

**SOCIO-ECONOMIC ASSESSMENT OF THE  
PROPOSED BEAUFORT SEA  
MARINE PROTECTED AREA**  
**Revised Final Report**

Submitted to:

**Fisheries and Oceans Canada**

Box 1871

Inuvik NT X0E 0T0

Submitted by:

**Kavik-AXYS Inc.**

Box 2320

Inuvik, NT X0E 0T0

In association with **Gustavson Ecological Research Consulting**



January 2003

---

**KAVIK-AXYS Inc.**

## EXECUTIVE SUMMARY

### INTRODUCTION

The world's largest summering stock of beluga whales congregate in the Beaufort Sea. The Beaufort Sea Beluga Management Plan aims to protect these beluga populations, their habitat and traditional harvesting by the Inuvialuit. The areas afforded maximum protection under the Plan are designated Zone 1a areas and defined as 'Traditional Harvesting/Concentration Areas'. The three Zone 1a areas, namely Shallow Bay, Kugmallit Bay, and the vicinity of Kendall Island, together comprise approximately 1,742 square kilometres of shallow (less than 2 m), warm brackish and highly turbid waters at the head of the Mackenzie Delta. The Zone 1a areas are currently an Area of Interest (AOI) under consideration as a marine protected area (MPA) under the *Oceans Act*. As part of the MPA candidacy process specified in the *National Framework for Establishing and Managing Marine Protected Areas*, the Beaufort Sea Integrated Management Planning Initiative (BSIMPI) Working Group initiated assessments of the ecological, social, cultural and economic environment of the proposed MPA, as well as of the technical merits of the proposal. Each of these assessments is presented in a separate report. The report contained herein is the Socio-economic Assessment. It provides a baseline description of current human use activities and cultural values in the area and identifies potential socio-economic impacts of various MPA scenarios incorporating the Zone 1a areas.

The socio-economic assessment was conducted using a combination of in-person interviews with community members in Inuvik, Aklavik and Tuktoyaktuk, telephone discussions, primarily with government officials and industry representatives, and a literature review of published reports, statistical documents, industry studies and websites. The interviews with hunters, trappers, elders and community members were particularly instrumental in describing the history of the beluga harvest and its social and cultural significance. The economic valuation focused on describing marketed and non-marketed direct use values; those actually involving current or recent physical use of the AOI by humans. The economic evaluation provides an indication of the extent of the 'values at risk' given a prohibition of elimination of specific uses.

### COMMUNITIES, GOVERNMENTS AND OTHER STAKEHOLDERS

The AOI is located in the Inuvialuit Settlement Region (ISR) established in the 1984 Inuvialuit Final Agreement (IFA). The ISR includes areas of the Beaufort Sea, the Mackenzie River Delta, the Yukon North Slope and the Arctic islands. There are three communities within the AOI. Inuvik, situated on the East Channel of the Mackenzie River Delta, is the regional administrative centre for the territorial government and the Inuvialuit and Gwich'in land claims. The Inuvialuit and Gwich'in have traditionally hunted and fished in the area, and continue to engage in their traditional cultural and subsistence pursuits on the land. However, Inuvik's local economy has been dominated by petroleum and service industries during the 1970s and 1980s, and again with the current resurgence of petroleum activity in the region. Tuktoyaktuk is situated at the northern end of the Tuktoyaktuk peninsula on the shore of Kugmallit Bay. While Tuktoyaktuk's traditional economy based on whaling and trapping shifted largely to a wage-based economy with the community's role in the Distant Early Warning line stations and petroleum industry, today, over 75% of households in the community still rely on the land for hunting and fishing. Transportation and petroleum industries, and increasingly guided recreation and tourism, provide wage-earning employment. Aklavik is situated on the shore of the Peel Channel on the west side of the Mackenzie River Delta. While it was once the major community in the Delta, today it is the smallest of the three communities owing to the relocation of a majority of its residents to the present-day Inuvik in the 1950s. This



community, too, has largely shifted to a wage-based economy, with employment found in government, retail, and services and support for transportation, tourism, and the mineral and gas industries; however, subsistence hunting, fishing, trapping and whaling remain important to the community's residents.

The IFA established a co-management system involving a number of Inuvialuit and Inuvialuit-government councils and committees such as Hunters and Trappers Committees, Inuvialuit Game Council, Fisheries Joint Management Committee, Wildlife Management Advisory Council (NWT), Wildlife Management Advisory Council (North Slope), Inuvialuit Land Administration, Environmental Impact Screening Committee, Environmental Impact Review Board, Community Corporations and Inuvialuit Regional Corporation. These organisations, along with Elders and Youth Committees, Community Economic Development Organisation, federal government departments and agencies (e.g., Fisheries and Oceans Canada, Environment Canada, Parks Canada, Indian and Northern Affairs Canada, National Defence, Transport Canada, Natural Resources Canada, National Energy Board, Canadian Environmental Assessment Agency), and NWT and Yukon territorial governments all share responsibility for management of the natural resources, land use and marine-based activities within the ISR. Integrated management initiatives such as the Beaufort Sea Beluga Management Plan and the Beaufort Sea Integrated Management Planning Initiative have been established to focus on activities within areas that include the AOI. In addition to these regulatory/management agencies and initiatives, other organisations have an interest in the AOI, namely:

- Petroleum companies, e.g., EnCana (formerly AEC West Ltd.), Anadarko Canada Corporation, Conoco-Phillips, Devon Canada, Imperial Oil Resources, Shell, SunCor Energy Inc.;
- Tourism Operators, e.g., Arctic Nature Tours, Arctic Tour Company, Aklavik Tours, Beaufort Delta Tours, Kendall Island Whale Watching Tours, Ookpik Tours, Uncommon Journeys;
- Transportation companies, e.g., Arctic Wings Ltd, Aklak Air, Beaudel Air, Canadian Helicopters, E. Grueben's Transport, Highland Helicopters, Northern Transportation Company Ltd, Stage Air;
- Research institutions/organizations, e.g., Aurora Research Institute, NWT and Yukon territorial governments, Canadian Wildlife Service, Canadian Polar Commission, Fisheries and Oceans Canada, Prince of Wales Northern Heritage Centre, universities; and
- Conservation organizations, e.g., World Wildlife Fund, Canadian Parks and Wilderness Society, Canadian Arctic Resources Committee.

## BASELINE SOCIO-ECONOMIC ASSESSMENT

### *Traditional Uses*

The Inuvialuit are the primary users of the AOI for fishing, hunting and camping. These activities are much more than subsistence economic pursuits; they are integral to the Inuvialuit culture offering tremendous social benefits, reconnection with the land, continuance of cultural traditions and strengthening of family and community bonds. All three Zone 1a areas are important fishing areas throughout the year for the Inuvialuit from Inuvik, Tuktoyaktuk and Aklavik. The main species harvested are broad whitefish and inconnu.

While documentation of the history and cultural significance of the beluga hunt to the Inuvialuit exists, more extensive traditional knowledge is held by Inuvialuit elders. The use of the AOI for whale hunting by ancestors



goes back many generations. Beluga is still an important traditional food harvested by the Inuvialuit. It is customary for the hunter to share the harvest among family, friends and elders. The Zone 1a areas are extremely important relative to other areas in the region. An estimated 95% of the beluga harvest is conducted in the Zone 1a areas, primarily in July and August. The harvest of beluga is limited to the number of whales required to cover subsistence needs, amounting to one or two whales per family annually. Other marine mammals harvested include ringed seals and bearded seals.

Wildlife such as polar bears, grizzly bears, caribou, Arctic and red fox, wolves, wolverines and lynx are also harvested in the vicinity of the AOI, predominantly in the Shallow Bay and Kugmallit Bay Zone 1a areas. Caribou are the most important land animals harvested year round and are a highly valued food source to the people of Inuvik, Tuktoyaktuk and Aklavik.

Important nesting and breeding habitat, and, hence harvesting areas for birds overlap all three Zone 1a areas. Geese, especially lesser snow goose, but also Canada goose and white-fronted goose are a very important food source in the spring and fall in all three Zone 1a areas.

While the predominant values of harvesting are social and cultural, the harvest also contributes to the economy of households and communities. Food harvested through traditional pursuits and shared among families is food that does not need to be purchased in stores. In remote northern communities, the cost of store-bought food is often several times higher than at stores in the south, and the food selection is more limited.

#### *Archaeological and Historical Values*

There are numerous known archaeological sites, including burial sites, campsites, villages and whaling stations, in the vicinity of the Zone 1a areas particularly around Shallow Bay and Kugmallit Bay. In addition, the Kittigazuit National Historic Site, located in the Mackenzie Delta 30 km southwest of Tuktoyaktuk, is recognized for the significance and abundance of archaeological resources which remain as evidence of a former Inuit settlement and whaling centre.

#### *Protected Areas*

Kendall Island Migratory Bird Sanctuary located on the outer margin of the Mackenzie Delta was established in 1961 to provide long-term protection to the colony of lesser snow geese, as well as the staging and breeding grounds of many migratory waterbird and shorebird species. Ivvavik National Park and Herschel Island Territorial Park are in the vicinity of the Zone 1a areas.

#### *Research and Education*

Prompted by the inherent wealth of biota and the implications of petroleum exploration, the AOI and surrounding area has been the subject of numerous geological, biological, oceanographic and archaeological studies in the past 30 years. Part of Garry Island is a Scientific Research Reserve for studying permafrost.

#### *Petroleum Exploration and Production*

Since the mid-1960s petroleum companies have been interested in tapping into the large volumes of oil and gas resources in the Beaufort-Mackenzie Basin resulting in thousands of seismic lines shot including 111 of which intersect the Zone 1a areas. The Kendall Island Zone 1a area is surrounded by significant hydrocarbon



discoveries and several exploration licenses. The significant discoveries within and adjacent to the Kendall Island Zone 1a area total approximately 15,270  $10^3\text{m}^3$  recoverable oil and 13,740  $10^6\text{m}^3$  marketable gas valued at approximately \$4.3 billion and \$1.5 billion respectively. Exploration licenses surround and clip the Kugmallit Bay Zone 1a area to the north, west and south. The significant discoveries within and adjacent to the Kugmallit Bay Zone 1a area total approximately 880  $10^3\text{m}^3$  recoverable oil and 4590  $10^6\text{m}^3$  marketable gas valued at \$0.25 billion and \$0.50 billion respectively. There are no existing exploration or significant discovery licenses near the Shallow Bay Zone 1a area.

Current interest in Arctic petroleum exploration and development is focused on onshore development. In addition, future development of these resources is highly contingent upon the selection of a pipeline route to transport the product south. Nevertheless, several offshore exploration licenses were issued in the vicinity in 2000 and winter seismic work was recently conducted.

### *Mining*

There are no mining interests in the immediate vicinity of the AOI.

### *Tourism*

Tourism is the third leading export of the NWT and is continuing to grow. The most important tourism activities in the Mackenzie Delta region are observing wildlife, hiking, rafting, sports hunting and fishing, visiting whaling, hunting and fishing camps, boating and attending community cultural events. No tourism operator presently conducts boat tours in the Zone 1a areas, although several operators have taken tourists to family camps near Kendall Island and whale watching near the boundary of the Kugmallit Bay Zone 1a area. Several companies that cater to tourists use the Shallow Bay and Kugmallit Bay Zone 1a areas as transportation corridors. Charter air companies also traverse these zones en route to other destinations. Although there are no plans underway by operators to use the Zone 1a areas for tourism, there remains, however, some interest in exploring opportunities for “appropriate” tourism focused on beluga whale watching.

There is insufficient information to estimate net economic tourism benefits in the vicinity of the AOI.

### *Transportation*

The primary local marine transportation route supplying the coastal communities is through Kugmallit Bay passing through the Zone 1a area. Fixed-wing and helicopter companies chartering to government, industry, local residents and tourists fly over the Zone 1a areas mostly during the summer. Winter charters primarily cater to oil and gas exploration activities. There is insufficient information to estimate the economic transportation benefits in the AOI.

### *Summary*

The table below summarizes and compares the socio-economic values of each of the Zone 1a areas. While it is difficult to make comparisons among different socio-economic sectors, one can apply a comparative relative scale. From a socio-economic (not ecological) perspective, Kendall Island offers the least conflict between the greatest development pressure, petroleum exploration and development, and the greatest socio-cultural values, traditional harvesting. While all three Zone 1a areas are important sites for beluga harvesting, Kendall Island's harvesting values are moderated by its distance from communities and comparatively less fishing, wildlife



harvesting and bird harvesting. Based on the information available, the Kendall Island Zone 1a area also has fewer known archaeological sites, although this may be a result of research effort rather than inherent historic value. In addition, the area around the Kendall Island Zone 1a area offers the greatest petroleum production potential.

**Summary of Socio-Economic Values in the Area of Interest**

<b>Socio-economic Sector</b>	<b>Shallow Bay</b>	<b>Kendall Island</b>	<b>Kugmallit Bay</b>
<b>Fishing</b>	High	Moderate	High
<b>Marine Mammal Harvesting</b>	High	High	High
<b>Land Animal Harvesting</b>	High	Moderate	High
<b>Bird Harvesting</b>	High	Moderate	High
<b>Archaeology</b>	High?	Moderate	High
<b>Protected Areas</b>	Low	High	Moderate
<b>Research and Education</b>	??	??	??
<b>Petroleum</b>	Low	High	Moderate
<b>Mining</b>	Low	Low	Low
<b>Tourism</b>	??	??	??
<b>Transportation</b>	Moderate	Low?	High

### SCENARIO ANALYSIS

Because activity in the Zone 1a areas is limited, at least voluntarily by the Beaufort Sea Beluga Management Plan (BSBMP) guidelines, the scenarios of different activity restrictions focus on allowing a greater degree of activity. The intent of the scenario analysis is to predict the consequences of management options and indicate the benefits that could be lost or gained. The chosen scenarios comprise:

- A. *Status quo*. Current BSBMP guidelines are formalized and legislated within a MPA.
- B. *Oil and gas driven scenario*. This development scenario assumes that identified resources adjacent to and within Zone 1a areas are extracted (*i.e.*, directional drilling is permitted to extract oil and gas from within the candidate MPA areas).
- C. *Tourism and recreation driven scenario*. Water-based tourism is permitted to continue unhindered.
- D. *Combination (oil and gas; tourism and recreation) of development*. Both water-base tourism and oil and gas development are allowed to proceed as defined in the previous scenarios.

In describing how the resource values may change with corresponding changes to management regulations and guidelines, one has to describe not only the current values associated with individual economic activities, but also the links between these activities and between the activities and the marine environment in the Zone 1a areas. The following table suggests a simple, explicit framework for examining the direct impacts of possible management policies and guidelines. Because of a lack of information specific to the study areas, the framework qualitatively describes the anticipated direction of the impact. It does not quantitatively describe the changes in



the net economic values, which would be preferred. In the table, the first column identifies the four separate development scenarios. The first row identifies the three primary sectors that will be affected by the management policies associated with each of the four development scenarios – that is, each scenario may result in changes to marine harvesting, oil and gas production, and tourism and recreation. The set of possible management policies are determined through consideration of the management objectives for the area as described in BSBMP. Possible alternative futures that are consistent with BSBMP, as well as those that represent an alteration of BSBMP plan, are described.

**Framework for Considering the Direct Impacts of Various Policy Scenarios on Economic Uses within Zone 1a Areas**

<b><i>Economic Activity</i> →</b>	<b>Marine Harvesting</b>	<b>Oil and Gas Production</b>	<b>Tourism and Recreation</b>
<b><i>Scenario</i> ↓</b>			
<b>Status quo</b>	Socio-economic values maintained. No change as a result of MPA.	Substantial resources “in ground” regionally, with some potential loss of those within/near Zone 1a areas.	Growth in sector reliant on use of areas outside of Zone 1a areas. No change as a result of MPA.
<b>Oil and gas driven scenario</b>	Socio-economic values at risk.	Full potential value derived from “in ground” resources.	Potential negative impact (magnitude unknown).
<b>Tourism and recreation driven scenario</b>	Potential negative impact (magnitude unknown).	No impact, unless activities restricted in favour of tourism development.	Growth at rate that is determined by industry ( <i>i.e.</i> , reduced restrictions).
<b>Combination (oil and gas; tourism and recreation) of development</b>	Socio-economic values at risk.	Full potential value derived from “in ground” resources.	Growth in sector reliant on ability to avoid use overlap with oil and gas development.



### INFORMATION AND KNOWLEDGE GAPS

While there is extensive information available on resources and activities in the Beaufort-Mackenzie region (Eddy 2001 provides an excellent information source), the time frame of the current project did not permit sufficient time to extract detailed information relating to the three Zone 1a areas under consideration as a MPA from which a reliable economic assessment can be conducted value. The socio-economic assessment could be refined with additional information as summarized in table below.

#### Summary of Data Gaps

Discipline	Description	Priority	Source
<b>Traditional Use</b>	The history of the beluga hunt, so central to the Inuvialuit way of life, has not been adequately documented (Day, pers. com.).	High	<ul style="list-style-type: none"> <li>▪ extensive discussions with elders as a means of more comprehensively articulating its significance</li> <li>▪ traditional use</li> </ul>
<b>Marine Harvesting</b>	Current data from the harvest study are not available as protocols for the third-party use of these data have not been developed. These data would be useful in providing a more accurate estimate of the total annual beluga harvest, the number of harvester, as well as locational information.	High	<ul style="list-style-type: none"> <li>▪ Inuvialuit Harvest Study (once 3<sup>rd</sup> party protocols are established)</li> </ul>
<b>Oil and Gas</b>	Production schedule would be needed to more accurately assess net values. Estimates of resources actually within Zone 1a areas need to be derived.	Moderate	<ul style="list-style-type: none"> <li>▪ petroleum companies</li> <li>▪ geological assessment</li> </ul>
<b>Transport</b>	Value of cargo, comparative air freight costs, fuel costs, etc. would be needed to more accurately assess net values.	Moderate	<ul style="list-style-type: none"> <li>▪ transport companies</li> </ul>
<b>Tourism</b>	There is presently no means of determining independent tourist use of the Zone 1a areas. Several people indicated that cruise ships from Russia, China, Germany, etc. are seen traveling through the area <i>en route</i> to Alaska, but did not have any details on where they went or how often. While of interest in predicting regional tourism trends and the possibility of unguided tourists in the Zone 1a areas, information on the number and travel patterns of independent tourists would be virtually impossible to collect. Further, the number of independent tourists is known to be low based on anecdotal information.	Low	<ul style="list-style-type: none"> <li>▪ cruise ship traffic may be available through the Coast Guard</li> </ul>



## MANAGEMENT IMPLICATIONS OF MPA DESIGNATION

### *Management Objectives*

Management direction, including boundary delineation and restrictions on human activities, for a MPA are generally developed in accordance with the overall objectives of the MPA. At this stage in the process, these have not been specifically and comprehensively defined for the Beaufort Sea MPA under consideration. Nevertheless, by virtue of identifying the three Zone 1a areas as defined in the BSBMP, the intent is to provide legislative authority to protecting beluga and fish habitat in support of maintaining healthy populations for subsistence harvesting, including whaling. While throughout the course of the study there was a general consensus that protecting the area and the whales was beneficial, some interviewees commented that allowing beluga whales to be harvested within the MPA appeared to be contrary to protection objectives.

### *Boundary Delineation*

The AOI for the proposed Beaufort Sea MPA is defined as the three Zone 1a areas specified in the BSBMP. The following factors should be taken into account in delineating the MPA boundary:

- core protection areas with stricter human use restrictions surrounded by a buffer zone where limited and controlled activities could take place which do not compromise the inherent management objectives;
- designating one or two of the Zone 1a areas as a MPA based on the contribution of each to the management objective and the degree of conflict in values;
- applying different restrictions to each of the three Zone 1a areas;
- applying temporal restrictions during critical periods for beluga and other marine species;
- the foreshore and upland extent of the boundaries to protect the ecological values from terrestrial impacts.

### *Existing Management Direction*

Management direction for the proposed MPA may be derived from existing plans, regulations and guidelines. For example, current management direction as specified in the BSBMP guidelines and the IFA include:

- all subsistence hunting and fishing would be allowed to continue as it does at present;
- the oil and gas industry should not be permitted to explore for resources within or on the shores of any Zone 1 waters nor produce hydrocarbons or construct/operate any type of facility;
- the main shipping channel through Kugmallit Bay should remain accessible to shipping traffic;
- subsistence hunting takes priority over tourism activities;
- water-based tourism and related activities are not permitted within the Zone 1a areas; and
- no mining activities (e.g., gravel removal) should be permitted within or on the shores of any Zone 1a waters.



