



Fisheries and Oceans
Canada

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OFFSHORE CLAMS
INTEGRATED FISHERY MANAGEMENT PLAN
Maritimes and Newfoundland Regions



Mactromeris polynyma
(*Arctic Surfclam*)



Arctica islandica
(*Ocean Quahog*)



CANADA

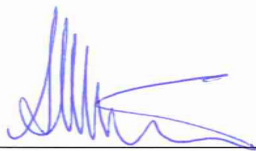
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FOREWORD

This document constitutes the Integrated Fisheries Management Plan (IFMP), developed in conjunction with licence holders for the Maritimes and Newfoundland Regions offshore clam fishery. It is based on an ecosystem approach, employs co-management, and continues the shared stewardship process used in this fishery to ensure sustainability of the fishery.

Where DFO is responsible for implementing obligations under land claims agreements, the IFMP will be implemented in a manner consistent with these obligations. In the event that an IFMP is inconsistent with obligations under land claims agreements, the provisions of the land claims agreements will prevail to the extent of the inconsistency.

This IFMP is not a legally binding instrument which can form the basis of a legal challenge. The IFMP can be modified at any time and does not fetter the Minister's discretionary powers set out in the *Fisheries Act*. The Minister can, for reasons of conservation or for any other valid reasons, modify any provision of the IFMP in accordance with the powers granted pursuant to the *Fisheries Act*.



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OFFSHORE CLAM

INTEGRATED FISHERY MANAGEMENT PLAN

INTRODUCTION

The offshore clam fishery has been operating on the Scotian Shelf since 1986 and on the Grand Banks since 1989. The fishery has developed into a vertically integrated industry employing approximately 350 people with annual sales exceeding \$50 million. The offshore clam fishery is managed on the basis of a Total Allowable Catch (TAC) for Arctic Surfclam and Ocean Quahog, divided into Enterprise Allocations (EAs), with an unlimited by-catch of Northern Propellerclam, Greenland Cockles and other non-quota molluscs. Fishing effort is limited to the existing licence holders. This Integrated Fishery Management Plan (IFMP) provides the opportunity for continued joint industry-DFO project agreements to better assess the status of the stocks and habitat and the long-term sustainability of the fishery at established harvest levels.

1.0 OVERVIEW OF THE FISHERY

In 1980, research activity, to determine the resource potential of underutilized clam species in Atlantic waters, began along the Scotian Shelf. From 1980 to 1983 surveys were conducted by DFO, leading to the discovery of commercial quantities of Arctic Surfclams on Banquereau and Ocean Quahogs on Sable Island and Western Banks (*Rowell and Chaisson, 1983; Chaisson and Rowell, 1985*). Commercial concentrations were not found in other areas on the Scotian Shelf.

Further research in 1986 enabled scientists to estimate that the surfclam resource on Banquereau had an exploitable biomass of 561,000t with a maximum sustainable yield (MSY) of 17,000t. This was regarded at the time as a highly preliminary estimate, given the limited nature of the survey. Results of a three-month test-fishery enabled scientists to revise the MSY estimate to 24,000t. In 1987, a three-year offshore fishery program was developed with industry consensus. In 1989, the regulated fishery began with TACs and EAs established based on biological information provided by the surveys and the test fishery plus an economic break-even analysis on the amount of resource required to achieve operational viability.

An exploratory fishery also commenced on The Grand Banks in 1989. A preliminary resource assessment estimated an exploitable biomass of 504,000t.

The first formal surfclam resource assessment on Banquereau was conducted during 1996-1997 (*Roddick and Smith, 1999*) following seven years of commercial fishing. Among the main findings:

- The total biomass at commercial densities was estimated at 344,000t;
- The *harvestable* surfclam biomass was estimated at 258,000t, contained in 2,174 km² of commercial grounds;

- The Catch per Unit Effort (CPUE) was anticipated to decline to a point where the fishery would eventually depend on recruitment.
- With the slow growth rates and unknown recruitment levels, harvested areas could not be expected to be re-harvested for at least 12-15 years.
- Under these circumstances, it was suggested that rotational fishing, rather than a TAC, may eventually provide the preferred management option.

Detailed clam surveys were conducted on Sable Island Bank in 2003 , Banquereau in 2004 and 2010, and Grand Bank from 2006 to 2009..

A summary chronology of major milestones in the development of the offshore clam fishery is included below and in Appendix VI.

1.1 FISHERY DEVELOPMENT

Exploratory Years: 1987-1989

A three-year commercial fishery commenced on the Scotian Shelf in 1987, and was reviewed after the 1989 season. An annual 30,000t TAC was established for Banquereau, with another 15,000t for the remainder of the Scotian Shelf.

Three companies participated: Pursuit Fisheries and the Nova Scotia Clam Co. shared the Banquereau TAC (15,000t each) while Pursuit Fisheries, the Nova Scotia Clam Co. and Mother Snow's shared the TAC on the remainder of the Scotian Shelf (5,000t each).

The 1987 fishery involved two of the three companies; one operating on Banquereau (Pursuit Fisheries) and the other, (Mother Snow's in joint venture with National Sea Products), conducting exploratory fishing elsewhere on the Scotian Shelf (and in NAFO Areas 3LNO). At this early stage of the fishery the companies relied on vessels chartered from the U.S. clam fishery, with shucking and processing completed in shore-based plants. The third company, Nova Scotia Clam Co., was engaged exclusively in marketing.

In 1988 the fishery gained momentum when both companies holding a surfclam EA for Banquereau were active. The Pursuit-Clearwater consortium started the year with a chartered vessel, but by year-end used their own Canadian-registered factory freezer vessels, *Atlantic Pursuit* and *Atlantic Vigour*. Late in 1988, the Mother Snow's-National Sea consortium obtained a licence to operate on the Scotian Shelf, excluding Banquereau Bank.

In 1989, the fishery expanded to include the Grand Banks; with a precautionary TAC of 20,000t. Pursuit-Clearwater and the Nova Scotia Clam Co. were awarded exploratory licences, while Mother Snow's-National Sea and Atlantic Surf Clam Co. were also issued exploratory licences. The latter obtained permission to use the Norwegian-registered factory freezer vessel *Concordia* for its operations. Atlantic Surf Clam Co. also acquired access to the Scotian Shelf. In 1989 the Arctic Surfclam (*Mactromeris polynyma*) officially became a regulated species.

Expansion and Consolidation: 1987-1994

Companies entering the fishery after 1987 focused their efforts on the potential Japanese market. Little was known at that time concerning the nature and size of the Japanese market, other than the existing market in the northern part of the country, for a similar species.

By the end of 1989, the economic climate of the fishery had deteriorated. The early (pre-1987) participation in the fishery was predominately based on expectations of a strong U.S. market. However, demand failed to materialize largely due to the characteristics (mainly colour) of the Arctic Surfclam being visibly different from the Atlantic Surfclam; the dominant clam in the U.S. processed food market.

The Japanese market proved insufficient to support the Canadian industry at its then current capacity and level of investment, and it was apparent structural changes were required. This was accomplished in the early 1990s, in conjunction with the Canadian and provincial governments, through a generic promotion program and independent marketing initiatives of the individual fishing companies.

The multi-year (1990-94) Arctic Surfclam Management Plan implemented important changes in the terms of resource access. While the TACs for each of the fishing areas (Banquereau and The Grand Banks) remained unchanged (at 30,000t and 20,000t respectively), allocations were shared between the four licence holders and the administration of the fishery was simplified through the inclusion of the Scotia-Fundy and Newfoundland regions into a singular IFMP.

Although clam landings gradually responded to increased Japanese market demands, catches remained at approximately 40 percent of the 1994 50,000t TAC.

Management for Sustainability: 1995-2002

In 1995, the Minister approved a three-year management plan (the *1995-1997 Offshore Clam Fishery Multi-Year Harvesting Plan*). The key elements of the Plan included:

- Continuation of the Enterprise Allocation Program, with a prohibition of permanent transfers of allocation;
- Unchanged TACs at 30,000t and 20,000t for Banquereau and The Grand Banks, respectively;
- A commitment by both industry and DFO to cost-share scientific studies during the 1995-97 period;
- A commitment by industry to fund an economic study of the fishery; and
- An industry-funded dockside-monitoring program.

The 1995-1997 Plan stressed the need for improved scientific data to ensure sustainable harvesting. Several information gaps were cited for both Banquereau and The Grand Banks, including the lack of reliable estimates of the standing stock biomass, growth rates, recruitment and natural mortality. In the absence of this information, no scientific basis existed for advice on TACs.

A five-year plan was approved for 1998-2002, the *Offshore Surfclam Integrated Fishery Management Plan*. This Plan extended the general theme of the previous plan, incorporating similar management measures

(EAs and TACs). Major issues continued to be the identification of a sustainable yield and the need to determine a scientifically based TAC. Research completed in 1999 addressed this deficiency for Banquereau.

The Plan also identified pre-condition factors to be evaluated when considering whether or not to award new licences; such as uncertainty surrounding recruitment, sustainability of the fishery, market conditions and a combined surfclam TAC established at or beyond a 50,000 t level.

The 1998-2002 Plan was extended pending finalization of a new long-term (2005-2009) IFMP.

