in turn are based on regular stock assessments). About 500 t/yr of herring is purchased for bait, a small quantity relative to the current herring TAC and catches of 50,000 t/yr. This herring stock has been at a low abundance level in recent years, but fisheries are considered to operate within sustainable TAC levels (DFO 2009).		
80	There is adequate knowledge of the use of bait including sources and amounts and there is sufficient information to indicate that collection of bait does not cause significant conservation problems.			
100	All significant impacts of the supply and use of bait are known, and are negligible.			

SCORING INDICATORS		Comments	Weight	Score
2.1.2.5		Are the potential and significance of introduced / relocated species known?	**4**	**100**
60	There is recognition of potential sources of introduced / relocated species.	No introduced or relocated species issues are known for this fishery. Bait is salt herring sourced from Nova Scotia herring fisheries, where no introduced species are known to interact with the herring fishery. The offshore lobster fishery is conducted in offshore marine waters where introduced species are not considered an issue. The only introduced or relocated species known in eastern Canada's marine waters are found in relatively shallow inshore areas.		
80	Potential routes and significance of introduced/relocated species directly related to the fishery are known.			
100	Potential routes and significance of introduced/relocated species directly related to the fishery are known and monitored. Records are kept.			

SCORING INDICATORS		Comments	Weight	Score
2.1.3	**There is adequate knowledge of the effects of gear-use on the receiving ecosystem and extent and type of gear losses.**		**25**	**85**
Weighting Commentary		All performance indicators were given equal weighting.		
2.1.3.1		Is there adequate knowledge of the physical impacts on habitat due to use of fishing gear?	**50**	**80**
60	Main impacts of gear use on habitat are identified or can be estimated, including extent and locations of use.	Main impacts of gear on habitat can be estimated, based on studies in other areas, and extent and location of gear use are well known A preliminary assessment of fishery impacts on bottom habitats has been done (Pezzack et al 2009). Good information is available on the distribution of fishing, including averaged maps of fishing effort over several years (Johnston et al 2007) and ongoing monitoring of distribution of fishing by mandatory VMS. Gear configuration and fishing methods are such as to cause minimal impact on the bottom, particularly relative to other types of fishing gear. Traps used in this fishery are not weighted, which would tend to reduce the impact of traps on bottom sediments and communities relative to the weighted traps typically used in inshore and midshore areas. However, impacts could be caused by anchors at the ends of trap lines, and by the lines connecting traps, particularly if traps were hauled in such a way as to drag lines on the bottom (due to wind or current) (Eno et al 2001). Impacts of this fishery on bottom sediments and geological structures are likely to be quite limited. Lobster trap fisheries are considered to have lower impacts than other types of fisheries on the gravel, sand or mud substrates on which this fishery concentrates (NEFSC 2002), although the cumulative effects of repeated trap hauls are not known. Impacts on biotic components of bottom habitats have not been studied in this area. The sediment types on which the fishery is primarily conducted – gravel, sand, mud – are not typically inhabited by vertically-developed organisms such as soft or hard corals, although such organisms may occur. The single published study of trap fishery impacts on bottom organisms (Eno et al 2001) suggests that direct impacts even on organisms with vertical structure (sea pens, soft corals) may be limited. However the cumulative impacts of many trap hauls in the same area, and the impacts of dragging lines, were not examined (Eno et al 2001). (note: assessment of impacts of trap gear on bottom habitats are critically dependent on a single published study, Eno et al 2001, and more research on this question would support better assessments of potential impacts). The score would have been higher if observations of gear impact on habitat in this area were available.		
80	Impacts of gear use on the habitat are identified or can be reliably estimated including reliable information on the extent, timing and location of use.			
100	The physical impacts on the habitat due to use of gear have been studied and quantified, including details of any irreversible changes.			

SCORING INDICATORS		Comments	Weight	Score
2.1.3.2		Is any gear lost during fishing operations and are any effects known (e.g. can 'ghost fishing' occur)?	**50**	**90**
60	Some recording of gear losses takes place and an assessment can be made of ecosystem impacts, including 'ghost fishing'.	Impacts of ghost fishing are considered to be low in this fishery, due to a combination of low gear losses and gear modifications to reduce the potential for ghost fishing by any lost traps. Strings of traps, if lost, will be retrieved as the cost of gear is high; use of GPS and effective grapples on the relatively soft substrates fished assure a very high probability of retrieval. Individual traps may be lost; the fishing company estimates about 20 lost per year (of a total of 12,000 fished). Traps by regulation include an escape panel attached to the trap with degradable iron rings which rust and release the escape panel. Similar degradable iron rings are also used to hold the trap together so traps would collapse over time (fishermen report that this occurs in a 3 month period). Bait is required for traps to fish effectively and bait attraction would be lost rapidly in lost gear. Under these circumstances, impact of ghost fishing is considered to be low. Effects of lost gear on marine mammal entanglements are considered to be low since all efforts are made to retrieve lost gear, and because line used is not buoyant. The score would have been higher if documented information on time required to degrade the iron release rings was available, and if information on loss of gear was available (for example from logbooks).		
80	There is knowledge of the type, quantity and location of gear lost during fishing operations. Estimates made show that losses do not cause unacceptable impacts on the ecosystem.			
100	There is detailed knowledge of the type, quantity and location of gear types lost during fishing operations. The impact of gear loss on target and non-target species can be shown to have negligible effects on habitats, ecosystems or species of concern through for example 'ghost fishing'.			

SCORING INDICATORS		Comments	Weight	Score
2.1.4		**Assessments of impacts associated with the fishery including the significance and risk of each impact show no unacceptable impacts on the ecosystem structure and/or function, on habitats or on the populations of associated species.**	**25**	**80**
Weighting Commentary		All the performance indicators are weighted the same.		
2.1.4.1		Does the removal of target stocks have unacceptable impacts on ecosystem structure and function?	**20**	**85**
60	The removal of target stocks could lead to impacts upon ecological systems (applying the precautionary approach where necessary). A programme is in development to identify these and, if appropriate, reduce mortality to acceptable limits.	Sufficient information is available on consequences of removal of the target species to indicate no unacceptable impacts on ecological systems in the fishery area. Removals in this fishery are low (720 t/yr) relative to the size of the population of which it is part, and exploitation rate in this area is estimated to be relatively low (15-20%). All lobsters taken are adult size, most of which are well above the minimum carapace length of 82.5 mm (DFO 2000). Adult lobsters are essentially top predators in the ecosystem, with no indications of regular predation by other species (Lawton and Lavalli 1995); accordingly removal of lobsters would not cause a dearth of prey for other predators. Lobsters feed on a wide variety of prey (Lawton and Lavalli 1995; Phillips 2006); while removal of a large proportion of the lobster population could potentially have impacts on structuring of prey communities the low removals in this fishery suggest that such impacts are minimal. Large lobsters (over 6 lbs), which would have the greatest impact on structuring prey communities, are discarded at sea and survivability is considered high.		
80	Sufficient information is available on consequences of current levels of removal of target species to suggest no unacceptable impacts of the fishery on ecological systems within major fishing areas.			
100	The ecological consequences of current levels of removal of target stocks have been evaluated and determined to be within acceptable limits.			

SCORING INDICATORS		Comments	Weight	Score
2.1.4.2		Does the removal of non-target stocks have unacceptable impacts on populations or ecosystem structure and function?	**20**	**80**
60	The removal of non-target species could lead to impacts upon population status and/or ecological systems (applying the precautionary approach where necessary). A program is in place to identify these and, if appropriate, reduce these to acceptable, defined limits.	Sufficient information is available on consequences of removal of non-target species to suggest no unacceptable impacts of the fishery on populations or ecosystems with the fishery area. Information on estimated bycatch weights for key bycatch species of finfish suggests that removals are low relative to other sources of mortality. For cusk, the estimate of 22 t/yr removed in this fishery is low relative to other sources of mortality (800-1500 t/yr in groundfish bycatch; 225 t/yr as bycatch in the inshore lobster fishery) (DFO 2008). For Atlantic cod, estimated bycatch of 0.19 t/trip is low compared to removals by directed fisheries of several thousand tons per year. Bycatch estimates for other finfish species are very low (Pezzack et al 2009), essentially negligible in terms of population-level impact. Abundance of Jonah crab has declined to a very low level in the past 10 years in this area, possibly as a result of fishing (DFO 2009jc). Bycatch and discards of this species are not well quantified in existing sources (DFO 2009jc; Pezzack et al 2009). All individuals caught are currently returned to the water and discard survival is probably relatively high as indicated by good returns from tagging programs of related *Cancer* species (Fahy 2004). Atlantic rock crab is the most important invertebrate species in reported bycatch (Pezzack et al 2009); all individuals are discarded and survival is expected to be high, as with Jonah crab. Several other crab species are taken but in low numbers; a few echinoderm and mollusc species are occasionally taken. Overall, information is available to indicate that there are no unacceptable impacts of bycatch in this fishery on non-target stocks and species. The score would have been higher if better information on impact of bycatch and discards of Jonah crab on the population were reported.		
80	Sufficient information is available on consequences of current levels of removal of non-target species to suggest no unacceptable impacts of the fishery on population status and/or ecological systems within major fishing areas.			
100	The consequences of removal of non-target species on population status and/or ecological systems have been evaluated and determined to be within acceptable limits			

SCORING INDICATORS		Comments	Weight	Score
2.1.4.3		Does the fishery have unacceptable impacts on habitat structure?	**20**	**80**
60	There is no evidence that the fishery is having unacceptable impacts, based on a reasonable understanding of the fishery, although the issue has not been directly studied.	Sufficient information is available on the fishery to indicate no unacceptable impacts on habitats. The fishery operates largely outside areas which have been identified as sensitive. No fishing is allowed in a coral closed area in the Northeast Channel between the lobster fishing areas on Georges and Brown's Bank (DFO 2006). The Brown's Bank lobster fishery closed area overlaps with the Roseway Basin conservation area for right whales (Johnston et al 2007). Lobster fishing areas (Johnston et al 2007) for the most part do not overlap with ecologically and biologically significant areas (EBSAs) on the Scotian Shelf , Gulf of Maine and Georges Bank identified through an expert consultation (Doherty and Horsman 2007). There is some overlap on the northern edge of Georges Bank with an area identified as sensitive for tubeworm development but fishing intensity is low here. The "stone fence" area of high benthic invertebrate diversity is to the north of the fishery area, in Jordan Basin. Major fishing areas on the southern edge of Brown's Bank, eastern edge of Georges Bank and off southwest Nova Scotia do not correspond with identified EBSAs. Impact of this fishery on bottom habitats is likely to be low relative to other fisheries due to the configuration of gear, fishing methods, and the low density of gear on the ground. The fishery primarily operates in gravel-sand-mud bottoms which are unlikely to be characterized by areas of complex biotic structure providing habitat. The impact of lobster trap fisheries on gravel-sand-mud bottoms such as fished here is considered to be generally low relative to other types of fishing gear (NEFSC 2002). The single study of trap impacts on bottom communities suggests that impacts would be relatively low, even on species with vertical development (Eno et al 2001) Traps are not weighted, which would reduce their impact on the bottom. Maximum trap densities would be 12,000 traps in 32,000 km^2 (Pezzack et al 2009). However, cumulative effects of numerous gear hauls in the same areas could add to impacts, as could dragging of groundlines on hauling, and these impacts of a trap fishery on bottom habitats have not been studied in this area (or in other areas).		
80	Sufficient information is available on the consequences of the fishery to suggest no unacceptable impacts upon habitats within major fishing areas or on sensitive habitats elsewhere.			
100	Effects on habitat structure are well documented and are within acceptable tested/justified limits.			

SCORING INDICATORS		Comments	Weight	Score
2.1.4.4		Are associated biological diversity, community structure and productivity affected to unacceptable levels?	**20**	**80**
60	There is no evidence that the fishery is having unacceptable impacts, although the issue has not been directly studied.	Impacts on communities other than the benthic are essentially non-existent; buoy lines (2 per 100 traps) are the only part of the gear off the bottom (interactions with protected, endangered and threatened species are treated later). With respect to benthic communities, gear configuration and fishing methods are such as to minimize impacts; although there could be unassessed impacts due to cumulative effects and dragging of groundlines, these are considered to be within acceptable limits given that the gear operates primarily on gravel-sand-mud bottoms. Invertebrate communities of these areas have been generally described (Breeze et al 2002) and consist of molluscs, echinoderms, annelid worms, brachipods and other benthic species. Although soft corals may occur on such soft bottoms (Edinger et al 2007) impacts of trap gear on such organisms have been found to be relatively low (Eno et al 2001).		
80	Appropriate information is available on the effects of the fishery on biological diversity, community structure and productivity. This does not indicate any unacceptable impacts.			
100	The effects of the fishery on biological diversity, community structure and productivity have been quantified and are within acceptable tested/justified limits			

SCORING INDICATORS	Comments	Weight	Score

2.1.4.5		Are management strategies in place to address impact identification and avoidance/reduction?	20	75
60	Management strategies include some appropriate consideration of ecosystem impact identification and avoidance/reduction, but may not be tested.	Several management measures are in place which act to reduce ecosystem impacts of this fishery. A coral closed area is in place near fishery areas and the lobster fishery closed area on Browns Bank overlaps with an area where concentrations of right whales occur. A process to identify ecological and biologically sensitive areas (EBSAs) is under way on the Scotian shelf, and EBSAs identified to date do not for the most part overlap with the fishery. Fishing operations are such as to address some ecosystem impacts. Traps include degradable escape panels to address ghost fishing and are put together with degradable clips; non-floating groundlines are used which should reduce risk of entanglement of marine mammals. All bycatch is discarded and amounts of bycatch species taken are estimated based on observer reports. Although these management measures are in place, the fishery management plan does not explicitly address impacts of the fishery on the ecosystem in which it operates, although one of the long-term objectives in the Integrated Fishery Management Plan states that adverse environmental impacts will be minimized. While the ecosystem impacts of this fishery are considered to be relatively low, meeting the 80 scoring guideline requires that strategies be in place to detect and reduce ecosystem impacts of the fishery. Developing these would include consideration of the potential impacts of the fishery on the ecosystem and either identification of measures to address these or a determination that such measures were not necessary.		
80	Management strategies are in place to detect and reduce ecosystem impacts, although these may not have been fully tested, they are considered appropriate to adequately protect key elements of the ecosystem within main fishing areas.			
100	Management strategies are in place to monitor, detect and reduce impacts. These are designed to adequately protect ecosystems, habitats and populations of target and non-target species and keep impacts within determined acceptable levels.			

SCORING INDICATORS		Comments	Weight	Score
2.2 *(MSC Criterion 2)*		**The fishery is conducted in a manner that does not threaten biological diversity (at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.**	**33**	**73**
2.2.1		**Fishing is conducted in a manner, which does not have unacceptable impacts on recognised protected, endangered or threatened species.**	**50**	**77**
Weighting Commentary		All performance indicators are weighted the same		
2.2.1.1		Is there information on the presence and populations of protected, endangered or threatened species?	**33**	**80**
60	There is a programme in place to identify protected, threatened and endangered species directly related to the fishery. There is periodic monitoring of the main population trends and status of protected, endangered and threatened species.	Endangered and threatened species are identified by the Committee on Status of Endangered Wildlife in Canada (COSEWIC) and certain species so identified are added to Schedule 1 of the *Species at Risk Act* (SARA), following which they are protected from harm. The following such species could be directly related to this fishery: right whale, leatherback turtle, and northern bottlenose whale, Scotian Shelf population (both assessed as "endangered" by COSEWIC and listed on SARA Schedule 1). (Species assessed by COSEWIC but not on SARA Schedule 1, and species undergoing COSEWIC assessment are treated in sections on Depleted Species.) A SARA-compliant recovery strategy is in place for leatherback turtle (Leatherback Turtle Recovery Team 2006). For right whale, a recovery strategy was published in 2000 (Anon. 2000b) and a revised version consistent with SARA requirements has recently been finalized (Brown et al 2009). A proposed recovery strategy for the northern bottlenose whale, Scotian Shelf population, was recently published (DFO 2009). These strategies outline research and conservation requirements for these species. A number of research and conservation activities are under way for all three species. Critical habitat for the North Atlantic right whale was identified in the recently-released SARA-compliant recovery strategy (Brown et al 2009), and has also been identified for northern bottlenose whale on the Scotian shelf (DFO 2009d). Right whales are regularly monitored under the North Atlantic Right Whale Consortium's program of shipboard and aerial surveys (e.g. Khan et al 2009). Survey effort is not evenly distributed in time and space, but tends to be concentrated in areas and at times of known concentrations, so may not provide an unbiased picture of distributions, but general patterns are relatively well known and consistent from year to year (see graphs of sightings information in the lobster fishery area in introduction). Information on presence of this species in the fishery is poor, although it is known that the species can be present in the fishery area at any time of year (Baumgartner and Mate 2005; Mellinger et al 2007). Leatherback turtle population status is monitored by spawning nest surveys in the spawning areas (Turtle Expert Working Group 2007), but there is no ongoing program of monitoring in coastal or offshore areas in Atlantic Canada. No information is available on distribution or abundance of this species in the fishery area. Northern bottlenose whales are only occasionally observed in the fishery area and are considered to concentrate in canyon areas on the shelf edge to the northeast of the fishery area (DFO 2009d; Wimmer and Whitehead 2004). Although information merits an 80 score, the score would have been higher if survey effort for right whales was more evenly distributed spatially and temporally to cover the fishery area, and if monitoring of leatherback turtles was done in the fishery area or nearby waters.		
80	Protected, threatened and endangered species directly related to the fishery have been identified. Populations are monitored on a regular basis.			
100	There is knowledge of all populations of protected species directly or indirectly related to the fishery including their dynamics. Regular monitoring of protected, endangered and threatened species is undertaken, supported by research programmes to assess threats and promote their conservation. The type and distribution of critical habitats have been identified.			

SCORING INDICATORS		Comments	Weight	Score
2.2.1.2		Are interactions of the fishery with such species adequately determined?	**33**	**75**
60	The main interactions directly related to the fishery are known.	Right whales, leatherback turtles and northern bottlenose whales could potentially become entangled in offshore lobster fishing gear. Entanglement in fishing gear is an important source of mortality for these species. Information available to assess risk of entanglement is relatively poor for each species, and this is of particular importance for right whales, for which any entanglement could prejudice survival of the species. Although risks for right whale from this fishery appear to be relatively low in the context of the overall threat environment (see Section 7.3 in Introduction), risks are not well determined because of incomplete information in the fishery area. There have been no reports of entanglement of these species in offshore lobster fishing gear. At present, it does not appear that a formal requirement to record and report on incidental mortalities of protected, endangered or threatened (PET) species, or to estimate interactions with these species, is reflected in the licence condition. Until this requirement is put in place the fishery does not meet the Scoring Guideline for 80.		
80	Appropriate estimates are made of the effects of interactions directly related to the fishery. There is a requirement to record and report all incidental mortalities.			
100	Reliable quantitative estimates are made of the interactions of all populations directly related to the fishery, and qualitative information is available on indirect impacts. Incidental mortalities are recorded and reported.			