These guidelines represent a status quo scenario that is generally consistent with the spirit and intent of MPAs under the *Oceans Act*. The guidelines, if adopted in whole or in part, could provide a firm basis for the development of a management plan for a regulated MPA. However, results of this socio-economic overview have indicated that there is some interest among stakeholders in deviating from the existing management direction as expressed in the BSBMP. Potential options for a MPA are discussed in more detail below. Final decisions regarding permissible uses and management prescriptions must be determined through further consultations among the Inuvialuit, regulatory agencies and other stakeholders.

#### *Activities in the MPA*

The negative and positive impacts of MPA designation on various socio-economic sectors are summarized in the table below. Beyond the intended benefits of protecting beluga populations, habitat and traditional harvesting, MPA designation could also provide a research focus for biophysical and archaeological studies. These opportunities can be enhanced by embarking on a traditional use study of the area, co-ordinating the research permitting process and establishing a forum for communicating and sharing research results. However, MPA designation may also serve to attract visitors and potentially intrusive research which will need to be monitored. Depending on the level of restrictions, MPA designation may also alienate some economic activities such as petroleum exploration and production, tourism and transportation. The petroleum industry could face a loss of investment in exploration and communities could lose employment opportunities. Tourism growth would have to be reliant on areas outside the MPA for growth. The transportation industry may be curtailed by lack of access or increased cost of circumventing Zone 1a areas. Negative impacts on these industries could be mitigated by permitting winter-seismic activity, directional drilling, whale watching from shore or in months other than July and August, and low overflight restrictions during July and August. However, given that two of the three Zone 1a areas are within direct transportation marine and air corridors, transportation restrictions (e.g., through trips only, no stopping, minimum flight altitude) would be difficult to enforce.



### Summary of Socio-Economic Impacts, Mitigation and Enhancement Options of a Marine Protected Area

Socio-economic Sector	Negative Impact	Positive Impact	Mitigate/Enhance
<b>Subsistence Harvesting</b>		<ul style="list-style-type: none"> <li>▪ Protected resource</li> <li>▪ Continuation of traditional use</li> </ul>	
<b>Archaeology/ History</b>		<ul style="list-style-type: none"> <li>▪ Less disturbance to archaeological sites</li> <li>▪ Opportunities for further studies</li> </ul>	<ul style="list-style-type: none"> <li>▪ Traditional use study</li> </ul>
<b>Protected Areas</b>	<ul style="list-style-type: none"> <li>▪ Could serve to attract more visitors</li> </ul>	<ul style="list-style-type: none"> <li>▪ Beluga sanctuary</li> <li>▪ Node in MPA network</li> </ul>	<ul style="list-style-type: none"> <li>▪ Monitoring</li> </ul>
<b>Research and Education</b>	<ul style="list-style-type: none"> <li>▪ Impact of intrusive research</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provides a research focus</li> <li>▪ Opportunities for public education</li> </ul>	<ul style="list-style-type: none"> <li>▪ Monitoring</li> <li>▪ Co-ordination of permitting process</li> <li>▪ Forum to communicate research results</li> </ul>
<b>Petroleum Exploration and Production</b>	<ul style="list-style-type: none"> <li>▪ Loss of investment (compensation issues)</li> <li>▪ Loss of employment</li> <li>▪ Loss of revenue</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduced impact on beluga</li> </ul>	<ul style="list-style-type: none"> <li>▪ Winter seismic activity</li> <li>▪ Directional drilling</li> </ul>
<b>Mining</b>	-	-	-
<b>Tourism</b>	<ul style="list-style-type: none"> <li>▪ Restriction of activity</li> <li>▪ Growth reliant on areas outside Zone 1a areas</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduced impact on beluga</li> <li>▪ Reduced intrusion on traditional harvesting</li> </ul>	<ul style="list-style-type: none"> <li>▪ Whale watching except in July and August</li> <li>▪ Whale watching from onshore</li> <li>▪ Enforcement</li> </ul>
<b>Transportation</b>	<ul style="list-style-type: none"> <li>▪ Lack of access</li> <li>▪ Additional cost of circumventing Zone 1a areas</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduced impact on beluga</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low overflight restrictions in July and August</li> <li>▪ Enforcement</li> </ul>



## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	<b>i</b>
<b>LIST OF FIGURES</b> .....	<b>xiii</b>
<b>LIST OF TABLES</b> .....	<b>xiii</b>
<b>ACRONYMS</b> .....	<b>XIV</b>
<b>PREAMBLE</b> .....	<b>xv</b>
<b>1.0 INTRODUCTION</b> .....	<b>1</b>
<b>1.1 Background</b> .....	<b>1</b>
<b>1.2 Objectives</b> .....	<b>3</b>
<b>1.3 Study Area</b> .....	<b>3</b>
1.3.1 Detailed Study Area .....	3
1.3.2 Regional Study Area .....	3
<b>1.4 Methods</b> .....	<b>5</b>
<b>2.0 COMMUNITIES, GOVERNMENTS AND OTHER STAKEHOLDERS</b> .....	<b>7</b>
<b>2.1 Communities</b> .....	<b>7</b>
2.1.1 Inuvik .....	7
2.1.2 Tuktoyaktuk .....	7
2.1.3 Aklavik .....	7
2.1.4 The Inuvialuit Settlement Region and Inuvialuit Final Agreement .....	8
<b>2.2 Governing and Advisory Bodies</b> .....	<b>9</b>
2.2.1 Overview .....	9
2.2.2 Organizations with Lead Responsibility for Beaufort Sea MPA .....	9
2.2.3 Federal Government .....	10
2.2.4 Territorial Governments .....	14
2.2.5 Joint Management Committees .....	15
2.2.6 Inuvialuit Organizations .....	16
2.2.7 Integrated Management Initiatives .....	19
<b>2.3 Industry and Science Interests</b> .....	<b>20</b>
2.3.1 Resource Exploration and Extraction .....	20
2.3.2 Tourism .....	21
2.3.3 Transportation .....	21
2.3.4 Research .....	22
2.3.5 Conservation .....	24
<b>3.0 BASELINE SOCIO-ECONOMIC ASSESSMENT</b> .....	<b>25</b>
<b>3.1 Cultural and Social Values</b> .....	<b>25</b>
3.1.1 Historical Context .....	25
3.1.2 Inuvialuit Cultural Identity and the Environment .....	26
3.1.3 Importance of Traditional Food .....	27
3.1.4 Current Use of the Land and Sea .....	28



3.1.5	Archaeological and Historical Values.....	35
3.1.6	Protected Areas .....	37
3.1.7	Research and Education .....	37
<b>3.2</b>	<b>Industry and Commerce.....</b>	<b>39</b>
3.2.1	Petroleum Exploration and Production .....	39
3.2.2	Mining .....	46
3.2.3	Tourism.....	46
3.2.4	Transportation.....	48
3.2.5	Military and Coast Guard Activities.....	49
<b>3.3</b>	<b>Summary .....</b>	<b>50</b>
<b>4.0</b>	<b>SCENARIO ANALYSIS.....</b>	<b>51</b>
<b>4.1</b>	<b>Description of Scenarios .....</b>	<b>51</b>
<b>4.2</b>	<b>Assessment of Scenarios .....</b>	<b>52</b>
<b>5.0</b>	<b>INFORMATION AND KNOWLEDGE GAPS.....</b>	<b>54</b>
<b>6.0</b>	<b>MANAGEMENT IMPLICATIONS OF A MPA DESIGNATION.....</b>	<b>55</b>
<b>6.1</b>	<b>Management Objectives.....</b>	<b>55</b>
<b>6.2</b>	<b>Boundary Delineation.....</b>	<b>55</b>
<b>6.3</b>	<b>Existing Management Direction .....</b>	<b>55</b>
<b>6.4</b>	<b>Activities in the MPA .....</b>	<b>56</b>
<b>7.0</b>	<b>REFERENCES .....</b>	<b>59</b>
<b>7.1</b>	<b>Reports .....</b>	<b>59</b>
<b>7.2</b>	<b>Interviewees .....</b>	<b>62</b>
<b>7.3</b>	<b>Websites .....</b>	<b>63</b>
<b>7.4</b>	<b>Other Information Sources .....</b>	<b>64</b>
APPENDIX A.	Interview Protocols .....	65
APPENDIX B.	A Primer on Economic Valuation.....	75
APPENDIX C.	Biophysical Research in the Vicinity of Zone 1a Beluga Protection Areas, 1996-2001 (Aurora Research Institute 2001) .....	77



## LIST OF FIGURES

Figure 1. Beaufort Sea MPA Area of Interest Regional Study Area.....	2
Figure 2. Beaufort Sea MPA Area of Interest Detailed Study Area.....	4
Figure 3. Inuvialuit Private Lands.....	18
Figure 4. Archaeological and Heritage Sites in the Vicinity of the Area of Interest .....	36
Figure 5. Seismic Lines in the Vicinity of the Area of Interest .....	40
Figure 6. Oil and Gas Activity in the Vicinity of the Area of Interest.....	41
Figure 7. Oil and Gas Exploration Camps in the Vicinity of the Area of Interest.....	43

## LIST OF TABLES

Table 1. Use of the Area of Interest by Tuktoyaktuk Harvesters (Community of Tuktoyaktuk <i>et al.</i> 2000) .....	28
Table 2. Key Fish Species Harvested in the Area of Interest (Fabijan <i>et al.</i> 1993).....	29
Table 3. Key Marine Mammals Harvested in the Area of Interest (Fabijan <i>et al.</i> 1993).....	30
Table 4. Key Land Animals Harvested in the Area of Interest (Fabijan <i>et al.</i> 1993).....	33
Table 5. Key Birds Harvested in the Area of Interest (Fabijan <i>et al.</i> 1993) .....	33
Table 6. Volume Estimates for Significant Oil and Gas Discoveries in the Vicinity of the Area of Interest (National Energy Board 1998).....	42
Table 7. Summary of Socio-Economic Values in the AOI.....	50
Table 8. Framework for Considering the Direct Impacts of Various Policy Scenarios on Economic Uses within Zone 1a Areas.....	53
Table 9. Summary of Data Gaps .....	54
Table 10. Summary of Socio-Economic Impacts, Mitigation and Enhancement Options of a MPA.....	58



## ACRONYMS

AOI	Area of Interest
ARI	Aurora Research Institute
BSBMP	Beaufort Sea Beluga Management Plan
BSIMPI	Beaufort Sea Integrated Management Planning Initiative
CAPP	Canadian Association of Petroleum Producers
CARC	Canadian Arctic Resources Committee
CEAA	Canadian Environmental Assessment Agency
CPAWS	Canadian Parks and Wilderness Society
CPC	Canadian Polar Commission
CWS	Canadian Wildlife Service
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
EIRB	Environmental Impact Review Board
EISC	Environmental Impact Screening Committee
EL	Exploration License
FJMC	Fisheries Joint Management Committee
GNWT	Government of the Northwest Territories
HTC	Hunters and Trappers Committee
IGC	Inuvialuit Game Council
IFA	Inuvialuit Final Agreement
IRC	Inuvialuit Regional Corporation
INAC	Indian and Northern Affairs Canada
ISR	Inuvialuit Settlement Region
MPA	Marine Protected Area
MWA	Marine Wildlife Area
NEB	National Energy Board
NMCA	National Marine Conservation Area
NRCan	National Resources Canada
NWT	Northwest Territories
RWED	Department of Resources, Wildlife and Economic Development (GNWT)
SDL	Significant Discovery License
SMC	Senior Management Committee
WG	Working Group
WMAC (NWT)	Wildlife Management Advisory Council (NWT)
WMAC (North Slope)	Wildlife Management Advisory Council (North Slope)
WWF	World Wildlife Fund



## PREAMBLE

The three Zone 1a areas of the Beaufort Sea Beluga Management Plan (BSBMP) are being assessed as a potential Marine Protected Area (MPA) under the *Oceans Act (1997)*. These three Zone 1a areas are located in the outer delta and estuary of the Mackenzie River and are wholly within the Inuvialuit Settlement Region (ISR), which was established through the Western Arctic Claim Act and Inuvialuit Final Agreement. The assessment is being conducted through the Beaufort Sea Integrated Management Planning Initiative (BSIMPI). BSIMPI is a collaborative arrangement between the Inuvialuit, government and industry to conduct integrated management planning for the marine and coastal area of the ISR.

The BSBMP was developed by the co-management body, Fisheries Joint Management Committee (FJMC), in cooperation with the six ISR community Hunters and Trappers Committees and Fisheries and Oceans Canada (DFO). The BSBMP created a series of beluga management zones with specific guidelines for each zone. It recommended that Zone 1 areas, which include the Zone 1a areas, be treated as if protected and recommended restrictions for a variety of activities within these areas. The BSBMP has no regulatory mechanisms associated with it; therefore, compliance to the BSBMP is voluntary.

With the passage of the *Oceans Act* in 1997, discussions began between DFO and FJMC on Oceans Act programs and priorities for implementation. These discussions led to a request from FJMC to DFO to examine the Zone 1a areas as a potential MPA. This request led to a broader discussion with the Inuvialuit, including the Inuvialuit Game Council and Inuvialuit Regional Corporation. This, along with discussions with other government agencies and the Canadian Association of Petroleum Producers, resulted in the establishment of the BSIMPI process to assess the proposed MPA.

The approach adopted for assessing the proposed MPA is outlined in the DFO working document *National Framework for Establishing and Managing Marine Protected Areas*. The National Framework describes three assessments; ecological, socio-economic and technical, which would assist in the determination of the suitability of an area of interest as a MPA. A multiple account framework, a method of economic analysis, has been added and will complement the socio-economic assessment. BSIMPI has added a fourth assessment to examine issues related to non-renewable resources.

The purpose of the ecological assessment is to determine whether the proposed MPA complies with the reasons for MPAs as stated in the *Oceans Act*; and to determine the ecological merits of the proposed MPA and their relative significance.

The focus of the socio-economic assessment is on the ways in which the establishment of a MPA will affect human activities in and around the proposed MPA. The assessment also examines ways in which the social and economic benefits of the proposed MPA could be enhanced or the costs reduced. The multiple account framework organizes and displays information and anticipated impacts (positive and negative) associated with the possible management objectives for the area.



The purpose of the technical assessment is to assess the feasibility of the designation of a MPA. It addresses administration and management (and co-management) related issues; a review of appropriate boundaries of the proposed MPA; and whether there is public and stakeholder support.

The non-renewable resource assessment describes the geological conditions, identifies potential and known commercial resource locations and assesses the feasibility of extracting resources from potential and known locations.

The four assessments, in conjunction with consultations with communities, Inuvialuit organizations, industry and government, form the basis for making an informed decision by the BSIMPI partners on whether the Zone 1a areas should be established as a MPA.



## 1.0 INTRODUCTION

### 1.1 Background

The areas referred to as Zone 1a in the Beaufort Sea Beluga Management Plan (BSBMP) are being assessed as a potential marine protected area (MPA) under the *Oceans Act* (Figure 1). These zones are defined Traditional Harvesting/Concentration Areas, in which belugas are harvested by Inuvialuit from Inuvik, Tuktoyaktuk and Aklavik (Fisheries Joint Management Committee 2001). The BSBMP calls for these Zone 1a areas to be treated as protected areas and includes guidelines for the conservation of beluga whales and their habitat. In the absence of regulatory authority, these guidelines are being followed on a voluntary basis. Designation of this area of interest (AOI) as a MPA will provide the regulatory authority to enforce these guidelines and other conservation measures. Discussions with the Inuvialuit regarding the candidate MPA led to the formation of a Senior Management Committee (SMC) and a Working Group (WG) to implement the Beaufort Sea Integrated Management Planning Initiative (BSIMPI) with the initial task of assessing the BSBMP Zone 1a areas as a potential MPA.

Canada's *Oceans Act* defines MPAs as legally designated areas designed and managed to: (1) conserve and protect the ecological integrity of marine ecosystems, species and habitats; and (2) to contribute to the social and economic sustainability of coastal communities by providing for uses that are compatible with the reasons for designation (Fisheries and Oceans Canada 1998, 1999a). Coastal areas have long been sought after for socio-economic opportunities such as subsistence and commercial harvesting, resource exploration, research, transportation, recreation and tourism. In current MPA practice, it is generally desirable to consider the continuation of such activities within and adjacent to MPAs where such activities can be managed to meet conservation principles and the objectives of sustainable development. MPA designation, however, may also require management of human use through some level of restriction or limitation on the types, timing, locations and scope of activities (Crosby 1994). These decisions can be facilitated by assessing the relative significance of these activities in the proposed MPA areas by documenting, describing and quantifying the historical, current, and potential social, economic and scientific values of a candidate MPA (Bunce *et al.* 2000, Kelleher and Kenchington 1992, Kelleher *et al.* 1997, Phillips 1998).

A socio-economic assessment of the proposed area can inform:

- boundary delineation;
- how establishment of the MPA will affect human activities such as fishing uses, community uses, aboriginal interests, economic and transportation uses, and cultural, recreational and tourism values and uses in and around the area (Fisheries and Oceans Canada 1998);
- the appropriate degree of protection based on the types and levels of use that should be permitted or prohibited;
- feasible options and recommended strategies for managing human uses so that the appropriate degree of protection is ensured; and
- how the socio-economic benefits of the MPA can be enhanced or the costs reduced (Fisheries and Oceans Canada 1998).



**Figure 1. Beaufort Sea MPA Area of Interest Regional Study Area**



Additionally, the socio-economic assessment will provide information needed to identify effective means of sharing management responsibilities for the proposed Beaufort Sea MPA.

The socio-economic assessment is one of three studies currently being undertaken for the candidate MPA in the Beaufort Sea. After completion, the socio-economic, ecological and technical assessments will be reviewed by a joint meeting of the FJMC and BSIMPI Working Group. This review will lead to one or more recommendations to the SMC for their comment and/or decision. If the recommendation is favourable to having these areas become a MPA, and the recommendation is accepted by the SMC, further consultations will occur and a management plan will be developed for the potential MPA. After consultations and the approval of a management plan by the SMC, a regulatory impact assessment will be completed by the federal government prior to the areas being designated as a MPA.

## 1.2 Objectives

The main purpose of the socio-economic assessment is defined in three project objectives:

1. provide a general socio-economic baseline description of that part of the Inuvialuit Settlement Region (ISR) that will potentially be affected by the proposed Beaufort Sea MPA;
2. identify the potential socio-economic impacts of the proposed MPA on human activities in and around the proposed MPA and provide information on how the socio-economic benefits of the MPA can be enhanced or the costs reduced; and
3. summarize the findings of the socio-economic assessment in a report.

## 1.3 Study Area

### 1.3.1 Detailed Study Area

The AOI for the proposed MPA comprises the three Zone 1a areas as defined in the BSBMP (Figure 2) (Fisheries Joint Management Committee 2001). Together they encompass approximately 1,742 km<sup>2</sup> of shallow (less than 2 m), warm, brackish and highly turbid waters at the head of the Mackenzie Delta. The western most Zone 1a area comprising 1,155 km<sup>2</sup> is located in Shallow Bay between Bird Camp and Shingle Point (hereafter referred to as Shallow Bay). The central area is bounded by Garry Island, Pelly Island and Kendall Island and occupies 207 km<sup>2</sup> (hereafter referred to as Kendall Island). The easternmost area is located in 380 km<sup>2</sup> of Kugmallit Bay, west of Tuktoyaktuk, southeast of Summer Island, to the entrance of the Mackenzie River (hereafter referred to as Kugmallit Bay).

### 1.3.2 Regional Study Area

Activities in areas adjacent to the AOI may have implications for the MPA. In turn, management guidelines and restrictions within the MPA may influence activities in the surrounding area. Therefore, it is important to recognize the regional context of the proposed MPA. The three Zone 1a areas are surrounded by a Zone 2 designation, which applies to the Mackenzie Shelf waters shallower than 20 m that are not already included in Zone 1 (Fisheries Joint Management Committee 2001). The regional study area encompasses the Mackenzie River Delta and three main communities: Inuvik, Tuktoyaktuk, and Aklavik (see Figure 1).



**Figure 2. Beaufort Sea MPA Area of Interest Detailed Study Area**



The Mackenzie River Delta includes lakes, wetlands and river channels covering about 35,000 km<sup>2</sup>. Approximately 5,000 people of Inuvialuit, Gwich'in and non-Aboriginal origin reside in the region. The regional study area lies entirely within the Inuvialuit Settlement Region (ISR), which was created with the signing of the Inuvialuit Final Agreement (IFA) in 1984.