Return of Ocean Quahogs to the Fishery: 2003 - 2004

In 1989, the Offshore Clam Fishery Management Plan authorized both a by-catch of Ocean Quahogs (*Arctica islandica*) on Banquereau and a directed Ocean Quahog fishery on Western and Sable Island Banks. Due, in part, to a lack of interest in Ocean Quahogs in the 1990's, a directed Ocean Quahog fishery on the Scotian Shelf was omitted from the 1998-2002 Management Plan.

In 2001, Clearwater Seafoods Limited Partnership submitted a proposal for departmental consideration for the re-introduction of a directed Ocean Quahog fishery on the Scotian Shelf (Sable Island Bank).

In September 2002, DFO provided an Expert Opinion on the Clearwater/Deep Sea Clam Ocean Quahog Development Proposal. Results from the discussions and analysis of the proposal indicated that a provisional allocation of 11,587 tonnes of Ocean Quahogs on Sable Island Bank could be provided to the current licence holder. To coincide with this allocation, a comprehensive Joint Project Agreement (JPA) was developed between DFO and Clearwater Seafoods Limited Partnership for the further scientific study of Ocean Quahogs which initiated a joint industry-DFO survey for quahogs on Sable Island Bank in 2003.

A provisional allocation of 800t of Ocean Quahogs was established to support by-catch requirements of the directed surfclam fishery on Banquereau.

1.2 Current Participants

The industry currently consists of Arctic Surf Co*, Clearwater Seafoods Limited Partnership (NS) (two licences), and a third licence issued to Clearwater Seafood Limited Partnership (NFLD), which was previously issued to Deep Sea Clam Company Inc.

Licence Holder	Number of vessel(s) authorized
Arctic Surf Co Inc. (NL)	1
Clearwater Seafoods Limited Partnership (NL)	1
Clearwater Seafoods Limited Partnership (NS)	2

* Arctic Surf Co is a wholly owned subsidiary of Clearwater Seafoods Limited Partnership.

The vessels in the fishery are specialized factory freezer clam vessels that operate year round and the licences have equal allocations for both commercial fishing areas (Banquereau and The Grand Banks). The

licensed vessels land product for further processing in Grand Bank, NL. The licences are issued from DFO's offices in Halifax and St. John's. In 2011 the company is operating two vessels.

The industry employs approximately 350 fishermen and plant workers on a year round basis. More than \$115 million has been invested by the participants in the development of the Canadian Arctic Surfclam industry, including costs relating to exploration, acquisition/conversion of specialized vessels, plant and product development, scientific research and the creation of new markets. In 2004, Clearwater Seafoods Limited Partnership (NS) initiated construction of a new offshore clam vessel, representing an additional \$45 million investment in the fishery. However, this vessel sank in 2007 prior to completion of the build. Also in 2007, one of the existing fleet, the Atlantic Pursuit was damaged beyond repair in a winter storm off the Grand Banks forcing Clearwater to remove it from service, and the Atlantic Vigour was retired in 2008 due to it's age. Clearwater was forced to quickly convert a vessel from their shrimp fishery to compensate for the unexpected losses of two vessels. Clearwater invested \$30 million to convert this vessel for the clam fishery. As a result of the unexpected vessel losses, the fishery experienced significant disruption in 2007 and 2008 that resulted in low landings due to the lack of harvesting capacity.

1.3 Location of the Fishery

The Arctic Surfclam fishery is concentrated on offshore clam beds located on the Grand Banks and Banquereau. See reference map, Appendix IV, and note Section 4.2 of this Plan regarding that portion of the Grand Banks grounds which extends beyond the 200 mile economic zone. The Ocean Quahog resource is located on Sable Island Bank (Appendix V) as well as the southern Grand Banks. This Plan authorizes the licence holders to commence a directed commercial fishery for Ocean Quahogs on Sable Island Bank.

1.4 Time Frame of the Fishery

The fishery is conducted on a year-round basis commencing January 1 of each year.

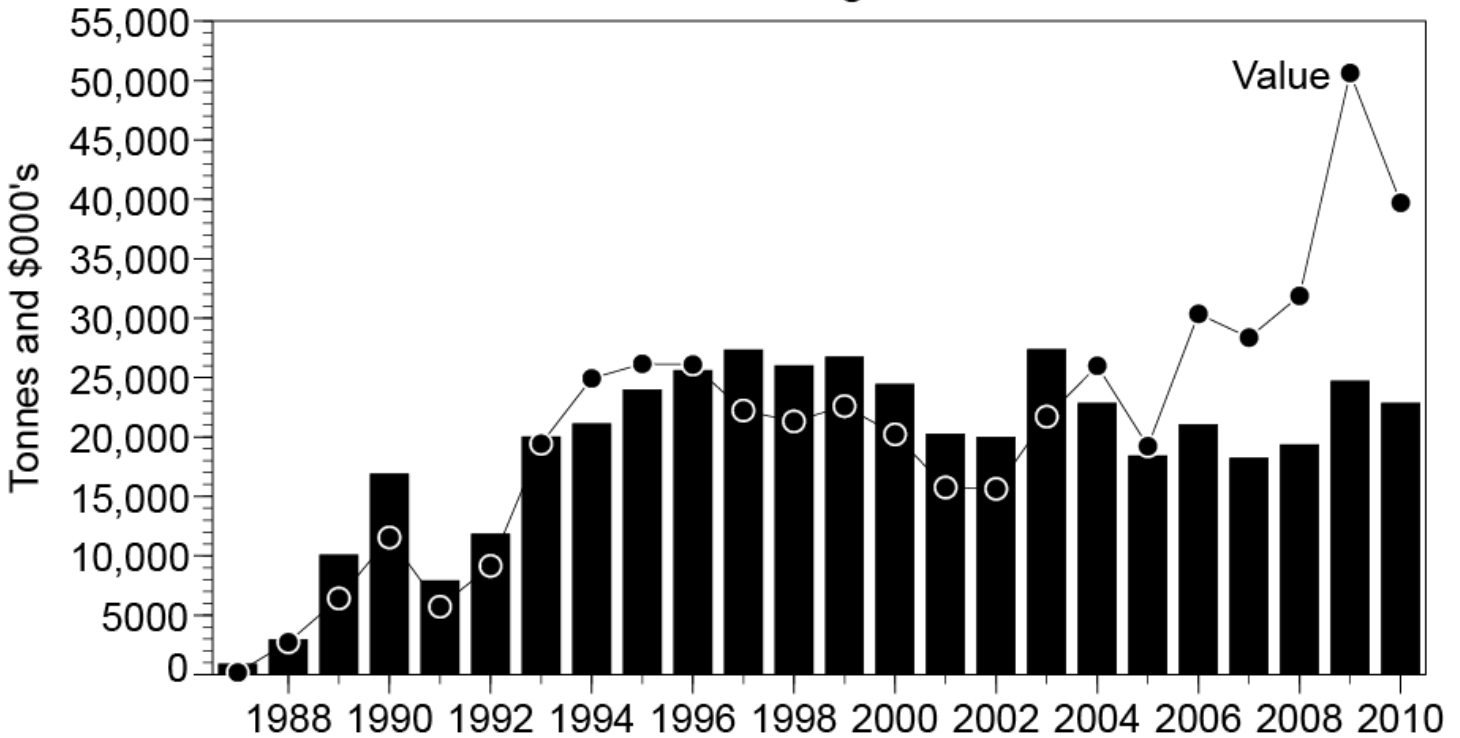
1.5 Landings/Landed Value

Data on the Canadian surfclam catch and landed value is shown in the table and chart below. Data for both quantity and value is the combined estimate. This information is calculated from DFO statistics on the reported price paid upon landing the product using a standard conversion factor to calculate the whole animal-in-shell weight from the final product weight.

Table 1. Canadian Surfclam Landings and Value - 1987-2010

Year	Quantity	Value
	(tonnes live weight)	(thousands of dollars)
1987	883	171
1988	2,929	2,724
1989	10,065	6,410
1990	16,876	11,538
1991	7,907	5,712
1992	11,832	9,147
1993	20,005	19,426
1994	21,110	24,926
1995	23,978	26,155
1996	25,596	26,096
1997	27,322	22,226
1998	25,976	21,308
1999	26,713	22,594
2000	24,415	20,219
2001	20,235	15,749
2002	19,960	15,632
2003	27,339	21,712
2004	22,841	25,985
2005	18,421	19,221
2006	21,033	30,361
2007	18,199	28,364
2008	19,336	31,873
2009	24,692	50,631
2010	22,845	39,706

Canadian Surfclam Landings and Value, 1987-2010



1.6 Market & Economics

Market Evolution and Present Situation

Canadian surfclams or “hokkigai” (as the product is known in Japan), were first introduced in late 1988 to Northern Japan (Hokkaido) where a local clam, with similar colour and taste, was consumed in sushi bars. Canadian hokkigai quickly gained local acceptance and carved out a market niche at a competitive price. The favorable introduction of Canadian product resulted in positive reports to distributors elsewhere throughout Japan.

After its initial introduction to Japan, the major obstacle to further market growth was the lack of consumer knowledge about the product beyond the Hokkaido region. This lack of knowledge about hokkigai, including unfamiliarity with the handling and preparation of frozen clam meats, hindered expansion of the Japanese market for Canadian hokkigai.

