

# BEAUFORT SEA INTEGRATED FISHERIES MANAGEMENT FRAMEWORK FOR THE INUVIALUIT SETTLEMENT REGION, CANADA



**Beaufort Sea**





**Beaufort Sea**  
**Integrated Fisheries Management Framework**  
**for the**  
**Inuvialuit Settlement Region**  
**Canada**

**Fisheries and Oceans Canada, Fisheries Joint Management  
Committee, Inuvialuit Game Council, and Inuvialuit Regional  
Corporation**

**2014**

## **Acknowledgements**

First and foremost, the communities and Hunters and Trappers Committees of the Inuvialuit Settlement Region must be praised for their collective wisdom and foresight in calling for the Beaufort Sea Integrated Fisheries Management Framework. The Fisheries Joint Management Committee, Inuvialuit Game Council, Inuvialuit Regional Corporation, and Fisheries and Oceans Canada provided exceptional leadership throughout the process, which ensured this plan addressed the original concerns and interests of the Inuvialuit and was completed in a timely fashion. Fisheries and Oceans Canada Oceans and Science staff also provided critical information and advice during the development and review of this Framework.

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## FOREWORD

The Steering Committee for the Beaufort Sea Integrated Fisheries Management Framework (BSIFMF) is pleased to present this report. The BSIFMF represents the culmination of a process that was agreed to in 2011 by a Memorandum of Understanding between the Fisheries Joint Management Committee, Fisheries and Oceans Canada, the Inuvialuit Game Council, and the Inuvialuit Regional Corporation. It specifically addresses the inputs of the six Inuvialuit Settlement Region communities in relation to their concerns about potential large-scale commercial fisheries development within the Inuvialuit Settlement Region.

The BSIFMF is not legally binding and it cannot form the basis of a legal challenge. It can be modified at any time and does not fetter the Minister of Fisheries and Oceans' 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 BSIFMF in accordance with the powers granted pursuant to the *Fisheries Act* and consistent with the provisions of the Inuvialuit Final Agreement.

The BSIFMF should be read in the context of pertinent legislation, including the Inuvialuit Final Agreement, *Fisheries Act*, *Oceans Act*, and the federal *Species at Risk Act*, and relevant Fisheries and Oceans Canada policies. It is a living document that can be amended at any time if a request is submitted and agreed to by the signatories after meetings with appropriate stakeholders.

Fisheries and Oceans Canada is responsible for implementing fisheries-related obligations under Canadian land claims agreements, and is the responsible regulatory agency for commercial fisheries licensing. The BSIFMF will be implemented in a manner consistent with these obligations and responsibilities. As the Canadian Beaufort Sea is within the Inuvialuit Settlement Region, Fisheries and Oceans Canada is responsible for implementing the BSIFMF in a manner consistent with obligations under the Inuvialuit Final Agreement. In the event that the BSIFMF is inconsistent with obligations under the Inuvialuit Final Agreement, the provisions of the Inuvialuit Final Agreement will prevail to the extent of the inconsistency.

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## Introduction

In April 2011, Fisheries and Oceans Canada (DFO)<sup>1</sup>, the Fisheries Joint Management Committee (FJMC), the Inuvialuit Game Council (IGC), and the Inuvialuit Regional Corporation (IRC) signed a Memorandum of Understanding (MOU) to develop the Beaufort Sea Integrated Fisheries Management Framework (BSIFMF). This MOU represents a commitment from the Parties to work together to ensure sustainable management and orderly use of current and future fisheries and fish stocks within the marine waters of the Inuvialuit Settlement Region (ISR; Fig. 1).

The MOU and the supporting Framework recognize that the fish and marine mammal resources of the Beaufort Sea are vital to the residents and beneficiaries of the ISR. All regional cooperating management agencies have an interest in ensuring the sustainability of those resources for current and future use by the Inuvialuit and Canadians. The Government of Canada and the Inuvialuit, through an adaptive co-management process, will implement the Framework within the context of pertinent legislation: the Inuvialuit Final Agreement (IFA), *Fisheries Act*, *Oceans Act*, federal *Species at Risk Act* (SARA), and any other applicable legislation, regulations, or policies. The BSIFMF also includes a mechanism for provision of advice and recommendations to the Minister of Fisheries and Oceans and others with responsibilities related to fish and fisheries of the Canadian Beaufort Sea.

The BSIFMF outlines supporting information, strategies, and recommended actions that empower the co-management regime created pursuant to the IFA, enhance conservation practices for sustainable use of marine and coastal fisheries resources, and support Inuvialuit rights and economic opportunities related to the Beaufort Sea. An initial list of potential stressors or threats to Beaufort Sea fisheries resources includes, but is not limited to: (1) commercial fishing, (2) oil and gas development, (3) shipping, (4) aquatic invasive species, (5) contaminants, and (6) other climate-change-related stressors.

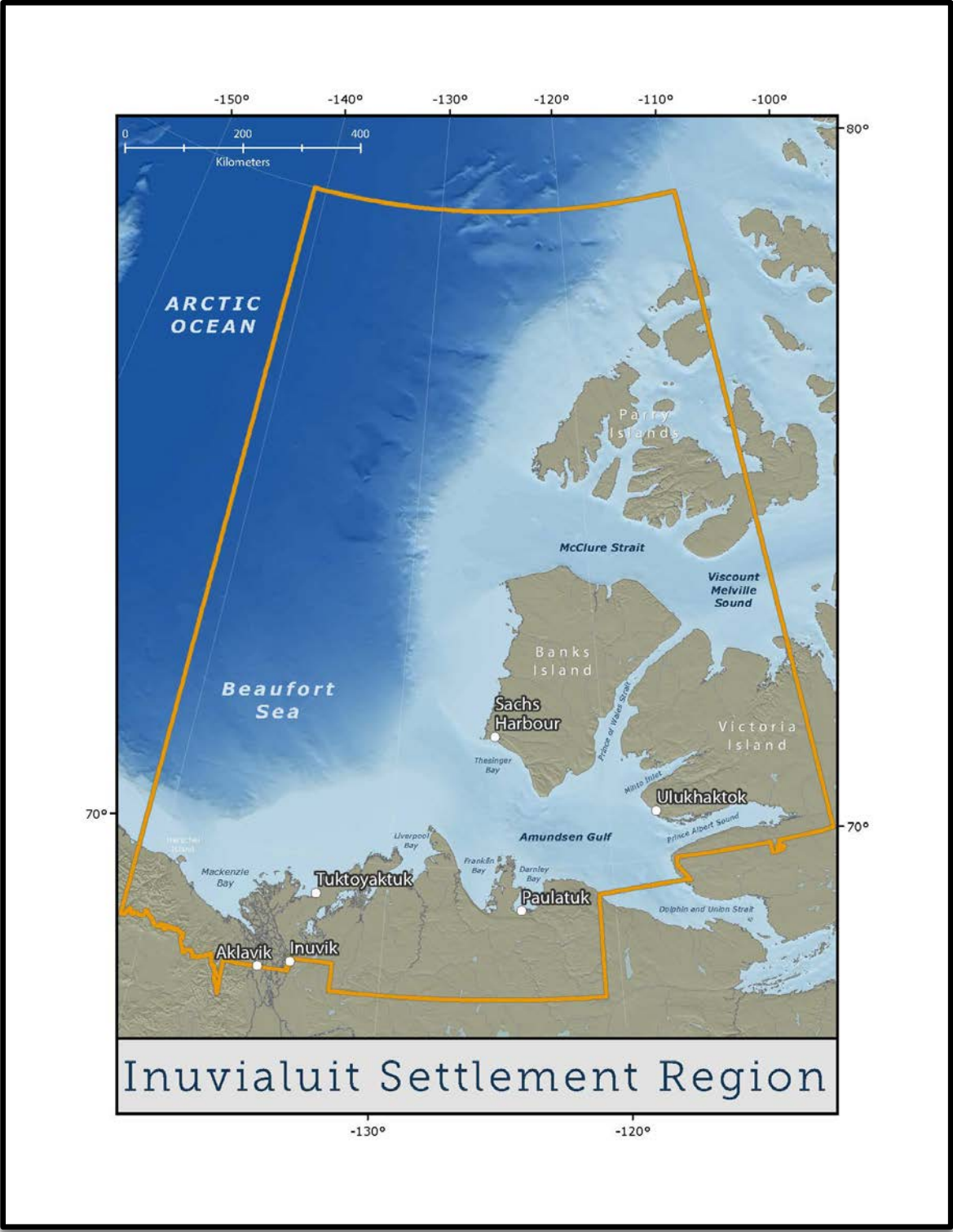
Currently, the BSIFMF only includes a management process to address the commercial fishing stressor. This action was triggered by the specific concern, raised by the Hunters and Trappers Committees (HTCs) of the ISR in 2008, related to increased interest in large-scale commercial fisheries development and conservation initiatives related to commercial fishing in the adjacent waters of the Alaskan Beaufort Sea. However, the intent of the MOU situates these concerns within the broader context of stressors that could affect the health and sustainability of regional marine mammal habitats and stocks. This targeted approach to achieving ecosystem-based management and sustainable development was first outlined at the 2<sup>nd</sup> Marine Conservation Congress in 2011 in Victoria, British Columbia, by the FJMC.

Future trigger events may create the need for the BSIFMF to address additional stressors beyond commercial fishing. At that time, the Parties will convene to determine what type of management tool is warranted. The decision-key process, the management tool designed to

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<sup>1</sup> See Appendix A for a list of acronyms used in this report.

Figure 1: Inuvialuit Settlement Region.



address the commercial fisheries stressor (outlined in Section 2) may, through augmentation, be considered appropriate. Conversely, a new action mechanism may be prudent. To date, the process employed to create the BSIFMF and the decision key for addressing commercial fishing was completed through a steering committee and a working group selected by the Parties to the MOU.

The balance of the BSIFMF unfolds as follows. Section 1 provides a brief overview of the current stressors facing the fisheries resources of the Beaufort Sea. Section 2 describes the legal, policy, and management contexts for the management of Beaufort Sea fisheries. Section 3 summarizes existing scientific information related to the fisheries resources of the Beaufort Sea. Section 4 outlines the framework for managing Beaufort Sea fisheries and fish stocks. Section 5 presents the decision-key process. Section 6 outlines annual performance reviews and modifications.

## **Section 1: Statement of Current Ecosystem-Level Stressors**

The long-term health of regional fishery resources stand to be affected by one or more of the following ecosystem-level stressors: (1) commercial fishing, (2) oil and gas development, (3) shipping, (4) aquatic invasive species, (5) contaminants, and (6) other climate-change-related stressors. This list was developed from the collective comments of the ISR communities, Inuvialuit organizations created pursuant to the IFA, and through consultations with relevant scientific and management agencies. It is not comprehensive and may change over time. The Parties will use this suite of stressors to ensure that future activities under the BSIFMF represent local, regional, and national priorities. The process for modification or expansion of the BSIFMF is outlined in Section 5.

### **Commercial Fishing and Fisheries**

The interest in commercially harvesting Arctic fish and invertebrate stocks has increased as a consequence of reduced seasonal ice cover. Future economic opportunities may become viable should new, commercially viable fish stocks move into the Canadian Beaufort Sea. Fishing affects the ecosystem by removing target and by-catch species, and can affect the overall structure and productivity of an ecosystem. Bottom contact gear can affect benthic productivity and benthos depending on a number of factors including the gear configuration and the sensitivity and resilience of the bottom feature or other ecosystem component to the specific gear. Of particular concern is the effect new fisheries could have on Arctic cod (*Boreogadus saida*), a key prey species of beluga whale (*Delphinapterus leucas*), ringed seal (*Pusa hispida*), and Arctic char (*Salvelinus alpinus*). World-wide commercial fishing pressures and trends illustrate increasing demand for seafood, illegal, unreported and unregulated fishing, and new fishing technologies that catch larger quantities of fish, all of which could have adverse effects on the Beaufort Sea ecosystem, its fishery resources, and the people who depend on those resources. Neighbouring jurisdictions such as the USA have taken precautionary planning measures by establishing an Arctic Fisheries Management Plan in 2009 (see Section 2: International Context).

## **Offshore Oil and Gas Development**

Over the past 50 years, oil and gas development in the ISR has been marked by discrete periods of heightened interest and development, and then relative disinterest. Historically, 144 wells have been drilled in the Beaufort Sea (Beaufort Sea Steering Committee 1991). Hydrocarbon production and pipeline construction are possible in the future. Concern remains high regarding the possibility of, and consequences from, an oil spill in the marine environment. Impacts on the marine resources of the Beaufort Sea could be significant and detrimental. Other potential effects include introduction of contaminants through ongoing exploration, impact of seismic operations on fish and marine mammals, alteration of benthic habitats through construction of platforms or pipelines, and disturbance of fishery resources and fishing through associated shipping activities.

## **Commercial Shipping**

Commercial shipping, specifically destination shipping, is expected to increase as the extent of summer sea ice continues its downward trend in the Canadian Beaufort Sea. The Canadian Beaufort Sea is a strategic shipping corridor and part of the Northwest Passage. Increased destination shipping will accompany new oil and gas, mining, and other infrastructure developments across Canada's north within the next decade. Possible spills of fuel or other contaminants from vessels are potential threats to the ecosystem and its marine fishery resources. The presence of vessels and the introduction of vessel noise into the environment could interfere with marine mammals and fishing activities.

## **Aquatic Invasive Species**

Aquatic invasive species may be introduced into the Beaufort Sea as a result of shipping activities or climate change. Such species may affect the Beaufort Sea ecosystem by replacing existing fishery resources, altering the links within the ecosystem, and could introduce pathogens, parasites, competitors, and predators to fishes, invertebrates, and marine mammals.

## **Contaminants**

Contaminants occur in the Beaufort Sea as a result of local activities, discharge from the Mackenzie River (and other rivers), oceanic waters, and from atmospheric deposition. Levels of contaminants in marine fishes and invertebrates are not well known.

## **Climate Change**

Climate change is occurring but its effects on the Beaufort Sea ecosystem and its fishery resources are uncertain. Climate change is projected to decrease the extent and duration of sea ice cover, making the Beaufort Sea more accessible to offshore fishing. Other potential physical changes include enhanced upwelling (currently ice cover restricts mixing), changing wind patterns, coastal erosion, and change in river flows, especially of the Mackenzie River. Although reduced sea ice will decrease productivity contributed by the epontic community, climate change is projected to slowly increase overall productivity as a result of longer and warmer growing

seasons, and to alter the occurrence, distribution and productivity of marine fish and invertebrates. Other possible biological effects include disruptions to links in the food web and the loss of, or change in, timing of environmental signals for key life-history events, especially for anadromous and migratory species.

## Section 2: Context for the Management of Beaufort Sea Fisheries

This section outlines information on five topics relevant to fishery management in the coastal and marine waters of the ISR. It begins by outlining the current international Arctic fisheries management context, including international treaties, laws, and agreements. Then, it provides a high-level overview of the national legislative and policy framework for managing fisheries in Canada, including the *Fisheries Act*, *Oceans Act*, *SARA*, and relevant policies of DFO that comprise the Sustainable Fisheries Framework. Next, it outlines the legal responsibilities established pursuant to the IFA, including responsibilities of the FJMC, IGC, IRC/Inuvialuit Development Corporation (IDC), and HTCs. It continues by describing the main features of the Beaufort Sea Integrated Ocean Management Plan (IOMP) and the Tarium Niryutait Marine Protected Area (TNMPA). The section finishes by summarizing the economic and socio-cultural importance of coastal and marine fisheries.

