This Integrated Fisheries Management Plan is intended for general purposes only. Where there is a discrepancy between the Plan and the Fisheries Act and Regulations, the Act and Regulations are the final authority. A description of Areas and Subareas referenced in this Plan can be found in the Pacific Fishery Management Area Regulations.
FOREWORD

The purpose of this Integrated Fisheries Management Plan (IFMP) is to identify the main objectives and requirements for the sea cucumber fishery in the Pacific Region, as well as the management measures that will be used to achieve these objectives. This document also serves to communicate the basic information on the fishery and its management to Fisheries and Oceans Canada (DFO) staff, legislated co-management boards and other stakeholders. This IFMP provides a common understanding of the basic “rules” for the sustainable management of the fisheries resource.

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.

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.
# TABLE OF CONTENTS

1 OVERVIEW ................................................................................................................. 6  
1.1. Introduction .............................................................................................................. 6  
1.2. History ..................................................................................................................... 6  
1.3. Type of Fishery and Participants ............................................................................ 7  
1.4. Location of Fishery .................................................................................................. 8  
1.5. Fishery Characteristics ............................................................................................ 8  
1.6. Governance ................................................................................................................ 9  
1.7. Approval Process ...................................................................................................... 11  

2 STOCK ASSESSMENT, SCIENCE AND TRADITIONAL KNOWLEDGE ..................... 11  
2.1. Biological Synopsis .................................................................................................. 11  
2.2. Ecosystem Interactions ............................................................................................ 12  
2.3. Aboriginal Traditional Knowledge/Traditional Ecological Knowledge ................ 12  
2.4. The Adaptive Management Plan (Phase 1 Fishery) 1997 to 2007 ......................... 12  
2.5. Stock Assessment ..................................................................................................... 13  
2.6. Stock Scenarios ....................................................................................................... 14  
2.7. Precautionary Approach ......................................................................................... 14  
2.8. Commercial No-Take Reserves .............................................................................. 15  
2.9. Precautionary Exploitation Rate (Harvest Rate) .................................................... 16  
2.10. Research .................................................................................................................. 16  

3 ECONOMIC PROFILE OF THE FISHERY ............................................................... 17  
3.1. First Nations ............................................................................................................ 17  
3.2. Recreational ............................................................................................................. 18  
3.3. Commercial .............................................................................................................. 18  

4 MANAGEMENT ISSUES ............................................................................................. 20  
4.1. Conservation and Sustainability .............................................................................. 21  
4.2. Social, Cultural and Economic ............................................................................... 22  
4.3. Compliance .............................................................................................................. 23  
4.4. Ecosystem ................................................................................................................ 23  
4.5. Oceans and Habitat .................................................................................................. 24  
4.6. Gear Impacts ............................................................................................................ 28  

5 OBJECTIVES .................................................................................................................. 28
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1. National</td>
<td>28</td>
</tr>
<tr>
<td>5.2. Pacific Region</td>
<td>28</td>
</tr>
<tr>
<td>5.3. Invertebrate Resource Management</td>
<td>29</td>
</tr>
<tr>
<td>5.4. Sea Cucumber</td>
<td>29</td>
</tr>
<tr>
<td>6 ACCESS AND ALLOCATION</td>
<td>31</td>
</tr>
<tr>
<td>6.1. First Nations</td>
<td>31</td>
</tr>
<tr>
<td>6.2. Recreational</td>
<td>31</td>
</tr>
<tr>
<td>6.3. Commercial</td>
<td>31</td>
</tr>
<tr>
<td>6.4. Aquaculture and Enhancement</td>
<td>32</td>
</tr>
<tr>
<td>6.5. Experimental, Scientific, Educational or Public Display</td>
<td>32</td>
</tr>
<tr>
<td>6.6. Request for Access</td>
<td>32</td>
</tr>
<tr>
<td>7 MANAGEMENT MEASURES FOR THE DURATION OF THE PLAN</td>
<td>32</td>
</tr>
<tr>
<td>8 SHARED STEWARDSHIP ARRANGEMENTS</td>
<td>32</td>
</tr>
<tr>
<td>8.1. Commercial Fishery</td>
<td>32</td>
</tr>
<tr>
<td>8.2. Fisheries and Oceans Canada</td>
<td>33</td>
</tr>
<tr>
<td>9 COMPLIANCE PLAN</td>
<td>33</td>
</tr>
<tr>
<td>9.1. Enforcement Issues and Strategies</td>
<td>33</td>
</tr>
<tr>
<td>10 PERFORMANCE REVIEW</td>
<td>35</td>
</tr>
<tr>
<td>10.1. Stock Assessment and Research</td>
<td>35</td>
</tr>
<tr>
<td>10.2. First Nations Fishery</td>
<td>36</td>
</tr>
<tr>
<td>10.3. Recreational Fishery</td>
<td>36</td>
</tr>
<tr>
<td>10.4. Commercial Fishery</td>
<td>36</td>
</tr>
<tr>
<td>10.5. Compliance</td>
<td>36</td>
</tr>
<tr>
<td>11</td>
<td>36</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>36</td>
</tr>
<tr>
<td>12 GLOSSARY</td>
<td>37</td>
</tr>
</tbody>
</table>

ATTACHMENTS

Appendix 1: Sea Cucumber Commercial Harvest Plan
Appendix 2: Sea Cucumber First Nations Harvest Plan
Appendix 3: Sea Cucumber Recreational Harvest Plan
Appendix 4: Sea Cucumber Aquaculture Management Measures
Appendix 5: Post Season Review
Appendix 6: Management Measures for the Commercial Fishery
Appendix 7: Stock Assessment Information
Appendix 8: Example of a Sea Cucumber Harvest Log
Appendix 9: Sea Cucumber Quota Management Area Descriptions
Appendix 10: Sea Cucumber Quota Management Area Maps
Appendix 11: Example of Sea Cucumber Conditions of Licence
Appendix 12: Fishing Vessel Safety
Appendix 13: Consultation
Appendix 14: Adaptive Rotational Fishing Strategy 2014 to 2016
Appendix 15: Contacts
1. OVERVIEW

12.1 Introduction

In this document, ‘sea cucumber’ refers to the giant red (California) sea cucumber (*Parastichopus californicus*).


The Sea Cucumber Commercial Harvest Plan is attached as Appendix 1 to this IFMP. Commercial fish harvesters are advised to review the attachments for harvest information.

12.2 History

The giant red sea cucumber (*Parastichopus californicus*) is the only sea cucumber species harvested in British Columbia (BC) and is harvested commercially under the authority of a limited “ZD” licence.

The commercial dive fishery began in BC in 1971. An experimental fishery occurred in southern waters during the early 1980s during which time markets were established for BC sea cucumbers. As a result, there was rapid escalation in effort during the 1980s which led to conservation concerns and the implementation of various management actions. Licence limitation came into effect in 1991 in an attempt to control an increase in fishing effort and the number of licence eligibilities was set at 85. In 1992 the commercial industry formed the Pacific Sea Cucumber Harvesters Association (PSCHA) which represents the interests of licence eligibility holders with regards to marketing and fishery sustainability. The PSCHA is a member of the Sea Cucumber Sectoral Committee (see Appendix 13) and provides advice and comments on this IFMP and other issues related to the commercial fishery.

A rotational style fishery began in 1993 in order to reduce the impacts of harvest by allowing a two year recovery period between openings and an Individual Quota (IQ) program was adopted for the commercial sea cucumber fishery in 1995. The implementation of the IQ program was beneficial for the BC sea cucumber industry since it gave an equal share of the Total Allowable Catch (TAC) to each licence eligibility holder which in turn promoted a safer fishery and reduced issues with quota overages.

An Adaptive Management Plan (AMP) was undertaken in the sea cucumber fishery from 1997-2007 (see section 2.4). Under the AMP, the Department restricted the commercial fishery to approximately 25 percent of the BC coastline. This restriction was not meant to be permanent and the PSCHA was told that areas closed for the AMP would be considered for reopening pending results from data collected during the plan. The fishery also moved from a rotational style fishery to an annual style fishery in order to allow the collection of time-series fishery dependent data. Arbitrary quotas in place prior to the AMP were replaced by a precautionary baseline TAC that was calculated using baseline density estimates and a precautionary fixed harvest rate. Provisions were
built into the AMP that allowed increases in TAC based on data collected from stock assessment surveys. The TAC steadily increased from 1998 to 2005 due to a number of surveys that were completed and due to the doubling of the baseline density estimate in 2002. The TAC was set at approximately 1.2 million pounds in 2006 and remained constant until an increase of approximately 9.5% in 2011.

In 2008, after reviewing the results of the 10 year AMP (Hand et al. 2009), the Department began allowing the commercial fishery to return into areas that were closed during the AMP. In 2011 the commercial fishery moved from an annual style fishery to a 3-year rotational style fishery. For the Adaptive Rotational Fishing Strategy (ARFS), each sea cucumber Quota Management Area (QMA) is harvested once every three years. The ARFS continues with a second round spanning 2014 to 2016.

Sea cucumbers are important to coastal First Nations, who harvest them for food, social and ceremonial purposes. Recreational harvest of sea cucumbers is undocumented but is considered minimal.

12.3 Type of Fishery and Participants

12.3.1 First Nations

First Nations’ harvest for food, social and ceremonial purposes may occur where authorized by an aboriginal communal licence or, under treaty, a harvest document. The communal licence or harvest document may contain provisions for the designation of individuals by the First Nation or First Nation organization but the number harvesting sea cucumber is otherwise unknown.