SCORING INDICATORS		Comments	Weight	Score
2.2.1.3		Do interactions pose an unacceptable risk to such species?	**33**	**75**
60	Known interactions are within acceptable limits of national and international legislative requirements and are believed to create no biological threats to the species concerned.	Risk assessment for right whale suggests that the risks of entanglement in this fishery are low in the context of the overall threat environment (see Introduction Section 7.3). No entanglements have been reported by fishermen or observers. However information in the fishery area is sparse and inferences on risk must be made from information on seasonal and areal patterns of abundance and from information on the mode of operation of the fishery. Gear configuration is such as to reduce entanglement risk: two buoy-lines are used for each string of 100 traps, and non-floating groundlines are used. Total vertical lines in the water would be a maximum of 240 at any given time (12,000 traps used, in strings of 100 traps, with two endlines per string), over a total fishing area of 32,000 km^2, or 7 endlines per 1000 km^2 over the whole fishing area (vertical lines would of course be more concentrated in areas fished, but density can be considered low). The offshore lobster fishery does not operate in areas of known right whale concentration (Johnston et al 2007) and does not operate in July-September, when abundance of right whales is at its peak in Canadian waters (see graphs of seasonal occurrence in section 7.3 of this report). Leatherback turtles typically are present in Canadian waters from June to October (Leatherback Turtle Recovery Team 2006; James et al 2005) so the seasonal cessation of fishing in July-September at the peak of presence of leatherback turtles in Canadian waters would help to reduce entanglement risk for this species. The critically endangered nature of the right whale population is such that any entanglement represents a threat to the population. Although it appears that risks may be low, it is considered that this PI does not meet the 80 scoring guideline since effects cannot be considered well estimated; achieving a score of 80 would require obtaining additional information on interactions with the fishery. Knowledge of leatherback turtles in the fishery area is essentially unavailable although as with right whales, seasonal fishing pattern and mode of operation of the fishery would be such as to reduce risks, Northern bottlenose whales are rarely observed in the fishery area.		
80	Direct and indirect effects are well estimated and do not threaten protected, endangered or threatened species.			
100	It is known that the direct and indirect effects of fishing on protected, threatened and endangered species are within acceptable limits.			

SCORING INDICATORS		Comments	Weight	Score
2.2.2	**Strategies have been developed within the fisheries management system to address and restrain any significant impacts of the fishery on protected, endangered or threatened species.**		**50**	**70**
2.2.2.1		Are management objectives and accompanying strategies in place in relation to impact identification and avoidance/reduction?	**100**	**70**
60	Management systems are in place to address key areas of impact identification and avoidance/reduction.	With respect to entanglement of identified PET species, management of fishing practices is such as to reduce risk to very low levels. However formal management objectives have not been set, nor have the management strategies been formalized in the fishery management plan. Consideration of measures to ensure that fishery operations are such as to minimise risk, and measures to obtain better information on interactions, would be required to achieve the 80 scoring guideline. These could be undertaken in the context of the Canadian Recovery Strategy for North Atlantic Right Whale (Brown et al 2008).		
80	Management objectives are set to detect and reduce impacts. Accompanying strategies are designed to adequately protect endangered and threatened species within main fishing areas.			
100	Tested management objectives are set to detect and reduce impacts. Accompanying strategies are designed to adequately protect the protected endangered and threatened species.			

SCORING INDICATORS	Comments	Weight	Score
2.3 *(MSC Criterion 3)*	**Where exploited populations (of non-target species) are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.**	**33**	**83**
2.3.1	**There are management measures in place that allow for the rebuilding of affected populations.**	**100**	**83**
Weighting Commentary	All performance indicators are weighted the same.		
2.3.1.1.	Is there sufficient information to allow determination of necessary changes in fishery management to allow recovery of depleted populations?	**33.3**	**90**
60 There is some information on functional relationships, sufficient to allow alterations to be made to fishing to recover and rebuild depleted species. 80 There is adequate information, combined with a precautionary approach wherever necessary, to allow alterations to be made to fishing that would be expected to recover and rebuild depleted species to specified levels within appropriate timeframes. 100 There is a clear understanding of functional relationships between the impacted population and the fishery. Intervention measures based on this understanding have been tested and/or are known to be effective in promoting recovery of depleted species to specified levels within appropriate timeframes.	Depleted populations which could interact with this fishery include cusk (identified by COSEWIC, candidate for SARA Schedule 1), and Atlantic cod (COSEWIC Special Concern; reassessment under way). Sufficient information is available on these species to indicate that current fishing practices in the offshore lobster fishery are adequate and that no further alterations to the fishery are necessary at this time. For cusk, a recent assessment (DFO 2008) indicates that bycatch in this fishery is low relative to other sources of mortality (bycatch in groundfish and inshore lobster fisheries, 800-1500 t/yr and 225 t/yr respectively), and relative to desirable levels to ensure future increase in the population (of the order of 700 t/yr). For Atlantic cod, removals in this fishery are estimated at 0.19 t per trip, substantially lower than removals of cusk; this is not considered significant relative to removals in other fisheries (3-4,000 t/yr, DFO 2006).		

SCORING INDICATORS		Comments	Weight	Score
2.3.1.2		Are management measures in place to modify fishery practices in light of the identification of unacceptable impacts?	**33.3**	**80**
60	A mechanism exists for the modification of fishing practices in light of the identification of unacceptable impacts	The Integrated Fishery Management Plan (IFMP) process and mechanisms used to manage the fishery based on this process (regulations, licence conditions, variation orders etc) are effective measures which could be used to modify fishery practices if unacceptable impacts on depleted species were identified. Although not considered a depleted species for the purposes of this assessment, the most recent assessment of Jonah crab (DFO 2009 jc) noted that abundance of the harvested fraction of this species (large males) had declined following a period of fishing, and suggested that this species might be particularly sensitive to fishing. For Jonah crab, all individuals captured are currently discarded for market reasons, and regulations require discarding of all females and males smaller than the minimum size of 130 mm carapace width (DFO 2009jc). Survival of discards is expected to be good based on experience in tagging studies with similar *Cancer* species (Fahy et al 2004). . The size limit would have the effect of protecting smaller mature males since 50% maturity is estimated at 128 mm. The score would have been higher if the potential requirements to manage a key bycatch species, Jonah crab, following recent declines, were recognised in the IFMP.		
80	Effective management measures are in place to modify fishery practices in light of the identification of unacceptable impacts.			
100	Monitoring programs are in place within the management system to allow the timely modification of fishery practices in light of the identification of unacceptable impacts. Objectives and limits for environmental change are used to guide operational practices. It is demonstrated that these are effective.			

SCORING INDICATORS		Comments	Weight	Score
2.3.1.3		Do management measures allow for recovery of affected populations?	**33.3**	**80**
60	Rebuilding measures based upon appropriate information exist and are being implemented. Measures may not have been tested, but are considered appropriate.	Fishing methods and practices are such as to minimize impacts of the fishery on depleted finfish populations, and impacts are demonstrably low for one species (cusk) and probably low for another (cod). Size limits in the Jonah crab fishery protect all mature females and smaller mature males; currently, all Jonah crab taken are immediately discarded for market reasons. Discard survival of Jonah crab is considered to be high. Degradable escape panels are used to minimize impact of ghost fishing. Estimated bycatch of cusk is low relative to other sources of mortality and to estimated allowable take. Bycatch of Atlantic cod is small in relation to other sources of mortality. A fishery management plan is in place for Atlantic cod which aims to maintain the population at a sustainable level. Despite the management measures for Jonah crab (in particular the TAC and size limits), a substantial decline in abundance has been observed in the fishery area over the past decade, which may be attributable to fishing (DFO 2009jc). Overall, appropriate measures are being taken to ensure rebuilding of depleted species which are impacted by the fishery, and these should be effective. The score would have been higher if formal measures to respond to the recent decline in Jonah crab had been in place, and if a rebuilding framework for cusk had been in place.		
80	Appropriate rebuilding measures based upon appropriate information have been implemented to specified timescales. Measures have been tested and can be shown to be effective in assisting to rebuild the affected populations.			
100	Appropriate rebuilding measures are being implemented to promote recovery as quickly as is possible. Additional measures are being implemented to prevent problems in the future.			

SCORING INDICATORS	Comments	Weight	Score

Principle 3	**The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable**		**33**	**88**
3A	**Management System Criteria**		**50**	**87**
3A.1 (*MSC Principle 3 Intent and Criterion 3*)	**A management system containing an institutional and operational framework exists with clear lines of responsibility.**		**12.5**	**90**
Weighting Commentary		Under sub-criterion 3A.1, external review was given a slightly lower weighting than the other performance indicators.		
3A.1.1		Are organisations with management responsibility clearly defined including areas of responsibility and interactions?	**25.8**	**100**
60	Organisations with management responsibility are known. Responsibilities and interactions may require clarification but are effective in critical areas.	The Canadian constitution grants legislative authority for the management of seacoast and inland fisheries to the Parliament of Canada. There are several pieces of legislation that apply to the fishing industry, the major one being the *Fisheries Act*, RS R.S. 1985, c. F-14C. That *Act* grants wide discretionary authority to the Minster of Fisheries and Oceans and provides the Governor in Council (for all practical purposes, the government in power) the authority to enact regulations respecting the management of the fishery. The *Atlantic Fishery Regulations*, 1985 and the *Fishery (General) Regulations* are the main regulations governing the fishery. Management measures are developed under the authority of the *Act* and the regulations and ministerial powers are delegated to officials of the DFO. All areas of management responsibilities and roles are clearly defined within the department and fishery management programs are delivered in an organized and controlled manner. A network of scientists, resource managers, monitoring, control and surveillance staff are responsible for the administration of fishery management programs. There is an effective industry advisory committee, the Offshore Lobster and Jonah Crab Advisory Committee (OLJCAC), which is composed of the significant stakeholder and other interested parties. This committee reviews DFO assessments and fishery performance data and develops recommendations to the DFO on annual total allowable catches (TAC) and management measures. Annual management plans are drafted and approved by the DFO. This committee is bolstered by the Offshore Lobster and Jonah Crab Management Board (OLJCMB) which oversees the implementation of the annual fishing plan. Scientific assessments of the stock are conducted via an open process called the Regional Assessment Process (RAP). This forum is open to knowledgeable individuals and includes scientists, industry members and others upon application and invitation. It is a peer review of the methodology and assessment of the offshore lobster stock in all areas.		
80	Organisations with management responsibility have been defined including key areas of responsibility and interaction.			
100	Organisations with management responsibility are clearly defined including all areas of responsibility and interaction. Interactions are demonstrably effective.			

SCORING INDICATORS		Comments	Weight	Score
3A.1.2		Is the system consistent with the cultural context, scale and intensity of the fishery?	**25.8**	**100**
60	Inconsistencies may arise in some key areas but a programme is in place to address these.	The system is fully in line with the geographical, structural and cultural features of the fishery. This is an offshore fishery conducted by 2 vessels ranging from 90-140 feet overall. The crew complement varies from 15-18 depending on the vessel. The OLJCAC membership includes representatives of the inshore lobster fishery and provincial governments and meetings are open to the public. Two First Nations groups are given notice of meetings although there is no history of aboriginal participation in the offshore lobster fishery There are occasional gear conflicts with groundfish mobile gear trawlers in some areas as the latter are required to maintain a distance of ½ nautical miles from previously set fixed gear.		
80	The system is consistent with key elements of the cultural context, scale and intensity of the fishery.			
100	The system is entirely consistent with the cultural context, scale and intensity of the fishery.			

SCORING INDICATORS		Comments	Weight	Score
3A.1.3		Is the management system subject to internal review?	**25.8**	**80**
60	There are mechanisms in place to allow for internal review	IFMPs are reviewed by the DFO and the industry through OLJCAC on a long term basis. The 2000 plan was updated in 2006 and runs from 2006-2011. These plans are broad and cover a wide range of conservation, economic and ecological issues, although they are weak on implementation and short-term objectives. The performance of the fishery is reviewed on an annual basis (usually in December) by the OLJCAC and adjustments made for the upcoming quota year. The Regional Assessment Process (RAP) is by design a review of the scientific assessment process and conclusions, although they are infrequent (2000, 2009). Its peer review meetings are a forum for challenging and testing the validity of scientific information and the process is designed to reach consensus on the available data. Hence, the methodology, assumptions and conclusions are under review. The score for this indicator would have been higher if a review mechanism at stated intervals was a documented and an integral part of the management regime.		
80	The major components of the management system are subject to internal performance review and evaluation at appropriate intervals. Results of on-going evaluation of management performance are made public. Evaluation results demonstrate that the management system shows improvements.			
100	The management system is subject to regular and frequent internal review. This includes evidence that the assessment methodology has been evaluated extensively and that any recommended changes have been made. Monitoring and evaluation are ongoing and improvements quickly tested and implemented.			

SCORING INDICATORS		Comments	Weight	Score
3A.1.4		Is the management system subject to external review?	**22.7**	**80**
60	There are mechanisms in place to allow for external review.	The RAP provides for external parties to attend its deliberations upon application. All Scientific Advisory Reports (SAR), Research Documents and proceedings documents are available for external readers via the DFO website. The assessment methodology is subject to review with external participation usually on a 5 year basis. Offshore lobster underwent such a review in 2009. These reviews usually comprise scientists from outside DFO and often outside Canada. The proceedings of the Advisory Committee are open to the public and the proceedings are publicly available**.** The Canadian Auditor General can, and has in the past conducted reviews of the fisheries management regime on an *ad-hoc* basis, (see Auditor General of Canada, 1999. Fisheries and Oceans – Managing Atlantic Shellfish in a Sustainable Manner) The score would have been higher if there were regular review mechanisms to enable Canadian national fisheries management policy and processes to be reviewed by bodies external to DFO and the industry inside or outside of Canada. .		
80	The management system is subject to external review at appropriate intervals. Monitoring and evaluation are responsive to reviews.			
100	The management system is subject to regular and frequent external review. Monitoring and evaluation are ongoing and improvements quickly tested and implemented			

SCORING INDICATORS	Comments	Weight	Score

3 A.2 (*MSC Criteria 1, 2, 4*)	**The management system has a clear legal basis.**	**12.5**	**97**
Weighting Commentary	All the performance indicators are given equal weighting.		
3A.2.1	Is the fishery consistent with International Conventions and Agreements?	**33.3**	**100**
60 The management system operates under relevant international conventions and agreements. 80 The management system transposes all relevant International Conventions and Agreements into legally enforceable regulations. 100 The management system creates a legally enforceable regime that exceeds the standards of all relevant international conventions and agreements..	The fishery takes place entirely inside Canada's 200 mile economic zone. The management regime is consistent with the UN Convention on the Law of the Sea (United Nations, 1982) as well as with the main principles of the 1995 United Nations Code of Conduct for Responsible Fishing. The management measures employed in this fishery - limited entry licensing, IFMP, conservative quota management, low exploitation rates, respect of scientific assessments and advice, the implementation of sophisticated monitoring surveillance and enforcement systems – meet or exceed the principles of the FAO Code. While the majority of the Canadian fishery takes place on Georges Bank which is divided between Canadian and US jurisdictions, there are no conventions or agreements respecting lobster fishing. However, pursuant to an agreement with the United States, no person aboard a Canadian fishing vessel is permitted to fish any species in US waters without a licence issued by the Minister [*Fishery (General) Regulations* ss 65 ff]. There are additional provisions regarding stowing of gear and obstruction of officials.		

SCORING INDICATORS		Comments	Weight	Score
3A.2.2		Is the fishery consistent with national legislation?	**33.3**	**100**
60	The management system operates under relevant national legislation.	The management measures for the offshore lobster fishery are compliant with all relevant national and regional fisheries acts and regulations, namely: • *Fisheries Act* • *Atlantic Fishery Regulations,1985* • *Fishery (General Regulations)* • *Coastal Fisheries Protection Act, 1985* • *Department of Fisheries and Oceans Act, 1985* • *Atlantic Fisheries Restructuring Act, 1985* • *Fishery (General) Regulations, 1993* • *Aboriginal Communal Fishing Licences Regulations, 1993* • *Oceans Act, 1996* • *Species at Risk Act, 2002* • *Commercial Fisheries Licensing Policy for Eastern Canada*		
80	The management system appears to be in full compliance with national legislation.			
100	The management system is demonstrably compliant with all relevant national legislation.			

SCORING INDICATORS		Comments	Weight	Score
3A.2.3		Does the system observe the legal and customary rights of people dependent upon fishing?	**33.3**	**90**
60	The customary and legal rights of the people dependent upon fishing are known and no major conflicts have been identified.	The system observes all legal and customary rights of people dependent upon fishing pursuant to the legislative framework. While First Nations have first access to fisheries for food, social and ceremonial purposes as well as a right to pursue fisheries for a reasonable livelihood, there is no history of its people having participated in the offshore lobster fishery. Nevertheless, representatives from the Native Council of Nova Scotia and the Union of Nova Scotia Indians are given notice of meetings and may attend. Initial entry into this fishery by offshore vessels was focused almost exclusively on George's Bank with subsequent development of fisheries on Browns Bank. An inshore mobile groundfish dragger representative expressed a gear conflict concern. In his view, set offshore lobster gear has reduced their effective fishing ground. From a legal perspective, section 37(1) of the Atlantic Fishery Regulations states that the master of a vessel with mobile gear shall maintain a distance of at least one-half nautical mile between his vessel, including any mobile gear attached thereto, and any previously set fishing gear. The conflict remains unresolved from the perspective of this representative. The Lobster fleet makes gear positions widely available to other fleets and makes efforts to shift gear to avoid gear conflict in areas/times of year where the groundfish fishery concentrates. Changes in distribution and seasonality of both fleets requires cooperation on the water.		
80	The system observes the legal and customary rights of people dependent upon fishing but does not necessarily have a formal codified system.			
100	The system observes all legal and customary rights of people dependent upon fishing under a formal codified system.			