The marine environment of the ISR includes a permanently ice-covered region, a seasonally ice-covered region, and a coastal area influenced by the mixing of salt water with fresh water from the Mackenzie River. The continental shelf of the Beaufort Sea is quite narrow, nowhere exceeding 150 km offshore. The average depth of the shelf is less than 65 m, and ranges from around 10 m in the Mackenzie Delta to 600 m around Amundsen Gulf. The shelf seas and ice edges provide hunting grounds for the Inuvialuit and top animal predators. The Beaufort Sea marine region has a large population of polar bear, ringed and bearded seals, the largest summer feeding population of bowhead whales, and perhaps the world's largest summering stock of beluga whales. The beluga that move into ISR waters every summer form part of a larger population that winters in the Bering Sea and/or the East Siberian Sea. Each spring the population separates into several stocks that migrate to summering areas ranging from Bristol Bay on the Alaskan West Coast, to the eastern Beaufort Sea. Individual beluga have been observed returning to the Mackenzie Delta estuary in successive years. Their unique tolerance for fresh water is thought to indicate an important physiological dependence on particular sites.

#### 1.4 Methods

In-person interviews, primarily with community members, were conducted over a one-week period in Inuvik and in Aklavik in November 2001 and January 2003 and telephone discussions, primarily with government officials and industry representatives, were conducted throughout the course of the project. Interview protocols covering traditional use, oil and gas exploration and development, transportation, tourism operations, and science and research were developed as guidelines for discussions (see Appendix A). Those with experience in a particular theme were asked relevant questions. For example, hunters, trappers, elders and community representatives were asked the question set relating to traditional use. Petroleum company representatives were asked the question set related to oil and gas exploration and development. There was no protocol applicable to some government representatives interviewed. Instead, these interviews were more informal; focusing on general knowledge of existing uses and sources of additional information or contacts.

The interviews proved valuable for the collection of primary information and data regarding human uses in and around the Zone 1a areas. Interviews focused on extracting information about the types and levels of past, present and proposed future uses of the AOI as well as the interviewees' opinions about the social, cultural and/or economic values and benefits of their activity in relation to the AOI. The interviews were conducted with Inuvialuit hunters, trappers and community members, tourism and industry representatives, and government representatives. Although a traditional use study was beyond the scope of this socio-economic overview, interviews with local Inuvialuit hunters, trappers and elders were used to gather information about the history of the beluga harvest and its social and cultural significance. However, more focused interviews with elders from the three communities would be required to more fully document the extensive amount of traditional knowledge.

In addition to interviews, a literature search was conducted to gather additional socio-economic information. This included published reports, statistical documents, industry studies and websites. Previous analyses of



economic values available for other similar regions and for similar economic activities in other regions were also incorporated.

Complete lists of reference material and personal communications are presented in Section 7.0.

The analysis of socio-economic values focused on describing marketed and non-marketed direct use values, including both the economic values that businesses and other commercial operations generate, as well as the benefits that individuals enjoy from the use of the study area (see Appendix B for a discussion on economic valuation). A key objective of the analysis is to explicitly link the baseline values associated with the AOI to known types, extent and patterns of use. It is then possible to examine potential changes in the baseline values associated with losses and gains in specific uses given different possible designation and management scenarios. In essence, the economic evaluation supports decision making by indicating the extent of the 'values at risk' – that is, the economic benefits that could be lost or gained given a prohibition or elimination of specific uses. For all uses, the information provides an indication of their relative importance.

Due to limitations in the amount of quantitative information available for the study area, the socio-economic value analysis is primarily qualitative. The use of more qualitative methods should not imply that these values do not exist or are not important. Care should be exercised in the interpretation of this report to ensure that certain economic values are not downplayed simply because the information was not available. For example, cultural, heritage and spiritual values associated with the study area are not conducive to quantification but can, nonetheless, be extremely important.

Section 2.0 of the socio-economic report describes the key community, government, industrial, commercial and scientific stakeholders in and around the AOI. The baseline socio-economic assessment is presented in Section 3.0. Section 4.0 presents three alternative scenarios for managing human use. Information gaps are identified in Section 5.0. The report concludes in Section 6.0 with some management implications emanating from the socio-economic assessment.



## 2.0 COMMUNITIES, GOVERNMENTS AND OTHER STAKEHOLDERS

### 2.1 Communities

#### 2.1.1 Inuvik

Inuvik (Inuvvik) is situated on the East Channel of the Mackenzie River, in an area where the Inuvialuit and Gwich'in have traditionally hunted and fished (see Figure 1). It is the largest permanent community in the region with more than 3200 residents, which includes an Inuvialuit population of approximately 1200 and a Gwich'in population of approximately 450 (Census 1996). The community, originally known as 'Aklavik East Three', was established in 1956 as the regional centre for administration, education, health care and transportation. It was also intended to be the relocation site for residents of Aklavik, a community whose location made it prone to flooding and erosion. Inuvik flourished in the 1970s and 1980s with the growth of the petroleum industry. Conversely, the economy suffered with the decline of the petroleum industry and closure of the Canadian Forces Base in the late 1980s. Today, it is the regional administrative centre for the territorial government and the Inuvialuit and Gwich'in land claims. The petroleum and service industries are again strong drivers of the local economy since 1999. Despite recent developments and the transition to more of a wage-based economy, subsistence harvesting of fish, animals and plants remains important to the Inuvialuit and Gwich'in people who reside in this area. Inuvik is accessible by air and by road year round except during break up and freeze up. In winter months, ice roads provide a link to Aklavik and Tuktoyaktuk (Community of Inuvik *et al.* 2000; <http://www.assembly.gov.nt.ca/MewNWT/Inuvik.html>).

#### 2.1.2 Tuktoyaktuk

The hamlet of Tuktoyaktuk (Tuktuujaartuq) is situated at the northern end of the Tuktoyaktuk Peninsula on the shore of Kugmallit Bay (see Figure 1). The area has been used by the Inuvialuit and their ancestors for thousands of years. During the early 20<sup>th</sup> century influenza epidemics decimated the Inuit whaling population and, shortly after, the area was populated by Alaskan Dene and Herschel Island residents. The town grew in the 1950s with a decline in fur trapping and an increasing role in the re-supply of Distant Early Warning (DEW) line stations. Further growth was prompted by oil and gas exploration in the 1970s and 1980s. Employment was severely affected by the decline of the oil and gas industry in the 1980s. Today, over 75% of households in the community of nearly 1000 people (1996 census) still rely on the land for hunting and fishing, while maintaining wage-earning employment in the transportation and petroleum industries. Guided recreation and tourism during winter and summer provide limited but increasing employment opportunities. The community is accessible by air from Inuvik, and by ice roads in the winter months. Barges transport food and supplies in the summer (Community of Tuktoyaktuk *et al.* 2000; <http://www.assembly.gov.nt.ca/MewNWT/Tuktoyaktuk.html>).

#### 2.1.3 Aklavik

Aklavik (Aklavik) is situated on the shore of the Peel Channel on the west side of the Mackenzie River Delta (see Figure 1). Shortly after its original settlement, Aklavik became an important gathering place and regional centre and by 1920 was the major community in the Delta. Serious flooding and erosion in the 1950s prompted the federal government to relocate its administration offices and staff to Inuvik, and as a result the population in



Aklavik began to decline. Nevertheless, many residents chose to remain in Aklavik, from which the slogan “never say die” emanated. Today, the Aklavik community is home to approximately 700 people (1996 Census), primarily Inuvialuit (50%) and Gwich’in (40%). The economy has largely shifted to a wage-based economy, with employment found in government, retail businesses, and services and support for transportation, tourism, and the mineral and gas industries. Subsistence hunting, fishing, trapping and whaling remain important to the community’s residents, although trapping for furbearers in particular has declined in recent years. The community is accessible by air from Inuvik, and by ice roads in the winter months. Barges transport food and supplies in the summer (Community of Aklavik *et al.* 2000; <http://www.assembly.gov.nt.ca/MewNWT/Aklavik.html>).

#### **2.1.4 The Inuvialuit Settlement Region and Inuvialuit Final Agreement**

The AOI is located entirely within the ISR. In 1984 the Inuvialuit and the Canadian federal government signed the Inuvialuit Final Agreement (IFA), the first comprehensive land claim agreement for a region wholly within Arctic Canada. It granted the Inuvialuit surface title to 72,000 km<sup>2</sup> of land and surface, and subsurface title to an extra 18,000 km<sup>2</sup>. The IFA has three basic goals (Department of Indian Affairs and Northern Development 1984):

- (a) to preserve Inuvialuit cultural identity and values within a changing northern society;
- (b) to enable Inuvialuit to be equal and meaningful participants in the northern and national economy and society; and
- (c) to protect and preserve arctic wildlife, environment and biological productivity.

The IFA granted the Inuvialuit responsibility for the management and investment of financial compensation and benefits and land ownership/use in the ISR, carried out through agencies such as the Inuvialuit Regional Corporation, six Community Corporations, Inuvialuit Land Corporation, Inuvialuit Investment Corporation, and Inuvialuit Development Corporation. Social concerns, such as housing, health, education, and the maintenance of traditional practices and perspectives within the ISR are addressed by the Inuvialuit Social Development Program.

The IFA also granted the Inuvialuit unprecedented and substantial co-management responsibilities for marine mammals, fish and wildlife through agencies such as the FJMC, the Wildlife Management Advisory Councils (WMAC (NWT) and WMAC (North Slope)), and the Inuvialuit Game Council (IGC). The IFA also required that local communities have a substantial say in what types of activities, including traditional harvesting, industrial activities, and recreational activities, can occur within their traditional harvesting areas (and particularly within privately owned lands as per Section 7(1)a and 7(1)b of the IFA). As a result of the IFA and its associated regulations and responsibilities, the establishment of a Beaufort Sea MPA would have to be set within the regulatory context of the ISR.



## 2.2 Governing and Advisory Bodies

### 2.2.1 Overview

The ISR, in which the proposed MPA is found, is governed by layers of political jurisdiction. The IFA established structures and processes by which the government and the Inuvialuit co-manage renewable resources. These ensure that the Inuvialuit are involved in the decision-making processes for decisions that affect Inuvialuit interests in the ISR. The mandates and responsibilities of the following federal, territorial, joint management, and Inuvialuit governing, advisory and regulatory bodies are described with respect to their role or interest in the establishment of a MPA in the Beaufort Sea or other activities in the Zone 1a and surrounding areas. DFO and the FJMC share the primary responsibilities for establishing and managing a Beaufort Sea MPA.

### 2.2.2 Organizations with Lead Responsibility for Beaufort Sea MPA

#### Fisheries and Oceans Canada

DFO is mandated to protect and conserve marine and freshwater resources and habitat, establish fishery management plans, develop conservation and protection policies and implement programs to provide for the sustainable use of Canada's marine resources. With the passage of the *Oceans Act* in 1997, Canada became one of the first countries in the world to make a legislative commitment to a comprehensive approach for the protection and development of oceans and coastal waters. To reinforce this approach, the *Oceans Act* calls for wide application of the precautionary approach to the conservation, management and exploitation of marine resources. It also recognizes the significant opportunities offered by the oceans and their resources for economic diversification and the generation of wealth for the benefit of all Canadians, particularly those in coastal communities. To achieve these commitments, the *Act* calls on the Minister of Fisheries and Oceans to lead and facilitate the development of plans for integrated management.

Also under the *Oceans Act*, DFO is responsible for identifying potential marine protected areas (including: unique habitats; endangered or threatened marine species and their habitats; commercial and non-commercial fishery resources including marine mammals; and marine areas of high biodiversity or biological productivity), presenting management plans for marine protected areas to the federal cabinet, drafting federal legislation or regulations, if required, to implement the protected area, and taking a coordinating and overseeing role for established marine protected areas in Canada. In addition to DFO, Parks Canada and Environment Canada (Canadian Wildlife Service) also share mandated responsibilities to create protected areas in the marine environment. DFO leads in the development and implementation of a national system of marine protected areas, which incorporates the different programs of the three departments (Fisheries and Oceans Canada 1999a). The process for establishing protected areas in the marine environment, as specified under the National Framework for Establishing and Managing Marine Protected Areas (Fisheries and Oceans Canada 1999b), allows for flexible approaches in each DFO Region. In the ISR, where the management of living resources is carried out in the context of co-management, DFO must collaborate with co-management bodies, in particular the FJMC, on processes for nominating, establishing and managing a MPA.



Management of the Beaufort stock of beluga has been carried out under several federal acts and regulations, including the *Fisheries Act*, which is the responsibility of DFO. Within this act are Marine Mammal Regulations, which state the licensing requirements for hunting marine mammals, including beluga, and regulate activities associated with their harvesting. DFO participated in the development of the BSBMP, which sets out a plan for the management and sustainable harvest of beluga in the Beaufort Sea. DFO is also involved in the management of Beaufort Sea beluga through its representation on the FJMC.

The Canadian Coast Guard is under the jurisdiction of DFO and is responsible for safe harbours, waters and waterways, and maintaining an extensive system of navigational aids and marine communication. They manage and regulate marine transportation and have a fleet that provides icebreaking, aids to navigation, rescue, safety and environmental response services, and provides some research logistics support to various agencies and organizations. Also under the jurisdiction of DFO, Canadian Hydrographic Services produces reliable navigational charts.

#### Fisheries Joint Management Committee

The FJMC was established to assist DFO and the Inuvialuit in administering the rights and obligations relating to fisheries under the IFA and to assist DFO in carrying out its responsibility for the management of fisheries and marine mammals in the ISR. The FJMC also advises the Inuvialuit and DFO on all fishery management and related issues within the ISR. This would include advice regarding the establishment of a MPA in Zone 1a areas. Among other areas, the FJMC is responsible for allocating subsistence quotas for fish and marine mammals, determining harvest levels, and preventing conflict with Inuvialuit activities. The goal of the FJMC is to ensure that the renewable marine, anadromous and freshwater resources of the ISR are managed and conserved for the wise use and benefit of present and future generations. The FJMC works closely with government agencies, particularly DFO, renewable resource user groups, and resource councils and committees established under the IFA, as well as with other land claim groups on a variety of activities and programs (Fisheries Joint Management Committee 2002; <http://www.fjmc.ca/>).

### **2.2.3 Federal Government**

Several federal government departments or agencies hold legislated responsibilities for regulating or managing resources or human activities in the Mackenzie Delta – Beaufort Sea Region. Those that would play key roles or maintain key interests relating to the establishment of a MPA in the study area are: DFO, Environment Canada, Parks Canada, Indian and Northern Affairs Canada (INAC), Department of National Defence (DND), Transport Canada, Natural Resources Canada (NRCan), National Energy Board (NEB) and Canadian Environmental Assessment Agency (CEAA).

#### Fisheries and Oceans Canada

See Section 2.2.2.

#### Environment Canada

Environment Canada's mandate is to preserve and enhance the quality of the natural environment. Environment Canada has legislative authority to establish marine wildlife areas and they regulate land activities that may affect marine protected areas in the offshore. Environment Canada's major focus is protecting major marine and



nearshore areas for wildlife, research, conservation and public education. The Canadian Wildlife Service (CWS) and Canadian Environment Assessment Agency (CEAA) are both under the regulatory mandate of Environment Canada and play a role, either direct or indirect, in the implementation and/or maintenance of MPAs.

CWS is the national wildlife agency of the federal government. Their mandate includes the protection and management of migratory birds and nationally important wildlife habitat, endangered species and research on nationally important wildlife issues. CWS establishes migratory bird sanctuaries, identifies key migratory bird habitat sites and is responsible for granting permits for migratory bird research (see Section 2.3.4). CWS is represented on the WMAC (NWT). The establishment of Marine Wildlife Areas (MWAs) is the responsibility of CWS, although none has been established to date. MWAs are intended to protect nationally significant habitats, especially for migratory birds, but also for other wildlife for the purpose of wildlife research, conservation and interpretation (Canadian Wildlife Service 1996).

CEAA has the mandate to provide Canadians with high-quality environmental assessments. CEAA is responsible for the overall administration of the federal environmental assessment process and serves as a centre of expertise. The roles of CEAA also include: providing advisory support for review panels, comprehensive studies and mediators; promoting the uniformity and harmonization of environmental assessment activities across Canada at all levels of government; ensuring opportunities for meaningful public participation in the federal environmental assessment process; promoting or conducting research and development on environmental assessment matters; and encouraging the development and application of sound environmental assessment techniques and practices. CEAA is mandated by instruments such as the *Canadian Environmental Assessment Act* and its accompanying regulations, and international agreements containing environmental assessment provisions to which Canada is a party (Canadian Environmental Assessment Agency 2002; [www.ceaa-acee.gc.ca/index\\_e.htm](http://www.ceaa-acee.gc.ca/index_e.htm)). In the ISR, however, the primary responsibility for environmental assessment lies with the Environmental Impact Screening Committee (EISC) and the Environmental Impact Review Board (EIRB) (see Section 2.2.5). To promote efficiency, effectiveness and the harmonization of procedures, when a development is subject to a review by both the EIRB and CEAA, the two will work out an agreement for a single review process by a panel that includes representatives from both organizations and which reports to both the Minister of Environment and the relevant regulatory authority under the IFA.

### Parks Canada

Parks Canada, an agency under the jurisdiction of Heritage Canada, is mandated to protect and present nationally significant examples of Canada's natural and cultural heritage and foster public understanding, appreciation and enjoyment in ways that ensure their ecological and commemorative integrity for present and future generations. Parks Canada identifies and establishes National Marine Conservation Areas (NMCA), National Historic Sites and National Parks (Parks Canada 2002; [http://parksCanada.pch.gc.ca/parks/main\\_e.htm](http://parksCanada.pch.gc.ca/parks/main_e.htm)).

The *Canada National Marine Conservation Areas Act*, passed in 2002, calls for a national system of marine areas to represent the full range of Canada's marine ecosystems found within the Atlantic, Arctic and Pacific oceans, and the Great Lakes. As of yet, there are no NMCAs in the Arctic. NMCAs are managed for sustainable use and may contain smaller zones of high protection. They are protected from such activities as ocean dumping, undersea mining, and oil and gas exploration and development, however, traditional fishing



activities would be permitted within the overall context of conservation. MPAs designated under other federal programs may be considered as part of the NMCA plan if conservation objectives are similar.

The National Historic Site component of Parks Canada is responsible for Canada's program of historical commemoration, which recognizes nationally significant places, persons and events. National Parks are a countrywide system of representative natural areas of Canadian significance. They are protected for public understanding, appreciation and enjoyment, while being maintained in an unimpaired state for future generations (Parks Canada 2002; [http://parkscanada.pch.gc.ca/parks/main\\_e.htm](http://parkscanada.pch.gc.ca/parks/main_e.htm)).

Protected areas within and adjacent to the AOI are described in Section 3.1.6.

#### Indian and Northern Affairs Canada

Indian and Northern Affairs Canada (INAC) has primary, but not exclusive, responsibility for meeting the federal government's constitutional, treaty, political and legal responsibilities to First Nations, Inuit and Northerners. This broad mandate falls under two programs: Indian and Inuit Affairs, and Northern Affairs. Through these programs, INAC supports Aboriginal peoples in the ISR in developing healthy, sustainable communities, and in achieving their economic, political, cultural and social aspirations. This includes overseeing the implementation of the IFA and promoting economic development. Under the Northern Affairs Program, INAC is responsible for managing natural resources, protecting and rehabilitating the northern environment and fostering leadership in sustainable development. Increasingly, INAC's role has become one of facilitating change and bringing together the partners and interests needed to facilitate the evolution of strong northern governments, economies, communities and peoples (Indian and Northern Affairs Canada 2002; [http://www.ainc-inac.gc.ca/ai/mand\\_e.html](http://www.ainc-inac.gc.ca/ai/mand_e.html)).

In the ISR, INAC works in partnership with aboriginal groups and non-aboriginal northerners, with other federal and territorial departments and agencies, co-management bodies, industry and other stakeholders. In terms of resources management, INAC no longer has sole responsibility for permitting resource development and use. INAC works with the resource and environmental management boards that have resulted from the IFA, and which are charged with reviewing and recommending to the Minister of INAC the permitting of proposed resource use in various regions of the North. INAC continues to administer issuance of surface and subsurface rights in Arctic offshore lands.

#### Department of National Defence

The Department of National Defence (DND) has the mandate to formulate and manage all aspects of defence policy, defend Canada and Canadian interests and values while contributing to international peace and security. The mandate to defend Canada is achieved through monitoring and controlling activity within Canada's national territory, airspace and maritime areas of jurisdiction, assisting other government departments in achieving various national goals, maintaining a national search and rescue capability, and assisting in national emergencies. The mandate to defend North America is achieved through protecting the Canadian approaches to the continent in partnership with the United States, particularly through the North American Aerospace Defence Agreement, maintaining the ability to operate effectively at sea, on land, and in the air with the military forces of the United States in defending the northern half the Western Hemisphere (Department of National Defence



2002; <http://www.forces.gc.ca/eng/index.html>). Within the ISR, DND has remote north warning systems, a forward operating location in Inuvik for F18 aircraft, and a local Ranger program.