12.3.2 Recreational

A British Columbia Tidal Waters Sport Fishing Licence is required for the recreational harvest of all species of fish including shellfish. Tidal Waters Sport Fishing Licences can be purchased at many tackle stores and marinas or online by using the internet at:


The Tidal Waters licence includes access to numerous species, and the number of recreational harvesters fishing for sea cucumbers is unknown. However, based on advice from the Sport Fishing Advisory Board of BC (SFAB), it is thought to be minimal.

12.3.3 Commercial

The commercial fishery is a limited entry fishery with 85 licence eligibilities. There are currently no designated communal commercial licences for First Nations participation in the commercial fishery. Vessel sizes in the commercial fishery range from 8 metres to 12 metres in length. It is common practice within the industry for vessels to stack multiple licence eligibilities in order to make fishing more economical.
A typical crew on a sea cucumber vessel consists of a vessel master and one or two crew members. One crew member will act as a dive tender while the others dive to harvest sea cucumbers.

12.3.4 Aquaculture

There is a keen interest by industry and investors to develop sea cucumber aquaculture technologies and methodologies both for aquaculture and enhancement of wild stocks. Further research, in the areas of hatchery and grow-out techniques for sea cucumber species native to BC, are required to support the growth of this sector. Further policy development is required to define DFO’s approach to sea cucumber aquaculture interest.

Aquaculture licence conditions include pre-harvest notification and the provision of an aquaculture landing log when harvest occurs. Sea cucumbers are a candidate species for integrated multi-trophic aquaculture systems, where they can be cultivated in containers below finfish and shellfish farms to feed on deposition material.

For more information, listing of licensed sites and Conditions of the Shellfish Aquaculture Licence see the Fisheries and Oceans Canada Pacific Aquaculture website at:

www.dfo-mpo.gc.ca/aquaculture/aquaculture-eng.htm

12.4 Location of Fishery

12.4.1 First Nations and Recreational

Aboriginal and recreational harvest may occur coastwide, where appropriately licensed.

12.4.2 Commercial

As a result of the Adaptive Management Plan (see section 2.4), the sea cucumber fishery was restricted to approximately 25 percent of the BC coast from 1997 to 2008. Presently the fishery is being reopened in some of the portions of the coast that were closed for the AMP. The commercial fishery occurs in units called Quota Management Areas. These Management Areas are a defined portion of Pacific fisheries waters. Areas and Subareas, as described in the Pacific Fishery Management Area Regulations, are referenced in describing each management area. (see Appendices 1, 9 and 10). There are also permanent closures for various purposes (see Appendix 1, Section 5).

12.5 Fishery Characteristics

12.5.1 First Nations

First Nations’ fishing for food, social and ceremonial (FSC) purposes are the first priority after conservation and is open coastwide throughout the year. First Nations’ fishing effort for FSC
domestic purposes has not been limited by catch quantity, except in those Nations where the
Council or fisheries program has established their own catch limits for band members, or where
allocated under treaty. While sea cucumbers were not allocated under the Maa-nulth, Tsawwassen
or Nisga’a treaties, harvesting for FSC purposes is permitted. See Appendix 2.

12.5.2 Recreational

The recreational fishery is open year-round (except for areas closed to fishing) and is an open entry
fishery with a daily limit and a two-day possession limit. There is no size limit for recreational
harvesters and the type of gear permitted is limited to hand picking and diving.

12.5.3 Commercial

The commercial licence year is from October 1 to September 30. The fishery generally opens on
the first Monday of October in the north coast licence area and the following Monday in the other
licence areas. The season is scheduled for approximately 8 weeks. Harvest is by hand picking
while diving.

The fishery operates under a Total Allowable Catch (TAC) with Individual Quotas (IQ). All
commercial landings are tracked using a coastwide Dockside Monitoring Program (DMP). Other
management measures include limited entry licensing, area quotas and area licensing. For more
information see Appendix 6.

12.5.4 Aquaculture

Sea cucumber aquaculture is at an early stage of development in BC. Currently aquaculture
harvests have consisted of wild sea cucumbers that have settled as juveniles on floating gear such as
oyster strings and shellfish trays. Hatchery techniques are also under development, with some early
indication of success. There is also keen interest by industry in outplanting hatchery raised juvenile
sea cucumbers and in ‘ocean ranching’ methods. DFO is working to develop phased, integrated
approaches for the development of aquaculture involving new and emerging species. Until these
phased approaches are in place, DFO will not be considering new applications for sea cucumber
aquaculture licences. See Appendix 4.

12.6 Governance

12.6.1 Fisheries Management

The sea cucumber fishery is governed by the Fisheries Act (R.S., 1985, c. F-14) and regulations
made thereunder, including the Fishery (General) Regulations (e.g., conditions of licence), the
Pacific Fishery Regulations (e.g., open times), the British Columbia Sport Fishing Regulations
(1996), the Aboriginal Communal Fishing Licences Regulations and the Pacific Aquaculture
Regulations. Areas and Subareas are described in the Pacific Fishery Management Area
Regulations.
In addition, the DFO’s Sustainable Fisheries Framework contains policies for adopting an ecosystem based approach to fisheries management, including: A Fishery Decision-Making Framework Incorporating the Precautionary Approach, Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas, and Policy on New Fisheries for Forage Species. Along with existing economic and shared stewardship policies, these help Fisheries & Oceans Canada (DFO) meet objectives for long-term sustainability, economic prosperity, and improved governance. More recent information on Canada’s Approach to Fisheries Modernization includes: The Policy on Managing Bycatch and Discards, Precautionary Approach Framework: Growing Stocks Out of the Critical Zone, and the Ecological Risk Analysis Framework. More information is available on the internet at:


Scientific advice for this fishery is peer-reviewed primarily through a committee called the Centre for Science Advice - Pacific (CSAP) (formerly, the Pacific Scientific Advice Review Committee (PSARC)).

The Sea Cucumber Sectoral Committee (Appendix 13) is the primary body guiding management decision-making processes for the sea cucumber fishery. The Sea Cucumber Sectoral Committee meets once a year in June for a post-season review and pre-season planning.

12.6.2 Spatial Planning for Marine Conservation

A co-operative and collaborative approach to marine conservation is being implemented by Fisheries and Oceans Canada, Parks Canada, and Environment Canada for planning, establishing, and managing federal marine protected areas in a more systematic and efficient way.

**Marine Protected Areas** may be established by Fisheries and Oceans Canada under the *Oceans Act* (1996, c. 31) to protect and conserve important fish and marine mammal habitats, endangered marine species, unique features, and areas of high biological productivity or biodiversity.

More information is available on the internet at:


**National Marine Conservation Areas** may be established by Parks Canada under the *Canada National Marine Conservations Areas Act* (2002, c. 18) to protect and conserve representative examples of Canada’s natural and cultural marine heritage, and to provide opportunities for public education and enjoyment.

More information is available on the internet at:


**Marine Wildlife Areas** may be established by Environment Canada under the *Canada Wildlife Act* (R.S.C., 1985, c. W-9) to protect and conserve habitat for a variety of wildlife, including migratory birds and endangered species.

More information is available on the internet at:
12.6.3 Species at Risk

Species listed as extirpated, endangered, threatened or special concern are governed by the *Species At Risk Act* (2002, c. 29) (*SARA*) which has implications for the management of fisheries that impact listed species. In addition to existing prohibitions under the *Fisheries Act*, it is illegal under the *SARA* to kill, harm, harass, capture, take, possess, collect, buy, sell or trade any listed endangered or threatened animal or any part or derivative of an individual.

These documents are available on the internet at:

www.dfo-mpo.gc.ca/acts-loi-eng.htm

More information on the SARA is available at:

www.sararegistry.gc.ca

12.7 Approval Process

The Regional Director General for the Pacific Region approves this plan.

13 STOCK ASSESSMENT, SCIENCE AND TRADITIONAL KNOWLEDGE

13.1 Biological Synopsis

The giant red or California sea cucumber (*Parastichopus californicus*) is a member of the phylum Echinodermata, which includes sea stars and sea urchins. It is the largest of approximately 30 sea cucumber species in BC and is the only one that is commercially harvested. The species ranges from the Gulf of Alaska to southern California, in water depths ranging from the intertidal to 250 m. Sea cucumbers occupy the seabed in a wide variety of substrate and current regimes, but are most abundant in areas of moderate current on complex boulder or bedrock substrates. Individuals have limited mobility, move an average of 4 metres per day while feeding, and are reputed to undertake seasonal migrations to different depths. Sea cucumbers feed by picking up organic detritus with their mop-shaped adhesive tentacles as they move over the sea floor.

Sea cucumbers have separate sexes and spawning occurs from spring through summer. Eggs and sperm are released directly into the water and the developing larvae remain planktonic for two to four months. Juveniles grow from 0.25 mm at settlement to approximately 1 cm in one year and 4 to 10 cm at the end of two years. During this early life-stage, they have been observed attached to the underside of rocks, in mats of stringy red algae in calm bays and among solitary tunicates, although juveniles have been reported from many different habitats. Adult populations tend to be uniform in size and rarely contain individuals less than 15 cm. Age at recruitment to the fishery is thought to be at least 4 years, since year classes can be distinguished through analysis of length frequency data for only the first three years.
The life history characteristics of importance to understanding the productivity of *Parastichopus californicus* are largely unavailable. No method has yet been found to age the animals, and therefore basic parameters for stock assessments (natural mortality and age at recruitment) are speculations. The body shape is plastic, and hence measurements of body dimensions are difficult to obtain. Furthermore the animals undergo annual fluctuations in body mass, skin thickness and muscle weight from their yearly cycle of resorbing and regenerating their internal organs.

13.2 **Ecosystem Interactions**

Sea cucumbers move slowly over the sea floor feeding on the organic component of detritus. They function in the ecosystem as nutrient recyclers. Adult sea cucumbers have few known predators, with the exception of sea otters and several species of sea stars. Sea stars can induce a violent escape response whereby the sea cucumber undulates its body, creating a swimming motion that allows it to move away from the predatory threat. Juveniles are probably more vulnerable and this may explain their secretive behaviour. Sea otters are also known to feed on sea cucumbers, although they appear to prefer other prey.