SCORING INDICATORS		Comments	Weight	Score
3A.3 *(MSC Criteria 2, 5, 7)*	**The management system includes strategies to meet objectives including consultative procedures and dispute resolutions.**		**12.5**	**83**
Weighting Commentary		All the performance indicator were given an equal weighting		
3A.3.1		Does the management system contain clear short and long-term objectives?	**16.7**	**75**
60	Short and long-term resource and environment objectives are implicit within the management system.	The long-term objectives for this fishery are outlined in the IFMP, They are: 1. To harvest at a conservative, sustainable level, based on sound scientific advice that will continue to protect the offshore lobster and Jonah crab resources; 2. To harvest at a level that will continue to protect the adjacent inshore lobster stocks that may be biologically linked to the offshore stock(s); 3. To protect the offshore lobster and Jonah crab fishery from exploitation pressures arising in adjacent LFAs (inshore Canadian and American) which may affect the LFA 41 fishery; 4. To maintain the long-term financial viability of the existing fleet; 5. To further increase industry's level of participation in the management of this resource to benefit Canadians by actively including the industry in ongoing research and fishery management; 6. To maintain within acceptable levels any adverse environmental effects of the fishing methods in accordance with DFO's *Ecosystem Approach to Fisheries Management*; 7. To address other domestic considerations including: • the exploration of the lobster resources in the unfished portion of LFA 41 to determine whether there is a commercial abundance of lobster; and • the resolution of real and potential gear conflicts with other domestic fisheries. 8. To address international considerations including: • the effects of direct and bycatch fisheries on offshore lobster and Jonah crab by various gear sectors on the US side of the Hague line; • gear conflicts detrimental to the Canadian offshore lobster and Jonah crab fishery as a result of foreign vessel operation in LFA 41 waters; and • the assurance that the elements of the IFMP for LFA 41 will continue to support the marketing initiatives for offshore Canadian lobster wherever possible. Short to medium-term objectives are not outlined in specific documents but are implicit within the management through annual fishing plans: • low exploitation rate • protect juvenile lobster • protect females • avoid non-target species and habitat impacts • data collection The score would have been higher if these implicit short/medium term objectives were clearly described in the IFMP.		
80	The management system contains short and long-term resource and environment objectives.			
100	The management system contains clear and explicit short and long-term resource and environment objectives that can be measured by performance indicators.			

SCORING INDICATORS		Comments	Weight	Score
3A.3.2		Do operational procedures exist for meeting objectives?	**16.7**	**85**
60	Operational procedures exist which are applied to the meeting of objectives.	Operational measures to meet long term objectives include : • a conservative harvest rate to protect the stock component as well as the adjacent LFA 34 component • limited entry and an effective EA program provides economic viability • industry/DFO cooperation on data collection and research initiatives • close cooperation between industry/DFO in management issues • use of escape vents, biodegradable hog rings and low number of buoy lines to minimize impact on environment and other species Operational measures to meet short to medium-term objectives include: • TACs/EAs limit the exploitation rate • Size limit/escape vents to protect juvenile lobster • berried lobster prohibition to protect spawning potential • flat-lying ground lines and a limited number of buoy lines(2 per 120-150 traps) to avoid marine mammal entanglement • logbooks/monitoring documents to provide data Transparency is provided to interested parties through an advisory process and meetings that are open to the public.		
80	Transparent operational procedures are applied to the meeting of objectives. These procedures can be expected to support the objectives.			
100	Operational procedures are transparent and clearly applied. There is a feedback mechanism testing effective application.			

SCORING INDICATORS		Comments	Weight	Score
3A.3.3		Do procedures include for a precautionary approach in the absence of sufficient information?	**16.7**	**75**
60	Measures exist to implement a precautionary approach in the absence of sufficient information. There is some evidence that this is occurring.	The industry does implement a number of precautionary measures: the long-term TAC of 720 mt is considered to be conservative and provide a low exploitation rate; size limits and escape vents protect juvenile lobsters; and, the industry practice of releasing all lobsters over 6lbs. (albeit a marketing decision) protects brood stock as does the berried female protection. The closed area (LFA 40) bordering LFAs 34 and 41 provides a refuge and an effective buffer between the two areas as well as lowering exploitation on the stock. Nevertheless, a formalized commitment to the application of the precautionary approach is missing in the IFMP.		
80	Appropriate, formalised measures exist and are implemented to apply a precautionary approach in the development and application of operational procedures in the absence of sufficient information.			
100	All procedures include for evaluation of uncertainty and application of precaution at an appropriate level.			

SCORING INDICATORS		Comments	Weight	Score
3A.3.4		Are there procedures for measuring performance relative to the objectives?	**16.7**	**75**
60	Operational procedures exist which can be used to measure performance relative to the objectives.	There are operational procedures to measure performance of the long term objectives – state of fleet viability, stock assessments, size structure stability, favourable sex ratio, estimated low fishing mortality and constant recruitment. (SAR 2009). Stock assessments are the major tool to measure the performance of the fishery and the effect of exploitation in relation to the objective of sustainability. Recent assessments indicate size structure stability, a favourable sex ratio, estimated low fishing mortality and stable recruitment (SAR 2009). Monitoring measures such as monitoring TAC uptake, observer coverage, DMP, log books and VMS assist in measuring performance relative to the long-term objectives. As short-term objectives are not outlined, there are no review milestones *per se*. Procedures such as above are being used to measure performance against the implied objectives. The score would have been higher if there were documented procedures to measure performance relative to fishery and habitat objectives.		
80	There are appropriate evaluated procedures used for measuring performance relative to the objectives.			
100	Tested procedures are used for regular measurement of performance relative to the objectives.			

SCORING INDICATORS		Comments	Weight	Score
3A.3.5		Does the system include a consultative process including relevant and affected parties?	**16.7**	**100**
60	The system incorporates a consultative process including key stakeholders within the fishery.	The two major consultative processes in the offshore lobster fishery are the Regional Advisory Process (RAP) which is a scientific review of the stock assessment and the Offshore lobster Advisory Committee, the DFO/stakeholder advisory committee. The RAP process is founded on the principles of rigour, impartiality, openness and transparency. The process is one of challenge and review of scientific information leading to objective consensus but the process is not intended to be a public information forum. Attendance is by invitation and key stakeholders are always present. Participation can also include individuals with user or traditional knowledge and non-government public interest groups. The process is intended to ensure that requests from knowledgeable participants would not be unreasonably refused. The OLJCAC membership is composed of DFO scientists, fishery managers, and enforcement personnel, the licence holders, a representative of LFA 34, representatives of the Native Council of NS and the Union of Nova Scotia Indians as well as a representative of the province of Nova Scotia. Proceedings of the Advisory Committee are open to the public. The stated overall management philosophy of this fishery is one of collaborative co-management In addition to the OLJCAC, the Offshore Lobster Jonah Crab Management Board oversees and directs the operational implementation of the Offshore Lobster and Jonah Crab IFMP and reports and makes recommendations to the OLJCAC.		
80	The system includes an appropriate consultative process including all main public and private stakeholders and can demonstrate consideration of representations made or a reliable mechanism for such considerations.			
100	The system incorporates an appropriate consultative process including all affected stakeholders. Decisions specifically discuss and/or address stakeholder concerns.			

SCORING INDICATORS		Comments	Weight	Score
3A.3.6		Is there an appropriate mechanism for the resolution of disputes within the system?	**16.7**	**85**
60	Mechanisms are theoretically adequate but have not been consistently applied or tested.	The management system is well defined by the legislation and the IFMP. Most disputes between the regulator and the industry and within the industry are resolved using the representational framework in the OLJCAC forum. The IFMP contains a dispute resolution procedure in the event of an impasse which includes firstly an additional effort to achieve consensus, secondly the licence holders will meet by themselves in an attempt to reach an agreement, thirdly, the license holders will meet with DFO and/or an independent mediator acceptable to both licence holders in an effort to seek a resolution and finally DFO will impose a final resolution. The above process applies to disputes between or among licence holders. There does not appear to be such a procedure for other stakeholders (adjacent fishers, NGO's, etc). In that case, the usual process is for regional managers in DFO to play a role in brokering solutions on policy related issues. The ultimate appeal of last resort is to the Minister of Fisheries, who is the final authority under Canadian fisheries legislation. The score would have been higher if there was a formal process for all stakeholders.		
80	There is an appropriate and effective mechanism for the resolution of disputes within the system.			
100	There is an appropriate, effective and tested mechanism within the system for the documentation and resolution of disputes of varying magnitude.			

SCORING INDICATORS		Comments	Weight	Score
3A.4 *(MSC Criterion 6)*	**The management system operates in a manner appropriate to the objectives of the fishery.**		**12.5**	**93**
Weighting Commentary		All the performance indicator were given an equal weighting		
3A.4.1		Does the system include subsidies that contribute to unsustainable fishing?	**50**	**100**
60	Subsidies exist that could contribute indirectly to unsustainable fishing. These are short-term and are in the process of being removed within acceptable timescales.	There are no subsidies in this fishery.		
80	The system is free from subsidies that contribute to unsustainable fishing or ecosystem degradation.			
100	The system has no subsidies that contribute to unsustainable fishing or ecosystem degradation.			

SCORING INDICATORS		Comments	Weight	Score
3A.4.2		Does the system include economic/social incentives that contribute to sustainable fishing?	**50**	**85**
60	Measures to allocate fishing opportunities and/or entry to the fishery, or other incentives, are generally supportive of achieving fishery objectives related to sustainability.	There are significant economic and social incentives that contribute to sustainable fishing and ecosystem management in this fishery. Since the fishery is totally controlled by one company, it is in its best interests, economically and socially, to ensure that the fishery is managed in a sustainable manner. Limited entry coupled with rights-based fishing provides strong economic incentives to maximize value over the long-term including the preservation of the stock for future economic opportunities, fishing the resource at yields that do not harm productivity and avoiding harm to the habitat and other species. As the single licence holder, the company is very conscious of its corporate image and has taken steps to ensure its fishery meets management goals. The score on this indicator would have been higher if there was a clear outline of ecosystem goals in the management plan, although the impacts are probably relatively low.		
80	Allocations of fishing opportunities and/or entry to the fishery, and/or other incentives, promote fishery and ecosystem management goals.			
100	The system has established economic and social incentives that contribute to sustainable fishing and ecosystem management.			

SCORING INDICATORS	Comments	Weight	Score

3A.5 *(MSC Criterion 8)*	**A research plan exists in line with the management system to address information needs.**		**12.5**	**85**
Weighting Commentary	All the performance indicator were given an equal weighting			
3A.5.1		Have key research areas requiring further information been identified?	**33.3**	**85**
60	Some major areas requiring further research have been identified.	The IFMP for the fishery has resulted in the identification of some key areas requiring further information in the area of at sea samples for size frequency, moult condition, blood protein levels, temperature monitoring and juvenile settlement areas. In addition, the SAR identifies research gaps such as the absence of knowledge about the source of recruitment offshore, the relation between LFSAs 41 and 34, the evaluation of indicators quantitatively in order to develop true reference points. The SAR also notes the need to develop further the trawl survey data set to better determine abundance, the need to investigate the decline in median size lobster in the Crowell Basin and that the female-biased sex ratio needs to be further investigated to determine whether it is a concern for population productivity.		
80	Key areas requiring further research have been identified.			
100	A comprehensive review of information requirements has been undertaken.			

SCORING INDICATORS		Comments	Weight	Score
3A.5.2		Is research planned/undertaken by the scientific advisers to meet the specific requirements of the management plan?	**33.3**	**80**
60	Research is planned for highest priority information needs and some capacity needs either exist or are programmed.	The cost and logistics of conducting lobster research in the deeper water has kept research to a minimum in the offshore, although the work that has been done is of a high calibre and has answered some important questions. That work, combined with research on inshore stocks in Canada and the U.S. provides a basic understanding of the resource sufficient to meet the requirements of the management plan. Much of the inshore research covers questions and issues that are useful in improving the understanding of lobsters in the more offshore areas. Specific offshore research includes tagging work done in the 1980s and 1990s (Campbell, Pezzack, Duggan) that has led to the conclusion that movement is generally one way from inshore to offshore and that the inshore stock is generally self-recruiting. Pezzack (1995) studied the sizes of lobsters recaptured in the tagging studies and how gear selectivity in the offshore could influence the sizes in the catch. Some larval work was done in the 1980-90's and a number of papers and circulation models were developed. A recent genetics report is being studied for indications of a complex population structure in the Gulf of Maine that may warrant future sampling. A study underway by the Lobster Science Center (LSC) of the University of Prince Edward Island seeks to improve understanding of the lobster moult process with a secondary goal of increasing the knowledge of the female lobster reproductive cycle, which will facilitate research and stock assessment work. The LSC is also working on a new method of determining maturity based on blood samples which would be useful in tracking changes over time. Work is also underway by DFO on recruitment levels and trends in the inshore fishery through the study of settlement levels in near-shore areas. U.S. researchers have documented settlement in deeper coastal waters for the first time. It is hopeful that this work can lead to a better assessment of recruitment levels and trends. There are some parallels in trends over large areas suggesting possible large scale influences that may allow the near shore trends to be used as a proxy for trends in the offshore. Clearly, some of the inshore work can be applied directly to the offshore fishery and in other cases the methods can be developed and tested before use in the offshore. On other issues, however, such as habitat/shelter dependence, settlement and recruitment dynamics, and possibly feeding and growth, may be quite area specific to the offshore and work from the shallower and more dynamic inshore areas of the Gulf of Maine may not transfer over to the more uniform, deeper and sparser offshore habitat. The score would have been higher if a more complete and funded research program existed for the offshore component of the stock.		
80	Research is planned and undertaken to provide necessary scientific support to the plan. There are demonstrable resources to allow implementation of the programme.			
100	There is an ongoing, funded, comprehensive and balanced research programme, linking research to the management plan.			

SCORING INDICATORS		Comments	Weight	Score
3A.5.3		Is relevant research carried out by other organizations (e.g. Universities) and is this taken into consideration?	**33.3**	**90**
60	The management system is aware of research carried out by other organisations and elements of this are taken into consideration.	Most of the research on lobster in Canada is carried out by DFO. It also participates in and considers the work conducted by the Lobster Science Centre of the Atlantic Veterinary Centre, University of Prince Edward Island. A joint DFO/lobster fishermen organization – the Fishermen Science Research Society (FSRS) - conducts survey work and gathers data which is used by DFO scientists. Research on such things as modelling, temperature surveys, hydrography, etc. carried out by other organizations and published in journals such as the J. of Northwest Atlantic Fisheries Science, the Can. J. Fish. Aquat. Sci, and by the Canadian Science Advisory Secretariat is reviewed for relevancy by DFO scientific and management staff. International research published by such organizations as NAFO, ICES, Universities of Maine, New Hampshire and Rhode Island on benthic habitats, larval transport, modelling and other theories are reviewed and considered. Reports of USA marine mammal protection organizations are reviewed with respect to the potential of entanglements in lobster buoy and ground lines. Data from the National Marine Fisheries Service (NMFS) on USA landings and trawl surveys catches for George's Bank are used to assess trends in abundance and recruitment. While most of this research is conducted in the inshore and is most relevance to that stock component, many of the questions and issues addressed are the same as those in the offshore fishery.		
80	Appropriate research carried out by other organisations is taken into consideration, although there is not necessarily any proactive co-ordination between organisations.			
100	Relevant research carried out by other organisations is taken into account for management considerations. This research is often co-ordinated with existing research plans of the management system.			

SCORING INDICATORS	Comments	Weight	Score

3A.6 *(MSC Criteria 7, 9, 10)*	**The management system includes measures to pursue objectives for the stock.**	**12.5**	**78**
Weighting Commentary	All the performance indicator were given an equal weighting		
3A.6.1	Are the resource and effects of the fishery monitored?	**33.3**	**80**
60	A monitoring programme is in place that addresses some key aspects of resource and effects and which can be extended.	Monitoring of the effects of the fishery is carried out by both DFO and the industry, including information from the multi-species trawl survey, VMS for real-time vessel position, observer data, 100% dockside monitoring of landings, port sampling data and some at-sea monitoring, aerial surveillance and analysis of logbook data on effort, catch rates and fishing trends. SARs are prepared and published infrequently (2000, 2009) and advice is generated based on a suite of a standardized CPUE index as well as the research cruise data. Indicators of abundance (i.e. landings, catch rates and trawl surveys) and indicators of fishing pressure (i.e. number of trap hauls, size frequencies and the trawl survey) provide information for stock assessment. A full list of the indicators is at 1.1.1.4 and section 5.5.2		
80	A monitoring programme is in place that addresses all key aspects of resource and effects at appropriate intervals and results are recorded.		
100	The resource and effects of the fishery are closely monitored over appropriate geographical areas and time periods. Full records are kept of monitoring results and these are made available to relevant research and management bodies.		

SCORING INDICATORS		Comments	Weight	Score
3A.6.2		Are results of monitoring evaluated against appropriate reference point(s)?	**33.3**	**75**
60	Reference points or measures with similar intent or outcome exist and some level of evaluation against these is possible.	As noted previously with respect to the Precautionary Approach, there are no biological reference points for this fishery. However, DFO scientists monitor indicators of abundance (landings, catch rates, size structure and trawl surveys) and indicators of fishing pressure (number of trap hauls, size frequencies and the trawl survey) as well as potential egg production based on the percentage of females surviving past the 50% maturity level. DFO is of the view that these indicators suggest that the offshore lobster fishery is removing a low percentage (estimate of 15% - 25%) of the available lobsters. The CPUE is the main indicator for changes in the performance of the stock and, while it has fluctuated over time, there is no trend. These indicators are reviewed annually during the OLJCAC proceedings to determine the impact of the fishery on the health of the stock. The result is a conclusion that abundance is stable or higher without trend or has trended higher since 1999, the size structure of the population has remained stable (except for a portion of Crowell Basin), the exploitation rate is inferred to be low, and the egg production is believed to be high. The advice is that the fishery has not had any negative impact on the resource in the area and the current removal TAC is an acceptable harvest strategy at this time. While these indicators allow conclusions to be drawn on the performance of the fishery, the lack of trigger points at which management action is taken is a weakness which leads to the lower score.		
80	Results of monitoring are regularly interpreted in relation to reference points or measures with similar intent or outcome.			
100	Results of monitoring are quantitatively evaluated against precautionary reference points on a regular and timely basis.			

SCORING INDICATORS		Comments	Weight	Score
3A.6.3		Do procedures exist for reductions in harvest in light of monitoring results and how quickly and effectively can these be implemented?	**33.3**	**80**
60	Practical procedures exist to reduce harvest. Programmes to link these with monitoring results are underway.	The Minister of Fisheries and Oceans has the discretion under the *Fisheries Act* to lower the TAC at any moment should the need arise. Management procedures through the fishing licence or variation orders under the regulatory provisions can be taken quickly to reduce the harvest if necessary until stock recovery is achieved. As this is a single company fishery with 2 active vessels, measures can be implemented very speedily. The OLJCAC and the OLJCMB monitor the performance of the fishery on an on-going basis and any significant change in the CPUE or some other indicators outlined above would quickly be reflected in the imposition of more restrictive management measures. The score would have been higher if formal procedures were in place to reduce harvest levels if monitoring results indicate such action is required.		
80	Practical procedures exist to reduce harvest in the light of monitoring results and provide for stock recovery to specified levels. Measures can be implemented speedily			
100	Effective practical procedures exist to reduce harvest in light of monitoring results and provide for stock recovery to specified levels within specified time frames. There are well documented procedures to implement changes and these can be introduced with immediate effect.			