In 1989, the Canadian Hokkigai Export Association (CHEA) was formed by Canadian exporters to expand the market for hokkigai in Japan. During the early 1990's, CHEA, in cooperation with DFO, implemented a generic marketing campaign for Canadian hokkigai throughout Japan. Over 50 supermarket chains and 1,420 stores participated with an estimated 3.3 million consumer samples supplied. Post campaign surveys indicated a substantial increase in awareness of hokkigai which, by 1995, resulted in over 4,000 t of Canadian exports of hokkigai to Japan.

The reliance on a single market left the fishery susceptible to fluctuations of localized markets; Since 1993, marketing initiatives have been aimed at diversifying away from the Japanese market not only to reduce dependency on and vulnerability to market downturns, but also to increase demand and expand the industry generally. The diversification campaign has met with mixed results, with slow growth in other major markets. Under the best of circumstances, the narrow Japanese market could be expected to grow slowly, however the Japanese market has declined over most of the last decade. The exports by market in 2006 were as follows: Japan 41%, North America 20%, China 29%, Other 10%.

Fishery Economics

Offsetting gross revenue from the fishery are the costs involved in the harvesting and processing operations, both at-sea and onshore. Immediate at-sea processing and freezing is required in adherence to Japanese market quality standards. The requirement for secondary processing onshore, for added value, is required to enhance the high quality products. The replacement value of a vessel used in this fishery is estimated at \$45 million, which includes \$4.5 million for the onboard processing equipment.

Comprehensive Economic Analysis of the Fishery

In accordance with the 1998-2002 Fishing Plan, the licence holders provided the Minister with economic analyses of the fishery, prepared by Gardner Pinfold Consulting Economists Limited, entitled *An Economic Analysis of the Arctic Surfclam Industry (December, 2002) and (December, 2007)*. The conclusions of the most recent report are as follows:

- The analysis shows that the industry is viable in the short term, though market operating conditions have caused operating income to decline from 1990s levels.
- The analysis shows that industry as it is currently structured can be expected to generate a pre-tax Internal Rate of Return of 12 percent. When compared to the cost of borrowing at 6-8 percent, this indicates the industry is marginally viable over the long term.
- The long term viability of the industry is relatively sensitive to changes in factors affecting revenues, and slightly less sensitive to changes in factors affecting costs. A 10% decrease in factors affecting revenue results in a negative Internal Rate of Return.

1.7 Consultative Management Process

The Offshore Clam Advisory Committee (OCAC) is the consultative forum for issues affecting the offshore clam fishery and is open to the public. It is composed of representatives of DFO, the two licence holding companies and the provinces of Nova Scotia and Newfoundland. The Terms of Reference and Membership List are attached as Appendix II. It is chaired by a representative of DFO and provides direction to the Offshore Clam Management Board (OCMB) (refer to Section 1.8).

OCAC meets at least once per year, or as required, prior to the preparation of the fishing plan for the next season. While specific issues may be discussed by the OCMB, formal scientific advice is presented to OCAC and discussed on this occasion.

Prior to scientific advice being formally tabled at OCAC, it is first reviewed publicly during DFO Science's Regional Advisory Process (RAP).

1.8 Management Style

The TAC is determined through formal scientific assessments. The TAC is primarily based on harvesting a percentage (exploitation rate) of an estimate of the harvestable biomass (fishable biomass $> 75\text{g/m}^2$) and is intended to optimize yield and not expose the resource to risk of over-exploitation. A fishing mortality (F) target at Maximum Constant Yield (MCY) is estimated to be one-third of natural mortality (M). F_{MCY} is applied to the harvestable biomass, such that the TAC is set at 2.64% of the harvestable biomass. Once the TAC is established, the EAs are allocated based on the percentage to which each licence holder is entitled. By-catch controls are applied, via licence conditions that limit retention of by-catch species.

In addition to these management measures, the OCMB reviews the operation of the fishery, recommends changes (consistent with the IFMP's objectives) to OCAC, and provides an annual report on the fishery to OCAC. A key requirement of the Board is to confirm the annual work plan elements. The Terms of Reference of the Board are attached as Appendix III.

All decision-making authority with regard to access, allocations and TACs remains with the Minister of Fisheries and Oceans.

1.9 Term of the Offshore Clam Integrated Management Plan

The Offshore Clam IFMP remains in effect until replaced. At the end of each year the plan is to be reviewed and amended as required.

2. STOCK STATUS

2.1 Biology

The Arctic Surfclam (*Macrumeris polynyma*) is a large clam (75-125 mm), similar in appearance to the more common Atlantic Surfclam. The main distinguishing feature is that most specimens of Arctic Surfclam have a purple color in the foot and mantle that turns red upon cooking, similar to lobster and shrimp. This species is found in both the Atlantic and Pacific oceans in medium to coarse sandy bottoms. On the east coast of Atlantic Canada, large commercial fisheries occur on Banquereau and Grand Banks. These clams are slow-growing and long-lived; the oldest aged to date was calculated to be over 56 years old and the largest was 157 mm. Preliminary estimates of age indicate that a large percentage of the unharvested population on Banquereau attains an age of 40 years.

Arctic Surfclams reach reproductive maturity between five and eight years of age and spawn in the fall.

The Ocean Quahog (*Arctica islandica*) is a very slow-growing species which experience episodic recruitment. These phenomena, combined with sparse data, support the calculation of sustainable harvest rates via approximation methods. The intended management objective is to ensure both the sustainability of the resource and the maintenance of the fishery during periods of recruitment pulses. The implications of this approach may result in lower exploitation rates.

In general, Ocean Quahogs reach maturity over a protracted period of time, both as a population and as individuals. They also have a protracted and variable spawning period with ripe individuals being found year around and peak spawning times varying from year to year at the same location. They mature at 7 to 30 years of age and males appear to mature earlier than females in most sites studied. Changes in the sex ratio with size indicate that females live longer than males.

With the size of maturity below commercial sizes, and the TAC set as a small fraction of total biomass, the fishery is not anticipated to experience low biomass levels. Nevertheless, since long-lived species also tend to experience sporadic recruitment events, low biomass levels would cause concerns. Should an extended period of poor recruitment coincide with declining mature biomass levels, special measures, including area closures, may be considered.

2.2 Environment

As both the Arctic Surfclam and Ocean Quahog are sedentary (i.e., non-migratory and bottom dwelling in the adult stage), environmental variations are thought to mainly influence the survival of the larval stages. For example, changes in water temperature may alter the amount and location of preferred habitat available for settlement.

2.3 Species Interactions

Arctic Surfclams and Ocean Quahogs are filter feeders and are in turn preyed upon by large groundfish such as cod as well as some species of whelks. The quantities consumed by their predators and the resultant impact on the surfclam stocks remain unknown.

2.4 Stock Assessment

Stock assessments are based on periodic surveys, with updates based on analysis of commercial fishery and sampling data. An intended objective is to survey each area on a 5 year cycle; the results of which will be publicly presented through the RAP process.

All surveys are conducted through industry-funded Joint Project Agreements. Surveys were conducted on Sable Island Bank in 2003, Banquereau in 2004, Grand Bank in 2006-2009 and Banquereau in 2010..

2.5 Current Research and Issues

Estimating stock biomass, recruitment levels and determining habitat impacts caused by hydraulic dredging are the principle challenges of this fishery.

In response to concerns of the effects of hydraulic clam dredging on the bottom habitat and localized organisms, a multi-year collaborative research program on Banquereau Bank was initiated by DFO Science (both Maritimes and Newfoundland Regions), the Geological Survey of Canada, Atlantic, and licence holders. Two DFO reports from this initiative are:

Banquereau Hydraulic Clam Dredging Experiment (1998 – 2000) Interim Summary Report, March 2002

Habitat Assessment – Proposed Ocean Quahog Fishery, September 2002

Three peer-reviewed scientific papers describing the results of the experiment are:

Gilkinson, K.D., G.B.J. Fader, D.C. Gordon Jr., R. Charron, D.L. McKeown, D. Roddick, E.L.R. Kenchington, K. MacIsaac, C. Bourbonnais. W.P. Vass and Q. Liu. 2003. Immediate and longer-term impacts of hydraulic clam dredging on an offshore sandy seabed: effects on physical habitat and processes of recovery. *Continental Shelf Research* 23: 1315-1336.

Gilkinson, K.D., D.C. Gordon Jr., D.L. McKeown, D. Roddick, E.L.R. Kenchington, K. MacIsaac, C. Bourbonnais and W.P. Vass . 2005. Susceptibility of soft corals (Anthozoa: *Gersemia rubiformis*, Ehrenberg, 1834) to capture by hydraulic clam dredges off eastern Canada: the significance of soft coral-shell associations. *American Fisheries Society*. In press.

Gilkinson, K.D., D.C. Gordon Jr., K.G. MacIsaac, D.L. McKeown, E.L.R. Kenchington, C. Bourbonnais and W.P. Vass . Immediate impacts and recovery trajectories of macrofaunal communities following hydraulic clam dredging on Banquereau, eastern Canada. *ICES Journal of Marine Science*. Under review.