13.3 **Aboriginal Traditional Knowledge/Traditional Ecological Knowledge**

Aboriginal Traditional Knowledge is not generally available. Traditional Ecological Knowledge in the form of observations and comments collected from commercial divers over many years contributes to the decisions on scientific survey locations and is considered in management decisions.

13.4 **The Adaptive Management Plan (Phase 1 Fishery) 1997 to 2007**

Due to the data-limited nature of the sea cucumber fishery, a phased approach for new and developing fisheries, following Perry et al. 1999, was recommended in order to evaluate the fishery. ‘Phase 0’ (collecting existing information) started in 1995 and a review of all existing data from the BC and Alaska fisheries was undertaken. Knowledge gaps were identified during Phase 0 and it was then recommended that the fishery enter ‘Phase 1’ (collecting new information) in order to collect important time-series fisheries-dependent data. In order to implement Phase 1, an Adaptive Management Plan (AMP) was developed and implemented for the sea cucumber fishery in 1997. This approach was based on advice from PSARC (Boutillier et al 1998, Scientific Advice for the Management of the Sea Cucumber Fishery in British Columbia). The AMP limited commercial fishing activity to approximately 25 percent of the BC coast.

After extensive research over a ten year period and analysis of harvest data, experimental fishery data and density survey data, risk-adverse exploitation rates were determined that would ensure a sustainable fishery (Hand et al. 2009; An Evaluation of Fishery and Research Data Collected During the Phase 1 Sea Cucumber Fishery in British Columbia 1998 to 2007). The paper made several recommendations, among which was to re-open areas that were closed during the AMP and consideration of a rotational harvest strategy. The commercial sea cucumber fishery started ‘Phase
2’ (fishing for commerce) in 2008 and since then, large portions of the BC coast that were closed for the AMP have reopened. Portions of the coast reserved for research purposes during the AMP will continue to remain closed to commercial harvest, as many of the experiments are ongoing.

13.5 Stock Assessment

The Department, in collaboration with First Nations and the Pacific Sea Cucumber Harvesters Association (PSCHA), continues to conduct stock assessment research leading towards an improved understanding of the sea cucumber resource. Scientific research and stock assessment surveys are of vital importance to this fishery as it continues to be managed under the precautionary approach to Canadian Fisheries.

Surveys of selected PFMA Subareas are conducted annually to obtain estimates of the density of *Parastichopus californicus*, expressed in number of sea cucumber per metre of shoreline. Individual sea cucumbers are also collected and weighed to calculate the mean sea cucumber weight. From these, the total population biomass is estimated for each Subarea.

Density data from transects has been collected in survey areas along the British Columbia coast (Hand et al. 2009, Duprey et al. 2010; Duprey 2011, 2012). Estimates from these surveys have shown that many survey areas have densities higher than the initial conservative assumption of 2.5 sea cucumbers per metre of shoreline.

In 2008, all survey data were reviewed and baseline densities for un-surveyed Subareas were calculated by Region. This resulted in baseline densities of 6.0, 4.1, and 1.9 sea cucumbers per meter shoreline for the North Coast/Central Coast, East Coast Vancouver Island, and West Coast Vancouver Island, respectively. Newly opened areas are surveyed before opening and their densities are set according to the collected survey data. All of these results have been incorporated into this IFMP.

In 1997 four Experimental Fishing Areas (EFA) were implemented along the BC coast. These four EFAs (Laredo Inlet, Tolmie Channel, Zeballos, and Jervis Inlet) were used to compare differing harvest rates and the effects on the local population (Hand et al. 2009). Four sites at each EFA were harvested annually at different rates and density surveys were conducted at 2 and 4 year intervals including a fifth site which was never harvested. The results from 10 years of data were analyzed and modelled. The results indicated that it is highly probable that a 4.2% harvest rate would be sustainable for 75 years in all four EFAs (Hand et al. 2009). These initial model results took a decade of research effort to produce, illustrating the need for long time series of data for complex animals with large knowledge gaps in their biology and life cycle.

A Limit Reference Point (LRP) was also recommended for the sea cucumber fishery using these survey and model results. A LRP of 50% B0, the biomass of the population in the un-harvested state, was recommended and was considered highly precautionary for three of the four EFA datasets (Hand et al. 2009). Three of the EFA research sites are still active and the collected data will be used to re-visit the model and update our advice on harvest rates and recovery rates in the future.
13.6 Stock Scenarios

There is no indication of concern for sea cucumber stocks at this time. The sea cucumber fishery is managed conservatively, and stocks generally appear healthy. A precautionary approach to management, which ensures the Department is meeting its conservation goals, will continue for the foreseeable future. This, in turn, will ensure sustainable harvests by all user groups. The long-term goal of the Department is to develop an ecologically-based management regime for a sustainable fishery through a better understanding of stock dynamics of the resource. Through collaboration with the PSCHA and coastal First Nations, tremendous gains have been made in the knowledge of the *Parastichopus californicus* population in BC.

Upon acceptance of the recommendations in the CSAS paper presented in 2007, the department moved ahead with reopening sections of the coast that were closed for the Adaptive Management Plan. All new areas are surveyed prior to reopening to ensure that there are sufficient densities of sea cucumbers to support a commercial harvest. For more information on sea cucumber stock assessment see Appendices 6 and 7.

13.7 Precautionary Approach

The Department has recently begun implementation of the Sustainable Fisheries Framework (SFF), which is a toolbox of existing and new policies for DFO and other interests to sustainably manage Canadian fisheries in order to conserve fish stocks and support prosperous fisheries.

Fisheries worldwide are under increasing pressure, creating challenges for policy makers, resource managers, and industry leaders to make informed decisions regarding the conservation, recovery, and wise management of these resources. DFO held consultations throughout Canada in 2007 and 2008 to develop strategies to ease ecosystem pressures and enhance the capacity of the resource to sustain growing industry needs. New conservation policies have been developed to implement the ecosystem and precautionary approaches to fisheries management. These new policies, incorporated into development of new Integrated Fisheries Management Plan (IFMP) templates, join existing policies in a framework to promote sustainable fisheries.

The new fishery decision-making framework incorporating the precautionary approach policy applies to key harvested fish stocks managed by DFO, including commercial, recreational, or subsistence fisheries and can be found on the internet at:


Applying the precautionary approach to fisheries management decisions entails establishing a harvest strategy that:

- identifies three stock status zones – healthy, cautious, and critical – according to upper stock reference points and limit reference points;

- sets the removal rate at which fish may be harvested within each stock status zone; and
- adjusts the removal rate according to fish stock status variations (i.e., spawning stock biomass or another index/metric relevant to population productivity), based on pre-agreed decision rules.

The framework requires that a harvest strategy be incorporated into respective fisheries management plans to keep the removal rate moderate when the stock status is healthy, to promote rebuilding when stock status is low, and to ensure a low risk of serious or irreversible harm to the stock. It also requires a rebuilding plan when a stock reaches low levels.

In general, the precautionary approach in fisheries management is about being cautious when scientific knowledge is uncertain, and not using the absence of adequate scientific information as a reason to postpone or fail to take action to avoid serious harm to fish stocks or their ecosystem. This approach is widely accepted as an essential part of sustainable fisheries management.

A Limit Reference Point (LRP) has been set for the sea cucumber fishery and is based on survey and model results from the Phase 1 fishery. A LRP of 50% $B_0$, the biomass of the population in the un-harvested state, was recommended and is considered highly precautionary (Hand et al. 2009).

Reference Points have limited value for monitoring sea cucumber stocks on a coastwide scale. In order for reference points to be useful, stocks must be monitored on a regular basis in order to see whether changes are occurring. Monitoring sea cucumber populations involves intensive dive surveys and the department does not have the money or personnel to monitor all commercially harvested areas in BC on a regular basis.

### 13.8 Commercial No-Take Reserves

Commercial No-take Reserves (CNTRs) are a management tool meant to provide an alternative to reference points, insurance against uncertainties in stock assessment and management, anticipated spill-over of adults and larvae into commercially harvested areas and for research opportunities. There are a number of other closures currently in place around the BC coast such as parks and marine reserves that likely also provide these same functions. The only difference between these types of closures and CNTRs is that CNTRs are surveyed prior to implementation to ensure there are sea cucumbers present. Since a survey is required prior to designation, CNTRs have only been placed in the reopened portions of the coast to date. The criteria currently used by the Department to choose CNTR locations are: the area must be surveyed, have clear boundaries (for enforceability), size and best judgement of which areas would be representative of the surrounding commercially harvested area.

In 2011 resource managers requested advice from DFO Science to provide guidance on development of a coastwide network of CNTRs. In the Fall of 2013 the CSAS paper *Simulation Modelling Tools to Evaluate Alternative Fishery Closure Network Designs for Shallow-water Benthic Invertebrates in British Columbia* was presented and accepted by the Centre for Science Advice Pacific. Model results from the CSAS paper indicate that CNTRs may not be needed given the current precautionary management regime in place for the sea cucumber fishery. Despite these
results, the Department still sees value in placing a limited number of CNTRs around the BC coast. As a result, CNTRs will continue to be placed in areas reopened for commercial harvest and will eventually be placed in the portions of the coast that were open during the Phase 1 fishery. There are currently twenty CNTRs in place around the BC coast that total 930 kilometers of shoreline.