SCORING INDICATORS		Comments	Weight	Score
3A.7*(MSC Criterion 10)*	**The management system includes measures to pursue objectives for the affected ecosystem.**		**12.5**	**80**
Weighting Commentary		Measures to avoid or minimise environmental impacts were considered to be most important within the performance indicators.		
3A.7.1		Are measures in place to address (avoid or minimise) significant environmental impacts?	**80.4**	**80**
60	Negative environmental effects caused by fishing have been identified. Measures are being applied to reduce any key impacts.	Seabed impacts are minimized with the use of un-weighted traps. The strings are secured on the seabed by weights on the two endlines. To avoid ghost fishing the lobster traps are held together with biodegradable rings. There are escape panels in the traps for small lobsters and fish. The number of surface to trap lines are minimized to 2 per 120-150 traps and the neutrally buoyant ground lines have been observed to lay relatively flat on the sea bed (Pezzack pers. Comm.) thus minimizing the potential of entanglement with marine mammals.		
80	Measures are being applied to minimise any environmental impacts and there is evidence that the measures are working.			
100	Measures are in place to avoid any significant environmental impacts and are subject to monitoring and periodic review, OR, no significant environmental impacts are known to exist.			

SCORING INDICATORS		Comments	Weight	Score
3A.7.2		Are no take zones, Marine Protected Areas or closed areas for specific periods appropriate and, if so, are these established and enforced?	**19.6**	**80**
60	The need for no-take zones and/or closed areas / seasons has been reviewed. Plans are in place to implement some or all of these as appropriate.	A large 6,400 square kilometre area (LFA 40) which separates the inshore and offshore fisheries on Browns Bank is closed to lobster fishing in an attempt to protect brood stock. This area has been closed since 1979 and encompasses waters shallower than 50 fathoms. Approximately 57% of its area is in LFA 34 and 43% in LFA 41. In June 2002, DFO established a Coral Conservation Area in a portion of the Northeast Channel. The Conservation Area contains the highest known density of intact large octocoral (bubblegum and seacorn coral) colonies in Atlantic Canada. Signs of fishing impact were visible as broken live corals, tilted corals, and scattered skeletons. Both of these closed areas are monitored by the VMS positional system and charges are laid for infractions. The established closed areas are well enforced through the use of VMS and overflights. The score would have been higher if the consequences were being monitored as an indicated requirement of the 100 scoring guidepost.		
80	The need for and potential distribution of no-take zones and closed areas / seasons has been reviewed against objective criteria and these are being implemented and enforced if and where appropriate.			
100	No-take zones and closed areas / seasons are established and enforced if and where appropriate and, if implemented, the consequences are being monitored.			

SCORING INDICATORS		Comments	Weight	Score
3 A.8 *(MSC Criterion 11)*	**There are control measures in place to ensure the management system is effectively implemented.**		**12.5**	**93**
Weighting Commentary		Those performance indicators concerning monitoring were considered of greater significance.		
3A.8.1		Are information, instruction and/or training provided to fishers in the aims and methods of the management system?	**23.6**	**90**
60	Mechanisms exist for the dissemination of information, instruction and training of fishers. Implementation of these mechanisms may not be universally implemented.	In order to achieve effective management of the fishery, all licence holders are issued with a fishing licence containing an extensive list of conditions outlining their obligations. These conditions cover such things as areas authorized to fish, a hail-in requirement, a fully functioning VMS providing data to the DFO operations centre, requirement to take an observer on board 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, annual SAR's and the Offshore Lobster IFMP is available on the DFO website and from personal contact with Fisheries Officers and scientists. The OLJCAC 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. In addition, the licence holder implements an in-house training program for all staff and crew called "The Lobster University". Specific components of the Lobster University include: • Clearwater's History • Lobster biology and environmental requirements • Lobster Fishery • Lobster moult cycle, seasons and their relation to quality • Clearwater's storage system design • Canada versus USA lobsters • Lobster stress, and how to minimise it • How to properly ship and store lobsters • How to properly handle lobsters		
80	Information, instruction and training are provided to fishers in the aims and methods of the management system allowing effective management of the system.			
100	Information, instruction and training are provided to fishers in the aims and methods of the management system allowing effective management of the fishery and operatives demonstrate comprehensive knowledge of this information.			

SCORING INDICATORS		Comments	Weight	Score
3A.8.2		Is surveillance and monitoring in place to ensure that requirements of the management system are complied with?	**43**	**90**
60	A surveillance and monitoring system has been implemented; however, its effectiveness and/or compliance has not been fully demonstrated relative to conservation objectives.	Extensive regional fisheries monitoring, surveillance and enforcement systems are in place including such things as hail-in requirement, VMS for catch and position reporting, at-sea observers, log books, 100% dockside monitoring, fishery surveillance patrols, aerial surveillance, random checks of dockside monitoring, review and analysis of vessel documentation and observer and dockside monitoring data. In addition all vessels are required to complete a fishing log containing set by set catch information.		
80	An effective enforcement system has been implemented and there is an appropriate degree of control and compliance.			
100	An effective enforcement system has been implemented and there is a high degree of control and compliance.			

SCORING INDICATORS		Comments	Weight	Score
3A.8.3		Can corrective actions be applied in the event of non-compliance and is there evidence of their effectiveness?	**33.4**	**100**
60	Mechanisms exist or are being developed which can be implemented or applied to deal with non-compliance. Their effectiveness is to be evaluated.	Fisheries officers can institute court proceedings for infractions. Penalties for non-compliance under the *Fisheries Act* and regulations can be severe amounting to tens of thousands of dollars in fines and forfeiture of entire catches by the court upon conviction. Due to the EA system of management and the fact that this is a one-company fishery, there is little incentive to breach regulations. Harvesters are confined to a specific geographic area which is enforced by VMS, the gear used is standard and the size of lobsters targeted by the fleet exceeds the minimum size by a considerable degree. The record of compliance in this fishery is very high with no violations for the past ten years.		
80	There are set measures that can be applied in the event of non-compliance although these may not be included in a formal or codified system. There effectiveness has been or will be evaluated.			
100	Agreed and tested corrective actions can be applied in the event of non-compliance.			

SCORING INDICATORS	Comments	Weight	Score

3 B		**Operational Criteria**	**50**	**90**
Weighting Commentary		All performance indicators were weighted equal.		
3B.1*(MSC Criterion 12)*		**There are management measures that include practices to reduce impacts on non-target species and inadvertent impacts upon target species.**	**16.7**	**80**
3B.1.1		Do management measures, principally through the use of gear and other fishing practices, include avoidance of impacts on non-target species and inadvertent impacts upon target species? These would include by-catch, discard, slippage and high grading.	**100**	**80**
60	Measures have been, or can be, implemented as appropriate that are intended to reduce the major impacts on non-target species and inadvertent impacts on target species, but their effectiveness is uncertain.	Measures such as the industry practice of using a minimum of buoy lines (2 per 100 traps) and ground lines that lay flat (limited submersible observations showed that the traps and ground line were tight and not looped) have the effect of minimizing entanglements of marine mammals especially right whales which are a listed species. There have not been any reports of whale entanglements in this fishery. Catches of cusk (identified by COSEWIC but not listed to date) are low as a result of the configuration of the fishing gear including escape vents. The trap itself is generally of low impact on target and non-target species. The traps are held together by hog rings which biodegrade in about three months causing lost traps (rare occurrence; about 20 per year) to fall apart and avoid ghost fishing. In addition, traps contain a rectangular escape vent measuring 44mm high and 127mm wide to enable escapement of small lobsters. Discards of small and >6 lb lobster are returned immediately to the water and survivability is believed to be high. Bycatch of other species is recorded on observed trips and the species that occur most frequently are Jonah crab, cusk, hake (red and white), cod, rock crab and redfish.		
80	Measures have been, or can be, implemented as and when appropriate to avoid or reduce any major impacts on non-target species and inadvertent impacts on target species and there is evidence that they are having the desired effect when applied.			
100	Measures have been implemented to reduce the major impacts on non-target species and inadvertent impacts on target species, and their effectiveness is clearly demonstrated.			

SCORING INDICATORS		Comments	Weight	Score
3B.2 *(MSC Criterion 13)*	**There are management systems in place that encourage fishing methods that minimise adverse impacts on habitat.**		**16.7**	**80**
3B.2.1		Do fishing operations implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning or nursery areas?	**100**	**80**
60	Fishing operations use measures to reduce major impacts on habitat, especially in critical or sensitive zones such as spawning or nursery areas.	The 2009 SAR concludes that the small size of the gear footprint and the relatively low density of traps in a large area is such that fishing impacts on the bottom habitat are deemed to be low. In June 2002, DFO established a Coral Conservation Area in a portion of the Northeast Channel. No offshore lobster fishing is conducted in areas where sensitive habitat such as cold water corals is known to occur. Offshore Lobster traps are rectangular measuring 48”x16”x11”. They are deployed un-weighted and rest on the seabed. Studies in Great Britain indicate that habitats and their communities were relatively unaffected by lobster pots hauled from rocky substrates. The results suggested that prolonged intensive fishing did not have immediate detrimental effects on the abundance of the species selected for study, although some individual ross coral colonies (*Pentapora foliacea*) were damaged. (Eno et al, ICES Journal of Marine Science, 58: 11–20. 2001). The final report for the certification of the red rock lobster fishery in Baja California, Mexico in April of 2004 concluded that traps are among the least impacting gear on both the habitat and other species. Chuenpagdee, R, et al (2003) concluded that traps have a medium impact (out of high, medium and low) for all impacts including bycatch, ghost fishing, bottom contact, etc. but concluded that, although each trap has a small footprint, large numbers of traps may have a considerable cumulative effect.		
80	There is evidence that fishing operations are effective in avoiding significant adverse effects on the environment, especially in critical or sensitive zones such as spawning or nursery areas.			
100	There is direct evidence that fishing operations implement appropriate methods to avoid significant adverse impacts on all habitats.			

SCORING INDICATORS		Comments	Weight	Score
3B.3 *(MSC Criterion 14)*	**The management system incorporates measures that discourage destructive practices.**		**16.7**	**100**
3B.3.1		Does the fishery employ destructive fishing practices (such as poisons or explosives)?	**100**	**100**
60	The fishery does not allow any such destructive fishing practices.	The fishery does not employ any destructive fishing practices. Lobster fishing by any means other than a lobster trap of a specified size is prohibited by law and enforced.		
80	The fishery does not employ any such destructive fishing practices and enforcement is considered sufficient to prevent their use.			
100	The fishery does not employ any destructive fishing practices. There is a code of conduct for responsible fishing, prohibiting these, that is fully supported by fishers.			

SCORING INDICATORS	Comments	Weight	Score

3B.4 *(MSC Criterion 15)*	**The management system incorporate measures that reduce operational waste.**	**16.7**	**100**
3B.4.1	Do measures exist to reduce operational waste?	**100**	**100**
60	Measures/facilities are in place to reduce sources of operational waste that are known to have detrimental environmental consequences, but further reductions may be possible.	Nothing from the operation of the vessels is discarded at sea. All garbage is bagged and brought ashore for disposal in dockside bins.	
80	Measures/facilities are in place to reduce all sources of operational waste that are known to have detrimental environmental consequences, and there is evidence they are effective.		
100	Measures/facilities are in place to reduce all sources of operational waste that are known to have detrimental environmental consequences, and there is evidence they are effective and these measures are supported by the fishers.		

SCORING INDICATORS	Comments	Weight	Score

3B.5 *(MSC Criterion 16)*	**Fishing operations are conducted in compliance with the management system and legal and administrative requirements.**	**16.7**	**93**
Weighting Commentary	Compliance was seen as being most significant.		
3B.5.1	Are fishers aware of management system, legal and administrative requirements	**29**	**90**
60 Fishers are aware of key management and legal requirements.	Licence holders and fishers are aware of the management and legal requirements of the fishery and are regularly updated on new guidelines. The extensive list of conditions contained in the fishing licence provides the fishers with a complete understanding of the requirements of the fishery, including authorized fishing areas, reporting requirements, a fully functioning vessel monitoring system, 100% dockside monitoring of landed weight, size limits, trap configuration, etc. Information on fisheries legislation, scientific research, annual SAR's and the Offshore Lobster Jonah Crab IFMP is available on the DFO website and from personal contact with regional DFO officers and scientists. The OLJCAC provides a forum for an exchange of information on the goals and detailed management measures of the fishery between the licence holders and regional managers and scientists on all aspects of the management system. The score on this indicator would have been higher if there was a clearly stated and communicated code of conduct.		
80 Fishers are aware of management and legal requirements upon them and are kept up to date with new developments.			
100 All fishers are aware of management legal requirements through a clearly documented and communicated mechanism such as a code of conduct.			

SCORING INDICATORS		Comments	Weight	Score
3B.5.2		Do fishers comply with management system, legal and administrative requirements?	**36**	**90**
60	Fishers appear generally to comply with requirements, but there is incomplete information on the actual extent of compliance.	Compliance in this fishery is very high. No reports of non-compliance with management measures have been filed in this fishery for the last 10 years. The economic incentives to properly manage the offshore lobster resource for the long-term have been effective in making infractions almost non-existent. In the event of breaches, heavy penalties are provided in the *Fisheries Act* and regulations to deter non-compliance with licence conditions and fishery regulations, including the institution of court proceedings for offences. The levy of heavy fines and forfeiture of entire catches is within the discretion of the court upon conviction. The potential for illegal behaviour in this fishery is consequently very low. The score for this indicator would have been higher if the fleet operated under an established code of conduct.		
80	Fishers appear compliant with relevant management and legal requirements and there are no indications of consistent violations.			
100	Fishers are fully compliant with, and fully supportive of, legal, and administrative requirements, such as through a code of conduct.			

SCORING INDICATORS		Comments	Weight	Score
3B.5.3		What is the record of enforcement of regulations in the fishery: quota control, by-catch limits, MLS, mesh regulations and closed areas?	**33.3**	**100**
60	There is information on breaches of regulations and on corrective action to prevent or curtail.	Quota control in this fishery is very closely monitored. The licence holder has an enterprise allocation amounting to a fixed percentage of the TAC established for LFA 41 converted to metric tonnes. A combination of hail-ins, VMS and dockside monitoring whereby every pound of lobster is weighed provides very tight control. Fishing areas, including the closed area LFA 40 and closed coral protection area are easily monitored by real-time satellite signals from the on-board VMS.		
80	Evidence of rigorous monitoring of all the enforcement measures and evidence of actions taken in the event of breaches is available.			
100	Strong evidence of rigorous monitoring and control of the enforcement measures through for example satellite monitoring, shipboard observers and nominated landing ports. Strong evidence of firm action taken in the event of breaches			

SCORING INDICATORS		Comments	Weight	Score
3B.6 *(MSC Criterion 17)*	**The management system involves fishers in data collection.**		**16.7**	**85**
3B.6.1		Do fishers assist in the collection of catch, discard and other relevant data?	**100**	**85**
60	Fishers are involved in the collection of some catch, discard and other information.	Landing data is derived from commercial dock-side sorting and weighing programs (funded by the industry). The recognition by fishers of the value of scientific information relating to the fishery appears to encourage cooperation. As a condition of licence, fishing captains are required to submit a fishing log upon landing which includes such information as catch and effort, trip dates, amount of gear used, area fished, number of crew, weather conditions, course, set areas by lat/long, number of sets, set by set catch and total landings. Comments/remarks are recorded per watch. In addition, the vessel provides constant position information via a VMS satellite system. Some specific initiatives between fishers and the regulator include: • Scientists/Captains' meetings to discuss trends in the data, fishing practices and techniques and Captains' observations. • Collection of bottom temperature data with mini-logs that is provided to DFO science. • A Joint Project Agreement (JPA) with DFO to enhance data collection on Cusk to supplement the analysis. • Collection of multibeam data that can contribute to the understanding and management of this fishery.		
80	Fishers are regularly involved in the collection and recording of relevant catch, discard and other information.			
100	Fishers assist significantly in the collection and recording of all appropriate catch, discard and other information.			

APPENDIX B
Peer Reviews

1. **Peer Reviewer Biographies**
2. **Peer Reviewer A Comments**
3. **Peer Reviewer B Comments**

Peer Reviewer Biographies

Dr Julian Addison has over 25 years experience of scientific research on crustacean biology and population dynamics, and stock assessment and provision of management advice on shellfish fisheries. He is Head of the Coastal and Freshwater Fisheries Group and Senior Shellfish Advisor for the UK's Centre for Environment, Fisheries and Aquaculture Science. Julian has also worked as a visiting scientist at the Department of Fisheries and Oceans and National Marine Fisheries Service where he carried out collaborative research and experienced shellfish management approaches in North America. For four years he was a member of the Scientific Committee of the International Whaling Commission (IWC) providing scientific advice to the UK Commissioner to the IWC.

Dr. Andy Brand 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 and fisheries of bivalve molluscs and crustacea. He has extensive fishery management and environmental assessment consultancy experience, including contracts with government departments and industry.

PEER REVIEWER A

The Eastern Canada offshore lobster fishery for *Homarus americanus*, is a substantial and well established pot fishery that has operated within the Canadian EEC in Lobster Fishing Area (LFA) 41 for nearly 40 years. Together with adjacent stocks of the same species in Canadian inshore waters (LFA34) and farther south in US territorial waters, the Northwestern Atlantic stocks of lobsters, and their fisheries, have been the subjects of a large amount of scientific research. For benthic invertebrates, like the lobster, where the adults are capable of limited movements but the pelagic larvae can be dispersed over large distances, stock status and population dynamics are difficult to assess. Exploited populations of lobsters occur over an enormous geographical area and there is great spatial heterogeneity. Each fishing area has its own physical and biological characteristics, stock dynamics, and history of exploitation and management. This presents problems in fisheries assessment and management. The geographical extent, the complexity and the monetary value of all the Northwestern Atlantic lobster fisheries has resulted in the large number of scientific studies and fisheries reports. Much of this, together with studies of other lobster fisheries elsewhere, is relevant to the assessment and management of the Eastern Canada offshore lobster fishery. The very large literature on these data-rich fisheries has been well summarised and clearly presented in this assessment report. Overall the descriptions of the stock population dynamics, the fisheries, their ecological impacts and the management systems are clear and well illustrated and the report contains a good, very long, list of literature cited. Although I am not familiar with all the literature cited I believe the information on which the assessments are based is accurate, comprehensive and up-to-date.

I consider that this information has been appropriately and rigorously applied in scoring the fishery to the MSC Principles and Criteria. There is always scope for discussion about the exact scores but the scores awarded are fair and reasonable, mostly what I would have awarded myself, and the explanations that accompany each score are detailed and clear. I therefore concur with the recommendation that the fishery is certified according to the MSC Principles and Criteria for Sustainable Fisheries.