### International Context

Global cooperation through the United Nations has resulted in the development of five core agreements that form the foundation of international fishery governance.<sup>2</sup> The United Nations Convention on the Law of the Sea (UNCLOS 1982) created jurisdiction and governance parameters through the creation of Exclusive Economic Zones (EEZs). An EEZ extends for 200 nautical miles from a country's coast. Second, the United Nations Agreement on Straddling and Highly Migratory Fish Stocks provides the framework for the conservation and management of fish stocks in high-seas areas by creating Regional Fisheries Management Organizations (RFMOs). International Arctic waters are not covered by a RFMO, except for a small part of the Barents Sea (Fig. 3).<sup>3</sup> Last, the Code of Conduct for Responsible Fisheries, the International Plan of Action for the Management of Fishing Capacity, and the International Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported, and Unregulated Fishing provide voluntary guidelines on by-catch and discards.

The Canadian Beaufort Sea abuts USA and international waters and shares many ecosystem features and marine species such as stocks of anadromous fishes, marine mammals, marine fish, and invertebrates. No bilateral arrangements exist between Canada and the USA for anadromous and marine fishery resources. However, the USA and Canada have signed a MOU for the south

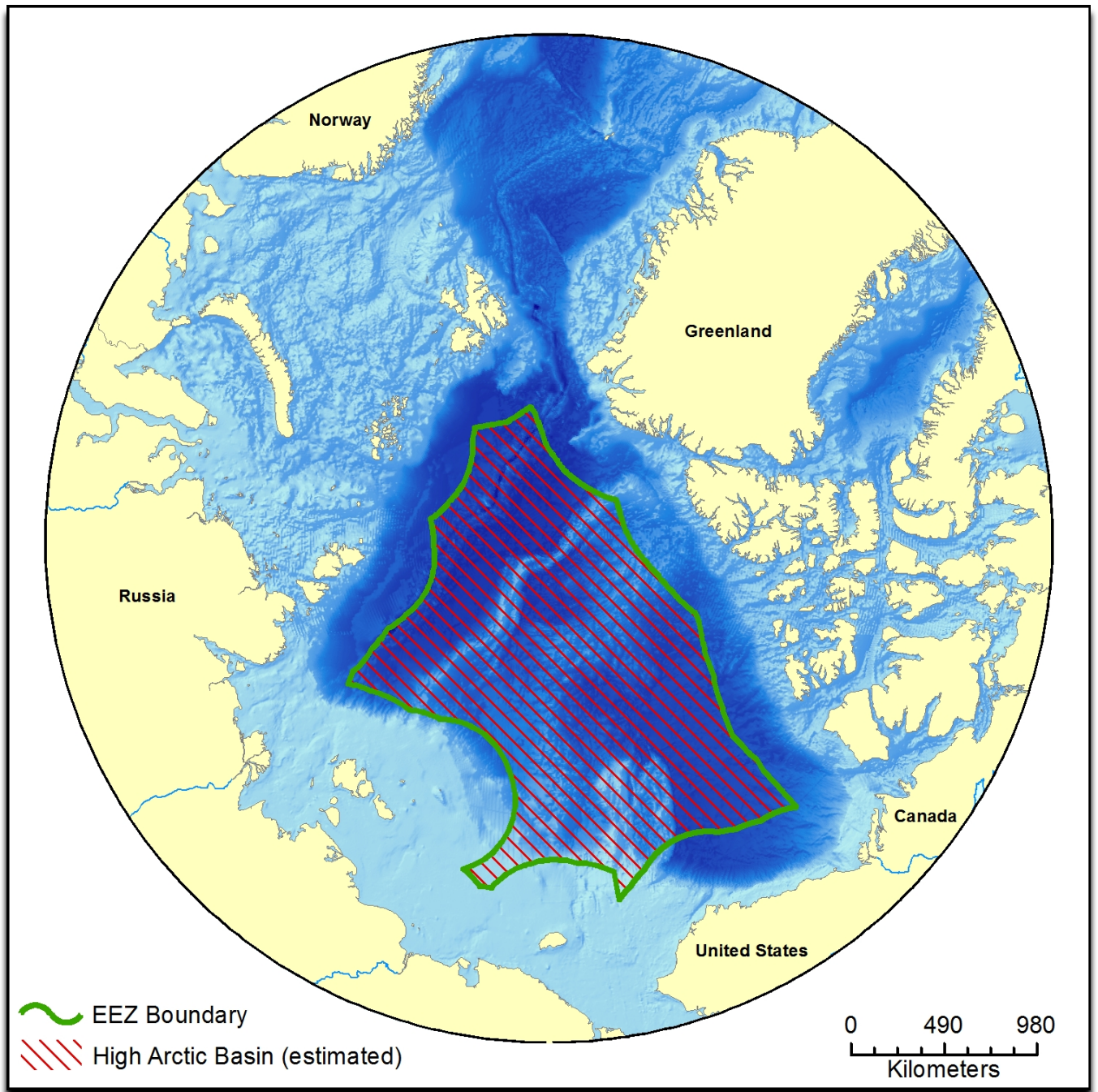
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<sup>2</sup> For information on international governance and agreements on fisheries see <http://www.fao.org/fishery/topic/2014/en> (accessed: 4 June 2014).

<sup>3</sup> There are currently no rules or agreements in place to govern fishing in the High Arctic Basin. The presence or absence of fishery management regimes just beyond Canada's Arctic maritime borders has direct bearing on Canada's ability to successfully manage, maintain, and benefit from healthy domestic fish populations.



**Figure 2: Extent of international Arctic waters.**



*Source:* DFO Oceans Winnipeg

Beaufort Sea polar bear (*Ursus maritimus*) population. The Inuvialuit and Inupiat also have established commissions to share research and harvest data related to polar bears and beluga whales.

In 2009, the USA signed the Arctic Fishery Management Plan. The Plan includes waters adjacent to the Canadian Beaufort Sea. The Plan prohibits the expansion of commercial fishing in Arctic federal waters until enough information is gathered on stocks and the environment to implement sustainable fisheries. The Plan does not apply to subsistence and recreational fishing, Alaskan State coastal waters, or species covered by other legislation or management plans. The Plan identifies Arctic cod, saffron cod (*Eleginus gracilis*), and snow crab (*Chionoectes opilio*) as initial target species for fishery development, and sets the maximum sustainable yield for the three species at zero.

It is crucial for Canada and the Inuvialuit to understand and consider management of fishery resources in Arctic international waters. These international waters will become more accessible as sea ice retreats. Historically, Canada has dealt with unregulated international fishing impacting domestic fisheries just outside of its EEZ. An international fishery could affect Canadian Beaufort Sea ecosystem components, existing fishery resources, and abundance of Inuvialuit subsistence species.

## **National Context**

The federal government has constitutional authority for sea, coastal, and inland fisheries. DFO exercises this authority through the *Fisheries Act* and its regulations, *Oceans Act*, *SARA*, and their supporting policies. In the ISR, DFO works in partnership with the FJMC to manage, protect, and co-manage fishery resources.

The *Fisheries Act* is applied to fisheries in the marine waters of the ISR primarily through its Fishery (General) Regulations and Northwest Territories Fishery Regulations. The *Act* provides DFO with the powers to conserve and protect fish and fish habitat. The Fishery (General) Regulations provide powers to issue variation orders and authorize experimental fisheries, while Section 7 of the *Fisheries Act* has the authority to issue new exploratory and commercial fishing licences.

The NWT Fishery Regulations apply to waters in and adjacent to the NWT, including the management of anadromous fish species. The Yukon Territory Fishery Regulations apply to waters in the Yukon and are also responsible for the licencing of sport fishing in Yukon coastal waters. The NWT Fishery Regulations prohibit commercial fishing except in waters listed in Schedule V, and do not permit commercial fishing in Schedule III waters. Schedule V lists commercial quotas for certain species for Liverpool Bay, the Cape Parry Area, and Area IV of the Mackenzie Delta that extends 12 nautical miles from the established baselines. Unlisted marine waters are closed to commercial fishing, but may be fished under DFO's New Emerging Fisheries Policy (see below).

The Aboriginal Communal Fishing Licence Regulations applies to fisheries in Canadian waters in and adjacent to the Northwest Territories and Yukon Territory, and enables the Minister to issue a communal licence to an aboriginal organization.

DFO administers the fish habitat provisions of the *Fisheries Act*, including the prohibition of any work, undertaking, or activity that results in serious harm to fish that are a part of a commercial, recreational, or Aboriginal fishery, or to fish that support such a fishery. Serious harm to fish includes the death of fish or permanent alteration or destruction of fish habitat on a scale, duration, or intensity that fish can no longer rely on these habitats for various life-history stages. Fish habitat is defined as spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly to carry out their life processes. Food supply includes fish that are prey for other fish species.

DFO's Sustainable Fisheries Framework incorporates precautionary and ecosystem-based approaches. The Sustainable Fisheries Framework has four main elements: (1) conservation and sustainable use policies, (2) economic policies, (3) governance policies and principles, and (4) planning and monitoring tools. Its application should ensure the continued health and productivity of Canada's fisheries and fish stocks, while protecting biodiversity and fish habitats. The Sustainable Fisheries Framework is made up of six conservation and sustainable use policies, and is generally implemented into fisheries management processes through Integrated Fisheries Management Plans (IFMPs).<sup>4</sup> The six policies are as follows:

- (1) Fishery Decision-Making Framework Incorporating the Precautionary Approach,
- (2) Guidance for the Development of Rebuilding Plans under the Precautionary Approach Framework: Growing Stocks out of the Critical Zones,
- (3) Managing the Impacts of Fishing on Benthic Habitat Communities and Species,
- (4) Ecological Risk Assessment Framework for Coldwater Corals and Sponge-Dominated Communities,
- (5) Policy on New Fisheries for Forage Species, and
- (6) Policy on Managing By-catch.

DFO's New Emerging Fisheries Policy guides the development of new commercial fisheries. As a general guideline, there are three stages in the development of new fisheries: Stage I – Feasibility, Stage II – Exploratory, and Stage III – Commercial. The objectives of the Feasibility Stage are to determine if harvestable quantities of a species or stock exist, gear type, impacts, markets, and next steps. The Exploratory Stage determines whether a species or stock can sustain a commercially viable operation, and collects biological data. The Commercial Stage is reached if it is determined that the species or stock can sustain a commercial fishery operation, and a formal IFMP is introduced. DFO is currently revising and updating the 2001 New Emerging Fisheries Policy. Once finalized, the revised policy will replace the existing 2001 policy. Future versions of this document will refer to the revised policy. DFO has already developed a data-collection protocol for exploratory Arctic char fisheries in Nunavut and the NWT. Implementation of the New Emerging Fisheries Policy, and the revised policy when it

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<sup>4</sup> For information on DFO fisheries management policies see <http://www.dfo-mpo.gc.ca/fm-gp/policies-politiques/index-eng.htm> (accessed: 4 June 2014).



comes into effect, must be consistent with fisheries-related obligations under the IFA, specifically goal (b) to enable equal and meaningful participants in the northern and national economy and society. DFO has affirmed that any exploratory or emerging fishery within the ISR must involve Inuvialuit interests and inputs in accordance with the above IFA goal and within the spirit and intent of the 2011 MOU. The existing 2001 New Emerging Fisheries Policy is to be applied in a manner consistent with other DFO policies including the Sustainable Fisheries Framework policies. In general this means that the development of a fishery will proceed in a cautious manner to ensure risks remain within acceptable limits. Once a fishery becomes fully commercial, it will be required over time to fully apply the Sustainable Fisheries Framework policies as required.

DFO's Integrated Aboriginal Policy Framework provides guidance to DFO employees in building respectful and mutually beneficial relations with Aboriginal groups. Its goals include enhancing involvement of Aboriginal groups in fishery management decision-making processes using a shared stewardship model, and continuing to manage fisheries consistent with the constitutional protection provided to Aboriginal and treaty rights by the *Constitution Act* and the *Fisheries Act*. In 2002, DFO directed the implementation of a policy that any fishery development in the Beaufort Sea must involve proper and meaningful representation of the Inuvialuit, and that this representation or participation could take the form of an arrangement or agreement between an Inuvialuit organization and a third party.

Part II of the *Oceans Act* enables the Minister of Fisheries and Oceans, with provincial and territorial governments and affected aboriginal organizations, to lead and facilitate the development and implementation of plans for the integrated management of all activities or measures in or affecting estuaries, coastal waters, and marine waters that form part of Canada or in which Canada has sovereign rights under international law. Under the *Oceans Act*, DFO has led the development of the IOMP for the Beaufort Sea, the TNMPA, and is leading discussions for the Anguniaqvia Niquiyuam Area of Interest (ANAOI) in the waters of Darnley Bay in the NWT.

*SARA* prevents Canadian species, subspecies, and populations from becoming extirpated or extinct, provides for the recovery of endangered species, and encourages the management of species to prevent them from becoming at risk. It can create prohibitions to protect listed, threatened, or endangered species and their critical habitats. It requires development of Recovery Strategies, Action Plans, or a Management Plan for listed species to aid their recovery. Approved fishery management plans can be recognized as equivalent to, or part of, *SARA* plans. *SARA* also requires consistency with Aboriginal and treaty rights, and respect of the authority of other federal ministers and provincial governments. The Minister of Fisheries and Oceans is responsible for fish and marine mammals under *SARA*. Some fish and marine mammal species occurring in the Beaufort Sea have been designated as threatened or of special concern (see Section 3: Stocks, Status, and Health).

Several other federal departments have responsibilities related to the protection of the Beaufort Sea. For instance, Environment Canada administers the pollution-prevention provisions of the *Fisheries Act* and the ocean-dumping provisions of the *Canadian Environmental Protection Act*,

and Transport Canada administers the *Arctic Waters Pollution Prevention Act* that prohibits the deposit of waste into Arctic waters.

## **ISR Context**

The IFA provides part of the legal context for fishery management in the ISR (IFA 1984, as amended in 2005). Its goals include: (1) to preserve Inuvialuit cultural identity and values within a changing northern society, (2) to enable Inuvialuit to be equal and meaningful participants in the northern and national economy and society, and (3) to protect and preserve the Arctic wildlife, environment, and biological productivity. As a land claim agreement within the meaning of Section 35 of the *Constitution Act, 1982*, the IFA is constitutionally protected. Federal legislation, including the *Fisheries Act* and discretionary powers under that *Act*, must be interpreted in light of the commitments made by Canada in the IFA. Where there is any inconsistency or conflict between the IFA and the *Fisheries Act*, the IFA prevails to the extent of the inconsistency or conflict. In addition to broad obligations relating to economic participation, the IFA specifically addresses the Inuvialuit interest in fisheries in two ways, namely Inuvialuit harvesting rights and Inuvialuit co-management rights. Actual operating practices have evolved since the signing of the IFA, and the relationship between DFO and its Inuvialuit partners has developed.

## **Inuvialuit Commercial Harvesting Rights**

Within the ISR, the Inuvialuit have the preferential right to harvest fish for subsistence usage, including trade, barter, and sale to other Inuvialuit (Section 14 (31) of the IFA). For commercial fisheries (Section 14 (32)), the Inuvialuit have the right to be issued non-transferrable licences under the commercial quota for a total weight of fish per species equal to the weight of the largest annual commercial harvest of that species from those waters taken by the Inuvialuit in the preceding three years. Subsequent land claim settlement agreements specifically give beneficiaries preferential access to new commercial fisheries, but the IFA does not specifically address Inuvialuit participation in new commercial fisheries. No active commercial fishing quotas currently exist (apart from one small, nearshore, Stage I, Arctic char quota issued to the Olokhtaktomiut HTC) in the coastal region of the ISR. Sections 14 (32) and (33) do not apply in determining the initial allocation of new commercial quotas to Inuvialuit. With this consideration, the specific sections of the IFA that apply in the initial allocation of new commercial quotas are 14(34) and all of 16.