Over the three and a half years, the Department has been in extensive discussions with the Kitasoo/Xai’xais First Nation on the size, number and location of CNTRs to place within the First Nation’s claimed traditional territory. As a result of these discussions, 6% of the shoreline within the claimed traditional territory will be set aside for CNTRs in 2014. The locations of the CNTRs were chosen based on advice provided by the Kitasoo/Xai’xais and the PSCHA. Discussions on CNTRs in the Kitasoo/Xai’xais claimed traditional territory are ongoing.

13.9 Precautionary Exploitation Rate (Harvest Rate)

In 1997, the harvest rate for the sea cucumber fishery was set at 4.2% of the estimated biomass, based on conservative estimates of *Parastichopus californicus* harvest rates in the Alaska and Washington State fisheries. Experimental fisheries were undertaken throughout coastal British Columbia in collaboration with the PSCHA and First Nations. These experiments were designed to evaluate the effect of different exploitation rates on *Parastichopus californicus* populations. Results of these experiments led to the conclusion that the 4.2 percent annual harvest rate appears to be precautionary and is suitable for a variety of habitats and densities. If unproductive, low-density areas are avoided, a conservative annual harvest rate of 6.7 percent is recommended (Hand et al. 2009). From 2008 to 2010 a harvest rate of 6.7 percent was applied to newly surveyed and reopened areas and the 4.2 percent harvest rate continued to be applied to all areas open during the Phase 1 fishery.

In 2011 the fishery moved to a rotational style fishery in which each quota management area is fished once every three years. Instead of tripling the harvest rate for each quota management area as is done in most rotational style fisheries, managers chose a harvest rate within the range of 3.5 to 10.3 percent recommended in Hand et al 2009 for an annual style fishery. A triennial harvest rate of approximately 10 percent is applied to each quota management area. This harvest rate is equivalent to a 3.3 percent annual harvest rate and is less than the 4.2 or 6.7 percent harvest rate used previously. The West Coast Vancouver Island licence area remains as an annual style fishery and has retained a harvest rate of 4.2 percent.

13.10 Research

The Department is working in collaboration with the PSCHA and First Nations to determine means of examining and measuring abundance, growth, recruitment, settlement, and mortality in sea cucumber populations.

Juvenile growth studies are currently underway to better understand the early stages of sea cucumber growth in a natural setting. Growth curves and seasonal variability will be analyzed over a 5 year period. A movement study is also underway to examine the speed in which sea cucumbers
re-settle an area after it has been harvested. The hope is to better understand whether sea cucumbers are migrating into recently depleted areas and how long it takes them to re-fill depleted areas. Commercial no-take reserves are also being established along the coast as new areas are opened to commercial harvesting. These areas will provide an excellent opportunity to monitor the natural trends in local populations, which will be ideal for comparisons to neighbouring harvested areas and for province wide comparisons of population trends over time. Deep water populations (50-250 m) have been studied using remotely operated vehicles to compare near shore densities to deep water densities. This is an important link to harvestable densities as the deep water population acts as a pseudo-reserve, being at depths unattainable by commercial divers.

The Experimental Fishing Areas (EFAs) set up during the Phase 1 fishery are still in use. The EFAs moved to a three year rotational fishery starting in 2012 in order to mirror the rotational style fishery management strategy used for the commercial fishery.

More detailed information about ongoing research projects and papers may be obtained by contacting Science Branch personnel (see Appendix 15).

14 ECONOMIC PROFILE OF THE FISHERY

The intent of this section is to provide a socio-economic context for the sea cucumber fishery in BC. An overview of Aboriginal, recreational and commercial sectors of the fishery is provided.

14.1 First Nations

First Nations are interested in economic opportunities through participation in BC’s commercial fishing industry. There are currently no communal commercial sea cucumber licence eligibilities, however several First Nations organizations hold regular commercial licence eligibilities. The Allocation Transfer Program (ATP) retires existing commercial licence eligibilities from fish harvesters on a voluntary basis and re-issues these to First Nation organizations as communal commercial licences. The Pacific Integrated Commercial Fisheries Initiative (PICFI), announced in 2007, is aimed at achieving environmentally sustainable and economically viable commercial fisheries, where conservation is the first priority and First Nations’ aspirations to be more involved are supported. The Government of Canada committed $175 million over five years (2007–2012) to implement the initiative. The initiative was renewed in 2012-13 with another $22.5 million and again in 2013/14 with an additional $22.1 million.

For more information on the Aboriginal Fisheries Strategy (AFS) and ATP, contact a resource manager listed in Appendix 15 or see the internet at:


More information on the PICFI is available on the internet at:

14.2 Recreational

Recreational fishing may occur to provide food for personal use, as a leisure activity, or as a combination of the two. Recreational fishing participants include local residents and visitors who access the resource directly or by hiring service providers such as charter operators. In 2010, over 245,000 anglers fished in BC’s tidal waters recreational fishery. Most (74%) were BC residents, with the remainder divided between Canadians from outside BC (12%) and visitors to Canada (14%) (Fisheries & Oceans Canada 2010). These activities provide a range of benefits to the participants as well as contribute directly and indirectly to economic activity.

Recreational fishing interests for harvesting shellfish species is directed mainly at crab, prawns and bivalves. The recreational harvest of sea cucumbers is believed to be minimal.

14.3 Commercial

The Pacific Region is home to the only commercial Parastichopus californicus fishery within Canada. There are also commercial fisheries for Parastichopus californicus in the states of Washington, California and Alaska in the USA as well as a drag fishery for a different species of sea cucumber (Cucumaria frondosa) on the east coast of Canada.

The 85 commercial sea cucumber licences are party-based, meaning that each licence eligibility holder may designate their licence to a registered commercial vessel of their choice each season. Licences are stackable, such that each vessel may hold numerous licences. In 2013, the 85 licences were distributed across 32 vessels. Most of the vessels were also licensed for one or more other dive fisheries such as geoduck, green sea urchin or red sea urchin. Overall, the dive fleet generates slightly more revenue from its harvest of non-sea cucumber species than from sea cucumber (Nelson 2011).

The annual sea cucumber fishery commences in October, when product quality is higher and weather conditions are still conducive to fishing. The fishery is scheduled for eight weeks and the majority of the TAC is usually harvested within the first three or four weeks of the opening.

The commercial sea cucumber fishery in BC has gone through a significant number of changes since 2008 when it moved from a Phase 1 fishery to a Phase 2 fishery (see section 2.4) in 2008. The fishery has expanded from approximately 25% of the BC coastline set aside in the Adaptive Management Plan (AMP) to approximately 48% in 2015. In the past five years approximately 5,800 km of shoreline has reopened to commercial harvest and this number continues to grow as more areas are surveyed. The amount of quota available for harvest has increased as a result of reopening portions of coastline and has allowed for an increase of approximately 9.5% in the commercial TAC and the implementation of a rotational style fishery (see Appendix 14). Another significant change has been the distribution of effort between the four licence areas (north coast, central coast, east coast of Vancouver Island and west coast of Vancouver Island). During the Phase 1 fishery, approximately 84% of the commercial TAC was in the north and central coast licence areas and approximately 8% in the east coast Vancouver Island licence area (Figure 1).
Once the Phase 2 fishery started, effort started to spread more evenly amongst the licence areas (with the exception of the west coast of Vancouver Island licence area).

![Graph showing number of commercial licences in each licence area from 2007 to 2014. NC = north coast licence area, CC = central coast licence area, ECVI = east coast of Vancouver Island licence area, WCVI = west coast of Vancouver Island licence area. The number of licences represents the share of the coastwide commercial TAC in each licence area.]

**Figure 1.** The number of commercial licences in each licence area from 2007 to 2014. NC = north coast licence area, CC = central coast licence area, ECVI = east coast of Vancouver Island licence area, WCVI = west coast of Vancouver Island licence area. The number of licences represents the share of the coastwide commercial TAC in each licence area.

14.3.1 Viability and Market Trends

The total allowable catch (TAC) remained relatively constant from 2006 to 2010 (Figure 2). In 2011, the TAC increased from approximately 1.2 million pounds (split) to 1.36 million pounds (split) due to an increase in quota made available from portions of coastline that have been reopened since 2008 (see section 2.4). As more portions of the coastline are reopened in the future, it is possible that the TAC could increase further, however this is unlikely in the next few years since the fishery is transitioning from an annual style fishery to a rotational style fishery.
**Figure 2.** Annual sea cucumber quota, landings (split lb.) and value for British Columbia, 1980 to 2014. Landings as reported on fish slips to 1994 and harvest logs 1995 to 2011; annual value calculated using harvest log landings and fish slip price per split pound. 2011 to 2014 values from the PSCHA (Ken Ridgway pers comm.).

Sea cucumber harvesters have reliable access to the resource, with a catch share of a fishery that has had a consistent TAC over many years. The price paid to harvesters for sea cucumber has more than doubled since 2008 from an average of $2.30 per split pound to an average of $5.00 per split pound in 2013. This increase in price reflects increased demand for BC sea cucumber in Asian markets.

Fleet-based financial modes using 2007 and 2009 data indicate that the sea cucumber fleet generates modest financial returns associated with the sea cucumber harvest. According to Nelson 2011, the average vessel generated an estimated $25,649 in earnings before interest, taxes, amortization and depreciation (EBITDA) from its sea cucumber harvest.

14.3.2 Processing & Exporting

Landed value does not reflect the total contribution of the sea cucumber fishery to the provincial economy. The processing and export of sea cucumbers landed in the province is another source of economic value. The wholesale value of sea cucumbers processed in BC in 2011 was $10.8 million, representing a value-added of $4.3 million over the landed value (BC YIR 2011).

Sea cucumbers are hand picked off the sea floor by SCUBA divers and brought to tender vessels. Once on the tender vessel, sea cucumbers are cut open longitudinally to remove water and viscera in a process called ‘splitting’. Sea cucumbers are landed in split form and therefore all landings are in split pounds and the commercial TAC is calculated in split pounds.