As expected, the dredging action directly impacted the seabed habitat. Furrows were created and biological structures (burrows, tubes) were removed. Considerable habitat recovery was documented over the short term. Traces of the dredge tracks were no longer visible in photographs or video footage, but could be seen on sidescan sonograms three years after dredging. While some soft corals were removed by the dredge, it was not possible, due to natural spatial variability, to determine if significant impact occurred. An immediate impact occurred on the abundance and biomass of infaunal organisms. After two years, the macrofaunal community showed evidence of substantial recovery in terms of species composition based on abundance. Over the course of the experiment, there were no detectable changes in species composition of the benthic community. It appears that non-target species, initially reduced in abundance, have recovered to pre-dredging levels in approximately two years. The only species that continued to show negative impacts two years after dredging were the four target species (surfclam, propellerclam, cockle clam and Ocean Quahog). This is to be expected due to their lack of mobility and slow growth rates. Slow recovery is built into the exploitation strategy of the fishery. Habitat effects are limited to sandy bottoms and the habitat area impacted by the fishery is small, estimated to be 3% of the area surveyed. The impacts of the dredging gear are considered acceptable within the existing management framework.

As a result of this ten year study, the effects of hydraulic clam dredging are now better understood compared with many other gear types used throughout the Canadian fisheries. However, there continues to be uncertainties regarding the long term impacts on the overall benthic productivity.

2.6 Prospects for Stock Status

Since Arctic Surfclam *Mactromeris polynyma* is a long-lived species, recruitment to the population is another issue of great interest. On Banquereau Bank, ageing data from studies in the 1980s indicated that the clams reached an age of 40 years or more and that the size range of commercial interest represents clams 10 to 15 years old. This is well above the age of maturity for this area; however, with regular recruitment, it may be 10 to 15 years before an area could be re-harvested.

The oldest Ocean Quahog aged to date was from Icelandic waters and was over 405 years old. The oldest quahog aged to date from the 2003 survey on Sable Island Bank was 210 years old. This long lifespan only requires successful year-classes every few decades for the population to survive. Observations indicate that the U.S. population has consistently declined during the past 30 years as recruitment has not kept pace with removals by the fishery. There were small quahogs observed during the 2003 survey, however, further sampling for age of the 2003 Ocean Quahog Sable Island Bank surveys could enable recruitment comparisons with the U.S. fishery to occur.

Starting in 1998 there have been a series of JPA agreements between DFO and the licence holders to conduct surveys and research studies to collect the data and life history parameters for stock assessments of offshore clam species. The current JPA runs to March 31, 2012.

3. LONG-TERM OBJECTIVES FOR THE FISHERY

Long-term objectives include:

- Increase certainty that harvesting occurs at an optimum sustainable level to ensure the long-term viability of the resource,
- Enhance industry's level of participation in the management of this resource to benefit Canadians,
- Maintain the long-term viability of the industry, and
- Assess, evaluate and minimize any adverse environmental effects of the fishing methods on the habitat.

4. GENERAL MANAGEMENT OBJECTIVES

4.1 Conservation/Sustainability

The primary objective of the plan is to ensure that a biologically and economically sustainable offshore clam fishery continues through the auspices of scientifically-based management plans involving collaborative enforcement, monitoring and regulatory measures. A further objective includes the continued cooperation between the licence holders and the Department in establishing ongoing management measures that will minimize impacts of harvesting on the habitat.

The precautionary approach (PA) is a decision making process with rules which identify triggers and responses during periods of changing stock health. A precautionary approach framework has been developed for the Offshore Surf Clam fishery (Appendix VII).

4.2 International Considerations

Sedentary clam resources existing beyond the 200-mile Canadian exclusive economic zone, contiguous to the Grand Banks, remain under Canadian fisheries management.

4.3 Domestic Considerations

(a) Aboriginal Fishery

There are no aboriginal elements involved in this fishery.

(b) Recreational Fishery

There are no recreational elements involved in this fishery.

(c) Inshore Quahog Fisheries

Inshore quahog fisheries occur in Southwest Nova Scotia (SWNS). The fishery in SWNS is conducted by two core enterprise licences and one First Nation licence with vessels having length-over-all (LOA) less

than 45 feet. This fishery operates with specific localized area quotas, inside the Territorial Sea Geographical Baseline (TSGB) from Pennant Point to the 65 30 line (Baccaro) and in St Mary's Bay, and by a competitive fishery from the TSGB out to the 20 mile line. A Conservation Harvesting Plan (CHP) outlines the consultation process and includes management measures which require dockside verification, hail in/hail out and seasons. There is a requirement for an approved Memorandum of Agreement (MOA) with DFO and the Canadian Food Inspection Agency (CFIA) prior to fishing.

In Southwest New Brunswick (SWNB), an inshore quahog fishery is still under development.

(d) Exploratory

While the existing offshore harvesting areas represent the major identified commercial concentrations of clams, opportunities remain for further exploration.

5. CURRENT MANAGEMENT ISSUES

5.1 Issue: Sustainable Yield

The TAC for Arctic Surfclams on Banquereau is determined by scientific assessment advice.

The TAC for Arctic Surfclams on the Grand Banks has been determined following recent detailed scientific advice from the 2010 Grand Bank assessment.

A survey of the Ocean Quahog stock on Sable Bank in 2003 provided stock status and TAC advice for this fishery.

Approach:

To continue with joint (government/industry) studies of the resource to determine biomass and optimum sustainable yield and other management measures which may be required to ensure the long-term sustainability of the resource.

5.2 Issue: Effects Monitoring

The objective of the 1998-2000 DFO/industry study was intended to measure the effects of the harvesting methods on the habitat and resource.

Approach:

Maintain periodic monitoring of previous dredge impact study sites and to continuing sampling studies on commercial vessels and during surveys to monitor effects.

A 10 year follow-up survey of the study site was conducted in 2008.

5.3 Issue: New Entrants

While the Department may receive future requests for new licences for this fishery, such requests are subject to consultations with the OCAC and the OCMB.

Approach:

Consideration for new licences shall take into account:

- (1.) the management objectives governing this Plan,
- (2.) uncertainty surrounding recruitment and the long-term sustainability of the resource,
- (3.) impacts of additional production on a limited market, and
- (4.) whether or not a scientifically-based Grand Bank/Banquereau Surfclam TAC could exceed the 1997 level of 50,000 t.

Should a new licence(s) be issued:

- a) the licensee(s) shall be viewed as having the same reporting, monitoring and joint research responsibilities as previous licence holders, thus establishing parity to all licences. Should future TACs be revised due to new scientific advice, such future TAC revisions will be shared on a *pro rata* basis among all licence holders.
- b) the licensee(s) shall immediately conform to all of the requirements under the applicable Management Plan.
- c) No new entrants will be permitted to direct for cockle clams or propellerclams in order to avoid additional harvesting effort on Arctic Surfclams

5.4 Issue: Exploratory Fishery

In addition to existing licensees, who may express an interest in exploring additional offshore areas for clams, requests from inshore core enterprises may be considered by the OCAC and the OCMC.

Approach:

Requests for exploratory activities shall be forwarded to Department of Fisheries and Oceans for review prior to presenting to the OCAC and the OCMB for consideration and comment.

5.5 Issue: Inshore Fisheries

Interference with inshore fisheries by offshore clam vessels has occasionally been raised as an incidental issue.

Approach:

This fishery will continue to be limited to offshore fishing grounds (see map, Appendix IV).

5.6 Issue: By-catch

Co-occurring molluscan shellfish species may be harvested as an incidental by-catch during this fishery. Although minimal incidental by-catch of groundfish species may inadvertently occur, by-catches can not be retained.

Approach:

By-catch of other molluscan invertebrates is permitted by licence condition, which includes all required conservation and reporting provisions directly related to the authorized by-catch species. Each licence holder shall be permitted an unlimited by-catch of propeller clams, cockle clams and other non-quota molluscs. Quahog landings will be applied against the quahog TAC. Throughout this Plan, by-catch information will be recorded in the fishing log books, regardless of whether or not the by-catch is permitted and retained, or discarded.

Quahogs on the Grand Banks are restricted to a 10% by-catch level, to a maximum of 500t, until such time as scientific advice supports a change.

5.7 Issue: Fishing More Than One Quota Area Per Trip

Licence holders are permitted, by condition of licence, to fish more than one quota area and species during the same trip.

Approach:

In order to be authorized to fish more than one quota area during the same trip, DFO must be formally notified prior to transiting between quota areas.

5.8 Issue: Species At Risk

With the promulgation of the *Species at Risk Act* in 2003, and the subsequent implementation of the prohibitions section of that act in 2004, it is now an offence to:

- Kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species.
- Possess, collect, buy, sell or trade an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species, or any part of such an individual.
- Damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species.

These prohibitions apply unless a person is authorized by a permit, or licence, issued in accordance with the *Species at Risk Act*, to engage in an activity affecting the listed species or the residence of the individuals.

Existing management measures in the offshore clam fishery will be revised on an ongoing basis to determine if a permit, licence or other document is required. This revision will be done on the basis that:

- Affecting the listed species is incidental to the offshore clam fishery and all alternatives to the offshore clam fishery that will reduce the impact on the listed species will be considered, with the best solution adopted,
- All feasible measures will be taken to minimize the impact of the offshore clam fishery on the listed species or the residences of its individuals, and
- The offshore clam fishery will not jeopardize the survival or recovery of the listed species.

Should a permit or licence be issued, the Minister of Fisheries and Oceans shall provide the rationale for protecting the species or providing for its recovery while minimizing the impact on the directed fishery. Other management measures affecting the offshore clam fishery may be required to ensure the full implementation of the *Species at Risk Act*, including the provisions of a Recovery Strategy or Action Plan.