## **Co-Management of Commercial Fisheries in the ISR**

Primary fishery management responsibilities are assigned to the FJMC (Section 14 (61–74)). The FJMC is a legislated public institution and must act in the public interest. It has a mix of decision-making and operational responsibilities, and it advises and makes recommendations to the Minister of Fisheries and Oceans (“the Minister”). Its most relevant responsibilities related to commercial fisheries include:

- (1) Assisting Canada and the Inuvialuit in administering the rights and obligations related to fisheries under the IFA,

- (2) Assisting the Minister in carrying out his responsibilities for the management of fisheries and marine mammals in the ISR,
- (3) Advising the Minister on all matters relating to Inuvialuit and fisheries within the ISR,
- (4) Advising the Minister on regulations, research policies, and administration of fisheries generally affecting the ISR, and on any new international agreements being developed that might apply to Inuvialuit fisheries (Section 14 (64)(j)), and
- (5) Making recommendations under Section 14 (64)(i) to the Minister on Inuvialuit commercial fishing, allocation of preferential fishing licences under Section 14 (29–32), regulations regarding sport and commercial fishing in waters on 7(1)(a) and (b) lands, and the identification of waters where such fishing may be prohibited.<sup>5</sup>

The responsibility to make recommendations is especially significant as specific procedures must be followed by the Minister to implement, vary, or reject recommendations of the FJMC (Section 14 (65–72)).

The HTC and IGC also have fishery-related responsibilities assigned to them under the IFA. The HTCs' specific fishery responsibilities are advising the IGC on the requirements of subsistence users in regard to fish, sub-allocating any Inuvialuit quota set for fish, assisting in providing harvest data at the request of the FJMC, and participating in the regulation of subsistence harvests and the collection of harvest information as determined by the FJMC. More general responsibilities for wildlife include advising the IGC on local matters, making by-laws pertaining to Inuvialuit harvesting rights, and promoting Inuvialuit involvement in research and management (Section 14 (76) and (78)). No specific fisheries responsibilities are assigned to the IGC, but it is the umbrella Inuvialuit organization for the HTCs and represents the collective Inuvialuit interest in wildlife and, as such, it does have an interest in any commercial fishery development (Section 14 (73–74)).

The IRC has overall responsibility for the management of compensation and benefits received by the Inuvialuit under the IFA (Section 6 (1)(a)). There are no specific fishery-related responsibilities assigned by the IFA to the IRC, but IRC responsibilities include control of the IDC and, as such, it would ultimately determine the role of any IDC commercial fishery established under Section 14 (34). The IRC also holds the broader responsibility to manage the Inuvialuit interest in the implementation of the economic measure outlined in Section 16 of the IFA.

Other organizations also have roles related to the overall management and protection of anadromous and marine fishery resources in the ISR. These organizations include ones created under the IFA, the NWT and Yukon territorial governments, other federal departments, and the Gwich'in and Sahtu Renewable Resources Boards (because the Gwich'in and Sahtu also share harvests of some stocks of anadromous fishes from the Beaufort Sea). Many of these organizations are specifically involved in environmental-protection decisions and oceans

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<sup>5</sup> Bankes (2010) argues that the power to make recommendations on the prohibition extends to waters throughout the ISR and that the word "such" evidently qualifies the word "fishing" (i.e., it covers sport and commercial fishing) and not the word "waters". Although the point is not perfectly clear, it is significant for the FJMC when it comes to making recommendations to the Minister to protect stocks throughout the ISR.

management, and are participants in the Beaufort Sea IOMP. They may also be involved in the co-management of ISR fishery resources appropriate to their responsibilities and interests.

### **Evolution of Inuvialuit Fishing Rights and Co-Management within the ISR**

The IFA provides the legislative basis for Inuvialuit commercial harvest rights and co-management within the ISR. It also outlines a broad range of obligations upon federal and territorial governments related to economic opportunities for Inuvialuit. In 2002, recognizing increased interest in the potential for commercial fishery development in the Beaufort Sea and to ensure that new fisheries would meet the long-term economic needs of the ISR, DFO proposed the development of a MOU involving DFO, the FJMC, and the NWT and Yukon governments. DFO and the parties agreed to rely on the New Emerging Fisheries Policy to assess new applications for commercial fisheries until that MOU would be in place. A successful application would have to meet DFO's policies on promoting Aboriginal participation in new fisheries.

In 2002, following discussions between the FJMC and DFO on the development of commercial fisheries in the ISR, DFO made a regional commitment (26 July 2002 letter from P. Chamut, Assistant Deputy Minister, Fisheries Management to R. Bell, Chair, FJMC) that "For an application to be successful it would have to meet DFO's policies on promoting Aboriginal participation in new fisheries", "it would have to respect Inuvialuit preferential subsistence right to subsistence fisheries and its rights to commercial fisheries", and "any exploratory or emerging fishery in the Beaufort Sea must involve proper representation of the Inuvialuit...[through] an arrangement or agreement between an Inuvialuit organization and third parties". This commitment was made in the context of developing inshore fisheries, although it did not contain any specific reference to inshore fisheries. Recent fishing efforts have been consistent with this commitment.

In the following decade, applications for commercial fisheries (variously in cooperation with the IGC, individual HTC's, or individual Inuvialuit business persons) were assessed under the interim arrangements. In 2010, DFO and the FJMC, this time with the participation of the IRC and the IGC, signed a MOU to develop a framework agreement for the proactive management of any emerging commercial fisheries in the ISR.

### **Beaufort Sea IOMP**

The Beaufort Sea Partnership has produced an IOMP for the Beaufort Sea Large Ocean Management Area (LOMA), which includes the coastal and marine portions of the Beaufort Sea in the ISR. Its intent is to maintain the health of the ecosystem in the Beaufort Sea LOMA while supporting sustainable communities and economies through integrated planning and management. The IOMP consists of goals, strategies, and objectives to help achieve the vision for the Beaufort Sea.

## **Ecologically and Biologically Significant Areas**

Ecologically and Biologically Significant Areas (EBSAs) (Appendix B) were identified through the Beaufort Sea Ecosystem Overview and Assessment in 2008 (Cobb et al. 2008). Twenty-one EBSAs were identified using the National Evaluation Framework developed by DFO. In 2011, a workshop was held to identify EBSAs in the rest of the Canadian Arctic (DFO 2011). During this exercise, two additional EBSAs were identified in the Beaufort Sea LOMA. These two EBSAs include the Arctic Basin and Arctic Archipelago, which are based primarily on the presence of multi-year ice and under-ice biological communities. In 2012, a workshop was held to update and re-evaluate the 2008 Beaufort Sea EBSAs. The EBSAs were modified and re-evaluated according to new information and enhanced understanding of the EBSA criteria (Fig. 3; DFO 2014). Valued ecosystem components (VECs) and habitat features were defined for each EBSA. Through an international EBSA identification process, the Beaufort Sea Coast/Cape Bathurst and the Polar Pack also were identified as “super EBSAs” by the Convention on Biological Diversity in 2013.

## **Marine Protected Area Initiatives**

The TNMPA is Canada’s first Arctic Marine Protected Area (MPA) located in the Mackenzie Delta. DFO, the Inuvialuit people, private industry, local stakeholders, and governments created the TNMPA through a collaborative effort. The MPA is part of Canada's expanding network of protected ocean regions. It also plays an important role in fulfilling Canada's commitments to managing Canada's oceans resources.

The TNMPA is meant to conserve and protect biological resources within the MPA, and to support the viability of a healthy population of beluga whales. This area is particularly important to the Beaufort Sea beluga whale stock that travels to the Mackenzie Estuary during the summer months. These whales come to this area for socializing, rearing calves, moulting, feeding, and for energetics (i.e., thermal advantage).

The ANAOI is of interest as a possible MPA in Darnley Bay, near the community of Paulatuk. The ANAOI is a highly productive area containing significant habitat for a number of marine species. The area is also culturally important to the Inuvialuit people. In addition to subsistence harvests of Arctic char, beluga, birds, and other species, the community of Paulatuk utilizes portions of the ANAOI for travel, education, and other activities.

The *Oceans Act* enables the Minister to establish MPAs to conserve and protect fishery resources, endangered species, habitats, and biodiversity. The first Canadian Arctic MPAs, Tarium Niryutait, were established in the Beaufort Sea/Mackenzie Delta under the TNMPA Regulations. The MPAs build on the Beaufort Sea Beluga Management Plan. The objective of MPAs is to conserve and protect beluga and other marine species, their habitats, and their supporting ecosystems. The objective contributes to the conservation and protection of important fish stocks in the area. The TNMPA is made up of three areas of the Mackenzie Estuary designated as Zone 1a in the Beaufort Sea Beluga Management Plan. The three areas are: Niaqunnaq, Okeevik, and Kittigaryuit (Fig. 4). Under the Regulations, fishing in accordance with the IFA and the *Fisheries Act* and its regulations may occur in the MPA.

## **Community Conservation Plans**

The six Inuvialuit communities have Community Conservation Plans (CCPs) that identify each community's important wildlife habitats and seasonal harvesting areas. The important areas in the CCPs are classified into one of five categories. Category A lands have no known significant and sensitive cultural or renewable resources. Category B lands have cultural or renewable resources of some significance and sensitivity. Category C lands and waters have cultural or renewable resources of particular significance and sensitivity during specific times of the year; potential damage and disruption should be eliminated to the greatest degree possible. Category D lands and waters have cultural or renewable resources of particular significance and sensitivity throughout the year; potential damage and disruption should be eliminated to the greatest degree possible. Category E lands and waters have cultural or renewable resources of extreme significance and sensitivity; the highest degree of protection is recommended for these lands and waters.

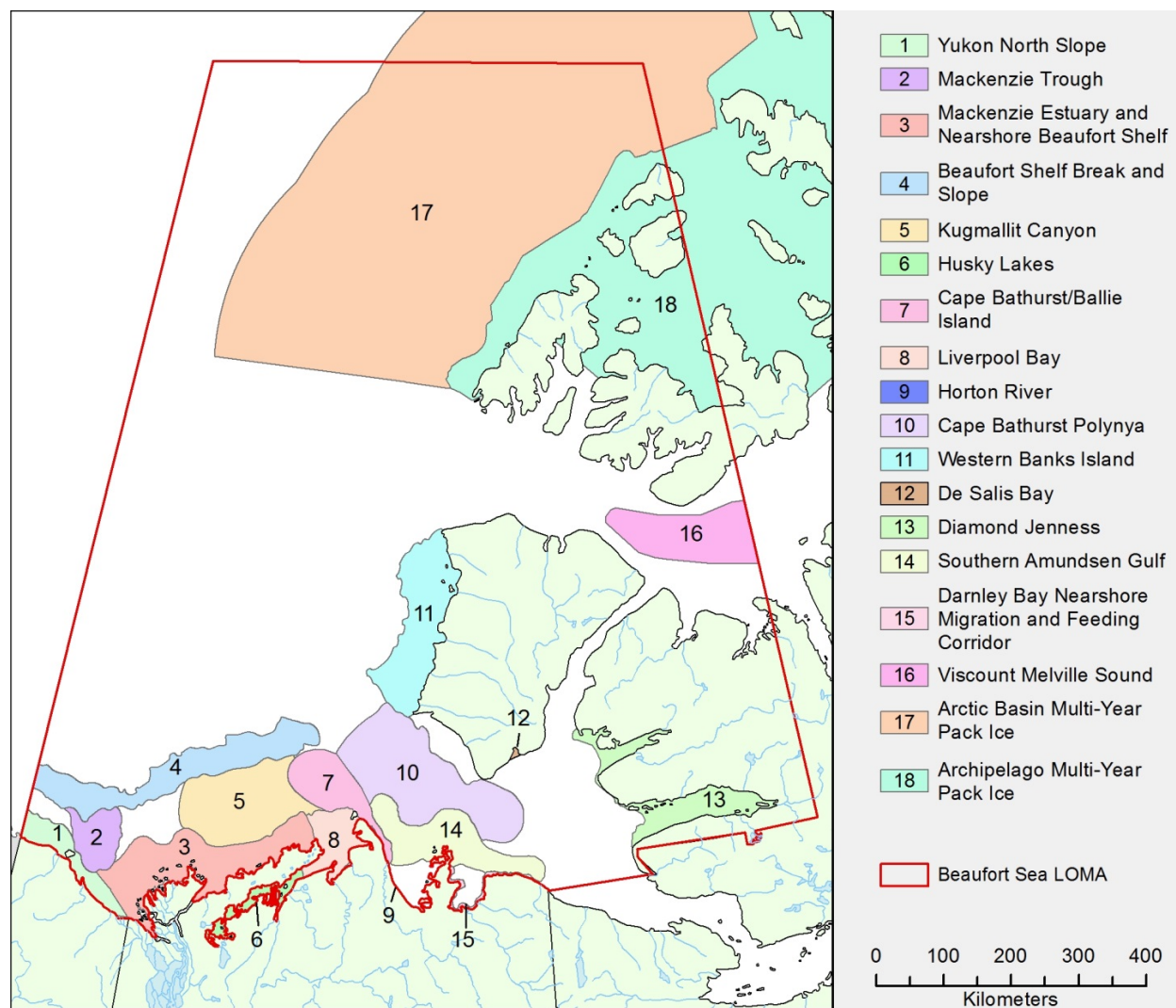
Appendix B contains a table of EBSAs, their overlap with MPAs and CCP areas, and their important fishery-related features. Only category C, D, and E marine waters are included in the table. A second table in Appendix B summarizes the importance of EBSAs for marine productivity, anadromous fishes, marine fishes and invertebrates, and marine mammals.

## **Socio-Cultural and Economic Context**

Anadromous and marine fishery resources of the Beaufort Sea have been harvested and shared by the Inuvialuit for centuries. The major fisheries currently and historically are for anadromous fish (chars and coregonids), bowhead, beluga, and ringed seal. These and other harvested marine fishery resources (see Section 3: Subsistence Fisheries) continue to play an important role in the nutrition and culture of the Inuvialuit, fostering the continuation of traditional Inuvialuit culture, lifestyles, provision of traditional foods, and local self-sufficiency. Marine mammal meat and muktuk have a special cultural and nutritional significance that cannot be replaced effectively by southern foods.