I consider that the conditions to be applied are rigorous, in line with the thoroughness of the assessment. Conditions 1 is concerned with improving the knowledge base in an area where the fishery is under-performing. While it is believed that discard and incidental mortality are low and some data are available from the at-sea sampling, this needs to be monitored, analysed and reported for the entire fleet and its collection should not be unduly arduous for the commercial boats (PI - 1.1.2.3; PI - 2.1.2.3.). Similarly, the lack of potentially useful by-catch data monitoring by the commercial fleet for the exploitable Jonah crab is an omission that can be easily rectified (PI - 2.1.2.1).

Condition 2 is concerned with formalising and quantifying the methods used to assess stock status in order to take account of uncertainly and establish clear decision rules for the management of the fishery. This will not be easy to achieve. The methods used for stock assessments of relatively immobile invertebrates and species that cannot be easily aged, like the lobsters, are still developing rapidly. There are particular problems in assessing pot fisheries. The use of analytical models and calculation of quantitative reference points is rarely possible, or meaningful, so it is necessary to resort to the evaluation of various proxy measures. In this fishery a suite of indicators of abundance, fishing pressure, egg production, recruitment and ecosystem variability have been used in recent years. In Condition 2 (a) the assessors recommend that ‘indicators with adequate data should be analysed quantitatively to identify their statistical variability in order to establish their suitability to measure changes in stock status’ and go on to suggest that ‘trigger and target reference points should be formalised for each indicator considered suitable’ and that ‘qualitative reference values established for indicators with qualitative trends’. These are laudable objectives and should clearly be attempted but this has been a very stable fishery, with low F over many years so statistical variability of many indicators may be expected to be low and without trend so the desired outcome may be difficult to achieve in the required time-frame (PI’s – 1.1.3.2; 1.1.3.4; 1.1.3.7 and 3A.6.2).

Condition 3 is a straightforward requirement that boats record and report all incidental mortalities of protected, endangered or threatened (PET) species. Although entanglement in fishing gear may be an important source of mortality of right whales and leatherback turtles, this mortality must be largely due to entanglement with fixed nets, rather than with bottom-weighted lobster pot lines, so it should not be too onerous for the commercial boats if this is made a condition of the licence to fish.

Condition 4 is concerned with strengthening fishery management procedures. This is clearly a well-managed fishery but its formal written objectives, procedures and strategies are not always in accord with the high standards required for MSC accreditation. This is particularly the case in areas such as the environmental impacts (PI - 2.1.4.5) and interactions with PET species (PI - 2.2.1.2 & 2.2.2.1) that have, perhaps understandably, been perceived by the fishery managers to be of very low likelihood of occurrence. However, compliance with Condition 4 can only be beneficial as it will encourage the fishery managers to review and formalise its procedures in line with best practice in the industry.

I consider that all four conditions are suitable and, with some reservations about Condition 2, are achievable in the required time frame. Together they will enhance the sustainable management of the fishery in future years.

This report is presented to a high standard and there are very few typographical or other errors.

MML assessment team response – As a result of the overall positive response by peer review A to the draft report there are no substantive points to take into account and so no amendments have been made.

Peer Reviewer B

The draft report provides a comprehensive evaluation of the nature and status of the Eastern Canada offshore lobster fishery in LFA41, the potential for any impact of the fishery on the wider ecosystem and the current management framework for this fishery. The draft report provides a thorough and accurate review of available information both for the fishery being assessed and more generally on the lobster (*Homarus americanus*) and its fishery in the northwest Atlantic. In reviewing the draft certification report, I have taken into account the information provided in the draft report, the DFO 2009 Science Advisory Report (DFO, 2009), a pre-publication copy of which was available to the assessors but which is now in the public domain, and the wider literature on the lobster and its fisheries in USA and Canada.

Principle 1: Sustainability of Exploited Stock.

I agree with the assessors that there is detailed knowledge of the biology, life history and basic population parameters of the lobster in the area, of the fleet and the fishing gears used and their selectivity, and that there are a range of management tools in operation in LFA41 that implement both input and output controls, all of which justify the relatively high scores in relation to the relevant indicators under Principle 1. There is no trap limit currently within the fishery, but at present there is no concern about overexploitation in the fishery and so the controls on numbers of vessels and number of days fishing, the technical conservation measures and the TAC provide sufficient regulation. A recent assessment of the lobster fishery in LFA41 published in the DFO 2009 Science Advisory Report provides the prime source of information on the sustainability of the exploited stock. The DFO report and the draft certification report conclude that the fishery has clearly been operating at a level at which there has been no detrimental impact on the stock, and that there is no opportunity within the current management framework to significantly increase exploitation rates, and there is sufficient justification therefore to provide a high score under criterion 1.1.4 that "the stock is at an appropriate level to maintain long-term productivity".

The DFO report did however identify a number of uncertainties in relation to the lack of a direct estimate of fishing mortality, potential bias in other key population parameters, and lack of knowledge of the effect of variations in oceanographic conditions and the relationship between lobsters in the offshore area and those in the adjacent inshore fishing area LFA34. The draft assessment identified additional uncertainties in relation to statistical uncertainty around indicators, changes in some population parameters, and a lack of knowledge of the source of recruitment, the processes influencing recruitment, and how a change in recruitment might impact on the fishery. These uncertainties and the lack of suitable reference points and consequent pre-determined decision rules to deal with declines in recruitment or stock are the key areas in which the scores for Principle 1 drop below 80 and which I agree should be addressed therefore in any conditions that are attached to certification. There is a lack of knowledge and some uncertainty over lobster stock structure in relation to LFA management areas particularly in relation to sources of larvae recruitment and net movements of adults between inshore and offshore areas, and therefore the scores for criteria 1.1.1.2, 1.1.1.3 and 1.1.1.6 might be considered to be too high.

MML assessment team comment – With respect to the reviewer's final point, the scoring narrative for these PI's compares the strengths and weaknesses of what applies to LFA41 to other lobster areas and notes that the state of knowledge for LFA 41 is sufficient for the present stock assessment and the current fishery management regime. We therefore consider that the scores are appropriate.

Principle 2: Maintenance of Ecosystem

In general, the lobster fishery in LFA41 can be considered to have relatively low impact on the ecosystem within the area because the annual exploitation rate is low and therefore removals of lobsters would be unlikely to have any impact on community structure, traps are considered to be one of the most benign methods of fishing particularly in relation to trawling or dredging, the intensity of

traps is very low in comparison with traditional inshore trap fisheries, most of the fishery occurs in areas where the substrate is mud, sand or gravel which is unlikely to harbour high concentrations of those invertebrate species which are particularly sensitive to disturbance by fishing gear (although few studies have been undertaken on such effects) and lobster fishing is not permitted in those areas where sensitive species such as coral are present. There are by-catches of Jonah crab that need to be addressed, but other bycatch species such as cusk and cod are at very low levels, and there have been no incidences of entanglement of species on SARA Schedule 1 such as right whales and leatherback turtles. I believe that the relatively benign nature of the lobster fishery in this area in relation to other methods of fishing has been appropriately assessed in the draft report and the overall score for Principle 2 of 85 is justified by the lack of evidence of significant impact on the ecosystem.

I agree that some scores under Principle 2 should be lower particularly in relation to the lack of quantification of the potential effects of lobster fishing in the area, and the lack of management objectives and strategies to deal with impacts of the fishery on the ecosystem. There is no system for recording discard rates of undersized lobsters (or indeed lobsters over 6 lb in weight), and whilst anecdotal information suggests that discard survival is high, I think that it is important that the level of discards is recorded, and that some estimate of survival of discarded lobsters is estimated. Similarly whilst gear modifications such as the incorporation of escape vents and biodegradable panels minimise the potential for ghost fishing, some quantitative information should be collected on the levels of gear lost annually and on the "time to release" of the biodegradable panels (although the latter may already be available if trials of the panels were undertaken prior to implementation).

All the information provided suggests that entanglement of right whales in lobster gear is unlikely in LFA41 because the main distribution of right whales is not close to the offshore lobster fishery and the peak sightings of whales correspond to the time of year when the lobster fishery is closed. There have been no reports of entanglement to date, but a formal recording system for incidental mortalities of whales (and turtles) is required to fully satisfy concerns about environmental impact of lobster gear. Although unlikely, a single entanglement could have an impact on local right whale numbers.

The main area where I believe conditions should be attached in relation to Principle 2 relates to bycatch of Jonah crabs. A recent assessment of bycatch in the fishery does not provide quantitative estimates of Jonah crab bycatch. As there have been recently documented declines in abundance of Jonah crab, I agree with the assessors that lack of information on this most important bycatch species justifies the relatively low score for criterion 2.1.2.1 (nature and extent of the bycatch).

MML assessment team comment – We note the reviewers comment with respect to Jonah crab. The scoring narrative for the PI 2.1.2.1 explicitly mentions the lack of information for this species and considers that it is implicit within the existing wording of the Condition.

Principle 3 Effective Management System

The LFA41 lobster fishery scores highly on a number of the criteria under Principle 3. There are clear institutional frameworks with significant stakeholder involvement in the committees which oversee the management plans and the Regional Advisory Process, there is strong compliance with management regulations, although there is scope for wider external review of the assessment and management process. This strong institutional framework is appropriately reflected in the assessors' scores for the relevant criteria. Whilst operational measures are effectively in place to meet short and medium term objectives, the long term objectives outlined in the Integrated Fisheries Management Plan are not very explicit with no clear application to the precautionary principle, and no procedures to measure performance against management objectives and I believe that the report adequately reflects that in the lower scores for criteria 3A.3.

Under Principle 3 the key omission for the offshore lobster fishery is the absence of biological reference points at which management action would be triggered, and the absence of pre-agreed decision rules to respond to adverse stock or environmental conditions, in particular how to deal with

a significant decline in recruitment. For example, the TAC of 720 tonnes is in effect a precautionary TAC with no analytical basis, and it is not clear how the fishery managers would respond to a significant decline in catch rates or recruitment to the fishery. In practice I assume that stakeholders and managers would reach agreement through the OLJCAC and OLJCMB about any necessary reduction in TAC, but that is not the same as having pre-agreed decision rules. The development of such rules would clearly need to be a condition of certification. To date the development of the offshore lobster fishery has not required any strong management action as stock indicators have been stable, but I agree with the assessors that reference points and decision rules are essential for the long term management of the fishery. All lobster fisheries have been driven in recent years by high levels of recruitment but these levels cannot be guaranteed in the future, so management plans with clear decision rules need to be in place for sustainable management of these fisheries.

Traceability

For the MSC standard to be maintained there needs to be traceability from the sea to the consumer. There are potential traceability issues for lobsters (*Homarus americanus*) because this species is distributed from Cape Hatteras to Labrador. For LFA41, however, there are only two active licensed vessels all owned by the same company, with VMS tracking of vessels, obligatory log books and landings declarations, 100% dockside monitoring and random inspections by enforcement officers, and I believe that sufficient safeguards are in place therefore to ensure the eligibility of the product entering into further chains of custody. Checks would however be needed to ensure that lobsters from the adjacent offshore LFA34 grounds were not able to enter the chain of custody.

Certification Recommendation and Conditions

I agree with the overall scores that the assessors have allocated to the various criteria and that the fishery has therefore scored sufficiently highly across all Marine Stewardship Council Principles and Criteria for Sustainable Fisheries to warrant certification. The assessors have set four conditions for the client to address over various time scales. Condition 1 covers discards and bycatch of both discarded lobsters and non-target species. The requirements and timescales appear appropriate, although the condition does not explicitly mention by-catches of Jonah crab which are of particular concern. Condition 2 covers indicators, reference values, uncertainty and decision rules and contains a suite of requirements through identifying statistical variability in indicators, development of qualitative and quantitative threshold, trigger and target reference values where appropriate, quantification of uncertainty and establishment of appropriate decision rules. This condition will be extremely challenging but is essential to ensure that all criteria under Principles 1 and 3 reach a score of 80. The assessors' report is comprehensive and sets out clearly exactly where the uncertainties lie in relation to all criteria, so this condition should be achievable. Condition 3 concerns ecosystem impacts and PET species and is relatively straightforward to meet. Condition 4 considers management systems and requires formalisation of what is already generally implicit within the current Integrated Fisheries Management Plan and should therefore be achievable within the suggested timeframe.

References

DFO 2009. Assessment of Lobster in Lobster Fishing Area 41 (4X + 5Zc). DFO Canadian Science Advisory Secretariat Science Advisory Report 2009/33.

MML assessment team response – In light of the overall positive response to the draft report no amendments have been made.

APPENDIX C

Client Action Plan

Clearwater Seafoods Limited Partnership
Client Action Plan

Condition 1:
In order to inform fisheries management, the Client, in conjunction with DFO, will review the existing sampling program with respect to the information provided on discards and main bycatch species. Methodologies for best estimating discards on an ongoing basis will be reviewed and discard estimates will be reported regularly. The results of this review and the estimates will be provided to the audit team by the first annual audit.

Condition 2:
In order to formalize and quantify where possible the methods used to assess the status of the stock and to establish clear decision rules, the Client, in conjunction with DFO will:

- By the second annual audit, review indicators for their ability to measure changes in stock status and identify quantitative threshold, trigger and target reference values where possible.
- By the third annual audit, establish qualitative reference values for those indicators where quantitative analysis is not possible. This approach will incorporate uncertainty either quantitatively or qualitatively.
- By the fourth annual audit, establish decision rules appropriate to the nature of the indicator.

The results of this work will be reported to the audit team as it is completed.

Condition 3:
In order to obtain better information on interactions with PET species, DFO will revise licence conditions and logbooks to accommodate recording of PET species interactions. A copy of the revised conditions and logbook will be made available to the audit team by the first annual audit. Clearwater will incorporate marine mammal ID training into the standard crew training program.

Condition 4:

The client will by the first annual:

- Develop explicit short-term and long-term resource and environment objectives, including those that address impacts on PET species. These objectives and procedures for measuring performance relative to the objectives will be incorporated in the update of the IFMP.
- Update the IFMP to explicitly address precautionary approach.
- Describe management strategies employed to detect and where appropriate reduce ecosystem impacts.
- Implement a marking protocol for all gear such that it can be clearly identified.

The results of this work will be provided to the audit team by the first annual audit.

APPENDIX D

Registered vessels belonging to the client fishing for lobster (*Homarus americanus*) in DFO lobster fishing area 41 (LFA 41).

Vessel Name	Registration No.
Atlantic Prospect	Reg # 100989
Nunatsiavut Nanuk	Reg # 107314

APPENDIX E

Stakeholder comments received following publication of the Public Comment Draft Report

Canadian Whale Institute

I have reviewed the MSC document and have the following comments and observations.
In respect to the impacts on listed endangered species in Atlantic Canadian waters i.e. Western North Atlantic Right whales and leather back turtles, it appears that although the status of the various species is recognised, the issue has been glossed over and the impression left with the reader is that this is a non-issue in respect to the offshore lobster fishery in Canadian waters by Clearwater Seafood's. The Western North Atlantic Right whale Recovery Strategy (2009) identified that fishing gear entanglement was the second most significant threat to the survival of the species, the first being struck by vessels, which incidentally Clearwater vessels are also not immune from.

My comments are to reflect my interests and concerns in respect to the Western North Atlantic Right whale of which just over 400 survive, I will leave the leatherback turtle issue to others to address although I believe some of the concerns I have are relevant to the turtle issues as well.

The suggestion that research done by the National Marine Fisheries Service (7.3.6) on whale entanglements in lobster gear in the offshore areas is not an issue of concern is misleading. The NMFS nor for that matter has the Department of Fisheries and Oceans has ever carried out any research in Atlantic Canadian waters in relation to the offshore lobster fishery and its impacts on endangered whale species.

It is alluded to that the offshore lobster fishery will not overlap significantly with the seasonal presence of right whales in the areas of concern. This in some small way may be true, however this assumption is based on what?, there is a significant lack of research activity or information on which to base this claim. In fact right whales are known to be in the general area (Jordan Basin, Bay of Fundy) year round. The loss of just two female right whales could jeopardize the survival of the species. Over 75% of right whales bare scars or have injuries indicating the whale as having been entangled at least one time if not more.

It may be true that the fishery only occurs in the periods January through June and then from October to December, what is not mentioned however is that the gear remains in the water during the intervening period. The document suggests that by virtue of not fishing during the intervening period (July -Sept) the threat of entanglement is removed, however, by their own acknowledgement it would suggest that its is recognised that there is a potential threat of entanglement. Although not technically "fishing". the vertical and bottom lines still poses a major threat of entanglement to the survival of the right whale and to other marine mammals and sea turtles.

Reference is made in the document to the Humpback whale and its listed "Endangered" status in the United States as well as its presence in the US waters adjacent to LFA 41, although Humpback is not given the same protected status in Canada the potential for Humpback whales to become entangled in Canadian offshore gear should be recognized and given the same value and consideration in this report as that of the Right whale.

In reviewing the **Scoring Indicators** specifically 3B.1.1 states "ground lines that lay flat (limited submersible observations showed that that the traps and ground lines were tight not looped) have the effect of minimizing entanglements in this fishery", although this might have some relevance to the inshore lobster fishery in some areas, to make this assumption for the offshore without any definitive research and documentation (of which I am not aware of) could be problematic,

It is also obvious from the assessments made by the peer reviewers that their information in respect to the Right whale in Canadian waters is limited. Reviewer "A" suggests that mortality is due to "entanglement with fixed nets" rather than the bottom weighted lobster pot lines, contrary to this suggestion lobster gear, specifically the vertical (buoy) lines and the bottom lines are considered a

major threat.

Reviewer "B" suggests that "the main distribution of right whales is not close to the the offshore lobster fishery", again this would indicates a lack of knowledge and appreciation of right whale issues especially annual migration, to get from one area to another (e.g. Grand Manan Basin, Roseway Basin and Gulf of Maine) right whales will transit these areas and subject to entanglement whether the lobster gear is "fishing" or not. Reviewer "B" however does acknowledge that" a single entanglement could have an impact on local right whale numbers" . It is not clear what is meant by his understanding and use of the term "local" as these whales are highly migratory. Right whales seen off Florida have been documented not only in the Bay of Fundy, Scotian Shelf, off Newfoundland, but also in the Gulf of St. Lawrence.

Overall, I fail to see how Clearwater in the prosecution of the offshore lobster fishery is addressing and mitigating the effects and impacts of this fishery. There is no indication that the crews of these vessels have any knowledge of marine mammals or able to identify species. Although it is indicated in Clearwater Seafood's Client Action plan (Condition 3) that DFO will revise licence conditions and log books to accommodate recording PET interactions, there is no indication that Clearwater Seafood's is prepared to develop mitigation strategies to address the entanglement (i.e. gear research) and disentanglement issues either with DFO or any other non-government organization.