5.9 Issue: Oil and Gas

The Eastern Scotian Shelf and Grand Banks are subject to ongoing oil and gas exploration and development. In particular, Sable Island Bank has a significant level of oil and gas activity. The potential exists for conflicts between the offshore clam fishery and the oil and gas sector. For example, it is possible that clam dredges could be damaged by, or alternatively, interfere with or damage submerged oil and gas infrastructure. Seismic surveys may coincide with fishing areas which could result in operational changes for both industries. In such instances of conflict, the licence holder will endeavor to seek resolution with the oil and gas operator or access existing compensation programs through respective Federal Provincial Petroleum Boards. The Eastern Scotian Shelf Integrated Management (ESSIM) Initiative may provide a proactive forum in which to raise and potentially address key issues between these two industries. Other industry-to-industry communication mechanisms e.g., Nova Scotia Petroleum and Fisheries Liaison Group (NS PFLG) may be utilized to resolve issues of common concern.

DFO will liaise with the respective Petroleum Boards to ensure that projects subject to the *Canadian Environmental Assessment Act* (CEAA) adequately mitigate concerns and issues related to this fishery. Ongoing communication and monitoring strategies may be considered important approaches for developments in these areas.

6. MANAGEMENT MEASURES

6.1 2005 - 2011 TACs

The Arctic Surfclam TACs for Banquereau and Grand Bank during the 1998-2010 period remained unchanged from the set levels of 24,000 MT for Banquereau and 20,000 MT for Grand Bank. In 2011, the TAC for Grand Bank was revised following detailed scientific advice from the 2010 Grand Bank assessment.

TACs may be revised should scientific assessment of the resource indicate the need for adjustment to ensure sustainability of the resource. The TAC for Banquereau is anticipated to be reviewed in 2011.

AREA	TAC (Live Wt.)
Banquereau	24, 000 MT
Grand Bank	<u>14, 756 MT</u>
Total	38, 756 MT

The Ocean Quahog TACs for Sable Island Bank and Banquereau during the 2005-2011 period (listed below) are provisionally established. These TACs may be revised during the period of this Plan should scientific assessment of the resource indicate the need for adjustment to ensure sustainability of the resource. Quahog catches on the Grand Banks are limited to a by-catch of 10% of surfclams.

AREA	TAC (Live Wt.)
Sable Island Bank	11, 587 MT
Banquereau	<u>800 MT</u>
Total	12, 387 MT

6.2 Conversion Factors

Conversion factors are employed in the monitoring of this fishery. These are factors that are applied against the landed product weight to convert it to the original whole animal-in-shell weight. The current (1998) conversion factors for Arctic Surfclams are times 6.51 (blanched product) and times 5.37 (raw product). The conversion factor for Ocean Quahogs from total gutted meat weight to whole round weight is times 4.01.

6.3 Enterprise Allocations

The licence holders will share the TACs equally as per the following table:

Arctic Surfclam Enterprise Allocations

<u>Licence Holder</u>	<u>Banquereau</u>	<u>Grand Bank</u>
Clearwater Seafoods Limited Partnership (NS)	8, 000 MT	4,918.66 MT
Clearwater Seafoods Limited Partnership (NL)	8, 000 MT	4,918.66 MT
Arctic Surf Co (Clearwater) (NL)	<u>8, 000 MT</u>	<u>4,918.66 MT</u>
TAC	<u>24, 000 MT</u>	<u>14,756 MT</u>

Ocean Quahog Enterprise Allocations

<u>Licence Holder</u>	<u>Banquereau</u>	<u>Sable Island Bank</u>
Clearwater Seafoods Limited Partnership (NS) 266 MT		3, 862 MT
Clearwater Seafoods Limited Partnership (NL)266 MT		3, 862 MT
Arctic Surf Co (Clearwater)	(NL) <u>266 MT</u>	<u>3, 862 MT</u>
TAC	<u>800 MT</u>	<u>11, 587 MT</u>

6.4 Exploratory Fishing Offshore

Subject to the requirements established via formal authorization from DFO (refer to section 5.4), including the use of certified at-sea observers (refer to Section 8.7 of this Plan); licence holders may conduct exploratory surfclam fishing in offshore areas outside Banquereau and The Grand Banks, providing this activity does not interfere with other established or developing fisheries in those areas. Closed areas and habitat sensitive areas remain closed to exploratory surveys. Formal proposals indicating intentions to conduct exploratory surveys shall be made in writing to both DFO and the OCMB for consideration. Conclusion reports from all exploratory surveys shall be forwarded to both the OCMB and DFO upon completion of such projects. The OCMB will forward recommendations to both the OCAC and DFO for consideration.

All offshore licence holders will have equal access to any new quotas established for new areas.

6.5 Licence Provisions

- All vessels used in the offshore clam fishery must be Canadian-registered fishing vessels, meet the requirements of Schedule III of the Fish Inspection Regulations and operate under a certified Quality Management Program.
- All crew must be Canadian citizens or have landed immigrant resident status in Canada.
- Vessels are authorized to fish more than one fishing area during the same trip under specific monitoring guidelines (see Section 5.7).
- An annual licence fee for Arctic Surfclam and Ocean Quahogs, as specified in the Atlantic Fishery Regulations, is payable to the Receiver General of Canada prior to licence issuance.

6.6 Enterprise Allocation Transfers

- Permanent transfers of allocation from one offshore clam licence holder to another are subject to prior review by the OCMB and prior written approval from the Minister of Fisheries and Oceans.
- Temporary transfers of allocation are permitted within a single fishing season (calendar year), subject to written request to and written approval by DFO.
- Permanent transfers of allocation from an existing offshore clam licence holder to a third Party are subject to prior review by the OCMB and prior written approval from the Minister of Fisheries and Oceans.

6.7 Season

The fishing season for Arctic Surfclams on Banquereau and The Grand Banks is January 1 to December 31. The fishing season for Ocean Quahogs on Banquereau and Sable Island Bank is January 1 to December 31.

6.8 Gear

The gear authorized for use in this fishery is a hydraulic clam dredge. This device is a metal cage approximately 3.8 m wide by 6 m long by 1.2 m high weighing approximately 8-9 tonnes. Seawater is pumped to a manifold on the front of the dredge where nozzles direct the water backward at a 45° angle into the seabed. This agitates the substrate in advance of the dredge cutting blade.

As the dredge moves forward, the clams slide over a grating that allows immature clams to escape while retaining larger, mature clams. The loosened sediment allows the clams to float in slurry as the blade directs it up and into the cage section of the dredge.

7. ECOSYSTEM MANAGEMENT CONSIDERATIONS

Since the 1992 United Nations Conference on Environment and Development (UNCED), there has been increasing international awareness of the cumulative impacts of ocean sector-based activities on marine ecosystems. The need for a more integrated approach to ocean management is increasingly being recognized.

The 1997 *Oceans Act* heralded a new approach to management of Canada's marine and freshwater resources. Under the *Fisheries Act*, resource management has been species and population based, with the emphasis on commercially important species and fish habitat management. The *Oceans Act* now requires consideration of the impacts of all human activities on the respective ecosystem.

In 2002, *Canada's Oceans Strategy* was published, a key element of which being a nationally co-ordinated Integrated Management (IM) program, in which interested stakeholders and regulators work together to decide how best to manage designated geographic areas of the ocean. Integrated Management is defined as "a commitment to planning and managing human activities in a comprehensive manner while considering

all factors necessary for the conservation and sustainable use of marine resources and the shared use of ocean spaces". Therefore, IM is the administrative vehicle whereby broader and consistent objectives shall be incorporated into the management of Canada's three oceans. On the Scotian Shelf, the IM mechanism for offshore clams is the Eastern Scotian Shelf Integrated Management (ESSIM) Initiative.

Two broad, overarching general objectives for ecosystem-based management (EBM) are accepted:

- the sustainability of human usage of ocean resources, and
- the conservation of species and habitats, including those other ecosystem components that may not be utilized by humans.

7.1 Diversity of Benthic Communities

Maintain area of disturbance within identified limits.

Information on disturbance caused by the fishery to the benthic community has been provided by a DFO Expert Opinion in January 2003 and the in the 2007 Science Advisory Report (DFO 2007). The benthic community on Banquereau is a well sorted sand bottom community that appears to be resilient to the effects of the clam dredges. The target species, its habitat preference, and fishing gear restrict the fishery to this community and as a consequence the impact on other benthic communities remains low.

Throughout the IFMP, consideration will be given to developing how and when future benthic monitoring studies can be designed in order to assess the long-term implications of this fishery on benthic communities.

7.2 Effects on Coral Communities

Prevent significant adverse alteration of coral communities on the Scotian Shelf and Slope Initiative.

The offshore clam fishery occurs in waters shallower than those in which most coral communities are found. Corals typically located on the banks are common and relatively widespread on the Scotian Shelf. Future benthic studies will be used to better assess impacts on corals present at these depths.

Prevent significant adverse alteration of Coral Communities in the Stone Fence Area.

The offshore clam fishery takes place in waters shallower than in which the coral community in the Stone Fence Area is found.

7.3 High Diversity Benthic Community in the Gully Marine Protected Area

Prevent significant adverse alteration of Benthic Communities in the Gully Marine Protected Area (MPA).