### Transport Canada

Transport Canada helps to ensure reliable, safe and sustainable transportation systems to connect communities and trading partners, and to protect the physical environment. This includes marine, road, ice road and air transportation systems. For marine transportation specifically, Transport Canada is responsible for ship safety, the protection of life, property and the marine environment. It develops and administers the Arctic marine regulatory regime, carrying out the application and enforcement of regulatory programs and initiatives of ship inspection and certification, and ship source pollution prevention (Transport Canada 2002; <http://www.tc.gc.ca/>). Barges that deliver goods to Tuktoyaktuk, Holman, Sachs Harbour and Paulatuk during the ice-free period make use of a transportation corridor that transects Zone 1a areas of the proposed MPA. Similarly, winter ice roads pass through these zones. Transport Canada works in partnership with other federal, provincial, territorial and municipal departments and organizations, the Transportation Safety Board, the Canadian Transportation Agency, NAV CANADA, other private organizations, stakeholders, and members of the transportation industry.

### Natural Resources Canada

Natural Resources Canada (NRCan) deals with natural resource issues related to the sustainable development and use of natural resources, energy, minerals and metals, forests and earth sciences. They conduct leading-edge science and technology research and maintain a national knowledge infrastructure (economic, environmental and scientific information) on Canada's land and resources. NRCan ensures that federal policies and regulations on issues such as the environment, trade, the economy, Canadian land and science and technology enhance the natural resources sector's contribution to the economy. Internationally, NRCan helps Canada meet its commitments related to natural resources, and keeps access open to global markets for Canadian products, services and technology. Acts administered by NRCan of particular relevance to the proposed MPA include the *Arctic Waters Pollution Prevention Act*, *Canada Oil and Gas Operations Act*, and *Canada Petroleum Resources Act* (Natural Resources Canada 2002; [http://www.nrcan-nrcan.gc.ca/inter/index\\_e.html](http://www.nrcan-nrcan.gc.ca/inter/index_e.html)).

### National Energy Board

The NEB mandate is to promote safety, environmental protection and economic efficiency in the Canadian public interest while respecting individuals' rights within the regulation of pipelines, energy development and trade. They regulate the construction and operation of interprovincial and international pipelines, the tolls and tariffs of interprovincial and international pipelines, the construction and the operation of international power lines, the exports of oil and electricity, the exports and imports of natural gas, and the exploration and development of oil and gas resources in non-accord frontier areas. The NEB grants permits for many of the activities involved in oil and gas exploration and development, including the drilling of wells and seismic activities in the Inuvialuit Settlement Region (National Energy Board 2002; [http://www.neb.gc.ca/index\\_e.htm](http://www.neb.gc.ca/index_e.htm)).



## 2.2.4 Territorial Governments

The territorial governments of NWT and Yukon have various responsibilities for the well being of people and the management of resources on land and offshore. Several government departments within each territory have regulatory responsibilities or legislative and program mandates that apply to activities that presently or may potentially occur in offshore areas and on lands adjacent to the proposed protected area, and would therefore have an interest in its establishment and management.

### NWT Territorial Government

The Government of the Northwest Territories (GNWT) recognizes that sustainable development of resources is essential to the long-term economic, cultural and social well being of northern residents. The Department of Resources, Wildlife and Economic Development (RWED) is mandated to promote economic self-sufficiency and growth through the sustainable development of natural resources and the creation of economic opportunities in the NWT, on behalf of the territorial government. Of the core RWED functions, those relating to environmental protection, minerals, oil and gas, parks and tourism, and wildlife management are the most relevant to the proposed MPA.

- **Environmental Protection** – Programs are aimed at protecting and enhancing the environmental quality in the north. Working closely with federal, aboriginal and municipal agencies, the Environmental Protection Division works to control the discharge of contaminants and reduce their impacts on the natural environment. These impacts can transcend into marine environments through the transport of contaminants via rivers and streams.
- **Minerals, Oil and Gas** – This division develops and implements strategies to encourage and attract non-renewable resource development in the NWT, and advises on the geological potential, industrial activity and potential opportunities associated with mineral, oil and gas exploration on land and offshore.
- **Parks and Tourism** – The Parks and Tourism Division provides for the development, operation, and maintenance of public tourism facilities such as parks, visitor centres, interpretive displays, and promotional signs. It also has responsibility for licensing tourism guides and outfitters, and providing information and advice to enhance tourism products in the NWT.
- **Wildlife Management** – The principal mandate of this division is to protect wildlife species through research, conservation programs, and partnerships with harvesters, stakeholders, residents and other governments. Some of their activities, such as research, occur within the Zone 1a areas. This division works closely with co-management boards and advisory bodies such as WMAC (NWT) (see Section 2.2.5).

### Government of Yukon

Three Yukon government departments oversee land uses occurring in the Yukon North Slope and particularly in the areas south of the Shallow Bay Zone 1a area.

- **Environment** – The Yukon Department of Environment is responsible for managing and protecting Yukon's natural environment in a sustainable, comprehensive and integrated manner. Their programs and services include fish and wildlife management and conservation, territorial parks and



protected areas, habitat and environmental protection, hunter and environmental education, the regulation of hunting, fishing, trapping, and the delivery of wildlife viewing programs.

- **Tourism** – In partnership with the private sector, interest groups, aboriginal governments and other government departments, the Yukon Tourism Department aims to stimulate and sustain economic growth and employment opportunities by promoting development and growth of the tourism sector. Their responsibilities also include licensing and providing information to guides and outfitters.
- **Energy, Mines and Resources** - The department's responsibilities are to responsibly manage Yukon's natural resources and ensure sustainable resource and land use and to promote investment in the responsible development of Yukon's natural resources. The department, on behalf of the Yukon government, is proceeding to enter into negotiations with the federal government that will lead to the development of a shared offshore oil and gas management regime. In the interim, while the shared offshore regime is being developed, the department, through its membership on an offshore committee, will review and make recommendations on all offshore oil and gas matters subject to federal ministerial decisions.

On November 19, 1998 the *Canada-Yukon Oil and Gas Accord Implementation Act (Bill C-8)* was passed which transferred the management and administration of the Yukon's onshore oil and gas resources from the federal government to the Yukon government. The management and regulation of the development and conservation of oil and gas is now governed by this territorial legislation. The *Yukon Oil and Gas Act* was developed jointly with Yukon First Nations, pursuant to a January 1997 Memorandum of Agreement to develop a common regime. To allow Yukon to exercise its new responsibilities, new legislative powers will be included in the *Yukon Act*, namely in relation to oil and gas exploration, development, conservation, management, pipelines, funds, and export. New provisions will be added to the *Yukon Act* to allow the federal government to continue to exercise its other responsibilities and will allow the Governor in Council to take back the administration and control of oil and gas in any lands in the Yukon in order to settle aboriginal land claims.

### 2.2.5 Joint Management Committees

Under the IFA, a number of organizations were established to bring together Inuvialuit, federal and territorial interests as advisory bodies under a co-management regime. Each of these have mandates that apply to activities in or adjacent to the AOI, and would therefore have an interest in the establishment and management of a Beaufort Sea MPA.

#### Fisheries Joint Management Committee

See Section 2.2.2.

#### Wildlife Management Advisory Councils (NWT and North Slope)

WMAC (NWT) and WMAC (North Slope) were established by the IFA to advise appropriate ministers and Inuvialuit agencies on all matters of wildlife policy, and the management, regulation and administration of wildlife, habitat and harvesting in the ISR. These councils also advise on related issues of park planning and management or any measures required to protect habitat that is critical for wildlife or harvesting. In consultation with the Inuvialuit Game Council and RWED, the councils set quotas for Inuvialuit harvesting governed by preferential harvesting rights to Inuvialuit based on sustainable harvest levels and exclusive harvesting rights on



Inuvialuit private lands. The councils provide advice to the Yukon Land Use Planning Commission, Environment Canada, the EISC and EIRB and other appropriate groups (WMAC (NWT) 2001, WMAC (North Slope) 2002; [www.taiga.net/wmac/](http://www.taiga.net/wmac/)).

#### Environmental Impact Screening Committee and Environmental Impact Review Board

Environmental assessment in the ISR is the mandate of the Environmental Impact Screening Committee (EISC) and the Environmental Impact Review Board (EIRB). The EISC has the legal obligation to screen all proposed onshore and offshore developments inside the ISR that may negatively impact the environment and/or Inuvialuit wildlife harvesting. This includes scientific research and camps and fuel caches requiring land use permits; commercial tourism proposals; granting of water rights in association with exploration or development activity; water withdrawals; industrial waste disposal; hydrocarbon, mineral and aggregate exploration and extraction; commercial harvesting of plant resources; commercial transportation developments (air, land, water); and scheduled military activities (Environmental Impact Screening Committee 2002). Similar responsibility exists for developments occurring outside the ISR. The IFA mandates that "no licence or approval shall be issued that would have the effect of permitting any proposed development to proceed unless the provisions of [the Environmental Impact Screening and Review Process] have been complied with" [IFA Subsection 11(31)].

It is the basic premise of the EISC that all proposed developments for the ISR, both onshore and offshore, are likely to have *some* negative effect on the environment and so are potentially subject to screening. However, it follows that not all developments are likely to have a *significant* negative impact. If the development is deemed to have the potential for a significant negative environmental impact then the EISC can refer it to the EIRB or an equivalent government body for further review. The EIRB project review is carried out in public such that anyone with an interest in the project may make a presentation to the review panel. The EIRB determines if a development should proceed and under what conditions. Mitigative and remedial measures can be suggested along with an estimate of the potential liability based on a worst case scenario. Regulators, developers and operators are compelled by the *Settlement Act* and the IFA to comply with provisions of the EISC and, if necessary, the EIRB processes prior to commencement of any onshore or offshore development (Environmental Impact Screening Committee 2002). Allowable developments within a MPA would still be subject to the IFA screening and review process.

#### **2.2.6 Inuvialuit Organizations**

The IFA created two parallel series of structures, one related to renewable resource management, the other related to revenue-generating subsidiary corporations and businesses. The former includes the six Hunters and Trappers Committees (HTCs) that make up the IGC. The latter includes the six Community Corporations that make up the Inuvialuit Regional Corporation (IRC).

#### Inuvialuit Game Council

The IGC is mandated under the IFA to represent the collective Inuvialuit interest in wildlife and environmental matters, and in all matters related to renewable resource management in the ISR. It is one of the major Inuvialuit organizations established to implement the IFA, and works in parallel with the IRC. The IGC appoints Inuvialuit representatives and provides advice to all wildlife and environmental co-management committees established under the IFA and to any other Canadian bodies affecting renewable resources within the ISR. It is responsible



to uphold and administer Inuvialuit harvesting rights acquired under the IFA, including those relating to marine mammals. The IGC represents Inuvialuit interests on issues concerning the Inuvialuit at community, territorial, national and international levels, and provides ongoing input into various territorial and national acts and regulations, including proposed MPAs in the ISR. In addition to its responsibilities under the IFA, the IGC acts as the regional representative of Inuvialuit hunters, trappers and fishermen (Inuvialuit Game Council 2002).

#### Hunters and Trappers Committees

Each of the ISR communities (Aklavik, Inuvik, Tuktoyaktuk, Paulatuk, Holman, Sachs Harbour) has an HTC. HTC membership is drawn from Inuvialuit community residents. The HTCs advise the IGC on local renewable resource interests, allocate local harvest quotas, write bylaws concerning Inuvialuit rights to harvest, appoint members to the IGC, and provide harvest information and other assistance to the co-management bodies. The HTCs also encourage and promote Inuvialuit involvement in conservation, research and management of wildlife resources in the ISR. The HTCs are also responsible for the sub-allocation of community shares of subsistence and other quotas among individuals, particularly elders, in the ISR communities and participate in the regulation of the subsistence harvest and the collection of harvest information (Inuvialuit Game Council 2002).

#### Inuvialuit Regional Corporation and Community Corporations

The IRC was established to receive the lands and financial compensation under the IFA and is directly controlled by the Inuvialuit population. Its mandate is to continually improve the economic, social and cultural well-being of the Inuvialuit through implementation of the IFA and by all other available means. IRC subsidiaries include the Inuvialuit Development Corporation, Inuvialuit Investment Corporation, Inuvialuit Land Corporation and Inuvialuit Petroleum Corporation. Each Inuvialuit community has a community corporation, which controls the above-mentioned corporations in protecting the financial compensation for the benefit of future Inuvialuit (Inuvialuit Regional Corporation, 2002; <http://www.irc.inuvialuit.com>).

#### Inuvialuit Land Administration

Inuvialuit Land Administration, a division of IRC, is responsible for administering and managing access to the lands received under the IFA. They review and approve applications to access and use Inuvialuit private lands; monitor land use operations to ensure protection of the land and environment; and ensure Inuvialuit receive business, employment and training benefits in the context of development projects. Under the IFA, the Inuvialuit were granted surface and sub-surface title to 13,000 square kilometres of land, including 1,800 square kilometres around each of the communities of Aklavik, Inuvik and Tuktoyaktuk (Figure 3). These are described as Inuvialuit 7(1)(a) lands. In addition, the Inuvialuit were granted surface title to 77,700 square kilometres of land selected throughout the ISR. These are described as 7(1)(b) lands. Any land use activity on Inuvialuit land requires an application to the Inuvialuit Land Administration (Inuvialuit Land Administration; <http://www.irc.inuvialuit.com/corporate.ila.description.asp>).

#### Elders and Youth Committees

Elders and youth committees are established under the community corporations to provide the elders and youth with a forum to provide input.



### Figure 3. Inuvialuit Private Lands



### Community Economic Development Organization

The Community Economic Development Organization promotes and provides a broad range of support service to enhance Inuvialuit economic development and assist communities in the development of a stable economic base. It assists Inuvialuit community businesses, organizations and individuals in their endeavours by providing business development, human resource and financial services, as well as advisory, administrative and advocacy assistance in such matters as management, identifying funding sources and regulatory compliance (Inuvialuit Community Economic Development Organization; <http://www.irc.inuvialuit.com/beneficiaries.cedo.asp>).

### **2.2.7 Integrated Management Initiatives**

Integrated management is a collaborative approach that involves comprehensive planning and management of human activities to minimize conflict among resource users. It is a flexible and transparent planning process that respects existing divisions of constitutional and departmental authority and any existing aboriginal or treaty rights. To achieve integrated management in the ISR, partnerships and cooperation are required. Existing management initiatives which are most relevant to the proposed MPA include the following:

#### Beaufort Sea Beluga Management Plan

The Beaufort Sea Beluga Management Plan (BSBMP) aims to ensure the responsible and effective long-term management of the beluga resource by the Inuvialuit and DFO. Its goals include maintaining a thriving population of beluga in the Beaufort Sea and providing for optimum sustainable harvest of beluga by Inuvialuit. The BSBMP was developed by the FJMC, in cooperation with the six HTC's, and DFO. It considers the diversity of parties with interests in the management of beluga specifically, or the Beaufort Sea in general. It addresses management issues related to their activities and related concerns, including: subsistence hunting practices and traditional values closely related to the beluga harvest; oil, gas and mining exploration, production and related development including dredging, drilling, seismic and sounding surveys, island/camp maintenance, vessel movements, helicopter and fixed-wing flights; ice-breaking, shipping routes, and port development; possible future commercial fisheries development; contaminant levels in marine waters and mammals; the developing tourism industry; a myriad of regulators; transboundary issues; and climate change. Completed in 1991, the BSBMP has since undergone revision in light of increased hydrocarbon activity in the region, and will undergo a major revision in 2003 (Fisheries Joint Management Committee 2001).

#### Beaufort Sea Integrated Management Planning Initiative

The Beaufort Sea Integrated Management Planning Initiative (BSIMPI) began in 1999 as a collaborative process between the Inuvialuit, government and industry to undertake integrated management planning for marine and coastal areas in the ISR. The principles of BSIMPI are:

- recognition of rights under the IFA;
- respect for the view of all parties;
- commitment to building consensus;
- use of local, traditional and scientific knowledge; and
- adoption of transparent, timely and coordinated procedures.



Two organizations were established for the management of BSIMPI: a Senior Management Committee (SMC) and the BSIMPI Working Group (WG). The SMC is composed of the interest groups who formed the Initiative: Chairs of the FJMC, IGC and IRC, and a senior representative from DFO and Canadian Association of Petroleum Producers (CAPP). It guides the integrated management planning process for ocean-related activities in the Beaufort Sea through the BSIMPI WG. Representation on the BSIMPI WG reflects that of the SMC, with the addition of a member from INAC. Its role is to implement effective collaboration on management efforts. Administrative, technical and communication support is provided through the BSIMPI Secretariat, which consists of Regional DFO staff and the Chair of the BSIMPI WG. The interest of other organizations, governments and communities is far larger than what is represented in the SMC and BSIMPI WG. The BSIMPI Secretariat's major function is to engage these other interested parties so that their issues and recommendations can be brought into the process as well as keeping these parties informed of BSIMPI activities and progress.

## 2.3 Industry and Science Interests

### 2.3.1 Resource Exploration and Extraction

#### Oil and Gas

Eleven major oil and gas companies hold an interest in the vicinity of the AOI:

- Anadarko Canada Corporation;
- BP Canada Energy Co.;
- Burlington Resources Canada;
- Chevron Canada;
- Conoco-Phillips;
- Devon Canada (formerly Anderson Exploration);
- EnCana (formerly AEC West Ltd.);
- Imperial Oil Resources;
- PetroCanada;
- Shell Canada; and
- SunCor Energy Inc.

The Canadian Association of Petroleum Producers (CAPP) is an industry association for Canada's upstream petroleum industry. CAPP represents 150 companies that explore, develop and produce most of Canada's natural gas and crude oil and also has 125 associate member companies that provide a wide range of services that support the upstream oil and natural gas industry. CAPP's mission is to enhance the economic well-being and sustainability of the Canadian upstream petroleum industry in a socially, environmentally and technically responsible and safe manner.

Detailed information on petroleum exploration and production is found in Section 3.2.1.

#### Mineral Extraction



The Inuvialuit Land Corporation, as per the IFA, holds mineral rights in the ISR. The IFA contains provisions for the reservation of granular and sand resources for community needs (Department of Indian Affairs and Northern Development 1984).

### Other Resources

The Mackenzie Valley Land and Water Board regulates the use of land and waters and the deposit of waste through the Mackenzie Valley. Their jurisdiction is outside the Zone 1a areas, but starts at Inuvik and Aklavik and is included from a regional perspective.

### **2.3.2 Tourism**

Capitalizing on the region's culture, landscape and wildlife viewing opportunities, tourism is a growing industry in the Mackenzie Delta region and throughout the Arctic. Most land- and water-based tours are conducted by licensed Inuvialuit guides and outfitters, while air tours are conducted by pilots of charter planes. Some independent tourism use by independent outfitters also occurs. The extent of tourism operations in the AOI is described in Section 3.2.3.

The following companies have been identified as having a past or present interest in tourism in the vicinity of the Zone 1a areas:

- Aklavik Tours (Aklavik);
- Arctic Nature Tours (Inuvik);
- Arctic Tour Company (Tuktoyaktuk);
- Beaufort Delta Tours (Inuvik);
- Hosanna Tours (Inuvik)
- Kendall Island Whale Watching Tours (Inuvik);
- Ookpik Tours (Tuktoyaktuk); and
- Uncommon Journeys (Whitehorse).

With the exception of Inuvialuit recreational use (see Section 3.1.2), due to their distance from communities, it is unlikely that independent recreational use occurs in the vicinity of the Zone 1a areas except, perhaps, for summer boat trips along the Mackenzie or along the coast *en route* to Herschel Island or Ivvavik National Park.

### **2.3.3 Transportation**

Eight privately-owned companies were identified as providing transportation services in the vicinity of the three Zone 1a areas. These companies are based in Inuvik and provide basic supply or charter services for government, industry and locals, with a small amount of tourist charter services. For information on companies which provide tourism transportation services, please refer to Section 2.3.2. Further details on transportation activities are found in Section 3.2.4.

There are six air charter companies, one marine transportation company and one road transportation company that conduct business in the vicinity of the Zone 1a areas. These main transportation companies are:



#### Air-Based Companies

- Aklak Air
- Arctic Wings Ltd.
- Beaudel Air
- Canadian Helicopters
- Highland Helicopters
- Stage Air

#### Marine-Based Companies

- Northern Transportation Company Ltd.

#### Road Transportation Companies

- E. Grueben's Transport

### **2.3.4 Research**

Several organizations and sectors have an interest in research and education in and around the Zone 1a areas. All research in the NWT and Yukon, including physical, social and biological sciences, archaeological studies, and research in traditional knowledge must be licensed (Aurora Research Institute 1998). Depending on the research subject, a researcher is required to obtain at least one of the following permits: wildlife research permit; archaeologist permit; or scientific research license. The main permitting agencies are territorial and federal governments, the Aurora Research Institute (ARI), and the Prince of Wales Northern Heritage Centre.