I would suggest that before Clearwater Seafood's receives MSC that the company assume a more responsible stewardship roll in mitigating the impacts their operations may have in respect to those listed marine mammal and sea turtle species while acknowledging the trans boundary and international nature and protection of the species.

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February 12, 2010

Moody Marine Ltd.
28 Flemming Drive
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Canada B3P 1A9

Dear Paul Knapman,

The Ecology Action Centre is pleased to be able to act as a stakeholder in the MSC assessment process for Eastern Canadian Offshore Lobster. We understand that this fishery is a small portion of the Atlantic Canadian lobster landings, and that traceability is a major concern given that Clearwater who fishes the offshore lobster, also is a major buyer of inshore lobster. We implore that the MSC process and the ongoing processes with inshore fisheries will address this issue.

The lobster trap fishery for Atlantic lobster is has been sustained at high levels particularly since the collapse of Atlantic groundfish. Traps in general have a relatively low impact on the marine environment. The Canadian lobster fishery has a negligible interaction rate with marine mammals, particular as compared to the US fishery.

Overall, the report is a comprehensive and thorough investigation of the literature and offshore lobster fishery. We concur with many of the comments of the peer reviewers. However, we continue to have a few specific concerns, particularly surrounding bycatch in this fishery. Additionally, this is a bait intensive fishery and as such, bait fisheries should undergo a full MSC assessment at the same time as the fishery for which the bait is utilized. Our comments pertain to both the scoring indicators as well as conditions on the fishery.

1) Observer Coverage: In order to determine the amount of observer coverage needed it is recommended than a power analysis be undertaken to estimate the number of trap hauls needed to accurately estimate bycatch in the lobster fishery.
2) Groundfish bycatch: Overall, the report gives a cursory view to addressing the impact of the lobster fishery on groundfish bycatch, particularly COSEWIC listed species (cod & cusk). Condition 3 states " The client is required to ensure that by the first annual audit there is a requirement to record and report all incidental mortalities of PET species." The client should be required to report all incidental catches of all bycatch species, in addition to PET species which should include

COSEWIC listed species. Recording mortalities is not an accurate assessment of bycatch nor of ecosystem considerations, particularly as many mortalities occur when species are thrown back. Accurate estimates of mortality rates should be sought. Groundfish mortality in the lobster fishery should then be included as fishing mortality in the stock assessments for these species.

3) Jonah crab bycatch: Given that jonah crab fishery is now a commercial fishery, all crab bycatch should be recorded, and mortality quantified for use in stock assessments.
4) Bycatch reduction: Following quantitative recording of bycatch of groundfish and jonah crab, efforts should be made to experiment with gear modifications to reduce bycatch if necessary.
5) Maximum size limit: We recommend that one of the conditions be a reduction in the maximum size kept for both male and female lobsters. Lobsters in the Maine fishery must be thrown back if >5inches in carapace size. Given that LFA 41 has larger lobsters, some of which likely are a source of new recruits to the inshore fishery, precautionary size limits are advised.

Given that this will likely be the first Atlantic lobster fishery certified, it is important that the precedents set in conditions and in assessment of management measures and data availability raise the bar for conservation, rather than accepting the status quo.

Sincerely,

Susanna Fuller
Marine Conservation Coordinator,
Ecology Action Centre

THE HUMANE SOCIETY
OF THE UNITED STATES

Paul Knapman
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Via email to: p.knapman@moodyint.com

12 February 2010

Re: Eastern Canada Offshore Lobster- Draft Assessment Report for Public Comment

Dear Mr. Knapman,

I am submitting these comments on behalf of the more than 11 million members and constituents of the Humane Society of the United States and Humane Society International (HSUS/HIS), thousands of whom reside in Canada. We oppose certification by the Marine Stewardship Council (MSC) of the Eastern Canada Offshore Lobster Fishery as a sustainable fishery based on the lack of protected species management measures in place at this time and an apparent misunderstanding of the risk posed to endangered right whales and humpback whales. As we will note in greater detail below, despite claims in the assessment that no entanglements of endangered North Atlantic right whales (*Eubalaena glacialis)* have been reported, we find this untrue and that management measures in place are insufficient to prevent unsustainable impacts. As the assessment notes on page 138, a single entanglement could result in an impact that could be unsustainable. In addition, we are concerned about impacts to humpback whales (*Megaptera novaeangliae*), which are listed as endangered in the United States. Though they may not be listed under the Species at Risk Act (SARA) in Canada, since the U.S. serves as a major and increasing market for Canadian lobster (FAO 2007), the status of the species in the U.S. is of great importance in determining whether this fishery has impacts that are sustainable. The assessment does not adequately address risk to endangered humpbacks, a trans-boundary species that is endangered in a major importing country. That a host country is not concerned about the status of a species should not be the deciding factor for a species that is traded and is listed as an endangered species in importing countries.

Background

North Atlantic right whales are listed as endangered in the U.S. under the Endangered Species Act (ESA) and they are also listed in Canada as endangered under the SARA. (DFO 2007a) Because right whales are trans-boundary species, any effort to protect them must be undertaken throughout their range in both the U.S. and Canada. Department of Fisheries and Oceans Canada (DFO) has determined that the two greatest threats to right whales are vessel strike and entanglement in fishing gear (DFO 2007b). The entanglement-related mitigation afforded to right whales in Canada is substantially less than that is the U.S.

Canada has lagged behind the United States in requiring risk reduction measures of lobster fisheries which are known to entangled and kill or seriously injure right whales in both Canada and the U.S. In 2009, the U.S. National Marine Fisheries Service (NMFS) published a final rule requiring lobster fisheries in the Northeast to use sinking groundline in their lobster trawls to reduce the entanglement of right whales and to adopt various other risk reduction measures (NMFS 2009). Canada does not require these same measures and the only voluntary strategy in place does not extend into lobster fishery area 41.

The MSC assessment states that fishermen in the Canadian offshore fishery use sinking groundline, but there is no mandate to do so nor do we see substantiation of universal use of what was, until outlawed in the U.S., a common gear configuration for all offshore lobster gear in the U.S. The fishery does not provide evidence in its publically available literature that it takes any steps to reduce risk to marine mammals, though it does tout measures to reduce fish bycatch (Clearwater undated). Even the MSC evaluation admits that there is not even a clear *voluntary* code of conduct in place (see 3.B.5.1)

According to Johnson et al. (2005) offshore lobster pot gear was the second most common gear type removed from humpback whales (only gillnets were higher) and right whales were entangled equally in inshore and offshore gear, where gear type could be identified. Because the origin of the gear is not generally known (i.e. offshore gear could be either Canadian or from the U.S.) it is disingenuous to claim that no entanglements of right whales have been reported from Canada. It is equally likely that offshore entanglements originate in Canada as not. In fact there is evidence of at least one entanglement that occurred within the area used by this fishery. The fishery states that it fishes in Crowell Basin (Clearwater, undated b). A right whale (catalog #1424) was found dead on Crowell Basin in 2007 as a result of chronic entanglement, the origin of which is not known. In addition, a right whale was found entangled in 2001 on Jeffreys Ledge that NMFS gear analysis found had been set offshore in 110 fathoms of water on the southwest edge of Crowell Basin in 2001 (NMFS 2001)

Both right whales and humpback whales utilize the waters of the Scotian shelf and LFA 41 that are used by this fishery. The NMFS has stated that although right whales tend to congregate in

recognized areas (such as the Roseway Basin and Bay of Fundy habitats in Canada) "feeding has also been observed ...over the Scotian Shelf" (NMFS 2008a). Humpback whales are widely distributed and animals from the Gulf Maine Stock have been observed off the Scotian Shelf (NMFS 2008b). Indeed 27% of animals from both the southern ends and the northern ends of the Scotian Shelf were matched to the Gulf of Maine (ibid). As such, the operation of the fishery on the Scotian Shelf may result in entanglement-related adverse impacts to this stock, which is listed under the U.S. Endangered Species Act (ESA).

That right whales and humpback whales are entangled in lines from lobster gear originating in Canada is undisputed. According to the NMFS stock assessment for right whales, between 2002 and 2008 (the most recent years for which data were available); five of the seven right whales killed or seriously injured were first seen in Canada. (Waring et al 2009) In most cases we do not know where the whale was entangled. Gear was not always identified as to inshore or offshore origin. Between 1997 and 2005 there were 48 recorded right whale entanglements and, of these, in only 13 of them could gear be recovered. Four of the 13 entanglements where gear was obtained for analysis were ascribed to Canada. (NMFS 2998 c). For endangered humpbacks, where the identified gear was trap/pot gear (and not gillnet) that number was four of 16 instances of entanglement (25%) originating in Canada. Again, whether or not it was inshore or offshore gear was generally not noted (ibid). This history of entangling a variety of species of endangered whales and contributing to the unsustainable level of mortality of North Atlantic right whales, Canada has yet to institute any changes in the practices of the lobster fishery to mitigate the risk to these "non-target" species that are being entangled and mortally injured. The MSC assessment itself states that "formal management objectives have not been set, nor have management strategies been formalized in fishery management plans" (at page 97). Thus there is no means of assuring that there are risk reduction measures sufficient to protect right whales and humpback whales.

According to a distributional map provided by the proponent fishery, its operations are in areas of known right whale and humpback whale distribution (see Clearwater undated a, compared with NMFS 2008b). The company claims that it operates in Georges Basin, Crowell Basin, and in Browns Bank on the outer and upper slope of the northeast Channel, and operates year-round (Clearwater undated b). The MSC relies on a report by Johnston et al. 2007, which states on page 31 of that report that, in lobster are LFA41, survey effort for whales is low but acknowledges that "right whales may migrate through offshore areas to reach feeding/nursery ground," and concludes that "due to lack of SPUE data in these offshore areas, the risk of overlap cannot be assessed." Far from the assertion in the MSC that the likelihood of overlap of fishery and right whales is low, Johnston and co-authors say that it cannot be assessed.

Nonetheless, the NMFS has found that Georges Basin, Crowell Basin and Browns Bank are likely regular use areas, stating that "in the summer months, right whales moved almost entirely away from the coast to deep waters over basins in the Central Gulf of Maine and north of Georges

Bank (Rogers, Crowell and Georges Basins). Highest abundance was found north of the 100m isobaths and over the deep slope waters and basins along the northern edge of Georges Bank" (NMFS 2008c). And, as noted above, right whales have been found entangled in these areas.

Many right whales are infrequently sighted and appear to prefer offshore waters. The NMFS has declared that right whales had an extensive offshore distribution in the 19th century in areas where they are not generally seen today. (NMFS 2006). That they are not often seen in offshore waters does not mean that they are not there. We note that it was long believed that right whales moved to the south during the winter months and few remained in northern waters. We now know this is not true. What were initially opportunistic flights by NMFS over Jordan Basin (but are now part of systematic surveys) have shown that this offshore area is quite heavily used (Pace and Merrick 2008). The MSC assessment itself admits that there is little effort to survey in the offshore areas where the fishery operates (see page 94 stating that sighting effort is concentrated in areas of already-known aggregations and thus "may not provide an unbiased picture of distribution").

The National Marine Fisheries Service (NMFS) has concluded that the death of a single right whale contributes to the extinction trajectory (NMFS 2007) and population modelers have concluded that preventing the death of only one or two females a year would allow slow recovery (ibid). The ongoing deaths of right whales in the lobster fishery contributes to the bleak outlook for this species.

In order to reduce risk to right whales, lobster fishermen in the much of the northeastern U.S. are required to modify their fishing gear by inserting weak links in the vertical line and buoy system and use sinking groundline between traps; however, Canada has no such requirements. In fact Canada has imposed no requirement of any kind for taking risk reduction measures to avoid the unsustainable levels of "bycatch" of "non-target" marine mammals nor has the fishery adopted any risk reduction measures comparable to, or more effective than, those in the U.S.

Comments and Rankings for Specific Principles and Criteria

MSC Criterion 2.

The key question of the Assessment is whether the fishery is conducted in a manner that threatens biological diversity (at the genetic, species or population levels) and avoids or minimizes mortality of, or injuries to endangered, threatened or protected species. The answer to this is "yes," indeed it is likely that the fishery does adversely affect endangered and protected species at unacceptable levels. In particular we are concerned with impacts from the fishery on both U.S. ESA-listed humpback and right whales. We believe that the fishery was scored inappropriately highly for a number of the assessment areas.

The fishery was given a score of 84 for item 2.1 'maintains natural functional relationships among species. We believe that this is inappropriate given rankings of sub-items on which we comment below.

Item 2.1.4.5 was given a score of 75 for having management strategies in place to address impact identification and avoidance/reduction. This seems inappropriately high. The lowest scoring criteria of 60 would be given for a fishery that has "management strategies that include some appropriate consideration of ecosystem impact identification and avoidance reduction but may not be tested." But it would seem that the fishery does not even meet this score for protected species interactions. There is no plan to address the impacts of the fishery as the MSC narrative comments acknowledged in section 3. While the assessment states in this section that fisheries use non-floating groundline, this is not part of a management plan, if fishermen are asserting that they are voluntarily taking this step, it is worth noting that no objective evidence of this was provided in this assessment. Indeed, in touting its bycatch reduction measures in its own literature, the fishery only mentions devices such as Nordmore grates and other devices designed to address fishery bycatch. It does not mention the ostensible use of non-floating groundline or any concern at all for marine mammals (Clearwater undated a, b). Further, though this section of the assessment asserts that there are closures in place on Brown's Bank, as we point out in our introductory comments, right whales and humpback whales are not confined to feeding and transiting that closed area and are often found entangled in offshore gear whose origin is not known, but may be Canadian. There is no strategy for risk reduction at all in LFA 41.

Item 2.2 scores 76 for "does not threaten biological diversity" and 82 for "does not have unacceptable impacts on recognized protected, endangered or threatened species" The comments in the assessment point to the existence of a Canadian recovery plan with "research and conservation strategies underway" but we point out that this plan has no mandatory risk reduction measures, simply a general goal of reducing risk. As Brown et al (2009) point out, even voluntary measures are not specified for much of the area in which the fishery operates. As noted above, Johnston et al (2007) stated that there may be overlap but the degree of risk can't be assessed due to lack of information on whale distribution. Though the fishery was given a score of 90 on "information on presence and populations of PET species," and the assessment says that right whales are "regularly monitored," it also admits that sighting effort is concentrated where whales are already known to congregate so data "may not provide an unbiased picture of distribution." Indeed the score of 60 would not even seem to have been met, as that minimal score requires a "programme in place to identify [PET] species directly related to the fishery" and "periodic monitoring of the trends…" (see p. 94). While the overall status of endangered whales is tracked, there is virtually no monitoring occurring in the main areas of operation of the offshore fishery, and there is evidence from non-systematic surveys that both humpback and right whales occur in the operating area. The assessment acknowledges this and Johnston et al (2007), a primary citation used by this assessment, concluded that the risk to whales could not be properly assessed due to the lack of information.

Item 2.2.1.2 scored 75. We believe that this too is inappropriate. Right whales potentially become entangled in areas of the fishery's operation (see comment on the entanglement of right whale #1424 above under background) and entanglement in lobster gear, including offshore gear, is an important source of mortality. We vehemently disagree that the risk of entanglement low. At best it is unknown.

Item 2.2.1.3 (p. 96) scored 80 (i.e., Direct and indirect effects are well estimated and do not threatened protected, endangered or threatened species). Though the assessment states that it is possible right whales could become entangled, the risk is considered low particularly relative to other types of coastal (trap/net) and offshore (longline) gear. In fact the origin of most entangling gear is unknown. Again, we point to the entanglement of a whale in Crowell Basin in 2007 and to the statement in Johnston et al (2007) that states "due to lack of SPUE data in these offshore areas, the risk of overlap cannot be assessed." The assessment cites the undocumented and voluntary use of non-floating groundline as a risk reduction measure and states that the fishery does not operate in areas of known right whale concentration in Canadian waters. Again, we point to Johnston et al (2007) and NMFS (2008) stating that right whales transit the areas used by the fishery. Though it states that no entanglement has been reported, the entanglement of right whale #1424 in an area used by the fishery seems to belie this.

Item 2.2.2.1 scores 70 on the grounds that strategies have been developed to address and restrain significant impacts on threatened and endangered species. This seems to be counteredmanded by the admission in this section that "formal management objectives have not been set, nor have management strategies been formalized in fishery management plans." There are no mandatory measures. Even the lowest score of 60 seems inappropriate, as it requires that systems be in place and there are none. The recovery strategy cited has only general measures in its Objective 2 and, as previously noted, there are no requirements for risk reduction as there are in the U.S. (i.e., this fishery does NOT meet international standards), and the mitigation strategy mentioned in the recovery plan is simply for areas 36 and 38 only (Brown et al. 2009).

MSC Principle 3

This category says the fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable. It was given an overall score of 88. Again this seems too high when considering the lack of management and mitigation for bycatch of humpbacks which are listed as endangered under the U.S. Endangered Species Act, and for right whales, that are protected both in Canada and the U.S. and for which both countries acknowledge the proximal threat of entanglement.

For example, item 3B.1.1 was given a score of 80 for having management measures that include practices to reduce impacts on non-target species. As noted above there are no mandated measures and the MSC evaluation itself acknowledges in section 2.2.2.1 "formal management objectives have not been set, nor have management strategies been formalized in fishery management plans." Thus this fishery does *not* meet the criteria of having management measures to reduce impacts to endangered whales. While this section again states that there are no reports of entanglement, as noted above, there is evidence of a right whale becoming entangled in an area used by this fishery and this assessment did not consider risks to U.S. endangered humpback whales. As we have previously noted, the management standards in Canada for the offshore fishery are *not* consistent with U.S. standards even though the fishery imports its product into the U.S. Risks and potential for fatal interactions with whales are not mitigated as they are in the U.S. This fishery should have been scored at less than 60.

Conditions

Condition 3 provided in the assessment would require as a condition of certification that the fishery report incidental mortalities of protected, endangered and threatened species. Yet this relies on fishermen acting against their best interest by reporting the entanglement of a right whale or humpback whale, knowing that documented bycatch of endangered species may jeopardize their certification. Indeed, voluntary reporting is usually unreliable. Credle et al (1994) found that fisher self-reports are negatively biased. It seems unrealistic to expect this condition to be met.

We also point out that the condition acknowledges on page 140 that a single entanglement could have an impact on "local right whale numbers." While we take issue with the notion that there is somehow a "local" population (i.e., it is a single stock that crosses international borders), we believe that the 2007 entanglement of a right whale in Crowell Basin where the fishery operates is indication that entanglements are likely.