The offshore clam fishery on Banquereau takes place in waters shallower than the Gully MPA; however, the area of interest for Ocean Quahog beds on Sable Island Bank occurs in close proximity to the Gully MPA. In accordance with the Gully MPA Regulations, this area is closed to the offshore clam fishery.

Given the highly dynamic environment on Sable Island Bank and the distance between the quahog fisheries from the Gully MPA, suspension of sediment resulting from the quahog fishery is not expected to be measurable within the natural sediment movement variation in the area. Therefore, the quahog fishery outside the Gully is not expected to have any measurable impact on the Gully environment.

7.4 Overall Species Diversity

Minimize incidental mortality of non-target species.

By-catch mortality of other species is minimal for the offshore clam fishery, and the dredge impact study indicates that the benthic community impacted by the gear is resilient to the disturbance caused by the fishery.

7.5 Genetic Diversity of Populations Under Human Pressure

Prevent elimination of spawning/breeding component by human activity.

The genetics of the surfclam populations on Banquereau and The Grand Banks were examined in a study using microsatellite markers (Cassita and Hart 2007). This study found broad spatial homogeneity of allele frequencies among northwest Atlantic populations, and significant spatial differentiation only on the largest geographic scale (between Atlantic and Pacific populations).

Studies of dredge tracks on Banquereau indicate that, after an area has been fished beyond commercial viability, at least 40-50% of the bottom remains undredged, which serves as a recruitment base during the fallow phase of the fishery.

8. MONITORING AND ENFORCEMENT ISSUES/STRATEGIES

8.1 Prohibited Areas

Offshore surfclam vessels are prohibited at all times from fishing:

- within 20 nautical miles of the territorial sea baseline, excluding Sable Island;
- in the Gulf of St. Lawrence - i.e., no fishing is authorized north northwest of a line drawn from Burgeo Island, NL., following the 3Pn line intersecting the 4Vn line at 46°50'N; 58°50'W and proceeding in a southeasterly direction and extending to Cape Breton Island NS at 46°11'N; 59°55'W;
- in the area West of 65°30'W in NAFO Division 4X and Subarea 5;
- in the Bay of Fundy (Fishing Zone 2);
- in the Gully Marine Protected Area as defined in Regulations;
- in the Lophelia Coral Conservation Area in the Laurentian Channel;
- in the Western and Emerald Banks "Haddock Box" Closed Area;

- in the waters off Cabot Island/Funk Island, NL., enclosed by straight lines joining the following points in the order in which they are listed:

50°05'N	53°15'W
50°05'N	52°35'W
49°15'N	52°35'W
49°15'N	53°15'W
49°43'30"N	53°38'W
50°05'N	53°15'W

8.2 By-catch Provisions

Only those species permitted by licence condition may be retained. All by-catch data must be reported in logs by species and weight or number.

In the case of whelks, a CFIA/industry protocol must be in place prior to retaining whelks for marketing purposes.

8.3 Contaminated Areas

Contaminated areas have not been an issue in this fishery to date.

8.4 Gear Restrictions

The gear type used while fishing must be as described in the licence (hydraulic dredge).

8.5 Transshipping

The at-sea transshipping or receiving of catches to or from other vessels is prohibited.

8.6 Reporting Requirements

Licence conditions stipulate the requirement for accurate reporting of catches through log books, dockside monitoring and 100% vessel monitoring systems (VMS).

8.7 At-Sea Observers

The requirement for certified at-sea observers in the offshore clam fishery remains, but is considered low due to:

- there is normally a near absence of groundfish by-catch in the fishery;

- data for scientific purposes will be collected under research programs to be developed under this Management Plan through Joint Project Agreements (JPAs).

Nevertheless, issues such as high-grading of catch, over-fishing of areas and by-catch of sedentary species not permitted by licence condition (such as scallops or other species) may arise during this Plan. The recommended minimum level of monitoring by industry-funded certified observers may vary up to ten percent of sea days on commercial grounds. This Plan, therefore, requires that certified observers be deployed on an as-required basis, at industry expense. In addition, a higher level of coverage, i.e. up to 20%, may be considered for exploratory trips.

8.8 Dockside Monitoring

100% industry-funded dockside monitoring remains an ongoing requirement.

8.9 Enforcement Strategies

DFO will monitor compliance with all regulatory and licence requirements through aerial surveillance, 100% VMS, patrol vessels, observer coverage, dockside checks and data audits. DFO enforcement staff will monitor compliance of regulations and licence requirements and apply legal recourse if required.

All clam harvesting vessels are required to employ an operational VMS transponder in accordance with the licence conditions.

8.10 Industry Administered Enforcement Strategies

The OCMB may develop an agreed set of self-administered sanctions to accommodate potential quota overruns subject to Ministerial discretion and consideration.

9. JOINT INDUSTRY/DFO RESEARCH PROGRAM

In 1994, a Joint Industry/DFO Program was initiated to study the Arctic Surfclam population on Banquereau and the Grand Banks. The main objective was to provide scientifically sound advice on sustainable yields. In recognition of the broad stabilizing influence the initial offshore clam IFMP provided to the industry, licence holders have committed to support further scientific research of clam resources.

During the 2003-2009 JPA, licence holders (on a *pro rata* licence share basis) and DFO committed to jointly develop and fund (on a cost sharing basis to be agreed to project by project) an Offshore Clam Research Program to further the knowledge about the mollusc species harvested in this fishery.

Since 1998, Industry has contributed \$2M financial and \$2M In-Kind towards surveys and research for the Offshore clam program.

9.1 Existing Projects

Sample processing and data analysis of the 2008, 10 year dredge impact study is continuing. The assessment from the 2010 Banquereau survey should be completed this year. Other studies include an investigation into growth rates on eastern Banquereau where there are reports of slow growth in the high density area.

9.2 Future Projects

During the 2003-2009 JPA, licence holders (on a *pro rata* licence share basis) and DFO committed to jointly develop and fund (on a cost sharing basis to be agreed to project by project) an Offshore Clam Research Program to further the knowledge about the mollusc species harvested in this fishery.

Projects currently under consideration are:

1. Surveys of the commercial clam grounds and investigation of effective tow distance for the survey tows.
2. Natural mortality rate studies: from size/age data, estimate mortality. Two or three small closed areas may be established from which the commercial vessels would land frozen shell stock (i.e., unprocessed except for freezing) for two consecutive years.
3. Continuation of studies on the effects of hydraulic gear: the effects of hydraulic dredging on the habitat, recruitment and incidental mortality of clams and other molluscs. The dredge impact study site on Banquereau was re-sampled in 2008.
4. Dredge selectivity studies: studies to determine the size selection effect of existing commercial and survey dredges have been completed, and studies on new survey dredges will be undertaken as they are introduced.
5. By-catch species: research on the biology/abundance of Ocean Quahogs, Greenland Cockles and Northern Propellerclams are ongoing with a view to establishing quota limits within the period of this plan.
6. Other projects as may be developed and approved by the OCMB.

The OCMB will recommend specific research projects to the OCAC for consideration.

APPENDIX I

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APPENDIX II

Offshore Clam Advisory Committee Terms of Reference

PURPOSE

The Offshore Clam Advisory Committee (OCAC) provides input and advice to Fisheries and Oceans Canada (DFO) on the conservation, protection and management of the offshore clam resource on Canada's Atlantic Coast. The Committee will continue to serve as an open and public consultative forum on all issues affecting the offshore clam fishery.

ADMINISTRATION

STRUCTURE

Any changes to the structure and administration of the Committee will be decided by the Committee membership.

SUBCOMMITTEES

Ad hoc subcommittees/working groups can be established to review and assess specific policy options and management measures.

MEETINGS

The Committee will meet at least once a year or as otherwise called by the Chair. Meetings will be held in either Nova Scotia or Newfoundland.

EXPENSES

Non-DFO members do not receive funding from DFO for expenses incurred when attending meetings.

VOTING PROCEDURES

No formal voting procedures will be established. The Committee will seek to operate on a consensus basis.

MINUTES OF MEETINGS

Minutes of the Committee's meetings will be prepared and distributed by DFO.

PUBLIC ACCESS

Meetings will be open to the public.

DFO WORKING GROUPS

The Committee will be supported by a working group or groups of DFO officials who will consolidate scientific, economic and management advice into draft fishing plans for the Committee's consideration.

ATTENDANCE

If a member cannot attend, an alternate may be nominated and the Chairman must be notified as far in advance of the meeting date as possible.

MEMBERSHIP

Chairperson - The Committee will be chaired by a DFO official, this position to rotate between the Scotia-Fundy Fisheries sector of the Maritimes Region and the Newfoundland Region. An industry co-chair may be appointed at the discretion of Committee members.

Members - The composition of the Committee membership will reflect the structure and nature of the offshore clam fishery. Membership on the Committee shall be made up of the two licence holding companies and related industry sectors that have a major involvement in the harvesting, processing and marketing of the resource, as well as representatives of government or provinces with significant shore-based infrastructure (i.e., Nova Scotia and Newfoundland) and DFO. In addition, First Nations representatives will be advised of committee meetings for discretionary participation. Membership on this Committee reflects the inter-regional nature of the fishery, in terms of the Department's Management Regions.