The interests of these and other agencies in the Zone 1a areas are discussed below. Research projects formerly and presently occurring in the study area are described in Section 3.1.7.

#### Territorial Government

Research studies on wildlife (any species of terrestrial vertebrates, polar bears and migratory birds) or wildlife habitats, including research activities conducted by territorial government staff, require a wildlife research permit by either the NWT or Yukon governments. Territorial government staff have an interest in studying and monitoring wildlife on lands adjacent to the Zone 1a areas and, in the winter, also conduct some research, namely polar bear studies, within the Zone 1a areas.

#### Federal Government

Research conducted on migratory birds or any research within migratory bird sanctuaries or designated wildlife areas requires a permit from CWS. Scientific research conducted offshore, including oceanographic research or studies in marine plants and animals, requires a permit from DFO.

The Canadian Polar Commission operates as an independent agency in the area of polar research and reports to the Minister of INAC. The CPC is responsible for monitoring, promoting and disseminating knowledge of the polar regions; contributing to public awareness of the importance of polar science to Canada; enhancing



Canada's international profile as a circumpolar nation; and recommending policy direction to government (Canadian Polar Commission 2002; <http://www.polarcom.gc.ca/homepage.htm>).

#### Aurora Research Institute

Licensing under the *Northwest Territories Scientists Act* is handled by the Aurora Research Institute (ARI) in Inuvik. ARI is responsible for: issuing scientific research licenses and coordinating research; promoting communication between researchers and communities; promoting public awareness of the importance of science, technology and traditional knowledge; fostering the recognition and use of traditional knowledge; making scientific and traditional knowledge available; and supporting or conducting research which contributes to the social, cultural and economic prosperity of NWT residents (Aurora Research Institute 1998). ARI maintains a database of research activities that have been permitted to occur in the NWT and, as such, provides a source of information about research permits issued for work conducted in and around the Zone 1a areas.

#### Prince of Wales Northern Heritage Centre (NWT)

Under the NWT Archaeological Sites Regulations, research studies in archaeology require a permit that can be obtained from the Prince of Wales Northern Heritage Centre. In addition to licensing, the Prince of Wales Northern Heritage Centre supports and conducts archaeological research in many areas of the NWT.

#### Other Research Interests

In addition to the agencies above which regulate, oversee and in some cases conduct research in the AOI, there are several other agencies and sectors that have an interest in research-related activities.

- **S. Lord Northern Geoscience Centre (CSLNGC)** – This is a multi-agency centre with the mandate to undertake geoscience studies in the Northwest Territories. The CSLNGC is a cooperative venture between the Minerals, Oil and Gas Division of RWED, the NWT Geology Division of INAC, and the Geological Survey of Canada.
- **Inuvialuit Social Development Program (ISDP)** – The ISDP has provided funding for, and prepared educational materials about, several studies on the archaeology and history of the Inuvialuit including traditional uses such as beluga hunting.
- **Academia** – Studies in a variety of disciplines have been conducted in the region by researchers from various academic institutions. Universities that are presently involved with research activities in the region are University of Manitoba, Carleton University, University of British Columbia and the University of Sussex.
- **Conservation Organizations** – Conservation agencies such as the World Wildlife Fund (see Section 2.3.5) have supported research on a variety of topics, for example, marine wildlife populations and their use of areas such as the Zone 1a areas. Conservation organizations have also funded studies to develop consumption use guidelines and codes of conduct for wildlife and tourism in the Arctic.
- **Oil and Gas Industry** – Baseline studies of land and marine environments have been conducted in and around the Zone 1a areas in support of oil and gas exploration and development. Although no oil and gas activities are presently occurring within the Zone 1a areas, several studies have occurred in adjacent areas.



### **2.3.5 Conservation**

Non-governmental organizations that work towards conservation also hold interests in and carry out initiatives related to the Beaufort Sea.

#### World Wildlife Fund

The goal of the World Wildlife Fund's (WWF) Marine Program is to create a representative network of marine protected areas for Canada by 2010. In the Beaufort Sea, WWF has an interest in seeing areas such as the Zone 1a areas adequately protected for their high ecological values. Additionally, the WWF is presently fundraising to support their research and programs that are relevant to BSIMPI. As a fundamental approach for areas like the Beaufort Sea, WWF supports the prior planning of industrial activity and other uses so that subsequent development activity can proceed in a sensitive manner. They also support an integrated ecosystem approach to MPAs that would allow human uses to be assigned to appropriate areas within the Beaufort Sea and reserve core areas such as the three beluga Zone 1a management zones as full MPAs, within the broader seascape context (P. Ewins, pers. comm.).

#### Canadian Parks and Wilderness Society

The Canadian Parks and Wilderness Society (CPAWS) actively supports the creation of marine protected areas in the Arctic. Their two northern branches, in Yellowknife and Whitehorse, have been working with government agencies, other non-government organizations, and stakeholders to identify ecologically sensitive areas in need of protection while recognizing economic, social and cultural land use requirements. CPAWS has recently put forward guiding principles for oil and gas development in the north that emphasize integrated planning and the creation of protected areas before development occurs.

#### Canadian Arctic Resources Committee

The Canadian Arctic Resources Committee (CARC) is a citizens' organization comprising over 5000 members from across Canada and around the world. The organization, funded mainly by individuals and private foundations, brings together people who share a common interest in the north. Although its current scope of interest is broad, CARC was originally formed in response to concerns about the prospect of major oil and gas development in the north in the 1970s. It set out to articulate the concerns of northerners and advocate a fair assessment process for proposed developments. Together with CPAWS, WWF and other non-governmental organizations working in the north, CARC has endorsed the recent guiding principles for oil and gas development in the north.



### 3.0 BASELINE SOCIO-ECONOMIC ASSESSMENT

#### 3.1 Cultural and Social Values

##### 3.1.1 Historical Context

The region in and around the proposed MPA has been occupied and used by aboriginal peoples for thousands of years. Oral history and archaeological evidence provide descriptions of settlements, gathering places, whaling centres and seasonal camps, as well as insight into the traditional way of life centred around hunting, trapping and fishing. The Inuvialuit in the Mackenzie Delta region today are descendants of both the Inupiat and the Mackenzie Delta Inuit. The Inupiat arrived from Alaskan coastal whaling communities in three waves of immigration during the early twentieth century, at a time when disease and epidemics brought on by contact with explorers and commercial whalers had nearly decimated the Mackenzie Delta Inuit population (Freeman *et al.* 1992). The Mackenzie Delta Inuit population dropped to approximately 200 in 1905 from an estimated mid-nineteenth century population of 2000 to 2500 people; by the mid-twentieth century, at least 75% of the Inuit in the region were of Inupiat origin (McGhee 1974, Freeman *et al.* 1992). Prior to their population decline, the Mackenzie Delta Inuit are believed to have had the greatest dependency on beluga whales of any aboriginal society in the Arctic (Friesen and Arnold 1995 as cited in Dressler 1999). The largest and most permanent camp of the ancestors of the present-day Inuvialuit was Kittigazuit (also called Kitigaaryuit), whose location near a large, shallow bay in the western Delta (Kugmallit Bay) made it the perfect location for whale hunting (Government of the Northwest Territories 1991). According to one interviewee who recalls stories of historic whaling activity, at the time when Kittigazuit was an active camp, the Inuvialuit were harvesting 100 whales per day. Whale harvesting, carried out primarily in what are now BSBMP Zone 1a areas in the proposed MPA, was traditionally the most important hunting activity of the Inuvialuit of the Mackenzie Delta region (Government of the Northwest Territories 1991).

The commercial whaling industry declined in the early twentieth century; however, Inuvialuit traditional use of resources from the Beaufort Sea continued and several summer whaling camps have been maintained in the Mackenzie Estuary (Harwood and Smith 2002). This has not been without its challenges. For the Inuvialuit, major disruptions to most aspects of traditional social and cultural life, caused by such events and circumstances as massive disease-induced mortality or hospitalization, severe depletion of important land resources, fluctuations in fur values, residential school programmes and government relocation, posed a challenge to maintaining whale harvesting and other traditional activities (Freeman *et al.* 1992). Profound changes to traditional Inuvialuit life continued to occur into the 1970s and 1980s, with people turning toward wage employment and the interests of oil exploration companies. Since the signing of the IFA in 1984, the Inuvialuit have re-gained much of the control over the resources within the Mackenzie Delta, forged resource management regimes, and renewed their commitment to subsistence whale hunting.

Today, the resources of the Mackenzie Delta region provide income and support subsistence needs of the Inuvialuit. While there has been an overall shift in reliance from marine to terrestrial food sources, with caribou becoming the most important food species for Inuvialuit, Usher (2002) attributes this change largely to the diminished food requirements for dogs as a result of the replacement of dog teams by snowmobiles. Beluga is the second most important traditional food harvested by weight (Usher 2002). During the 1990s, an average of 111 beluga were taken annually in subsistence harvesting in the ISR (Harwood and Smith 2002). The history



and cultural significance of the beluga hunt to the Inuvialuit has been documented to some extent by Nuligak (1966), McGhee (1974, 1996), Freeman *et al.* (1998) and Day (2002), and extensive traditional knowledge is held by elders. Subsistence harvesting of beluga persists as a significant economic and cultural preoccupation in the lives of the Inuvialuit today.

In spite of the massive social and cultural changes of the past century and changes that are still underway to further connect the Inuvialuit with cities and cultures of the south (e.g., scheduled airline flights, satellite television, the internet, road systems and large-scale developments that make the Mackenzie Delta less and less 'remote' or 'isolated'), vital traditional aspects of Inuvialuit life have been maintained; namely the Inuvialuit connection with the environment. As stated by the Inuvialuit:

There is much about us that has not changed, things such as our love and use of the land. We are beginning to rediscover the old ways of our ancestors. We see their value in our new world. Despite all of the changes our people have experienced, we still call ourselves Inuvialuit. We are a distinct people bound together by our past and our future (Government of the Northwest Territories 1991)

### **3.1.2 Inuvialuit Cultural Identity and the Environment**

Inuvialuit cultural identity is intricately linked to the environment of the land and sea. The Inuvialuit are a part of their environment and still find ultimate meaning of life close to the land and sea. Hunting is the activity, above all others, that sustains the full expression of Inuvialuit values and identity. Along with the accompanying production, distribution and consumption of traditional foods, hunting is a powerful means of maintaining a meaningful connection to the environment. As with Inuit throughout the Arctic, hunting is regarded as among the highest forms of human achievement, and provides a cultural reinforcement of self-respect and self-worth. Even among those Inuvialuit who base their family economy upon wage employment, it remains of considerable importance. Indeed, for some such people, hunting is especially important as it allows them to engage in those activities which if denied would compromise their sense of identity, their cultural distinctiveness. Thus hunting (or trapping or fishing) when practiced on a seasonal, weekend, part-time, infrequent or recreational basis contributes to the maintenance of social, cultural, psychological and spiritual well being (Freeman *et al.* 1992).

The value and importance of "just being out on the land" was reinforced throughout the interview process with Inuvialuit hunters and trappers. According to one interviewee "It's a tradition and it's a working holiday". Another interviewee stated that although the hunt is hard work, he would not miss it citing the health benefits, relief of day-to-day stress, and the reconnection with the land as important factors in this decision. Annual trips to whaling camps are also opportunities to spend time with family, friends, and extended families comprised of the occupants of nearby camps. Time in the camps is also used to teach children and youth the history of the area and how to properly hunt and prepare the harvest. Several interviewees noted that they stayed at their camps after harvesting activities were completed. Another said that "With boats and good weather some people take their families just to watch the whales." One interviewee noted that there are more activities where people are being taken out to learn cultural experiences. For example, elders are taken to camps for one to two weeks and teach children to prepare whales and how to survive on the land. As one interviewee commented, "I have two young boys and 30 years from now I would like to see them doing what I do on the land right now". In addition, many Inuvialuit just go out touring for the day, but are always prepared for hunting. As summarized by one interviewee, the land and resources are important to the Inuvialuit on many levels: "I go for the enjoyment of it.



It is important that I go because it provides food for the table. If I go I have achieved something by harvesting the animal I went for. It is the way I was brought up, my dad took me out and taught me about the land and how to live off the land. It is so deep it is spiritual. I count it as a blessing to go out.” One elder noted that time on the land was extremely important to him: “I will go out as long as I can keep going.”

The objectives of a marine protected area are consistent with this cultural identity with the land and sea. The continued health and abundance of a diversity of species and the environment that supports them is as important to Inuvialuit now as it has always been (Usher 2002).

### **3.1.3 Importance of Traditional Food**

Traditional foods are valued and consumed by the Inuvialuit for the important nutritional, social, cultural, economic and spiritual benefits they provide and which cannot be replaced by store-bought foods. For many Inuvialuit, traditional foods are preferred over store-bought foods. For the many Inuvialuit who continue to practice subsistence harvesting of traditional food items, this is a way to enhance social relationships among families and communities and to ensure the continuity of cultural values and traditions over time. Actual harvesting and/or consumption records can be found in Fabijan *et al.* (1991 – 1998) and Wein and Freeman (1992) and summarized in Usher (2000, 2002). The many benefits of a traditional food diet are detailed in Gilman *et al.* (1997) and Kuhnlein *et al.* (2000).

Traditional foods are very healthy. They contain all the necessary vitamins and minerals for a healthy diet. Compared with store-bought foods that are commonly used as replacements, traditional meats are high in protein, iron, and B-vitamins. Foods from marine mammals are high in omega-3 fatty acids, which are thought to help prevent heart disease. Marine mammals are also known to contain contaminants; however, the benefits of a traditional food diet are understood to outweigh the risks associated with those levels (Gilman *et al.* 1997). The physical activity associated with hunting or fishing provides an additional health benefit associated with a lifestyle that involves traditional foods.

Within the Inuvialuit communities, households are linked through sharing, exchange, and partnership. Traditional foods are central to these bonds, which serve to strengthen social and cultural ties and distribute resources. Hunting or fishing for traditional food items are also important means for passing on cultural traditions, teaching children skills in survival, food preparation, and providing opportunities for learning patience and building confidence.

A diet based on traditional foods, including beluga, makes economic sense in Inuvialuit communities in the Mackenzie Delta Region. The price of perishable food items in remote communities can be up to three times their price in southern cities. Usher (2002) estimates that by hunting or fishing, a typical household could produce several thousands of dollars worth of food that it would not have to purchase at a store.

Traditional foods provide a healthy and often preferred diet at relatively low cost in the Mackenzie Delta – Beaufort Sea region, and the harvesting, processing and sharing of these foods contributes to cultural continuity.



### 3.1.4 Current Use of the Land and Sea

Each of the Zone 1a areas is designated by the Aklavik, Inuvik and Tuktoyaktuk Community Conservation Plans as Management Category ‘E’, defined as: “Lands and waters where cultural or renewable resources are of extreme significance and sensitivity. There shall be no development on these areas. These lands and waters shall be managed to eliminate, to the greatest extent possible, potential damage and disruption. This category recommends the highest degree of protection in this [Community Conservation Plan]” (Community of Aklavik *et al.* 2000, Community of Inuvik *et al.* 2000, Community of Tuktoyaktuk *et al.* 2000). Hunters from Tuktoyaktuk naturally use the Kugmallit Bay Zone 1a area more than the other two areas although they will travel as far as Shallow Bay for goose hunting in the fall (Table 1). Similar information is not available for Inuvik and Aklavik hunters.

The main focus of the Zone 1a areas, from a harvesting perspective, is beluga. Interviewees noted that the areas were also important for the harvest of fish, waterfowl and terrestrial mammals and that harvesting of these animals often took place in conjunction with the beluga harvest. One interviewee indicated that people picked berries at Hendrickson and Richards Islands during August. One hunter indicated that when he went whaling he was also prepared to harvest caribou should the opportunity arise and/or the weather conditions did not permit harvesting a beluga. Similarly, when he went into the area specifically to harvest caribou, he was also prepared to harvest other species. Hunters noted the beluga harvesting occurs within and adjacent to the Zone 1a areas. One interviewee noted that consideration should be given to extending MPA boundaries beyond those of the Zone 1a areas. He noted that whaling also takes place outside these areas. He was concerned that activities inside and outside the Zone 1a areas could have an impact on beluga harvesting. Hunters indicated that they had been involved in subsistence harvesting in the area for most or all of their lives.

**Table 1. Use of the Area of Interest by Tuktoyaktuk Harvesters (Community of Tuktoyaktuk *et al.* 2000)**

Kugmallit Bay	Kendall Island	Shallow Bay
Spring: Fish, Goose, Caribou Summer: Fish, Caribou, Beluga Fall: Fish, Goose, Caribou, Seal Winter: Fish, Caribou	Spring: Goose Summer: Goose	Fall: Goose

#### Subsistence Fishing

All three Zone 1a areas are important fishing areas throughout the year for the Inuvialuit from Inuvik, Tuktoyaktuk and Aklavik (Community of Aklavik *et al.* 2000; Community of Inuvik *et al.* 2000; Community of Tuktoyaktuk *et al.* 2000). However, from the available information it was not possible to discriminate among the communities in terms of their fishing effort or the relative importance of the Zone 1a areas. For example, the exact locations of fishing camps along the coast for the communities of Inuvik, Aklavik and Tuktoyaktuk are confidential (Eddy 2001). It is known, however, that Shallow Bay is an important traditional fishing area for residents of Inuvik and is also vital to the people of Aklavik as they set fish nets there throughout the year (Community of Aklavik *et al.* 2000; Community of Inuvik *et al.* 2000). The Inuvialuit Harvest Study 1987-1992 indicates that Kugmallit Bay is likely subject to more fishing than either Shallow Bay or Kendall Island areas although Shallow Bay supports a slightly greater diversity (Table 2). Interviewees noted that fishing also took place in areas adjacent to the Zone 1a areas. Summer fishing near Kendall Island includes areas just to the



south of the Zone 1a area, while near Kugmallit Bay fish are also harvested in some of the lakes within walking distance of the shore. Fishing in the Beaufort Sea is subsistence-based rather than commercial, although some sales of fish do occur. Local interview information indicates that 100-300 fish may typically be harvested by each family in the study area. One hunter attributed reduced catches to increased boat and plane traffic and harbour dredging.

**Table 2. Key Fish Species Harvested in the Area of Interest (Fabijan *et al.* 1993)**

Shallow Bay	Kendall Island	Kugmallit Bay
Arctic cisco	Arctic cisco	Arctic cisco
Blue/Pacific herring	Broad whitefish	Blue/Pacific herring
Broad whitefish	Inconnu	Broad whitefish
Burbot/loche	Lake whitefish/crooked backs	Burbot/loche
Dolly Varden charr	Pike/jackfish	Inconnu
Inconnu		Lake whitefish/crooked backs
Lake whitefish/crooked backs		Least cisco/big-eyed herring
Least cisco/big-eyed herring		Pike/jackfish
Pike or jackfish		
Saffron cod		

Broad whitefish (*Coregonus nasus*) is the primary migratory fish species sought in the subsistence fishery, and is used for human and dog-team consumption (Chang-Kue and Jessop 1991, 1997 as cited in Eddy 2001). Semi-anadromous populations of the fish, *en route* to spawning locations, migrate through the Mackenzie Delta and the lower Mackenzie River during the late summer and early fall. Adults feed and overwinter in the nearshore coastal regions of the Beaufort Sea and Tuktoyaktuk Peninsula including all the Zone 1a areas (Chang-Kue and Jessop 1991, 1997 as cited in Eddy 2001, p.52).

Lake whitefish (*Coregonus clupeaformis*) (local common name humpback or crooked back) are also taken in the subsistence fishery. The juveniles of anadromous populations spend the summer in the coastal habitats near the mouth of the Mackenzie River, while the adults occupy the delta lake systems. The juveniles overwinter in the channels, while adults overwinter in the delta and inner estuary including Shallow Bay, Kendall Island and Kugmallit Bay Zone 1a areas (MacMillan *et al.* 1992 as cited in Eddy 2001). Lake whitefish tend to have more parasites than broad whitefish, and consequently, are harvested less by local fishermen (*e.g.*, Community of Tuktoyaktuk *et al.* 2000).

For inconnu (*Stenodus leucichthys*) (local common name coney), whose anadromous populations do not move far from the river and channel mouths of the Mackenzie River, there is a subsistence fishery in the autumn and winter. Catches are reportedly used primarily to feed dog teams (Chang-Kue and Jessop 1991 as cited in Eddy 2001, p.56).

Dolly Varden charr (*Salvelinus malma*),<sup>1</sup> is another very important food source to the Inuvialuit communities particularly in Shallow Bay. The anadromous species summer in estuarine and nearshore areas of the Beaufort

<sup>1</sup> Considered to be Arctic char (*Salvelinus alpinus*) east of the Mackenzie River.