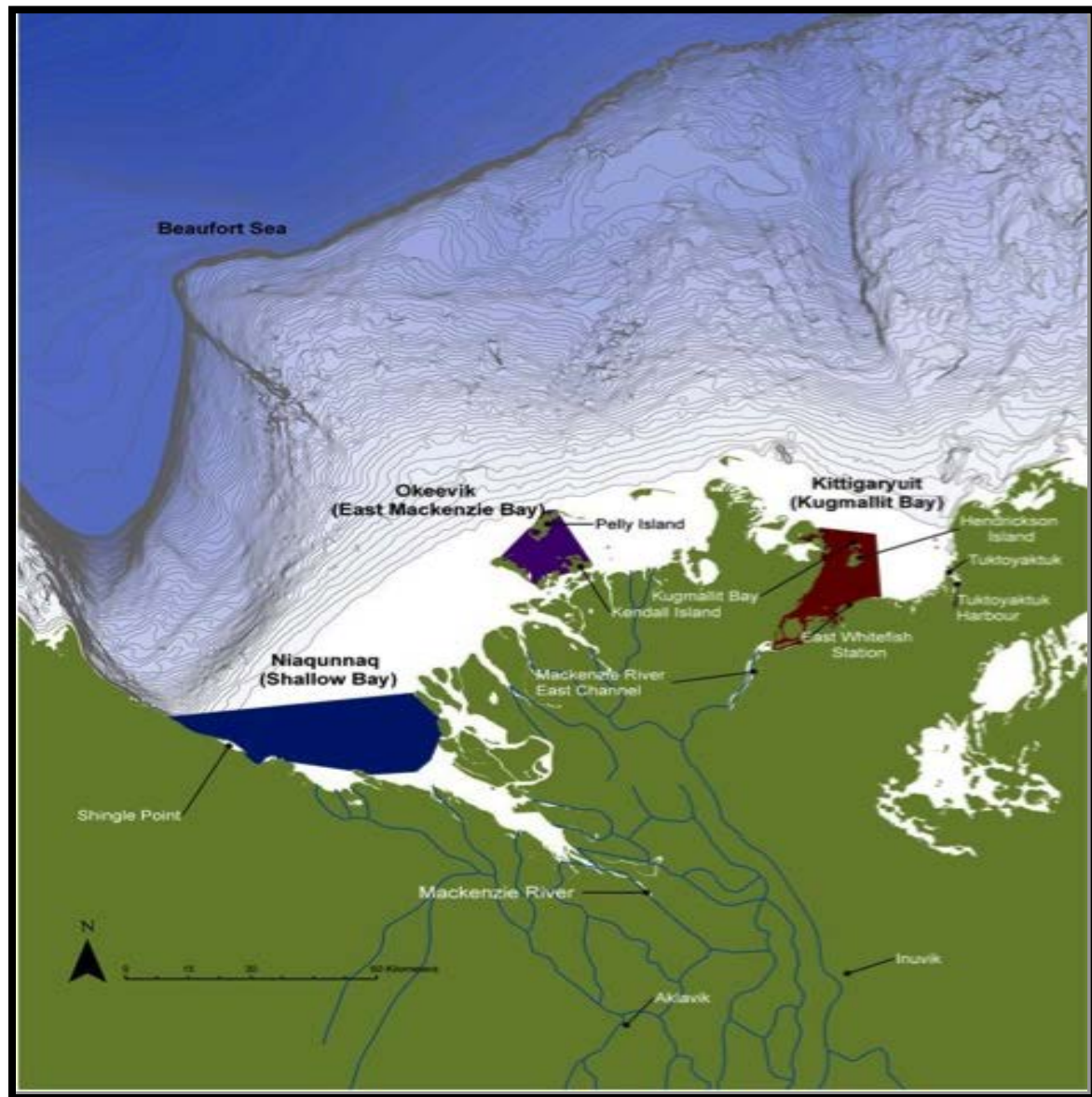
Fishery resources, especially anadromous fishes and marine mammals, of the Canadian Beaufort Sea were and are of great significance to the Inuvialuit and need to be managed in accordance with the goals and provisions of the IFA.

**Figure 3: Ecologically and Biologically Significant Areas in the Canadian Beaufort Sea.**



Source: DFO (2014).

**Figure 4: Tarium Nirvutait Marine Protected Area.**



*Source: DFO and FJMC (2013).*



### Section 3: Fishery Resources of the Beaufort Sea

#### The Beaufort Sea Ecosystem

The Beaufort Sea in the ISR encompasses parts of three marine biogeographic regions defined by DFO: Western Arctic, Arctic Basin, and Arctic Archipelago. The Western Arctic Region covers the southern part of the area, including the coastal shelf and the Beaufort Sea Slope near the mainland.<sup>6</sup> The coastal shelf is up to 145 km wide and much of it is less than 10 m deep. The Kugmallit and Mackenzie troughs dissect the coastal waters of the Mackenzie Estuary. Underwater pingos, gas vents, and mud volcanoes are present. Further east and north, Amundsen Gulf, Prince of Wales Strait, McClure Strait, and Viscount Melville Sound are also part of the Western Arctic Region. Amundsen Gulf is up to 600 m deep and Viscount Melville Sound is up to 1000 m deep. Ice cover in the Region is changing. The Region used to be covered by landfast and pack ice from October to June, with southern portions typically being ice-free in August and September. Now, extensive summer melt-back of sea ice and progressive export of ice has resulted in much larger areas of open water in the summer, although the extent of open water varies significantly from year to year.

The Arctic Basin covers most of the area and is up to 3600 m deep. It typically had permanent ice cover (mostly multi-year pack ice) over much of the area, but had leads in the ice. The waters of the Arctic Archipelago also typically had permanent ice cover. As in the southern Beaufort Sea, progressive summer melt-back and export of ice has diminished ice cover in late summer; overall, the ice is generally younger, although still multi-year in nature. The seasonal duration of consolidated ice is also shorter; i.e., periods with extensive open water are longer.

The Beaufort Sea receives inputs of salt water from the Arctic Ocean and the Bering Strait and fresh water from several rivers, primarily the Mackenzie River. Water exits through the Arctic Archipelago or moves into the central Arctic Ocean Basin. The main circulatory pattern near the surface of the Beaufort Sea is the clockwise Beaufort Sea Gyre, with sub-surface counter-clockwise currents that typically follow the Beaufort Sea Slope and may be mixed upwards into surface waters during upwelling events. The Beaufort Shelf and Shelf-Slope have a westward-moving surface water layer about 50 m thick, which is highly mixed fresh and marine waters. This westward layer overlays an eastward-moving water layer about 150 m thick that originates in the Bering Sea of the North Pacific. Below about 200 m, a layer originating from the Northeast Atlantic extends to about 1000 m depth. Below this layer is the water of the Arctic Basin. The tidal range is less than 1 m. The Mackenzie River provides significant sediment and freshwater inputs during the spring and summer, annually transporting  $130 \times 10^6$  t of sediment and 18 million km<sup>3</sup> of fresh water into the Beaufort Sea.

A significant feature of the Beaufort Sea is its low annual and highly pulsed energy input. This feature results in low water temperatures, the presence of sea ice, and a relatively short ice-free season in the southern Beaufort Sea and adjacent waters. Important sea-ice features are the Cape

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<sup>6</sup> The scientific information presented in this section is a summary of pertinent information from Mathias (2013), a white paper of existing peer-reviewed scientific literature.

Bathurst Polynya and its associated leads, and the multi-year ice in much of the northern part of the area.

Productivity is relatively low in the Beaufort Sea. The productivity is lower than in the western Beaufort Sea, and is much lower than in the Chukchi Sea (or in much of the eastern Arctic and more temperate waters). Phytoplankton, epontic algae, benthic algae, and aquatic macrophytes all contribute to primary productivity. Growth is controlled by light and nutrient availability, and nitrates are limiting. Areas of riverine discharge, upwelling, and mixing of water masses (e.g., the Beaufort Shelf, Cape Bathurst Polynya, Mackenzie River plume) tend to be more productive and support anadromous fish and inshore marine fish, marine invertebrates, and marine mammals. Productivity in offshore waters is lower.

Food webs are relatively simple. The marine food web (Fig. 5) supports anadromous, inshore and offshore marine fish, marine invertebrates, and marine mammals. It has four main trophic levels: (1) primary producers, (2) zooplankton and benthos, (3) Arctic cod and other forage fish, and (4) major predators, including char (*Salvelinus* spp.), ringed seal, beluga, polar bear, and sea birds. Energy passes from phytoplankton and epontic algae to zooplankton, mainly copepods, epontic and littoral amphipods, and mysids. Fish, especially Arctic cod, and some marine mammals and sea birds, rely on this biota. Arctic cod is central to the functioning of the ecosystem, is eaten by char, seal, beluga, and sea birds. The importance of Arctic cod cannot be overemphasized. Arctic cod is the link in the food web that transfers up to 75% of the energy from lower trophic levels to top predators. Recent studies found significant concentrations of Arctic cod along the Beaufort Sea Slope, mainly at depths of 200 m to 400 m.

Different parts of the marine food web are more important at different seasons or at different places. The epontic community is especially important along ice edges and under first-year ice in inshore and offshore areas (Fig. 6), and is available earlier in the year than production from the phytoplankton community. In ice-free offshore waters, the phytoplankton-supported portion of the food web dominates. The benthic component of the food web, especially benthic amphipods, is most important in inshore waters beyond the intertidal and ice-scour zones. Important populations of polar bear and birds also use the Beaufort Sea.

The estuarine food web (Fig. 7) supports both anadromous and inshore fish, marine invertebrates, and marine mammals, especially Arctic char, Dolly Varden (*Salvelinus malma*), and beluga, but also Pacific herring (*Clupea pallasii*) and whitefishes (*Coregonus* spp.). It is dominated by the outflow of the Mackenzie River. Epibenthic mysids, benthic amphipods, and isopods are key links between organic matter from riverine discharges and anadromous forage fish such as saffron cod and least cisco. Arctic cod and Arctic cisco (*Coregonus autumnalis*) also are key food resources for char and beluga.

The basic biology of anadromous fish is reasonably well known, but the basic biology of marine fish and invertebrates, including their food-web relationships, is not well known. About 70 species of fish are known to occur in the Beaufort Sea. Inshore coastal waters are feeding areas and migration corridors for 20–30 species of anadromous (e.g., Arctic char, Dolly Varden, whitefishes, and ciscoes) and freshwater fishes. Some pelagic marine fishes (e.g., Pacific herring) and benthic marine fishes (e.g., saffron cod, fourhorn sculpin (*Myoxocephalus*

*quadricornis*), and starry flounder (*Platichthys stellatus*)) also occur in inshore areas. Offshore waters also support pelagic marine fish (e.g., polar cod (*Arctogadus borisovi*) and Arctic cod) and benthic fish (e.g., eelpout (*Lycodes* sp.) and Greenland halibut (*Reinhardtius hippoglossoides*)). More important areas for marine fishes are upwelling areas along the Beaufort Sea Slope, recurrent polynyas and flaw leads, mixed-ice zones, and ice edges. Less is known about the occurrence and distribution of marine invertebrates than about marine fishes. Zooplankton and benthos, especially benthic amphipods, are links in the food webs, and other invertebrates, such as shrimps, crabs, and molluscs (e.g., clams, mussels, and scallops), support small subsistence fisheries.

Terminal predators, such as beluga whale, Arctic char, Arctic cisco, Inconnu (*Stenodus leucichthys*), and Dolly Varden, are the most important fishery resources. Benthic-feeding whitefishes (broad whitefish and lake whitefish) are also harvested. Bowhead and beluga exhibit large biomass (as individuals and as populations), low reproductive rates, and stable population structures. The southern Beaufort Sea is vital spring and summer feeding and calving habitat for beluga. Ringed and bearded seals (*Erignathus barbatus*) also use the areas for breeding. In contrast, stocks of Arctic char and Dolly Varden often exhibit significant annual variation in abundance. Many anadromous fishes and marine mammals migrate out of the Beaufort Sea when it is ice covered; marine mammals go to the Bering and Chukchi seas, and anadromous fishes go to adjacent rivers and streams. Ringed seal is an exception, having a year-round presence in the Beaufort Sea.

Little biological information exists for the Arctic Basin and Arctic Archipelago regions. However, their epontic communities, polynyas, and flaw leads are thought to be important.

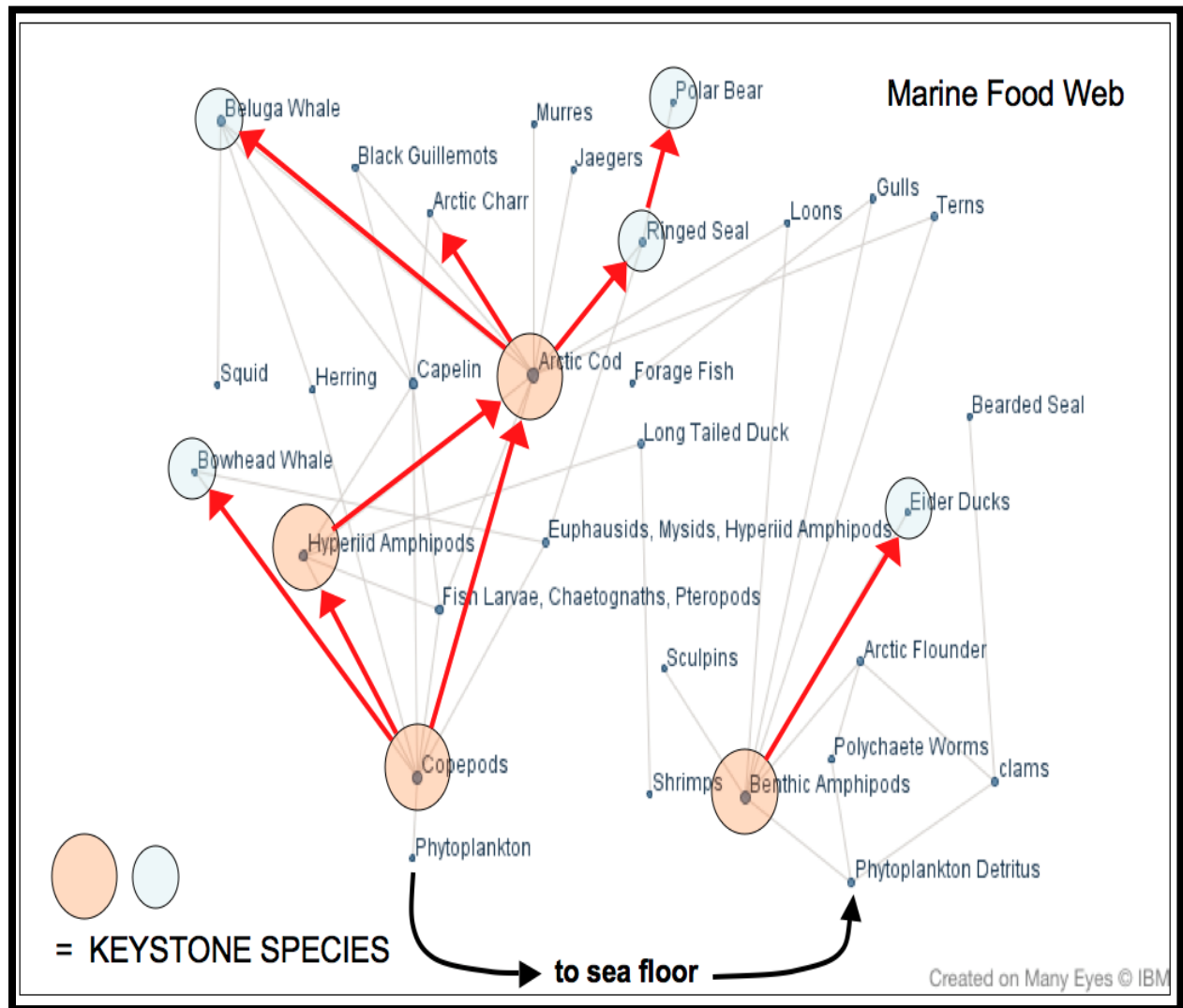
In summary, the main features of the Beaufort Sea from a fishery perspective are: (1) marine mammal and anadromous fish stocks are of food and cultural importance for Inuvialuit, Gwich'in, and Sahtu peoples, (2) harvestable surpluses have not been scientifically determined for most populations of anadromous fish, marine fish, and marine invertebrates, (3) there is generally low productivity compared to the western Beaufort Sea, the Chukchi Sea, and the Eastern Arctic, (4) ice covers much of the area for much or all of the year, and (5) limited biological information is available except for some anadromous fish and marine mammal stocks.

## **Fisheries**

### **Subsistence Fisheries**

Several species are harvested in subsistence fisheries in the Beaufort Sea. Marine mammals (beluga, bowhead (*Balaena mysticetus*), ringed seal, and bearded seal) and anadromous fishes, especially Arctic char, Dolly Varden, Inconnu, broad whitefish (*Coregonus nasus*), lake whitefish (*C. clupeaformis*), Arctic cisco, and least cisco (*C. sardinella*), are most frequently harvested. Although primarily harvested by Inuvialuit, anadromous fish stocks are also harvested in the Gwich'in and Sahtu settlement regions.