Offshore Clam Advisory Committee Members

Organization	Address
<u>Chairman</u>	
(Chairmanship is to rotate between Maritimes Region and Newfoundland Region)	
DFO, Maritimes Region	Dartmouth
DFO, Newfoundland Region	St. John's
<u>Licence Holders</u>	
Clearwater Seafoods Limited Partnership Ltd.	Halifax
<u>Processors</u>	
Arctic Surf Co	St. John's
<u>Provincial Government</u>	
NS Dept. of Fisheries & Aquaculture	Halifax
Nfld. Dept. of Fisheries	St. John's
<u>Federal Government (DFO)</u>	
Resource Management, Maritimes Region	Dartmouth
Economics, Maritimes Region	Dartmouth
C&P, Maritimes Region	Dartmouth
Oceans and Habitat	Dartmouth
Science, Maritimes Region	Dartmouth
Science, Newfoundland Region	St. John's
Resource Management, Nfld. Region	St. John's
ENS, Maritimes Region	Sydney
Newfoundland Region	St. John's
<u>First Nations</u>	
Representatives - Notification of OCAC meetings	

APPENDIX III

Offshore Clam Management Board Terms of Reference *(updated June 2014)*

Purpose

The Offshore Clam Management Board (OCMB) will oversee and direct the implementation of the Management Plan.

Functions and Responsibilities

The Board will:

- * Ensure the principles and provisions of the Management Plan are adhered to and respected.
- * Recommend changes to the Management Plan consistent with the Plan's principles.
- * Receive and review scientific advice on the state of the resource.
- * Develop and recommend scientific research programs to be funded on an agreed industry/DFO basis.
- * Develop and recommend monitoring and conservation measures.
- * Provide an annual report, with recommendations, on the offshore clam fishery to the Offshore Clam Advisory Committee.
- * Consult with other persons, bodies and governments as deemed necessary.

Meetings

The Board shall meet at least once a year and may meet as often as it deems fit.

Subcommittees

Ad hoc subcommittees/working groups can be established to review and assess specific issues and management measures.

Minutes of Meetings

Preparation and distribution of the Minutes of the Board's meetings to be the responsibility of the Board Chairperson.

Expenses

Members are responsible for their own expenses.

Attendance

If a member is unable to attend, an alternate may be chosen. The Chair should be notified by that member as far in advance of the meeting date as possible.

Membership

The composition of the Board's membership is outlined below. The membership will appoint an industry chair. The position of Vice-Chair shall be held by a DFO official.

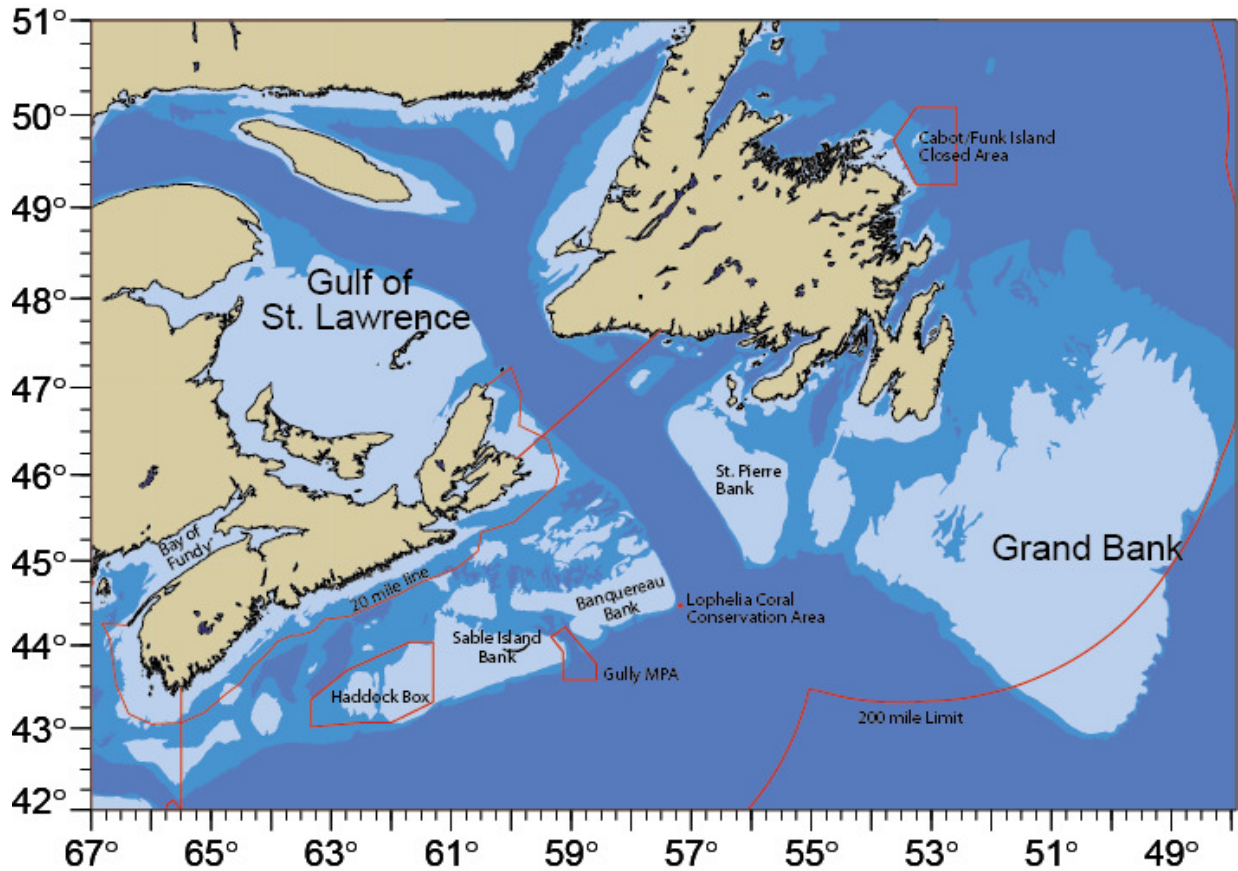
- * One representative from each offshore licence.
- * Representative(s) from DFO Science (as deemed appropriate).
- * Representative(s) from DFO Fisheries Management (as deemed appropriate).

Quorum

All meetings of the Committee shall require a quorum consisting of one representative from each offshore licence and at least one DFO representative to be considered a duly convened meeting.

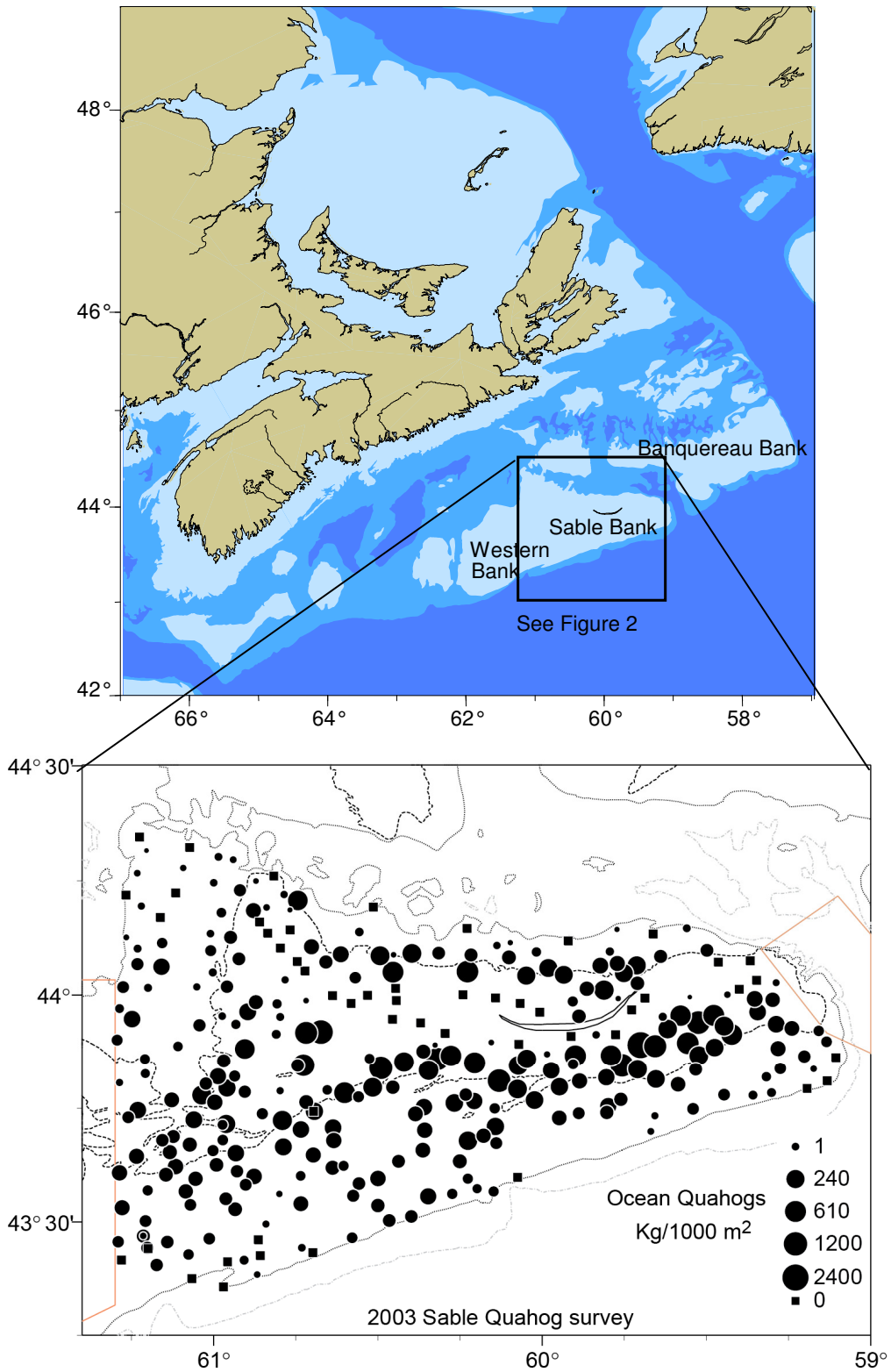
APPENDIX IV

Offshore Surfclam Commercial Fishing Banks (Newfoundland and Maritimes Region)