Sea cucumbers are processed into two products: frozen muscle strips and dried skin. The skin is semi-processed in plants where it is boiled, salted and then shipped to China where it is dried either outdoors or in drying machines. The meat is removed from the skin and then frozen and shipped to Asian markets.

China is the largest market for sea cucumber, where the skins (called trepang) have been used for centuries as a medicinal food. Many different species of sea cucumber from around the world compete with BC sea cucumber in Asian markets. The highest value species come from China and Japan. The domestic market for sea cucumber is small.

The 2008 processor employment survey found that sea food processing generated 4,176 person days of employment in that year. Of these, processing the wild shellfish harvest accounted for 13% of jobs (BC Ministry of Agriculture, 2011). A 2008 report linking seafood landings and processing employment found that sea cucumbers account for 8% of wild shellfish processing employment (Fraser, 2008), or 680 person-months of work.

15 MANAGEMENT ISSUES
The following emerging issues may impact the management measures in place for the sea cucumber fishery.

15.1 Conservation and Sustainability

15.1.1 Collection of Biological Information

The life history characteristics of importance to understanding the productivity of *Parastichopus californicus* are still largely unavailable and may lead to uncertainties in sea cucumber stock assessment. More research focusing on the life history, population dynamics and depth distribution of sea cucumbers is needed to better understand the effects of harvesting on sea cucumber populations.

15.1.2 Localized Over harvesting

The concentration of fishing effort in relatively small areas may lead to local depletion of sea cucumber stocks. The impact of localized depletions on sea cucumber populations, on the ecosystem in general, and the mechanisms involved in the re-establishment of populations are not well understood. However, repeated surveys in several locations has not shown detrimental effects on stocks from the annual harvesting that occurred during the Phase 1 fishery. In order to minimize the effects of localized over harvesting, managers may look at management measures to spread harvest effort amongst quota management areas.

15.1.3 Sea Otters

Sea otter populations are expanding in British Columbia and may become an issue in the management of the commercial fishery in the future. Sea cucumbers are not generally the preferred prey of sea otters but as other prey sources become scarce, it is likely that they will begin to target sea cucumber populations. A recent study done in Alaska showed that the long-term presence of sea otters resulted in an up to 100% decline in sea cucumber densities (Larson et al. 2013).

15.1.4 Quota Overages

Any quota taken above the TAC is a conservation concern. Quota overages over the amount permitted to a licence may be transferred to another licence up to a limit of 500 pounds. Overages that are not transferred to another licence are considered a Non-Transferable Overage (NTO) and the limit permitted is zero. The Department will be monitoring quota overages during the 2015 season and may pursue enforcement action for repeat violators.

15.1.5 Aquaculture

The practice of collecting wild-set juvenile sea cucumbers off of floating aquaculture gear (e.g. oyster strings) and growing them on tenures is a concern since potential impacts on wild stock and recruitment have not yet been assessed.
Stocking aquaculture sites with hatchery-raised juveniles raises additional questions for consideration. Sea cucumbers are a mobile species and wild individuals could be attracted to tenure sites to forage or for shelter. Since cultured sea cucumbers cannot be distinguished from wild sea cucumbers, wild animals may get harvested along with cultured animals and could lead to detrimental effects to wild populations around tenures. The department is in the process of drafting policy for sustainable sea cucumber aquaculture.

15.2 Social, Cultural and Economic

15.2.1 First Nations

Coastal First Nations may have an interest in economic opportunities from the sea cucumber resource through access to the wild commercial fishery.

Access to the wild commercial fishery is currently being addressed by two programs; the Allocation Transfer Program (ATP) and the Pacific Integrated Commercial Fishery Initiative (PICFI). The ATP and PICFI retire existing commercial licence eligibilities from fish harvesters on a voluntary basis and re-issue these to eligible First Nation organizations as communal commercial licences.

To date the ATP and PICFI programs have not acquired sea cucumber licences so there are no communal commercial licences. However, several First Nations organizations have regular commercial licences.

For more information on the Aboriginal Fisheries Strategy (AFS) and ATP, contact a resource manager listed in Appendix 15 or see the DFO website at:

www.pac.dfo-mpo.gc.ca/abor-autoc/index-eng.html

More information on the PICFI is available at:


15.2.2 Managing the Commercial Fishery to an Appropriate Scale

DFO works collaboratively with the PSCHA to make improvements to the management regime on an annual basis. For example, starting in 2008 large Quota Management Areas (QMAs) were split into multiple smaller QMAs in order to facilitate the start of a rotational fishery. Managers must consider several factors when determining the size of QMAs. They must be large enough that they are not too difficult to manage (i.e. ability to keep track of remaining quotas, hails, effort, etc.) and yet be small enough to spread effort over larger areas in order to minimize the effects of localized overharvesting. QMAs will likely continue to change as the fishery proceeds through the Adaptive Rotational Fishing Strategy.

15.2.3 Managing a Rotational Fishery
The 2011 season was the start of a three year rotational fishery in which different areas along the BC coast will be targeted in different years. There are both conservation and logistical advantages to a rotational harvest. Conservation advantages include a higher average animal weight and higher densities of spawning adults which would ultimately result in a higher number of sea cucumbers. Logistical advantages include concentrating harvest effort in smaller areas, reducing travel costs and reducing the cost of staffing multiple offloading ports.

The rotational fishery strategy will be adaptive since the process of reopening the sections of coastline that were closed for the Adaptive Management Plan is not complete. Harvest rate, licence distribution between licence areas, QMA size and order of QMA harvest will be examined prior to each new season.

15.2.4 Increase in the Number of Sea Cucumber Aquaculture Tenures

An increase to the number of sea cucumber aquaculture tenures licensed for sea cucumber will require consideration in the biomass and TAC estimates for the wild commercial fishery. Aquaculture tenures are considered private property and sea cucumber stocks that include both hatchery-raised and wild that cannot be distinguished from cultured on the tenure would be considered the property of the aquaculturist. If a large number of tenure sites are approved for sea cucumber aquaculture, there is potential for the wild fishery to be reduced in portions of the BC coast.

15.3 Compliance

15.3.1 Hail Notification Infractions

During the 2010 and 2011 seasons there were issues with certain vessels not giving adequate hail notification. This creates difficulties for managing the fishery and may result in quota overages. Hail notification infractions are reported to the Department by the sea cucumber service provider in incident reports and are considered a high priority for enforcement. The Department will be monitoring hail infractions during the 2015 season and may pursue enforcement action for repeat violators.

15.4 Ecosystem

15.4.1 Depleted Species Concerns

The sea cucumber fishery is a selective fishery and there are no concerns or potential impacts on depleted species.

In addition to the existing prohibitions under the Fisheries Act, under the SARA it is illegal to kill, harm, harass, capture, take, possess, collect, buy, sell or trade any listed endangered or threatened animal or any part or derivative of an individual. These prohibitions apply unless a person is authorized, by a permit, licence or other similar document issued in accordance with the SARA, to
engage in an activity affecting the listed species or the residences of its individuals. Species listed as special concern are not included in these prohibitions.

Endangered, threatened, and special concern species in Pacific region currently listed under the SARA can be found at:


### 15.5 Oceans and Habitat

In 1997, the Government of Canada enacted the *Oceans Act*. This legislation provides a foundation for an integrated and balanced national oceans policy framework supported by regional management and implementation strategies. In 2002, Canada’s Oceans Strategy was released to provide the policy framework and strategic approach for modern oceans management in estuarine, coastal, and marine ecosystems. As set out in the *Oceans Act*, the strategy is based on the three principles of sustainable development, integrated management, and the precautionary approach. The *Oceans Act*, the *Canada Wildlife Act* and the *National Marine Conservation Areas Act* have given rise to several initiatives on the BC Coast, which are listed below. As goals, objectives and management plans are finalized for these initiatives, the Department’s management of fisheries will be adapted as appropriate, in consultation with interested parties through Integrated Fisheries Management processes.

**Pacific North Coast Integrated Management Area (PNCIMA):** Ecologically, the PNCIMA boundary represents the Northern Shelf Bioregion of the Pacific Ocean. The boundary stretches from BC’s northern border with Alaska, south to Bute Inlet on the mainland, across to Campbell River on the east side of Vancouver Island and the Brooks Peninsula on the west side of Vancouver Island. As such, it encompasses close to 85% (of the commercial TAC) of the BC sea cucumber fishing area. An integrated management plan for the PNCIMA has been developed to help coordinate various ocean management processes and to complement and link existing processes and tools including IFMPs. The PNCIMA is one of five national Large Ocean Management Areas identified in Canada’s 2005 Oceans Action Plan, and the plan is the product of a collaborative process led through an oceans governance agreement between the Government of Canada, British Columbia and First Nations, and contributed to by a diverse group of organizations, stakeholders and interested parties. High level and strategic, the plan provides direction on and commitment to integrated, ecosystem-based and adaptive management of marine activities and resources in the planning area as opposed to detailed operational direction for management.

The plan outlines a framework for ecosystem-based management (EBM) for PNCIMA that includes assumptions, principles, goals, objectives and strategies. This EBM framework has been developed to be broadly applicable to managers, decision-makers, regulators, community members and resource users alike, as federal, provincial and First Nations governments, along with stakeholders, move together towards a more holistic and integrated approach to ocean use in the planning area.
Implementation of the plan is the shared responsibility of all signatories to the planning process and will be undertaken within existing programs and resources. An electronic copy of the draft plan is available online at [www.pncima.org](http://www.pncima.org).