Sea. Spawning and overwintering occur in freshwater (Everett *et al.* 1997, Gillman *et al.* 1985 as cited in Eddy 2001).

#### Subsistence Harvesting (Marine Mammals)

All three Zone 1a areas are important areas for harvesting marine mammals for the Inuvialuit from Inuvik, Tuktoyaktuk and Aklavik. The Inuvialuit Harvest Study 1987-1992 data indicate that a greater variety of marine mammal species is harvested at Shallow Bay than at Kendall Island or Kugmallit Bay (Table 3). Beluga have been the predominant catch in the western Arctic although a limited hunt of bowhead whales has recently been revived under the IFA (Harwood and Smith 2002).

**Table 3. Key Marine Mammals Harvested in the Area of Interest (Fabijan *et al.* 1993)**

Shallow Bay	Kendall Island	Kugmallit Bay
Beluga whale	Beluga	Beluga
Bowhead whale		Ringed seal
Bearded seal		
Ringed seal		
Polar bear		

A formal beluga harvest monitoring program for the Mackenzie estuary was first initiated in 1973, and continues annually with a hunter-based monitoring program now conducted by the FJMC. This has made available a range of beluga management information, including the number of whales harvested and the efficiency of hunts (Harwood *et al.* 2002).

All of the Inuvialuit members interviewed for this study indicated they had been involved with beluga hunting and associated activities (*e.g.*, camping and fishing) in and around the Zone 1a areas since childhood, and there were many references to the use of areas by ancestors going back generations. In communities such as Tuktoyaktuk, nearly everyone who lives in the community has some ties to the beluga hunt. While the Zone 1a areas have typically attracted harvesters from the nearest communities, historically, in some years, Inuvialuit from all across the settlement region would congregate in one of the known beluga harvest areas to hunt.

The harvest of beluga whales by Inuvialuit from Inuvik, Tuktoyaktuk and Aklavik is focused within the three Zone 1a areas (see Figure 2). The zones are located near seasonal hunting camps located along the shores of Shallow Bay, used predominantly by Aklavik harvesters (four primary camps, including Shingle Point); Kendall and Baby Islands, used predominantly by Inuvik hunters (two primary camps); and Kugmallit Bay, used predominantly by Inuvik and Tuktoyaktuk harvesters (five primary camps) (Fisheries Joint Management Committee 2001, Community of Inuvik *et al.* 2000, Harwood *et al.* 2002). These camps have a long history of use by families. Archaeological evidence all along the coast, including old gravesites and whale bones, attest to this historical use and point to important seasonal camping areas, such as Kittigazuit, that were centred around whaling.

Prior to the use of motorboats, groups of kayaks were used to surround and drive whales into shallower waters where they would be hunted with harpoons and spears. Care would be taken to perform the hunt during low tide



so that whales that were not taken could get back to deeper waters during high tide (Day 2002). Historically, the hunt was coordinated among many hunters who each shared in the harvest. With the introduction of faster boats, whales could successfully be hunted in smaller hunting parties. However, it remains customary for the hunter to share the harvest among family, friends, elders, and those unable to harvest, reinforcing the kinship and community ties upon which Inuvialuit cultural practices and beliefs are built. As one interviewee put it, "If people ask, we just give it to them". A Tuktoyaktuk harvester noted that "usually the first whale of the season winds up being for the community as people just come to get a piece and pretty soon the whale is gone".

Beluga whales are an integral part of Inuvialuit subsistence harvesting. A portion of the beluga meat (mipku) and blubber (or muktuk) is consumed at the camps while the remainder is normally prepared and stored for use throughout the winter. Generally, whales harvested are butchered on site and the meat is taken back to communities. The meat may be transported raw in pails. Alternatively, it may be prepared on site by drying, curing or cooking the meat or it may be drained then frozen raw using ice. Harvesters from Tuktoyaktuk have the opportunity to tow the whale and prepare it within the community. Interviewees noted that people often go whaling during day trips to the Hendrickson Island area. Harvesters travel prepared to camp on Hendrickson Island in case the weather conditions changes. Before people had freezers, fish were preserved using oils from the belugas or stored in holes in ice or ice houses. One elder recalls that all parts of the whale were utilized including the stomach lining as a sack to transport fish and meat back to the communities. Oils from whales were also used in bread. Blubber was used to feed sled dogs. Some elders continue these practices.

The Zone 1a areas are extremely important relative to other areas in the region; according to one interviewee, "you can set your watch to the return of the belugas to these areas". Whales may be hunted further to the east at different times of the season but an estimated 95% of the beluga harvest is conducted in the Zone 1a areas. Those interviewed for this study did not feel there had been a significant change in the harvest over the last generation although annual harvests may vary due to factors such as weather or the number of Inuvialuit able to participate in the hunt for any given year. During the course of the whaling season, the intensity of the harvest is also variable. For example, fewer whales may be taken after calving since hunters avoid harvesting females with calves. The Inuvialuit generally believe the beluga population to be healthy and the results of the hunter-based monitoring program support the belief that the present harvest levels are sustainable (Harwood *et al.* 2002).

The harvest of beluga is limited to the number of whales required to cover subsistence needs and interviewees reported "just going for one whale" (Fisheries Joint Management Committee 2001). Most landings occur over a six-week period during July and August, although occasionally landings are made in late June and early September (Weaver 1991, Harwood *et al.* 2002). It is estimated that from the shores of the Beaufort Sea (including from hunting camps in the study area and along the Yukon coast), an average of 111 beluga per year were harvested during the 1990s, down from an average of 132 in the 1970s and 124 in the 1980s (Eddy 2001, Harwood *et al.* 2002). Of those harvested during the 1990s, 92% were taken from the Mackenzie Delta (including 17% by Aklavik residents, 35% by Inuvik residents and 40% by residents of Tuktoyaktuk) (Eddy 2001, Harwood *et al.* 2002). In a 1987 survey of beluga landings in the three areas that approximately correspond to the three Zone 1a areas, Weaver (1991) estimated that 78% of landings came from Kugmallit Bay, 9% from the Kendall Island area, and 13% from the Shallow Bay area. The share of total landings from 1980 through 1987 was 65.4% (Kugmallit Bay), 18.2% (Kendall Island), and 16.4% (Shallow Bay area) (Weaver 1991).



Several harvesters commented on the impact of development on their ability to harvest beluga. One elder noted that he thought there used to be a lot more whales when he hunted with his father in a sail boat. The whales used to stay in the area until the end of August and, in areas further east of Kugmallit, until September. Several interviewees noted that whales seemed to be harder to harvest during the years when the beluga tagging program was operating. People did not know if this was a direct effect of the tagging program but thought it might have been the result of increased boat traffic associated with the program. One interviewee noted some harvesters are looking for smaller whales and as such are spending more time tracking and thus disturbing the whales. A number of interviewees felt that development activities, such as tourism and seismic work, did not affect their ability to harvest as those activities were conducted outside the Zone 1a areas or they were carried out when people were not harvesting.

Ringed seal are harvested for their pelts, which are used for handicrafts and clothing and some are used for human consumption and dog food (Eddy 2001, Community of Aklavik *et al.* 2000, Community of Tuktoyaktuk *et al.* 2000). Ringed seal (*Phoca hispida*) are present throughout the year in the Beaufort Sea and hunted from February to May and from August to the middle of October on shorefast ice and stable offshore ice (Eddy 2001, Community of Tuktoyaktuk *et al.* 2000). Aggregations of ringed seal occur offshore from the Tuktoyaktuk Peninsula in an area that corresponds to the winter location of the Bathurst polynya (Harwood 1989 as cited in Eddy 2001). The southern and western extent for winter seal harvesting touches upon the northern edge of the Kendall Island Zone 1a area near Pelly Island (Community of Tuktoyaktuk *et al.* 2000). Most of the Kugmallit Bay Zone 1a area is a key fall harvesting area (Community of Tuktoyaktuk *et al.* 2000). Seals have also been harvested in the Shallow Bay Zone 1a area. Bearded seals are also harvested for clothing and, to a lesser degree, for food (Community of Tuktoyaktuk *et al.* 2000).

Polar bears are harvested from the Shallow Bay and Kendall Island Zone 1a areas between December and May for fur and, occasionally, for food (Fabijan *et al.* 1993, Community of Aklavik *et al.* 2000, Community of Tuktoyaktuk *et al.* 2000). One hunter reported that Pullen and Hooper islands are popular polar bear hunting areas.

#### Subsistence Harvesting (Land Animals)

Inuvialuit Harvest Study 1987-1992 data indicate that Kugmallit Bay is likely subject to more hunting of land animals than Shallow Bay. Only caribou are hunted near Kendall Island (Table 4). Interviewees noted that caribou were harvested on the land adjacent to all the Zone 1a areas.

Grizzly bears are harvested for their fur in the Shallow Bay and Kugmallit Bay areas. The grizzly bear hunt is regulated by the establishment of co-management plans and community hunting areas. The hunt takes place two times yearly, with spring harvesting occurring from April to June, and summer hunting happening from the middle of August to the end of September (Community of Tuktoyaktuk *et al.* 2000).

Caribou, which are hunted year round, are a highly valued food source to the people of Inuvik, Tuktoyaktuk and Aklavik. They have also been historically used as a source of clothing and tools (Community of Inuvik *et al.* 2000, Community of Tuktoyaktuk *et al.* 2000). One hunter reported selling caribou to other communities. The Cape Bathurst caribou herd's range partially overlaps the Kugmallit Bay Zone 1a area (Community of Tuktoyaktuk *et al.* 2000). For the past two years, sports hunts for caribou have occurred along the west side of Kugmallit Bay on Richards Island. One Tuktoyaktuk hunter reported that while caribou used to be present



around town, in more recent years hunters have to travel a greater distance. Moose, primarily hunted in Shallow Bay, offer an alternative food source when caribou are unavailable (Community of Tuktoyaktuk *et al.* 2000).

Arctic and red fox are traditionally harvested for their fur from Shallow Bay and Kugmallit Bay areas between November and April. Wolves, found predominantly in the Husky Lakes region, and wolverines are hunted for their fur and to help maintain a balance of nature (Community of Tuktoyaktuk *et al.* 2000), but have also been harvested in the Shallow Bay and Kugmallit Bay Zone 1a areas (Fabijan *et al.* 1993). Kugmallit Bay Zone 1a area has traditionally been used as a harvesting ground for lynx which are valued for their fur and as a source of food (Community of Tuktoyaktuk *et al.* 2000, Fabijan *et al.* 1993). One interviewee noted that he knew several hunters, including his father, who used to trap fox in the Kendall island area.

**Table 4. Key Land Animals Harvested in the Area of Interest (Fabijan *et al.* 1993)**

Shallow Bay	Kendall Island	Kugmallit Bay
Arctic fox	Caribou	Arctic fox
Caribou	Polar bear	Caribou
Grizzly bear		Grizzly bear
Moose		Lynx
Red fox		Muskrat
Wolf		Red fox
Wolverine		Wolf
		Wolverine

#### Subsistence Harvesting (Geese and Waterfowl)

Important nesting and breeding habitat, and hence, harvesting areas for birds overlap all three Zone 1a areas. Birds are generally harvested from the beginning of May to the end of June and the month of September (Community of Aklavik *et al.* 2000). Kugmallit Bay appears to be subject to more bird harvesting than the other two Zone 1a areas (Table 5). Several interviewees noted that waterfowl used to stage along the East Whitefish coast prior to petroleum exploration in the 1970s and 1980s. They noted the birds stopped traveling that way when helicopter traffic increased between Tuktoyaktuk and the exploration and camp sites.

**Table 5. Key Birds Harvested in the Area of Interest (Fabijan *et al.* 1993)**

Shallow Bay	Kendall Island	Kugmallit Bay
Canada goose	Snow goose	Canada goose
Snow goose	White-fronted goose	Snow goose
White-fronted goose	Brant	White-fronted goose
Mallard		Swan
Oldsquaw		Mallard
Scoter		Meganser
		Scoter
		Wigeon
		Ptarmigan



Geese, especially lesser snow goose, but also Canada goose and white-fronted goose, are a very important food source in the spring and fall in all three Zone 1a areas, and down from these birds are traditionally used in pillows and blankets (Community of Tuktoyaktuk *et al.* 2000). Spring goose harvesting areas include the whole Tuktoyaktuk Peninsula and Husky Lakes region and much of the Mackenzie River Delta and Richards Island, overlapping with the Kugmallit Bay and Kendall Island Zone 1a areas (Community of Tuktoyaktuk *et al.* 2000). Key areas for summer goose harvesting area include the entire Kendall Island Zone 1a area and the Kugmallit Bay Zone 1a area in the region of Summer Island and Mason Bay (Community of Tuktoyaktuk *et al.* 2000). Key areas for fall goose harvesting include the eastern half of the Shallow Bay Zone 1a area and much of the Kugmallit Bay Zone 1a (Community of Tuktoyaktuk *et al.* 2000). Shallow Bay is also a key staging area for the greater white-fronted geese (Community of Inuvik *et al.* 2000). Interviewees noted that waterfowl harvesting also took place in areas adjacent to all the Zone 1a areas. One interviewee explained that he harvested geese in the Kendall Island bird sanctuary as soon as he could travel into the area by boat. During the spring and fall, some harvested geese were eaten while others were stored for the future. Geese harvested during the summer were taken for day to day needs at their camp.

Mallard duck and oldsquaw duck are harvested in the Shallow Bay Zone 1a area during spring and fall (Community of Inuvik *et al.* 2000, Fabijan *et al.* 1993). Scoter duck and ptarmigan are harvested in the Shallow Bay and Kugmallit Bay Zone 1a areas (Community of Inuvik *et al.* 2000, Fabijan *et al.* 1993). Kugmallit Bay Zone 1a area is a reported harvesting area for brant and tundra swan and widgeon duck (Fabijan *et al.* 2000). One harvester noted that he preferentially harvested geese even though ducks were abundant in the Kendall area.

### Economic Values

Estimates of the amount of beluga harvested in the study area are available (see earlier discussion in this report and, in particular, Harwood *et al.* 2002). Usher (2002) provides estimates of the mean annual harvest of country food per hunter. In the 1990s, harvests were approximately 707 kg per harvester per year, with 45% being from marine sources and 55% from terrestrial sources. This harvest level translates to about 115 kg/yr being available for consumption on a per capita basis (Usher 2002). These harvests are important for both the subsistence and cash values they generate.

Economic valuation of harvesting has been conducted, to a limited extent, for other northern regions of Canada (Berkes and Fast 1996). There is a notable lack of information regarding the value of harvests in the Canadian Arctic. Gaining an estimate of net values requires fairly detailed knowledge of the economic costs associated with the activities, the investments in capital equipment required, the time spent, and the corresponding amount harvested. Within the confines of the present study, such information was not readily forthcoming.

In addition, the studies that have estimated the economic value of subsistence harvests have only considered the production values, and not utility values associated with traditional land use activities. In other words, they have not considered the social and cultural value of the activities. Attempts have been made to estimate social and cultural values of activities such as sport fishing (see Fisheries and Oceans Canada 1995); however, given the strong social and cultural ties of the Inuvialuit to the land compared to the average sport fisherman, use of these data to estimate utility values of subsistence activities in the AOI would not be appropriate.



Because of the above limitations, a quantitative estimate of the economic value of harvesting within the study area is not provided. It is possible to derive a rough estimate of the production value (i.e., via consideration of the replacement value of the food and the costs of conducting the harvest), but this would not capture the social and cultural values. Not quantifying these would significantly underestimate the total economic value.

### **3.1.5 Archaeological and Historical Values**

Archaeological sites represent a link to the past and provide a sense of history. There are numerous known archaeological sites in the vicinity of the Zone 1a areas (Figure 4). Between King Point and Trent Island near the Shallow Bay Zone 1a area there are over ten archaeological and heritage sites along the shore, including four archaeological sites at Sabine Point and four locally identified heritage sites between Shingle Point and Running River (Dickens *et al.* 1987). There are two archaeological sites and four locally identified heritage sites on Kendall Island (Dickens *et al.* 1987). Three burial sites lie within or immediately adjacent to Zone 1a area (Prince of Wales Northern Heritage Centre 2001). The shores of Kugmallit Bay have a comparatively high density of archaeological sites including nine burial sites, six campsites, three isolated finds, two villages and one whaling station (Prince of Wales Northern Heritage Centre 2001).

In addition, the Kittigazuit National Historic Site (also referred to as 'Kitigaaryuit'), located in the Mackenzie Delta 30 km southwest of Tuktoyaktuk, is recognized for the significance and abundance of archaeological resources which remain as evidence of a former Inuit settlement and whaling centre. The first detailed inventory of cultural features at this site resulted in the recording of approximately 190 graves, 17 sod house ruins, and the foundation of a Hudson's Bay Company store and related buildings. Also located on the east channel of the Mackenzie River at Cache Point on Richards Island is the earliest known Inuvialuit beluga hunting site in the Mackenzie Delta region. Three of four excavated houses on the site were occupied during a fairly brief period, probably between about 500 and 600 years ago. The artifacts and animal bones from the houses are currently being studied to form a more detailed picture of early Inuvialuit life in the Mackenzie Delta region.



**Figure 4. Archaeological and Heritage Sites in the Vicinity of the Area of Interest**



### 3.1.6 Protected Areas

There are numerous protected areas currently in the vicinity of the AOI and throughout the ISR.

The Kendall Island Migratory Bird Sanctuary, located east of Mackenzie Bay on the outer margin of the Mackenzie Delta, was established in 1961 to provide long-term protection to the colony of lesser snow geese, as well as the staging and breeding grounds of many migratory waterbird and shorebird species. Management of the sanctuary is such that no activity that could harm migratory birds or their habitat is allowed, except when authorized by a permit issued by the CWS. Such a permit outlines various restrictions on the timing, location and intensity of the proposed activities so that negative impacts on birds are minimized.

In addition to Kittigazuit National Historic Site (see Section 3.1.5), Parks Canada has designated Pingo Canadian Landmark Site as a National Historic Site. Just to the west of the AOI is Ivvavik National Park (see Figure 1). Parks Canada staff do not use the Zone 1a areas except in transit *en route* from Inuvik to Ivvavik National Park about four times per year. There are currently no national marine conservation areas in the Beaufort Sea, but three representative marine areas have been identified: Cape Bathurst Polynya, Yukon North Slope and Western Banks Island.

Herschel Island Territorial Park, located offshore of Ivvavik National Park, protects a wide variety of arctic flora and fauna including nesting birds and numerous species of wildflowers. The surrounding marine areas support salt- and freshwater fish species, ringed and bearded seals, and transient beluga and bowhead whales. Polar bears use Herschel Island for foraging and calving during the winter and spring prior to migrating in the early summer to the permanent ice pack about 150 km north of the island. Once home to more than 1500 people, and possibly the first point of commercial contact between the Inuvialuit of the Western Arctic and European whalers, Herschel Island contains many historical buildings and artifacts. The island was abandoned in the early 1900s during a flu epidemic. Today, several charter companies operate tours to the island

### 3.1.7 Research and Education

#### Biophysical Research

Prompted by its inherent wealth of biota and the implications of petroleum exploration, the AOI and surrounding area have been the subject of numerous geological, biological and oceanographic studies, in the past 30 years. Data for Illisarvik, a drained lake on Richards Island, have been collected for the past 20 years while permafrost conditions on Garry Island have been monitored for 30 years. Biophysical research-related activities occurring in the vicinity of the Zone 1a areas between 1996 and 2001 are summarized in APPENDIX C.

Regionally, the study area has repeatedly been surveyed by CWS as part of population studies for migratory waterfowl with the greatest intensity of study in the 1970s and 1980s. The Zone 1a areas are known staging areas in the spring and fall, although the primary staging areas are further offshore.

DFO conducts research throughout the Beaufort Sea on topics such as fisheries stock assessments, marine mammal studies, and oceanographic processes. Research is also conducted in the Western Arctic as part of the Northern Contaminants Program under Indian and Northern Affairs Canada. Specific to the Zone 1a areas,



studies near Kendall and Baby islands in 2000 and 2001 focused on the collection of stock-specific data for the Beaufort Sea beluga (L. Harwood, DFO, pers. comm.).

### Social and Archaeological Research

Several archaeological studies have been undertaken in the vicinity of the Zone 1a areas.

An archaeological assessment was undertaken in 2001 on the north shore of Richards Island in the vicinity of the Kendall Island Zone 1a area. Known heritage sites on or near proposed developments related to two seismic programs were located and those in close proximity to developments were staked.