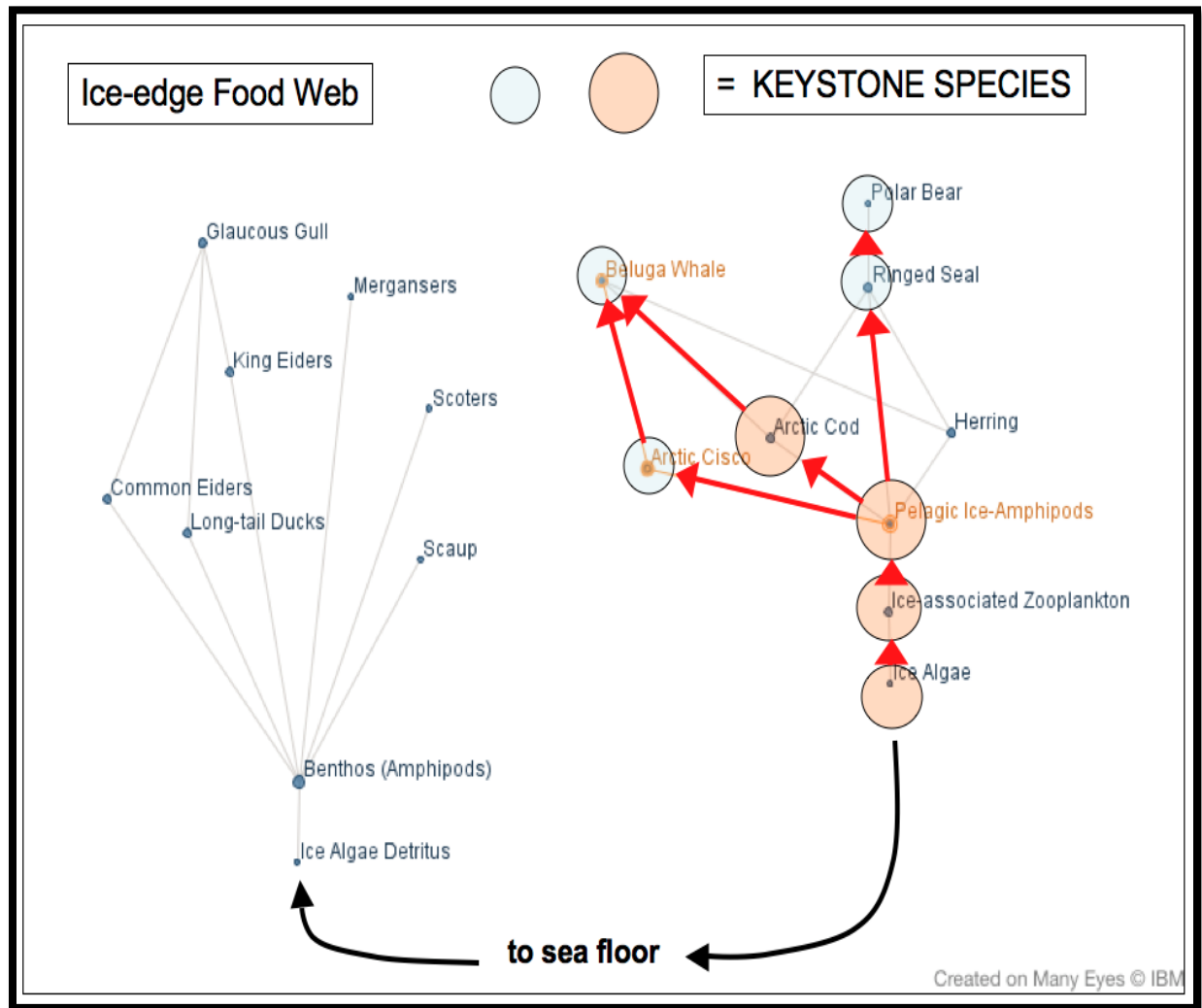
**Figure 5: Marine food web in the Canadian Beaufort Sea.**



Source: Mathias (2013).

Note: Orange circles are keystone species important for food-web integrity. Blue circles are also keystone species that, in addition, are important for Inuvialuit subsistence. Predator-prey relationships are based on published reports. Red arrows indicate predominant energy pathways.

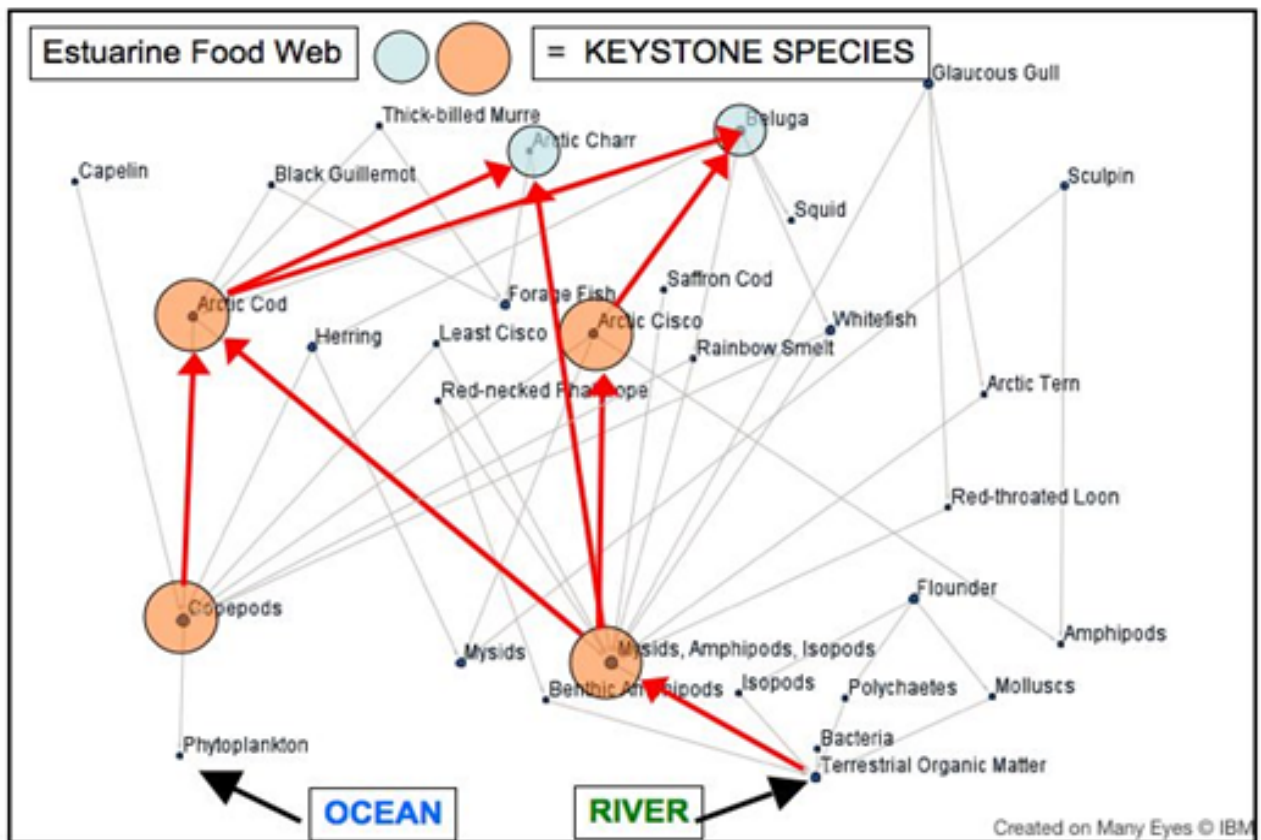
**Figure 6: Ice-edge food web in the Canadian Beaufort Sea.**



Source: Mathias (2013).

Note: Orange circles are keystone species important for food-web integrity. Blue circles are also keystone species that, in addition, are important for Inuvialuit subsistence. Predator-prey relationships are based on published reports. Red arrows indicate predominant energy pathways.

**Figure 7: Estuarine food web in the Canadian Beaufort Sea.**



*Source:* Mathias (2013).

*Note:* Orange circles are keystone species important for food-web integrity. Blue circles are also keystone species that, in addition, are important for Inuvialuit subsistence. Predator-prey relationships are based on published reports. Red arrows indicate predominant energy pathways. “Arctic char” refers to both Arctic char and Dolly Varden.

Inuvialuit also harvest marine fish and invertebrates for subsistence. Marine species harvested include Pacific herring, polar cod, Arctic cod, saffron cod, and to a lesser extent fourhorn sculpin, flatfish, and some invertebrates. Little is known about the size of this harvest, but 1880 kg of Pacific herring were harvested in 1987–1988 by about 10 residents.

CCPs identify marine fish and invertebrates that are important to the Inuvialuit either for harvesting or as part of the food web, and some marine areas where they are harvested. All communities identified Pacific herring, capelin (*Mallotus vilotus*), Arctic cod (sometimes called tom cod), saffron cod (sometimes called tom cod), and Greenland cod (*Gadus ogac*) as important. Invertebrates occasionally harvested by Aklavik and Sachs Harbour residents include pink shrimp (*Pandalus borealis*), Greenland cockle (clam) (*Serripes groenlandicus*), hairy cockle (cockle shell) (*Clinocardium ciliatum*), Bay mussel (*Mytilus edulis*), and Greenland scallop (*Delectopecten groenlandicus*). Striped shrimp (*Pandulus montagui*), toad crab (*Hyas coarctatus*), and soft shell clam (*Yoldiella intermedia*) are occasionally harvested by Sachs Harbour residents. Ulukhaktok residents occasionally take jellyfish, krill, spider crab, Greenland cockle, Bay mussel, starfish, and sea urchin. The subsistence fisheries occur primarily around the coasts and close to communities (see Appendix B).

### **Commercial Fisheries**

Commercial fisheries for fish and marine mammals have been conducted in the Canadian Beaufort Sea since the commencement of official records (Porta and Ayles 2014). However, to date, no offshore commercial fishery has occurred. Marine mammals were the main targets in early fisheries. The largest commercial fishery was for bowhead whale, conducted between 1848 and 1915. Some 18,650 bowhead were harvested. There may have been some commercial catch of beluga during the bowhead fishery. Ringed seal were commercially harvested, especially between 1960 and 1980, with an average annual catch of 2600; the commercial harvest of ringed seal now is considerably less.

Anadromous commercial fisheries have occurred. Unsuccessful attempts were made to establish commercial Dolly Varden (then identified as Arctic char) fisheries in 1960–1961 and 1965–1966 along the Yukon coast. Paulatuk established a commercial Arctic char fishery in 1968; it was permanently closed in 1987. These Arctic char stocks were significantly overharvested during the commercial fishery periods. At present, Ulukhaktok has a Stage I (Feasibility) Emerging Fishery for 500 Arctic char from the coastal waters adjacent to the community.

Pacific herring is the only inshore marine species to have had a targeted experimental fishery. In 1963, an inshore fishery harvested 8000 kg near the Baillie Islands, but it was concluded that the fishery was not economically viable. In 1983, another inshore experimental fishery harvested 4581 kg of Pacific herring and 398 kg of roe at the mouth of Liverpool Bay; it was concluded that the available biomass was too low for investment in a commercial fishery.

There has been interest in developing commercial inshore marine fisheries since 2002. Between 2002 and 2009, there were eight applications under the New Emerging Fisheries Policy of which six were granted. Fishing only occurred twice—in 2004 and 2006. Each of these inshore fisheries had a fishing licence for the same target species and 4000 kg quotas for each of cod,

crab, shrimp, prawn, and halibut/turbot. The 2004 fishing was along the Yukon coast; many of the targeted species were caught, but the catch per unit effort (CPUE) and abundance were low. The 2006 fishing was off the coast of Banks Island; only a few target species were harvested and abundance was minimal.

### **Recreational Fisheries**

No recreational fisheries have targeted marine species in the Beaufort Sea. A 2001 survey of anglers in the ISR showed that Arctic char and Dolly Varden were the main anadromous target species for anglers, and that some Inconnu and whitefish were also taken. No angling for marine fish was recorded.

No Daily Catch Limit and no Possession Limit have been established for sport fishing of marine species in the Beaufort Sea under the NWT Fishery Regulations. The Daily Catch Limit and Possession Limit for Arctic char in the ISR are four and seven, respectively, except for the Hornaday River where they are zero and zero. The limits for Dolly Varden are zero and zero, excluding the rivers within Ivvavik National Park where the limit is one and one. The limits for all species of whitefishes are 10 and 20.

### **Stocks, Status, and Health**

No stock assessment has been conducted for any marine fish and invertebrate stocks in the Beaufort Sea. Information to establish stock status is very limited for these species and stocks, and often is restricted to information on occurrence and distribution. Required information for management of target species includes: (1) abundance or biomass estimates and trends, (2) distribution, (3) stock age and size (length and weight) structures, and (4) reproductive and natural mortality rates. Such information is required to: (1) set harvest levels, (2) establish Upper Stock and Limit reference points and the stock-status zone (healthy, cautious, critical), and (3) calculate maximum sustainable yield and optimum yield. Little information is available on contaminants, diseases, and parasites of anadromous fishes, marine fishes, and marine invertebrates in the ISR.

Information is not yet available to establish indicators to aid fishery management. For instance, CPUE data are limited or do not exist because there is no commercial fishing. Information is minimal on food-web structure and bioenergetics that would enable the effects of harvesting on non-target species and the ecosystem to be predicted. In particular, information is lacking on the role of Arctic cod in the maintenance of ecosystem structure and function, and on potential effects of harvesting on harvested species of fish and marine mammals. Further information will likely be needed to meet the requirements of DFO's Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas and Policy for Managing New Fisheries for Forage Species.

More information exists for some anadromous species than for marine species. This information usually includes relative abundance, length, weight, sex, maturity, and in some cases age data, fecundity, population abundance estimates, and trends. Some stock assessments have been conducted, and have been completed for the following anadromous fish stocks: (1) Arctic char, Hornaday River 1999 and 2014, (2) Dolly Varden, Rat River 2001 and 2008, Babbage River



2003, Big Fish River 2003 and 2012, Firth River 2003, and (3) Inconnu, Mackenzie River 1998. However, information is still lacking on many variables for these and other anadromous stocks, limiting abilities to establish Upper Stock and Limit reference points and stock-status zones.

No Total Allowable Catches or other harvest limits have been established for marine fish and invertebrates of the Canadian Beaufort Sea. However, Schedule V of the NWT Fishery Regulations contains old quotas for Pacific herring and cod and for some anadromous species for some inshore waters. These require scientific review prior to issuance.

IFMPs or fishing plans exist for some anadromous fishes, but not for any marine fishes or marine invertebrates in the Beaufort Sea. The following plans exist: (1) Arctic char: Paulatuk Char Fishing Plan; (2) Arctic char: Ulukhaktok (Holman) Char Fishing Plan; (3) Dolly Varden: IFMP, 2011–2015; and (4) Inconnu: Lower Mackenzie Basin IFMP, expired 2005. Harvest levels for these plans are usually set from annually (Dolly Varden) to every 3–5 years (Arctic char). The Beaufort Sea Beluga Management Plan (BSBMP) also has implications for regional fisheries management and was updated in 2013.

Some anadromous and marine species have been assessed under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or SARA. Their status is as follows:

- Dolly Varden: COSEWIC 2011 decision—species of special concern; being assessed under SARA by the Minister of Fisheries;
- Northern wolffish (*Anarchichas denticulatus*): SARA decision—threatened; reassessment for 2012; requires development of a Recovery Strategy and then an Action Plan;
- Western Arctic (Bering–Chukchi–Beaufort population) bowhead: SARA decision—special concern; Management Plan due in December 2012;
- Grey whale (*Eschrichtius robustus*) (Eastern North Pacific population): SARA decision—special concern; and
- Blackline prickleback (*Acantolumpus mackayi*): COSEWIC decision—data deficient.

In summary, sufficient scientific information and traditional ecological knowledge (TEK) exist to manage some anadromous fisheries reasonably well. However, a dearth of scientific information and TEK prevents managing any marine fishery. This lack of information includes basic biology, stock size, and surplus biomass available for harvesting. The effects of harvesting on important anadromous fishes and marine mammal resources of the ISR, and key links (e.g., Arctic cod) in the ecosystem, are also unknown.