**Marine Protected Areas (MPAs):** DFO is responsible for designating Marine Protected Areas (MPAs) under Canada’s *Oceans Act*. Under this authority, DFO has designated two MPAs in the Pacific Region, the Bowie Seamount and the Endeavour Hydrothermal Vents. Both areas are offshore and do not include sea cucumber fishing areas.

Work is also ongoing to designate the Hecate Strait and Queen Charlotte Sound Glass Sponge Reefs Area of Interest as a Marine Protected Area under the *Oceans Act*. The reefs are located at depths of 140m to 240 m in Hecate Strait and Queen Charlotte Sound. Changes to existing IFMPs with respect to fishing activities may be required upon MPA designation. In addition, DFO will produce a management plan for the MPA, and will seek to align the plan with relevant IFMPs.

More information on MPAs can be found at: [http://www.dfo-mpo.gc.ca/oceans/marineareas-zonesmarines/mpa-zpm/index-eng.htm](http://www.dfo-mpo.gc.ca/oceans/marineareas-zonesmarines/mpa-zpm/index-eng.htm)

**MPA Networks:** The *Oceans Act* mandates DFO with leading and coordinating the development and implementation of a national system (or network) of marine protected areas. The *National Framework for Canada's Network of Marine Protected Areas* provides strategic direction for the design of a national network of marine protected areas (MPAs) that will be composed of a number of bioregional networks. Consistent with this direction, a Canada-British Columbia Marine Protected Area Network Strategy has been developed jointly by federal and provincial agencies. This strategy reflects the need for governments to work together to achieve common marine protection and conservation goals. Bioregional marine protected area network planning will identify new areas of interest for protection by DFO, Parks Canada Agency, Environment Canada, the Province of BC, and any other agencies with a mandate for protecting marine spaces. Future network of MPAs may overlap or include sea cucumber fishing areas depending on the type and nature of the MPA. Design and implementation of an MPA Network in the Northern Shelf Bioregion (the boundary of which aligns with PNCIMA) is a key deliverable of the PNCIMA planning process, and collaborative development of a network is underway.

More information on integrated management planning, MPA Networks, and MPAs under Canada’s *Oceans Act* can be found at: [http://www.pac.dfo-mpo.gc.ca/oceans/index-eng.html](http://www.pac.dfo-mpo.gc.ca/oceans/index-eng.html)

**National Marine Conservation Areas (NMCAs):**

The Canada National Marine Conservation Areas Act provides for the establishment of National Marine Conservation Areas (NMCAs).

**Gwaii Haanas**
Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site (hereafter Gwaii Haanas) is a 5,000 km² land-and-sea protected area in the southern portion of Haida Gwaii (formerly the Queen Charlotte Islands), approximately 100 kilometres off the north coast of British Columbia. The Haida Nation declared the area a Haida Heritage Site in 1985. The terrestrial part of Gwaii Haanas was designated a National Park Reserve by the Government of Canada soon after, and the two parties have been managing the area cooperatively since 1993. In 2010, following an extensive public consultation process, the marine area of Gwaii Haanas was given the designation of National Marine Conservation Area Reserve.

Gwaii Haanas is managed by the Archipelago Management Board (AMB), a cooperative body made up of equal representation from the Government of Canada (represented by Fisheries and Oceans Canada and Parks Canada) and the Council of the Haida Nation. The Gwaii Haanas marine area is currently managed under the Interim Management Plan and Zoning Plan, which includes “balancing protection and ecologically sustainable use” in its guiding principles. The Zoning Plan identifies six areas, described below, that are closed to commercial and recreational fishing.

Development of a long-term management plan for the Gwaii Haanas marine area is underway and is scheduled to be completed in 2015. This process will take place in consultation with the commercial and recreational fishing sectors through Fisheries and Ocean’s established integrated fisheries planning and advisory processes. Annual fishing plans will be developed in consultation with stakeholders.

Users of the Gwaii Haanas marine area should be aware that adjacent land is managed under the authority of the Canada National Parks Act and its regulations and, as specified in the Gwaii Haanas Agreement (1993), there is "no extraction or harvesting by anyone of the resources of the lands and non-tidal waters of the Archipelago for or in support of commercial enterprise" (s3.3). There are specific requirements for visiting the terrestrial portion of Gwaii Haanas, and advanced planning is necessary. Please contact the Gwaii Haanas administration office at 1-877-559-8818 for further information.

In 2012, Canada and the Haida Nation agreed to a continued closure of the sea cucumber commercial fishery in Gwaii Haanas until a management plan is complete (scheduled for 2015). Scientific surveys and/or research may be permitted within Gwaii Haanas under the discretion of the AMB.

Commercial and recreational fishers and harvesters are reminded that extraction of any kind (e.g., fishing, kelp harvest) is not permitted in the following closures:

- Burnaby Narrows
- Louscoone Estuary
- Flamingo Estuary
- Gowgaia Estuary
- Cape St. James
- SGang Gwaay
These closures are described in detail in section 6 of Appendix 1.

**Southern Strait of Georgia**

Parks Canada, in partnership with the Government of British Columbia, launched a feasibility assessment for an NMCA reserve in the southern Strait of Georgia in 2004. Since then, consultations with First Nations, key stakeholders, communities and the public have occurred. Informed by those discussions, a proposed boundary for consultation was announced by the provincial and federal Ministers of Environment in 2011. Since 2011, the two governments have been consulting with First Nations, local governments and industry. A preliminary concept is currently being developed to help advance consultations on the feasibility assessment. If the results of the feasibility assessment indicate that establishment of an NMCAR is practical and feasible, an establishment agreement between the Governments of Canada and British Columbia will be negotiated and an interim management plan developed. If the NMCAR is determined to be feasible, further consultations related to establishment agreements and Aboriginal rights will also take place with First Nations. Commercial and recreational fishing sectors, communities, landowners, recreation and environmental organizations and other stakeholders will also have opportunities to provide input to the development of the interim management plan. More information on the proposed National Marine Conservation Area Reserve in the Southern Strait of Georgia is available on the internet at:


**Cold-Water Coral and Sponge Conservation Strategy:** DFO’s Pacific Region Cold-Water Coral and Sponge Conservation Strategy encompasses short and long-term goals and aims to promote the conservation, health and integrity of Canada’s Pacific Ocean cold-water coral and sponge species. The Strategy also takes into consideration the need to balance the protection of marine ecosystems with the maintenance of a prosperous economy. It was created with input from stakeholders throughout the Pacific Region and will help regional partners and stakeholders to understand how DFO’s existing programs and activities tie into cold-water coral and sponge conservation.

The Cold-Water Coral and Sponge Conservation Strategy is available on the internet at:


**Marine National Wildlife Areas:** Under the Canada Wildlife Act, Environment Canada may establish marine National Wildlife Areas (NWAs). The Scott Islands marine National Wildlife Area, located on off the northern tip of Vancouver Island, has been proposed for designation through amendment to the Wildlife Area Regulations. DFO would continue to regulate and
administer fisheries within the proposed area. Environment Canada and DFO will develop a collaborative approach and agreement regarding management of fisheries in the area.

15.6 Gear Impacts

Sea cucumber fishing occurs in rocky or soft bottom areas in less than 20 m depth by divers who hand pick sea cucumbers off the sea floor and place them into large mesh bags. The mesh bags are attached to lift bags or buoys that the diver will fill with air to lift the harvested sea cucumbers to the surface for pick up by the tender vessel. Gear impacts on the benthic environment are believed to be negligible, since sea cucumbers are picked by hand and there is no gear contact with the bottom. Sea cucumber harvest is too shallow to impact most coral and sponge species.

16 OBJECTIVES

Sections 5.1 to 5.3 outline the “longer term” objectives for this and other invertebrate fisheries in BC. Section 5.4 describes the species-specific and “shorter term” objectives for sea cucumber.

16.1 National

DFO aims to:

- Meet conservation objectives and ensure healthy and productive fisheries and ecosystems;
- Manage fisheries to provide opportunities for economic prosperity;
- Provide stability, transparency, and predictability in fisheries management and improved governance.

16.2 Pacific Region

In 1994, the Biological Objectives Working Group of the Pacific Scientific Advice Review Committee (PSARC) identified three biological objectives for management of Pacific Region fish and invertebrate stocks (Rice et al. 1995):

- Ensure that subpopulations over as broad a geographical and ecological range as possible do not become biologically threatened (in the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) sense of “threatened”).
- Operationally, the above objective requires at least that management allow enough spawners to survive, after accounting for all sources of mortality (including all fisheries and natural mortality), to ensure production of enough progeny that they will, themselves, be able to replace themselves when mature.
• Fisheries may have collateral effects on other species, mediated by the ecological relationships of the target species. Fisheries should be managed in ways that do not violate the above objectives for ecologically related species, as well as target species.

The objectives remain relevant today, particularly in light of development of the national objectives around sustainable fisheries.

16.3 Invertebrate Resource Management

Management goals and objectives have been defined for invertebrate fisheries in annual management plans produced by the Department since 1990. The management goals and objectives, as written by Invertebrate Fisheries Management and revised in 1997, are:

• To ensure conservation and protection of invertebrate stocks and their habitat through the application of scientific management principles applied in a risk averse and precautionary manner based on the best scientific advice available.

• To meet the federal Crown’s obligations regarding aboriginal fisheries for food, social and ceremonial purposes.

• To develop sustainable fisheries through partnership and co-management arrangements with client groups and stakeholders to share in decision making, responsibilities, costs, and benefits.

• To develop fishing plans and co-operative research programs which will contribute to improving the knowledge base and understanding of the resource.

• To consider the goals of stakeholders with respect to social, cultural and economic value of the fishery.

• To consider health and safety in the development and implementation of management plans, fishery openings and closures.

• To consider opportunity for the development of the aquaculture industry.

• To provide opportunities for a recreational fishery.