APPENDIX V

Ocean Quahog Fishing Areas



Appendix VI

Offshore Clam Fishery Chronology

<u>1980-83</u>	DFO conducts scientifically monitored Developmental Charter on Banquereau.
<u>1984-85</u>	Attempts made to develop surfclam fishery out of Lockeport, NS (C. Widrig, D. Williams and R. Baker).
<u>1986</u>	Industry test fishery by Pursuit, Nova Scotia (NS) Clam and Mother Snow's (MS). Pursuit and NS Clam Co. are awarded 2 licences on Banquereau with 15,000t EA of Arctic Surfclams. MS awarded licence for 1 year to fish experimentally outside Banquereau with a 5,000t EA of Arctic Surfclams
<u>1987</u>	Beginning of 3 year EA plan. Pursuit joined Clearwater, operates 1 Charter vessel for 9 months (the <u>Legend</u>). NS Clam purchases shell stock from Clearwater and sells some product. MS enters joint venture with National Sea Products (NSP) and experimentally fishes in: 4Vn, 4WX & 5Z, and 3LNO MS/NSP request access to Banquereau on equal basis with Clearwater and NS Clam Co. Japanese Clam market is opened to Arctic Surfclams. MS/NSP appeal for licence to fish on The Grand Banks
<u>1988</u>	Interest created by NSP/MS sparks request by Clearwater to experiment in 3LNO. The <i>Steven S</i> , a traditional USA clam vessel, commenced fishing for Pursuit/ Clearwater. Commercial quantities of surfclams discovered in 3LNO. Atlantic Surf Clam Co. received approval on The Grand Banks (3LNO) for 1989 but no access to Banquereau. Clearwater/Pursuit begin fishing with its first Canadianized vessel <i>Atlantic Vigour</i> in July followed by the <i>Atlantic Pursuit</i> in November. NS Clam Co. request to fish 3LNO outstanding. Uses <i>Steven S</i> to fish on Banquereau. NSP/MS requested 2 licences; partially answered/one licence awarded for Scotian Shelf (eg. Banquereau). Clearwater purchases Alder Point plant to process clams.
<u>1989</u>	3 year EA trial ends. Atlantic Surf Clam Co. and MS/NSP issued exploratory licences for Eastern Grand Bank. Over supply forces Clearwater to tie-up <i>Atlantic Vigour</i> . Atlantic Surf Clam Co. permitted to use the vessel, <i>Concordia</i> and begins processing surfclams at Holyrood, Nfld
<u>1991</u>	1990-1994 Management Plan + EA Program approved. Quotas on all banks shared equally among the four licence holders - Atlantic Surf Co.; Deep Sea Clam Co.; Pursuit Fisheries [Clearwater] and NS Clam Co. Clearwater purchases Atlantic Surf Co. licence to be used to supply The Grand Banks plant. This licence is fished under Arctic Surf Co. NS Clam Co. stops fishing due to financial problems.
<u>1992</u>	NS Clam Co. goes out of business. This leaves three licences in the fishery, held by the following two participants: Clearwater Fine Foods Ltd. and Seabay Clam Co.
<u>1993</u>	Joint Industry/Government generic promotion program approved. Promotional program launched in March. NSP begins processing surfclams at Arnold's Cove, Nfld. Clearwater begins onshore production at Grand Bank, Nfld
<u>1994</u>	DFO/Industry agrees on joint, 3 year survey of the Arctic Surfclam resource. Seabay Clam Co. acquires licence independent of NSP to fish The Grand Banks.
<u>1995</u>	Minister approves 3 year Management Plan with EA program 1995-1997.

Appendix VI

Offshore Clam Fishery Chronology (continued)

<u>1996</u>	Surfclam sales in Japan plummet as result of E. coli outbreak [unrelated to seafood]. Entire fleet ties up for extended period in October.
<u>1998</u>	A five year management plan (1998 – 2002) approved. In addition, cooperative scientific studies were conducted. An economic analysis of the Arctic Surfclam fishery was completed.
<u>2001</u>	Clearwater applies for access to Ocean Quahog resources
<u>2002</u>	DFO completed an Expert Opinion on “Clearwater/Deep Sea Clam Ocean Quahog Development Proposal”. DFO completed a report on “Habitat Assessment – Proposed Ocean Quahog Fishery”
<u>2003</u>	Clearwater provided an Experimental Licence for 11,587 tonnes of Ocean Quahogs. Multi-year clam JPA signed. Clearwater and DFO begin scientific work on Ocean Quahog assessment as per JPA. A survey is conducted on Sable Island Bank.
<u>2004</u>	Joint Clearwater contracts for the construction of a new clam vessel and the installation of a new shucking system on the Ocean Concord. Clearwater and /DFO conduct a survey of Banquereau
<u>2005</u>	Minister approves a five year rolling, or evergreen IFMP
<u>2006</u>	The first phase of a 3-year survey of the Grand Banks is undertaken and completed
<u>2007</u>	Scientific survey season was lost due to inaccessibility of research vessel
<u>2008</u>	The second phase of a 3-year survey of the Grand Banks is undertaken and completed
<u>2009</u>	The third phase of a 3-year survey of the Grand Banks is undertaken and completed.
<u>2010</u>	Assessment of the Arctic Surfclam stock on Grand Bank, Clearwater and DFO conduct survey of Banquereau
<u>2011</u>	Technical update of IFMP, which reflects the 2010 Grand Bank assessment and revised TAC for that area Assessment of Banquereau Arctic Surfclam stock

Appendix VII

Precautionary Approach Framework - Offshore Surf Clam *(appended June 2014)*

Upper¹ and Limit reference points for the Arctic surf clam fishery have been scientifically reviewed and established as a formal component of the IFMP (Canadian Stock Advisory Report 2012/035). The reference points were established based on a Bmsy proxy of 1,015,059mt for Banquereau and 703,065mt for Grand Bank. The Bmsy proxy was determined using fishable biomass per recruit and estimated average annual recruitment. Reference points for this fishery were established using the default 80% and 40% of the Bmsy proxy for the stock:

Area:	Limit Reference Point (LRP)	Upper Reference Point (URP)
Banquereau	406,024mt	812,047mt
Grand Banks	281,226mt	562,452mt

Harvest Control Rules:

Above the Upper Reference Point (URP):

- Measures should promote the biomass remaining above the URP.
- The upper removal reference rate will be $F=0.33M$ (0.0264) for the stock while it is in the healthy zone. This removal reference is applied to the harvestable biomass $>75g/m^2$.

Between the Limit Reference Point (LPR) and the Upper Reference Point (URP):

- Fishing mortality will be reduced.
- Measures should promote the rebuilding of biomass towards the Upper Reference Point.
- The TAC should not be increased if this can reasonably be expected to result in declining trend in the biomass.
- Survey frequency will be reexamined in the context of increased risk to the stock.

Below the Limit Reference Point (LRP):

- Fishing mortality will be reduced to the lowest practicable level
- If the stock falls below the proxy LRP research may be undertaken to better determine the true Limit Reference Point for this stock, the level below which reproductive success would be seriously impaired.

Implementation:

A multi-year approach to fisheries management has been applied to the offshore surf clam resource. Formal stock assessments are anticipated approximately every 10 years. This schedule has been determined based on the population dynamics of the stock, the fact that the stock is comfortably within the healthy zone and the conservative exploitation rate in place to maintain the stock within the healthy

zone. In the intervening period between formal stock assessments a monitoring program has been put in place. Key indicators are monitored with triggers established to detect changes in stock status.

Indicators:

Three indicators have been established to monitor changes to the stock between surveys:

	Trigger Level - Banquereau	Trigger Level – Grand Bank
CPUE	70g/m ²	50g/m ²
Spatial Extent	253 km ²	128km ²
Size Composition	<1% of catch >120mm	<0.5% of catch >105mm

These trigger levels are set at levels previously observed and represent a stock status that did not require management intervention for growth in the stock. These trigger levels represent a stock status that remains in the healthy zone. The trigger levels serve as an early warning of changes in the stock that warrant a closer examination of the data. Such examination will be used to determine whether a survey, formal stock assessment, and/or some other management actions are required. The trigger levels will be a primary determinant of adjustments to the multiyear assessment schedule.

1. The Upper Reference point is the lowest level at which the stock is considered healthy. Above this point, there is no requirement to take action to increase stock abundance, although in practice there may be several reasons for which the fishery prefers to operate with a biomass above this point. The term Upper Reference Point is used in the DFO PA framework, and is equivalent to the Target Reference Point in the MSC's fisheries assessment guidelines.