## **Section 4: The Framework for Managing Beaufort Sea Fisheries**

The development of a process for managing the stressor of commercial fishing in the Beaufort Sea was triggered in 2008 when all six HTC's formally affirmed, to the FJMC, their concern regarding the potential impacts of large-scale commercial fishery development on Inuvialuit subsistence fisheries and fish that support those fisheries. The anadromous fishes, nearshore marine fishes, and marine mammals of the Beaufort Sea provide the Inuvialuit with significant cultural, nutritional, and social benefits. Offshore marine fishes and invertebrates that may be targeted for commercial fisheries are directly linked to these subsistence fisheries. The FJMC began tracking this issue in 2002 and discussed mechanisms for cooperative management of new commercial fisheries in the nearshore waters of the Beaufort Sea, including the development of a MOU with DFO. Pending the development of a formal agreement, DFO implemented some interim measures to ensure Inuvialuit participation in decisions related to new commercial fishing ventures.

Thick, multi-year ice used to make access for commercial fishing difficult and costly. Increased melting of multi-year ice in recent years has led to more open water during the summer season, which could allow greater access to these waters for large- and small-scale commercial fishing. Since 2002, there has been renewed interest in establishing new commercial fisheries in the Beaufort Sea, with eight applications to conduct exploratory fisheries. The collection of scientific information on offshore marine resources similarly has been limited by the multi-year ice, and largely has been driven by the oil and gas industry. Recent opportunities and efforts to study the area have provided preliminary baseline information on the offshore ecosystem. However, information pertaining to the composition, biomass, size, and resilience of Beaufort Sea marine trophic structure in the offshore ecosystem remains rare.

This section outlines a management approach and a decision-key process for commercial fisheries applications. Future action against one of the stressors described in Section 1 may require revisions to this section and/or to the decision-key process.

### **Management Approach and the Decision-Key Process**

The intent of the MOU was to achieve the orderly and sustainable management of Beaufort Sea fish stocks and to protect subsistence fisheries. This section of the BSIFMF outlines the agreed upon management approach, decision-key process, and outcomes key stakeholders will rely upon to address the stressor of commercial fisheries development in the ISR.

#### **Management Approach**

The approach for managing Beaufort Sea marine resources reflects the expectations, responsibilities, and rights of DFO, FJMC, IGC, and IRC. Over time and use, the implementation of the BSIFMF will: (1) support an adaptive co-management stakeholder advisory process through which future applications for commercial fisheries can be vetted, (2) help ensure that any new commercial fishery would involve proper participation by the

Inuvialuit, and (3) identify information, policy, and operational management gaps, and approaches that could be used to fill those gaps.

A major part of implementing the BSIFMF is the use of a decision-key process to vet proposals for new commercial fisheries and to recommend their acceptance, rejection, or return for revision. A decision key is a decision-support tool commonly used in operations research. The decision-key approach was selected because it is simple to understand and interpret, and easy to explain to partners and community members.

Use of the decision key will be triggered by DFO's receipt of an application for a new commercial fishery. The decision key identifies the key considerations that need to be made within the context of the ISR for the implementation of the New Emerging Fisheries Policy. While the decision key does not replace the national DFO policies, it provides a first level screening of the key issues that need to be considered in the Inuvialuit Settlement Region, and therefore overlaps in the questions and policy requirements. The decision key will enable the application to be assessed against a series of questions that represent the concerns, interests, and responsibilities of the Parties for conservation and sustainable use, and the information available for anadromous, inshore, and offshore fisheries and their management. The decision key is based on information presented in Sections 2 and 3. Use of the decision key will enable the Parties to make consistent and transparent decisions. Over time, information flowing from the use of the decision key will encourage new actions, including responding to emerging ecosystem-level stressors.

The decision key will be updated over time to incorporate new scientific information, local knowledge, new national and local policy and governance directions, and new Inuvialuit interests. It is an adaptive management tool, so if a decision-key question cannot be adequately answered, this deficiency reflects a legislative, policy or information gap, and identifies the need for additional work to fill that gap. Therefore, the decision key may need to be modified after the work is completed.

The use of the decision key in conjunction with the application of DFO's policies on sustainable fisheries will ensure any future commercial fisheries will incorporate the precautionary approach, reflect ecosystem-based management criteria, and meet the co-management, conservation, and sustainable-use obligations created pursuant to the IFA and under the *Fisheries Act*. The decision key also helps support the implementation of DFO's Sustainable Fisheries Framework and New Emerging Fisheries Policy within the context of the IFA.

### **The Decision- Key Process**

The decision key has two types of questions: (1) questions that are based on existing information and can be answered by DFO, and (2) questions that require evaluation, consideration, and consensus. The second category of questions requires interaction and perhaps meetings of the Parties.

Each question in the decision key (see Section 5) identifies the actions that need to be undertaken to answer the question, the responsible party or parties for each action, links to pertinent documents, and the rationale for the question. The actions and rationale will help users of the decision key to answer each question appropriately, while considering the different requirements for new commercial anadromous, inshore, or offshore fisheries. Progression through the decision key requires completing the actions listed under a question, reaching an outcome, and then proceeding to the next question or recommendation as identified by the outcome.

The decision key will be used to assess applications for commercial anadromous, inshore, and offshore fisheries. The following description and analysis of the three potential fishery sectors provide a practical lens and context to help the Parties use the decision key. The responsibilities, actions, and rationale for each question reflect Inuvialuit rights, knowledge, and management experience for anadromous, inshore, and offshore fisheries. These fishery sectors also reflect the way historical applications for new commercial fishing licences have been presented to DFO.

The following brief descriptions of the major features of anadromous, inshore, and offshore fisheries should be considered in applying the decision-key questions.

1. **Anadromous Fisheries:** The most information and management experience is available for anadromous fisheries. The Inuvialuit have a long history of community-based char and whitefish fisheries. Community fishing plans, an IFMP, and management processes already exist for some priority fisheries. These fisheries management protocols generally account for community concerns, scientific information gaps, and regional conservation designations found in CCPs, MPAs, and EBSAs. Anadromous commercial fisheries currently provide the most direct social, cultural, and economic benefit to the Inuvialuit. The advent of new commercial anadromous fisheries could conflict directly with existing subsistence fisheries. A small harvestable surplus of Arctic char from some stocks may exist but would, at most, only support local sales. Opportunities may exist for new commercial whitefish or other anadromous fisheries.
2. **Inshore Fisheries:** Information and management experience is limited for inshore marine fish and invertebrate fisheries. Applications for inshore fisheries have been submitted eight times since 2002. Six of those applications for an Exploratory Licence were granted, and in 2004 and 2006 fishing occurred but was not encouraging because insufficient biomass was found for any commercial sales. This type of application may identify a large geographic scope for proposed fishing activities, may target a wide variety of species from forage fish to benthic invertebrates, and may use a suite of gear types, which could include long lines, cod traps, prawn traps, hoop traps, trawls, and seines. No fishery management or gear protocols exist for any inshore marine species or fishing activity. The implications of scientific data gaps, such as whether sufficient surplus biomass exists, and/or interactions with designated regional conservation areas are unclear. Species of interest are not likely to be harvested in Inuvialuit subsistence fisheries, but new inshore commercial fisheries could affect existing subsistence fisheries through ecosystem effects. Development of commercial inshore fisheries has the potential to provide some economic benefit to the Inuvialuit provided suitable partnership agreements or other means of ensuring meaningful Inuvialuit participation are arranged. Inshore primary productivity is low, and no harvestable surpluses

have currently been identified. Consequently, caution should be exercised and any new fishery should be closely monitored and well-managed.

3. **Offshore Fisheries:** The least information and management experience exists for offshore marine fish and invertebrate fisheries. An application for a commercial offshore fishery in the ISR has never been filed. This type of application is likely to be of the highest profile and concern to the Parties and communities for the following reasons: (1) it may encompass most of the marine waters of the ISR, (2) it may rely on high-impact gear types such as Beam, Otter, and Pair trawlers, and (3) likely it would target or affect Arctic cod, a keystone species for the Beaufort Sea ecosystem. The implication of scientific data gaps, such as whether (and how much) surplus biomass exists and/or interactions with designated regional conservation areas, is critical to understand prior to the commencement of any fishing operations. Potential exists for significant impacts to key subsistence species such as beluga whale, ringed seal, and possibly Arctic char and Dolly Varden. Although this type of commercial fishing has the potential to provide some economic benefit to the Inuvialuit, a commercial offshore fishery could affect existing subsistence fisheries through ecosystem effects. No known harvestable surpluses currently exist.

Recommendations from the decision key do not fetter the Minister's ability to meet DFO's obligations under the *Fisheries Act*. The outcomes of the decision key represent the current consensus of regional stakeholders regarding commercial fisheries development and management.

## Section 5: The Decision Key

Application for a new commercial fishery in the Beaufort Sea submitted to DFO should follow these steps:

1. Would the proposed commercial fishery adversely affect an Inuvialuit subsistence fishery to an unacceptable degree?
  - Yes – **recommend revision or rejection**; go to 12
  - No – go to 2

### *Actions*

- a) **DFO** reviews the baseline of existing Inuvialuit subsistence fisheries (see Section 3) developed from the BSBMP, CCPs, community fishing plans, [Traditional Knowledge Study for the Proposed Beaufort Sea Offshore Drilling Program](#), and other sources.
- b) The **FJMC** and local **HTC(s)** review the application, determine whether it conflicts with a local subsistence fishery, and advise DFO.
- c) **DFO** consolidates the information to determine whether the proposed fishery would adversely affect existing Inuvialuit fisheries.

*Rationale:* This question helps ensure the protection of Inuvialuit subsistence fisheries and the fulfilment of obligations under the IFA, the [Fisheries Act](#) (which states that Aboriginal Fisheries are to be protected as well as fish that support those fisheries), and the *Constitution Act*.

2. Is the proposed commercial fishery consistent with fulfilling responsibilities to the Inuvialuit for commercial fishing and economic opportunities under the IFA?
  - Yes – go to 3
  - No – **recommend revision or rejection**; go to 12

*Actions*

- a) **DFO** reviews the list of all active, or previously active, commercial fishing licences over the past three years (see Section 3) to determine whether Inuvialuit commercial fishing for the target species has occurred. The intent is to ensure fulfilment of obligations under IFA Section 14 (34) and Section 16 to ensure meaningful Inuvialuit participation.
- b) **DFO** requests the IRC, FJMC, and local HTC to review elements of the proposed fishery against their organizations' responsibilities for Inuvialuit commercial fishing pursuant to the IFA.
- c) **DFO** requests the IRC to evaluate the economic components of the proposed fishing activity based on Section 14 (32–34) and Section 16 of the IFA.
- d) Based on the advice provided by the IRC, FJMC, and HTCs, **DFO** determines whether the proposed fishery is consistent with fulfilling obligations to the Inuvialuit. To support this action, DFO relies on the [Integrated Aboriginal Policy Framework](#), the [IFA](#), and DFO commitment on participation of the Inuvialuit.

*Rationale:* Under Section 14 (32–34) of the IFA, the Inuvialuit have specific rights related to quota allocation, economic arrangements, and marketing features in a given commercial fishery. In addition, Section 16 of the IFA requires that all government programs be implemented in a manner that supports achievement of the economic objectives of Section 16 of the IFA. This question ensures that those rights are protected. Last, DFO has made a commitment that any exploratory or emerging fishery in the ISR must involve proper representation and meaningful participation by the Inuvialuit.

3. Does an IFMP or a community fishing plan exist for the target species and, if so, is the proposed fishery consistent with the plan?
  - Yes – **recommend acceptance**; go to 11
  - No – go to 4

*Actions*

- a) **DFO** reviews the application to determine whether the target species is covered by an existing IFMP or community fishing plan. The [Dolly Varden IFMP](#), [Paulatuk Char Management Plan](#), and [Ulukhaktok \(Holman\) Char Fishing Plan](#) are the only existing management plans for anadromous and marine fish and invertebrates in the western Arctic.
- b) **DFO** reviews any relevant IFMP or community fishing plan.

*Rationale:* IFMPs and community fishing plans are expressions of multi-stakeholder fishery advisory processes for priority fisheries. They represent the current expectations and priorities of parties with a stake in the fishery, and identify harvest management protocols for the species covered by the plans. The plans include information on fisheries and harvest rates suitable for the target species. Any proposed fishery should be consistent with existing IFMPs or community fishing plans.

4. Is the proposed commercial fishery consistent with any existing *SARA* plan or strategy?

- Not applicable (target species or affected species not listed under *SARA*) – go to 5
- Yes – go to 5
- No – **recommend revision or rejection**; go to 12

*Actions*

- a) **DFO** reviews the application against existing *SARA* [listed species](#) in the Beaufort Sea to determine whether the proposed fishery could affect a *SARA* listed species directly as a target species, through by-catch, or indirectly by targeting a known prey species.
- b) **DFO** reviews any *SARA* action plan, management plan or recovery strategy, and *SARA* listing to determine whether the proposed fishery is consistent with the requirements of these documents.

*Rationale:* Review of applicable *SARA* action plans, management plans or recovery strategies, or a *SARA* listing identifies whether a commercial fishery of the target species is allowed and, if so, under what conditions.

5. If the proposed commercial fishery occurs in any CCP category C, D, or E area, EBSA, or MPA, is the proposed fishery consistent with the area's legislation, management plan, or management objectives?

- Not applicable (proposed fishery outside of all such designated areas) – go to 6
- Yes – go to 6
- No – **recommend revision or rejection**; go to 12

*Actions*

- a) **DFO** determines whether the proposed fishing area overlaps with a category D or E marine area listed in the CCPs, a DFO EBSA, MPA, or marine park.
- b) **DFO** and **FJMC** review the prohibited and exempted activities listed in the TNMPA Regulations, the TNMPA Management Plan, and other management plans to determine whether the proposed fishery is consistent with these provisions.
- c) **DFO**, **FJMC**, and affected **HTC(s)** determine whether the proposed fishery poses a risk to the any of the above conservation designations, and supports the principles and objectives of the [IOMP for the Beaufort Sea](#).

*Rationale:* The IFA and *Oceans Act* call for the development and identification of MPAs, CCPs, and EBSAs. EBSAs, MPAs, and CCP category D and E sites are areas that may contain important fishery resources and/or critical supporting habitat, and require special management.

6. Is there a known harvestable surplus for the target species?

- Yes – go to 8
- No – go to 7

*Actions*

- a) **DFO** requests science advice relevant to the application. The advice considers the precautionary principle and ecosystem-based management a national priority both in legislation (*Oceans Act*) and in policy (Sustainable Fisheries Framework).

Specifically:

- The [Policy for Managing the Impact of Fishing on Sensitive Benthic Areas](#), Section 6.0 “Identification of Sensitive Benthic Areas and Risks” and Section 7.0 “Management Decision-Making Process”,
  - The [Policy on New Fisheries for Forage Species](#), Sections “Biological Pre-requisites for Commercial Fisheries on Forage Species” and “Management Pre-requisites for Commercial Fisheries on Forage Species”, and
  - A [Fishery Decision-Making Framework Incorporating the Precautionary Approach](#), Sections “Harvest Rate Strategy and Harvest Decision Rules”, and “Uncertainty and Risk”.
- b) **DFO** determines whether a harvestable surplus exists given existing subsistence fisheries.

*Rationale:* Existing legislation and policy (discussed in Section 2) places an emphasis on precautionary and ecosystem-based decision-making to ensure that fishery resources of the ISR are present for current and future generations. The Commissioner of the Environment and Sustainable Development provided additional support for this approach in the report “[A Study of Managing Fisheries for Sustainability](#)”. Canada has also signed the United Nations Agreement on Straddling and Highly Migratory Fish Stocks, further indicating that the federal government has committed to use the precautionary approach for managing domestic fish stocks.