The Kittigazuit (Kitigaaryuit) National Historic Site (see Section 3.1.5) and its surrounding area, were the site of archaeological inventory work between 1995 and 2000. This work has been sponsored by the Inuvialuit Social Development Program (ISDP). During the 2000 season researchers discovered that major impacts are occurring from erosion and the thawing of permafrost. More detailed studies on the impacts of coastal erosion at Kitigaaryuit were conducted by the Geological Survey of Canada in August 2001. Oral historical research, conducted by the ISDP, is underway to document the history of Kitigaaryuit and the experiences of those who once lived there.

The earliest known Inuvialuit beluga hunting site at Cache Point was surveyed between 1996 and 1999 as part of the Qilalugaq Archaeology Project. During the three years of the project, the Cache Point site was mapped and four houses were completely excavated, including entrance tunnels, middens and kitchen structures.

In 1998 the ISDP conducted an oral history and archaeology project at a former Royal Canadian Air Force and United States Air Force Loran navigation station. The station, code named Yellow Beetle, was also referred to as Kittigazuit. It was located on the east channel of the Mackenzie River about 12 km west along the coast from the old village of Kitigaaryuit. Construction started in 1947 and the Loran system operated from 1948 to 1950. In 1998, funding from the Department of National Defence was provided to ISDP to document the experiences of the Inuvialuit who worked at the station and to obtain a collection of artifacts that could be used in an exhibit on its history. Information from elders and a former meteorological technician who worked at the station, together with archival documents, are being used to write a report on the history of the station.

### Research Facilities

Part of Garry Island is a Scientific Research Reserve for study of permafrost phenomena. A small, rustic cabin, erected in 1963, and which is accessible by foot or helicopter only, is still used by research parties in summer and winter and is left unlocked for use by others in the case of emergency. A second research facility is located near Illisarvik Lake on Richards Island near the Kugmallit Bay Zone 1a area.

### Education

The only known formal educational use of the Mackenzie Delta region is the periodic documentation of historic and cultural features. Some of the efforts of the ISDP have been discussed above. In another example, a film crew from the Inuvialuit Communications Society joined an archaeological crew on site at Cache Point in 1999 to record the researchers' findings.



## 3.2 Industry and Commerce

### 3.2.1 Petroleum Exploration and Production

The Beaufort-Mackenzie Basin possesses large volumes of discovered oil and gas resources, with high potential for future discoveries. It is estimated that total discovered petroleum resources are between  $186 \times 10^9 \text{m}^3$  and  $349 \times 10^9 \text{m}^3$  of marketable gas and between  $93 \times 10^6 \text{m}^3$  and  $229 \times 10^6 \text{m}^3$  of recoverable oil (National Energy Board 1998). Exploration in the Beaufort-Mackenzie Basin began in the mid-1960s, with the majority of exploration drilling occurring between 1970 and 1989. During this period, thousands of seismic lines were shot and a total of 183 exploration wells and 66 development wells were drilled. Approximately 700 seismic lines were shot within a 15-km radius of the Zone 1a areas and 111 of these intersect the Zone 1a areas. All but two of these were shot prior to 1978 and two were shot in 1985 in the Kugmallit Zone 1a area. More recently, seismic lines have been shot around the Zone 1a areas, particularly around Kugmallit Bay (Figure 5). Seismic work resulted in 53 'significant discoveries' (i.e., a field for which at least one zone in the discovery well demonstrated sustainable flow), including 20 gas, 13 oil, and 20 oil and gas (National Energy Board 1998). Of the total wells drilled in the area, approximately 20 are located within a 15-km radius of the Zone 1a areas (Figure 6). There are 59 licenses in the general region, although not all of these are presently active. Ten new exploration parcels were nominated during summer 2000 and the IRC recently put some of their subsurface lands out for bids, resulting in four parcels being allocated to three different oil and gas companies (Brackman 2000). In addition, four parcels of IRC subsurface lands have recently been allocated (Brackman 2000). Recently, within the Mackenzie Delta-Beaufort Sea region, no oil or gas fields have been developed, other than the onshore Ikhil field (Brackman 2000). There is one production facility operating in the Canadian Arctic at Norman Wells on the Mackenzie River. The Bent Horn seasonal production facility on Cameron Island terminated oil production and shipping via tanker (*MV Arctic*) in 1997.

The Kendall Island Zone 1a area is surrounded by significant hydrocarbon discoveries, and several Exploration Licenses (EL) and Significant Discovery Licenses (SDL) (Figure 6). Suncor Energy Ltd. owns two SDLs overlapping the area. SDL28, east of Pelly Island, was awarded in 1988. It covers 1809 ha and contains an abandoned gas well (PELLY B-35) on an artificial island. A portion of SDL28, southeast of Garry Island, covers 1216 ha and contains a suspended gas well (GARRY G-07) (Gal 2002). SDL15, owned by Chevron Canada, is entirely land based. It covers 304 ha on an island to the southwest of Kendall Island. The island also contains an abandoned well (Upluk M-38). Other petroleum discoveries in the area include Nipterk (oil-gas) to the south, Netserk (gas) to the west, Adgo (ADGO F-28, oil-gas) to the southwest, Garry (GARRY P-04, gas) to the south and Taglu (gas) to the southeast (Gal 2002). A small portion of Devon Canada EL (issued 2000, expiry 2009) falls within the Zone 1a area around Pelly Island, as does a larger portion of Anadarko Canada Corporation's EL (issued 2000, expiry 2009). Devon Canada conducted a seismic program in their ELs in 2001. The significant discoveries within and adjacent to the Kendall Island Zone 1a area total approximately  $15,270 \times 10^3 \text{m}^3$  recoverable oil and  $1,740 \times 10^6 \text{m}^3$  marketable gas (Table 6).



**Figure 5. Seismic Lines in the Vicinity of the Area of Interest**



**Figure 6. Oil and Gas Activity in the Vicinity of the Area of Interest**



**Table 6. Volume Estimates for Significant Oil and Gas Discoveries in the Vicinity of the Area of Interest (National Energy Board 1998)**

Zone 1a Area	Field	Mean Volume Estimate of Recoverable Oil (10 <sup>3</sup> m <sup>3</sup> )	Mean Volume Estimate of Marketable Gas (10 <sup>6</sup> m <sup>3</sup> )
<b>Kendall Island</b>	ADGO F-28	6,183.35	3,205.84
	GARRY S. P-04	9,085.20	7,291.42
	GARRY N. G-07	0	291.87
	PELLY B-35	0	2,948.23
	<i>Total</i>	<i>15,268.55</i>	<i>13,737.36</i>
<b>Kugmallit Bay</b>	HANSEN G-07	687.49	4,593.91
	TUK Tert. J-29	195.88	0
	<i>Total</i>	<i>883.37</i>	<i>4,593.91</i>

Exploration licenses owned by Devon Canada (issued 2000) and EnCana (formerly AEC West Ltd.) (issued 1997) surround and clip the Kugmallit Bay Zone 1a area to the north, west and south. In addition, Imperial Oil Resources owns SDL92 (issued 1990) on the northwest corner of the area. This SDL includes drill hole HANSEN G7 drilled in 1986. Other petroleum discoveries in the area include Ivik (oil) to the northwest and Tuk (oil-gas) to the southeast (Gal 2002). The significant discoveries within and adjacent to the Kugmallit Bay Zone 1a area total approximately 880 10<sup>3</sup>m<sup>3</sup> recoverable oil and 4590 10<sup>6</sup>m<sup>3</sup> marketable gas (Table 6).

There are no existing ELs or SDLs near the Shallow Bay Zone 1a area.

Oil and gas related activities that are currently being conducted or are planned in the region for the future comprise seismic activities and a small amount of exploration drilling. Several of the seismic programs that have been conducted during the 2000/2001 winter season border on both the Shallow Bay and Kugmallit Bay Zone 1a areas.

Both seismic and drilling programs are currently being conducted during the winter months, when whales are not present in the area. Some seismic programs have been carried out during the summer months, but the oil and gas companies appear to be restricting these programs to the winter months to ensure that there is no interference with the whales. During the winter 2000/2001 season, three separate companies conducted 2D seismic activities and one test well was drilled, approximately 20 kilometres away from the Shallow Bay Zone 1a area. There are other activities related to oil and gas exploration, including the construction of access roads and setting up of temporary camps. There are no camps within the three Zone 1a areas. Eight camps used for the 2000/2001 season and two camps (plus five alternative camps) proposed for the 2001/2002 season lie within a 16 kilometre radius of the Kugmallit Bay Zone 1a area (Figure 7). One ice road has been proposed that also borders this zone. Further exploration activities are planned for the winter 2001/2002 including more 2D seismic, some 3D seismic and potentially the drilling of more test wells. If seismic programs indicate a potential reservoir, then an exploratory well is drilled to test the quality of the potential reservoir. The decision to take the next step in full development depends on the success of the testing of the exploration well(s) and ultimately the likelihood that a pipeline will be built to transport the product south.



**Figure 7. Oil and Gas Exploration Camps in the Vicinity of the Area of Interest**



The potential exists for an extension of the Norman Wells oil pipeline to the Mackenzie Delta, although for this to become economically feasible, several of the existing onshore discoveries in the delta would need to be developed and produced (Brackman 2000). There are currently two oil and gas consortia which are assessing the feasibility of building pipeline routes from Prudhoe Bay and the Mackenzie Delta.

The Producers Group, which consists of Imperial Oil Resources, Conoco Canada, Shell Canada Limited and ExxonMobil Canada have recently completed feasibility studies and have made the decision to begin preparing the regulatory applications needed to develop onshore natural gas resources in the Mackenzie Delta, referred to as the project definition phase. A Mackenzie Valley route would likely follow the Mackenzie River beginning around Inuvik and running south. It is the shortest route to southern markets. The pipeline would be anchored by nearly six trillion cubic feet of natural gas at the Taglu, Parsons Lake and Niglintgak gas fields, and would be accessible to other existing and future natural gas discoveries in the Mackenzie Delta and Mackenzie Valley regions. It has been estimated that the Mackenzie Valley Pipeline could have a throughput of about one billion cubic metres per day, able to carry up to 2.5 billion cubic feet of gas per day. In October 2001, the Producers Group and the Mackenzie Valley Aboriginal Pipeline Corporation, representing the aboriginal peoples of the Northwest Territories, signed a memorandum of understanding to guide future work on economic and timely development of a Mackenzie Valley Pipeline. This pipeline itself is well south of the Zone 1a areas, but having a route for the transportation natural gas would likely result in an increase in oil and gas activities in the Mackenzie Delta and Beaufort Sea.

The North American Natural Gas Pipeline Group is a consortium of BP, Phillips Petroleum Co. and Exxon Mobil Corp. who initiated the Alaska Gas Pipeline Project. This consortium is currently assessing two routes for a natural gas pipeline from Prudhoe Bay, Alaska and the Mackenzie Delta, Northwest Territories to the lower 48 states. The two options under consideration comprise the "Over the Top Route" through the Beaufort Sea and the Alaska Natural Gas Transportation System route.

The "Over the Top" route would originate in the Prudhoe Bay area and routing eastward to a landfall in Canada, either on the mainland east of Ivvavik National Park (formerly Northern Yukon National Park) or on Richards Island in the outer Mackenzie Delta. The pipeline would then proceed to Inuvik or connect with a spur from Inuvik and proceed south following a similar route as the proposed Mackenzie Valley Pipeline. The offshore portion of the pipeline would consist of a large diameter pipeline, with no compressor stations, buried offshore to the Mackenzie Delta, then a pipeline to carry both Alaska gas and Canadian gas to the southern markets. The offshore portion would require 550 to 650 km of pipe to be buried in approximately 15 m of water in a trench sufficiently deep to provide sufficient soil cover depth for ice scour protection. Several different alignments are being considering for the 'Over the Top' route and depending on the route chosen the pipeline may infringe on the Shallow Bay Zone 1a area.

The Alaska Natural Gas Transportation System alignment runs from Prudhoe Bay along the Alaska Highway through the southwest corner of the Yukon and then proceeds through the northeast corner of British Columbia, across Alberta and Saskatchewan and then into the United States. This onshore route would not have a direct impact on the Zone 1a areas other than to bring increased oil and gas exploration and development to the Beaufort Sea area.



The BSBMP guidelines state that “The oil and gas industry should not be permitted to explore for resources within or on the shores of any Zone 1 waters nor produce hydrocarbons or construct/operate any type of facility” (Fisheries Joint Management Committee 2001). The oil and gas industry has abided by these guidelines and does not enter the Zone 1a areas for any exploration activities. Nevertheless, the oil and gas industry has expressed interest in conducting seismic explorations within Zone 1a areas.<sup>2</sup>

It is the general consensus of those companies interviewed for the socio-economic study that future development is highly contingent upon the selection of a pipeline route, and that a decision to proceed with development of one of the proposed routes could heavily sway oil and gas related activities in the region. One company also indicated that if the route selected is too far away from their license area, they may not continue with exploration and development plans.

Assessing the reservoir potential of the Zone 1a areas would be the first stage in development if these areas were opened up to oil and gas activities. The same exploration procedures as are currently being used would be used in the Zone 1a areas, such as exploration seismic and test drilling, to determine the potential of the area prior to making a decision to proceed into a development stage. Development would then proceed if a reservoir of sufficient size and quality was identified. There is currently little interest in the Zone 1a areas as they are offshore areas and companies are focusing on developing on-shore areas, which are cheaper and easier to develop, before moving offshore. Offshore areas could be of interest further in the future and may play a role in a long-term plan that would see areas being slowly and steadily developed to ensure a steady flow of gas well into the future. One company, whose explorations license borders the Kugmallit Bay Zone 1a area, indicated that they would like access to this area to conduct a winter seismic program. The reservoirs that they are currently exploring within their license may extend into the Zone 1a area and conducting a seismic program within this area would allow them to get a better picture of the exact location and size of the surrounding reservoirs.

### Economic Value

Based on the 1998 estimates for the total volume of oil and gas discoveries in the Mackenzie Delta and Beaufort Sea, the gross value of the oil in the ground is approximately \$26.0 billion to \$64.1 billion (assuming an average 2000 oil price of \$280/m<sup>3</sup>), and the gross value of natural gas is approximately \$20.5 billion to \$38.4 billion (assuming an average 2000 natural gas price of \$110/10<sup>3</sup>m<sup>3</sup>). These gross value estimates are useful in that they, to a certain extent, indicate the potential economic impact of oil and gas development. However, information is not available from which to reasonably estimate development costs, price changes for oil and natural gas, and production schedules for the region. This requires more sophisticated modelling, but would allow for a more meaningful description of the net values. In other words, these total gross value estimates indicate the size of the resources in the ground, but not the net benefits that would be associated with oil and gas development.

There are identified oil and gas discoveries adjacent to two of the Zone 1a areas. Using the above average prices, the value of the oil and gas discoveries immediately adjacent to the Kendall Island Zone 1a and the Kugmallit Bay Zone 1a can be estimated (see Table 6). For Kendall Island, the value of the oil is approximately

---

<sup>2</sup> Inuvialuit – DFO – Industry Steering Committee on Integrated Management Planning for Oceans in the Western Arctic (Integrated Management Planning Steering Committee), Minutes of Meeting, 9-10 November 2000, Mackenzie Hotel, Inuvik, NWT.



\$4.3 billion and the value of the natural gas is \$1.5 billion. For Kugmallit Bay, the value of the oil is approximately \$0.25 billion and the value of natural gas is \$0.50 billion. These volume and value estimates are a fraction of the total for the Mackenzie Delta and Beaufort Sea region. The size of these adjacent significant discoveries is of interest here because their development could potentially be restricted with the MPA designation of the Zone 1a areas. With their close proximity to the study areas, concern over potential significant environmental impacts may prohibit development. This is not to say that any future environmental impact assessment work will arrive at this conclusion, but it is useful to highlight these areas at this time.

Actual production of oil and gas in the Mackenzie Delta and Beaufort Sea area will be highly dependent on the development of a pipeline. Until more detailed information is available on the costs associated with acquiring production, as well as the production schedule (*i.e.*, how much is extracted each year), a reasonable estimate of net values will not be possible (see ARC Financial Corporation 2001 for estimates of operating costs and total costs of finding, developing and acquiring production for the industry). It must be emphasised that the gross value estimates provided here are total 'in ground' values. When or if oil and gas extraction takes place, actual annual gross and net values will be a fraction of the above dollar amounts, determined by the amount produced each year.

### 3.2.2 Mining

The Inuvialuit Land Corporation, as per the IFA, holds mineral rights in the ISR. The ISR is a relatively unexplored area in terms of mineral potential and the only active mining interests are presently located outside the AOI at Darnley Bay. Known deposits of iron, coal, copper, lead and zinc exist within the Mackenzie Estuary area, but have yet to be developed (Mackenzie Delta-Beaufort Sea Regional Land Use Planning Commission 1991). In the IFA provisions are made for the reservation of granular and sand resources for community needs (Department of Indian Affairs and Northern Development 1984). Sand and gravel supplies within the southern Beaufort Sea and Mackenzie Delta region are generally in short supply. Demands for sand and gravel include community requirements, maintenance and upgrading of transportation facilities, military activities and the oil and gas industry. Marine deposits of gravel are found northwest of Herschel Island and north of Cape Bathurst (Mackenzie Delta-Beaufort Sea Regional Land Use Planning Commission 1991).

BSBMP states that "No mining activities (*e.g.*, gravel removal) should be permitted within or on the shores of any Zone 1a waters" (Fisheries Joint Management Committee 2001).

### 3.2.3 Tourism

Tourism is important economically for the territorial governments and the Inuvialuit. It is the third leading export of the NWT and is continuing to grow. The most important tourism activities in the Mackenzie Delta region are observing wildlife, hiking, rafting, sports hunting and fishing, visiting whaling, hunting and fishing camps, boating and attending community or cultural activities. Tours typically run May to September. Interviews indicate that Herschel Island gets approximately 150 tourists per year. Cruise ship tours, small boat tours of the Mackenzie Estuary, kayaking and flight tours have been increasing in popularity in recent years. Three cruise ships currently utilize offshore waters of the ISR – the Russian ship *Kaptain Khlebnikov*, the German ship the *MS Haneseatic*, and the US ship the *Frontier Spirit* (Eddy 2001). At least one of these ships brings tourists to the mainland by helicopter and zodiac boat (Fast *et al.* 1998). Cruise ships do not enter the Mackenzie River or estuary areas due to insufficient water depth. Local interviews indicate that there are a total of four to six cruise ship visits per



year. The primary tour route of kayakers is along the Yukon North Slope to Kaktovik, stopping at the whaling camps of Running River and Shingle Point, as well as Herschel Island (Eddy 2001).

Plans are underway to route a portion of the Trans-Canada Trail between Inuvik and Tuktoyaktuk. The present route follows an existing winter road and traverses near the eastern shores of Kugmallit Bay. Once developed, the trail has the potential to attract adventure tourists. A plaque commemorating the trailhead has already been erected at Tuktoyaktuk.

No tourism operator presently conducts boat tours in the Zone 1a areas. However, two operators have in the past taken tourists to visit family camps near the Kendall Island Zone 1a. One Tuktoyaktuk-based tour company has taken visitors to the boundary of the Kugmallit Bay Zone 1a area to view whales.

Several companies that cater to tourists use the eastern and westernmost Zone 1a areas as transportation corridors. Charter air companies that cater to tourists traverse the Shallow Bay and Kugmallit Bay Zone 1a areas *en route* to other destinations. Several flights per day, for example, may fly over the Shallow Bay Zone 1a area in the summer taking visitors between Aklavik and Herschel Island Territorial Park. One tour operator leads a dogsled tour of up to three people (plus guides) along this same route over land and sea ice. Two dog sled tours are conducted in April: the first trip originates in Aklavik destined for Herschel Island; the later trip uses the same route to take a second group of tourists from Herschel Island to Aklavik. Both legs involve winter camping.

In addition to traditional tourists, other users who travel through these areas (*e.g.*, oil and gas workers, researchers, business people and government staff) may also be perceived as tourists in the sense that they may be travelling similar routes and experiencing similar benefits as tourists although their reasons for travelling through the area may differ from the more traditional traveller.

BSBMP speaks extensively to tourism activities. In recognition of the priority of the ongoing subsistence beluga harvest, water-based tourism and related activities are not permitted within the Zone 1a areas. HTC's have also prepared tourism guidelines for their respective hunting areas. Guidelines for tourism in the ISR (Fisheries Joint Management Committee 1994) include the following provisions:

- subsistence hunting takes priority over tourism activities;
- HTC's will designate areas to be used for whale watching/tourism within the ISR;
- tourism operators must have written agreement with the appropriate HTC; and
- specific guidelines covering harassment, timing of activity, tour length, photography, use of aircraft and protection of the environment are to be followed.