16.4 Sea Cucumber

16.4.1 Conservation and Sustainability

DFO’s species-specific objectives for the conservation and sustainability of sea cucumber stocks are:

• To conduct ongoing surveys and research to improve information on sea cucumber stocks, biological characteristics and impacts of the commercial fishery.
• To manage the commercial fishery to an appropriate scale in order to avoid any risks of localized over-harvesting.

• To place a limited number of commercial no-take reserves around the BC coast in order to help ensure that there are portions of the BC coast that will remain closed to commercial harvest.

• To track harvest information for all users. For the commercial fishery this will be accomplished through a Dockside Monitoring Program. There are currently no programs in place for tracking First Nations and recreational sector harvests.

• To conduct surveys of areas that were open during the Phase 1 fishery. Most of these areas have not been surveyed and their quotas are calculated using an estimated baseline density.

16.4.2 Social, Cultural and Economic
DFO’s objective is to continue to work collaboratively with the Sea Cucumber Sectoral Committee to ensure sustainable fisheries and to collect input from all fishing sectors in the annual development of the IFMP.

Commercial Fishery: DFO’s objective is to continue to work collaboratively with the commercial industry on sustainable resource use and long-term economic viability of the sea cucumber seafood industry recognizing that commercial fisheries play a vital role in the Canada’s economy. This will include adapting to changing resource and market conditions and extracting optimal value from world markets.

Vessel safety is an objective shared between DFO, Transport Canada, Transportation Safety Board, and WorkSafeBC (Appendix 10). All parties acknowledge the role of vessel masters and crew in responsibility for their own decisions regarding fishing vessel operations. DFO’s objective, in conjunction with other responsible agencies, is to adopt an affirmative action profile in respect of vessel safety considerations.

First Nations involvement in the commercial fishery is a shared goal between DFO and First Nations people. First Nation participation in the commercial fisheries is being addressed through the ATP and PICFI (Section 3.1).

First Nations Fishery: DFO’s objective is to continue to provide opportunities for First Nations to harvest fish for food, social and ceremonial purposes, in a manner consistent with the decision of the Supreme Court of Canada in the Sparrow Decision, and other court decisions. For more information, see Appendix 2 or the Internet at:

www.pac.dfo-mpo.gc.ca/abor-autoc/index-eng.html

It is an objective to provide DFO treaty negotiators and First Nations with fishery related information in support of treaty negotiations, expeditiously.
**Recreational Fishery:** DFO’s objective is to affirm the social and economic importance of the recreational fishery, provide sustainable recreational harvesting opportunities as part of integrated management plans consistent with DFO’s policies, to create environments within the advisory process in which recreational fishing representatives are welcome to express their concerns and opinions at the table, and to establish working mechanisms in conjunction with the other fishing sectors to reduce conflict and mitigate issues.

Recreational fisheries in the Pacific Region are also guided by ‘A Vision for Recreational Fisheries in British Columbia’ developed cooperatively by DFO, the Province of BC and the Sport Fish Advisory Board (SFAB). The recreational fisheries Vision is available at:


The document ‘Recreational Fisheries in Canada. An Operational Policy Framework’ may be requested from any fishery manager listed in this plan.

16.4.3 Compliance

DFO’s objective is to pursue opportunities to monitor and enforce the sea cucumber fishery, in conjunction with the monitoring and enforcement priorities in the Pacific Region. For more information please see the sea cucumber compliance plan in section 9.

17 **ACCESS AND ALLOCATION**

The Minister can, for reasons of conservation or for any other valid reasons, modify access, allocations, and sharing arrangements as outlined in this IFMP in accordance with the powers granted pursuant to the *Fisheries Act*.

17.1 First Nations

To date no limits have been placed on First Nations’ harvest for food, social and ceremonial purposes. Sea cucumbers may be allocated under treaty, but were unallocated under the Maa-nulth, Tsawassen and Nisga’a Treaties. Under the Individual Quota (IQ) program, two percent of the coastwide TAC is reserved, for planning purposes, for First Nations fisheries for food, social and ceremonial purposes. The amount of sea cucumbers harvested for FSC purposes coastwide is unknown. See Appendix 2.

17.2 Recreational

The daily limit for sea cucumbers is 12 with a possession limit of 24. Gear is limited to handpicking and diving.

17.3 Commercial

The commercial fishery is managed using a total allowable catch, limited entry licensing, individual quotas, area licensing, area quotas and a precautionary harvest rate. For more information please see
Appendix 6. All sea cucumber harvested commercially is monitored through a Dockside Monitoring Program.

17.4 Aquaculture and Enhancement

The first priority in managing fish stocks is conservation, followed by First Nations obligations. Beyond that, the needs of aquaculturalists will be given equitable consideration to those of other users in the commercial and recreational sectors.

17.5 Experimental, Scientific, Educational or Public Display

DFO supports and facilitates scientific investigations related to sea cucumbers. Scientific licence requests received from scientific, educational and public display institutions, including biological collecting firms, are considered. Existing policies with respect to scientific licences and the Larocque court decision apply.

17.6 Request for Access

From time to time, DFO receives requests from First Nations to improve access to shellfish for FSC purposes. First Nations interested in bilateral discussion with DFO regarding FSC access issues should contact the resource manager for their area (see Contacts in Appendix 15).

18 MANAGEMENT MEASURES FOR THE DURATION OF THE PLAN

See the Commercial, Recreational and First Nations Harvest Plans, Appendices 1 to 3 for detail on the following:

- Total Allowable Catch (TAC), Individual Quotas (IQ);
- Fishing Season/Areas;
- Control and Monitoring of Removals
- Licensing

19 SHARED STEWARDSHIP ARRANGEMENTS

19.1 Commercial Fishery

A collaborative agreement is typically developed that details the working relationship between the Department and the Pacific Sea Cucumber Harvesters Association (PSCHA). This agreement typically includes an annual work plan of activities related to the commercial sea cucumber fishery that are to be accomplished by both parties and the annual financial contributions of each party to the sea cucumber science, management and enforcement programs.
The total cost for the Department to manage the sea cucumber fishery is estimated to be $278,000. PSCHA funded projects identified in the agreement include undertaking surveys for stock assessment purposes and a coastwide dockside monitoring program. The total cost to the PSCHA to undertake surveys for stock assessment and a coastwide dockside monitoring program in 2014 was estimated at approximately $261,000.

Several coastal First Nations contribute time and expertise through collaborative research surveys with PSCHA and the Department by providing biologists, vessels, and divers.

19.2 Fisheries and Oceans Canada

Two Stock Assessment and two Resource Management personnel are directly involved in this fishery. Contributions to the IFMP are provided by the Fisheries Management Directorate, the Science Branch, the Shellfish Data Unit, the Conservation and Protection Directorate, the Pacific Fishery Licence Unit, the Treaty and Aboriginal Policy Directorate, the Recreational Fisheries Division, the Oceans Directorate and numerous administrative personnel. Generally, all personnel are multi-tasked, i.e. fishery managers work on all dive fisheries.

20 COMPLIANCE PLAN

General information about the Conservation and Protection (C&P) program is available at:
www.dfo-mpo.gc.ca/fm-gp/enf-loi/index-eng.htm

C&P staff will pursue opportunities to monitor and enforce this fishery, in conjunction with the monitoring and enforcement priorities directed by senior managers in the Pacific Region.

Users of the resource have a responsibility to report violations. Any suspected or actual fisheries, wildlife or pollution violations can be quickly and discretely reported to the appropriate enforcement officer by using the toll free observe, record and report hotline. This toll free number is available 24 hours a day.

OBSERVE, RECORD AND REPORT 1-800-465-4DFO (1-800-465-4336)

Enforcement enquiries can also be directed to the local field offices during regular office hours.

20.1 Enforcement Issues and Strategies

Enforcement of the sea cucumber fishery will be tempered by commitments to higher priority issues, such as species at risk, the Canadian Shellfish Sanitation Program and fisheries that have conservation concerns. C&P staff will pursue opportunities to monitor and enforce issues and problems related to the fishery in conjunction with the monitoring and enforcement activities dedicated to the identified priority fisheries in the Pacific Region.
Dockside validation is a key component of the management of the fishery. C&P supports dockside validation by inspecting offloads and monitoring offloading practices.

Air surveillance resources will be utilized to patrol boundaries and conduct gear and vessel counts. Charter aircraft as well as DFO aircraft may be utilized for these activities.

Underwater harvest activity is observed by fishery officers trained in the use of SCUBA. On dive patrols fishery officers check for the harvest of prohibited species and for incidences of dumped product.

C&P strives to meet with First Nations groups to build relationships. Fishery Guardians are integral to this process and are very important to our enforcement program. C&P conducts joint patrols of First Nations fisheries and strives to complete enforcement protocols to better define our working relationship.