7. Would the proposed commercial fishery have unacceptable effects on the target species, VECs, or the ecosystem?

- Yes – **recommend revision or rejection**; go to 12
- No – go to 8

*Actions*

- a) **DFO, FJMC, and HTC(s)** review the application to determine whether effects on the target species, VECs, and the ecosystem are acceptable.

*Rationale:* Any commercial fishing in the Beaufort Sea has to be consistent with the principle of the IFA (“to protect and preserve the Arctic wildlife, environment, and biological productivity”), the precautionary principle, and ecosystem-based management. This question enables an examination of the potential impacts of the proposed fishery on target species, VECs, and the ecosystem, and hence is crucial in achieving ecosystem management.



8. Is the proposal consistent with any established policies in the ISR with regard to gear type, vessel capacity, and independent monitoring by fishery observers?
- Yes – go to 9
  - No – **recommend revision or rejection**; go to 12

*Actions*

- a) **DFO** reviews the application against ISR policies on gear type, vessel capacity, and monitoring. As of 2013, no such policies exist for the ISR.

*Rationale:* Following applicable fishery management policies is part of implementing the Sustainable Fisheries Framework within the ISR. Applicability to the ISR of national policies on gear type, vessel capacity, or independent monitoring has not been assessed.

9. If the target species is shared with one or more other jurisdictions, do those jurisdictions support the proposed fishery?
- Not applicable (target species not shared with other jurisdictions) – go to 10
  - Yes – go to 10
  - No – **recommend revision or rejection**; go to 12

*Actions*

- a) **DFO** presents the application to any jurisdiction that shares the stock, and conducts formal consultations with them.
- b) The **other jurisdictions** provide a letter of position on the application to **DFO**.
- c) **DFO** determines whether the proposed fishery can proceed.

*Rationale:* It is common practice, if stocks are shared between the Inuvialuit and neighbouring land claims or other jurisdictions, to develop overlap agreements to promote shared management arrangements, joint science, and precautionary harvest practices. The positions of all affected jurisdictions should be considered in making any recommendation on a proposed fishery.

10. Are there other reasons why the proposed fishery should not proceed?
- Yes – **recommend revision or rejection**; go to 12
  - No – **recommend acceptance**; go to 11

*Action*

- a) **DFO, FJMC, IRC, and HTC(s)** review the application to determine whether any additional considerations exist that may prevent the acceptance of the application.

*Rationale:* Additional considerations, such as opinions or positions of stakeholders or other information, that have not been reflected in the preceding questions may exist. This question ensures that all such considerations are known and incorporated into making a final recommendation.

## 11. Recommend acceptance of the proposal

### *Actions*

- a) **DFO** communicates the decision to FJMC, IGC, IRC, HTC, and to other jurisdictions if necessary.
- b) **DFO** communicates the decision to the applicant.
- c) **DFO** implements the New Emerging Fisheries Policy if and as applicable.
- d) **DFO** conducts consultations with local HTC, FJMC, and IRC.
- e) **DFO** develops draft licence conditions consistent with: (1) the Sustainable Fisheries Framework and its policies, (2) the Precautionary Approach, (3) requirements to protect marine waters and their fishery resources, and (4) research and monitoring needs.
- f) **DFO** establishes or revises quotas if necessary.
- g) **DFO** implements a monitoring and enforcement plan.
- h) **DFO, FJMC, IRC and HTC(s)** review licence conditions.

## 12. Return the proposal to proponent(s) for revision or recommend rejection

### *Actions*

- a) **DFO** communicates the decision and its justification to FJMC, IGC, and IRC.
- b) **DFO** communicates the decision and revision instructions to applicant.

A lack of agreement on the DFO recommendations by the other Parties will necessitate further discussions with DFO.

## **Management Outcomes and Triggers for Implementation of Additional Activities**

Outcomes from the decision key are recommendations as to whether an application for a commercial fishery is accepted, rejected, or returned for revision. Regardless of the outcome of applying the decision key, the application, the process, and the possible subsequent fishery may trigger follow-up actions. Follow-up actions would depend, in part, on whether the proposed fishery would be for anadromous, inshore, or offshore species, and on the specifics of the proposal such as species, time, place, gear, and vessel. In addition, on-going management and monitoring of fisheries and actions related to anthropogenic stressors are required to help ensure protection of the Beaufort Sea ecosystem and its fishery resources.

### **Anadromous Fisheries**

Fishing plans exist for Paulatuk and Ulukhaktok Arctic char, and an IFMP exists for Dolly Varden. No current fishing plans or IFMPs exist for other anadromous species. Development of such plans would help to determine whether commercial fisheries are feasible and desirable. The specific process to develop IFMPs for anadromous fisheries within the ISR was established by the West Side and Rat River Working Groups during the creation of the IFMP for west side Dolly Varden stocks. Future IFMPs for anadromous species would be expected to follow the same protocol.

### **Inshore Fisheries**

Insufficient information exists to develop scientifically based IFMPs or fishing plans for inshore marine fish and invertebrate species or stocks. However, some community-based harvesting of these stocks does occur.

### **Offshore Fisheries**

Insufficient information exists to develop IFMPs or fishing plans for offshore marine fish and invertebrate species or stocks. Many offshore species are important parts of the Beaufort Sea food chain, support beluga and other species that are harvested by the Inuvialuit, and are part of the broader High Arctic Basin ecosystem context. The possible establishment of offshore fisheries requires significant research and policy review that also may be applicable for inshore fisheries. The requirements include:

- Research to determine whether harvestable surplus biomasses exist, and whether harvesting any surplus biomass would have adverse effects on existing Inuvialuit fisheries, potential by-catch species, and/or the Beaufort Sea ecosystem.
- Research to improve understanding of the occurrence, distribution, and life history of Arctic cod and its role in the Beaufort Sea ecosystem.
- Research and modelling to provide a better ecosystem model for the Beaufort Sea.
- Review of the New Emerging Fisheries Policy by DFO and IRC to ensure its implementation in the ISR is consistent with the specific obligations in Section 14 (32–34) and the broader obligations outlined in Section 16 of the IFA.

## **Section 6: Annual and Performance Reviews and Modifications**

Parties to the BSIFMF will work together through the appointed Steering Committee (SC) to manage the implementation of the BSIFMF:

- The SC is composed of representatives of DFO, FJMC, IGC, and IRC. The existing Terms of Reference for the SC and its responsibilities in regard to the implementation of the BSIFMF will be amended as required to address current priorities and directions of the Parties of the MOU.
- The Parties of the MOU and their appointed representatives will work together to ensure, to the extent possible, that funds are available to support the effective implementation of their responsibilities in the BSIFMF, and for its revisions.
- Reviews and evaluations of the BSIFMF will follow the adaptive co-management process, i.e., the SC will document decisions, report to the Parties of the MOU, assess results, and respond to the results.

## **The Review Process**

The SC will review implementation of the BSIFMF each year and report to the Parties of the MOU.

Based on current fisheries issues affecting the ISR, inputs of the key partner and stakeholder groups, research results, harvest monitoring, community feedback, and other information, the SC will determine:

- Whether a trigger exists for additional activity by the Parties in regard to known and unknown stressors for the marine environment of the Canadian Beaufort Sea.
- Whether changes should be made to existing harvest management and monitoring requirements.
- Whether changes should be made to implementation of the BSIFMF, e.g., through additional stock assessment, research, and monitoring or habitat-protection initiatives.
- Whether any IFMPs or fishing plans should be prepared.
- Whether any new policies or procedures should be developed.

The SC will consult with senior representatives of DFO, FJMC, IGC, IRC, and other agencies as required and recommend activities to the Parties of the MOU to be undertaken to further implement the BSIFMF MOU. Such activities might include: creation of a working group to examine an individual stressor, recommendation of major changes to fishery management measures, initiation of major new research or other initiatives, and development of any IFMP and fishing plans.

## SIGNATURE PAGE

The Department of Fisheries and Oceans, the Fisheries Joint Management Committee, the Inuvialuit Regional Corporation and the Inuvialuit Game Council support this Beaufort Sea Integrated Fisheries Management Framework for the Inuvialuit Settlement Region, and are committed to its effective implementation.

The signatories wish to acknowledge the roles of the Aklavik HTC, the Inuvik HTC, the Olokhtomiut HTC, the Paulatuk HTC, the Sachs Harbour HTC, the Tuktoyaktuk HTC and the Beaufort Sea Working Group in the development of the Framework, and their roles and responsibilities for its implementation.

The signatories undertake to conduct an in-depth review and evaluation of the Beaufort Sea Fisheries Management Framework every three to five years.



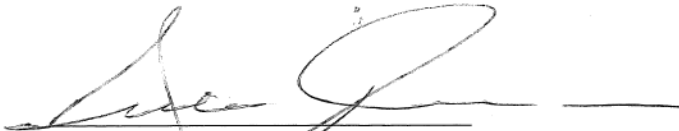
David Burden, A/Regional Director General, Central and Arctic Region  
Department of Fisheries and Oceans



D.V. Gillman, Chair  
Fisheries Joint Management Committee



F. Pokiak, Chair  
Inuvialuit Game Council



N. Cournoyea, Chair and CEO  
Inuvialuit Regional Corporation

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## APPENDIX A: ACRONYMS AND GLOSSARY

### Acronyms

ANAOI	Anguniaqvia Nqiqyuam Area of Interest
BSBMP	Beaufort Sea Beluga Management Plan
BSIFMF	Beaufort Sea Integrated Fisheries Management Framework
CCP	Community Conservation Plan
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPUE	Catch per Unit Effort
DFO	Fisheries and Oceans Canada
EBSA	Ecologically and Biologically Significant Area
EEZ	Exclusive Economic Zone
FJMC	Fisheries Joint Management Committee
HTC	Hunters and Trappers Committee
IDC	Inuvialuit Development Corporation
IFA	Inuvialuit Final Agreement
IFMP	Integrated Fisheries Management Plan
IGC	Inuvialuit Game Council
IOMP	Integrated Ocean Management Plan
IRC	Inuvialuit Regional Corporation
ISR	Inuvialuit Settlement Region
LOMA	Large Ocean Management Area
MOU	Memorandum of Understanding
MPA	Marine Protected Area
NEAFC	North East Atlantic Fishery Commission
NWT	Northwest Territories
RFMO	Regional Fisheries Management Organization
SARA	Species at Risk Act
SC	Steering Committee (of the BSIFMF)
TEK	Traditional Ecological Knowledge
TNMPA	Tarium Niryutait Marine Protected Area
UNCLOS	United Nations Convention on the Law of the Sea
VEC	Valued Ecosystem Component

### Glossary

#### *Adaptive co-management*

Adaptive co-management is a resource management process in which managers and fishers learn from their successes and failures. It combines the shared management responsibility of co-management with the cyclical process of adaptive management. It follows a three-step process: (1) documenting decisions, evaluating results, and responding to the evaluation or similarly identifying options, (2) developing indicators, and (3) monitoring results.

### *Anadromous*

Anadromy refers to a life-history mode in a species of fish that is hatched and resides in a freshwater ecosystem for a short period of time, matures in the ocean, and returns to fresh water to spawn. Various modes of anadromy exist (e.g., northern Dolly Varden has “seasonal anadromy” where fish use the sea during summer but return each year to overwinter in fresh water).

### *Benthos, benthic*

The bottom environment. These terms usually refer to invertebrates that inhabit the bottom sediments of rivers, lakes, and marine ecosystems.

### *Canadian Beaufort Sea*

That portion of the Arctic Ocean contained within the ISR, as outlined by the IOMP for the Beaufort Sea LOMA.

### *CCP*

The six Inuvialuit communities (Aklavik, Inuvik, Paulatuk, Sachs Harbour, Tuktoyaktuk, and Ulukhaktok) have each prepared a CCP with the Wildlife Management Advisory council (NWT) and the Joint Secretariat. Each plan provides information on species and areas important to the community, and is intended to provide guidance for planning in the area. The Plans are not legally binding.

### *Co-Management*

There are many different definitions of co-management. In the western Arctic, as a result of the IFA, co-management refers to the legislatively based sharing of management responsibilities between beneficiaries and the responsible government agency. With respect to the mandate of DFO, the FJMC provides the forum for, and is the mechanism through which, the co-management of fish and marine mammals in the ISR is conducted. Specific responsibilities are defined in the IFA, *Fisheries Act*, and *Oceans Act*.

### *COSEWIC*

COSEWIC is a committee of experts that assesses and designates which wildlife species are in some danger of disappearing from Canada. COSEWIC was created in 1977 as a result of a decision made at the Conference of Federal-Provincial-Territorial Wildlife Directors held in 1976 in Fredericton, New Brunswick. It arose from the need for a single, official, scientifically sound, national classification of wildlife species at risk. COSEWIC is an advisory body to SARA, thus ensuring that wildlife species will continue to be assessed using the best available scientific and Aboriginal TEK. Under SARA, the government of Canada will take COSEWIC's designations into consideration when establishing the legal list of wildlife species at risk.

### *CPUE*

Catch per unit effort is the amount of fish caught for a given fishing effort (e.g., the number of fish caught per hour per metre of gill net).

### *EEZ*

An EEZ, as prescribed by UNCLOS, stretches out from the seaward edge of a country's territorial sea to 200 nautical miles from its coast. A country has special rights for the exploration and use of marine resources, including fishery resources, within its EEZ. The EEZ may extend beyond the 200-mile limit.

### *Epontic community*

Ice-associated (e.g., under ice) plants and animals.

### *Harvestable Surplus*

Harvestable surplus is the biomass or number of fish that can be removed from a population through harvesting without impacting the long-term sustainability or average population size. Harvestable surplus is based on compensatory mortality (i.e., replacing deaths normally expected due to natural causes) with harvest deaths. Harvestable surplus is typically estimated through population dynamics modelling. A variety of models are available, ranging from simple with minimal data requirements (e.g., catch rates and harvest levels) to more complex with intensive data requirements (e.g., biological data such as age structure, age at maturity, fecundity, growth, and natural and fishing mortality).

### *IFA*

The IFA is the 1984 comprehensive land claim agreement between Canada and the Committee for Original Peoples' Entitlement, representing the Inuvialuit of the western Canadian Arctic. The agreement established the ISR and a co-management system for all matters relating to the management of living resources in the region, including their habitats. The basic goals of the Agreement are to: (1) preserve Inuvialuit cultural identity and values within a changing northern society, (2) enable the Inuvialuit to be equal and meaningful participants in the northern and national economy and society, and (3) protect and preserve the arctic wildlife, environment, and biological productivity.

### *IFMP*

IFMPs provide a planning framework for conservation, sustainable use, and recovery of fishery resources, a process by which a fishery and its supporting habitats will be managed for a period of time. IFMPs include measures to prevent harm to fishery resources. IFMPs were initiated to ensure greater integration of functional and technical expertise, integrate decision-making within areas subject to land claims agreements, identify performance outputs, and allow enhanced input from resource users and industry within a given fishery.

### *ISR*

The ISR is the area of the NWT and Yukon Territory negotiated in the IFA as defined in Annex A-1 of the IFA.

### *LOMA*

LOMAs are marine regions established by DFO for integrated management and planning purposes. They form the planning basis for implementation of integrated-management plans. LOMAs are typically hundreds of square kilometres in size. Their boundaries are determined using a combination of ecological and administrative considerations.



### *Precautionary Approach*

The precautionary approach was defined in the 1992 United Nations Conference on Environment and Development: “In order to protect the environment, the Precautionary Approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”. DFO’s Precautionary Approach identifies three stock status zones (healthy, cautious, critical) according to Upper Stock and Limit reference points, sets a removal rate at which fish may be harvested within each stock status zone, and adjusts the removal rate based on pre-agreed decision rules, in accordance with variations in fish stock status.