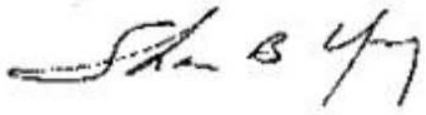
Conclusion

Our comments have focused almost entirely on impacts of the fishery on endangered large whales, critically endangered right whale in particular. We disagree that risk of entanglement is low, and have cited regular entanglement in offshore lobster gear, including gear used in the area where the fishery operates. The lack of sightings effort in offshore areas precludes statements made in the assessment that risk is low because there are few whales present. The assessment is also deficient in that it does not consider risks to humpback whales that are listed as endangered in the U.S. These risks must be addressed for this trans-boundary stock that is entangled on a regular basis in offshore gear---particularly as this fishery imports its product into the U.S. and should have management measures comparable to those in the U.S.

Within our comments, key indicators of impact involving endangered species in the ecosystem are below 60 and the impacts on endangered species coupled with a lack of formalized program of risk reduction that is comparable to international standards for these same individuals in U.S. waters should preclude certification. The ongoing unsustainable levels of entanglement of right whales in buoy lines of unknown origin (but often of a length that indicates an offshore placement) should prevent this fishery from being rewarded at this time with certification as sustainable by the Marine Stewardship Council even if the other habitat effects and the management of the target species are deemed acceptable. The impacts to endangered and threatened species must take precedence in determinations of sustainability.

Feel free to contact me if you have questions on our rankings and concerns.

Sincerely,



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Friday, February 12, 2010

Re: Eastern Canada Offshore Lobster- Draft Assessment Report for Public Comment

Dear Mr. Knapman,

On behalf of the more than 125,000 supporters and constituents of the Whale and Dolphin Conservation Society (WDCS) I offer the following comments on the Draft Report for Eastern Canada Offshore Lobster Fishery and the fishery's application to be certified as a sustainable fishery under the Marine Stewardship Council (MSC).

Our comments will focus on the issue of large whale entanglements and the threat to protected and endangered species which we do not believe are adequately addressed in this document.

First, Principle 2 indicates that Jonah crab are the most notable bycatch of the fishery. While we do not dispute that may be true in volume, we do not believe the statement adequately reflects the impact of the fishery on endangered and/or protected species including large whales. As the MSC itself acknowledges in the assessment, entanglements in fishing gear remain one of the two most significant impediments to the recovery of the endangered North Atlantic right whale and continue to impact all other large whales species.

We are confused as to why, on page 39, the document states there is no indication that right whales have been entangled in the "offshore area" when this is far from clear. There is ample evidence of right whales becoming entangled lobster pot fisheries and the assessment itself acknowledges that entanglements in fishing gear are one of the leading threats to this species. For most entanglements of right whales, the origin of the entangling gear is unknown (Johnson et al 2005).

The assessment pays little attention to risk to other large whale species, including humpback whales, a species listed as Endangered in the US, a major market for the

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lobster from this fishery. According to NMFS data, gear removed from a humpback whale on August 12, 2005, was identified as Canadian lobster pot gear. The 5/8" in rope and 9 links of 5/8" chain that was removed was found to be consistent with offshore gear (Kozuck 2003). The risk to this, and other species, must not be discounted simply because they are not listed under Canada's Species at Risk Act (SARA). According to the assessment document, 75% of the landings from this fishery are exported to the U.S. where all large whale species are protected by the Marine Mammal Protection Act and humpback, finback, sei, right, and blue whales receive additional protection under the Endangered Species Act (ESA). Since the majority of consumers are US citizens, they should not be misled by an "ecocertification" label that disregards the risk to listed US endangered species.

We also believe that the risk of entanglement is not adequately considered by the data presented in the document. While we do not dispute the validity of the right whale sightings data provided in Figure 11 in the assessment document, we wish to point out that additional sightings data from OBIS indicate that large baleen whales, including North Atlantic right whales are found in the area (Fig 1 below). Additionally, sightings data alone are insufficient to determine the presence or absence of right whales, as the assessment itself acknowledges that little sighting effort is focused on major operating areas for the fishery. No passive acoustic data have been collected for this area that might indicate greater use than can be detected by the extraordinarily limited visual observations. According to studies within the Stellwagen Bank National Marine Sanctuary, the number of visual right whale detections was quite limited (n=33) as compared to the likely number of right whales that were detected acoustically during the same time frame (n=311) (Mussolini 2008). Similarly, passive acoustic monitoring off Greenland has demonstrated use of an area for right whales previously unknown (Mellinger et al. 2009). Therefore, the limited sightings data available for area 41 should not be considered an adequate basis for concluding that right whale distribution does not overlap the fishery effort. There are already limited data that contradict this assumption.

We are also concerned that the fishery does not meet the standards of the Certification Process in regard to gear type and requirements of risk reduction. According to the Operational Criteria (B12) states that the Fishing Operation shall (emphasis added) "*Make use of fishing gear and practices designed to avoid the capture of non-target species…*" While the document indicates the fishery is using "non-floating" groundline, it is unclear as to whether this is "neutrally buoyant" line or sinking line. Nor is it clear that the "non-floating" line is universally used. Further, there is no requirement in Canada that the fishery use sinking groundline or weak-links as is mandated for the U.S. lobster fisheries. The two countries, which share management of this species, do not have equivalent standards for risk reduction; Canada's is demonstrably weaker. We believe that additional measures to reduce entanglement risk are available but are not

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mandated in this fishery resulting in the fishery not doing all it can to avoid the capture of non-target species or provide equivalent risk reduction potential to that of the U.S.

Our greatest concern is that the motivation to become certified has little to do with sustainable fishing practices and everything to do with a means to increase competitive marketing for the product. According to the Government of Canada Response to the Report of the House of Commons Standing Committee on Fisheries and Oceans: The Canadian Lobster Fishery: Trapped in a Perfect Storm *(2009)*, *The lobster fishery in Maine is currently under MSC assessment with a view to successful completion in 2010-11. This decision by the Maine fishery had led to an increase in interest in the MSC ecocertification by Canada's lobster fishery, particularly since Canada exports approximately 80% of its lobster products to the US.* While we are well aware that the labeling provides consumers with a choice and is designed to provide a marketing edge, we do not believe it should be provided to a fishery based solely on "green washing" a product to compete in a market. Just as tuna cannot be marketed as "eco-friendly" with significant bycatch of dolphins, so too should lobster fisheries with bycatch of endangered whales, not be allowed to mislead consumers into thinking that the product is somehow "whale safe."

We do not feel this fishery has adequately demonstrated that it has reduced its risk to large whale entanglements to a point that it merits an "ecocertification" label. As we have pointed out in our comments, the risk to a number of U.S. protected and endangered species exists without protection in Canada that is at least comparable to that in the U.S. And more specifically, the threat to the critically endangered right whale is significant and must not only *not* be discounted but given precedence over the management of the target species or any fish bycatch.

Sincerely,

Regina A. Asmutis-Silvia

Regina Asmutis-Silvia
Senior Biologist
WDCS (North America)

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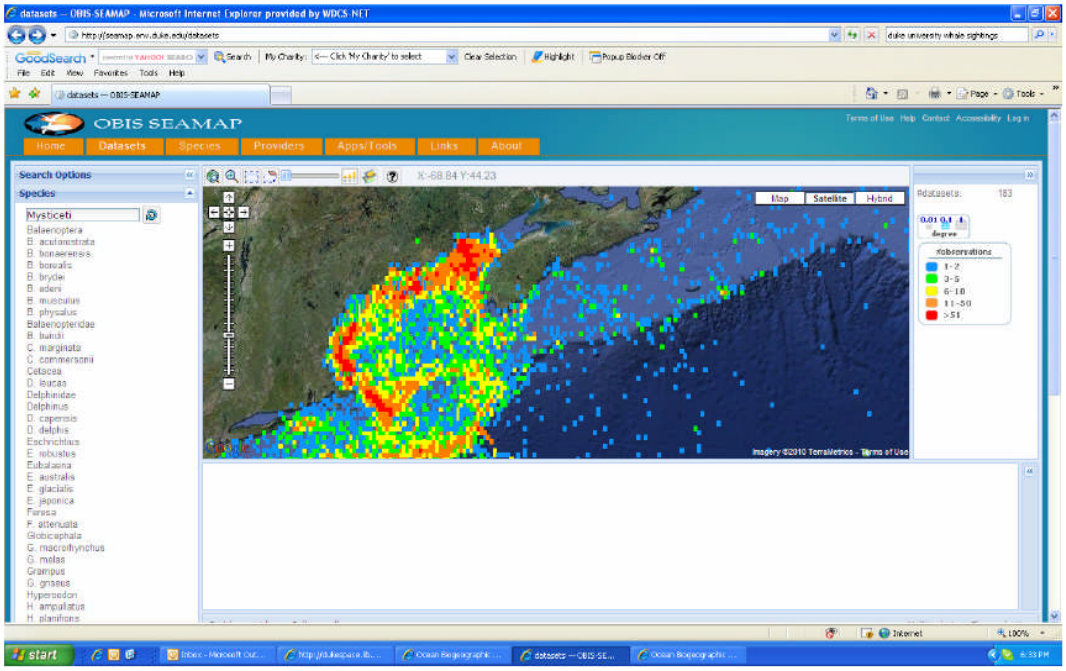
Fig 1. Large Whale sightings Data- OBIS (accessed 2-11-2010)



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February 12, 2010

Paul Knapman
Moody Marine Ltd.
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Re: Public Comment Draft Report for Eastern Canada Offshore Lobster Fishery
Submitted by email attachment on February 12, 2010

Dear Mr. Knapman,

I have reviewed the Public Comment Report for Eastern Canada Offshore Lobster Fishery issued by Moody Marine Ltd. and my comments are detailed below (sections extracted from the Comment Draft are italicized). The basis for these comments is a 25 year career of scientific studies of right whale and using the results of those studies to develop, justify, implement and monitor conservation strategies to reduce the impact of human related mortality and promote the recovery of the species.

In general I am surprised and disappointed that the assessment team has taken such a light view of the problem of entanglement for North Atlantic Right Whales relative to their assessment of this fishery. Many of the issues raised in the document I submitted during the site visit have not been addressed, nor have key references been examined. That document is attached to this letter with certain sections highlighted that merit examination and recognition in your assessment in order to fully address the threat of entanglement from this fishery.

For example, in ***Principle 2*** - *There is good knowledge of benthic habitats and species within the fishing area.* As we discussed in the site visit, the area is data poor for right whale distribution and seasonality. Systematic surveys are not regular on the area south of Nova Scotia and have not been conducted for specific relevance to the Eastern Canada Offshore Lobster Fishery. Although the review team examined right whale sighting data from the North Atlantic Right Whale Consortium database for two Right Whale Critical Habitats, Bay of Fundy and Roseway Basin, they failed to take into consideration that right whales migrate between the two critical habitats within a season and that data exists from other sources showing right whales do overlap with the area of the Eastern Canada Offshore Lobster Fishery (see Baumgartner and Mate 2005). The data presented in Baumgartner and Mate 2005 are not archived with the North Atlantic Right Whale Consortium and thus are not included in this assessment. The statement on Page 32 *5.5.2. Environmental/Ecosystem Indicators Right whales - No trend. Trap density is low and does not overlap known whale routes, although specific information on the latter is*

poor for the offshore areas. No entanglements reported to date in offshore lobster gear ... is in error because the Baumgartner and Mate 2005 data have not been included in the report. In addition it is rare to be able to assign an entanglement to a specific fishery, as is detailed below in this letter.

More information is needed on the details of how this fishery is prosecuted to properly assess the level of entanglement potential. On Page 26 *3.5.1.The offshore lobster fishery is strictly a commercial one and is conducted using rectangular wire coated lobster traps measuring 48" long, 16" wide and 11" tall. Traps are set in strings, or trawls, of 120-150 and are joined by a ground line approximately 14 fathoms apart. Traps are constructed in panels connected by biodegradable clips and all traps are fitted with escape vents for small lobsters. Strings are anchored at each end with a surface line attached to a buoy and high flyer. Vessels set about 30 strings at a time stretching about 1.2 miles with a 4-5 day soak time. Trips typically last 4-5 days. The quota year runs from January to December but the company restricts fishing from January to June and from October to December...* and on Page 96 *... and non-floating groundlines are used* and on Page 127 *Measures such as the industry practice of using a minimum of buoy lines (2 per 100 traps) and ground lines that lay flat (limited submersible observations showed that the traps and ground line were tight and not looped) have the effect of minimizing entanglements of marine mammals especially right whales which are a listed species. There have not been any reports of whale entanglements in this fishery.*

There are right whales in the vicinity south of Nova Scotia through December as demonstrated by Mellinger et al 2007. Given the recent discovery of a putative mating ground in Jordan Basin and the presence of right whales on Jordan Basin in at least November through January, it is possible that there are right whales in the area of the fishery migrating between Roseway Basin and Jordan Basin.

There is little detail provided on the characteristics of the gear used. For example:

- what is the specific gravity of the "non-floating groundline"?
- what is the diameter and breaking strength of the groundline and vertical line used?
- are there any weak links incorporated into the buoy or end lines, or on the groundline?
- how is the gear stored during the time of the year in which the gear is not active (July – September)?

Page 35. 6.2 Management Objectives.

There is no recognition of possible entanglement impacts on endangered right whales.

On Page 40. *Spatial and temporal distribution of the right whale is such as to reduce the risk of entanglement in offshore lobster gear. Right whales are known to congregate in two areas, the mouth of the Bay of Fundy and the Roseway Basin, neither of which are in the fishery area (Brown et al. 2008; Johnston et al 2007). The offshore lobster fishery*

does not operate during the months of July-September, the period of maximum occurrence of right whales in Canadian waters ... However, a risk of entanglement remains since both species have been recorded throughout the year in Canadian waters, and could occur in the offshore lobster fishery area.
Given the statement above, it is not clear why the issue of right whale entanglement has not been given greater considerations in the Client Action Plan.

On Page 94 *For right whale, a recovery strategy was published in 2000 (Anon. 2000b) and a revised version consistent with SARA requirements has recently been finalized (Brown et al 2009). These strategies outline research and conservation requirements for these species. A number of research and conservation activities are under way for both species. Critical habitat for the North Atlantic right whale was identified in the recently-released SARA-compliant recovery strategy (Brown et al 2009).*
The Department of Fisheries and Oceans does not have any activities ongoing in the area of this fishery to reduce the risk of entanglement of right whales. To date, DFO has not initiated an Action Plan on the issue, as required under SARA.

Right whales are regularly monitored under the North Atlantic Right Whale Consortium's program of shipboard and aerial surveys (e.g. Khan et al 2009). Survey effort is not evenly distributed in time and space, but tends to be concentrated in areas and at times of known concentrations, so may not provide an unbiased picture of distributions, but general patterns are relatively well known and consistent from year to year (see graphs of sightings information in the lobster fishery area in introduction).
Survey effort for right whales in areas south of Nova Scotia is not regular, in many years there has been no survey effort at all in the Roseway Basin Critical Habitat.

The score would have been higher if survey effort for right whales was more evenly distributed spatially and temporally.
This statement and the one above highlight the need for systematic survey effort in the area of the Eastern Canada Offshore Lobster Fishery.

One Page 96. *While it is possible that right whales and leatherback turtles could entangle in offshore lobster gear, the risk is considered very low, particularly relative to other types of coastal (lobster, gillnet) and offshore (longline) fishing gear. Gear configuration is such as to reduce entanglement risk: two buoy-lines are used for each string of 100 traps, and non-floating groundlines are used. Total vertical lines in the water would be a maximum of 240 at any given time (12,000 traps used, in strings of 100 traps, with two endlines per string), over a total fishing area of 32,000 km2, or 7 endlines per 1000 km2 over the whole fishing area (vertical lines would of course be more concentrated in areas fished, but density can be considered low). The offshore lobster fishery does not operate in areas of known right whale concentration (Johnston et al 2007) and does not operate in July-September, when abundance of right whales is at its peak in Canadian waters (see graphs of seasonal occurrence in section 7.3 of this report). Although there remains some level of risk of entanglement for these two species, risks are substantially lowered by the spatial and temporal distribution of the fishery and the low density of endlines. No entanglements of these species have been reported in the offshore lobster fishery. Based*

on these considerations, potential effects of the fishery on right whales and leatherback turtles can be considered well estimated and not to pose a threat to these two species. The potential effects of this fishery on right whale entanglement are not well estimated by even the most basic standards. Low density of endlines does not preclude an entanglement risk. The absence of endlines would eliminate risk of entanglement of right whales in that segment of the gear.

On Page 97. *The recovery strategy for North Atlantic right whale in Canada (Brown et al 2009) notes that entanglement in lines from fixed fishing gear is an important threat to this species, and identifies general measures objectives are set for addressing this threat.* **Comment**: Request the client incorporate into their fishing practises the recommended measures for addressing the threat of entanglement to right whales.

Comments on Peer Review:

On Page 138 Reviewer A wrote *Condition 3 is a straightforward requirement that boats record and report all incidental mortalities of protected, endangered or threatened (PET) species. Although entanglement in fishing gear may be an important source of mortality of right whales and leatherback turtles, this mortality must be largely due to entanglement with fixed nets, rather than with bottom-weighted lobster pot lines, so it should not be too onerous for the commercial boats if this is made a condition of the licence to fish.*
Comment: Entanglement of right whales in fishing gear is a significant source of entanglement (Kraus et al 2005, Kraus and Rolland 2007). Entanglements are caused by fixed nets and by trap/pot fisheries (Johnson et al 2005). There is evidence of entanglement of right whales in groundlines which it thought to be lessened by sinking ground lines. There is also evidence of entanglement in vertical lines. **Thus there is risk of entanglement of right whales throughout the water column (NMFS 2005).** Given the information taken from Anon 2008 and underlined below, it is folly for the certification body and for Clearwater Seafoods to assume that the risk of entanglement is minimal.