In the following table: PFR: Pacific Fisheries Regulations, 1993, F(G)R: Fisheries (General) Regulations, S: Section.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Section</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensing Verification</td>
<td></td>
<td>At-sea and dockside inspections will occur when opportunities exist. These inspections may include checks of all licensing documents on board the vessel to ensure compliance with the regulations.</td>
</tr>
<tr>
<td>• Vessel licensed.</td>
<td>PFR S.22</td>
<td></td>
</tr>
<tr>
<td>• Experimental licence.</td>
<td>F(G)R S.52</td>
<td></td>
</tr>
<tr>
<td>• No Fisher Registration Card (FRC).</td>
<td>F(G)R S.68(1)</td>
<td></td>
</tr>
<tr>
<td>• Fail to produce FRC.</td>
<td>PFR S.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F(G)R S.11</td>
<td></td>
</tr>
<tr>
<td>Issue</td>
<td>Section</td>
<td>Strategy</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Fishing during closed time/area.</td>
<td>PFR S.63</td>
<td>Patrols utilizing patrol vessels will be pursued when opportunities exist. Possibilities may exist to use the regional enforcement charter aircraft in co-ordination with other patrols scheduled for priority fisheries.</td>
</tr>
<tr>
<td>Fail to provide proper landing and hail information, lack of notification for change of area, cancellation of trip, or incorrect reporting of area fished.</td>
<td>F(G)R S.22(7)</td>
<td>At sea and dockside inspections will occur when opportunities exist. Investigations will occur on an opportunistic basis after C&amp;P have been notified by fisheries management that a violation has occurred. The investigation will be pursued when larger priorities permit. Possibilities may exist to use the regional enforcement charter aircraft in co-ordination with other patrols scheduled for priority fisheries, to track vessels in the fishery.</td>
</tr>
<tr>
<td>Fail to maintain a Validation &amp; Harvest Logbook.</td>
<td>F(G)R S.22(7)</td>
<td>At sea and dockside inspections will occur when opportunities exist. Investigations may also occur on an opportunistic basis after C&amp;P have been notified by fisheries management that a violation has occurred. The investigation will be pursued when larger priorities permit.</td>
</tr>
<tr>
<td>Marking and tagging of pick bags, and any other type of enclosures containing harvested sea cucumbers.</td>
<td>F(G)R S.22(7)</td>
<td>At sea and dockside inspections will occur when opportunities exist.</td>
</tr>
<tr>
<td>Landings validated at time of offloading.</td>
<td>F(G)R S.22(7)</td>
<td>Dockside inspections and monitoring will be pursued when opportunities exist.</td>
</tr>
</tbody>
</table>

## 21 PERFORMANCE REVIEW

Performance indicators are reported in the Post-Season Review (Appendix 5)

### 21.1 Stock Assessment and Research
Stock Assessment activities undertaken during the 2014/15 season will be outlined.

21.2 First Nations Fishery

The post season review may include outcomes of meetings with First Nations on specific issues, and sea cucumber information contributing to, or resulting from the treaty process.

21.3 Recreational Fishery

The post season review may include interactions with the recreational fishing representatives of the SFAB. Any recommendations and action taken in response by DFO will be described.

21.4 Commercial Fishery

The delivery of the commercial fishery will be assessed by performance measures including the number of vessels participating in the fishery, the number of licence eligibilities fished, the amount of sea cucumbers landed and the value of the fishery. Input from representatives at the Sea Cucumber Sectoral Committee meetings will also be included.

21.5 Compliance

The post season review will include time spent attending to enforcement of the fishery. It should be noted that low numbers of violations may be indicative of a successful proactive program, establishing a visible presence of enforcement authority as a deterrent to non-compliance.

22 REFERENCES


Front cover drawing is from Royal B.C. Handbook on Sea Cucumbers by Philip Lambert.

23 GLOSSARY
AAROM  
Aboriginal Aquatic Resources and Oceans Management (AAROM) program - DFO’s AAROM funds aggregations of First Nation groups to build the capacity required to coordinate fishery planning and program initiatives and is focused on developing affiliations between First Nations to work together at a broad watershed or ecosystem level where there are common interests and where decisions and solutions can be based on integrated knowledge of several Aboriginal communities.

Aboriginal Traditional Knowledge (ATK)  
Knowledge that is held by, and unique to Aboriginal peoples. It is a living body of knowledge that is cumulative and dynamic and adapted over time to reflect changes in the social, economic, environmental, spiritual, and political spheres of the Aboriginal knowledge holders. It often includes knowledge about the land and its resources, spiritual beliefs, language, mythology, culture, laws, customs and medicines.

AFS  
Aboriginal Fisheries Strategy - DFO’s AFS was implemented in 1992 to address several objectives related to First Nations and their access to the fisheries resource and continues to be the principal mechanism that supports the development of relationships with First Nations including consultation, planning and implementation of fisheries, and development of capacity to undertake fisheries management, stock assessment, enhancement and habitat protection programs.

Area  
Defined in Section 2 of the Pacific Fishery Management Area Regulations. A map of Pacific Fishery Management Areas is available on the Department’s Internet site at:  

aquaculture  
As defined by the United Nations Food and Agriculture Organization (FAO), aquaculture is the culture of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants. Aquaculture implies some form of intervention in the rearing process to increase production, such as regular stocking, feeding, protection from predators, etc. It also implies individual or corporate ownership of the cultivated stock.

catch verification program  
A program designed to monitor, record, and verify catches, also called the Validation Program or Dockside Monitoring Program.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communal Licence</td>
<td>Issued to First Nations organizations pursuant to the <em>Aboriginal Communal Fishing Licences Regulations</em>, to carry on fishing and related activities.</td>
</tr>
<tr>
<td>Communal commercial licence</td>
<td>Issued to First Nations organizations pursuant to the <em>Aboriginal Communal Fishing Licences Regulations</em> for participation in the general commercial fishery. Licences issued are equivalent to the capacity of licences that have been retired under the Treaty and Aboriginal Policy Directorate Licence Retirement/Allocation Transfer Program.</td>
</tr>
<tr>
<td>Centre for Scientific Advice – Pacific (CSAP)</td>
<td>Centre for Scientific Advice - Pacific (formerly, Pacific Scientific Advice Review Committee), chaired by DFO and including other federal and provincial government agency representatives and external participants.</td>
</tr>
<tr>
<td>Canadian Science Advisory Secretariat (CSAS)</td>
<td>Canadian Science Advisory Secretariat - coordinates the peer review of scientific issues for Fisheries &amp; Oceans Canada. The different Regions of Canada conduct their resource assessment reviews independently, tailored to regional characteristics and stakeholder needs. CSAS facilitates these regional processes, fostering national standards of excellence, and exchange and innovation in methodology, interpretation, and insight.</td>
</tr>
<tr>
<td>DFO</td>
<td>Fisheries &amp; Oceans Canada. On behalf of the Government of Canada, DFO is responsible for developing and implementing policies and programs in support of Canada’s scientific, ecological, social and economic interests in oceans and fresh waters.</td>
</tr>
<tr>
<td>enhancement</td>
<td>Adding to (enhancing) the biomass of a species in the wild by spawning and growing juvenile animals, subsequently releasing them to their natural habitat for further growth. Usually requires little or no further intervention after release.</td>
</tr>
<tr>
<td>Food, Social and Ceremonial (FSC)</td>
<td>A fishery conducted by First Nations for food, social and ceremonial purposes.</td>
</tr>
<tr>
<td>IFMP</td>
<td>Integrated Fisheries Management Plan.</td>
</tr>
<tr>
<td>IQ</td>
<td>Individual quota. In the sea cucumber fishery IQs are set at 1/85 of the commercial TAC.</td>
</tr>
<tr>
<td>invertebrate</td>
<td>An animal without a backbone.</td>
</tr>
</tbody>
</table>
landed or off-loaded

The transfer of sea cucumbers from a vessel in water to land.

Landed value

Value of the product when landed by a licensed fishing vessel.

Landings

Quantity of a species caught and landed.

Observer

An individual who has been designated as an observer by the Regional Director General for Pacific Region pursuant to Section 39 of the *Fishery (General) Regulations*.

PICFI

Pacific Integrated Commercial Fisheries Initiative - DFO’s PICFI is an initiative aimed at achieving environmentally sustainable and economically viable commercial fisheries, where conservation is the first priority and First Nations’ aspirations to be more involved are supported.

Precautionary Approach (PA)

In resource management, the PA is, in general, about being cautious when scientific information is uncertain, unreliable or inadequate and not using the absence of adequate scientific information as a reason to postpone or fail to take action to avoid serious harm to the resource. Information on the adoption of a PA framework for fisheries management in Canada is available at: [www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm](http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm)

PSCHA

Pacific Sea Cucumber Harvesters Association

PSARC

Pacific Scientific Advice Review Committee (now called CSAP).

Quota Management Area

A defined portion of Pacific fisheries waters. Areas and Subareas, as described in the *Pacific Fishery Management Area Regulations*, are referenced in describing Quota Management Areas (QMA). Each QMA has a name, e.g. 4A West Dundas, and is assigned a maximum allowable catch in pounds (lb.).

service provider

An agency contracted by fish harvesters or their harvesters association to coordinate notification, catch validation, fishery monitoring, biological sampling, and data submission requirements. The service provider may train and recommend candidates for certification by Fisheries and Oceans Canada as observers.
<table>
<thead>
<tr>
<th><strong>SFAB</strong></th>
<th>Sports Fishing Advisory Board, which provides advice to DFO on matters of recreational (sport) fishing.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>stakeholder</strong></td>
<td>All people and groups with an interest in the fisheries resource.</td>
</tr>
<tr>
<td><strong>stock assessment</strong></td>
<td>Results of analyses of fisheries and research data used to evaluate the effects of fishing on a stock or population and to predict the reaction of populations to alternative management choices.</td>
</tr>
<tr>
<td><strong>Subarea</strong></td>
<td>As in Section 2 of the <em>Pacific Fishery Management Area Regulations</em></td>
</tr>
<tr>
<td><strong>TAC</strong></td>
<td>Total allowable catch. The amount of catch that may be taken from a stock, determined by analytical procedures to achieve management objectives.</td>
</tr>
<tr>
<td><strong>Traditional Ecological Knowledge (TEK)</strong></td>
<td>A cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.</td>
</tr>
<tr>
<td><strong>Tranship</strong></td>
<td>The transfer of sea cucumbers from a vessel to another vessel.</td>
</tr>
<tr>
<td><strong>Validated</strong></td>
<td>Sea cucumbers that have been weighed by an observer and the weight entered into the sea cucumber Validation and Harvest Logbook, or an approved alternative log.</td>
</tr>
</tbody>
</table>