### *SARA*

*SARA* provides federal legislation to prevent wildlife species from becoming extinct and to provide for their recovery. Specifically, *SARA* is meant to: (1) prevent Canadian indigenous species, subspecies, and distinct populations from becoming extirpated or extinct, (2) provide for the recovery of endangered or threatened species, and (3) encourage the management of other species to prevent them from becoming at risk. *SARA* is a result of the implementation of the Canadian Biodiversity Strategy, which is a response to the United Nations Convention on Biological Diversity.

### *Sustainable Fisheries Framework*

The Sustainable Fisheries Framework forms the basis for decision-making in Canadian fisheries. It incorporates existing policies for fisheries management, conservation and sustainable use, governance, and economics with new and evolving policies using a phased-in approach. It also includes tools to monitor and assess results of conservation and sustainable use to identify areas that may need improvement. The primary goal of the Sustainable Fisheries Framework is to ensure that Canada’s fisheries are environmentally sustainable, while supporting economic prosperity. This goal means maintaining a balance between healthy fish stocks and marine environments, while allowing for prosperous fisheries, a balance known as “sustainable development”.

### *TEK/TK*

TEK (also known as traditional knowledge, TK) is a cumulative body of knowledge, practice, and belief evolving from adaptive processes and handed down through generations by cultural transmission. TEK is knowledge about the relationships between the biotic and abiotic parts of the land (including humans), learned from extensive interactions with the land. TEK is also values, beliefs, and practices that are passed from one generation to another by oral means or through learned experience, observation, and spiritual teachings, and pertains to identity, culture, and heritage. This body of knowledge reflects many millennia of living on the land. It is a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs the use of resources and defines the relationship of living beings with one another and with their environment.

## APPENDIX B: EBSAs, MPAs, AND CCP AREAS

EBSAs have been identified in the marine portion of the ISR (Fig. 3). EBSAs overlap with important areas identified in CCPs. EBSAs are the scientific support for the TNMPA and the ANAOI. Table 1 shows the relationship between the different areas, summarizes their important fishery-related features, and provides an assessment of the level of confidence in the data supporting an area as an EBSA. Table 2 uses the information in Table 1 to depict the importance of EBSAs for marine productivity, anadromous fishes, marine fishes and invertebrates, and marine mammals.

The six Inuvialuit communities have CCPs that identify important habitats and seasonal harvesting areas for each community. Important areas in the CCPs are classified into one of five categories. Category A lands have no known significant and sensitive cultural or renewable resources. Category B lands have cultural or renewable resources of some significance and sensitivity. Category C lands and waters have cultural or renewable resources of particular significance and sensitivity during specific times of the year; potential damage and disruption should be eliminated to the greatest degree possible. Category D lands and waters have cultural or renewable resources of particular significance and sensitivity throughout the year; potential damage and disruption should be eliminated to the greatest degree possible. Category E lands and waters have cultural or renewable resources of extreme significance and sensitivity; the highest degree of protection is recommended for these lands and waters. Only category C, D, and E marine waters are included in Table 1.

**Table 1: The important features of marine EBSAs, MPAs, and CCPs in the Beaufort Sea (Cobb 2011).**

Marine EBSA	Overlapping MPAs and CCP Areas (and CCP Category)	Important Fishery-related Features
<b>Western Arctic Biogeographic Region</b>		
Yukon North Slope	<ul style="list-style-type: none"> <li>• Aklavik and Inuvik CCPs: Eastern North Slope (D); Yukon North Slope Coastal Zone (D)</li> </ul>	<ul style="list-style-type: none"> <li>• High data confidence</li> <li>• Steep bathymetry; freshwater corridor</li> <li>• Dolly Varden, Arctic cisco, and other anadromous fish migration</li> <li>• Marine fish</li> <li>• Bowhead, beluga, and ringed seal migration and feeding</li> </ul>
Mackenzie Trough	<ul style="list-style-type: none"> <li>• Aklavik and Inuvik CCPs: Beluga Management Zone 2 (C)</li> </ul>	<ul style="list-style-type: none"> <li>• High data confidence</li> <li>• Deep trough; upwelling; Mackenzie River plume</li> <li>• High benthic diversity and productivity</li> <li>• Arctic cod</li> </ul>

		<ul style="list-style-type: none"> <li>• Bowhead, beluga, and ringed seal migration and feeding</li> </ul>
Mackenzie Estuary	<ul style="list-style-type: none"> <li>• TNMPA</li> <li>• Aklavik, Inuvik, and Tuktoyaktuk CCPs: Shallow Bay (C, E); Inner Mackenzie Delta (C); Kugmallit Bay (C, D, E); Beluga Management Zone 1A (E); Beluga Management Zone 2 (C); Mackenzie Bay and Shallow Bay (C, E); Tuktoyaktuk Peninsula Coast (C)</li> <li>• Inuvik CCP: Kendall Island</li> <li>• Tuktoyaktuk CCP: Kugmallit Bay and Tuktoyaktuk Peninsula Coast Spring, Summer, Fall, and Winter Fish Harvesting Areas (C)</li> </ul>	<ul style="list-style-type: none"> <li>• High data confidence</li> <li>• Shallow waters; upwelling; Mackenzie River plume</li> <li>• Zooplankton</li> <li>• Anadromous fish migration</li> <li>• Marine larval fish nursery; marine fish</li> <li>• Beluga aggregation; ringed seal feeding and migration</li> </ul>
Beaufort Shelf Break		<ul style="list-style-type: none"> <li>• High data confidence</li> <li>• Steep bathymetry; upwelling</li> <li>• High benthic diversity and productivity</li> <li>• Marine fish</li> <li>• Bowhead feeding and beluga migration</li> </ul>
Beaufort Slope		<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Steep bathymetry</li> <li>• High benthic diversity</li> <li>• Arctic cod aggregations; marine fish</li> <li>• Beluga feeding</li> </ul>
Husky Lakes	<ul style="list-style-type: none"> <li>• Aklavik CCP: Husky Lakes (E)</li> <li>• Inuvik CCP: Husky Lakes (D)</li> <li>• Tuktoyaktuk CCP: Husky Lakes Spring Seal Harvesting and Spring,</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Estuary; strong tidal flows</li> <li>• Freshwater and estuarine fish</li> <li>• Beluga feeding; ringed seal breeding, rearing, and feeding</li> </ul>

	Summer, Fall, and Winter Fishing Areas (C); Husky Lakes (D)	
Liverpool Bay	<ul style="list-style-type: none"> <li>• Aklavik, Inuvik, and Tuktoyaktuk CCPs: Kugaluk River Estuary (D); Liverpool Bay (D); Wood Bay (D)</li> <li>• Tuktoyaktuk CCP: Winter Fishing Area (C)</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Upwelling</li> <li>• High benthic diversity and productivity; kelp; clams; zooplankton</li> <li>• Diverse marine and anadromous fish; Pacific herring spawning</li> <li>• Bowhead, ringed seal, and bearded seal migration and feeding</li> </ul>
Horton River	<ul style="list-style-type: none"> <li>• Paulatuk CCP: Spring and Winter Seal Harvesting Areas (C); Summer/Fall Fish and Beluga Harvesting Areas (C); Beluga Management Zone 1B (E)</li> </ul>	<ul style="list-style-type: none"> <li>• Low data confidence</li> <li>• Steep bathymetry; upwelling</li> <li>• High primary productivity</li> <li>• Arctic char feeding and migration</li> <li>• Occasional bowhead and beluga feeding</li> </ul>
Franklin Bay	<ul style="list-style-type: none"> <li>• Paulatuk CCP: Spring and Winter Seal Harvesting Areas (C); Summer/Fall Fish and Beluga Harvesting Areas (C); Beluga Management Zone 1B (E); Offshore Franklin Bay (C)</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Deep water; lower halocline</li> <li>• Enhanced primary productivity</li> <li>• Arctic char</li> <li>• Arctic cod aggregations</li> <li>• Beluga and ringed seal feeding</li> </ul>
Cape Parry	<ul style="list-style-type: none"> <li>• Paulatuk CCP: Spring and Winter Seal Harvesting Areas (C); Summer/Fall Beluga Harvesting Area (C); Beluga Management Zone 1B (E)</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Potential upwelling; polynya</li> <li>• Enhanced productivity (benthos, ice-edge organisms, phytoplankton)</li> <li>• Arctic cod aggregations</li> <li>• Bowhead, beluga, ringed seal, and bearded seal feeding</li> </ul>
Hornaday River (Nearshore Darnley Bay)	<ul style="list-style-type: none"> <li>• Darnley Bay MPA Area of Interest</li> <li>• Paulatuk CCP: Spring and</li> </ul>	<ul style="list-style-type: none"> <li>• High data confidence</li> <li>• Estuary</li> <li>• Kelp beds</li> </ul>

	<p>Winter Seal Harvesting Areas (C); Summer/Fall Fish and Beluga Harvesting Areas (C); Beluga Management Zone 1B (E); Hornaday River Estuary (E)</p>	<ul style="list-style-type: none"> <li>• Arctic char feeding and migration</li> <li>• Pacific herring; capelin</li> <li>• Bowhead feeding and migration; beluga migration</li> </ul>
Offshore Darnley Bay	<ul style="list-style-type: none"> <li>• Darnley Bay MPA Area of Interest</li> <li>• Paulatuk CCP: Offshore Darnley Bay (C)</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Upwelling; ice-edges</li> <li>• High seasonal productivity</li> <li>• Arctic cod aggregations</li> <li>• Ringed seal rearing; bowhead and beluga migration</li> </ul>
DeSalis Bay	<ul style="list-style-type: none"> <li>• Sachs Harbour CCP: Offshore and Onshore Banks Island (C); Beluga Management Zone 1B (E)</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Upwelling</li> <li>• Arctic char feeding and migration</li> <li>• Bowhead feeding; moderately important beluga area; ringed seal habitat</li> </ul>
Thesiger Bay	<ul style="list-style-type: none"> <li>• Sachs Harbour CCP: Offshore and Onshore Banks Island (C); Offshore Sachs, Kellett, and Lennie rivers (D); Banks Island Coastal Waters (C)</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Flaw-lead polynya</li> <li>• High benthic diversity</li> <li>• Arctic char feeding and migration</li> <li>• Capelin migration</li> <li>• Bowhead feeding and migration; beluga and seals feeding</li> </ul>
Walker Bay	<ul style="list-style-type: none"> <li>• Olokhaktomiut CCP: Southwest Victoria Island Coastal Zone (C); Beluga Management Zone 1B (E)</li> </ul>	<ul style="list-style-type: none"> <li>• Low data confidence</li> <li>• Estuary</li> <li>• Shellfish</li> <li>• Arctic char feeding and migration</li> <li>• Ringed seal feeding and breeding; bearded seal feeding</li> </ul>
Minto Inlet/Kuuujua River	<ul style="list-style-type: none"> <li>• Olokhaktomiut CCP: Kuujua River and Diamond Jenness Peninsula Coastal Zone (E); Minto Inlet System</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Estuary</li> <li>• Pacific herring and Arctic cod use</li> <li>• Arctic char feeding and</li> </ul>

	(E); Beluga Management Zone 1B (E)	<ul style="list-style-type: none"> <li>• migration</li> <li>• Bowhead, beluga, and ringed seal occurrence</li> </ul>
Albert Islands/Safety Channel	<ul style="list-style-type: none"> <li>• Olokhaktomiut CCP: Tahioyak (Safety Channel) (D); North Shore of Prince Albert Sound (E); Southwest Victoria Island Coastal Zone (C); Beluga Management Zone 1B (E)</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Channel bathymetry; flaw leads</li> <li>• Capelin abundance; Arctic cod occurrence</li> <li>• Arctic char feeding and migration</li> <li>• Ringed seal and bearded seal breeding, rearing, and feeding</li> </ul>
Kagloryuak River	<ul style="list-style-type: none"> <li>• Olokhaktomiut CCP: Southwest Victoria Island Coastal Zone (C)</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Estuary</li> <li>• Arctic char feeding and migration</li> <li>• Ringed seal breeding, rearing, and feeding</li> </ul>
Viscount Melville Sound		<ul style="list-style-type: none"> <li>• Low data confidence</li> <li>• Deep basin</li> <li>• Lower-trophic-level prey species</li> <li>• Beluga and ringed seal feeding; bowhead occurrence</li> </ul>
Banks Island Flaw Lead		<ul style="list-style-type: none"> <li>• High data confidence</li> <li>• Flaw lead and ice edges</li> <li>• Enhanced productivity</li> <li>• Bowhead and beluga migration; bearded seal feeding</li> </ul>
Cape Bathurst Polynya		<ul style="list-style-type: none"> <li>• High data confidence</li> <li>• Major polynya and ice edges; upwelling</li> <li>• High benthic and zooplankton diversity and productivity</li> <li>• Arctic cod aggregations</li> <li>• Beluga migration; ringed seal feeding</li> </ul>
Cape Bathurst/Baillie Islands	Aklavik, Inuvik, and Tuktoyaktuk CCPs: Baillie	<ul style="list-style-type: none"> <li>• High data confidence</li> <li>• Upwelling</li> </ul>

	Islands (D)	<ul style="list-style-type: none"> <li>• High productivity; high benthic and zooplankton diversity and productivity</li> <li>• Bowhead and ringed seal feeding; beluga</li> </ul>
Beaufort Gyre/Multi-year Pack Ice (overlaps with Arctic Basin Multi-year Pack Ice EBSA)		<ul style="list-style-type: none"> <li>• Moderate data confidence</li> <li>• Ocean current; multi-year ice</li> <li>• Diversity and importance of organisms unknown</li> </ul>
Prince of Wales Strait	<ul style="list-style-type: none"> <li>• Olokhaktomiut CCP: Prince of Wales Strait (C)</li> <li>• Sachs Harbour CCP: Beluga Management Plan Zone 1B (E); Banks Island Coastal Waters (C); Prince of Wales Strait (C)</li> </ul>	<ul style="list-style-type: none"> <li>• Low data confidence</li> <li>• Bowhead, beluga, and ringed seal migrations</li> </ul>
<b>Arctic Basin Biogeographic Region</b>		
Arctic Basin Multi-year Pack Ice (overlaps with Beaufort Gyre/Multi-year Pack Ice EBSA)		<ul style="list-style-type: none"> <li>• High data confidence</li> <li>• Pack ice and ice edges</li> <li>• Unique habitats</li> <li>• Under-ice communities</li> </ul>
<b>Arctic Archipelago Biogeographic Region</b>		
Archipelago Multi-year Pack Ice		<ul style="list-style-type: none"> <li>• High data confidence</li> <li>• Pack ice and ice edges</li> <li>• Under-ice communities</li> </ul>

**Table 2: The importance of EBSAs for marine productivity, anadromous fishes, marine fishes and invertebrates, and marine mammals (Cobb 2011).**

EBSA	Productivity	Anadromous Fishes	Marine Fishes and Invertebrates	Marine Mammals
Yukon North Slope		x	x	x
Mackenzie Trough	x		x	x
Mackenzie Estuary		x	x	x
Beaufort Shelf Break	x		x	x
Beaufort Slope			x	x
Husky Lakes		x		x
Liverpool Bay	x		x	x
Horton River	x	x		x
Franklin Bay	x	x	x	x
Cape Parry	x		x	x
Hornaday River		x	x	x
Offshore Darnley Bay	x		x	x
DeSalis Bay		x		x
Thesiger Bay	x	x	x	x
Walker Bay		x	x	x
Minto Inlet/Kuujuua River		x	x	x
Albert Islands/Safety Channel		x	x	x
Kagloryuak River		x		x
Viscount Melville Sound				x
Banks Island Flaw Lead	x			x
Cape Bathurst Polynya	x		x	x
Cape Bathurst/Baillie Islands	x			x
Beaufort Gyre/Multi-year Pack Ice				
Prince of Wales Strait				x
Arctic Basin Multi-year Pack Ice				
Archipelago Multi-year Pack Ice				



## **APPENDIX C: CONTACTS**

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