(Anon. 2008. ***Biological Perspective on Large Whale-Fishing Gear Conflicts in the Northwest Atlantic.*** Prepared by: The Large Whale Entanglement Working Group and presented to the Atlantic Large Whale Take Reduction Team April, 2008.) Extract from Anon 2008. Right whales have been found entangled in several types of fixed fishing gear, including lobster pot, crab pot, gillnet, hagfish, and aquaculture gear, and also in a Danish seine net (Johnson et al., 2005). However, in many instances it is not possible to determine either the type of gear involved or the actual component of gear on the animal since often only unmarked rope is retrieved with no attached gear to help identify the source. Johnson et al. (2005) reviewed all entanglement events of right whales and humpbacks where the animal was observed carrying gear. Of the 61 events reviewed, 45 could be attributed to gear type. The majority (89%) of events was attributed to lobster and gillnet gear. Of these 45 animals, the component of gear involved could only be determined for 25 cases. (Fishery attribution was generally most successful in cases in

which gear was removed versus photographed). Both buoy line and bottom gear have been found on both species (buoy line constituted 33% of the entanglements out of a total number for which the gear component could be determined, and groundline/gillnet floatline 25%) indicating that entanglement can occur throughout the water column. The same study indicated that no single gear type was inherently more or less dangerous – rope, versus tackle, was the common factor and posed the entanglement risk.
The locations where these interactions occur are not often known. Large whales occupy wide ranges and can also move great distances while entangled. Therefore, the entanglement site can only be known with certainty when the whale happens to be anchored by the gear that entangled it, or when the gear is recovered and successfully tracked to its owner. For the subset of right whale entanglement events that have been tracked to a specific site, the range extends from the Gulf of St. Lawrence to the coast of Florida, which corresponds to the species' main area of distribution

As a result of downplaying the entanglement risk for right whales, the client action plan only states the following:
Condition 3: *In order to obtain better information on interactions with PET species, DFO will revise licence conditions and logbooks to accommodate recording of PET species interactions. A copy of the revised conditions and logbook will be made available to the audit team by the first annual audit.*

Recommended Action for Client:
The condition is not sufficient in scope or detail.
i) There is no indication that the crews on board Clearwater Seafood lobster fishing vessels have any training in marine mammal species identification which will greatly affect their ability to accurately record species interactions. Clearwater lobster vessel crews should be trained to identify marine mammal species. Given the number of vessels and the lack of survey data for marine mammal species in the area of the fishery, it would be practical to have 100% observer coverage and a requirement that all marine mammal species be recorded (date, time and position in latitude and longitude) during daylight hours.

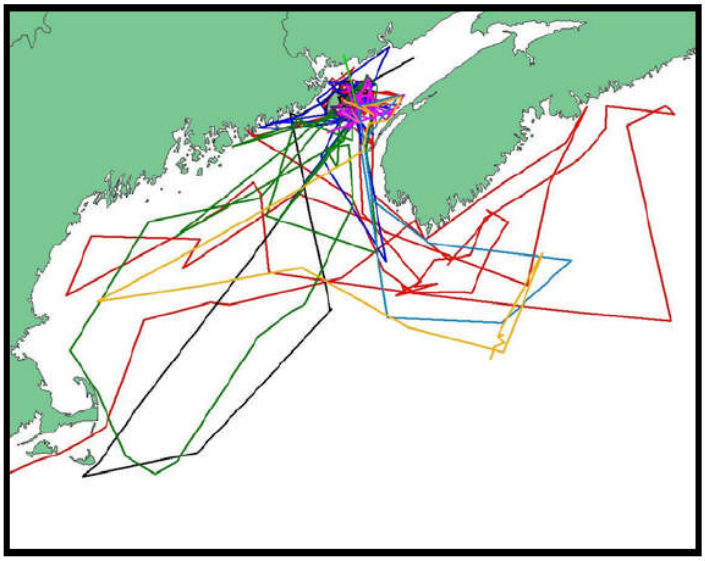
ii) Although the fishing area for offshore lobster is beyond the response range of the only fully trained and equipped Canadian disentanglement team (Campobello Whale Rescue Team, based Campobello Island NB), the crews should be introduced to disentanglement methods and the existence of the Whale Emergency Hotline number should they come across a whale entangled in their gear. They should be required to report all entanglement events as soon as the entangled whale is observed and required to stand by until the deployment of a disentanglement team can be assessed as possible. There have been disentanglement efforts in offshore areas in the past.

iii) Make sure that the groundlines are made of material such that the specific gravity of the line exceeds that of the water and is truly sinking groundline.

iv) Replace existing endlines with new technology that results in no endlines in the water column.

On page 140 Reviewer B wrote: *All the information provided suggests that entanglement of right whales in lobster gear is unlikely in LFA41 because the main distribution of right whales is not close to the offshore lobster fishery and the peak sightings of whales correspond to the time of year when the lobster fishery is closed. There have been no reports of entanglement to date, but a formal recording system for incidental mortalities of whales (and turtles) is required to fully satisfy concerns about environmental impact of lobster gear. Although unlikely, a single entanglement could have an impact on local right whale numbers.*

Comment: Although the data presented suggest entanglement of right whales in lobster gear is unlikely, not all of the available data were presented in the Comment Draft. Omitted from this assessment were two scientific papers that were provided to the assessment team during the site visit by email. Baumgartner and Mate 2005 show tracks of right whales equipped with satellite monitored transmitters that crossed through the area of this fishery. (Baumgartner, M.F. and Mate, B. R. 2005. Summer and fall habitat of North Atlantic right whales (*Eubalaena glacialis*) inferred from satellite telemetry. Canadian Journal of Fisheries and Aquatic Sciences 62: 527–543.) Below is an extract from the some of the data presented in Baumgartner and Mate 2005 showing tracks derived from right whales equipped with satellite monitored transmitters. Although the assessment team did request and examine data from the North Atlantic Right Whale Consortium database, these satellite derived data are not included in that database. Please reference the published paper for the full data set presented from the satellite equipped right whales.



Also omitted was the paper by Mellinger et al 2007 which demonstrates the presence of right whales in the area south of Nova Scotia June through December. (Mellinger, D. K., Nieukirk, S. L., Matsumoto, H., Heimlich, S. L., Dziak, R. P., Haxel, J., and Fowler, M. 2007. Seasonal Occurrence of North Atlantic Right Whale (*Eubalaena glacialis*)

Vocalizations at Two Sites on the Scotian Shelf. Marine Mammal Science. 23 (4): 856-867.) This assessment fails to take in account that the area of the fishery is data poor for marine mammal species composition and distribution because due to a lack of surveys and ignores the two scientific papers that suggest the risk is likely higher than thought because there are right whales in the area during the season of the fishery.

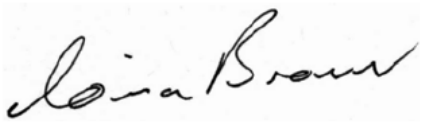
Recommended Action for Client:
Support for systematic marine mammal surveys in the area of the fishery during the time period of the fishery.

Conclusions:
Clearwater Seafoods has an opportunity to take on a much more rigorous conservation strategy for marine mammals by taking the heed of science over industry because "…any lines rising into the water column have the potential to entangle a whale" (NMFS, 2005). Here is an opportunity for Clearwater Seafoods to carry out a "whale friendly fishery" by:

1. Incorporating the latest technological advances into their fishing practices.
2. Trying new technology to eliminate profile of vertical line in the water to reduce risk of vertical line entanglements
3. Supporting systematic surveys in the area of their fishery to properly assess the distribution and seasonality of right whales relative to this fishery.
4. Encourage the Department of Fisheries and Oceans to become more involved and provide guidance and funding to the fishing industry to help them assess and switch to gear that is less likely to entangle right whales and other marine mammals.

I recommend that Clearwater Seafoods take on more responsible and stewardship oriented fishing practices to mitigate their potential entanglement impact on North Atlantic Right Whales, and I am willing to help them develop and implement those practices just as was done with the shipping industry in Canada to significantly reduce the risk of right whale mortality from vessel strikes.

Sincerely,



Moira W. Brown, PhD
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Presented to the Assessment Team for the Eastern Canada Offshore Lobster Fishery Marine Stewardship Council Certification (Certification Body: Moody Marine Ltd) on 22 January 2009 by conference call.

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22 January 2009

Preamble:

Dr. Moira Brown is a Canadian Right Whale Scientist presently affiliated as a Senior Scientist at the New England Aquarium in Boston, MA. Dr. Brown called the Assessment Team for the Eastern Canada Offshore Lobster Fishery Marine Stewardship Council Certification as a stakeholder who has concerns about the potential for by catch of right whales in the fixed fishing gear used to catch lobsters in Lobster Fishing Area 41. The following was read to the assessment team during a conference call on January 22, 2009.

North Atlantic Right Whales and Entanglement in Fixed Fishing Gear in Canadian Waters

What is the problem?

- Fewer than 350-400 North Atlantic right whales remain; the species is critically endangered and is listed on Schedule I of the Canadian Species at Risk Act.
- Recovery of the species is compromised by mortality from ship strikes and entanglement in fixed fishing gear.
- North Atlantic right whales are highly migratory ranging seasonally from southeast U.S. coast to the waters of Atlantic Canada. There are five reasonably well-studied habitat areas, three in the United States and two in Atlantic Canada.
- In Canadian waters, high concentrations of right whales are found in at least June through December in the lower Bay of Fundy and western Scotian Shelf. Annual monitoring since 1980 in the Bay of Fundy by researchers at the New England Aquarium represents the longest uninterrupted field study of the species. Monitoring on the western Scotian Shelf has been more variable.
    - In large part, systematic science surveys have been focused on the two Canadian Right Whale conservation areas: Grand Manan Basin and Roseway Basin designated by Fisheries and Oceans in 1993 (Brown *et al.* 1985).
    - There are right whale sightings in the waters of LFA 41 between the two conservation areas out to the Hague Line, along the northern and eastern margins of Georges Bank, and on the Scotian Shelf, but this area has never been thoroughly surveyed.
        - Thus one cannot assume that because there are only a few data points of right whales in LFA 41 where the offshore lobster fishery is undertaken, that there are only a few right whales. The area is data poor and surveys are needed to determine the distribution of right whales in time and space relative to the offshore lobster fishery.
    - Right whales are known to transit back and forth between the two conservation areas in a single season.
    - What is known about the distribution of right whales in Atlantic Canadian waters is based on systematic science surveys, photographed opportunistic sightings, acoustic monitoring, and tracks of right whales equipped with satellite monitored transmitters (Brown *et al.* In review Right Whale Recovery Strategy Figures 1 & 2, Brown *et al.* 2007, Mellinger *et al.* 2007, Baumgartner and Mate 2005).
- Recent analyses of individually identified right whales reveal a marginally increasing growth rate of 1.03 in 1980 that changed to a marginally decreasing rate of 0.98 by 1995 (Fujiwara and Caswell 2001). Caswell et al. (1999) estimate extinction probabilities centered on year 2200 based on contemporary population dynamics. (See also Brown *et al.* In review. Canadian Recovery Strategy).
    - Reducing mortality by two females per year will shift the population trajectory from decline to stable (Caswell *et al.* 1999), thus the species growth rate is extremely sensitive to mortality.

- Mortality from fixed gear fishing and shipping is driving the species toward extinction (Kraus *et al.* 2005, Caswell *et al.* 1999).
- Annual reproduction is extremely variable; in some years mortalities have exceeded births (Kraus *et al.* 2005).

What is essential to change this?

1. Eliminate human-caused mortality from shipping and fishing
    a. Shipping mitigation – Transport Canada (Marine Safety), sanctioned by the International Maritime Organization, relocated the Bay of Fundy shipping lanes (2003) and designated an area to be avoided on Roseway Basin (2008) to substantially reduce the risk of ship strikes (Vanderlaan *et al*. 2008, Knowlton and Brown 2007). This science based conservation program demonstrates that right whale biologists have worked successfully with industry to develop and implement solutions to reduce the impact of human activities on right whales.
    b. Fishing mitigation – Fisheries and Oceans Canada has not required any modification to fishing practices to reduce the threat of entanglement of right whales in Canadian waters. Little has been done to address the issue of right whale entanglement beyond a voluntary disentanglement response mostly in the Bay of Fundy and aerial reconnaissance to see if right whales are present in November prior to the start of lobster fishing in LFA 38.
2. Increase population reproduction rate
    a. Reproduction in North Atlantic right whales is lower than expected, and extremely variable (For a review see Kraus, Pace and Frasier 2007). Captive breeding programs are not an option for large whales.
3. Protect right whale habitats
    a. Critical habitat designation has been proposed for the Grand Manan Basin Right Whale Conservation Area (Brown *et al.* In review: Canadian Recovery Strategy) and is under investigation for the Roseway Basin Right Whale Conservation Area.

What actions can be taken?

Eliminate mortality and serious injury from entanglements in fishing gear to right whales.

Rationale

- Fixed fishing gear is known to kill right whales. There are nine known entanglement mortalities, two of which were in Canadian gear (1988 - first known entanglement mortality of a right whale occurred in lobster gear deployed in the Grand Manan Basin, the right whale drowned in the gear; 2001 - a right whale was fatally entangled in a Danish Seine in the Gulf of St. Lawrence)

WWF-Canada's comments on the Draft Report for the Marine Stewardship Council evaluation of the Eastern Canada offshore lobster fishery

Submitted to: Moody Marine Ltd.
Date: February 11, 2010

Introduction

WWF-Canada is working to conserve biodiversity, restore ecosystem health and ensure resource use is sustainable throughout the Northwest Atlantic. We are involved in sustainable seafood initiatives at both national and global levels which include improvement of fisheries management plans and the promotion of fisheries certification. Our priorities in this region include right whale recovery, cod bycatch reduction, cold-water coral protection, and habitat protection through the establishment of networks of marine protected areas (MPA).

We appreciate the opportunity to comment on the draft report recommending that the Eastern Canada offshore lobster fishery be certified. WWF believes the ecosystem approach is needed to restore healthy ecosystems and sustain productive fisheries. For a fishery to be ecologically sustainable, any significant impacts to non-target species must be minimized. It is our hope that the MSC certification process will play an important role in ensuring this and other Atlantic Canadian fisheries are sustainable over the long-term.

We have reviewed the draft report and have several comments relating to the conclusions regarding elements scored in Principle 2 and to the Conditions of Certification. Our main concerns remain focused on the unintentional take of non-target species, specifically of endangered North Atlantic right whales.

a) Risk posed by the offshore lobster fishery to North Atlantic right whales (NARWs)

Throughout the report and in several elements of the scoring of Principle 2 (e.g. 2.1.1.2., 2.2.1.1, 2.2.1.2 and 2.2.1.3), it is reiterated that the offshore lobster fishery poses a low risk to NARWs because it is not conducted within the identified critical habitats or during the months of July to September and because offshore lobster fishing gear has not been identified on entangled right whales.

This assessment does not appear to take into consideration the movements of these animals between these critical habitats, which have clearly been documented, nor that the animals can be in Canadian waters in May, June, October and November.

There is new information regarding the distribution and movements of NARWs in Canadian waters (including in their critical habitats and areas between these habitats). Dr. Sean Brillant, post-doctoral fellow with WWF-Canada and Dalhousie University, has modeled the probabilistic movements of NARWs in Canadian waters and examined the co-occurrence of NARWs with various fixed fishing gear fisheries, including offshore lobster (see Appendix). This has enabled him to estimate the probability that a right whale will encounter fixed-fishing gear and he is in the process of determining the relative 'risk' posed by each individual fishing sector.

It is also clear that one of the reasons this fishery is considered a low risk to entangling right whales is because gear from the offshore lobster fishery has not been identified on entangled whales. However, it should be clear that there is limited information regarding the fishing gear involved in entanglements. Of the 48 of entangled right whales for which the gear involved was able to be examined, there were only 16 for which the gear could be identified to a specific fishery. Thus, it is very clear that we do not have a clear picture of the extent to which any one fishery is involved in right whale entanglements.

In order to accurately determine the role this fishery plays in entanglements, there needs to be better reporting of incidents when they occur and participation of industry in the identification of gear which has been involved in entanglements.

b) Role ghost fishing may play in entanglements

In regards to ghost fishing, the conclusion of the assessment team is that the impacts are considered to be low as there are gear modifications to reduce the potential for ghost fishing by any lost traps (2.1.3.2). The assessment clearly only focused on the ability of ghost gear to catch organisms (target or non-target) within the trapping component of the gear (the trap itself), no consideration appeared to be given for the other elements of the gear which pose a risk such as the ropes. This lost gear could pose a significant threat to marine mammals and sea turtles and should be considered by the assessment team.

c) Management measures to identify, assess and mitigate impacts

As far as we are aware, this fishery does not have specific management measures in place to identify the impact of this fishery on marine mammals (addressed in 2.2.2.1, 2.1.4.5. and 2.3.1.2.), nor have measures specifically meant to address/mitigate entanglements been developed or implemented (such as the Voluntary Standard Practices implemented by the inshore lobster fishery in Lobster Fishing Areas 33 and 34).

A recovery strategy for NARWs exists, which outlines the key factors hindering the recovery of this species. Entanglement in fixed gears – including lobster gear – is a major cause of mortality for this species. A Federal Action Plan to mitigate entanglements is in the process of being prepared by DFO. This plan will outline the activities to be undertaken to reduce the impacts of all fisheries on this endangered species.

d) Prevention of entanglements is critical for the recovery of North Atlantic right whales
Condition 3 states that, to be certified, the client is required to ensure that there is a requirement to record and report all incidental mortalities of protected, endangered and threatened (PET) species. While the chances of entangling right whales are considered to be low, it is crucial that all incidents involving these species be recorded and reported, not just mortalities. More importantly, this condition is requiring the client to focus on the reaction to an incident rather than requiring them to implement preventative measures.

It has been found that preventing the deaths of two females per year could make the difference between a positive versus a negative growth rate for this population. This, in combination with the low population size and limited observed recovery to-date, indicates that more needs to be done to prevent the chance of entangling right whales, not just reporting the incidence of dead animals. There are several measures this fishery could implement to ensure they are reducing their chances of entangling a right whale (e.g. the Voluntary Standard Practices implemented by Lobster Fishing Areas 33 & 34).

Finally, in regards to other species, it should be noted that northern bottlenose whales, specifically the Scotian Shelf population is listed as an endangered species under SARA (Canada Gazette, 2006) and should have been considered as a PET species, not a depleted one. While they are typically concentrated in and near the Sable Gully, there have been several sightings of this species in the vicinity of this fishery (see Wimmer & Whitehead. 2004, Can. J Zoology, 82: 1782–1794).

Overall Comments

With approximately four hundred individuals remaining, the North Atlantic right whale is one of the most endangered large whales in the world. Entanglement in fixed-fishing gear is a major cause of mortality for this species and therefore all of these fisheries must conduct themselves in a manner to reduce the chances of these incidents occurring.

Throughout the assessment report it is mentioned that this fishery poses a low risk, however, as Dr. Brillant has shown, this does not mean no risk. To ensure the recovery of endangered species, it is important that all possible measures are taken to reduce the risk.

Overall, the impacts of this fishery are considered to be low and we found the report documented the ecosystem impacts quite well. We would like to commend the client for their commitment to ensuring their operations are conducted in a sustainable manner. We are confident that with this additional information we've contributed, they can work to minimize the threat to North Atlantic right whales.

Again we appreciate the opportunity to comment on this draft assessment report for the Eastern Canada offshore lobster fishery.

NB An appendix was also attached to this submission showing the monthly maps of (a) probability of North Atlantic right whales occurring in Canadian waters and (b) the probability of North Atlantic right whales and offshore lobster co-occurring in Canadian waters. The size of the files makes it too prohibitive to attach this report but can be forwarded on request to p.knapman@moodyint.com