There remains, however, some interest by operators in exploring opportunities for "appropriate" tourism that is focused on beluga whale watching. The Zone 1a areas, and their use for traditional pursuits, could potentially be successfully marketed to tourists interested in viewing marine mammals and birds, and observing cultural activities. Establishment of a MPA would enhance the attractiveness of the areas to tourists. One interviewee suggested that whale watching tours could be conducted within the Zone 1a areas in early September after the beluga harvest has concluded and while the chance of seeing whales is still possible. Another interviewee suggested the construction of a base camp outside the Zone 1a boundary that would be used only by tourists to



minimize disturbance to hunters at traditional camps. According to one company, if tourism were allowed to take place in the Zone 1a areas, the number of tourists would be low, probably less than a dozen per year, and the operations would be small scale, using Inuvialuit guides. Beluga hunters, however, have concerns about opening the doors to tourism. The principal concerns are disturbance to whales and/or hunters, and the potential for negative publicity that may result from tourists photographing the hunts.

#### Economic Value

Economically big game and trophy hunting are the largest single tourism products in the north. There are descriptions of economic and northern development issues related to arctic tourism (e.g., Hinch 1995, Marsh and Staple 1995). For example, Dressler (1999) presents an analysis of stakeholder perspectives related to tourism development in the Arctic. However, economic analyses are not available and there are no data describing the level and locations of tourism use in the Mackenzie Delta Region. It is estimated that the whole of the Arctic region including Nunavut receives between 5000 and 8000 tourists per year (D. Zimmerman, pers. Comm.). The largest tourism company in the region, Arctic Nature Tours, sells tour packages, which are in turn contracted to independent guides. The company books approximately 2500 tourists per year.

There is insufficient information to estimate net economic values (*i.e.*, tourism benefits that may be accrued if tourism activities were permitted in the Zone 1a areas). Furthermore, given the dominance of one tourism operator, concerns over maintaining confidentiality arise.

#### **3.2.4 Transportation**

There are three main types of non-government transportation companies based out of Inuvik: a barge company, fixed-wing air charter companies; and helicopter charter companies. The majority of these companies conduct business within the Zone 1a areas, although many are infrequent users. The primary local marine transportation route is through Kugmallit Bay, passing through the Zone 1a area. Northern Transportation Company Limited (NTCL) operates a coastal community supply vessel through the east channel of the Mackenzie Delta, as well as through Kugmallit Bay every other day between 1 July and 1 October (Fast *et al.* 1998). Barge traffic consists of ten river tugs that push/tow on average six linked barges. They primarily transport bulk petroleum products, dry cargo and supplies to communities, defence installations, and oil and gas exploration sites. On average, vessels with barge tow would transit the Kugmallit Bay Zone 1a area approximately two to three times per week during the summer.

The fixed-wing and helicopter companies charter to government, industry, local residents, tourists or a combination. The frequency of travel through the Zone 1a areas also varies, but generally ranges from one flight per week to two flights per day during the summer season. There is very little winter charter work, other than in support of oil and gas exploration activities. The destinations of these air charter companies vary from company to company and year to year depending on their clientele. Herschel and Kendall islands, however, seem to be reasonably consistent destinations. A typical flight path to Herschel Island passes through or near the Shallow Bay Zone 1a area. Servicing and maintenance of the communication towers at Tuktoyaktuk and Swimming Point and related activities on Garry and Pullen islands are conducted via air charter. One company travels to Garry and Pullen islands six times per year each.



There has been little change to the size or nature of barge and air charter companies in the recent past, other than an increase in tourism over the last 20 years and the recent upsurge in oil and gas related activities. Most of the companies interviewed indicated that alternate routes, to avoid the Zone 1a areas, were possible. Marine vessel traffic, however, must follow a registered route that can not be altered.

According to the BSBMP guidelines “All shipping activities (including dredging) should be confined to designated routes and areas. Passage through or close to Zone 1a outside of designated routes, even if it’s the shortest route, should be avoided from break-up to 15 August.” In addition, the guidelines specify that “No port development should be allowed within or on the shores of any Zone 1a waters” (Fisheries Joint Management Committee 2001).

### Economic Values

Further information was not available from which to estimate economic values associated with transportation activities. It would be particularly beneficial to be able to estimate the value of the use of the Zone 1a waters by the marine transportation sector (*i.e.*, through Kugmallit Bay). However, there was no public secondary information available relating to the economic value of the use. Further, given the dominance of one company, confidentiality concerns again arise. Any changes in marine navigation routes or in seasonal uses that are considered as part of MPA designation, nonetheless, should consider the impacts on this sector and the activities associated with them.

### **3.2.5 Military and Coast Guard Activities**

The northern component of DND, Canadian Forces Northern Areas, maintains a military base at Yellowknife. Inuvik is the location of a Forward Operating Line for aircraft support and was previously a major military base (Capt. B. Saunders, pers. comm.). Currently, Inuvik is periodically used for land-based military and flight training exercises and the only infrastructure remaining at the base is hangars for six aircraft (Capt. B. Saunders, pers. comm.).

The Distant Early Warning (DEW) line was constructed across Canada’s Arctic in 1955 as part of the North American Air Defence System. In 1988 the DEW line was partially deactivated and ceased operation (Eddy 2001). Along the coast of the Mackenzie Estuary are the remains of two stations, at Shingle Point and Tuktoyaktuk. Clean-up and decommissioning of these sites is ongoing, with specific attention to limiting environmental contamination, particularly of PCBs. A military waste site is located near the Tuktoyaktuk station, with several other sites further inland. The DEW Line system was replaced and modernized under an agreement signed by Canada and the United States in 1985. Within Canada, this system is operated by the Canadian military and is made up of nine automated long range radar sites and 32 unmanned short range radar sites and four manned logistical sites located near shore along the Northwest Passage route (Capt. B. Saunders, pers. comm.). None of these sites is within the detailed study area.

The Coast Guard moves through the region three times per season to maintain navigational buoys (involving setting, checking and retrieving) (Fast *et al.* 1998).



### 3.3 Summary

Table 7 summarizes and compares the socio-economic values of each of the Zone 1a areas. While it is difficult to make comparisons among different socio-economic sectors, one can apply a comparative relative scale. From a socio-economic (not ecological) perspective, Kendall Island offers the least conflict between the greatest development pressure, petroleum exploration and development, and the greatest socio-cultural values, traditional harvesting. While all three Zone 1a areas are important sites for beluga harvesting, Kendall Island's harvesting values are moderated by its distance from communities and comparatively less fishing, wildlife harvesting and bird harvesting. Based on the information available, the Kendall Island Zone 1a area also has fewer known archaeological sites, although this may be a result of research effort rather than inherent historic value. In addition, the area around the Kendall Island Zone 1a area offers greatest petroleum production potential.

**Table 7. Summary of Socio-Economic Values in the AOI**

<b>Socio-economic Sector</b>	<b>Shallow Bay</b>	<b>Kendall Island</b>	<b>Kugmallit Bay</b>
<b>Fishing</b>	High	Moderate	High
<b>Marine Mammal Harvesting</b>	High	High	High
<b>Land Animal Harvesting</b>	High	Moderate	High
<b>Bird Harvesting</b>	High	Moderate	High
<b>Archaeology</b>	High?	Moderate	High
<b>Protected Areas</b>	Low	High	Moderate
<b>Research and Education</b>	??	??	??
<b>Petroleum</b>	Low	High	Moderate
<b>Mining</b>	Low	Low	Low
<b>Tourism</b>	??	??	??
<b>Transportation</b>	Moderate	Low?	High



## 4.0 SCENARIO ANALYSIS

### 4.1 Description of Scenarios

The scenario analysis is intended to provide a general prediction of the consequences of management options by looking at changes in baseline uses and values due to potential prohibitions or elimination of activities, as well as the introduction of new activities into the areas of interest (e.g., tourism and oil and gas). The results will provide an indication of the benefits that could be lost or gained.

The starting point for the scenario analysis is the status quo, that is, formalizing and legislating the BSBMP guidelines for industrial development and tourism in Zone 1a areas. Because activity in the Zone 1a areas is limited, at least voluntarily, the scenarios focus on allowing a greater degree of activity. The chosen scenarios comprise:

- A. *Status quo*. Current BSBMP guidelines are formalized and legislated within a MPA.
- B. *Oil and gas driven scenario*. This development scenario assumes that identified resources adjacent to and within Zone 1a areas are extracted (i.e., directional drilling is permitted to extract oil and gas from within the candidate MPA areas).
- C. *Tourism and recreation driven scenario*. Water-based tourism is permitted to continue unhindered.
- D. *Combination (oil and gas; tourism and recreation) of development*. Both water-based tourism and oil and gas development are allowed to proceed as defined in the previous scenarios.

Muir (1997), in her legal analysis of the IFA, concludes that a marine protected area established under Canada's *Oceans Act* would not interfere with the Inuvialuit harvesting rights as defined by the IFA. Furthermore, because of the vital link, it is assumed that the designated transportation corridor through Kugmallit Bay would be maintained. Thus, for all scenarios, it is assumed that neither of these activities will be directly affected by MPA designation.

The oil and gas driven scenario assumes that all identified oil and gas resources, including those within and adjacent to the proposed Kugmallit Bay and Kendall Island MPA sites (see Table 6), are permitted for development. Although not necessarily within the Zone 1a areas, the close proximity of oil and gas development does place the associated marine harvesting values at risk. It is beyond the scope of this paper to provide an assessment of the level of risk involved, but unintentional impacts from accidents or disturbance of living marine resources (e.g., beluga whales) from exploration, drilling, extraction and transportation, represent potential risks. In addition, there would be an 'exclusion zone' established around all drilling and extraction sites, within which non-oil and gas activities would not be permitted for safety reasons. With oil and gas development, there are also potential negative impacts on the tourism and recreation sector. Specifically, negative impacts could be felt due to the sites and noises associated with development, or more indirectly with a general increase in the industrialization of the region.

The tourism and recreation driven scenario assumes that water-based tourism operators are able to continue to use the Zone 1a areas *en route* to other destinations, as well as use the areas themselves as part of the tourism



product. The latter would require relaxation of the current BSBMP guidelines in the MPA Management Plan. Increases in the levels of current uses, while remaining in conformity with the BSBMP guidelines, have the potential to have a negative impact on marine harvesting activities. This is highly dependent, however, on the specific permitting granted, given the discretionary latitude provided. At this point in time, any impacts are speculative. The oil and gas sector would not be impacted by policies aimed at promoting the tourism and recreation sector, unless such policies restricted oil and gas production in favour of tourism and recreation.

With a combined oil and gas/ tourism and recreation development scenario (*i.e.*, policies designed to specifically favour the expansion of both sectors), the greatest risks to marine harvesting values come mainly from oil and gas development as previously described. Also, the extent of any conflicts between tourism and the oil and gas sector will be determined by their abilities to avoid 'use overlap' (*i.e.*, competition for the same environmental space).

## 4.2 Assessment of Scenarios

In describing how the resource values may change with corresponding changes to management regulations and guidelines, one has to describe not only the current values associated with individual economic activities (*i.e.*, marine harvesting, resource exploration and production, tourism and recreation), but also the links between these activities and between the activities and the marine environment in the Zone 1a areas. The relationships are largely unknown. For example, port development and shipping could affect the beluga directly with noise generation and pollution, but the likelihood and strength of the effects remain in question (*e.g.*, Fisheries Joint Management Committee 2001).

Table 8 suggests a simple, explicit framework for examining the direct impacts of possible management policies and guidelines. Because of a lack of information specific to the study areas, the framework qualitatively describes the anticipated direction of the impact. It does not quantitatively describe the changes in the net economic values, which would be preferred. In the table, the first column identifies the four separate development scenarios. The first row identifies the three primary sectors that will be affected by the management policies associated with each of the four development scenarios – that is, each scenario may result in changes to marine harvesting, oil and gas production, and tourism and recreation. The set of possible management policies are determined through consideration of the management objectives for the area as described in BSBMP (Fisheries Joint Management Committee 2001). Possible alternative futures that are consistent with BSBMP, as well as those that represent an alteration of BSBMP plan, are described.

There has been interest expressed by the oil and gas industry to conduct winter seismic work through the Zone 1a areas to get a clearer picture of the resources in the area. If conducted during the winter, the effect on marine harvesting would be minimal. It would only increase the economic value of the oil and gas production if the seismic work identified more reserves. At this point, it is not possible to answer this question.

The economic activity baseline conditions reported in this study are undoubtedly different from past conditions and will likely change in the future. Changes will occur whether or not the area is designated as a MPA, being dependent on a wide variety of influences, not simply the existing local management regime.



When considering various policy scenarios for management, specific direct impacts on economic uses should not be the only consideration. Changes in the levels of one activity may, over time, positively or negatively affect other uses. This would likely result through intermediate changes in the baseline ecological conditions (e.g., an increase in oil and gas activity may lead to an eventual decrease in marine harvesting).

**Table 8. Framework for Considering the Direct Impacts of Various Policy Scenarios on Economic Uses within Zone 1a Areas**

<b>Economic Activity →</b> <b>Scenario ↓</b>	<b>Marine Harvesting</b>	<b>Oil and Gas Production</b>	<b>Tourism and Recreation</b>
<b>Status quo</b>	Socio-economic values maintained. No change as a result of MPA.	Substantial resources 'in ground' regionally, with potential loss of those within/ near Zone 1a areas.	Growth in sector reliant on use of areas outside of Zone 1a areas. No change as a result of MPA.
<b>Oil and gas driven scenario</b>	Socio-economic values at risk.	Full potential value derived from 'in ground' resources.	Potential negative impact (magnitude unknown).
<b>Tourism and recreation driven scenario</b>	Potential negative impact (magnitude unknown).	No impact, unless activities restricted in favour of tourism development.	Growth at rate that is determined by industry (i.e., reduced restrictions).
<b>Combination (oil and gas; tourism and recreation) of development</b>	Socio-economic values at risk.	Full potential value derived from 'in ground' resources.	Growth in sector reliant on ability to avoid use overlap with oil and gas development.



## 5.0 INFORMATION AND KNOWLEDGE GAPS

While there is extensive information available on resources and activities in the Beaufort-Mackenzie region (Eddy 2001 provides an excellent information source), the time frame of the current project did not permit sufficient time to extract detailed information relating to the three Zone 1a areas under consideration as a MPA from which a reliable economic assessment can be conducted value. The socio-economic assessment could be refined with additional information as summarized in Table 9.

**Table 9. Summary of Data Gaps**

<b>Discipline</b>	<b>Description</b>	<b>Priority</b>	<b>Source</b>
<b>Traditional Use</b>	The history of the beluga hunt, so central to the Inuvialuit way of life, has not been adequately documented (Day, pers. com.).	High	<ul style="list-style-type: none"> <li>▪ extensive discussions with elders as a means of more comprehensively articulating its significance</li> <li>▪ traditional use</li> </ul>
<b>Marine Harvesting</b>	Current data from the harvest study are not available as protocols for the third-party use of these data have not been developed. These data would be useful in providing a more accurate estimate of the total annual beluga harvest, the number of harvester, as well as locational information.	High	<ul style="list-style-type: none"> <li>▪ Inuvialuit Harvest Study (once 3<sup>rd</sup> party protocols are established)</li> </ul>
<b>Oil and Gas</b>	Modelled cost estimates, price estimates, and production schedule would be needed to more accurately assess net values.  Estimates of resources actually within Zone 1a areas need to be derived.	Moderate	<ul style="list-style-type: none"> <li>▪ petroleum companies</li> <li>▪ geological assessment</li> </ul>
<b>Transport</b>	Value of cargo, comparative air freight costs, fuel costs, etc. would be needed to more accurately assess net values.	Moderate	<ul style="list-style-type: none"> <li>▪ transport companies</li> </ul>
<b>Tourism</b>	There is presently no means of determining independent tourist use of the Zone 1a areas. Several people indicated that cruise ships from Russia, China, Germany, etc. are seen traveling through the area <i>en route</i> to Alaska, but did not have any details on where they went or how often. While of interest in predicting regional tourism trends and the possibility of unguided tourists in the Zone 1a areas, information on the number and travel patterns of independent tourists would be virtually impossible to collect. Further, the number of independent tourists is known to be low based on anecdotal information.	Low	<ul style="list-style-type: none"> <li>▪ cruise ship traffic may be available through the Coast Guard</li> </ul>



## 6.0 MANAGEMENT IMPLICATIONS OF A MPA DESIGNATION

### 6.1 Management Objectives

Management direction, including boundary delineation and restrictions on human activities, for a MPA has generally developed in accordance with the overall objectives of the MPA. At this stage in the process, these have not been specifically and comprehensively defined for the proposed Beaufort Sea MPA. Nevertheless, by virtue of identifying the three Zone 1a areas as defined in the BSBMP, the intent is to provide legislative authority to protecting beluga and fish habitat in support of maintaining healthy populations for subsistence harvesting including whaling. Throughout the course of the study there was a general consensus that protecting the area and the whales was beneficial; however, some interviewees commented that allowing beluga whales to be harvested within the MPA appeared to be contrary to protection objectives.

### 6.2 Boundary Delineation

The AOI for the proposed Beaufort Sea MPA is defined as the three Zone 1a areas specified in the BSBMP. The following factors should be taken into account in delineating the MPA boundary:

- core protection areas with stricter human use restrictions surrounded by a buffer zone where limited and controlled activities could take place which do not compromise the inherent management objectives;
- designating one or two of the Zone 1a areas as a MPA based on the contribution of each to the management objective and the degree of conflict in values (see Table 7);
- applying different restrictions to each of the three Zone 1a areas;
- applying temporal restrictions during critical periods for beluga and other marine species; and
- protecting the ecological values from terrestrial impacts by considering the foreshore and upland extent of the boundaries

### 6.3 Existing Management Direction

Management direction for the proposed MPA may be derived from existing plans, regulations and guidelines. For example, current management direction as specified in the BSBMP guidelines and the IFA include:

- all subsistence hunting and fishing would be allowed to continue as it does at present;
- the oil and gas industry should not be permitted to explore for resources within or on the shores of any Zone 1 waters nor produce hydrocarbons or construct/operate any type of facility;
- the main shipping channel through Kugmallit Bay should remain accessible to shipping traffic;
- subsistence hunting takes priority over tourism activities;
- water-based tourism and related activities are not permitted within the Zone 1a areas; and
- no mining activities (e.g., gravel removal) should be permitted within or on the shores of any Zone 1a waters.



These guidelines represent a status quo scenario that is generally consistent with the spirit and intent of MPAs under the *Oceans Act*. The guidelines, if adopted in whole or in part, could provide a firm basis for the development of a management plan for a regulated MPA. However, results of this socio-economic overview have indicated that there is some interest among stakeholders of deviating from the existing management direction as expressed in the BSBMP. Potential options for a MPA are discussed in more detail below. Final decisions regarding permissible uses and management prescriptions must be determined through further consultations among the Inuvialuit, regulatory agencies and other stakeholders.

#### **6.4 Activities in the MPA**

The socio-economic assessment has described qualitatively and quantitatively, where possible, the human activities in the AOI and the values they represent to the Inuvialuit and broader community. The key activities taking place in and around the AOI are beluga harvesting, oil and gas exploration, tourism and transportation. In addition, the Mackenzie Delta region represents an important research area. It is understood that beluga harvesting will not be compromised by MPA designation. However, specific issues and implications relating to the other activities need to be addressed.

##### Oil and Gas

Subject to pipeline routing opportunities and priority for onshore development, the oil and gas industry has expressed an interest in conducting seismic explorations in the Zone 1a areas. In the event that interest and feasibility of offshore exploration become more prominent, several options exist:

- permit winter seismic exploration prior to MPA designation. However, Inuvialuit hunters and others who strongly endorse a strict protection of environment fear that the evidence of a viable reservoir would present added pressure for extracting those resources; and
- explore the feasibility of directional drilling from outside the Zone 1a areas (dependent on seismic work).

Both these options would require modifications to the current BSBMP guidelines.

##### Tourism

Tourism, and in particular, ecotourism is a growing industry in the Arctic as travellers seek more exotic and 'adventurous' experiences. While water-based tourism does not currently take place within the three Zone 1a areas, tourists are transited *en route* to other destinations. Control of this transit and associated implicit tourism needs to be examined. Additionally:

- further consultation with hunters is required to determine whether or not tourism activities would be appropriate in the Zone 1a areas. There are currently mixed feelings about tourism use of these areas in the months outside of the main beluga hunting season. There is, however, almost unanimous support among those interviewed that tourism use should be restricted while the hunt is in progress. A code of conduct for tourism, and a means to communicate to tourists and guides information about the MPA, would be needed if tourism is permitted; and



- the permitting process for guides/operators should be coordinated. There are presently several permitting agencies such as territorial governments and INAC (for camps). If a MPA is established, likely a federal permit will also be required.

The implications on tourism of an established MPA will depend upon the types of tourism, if any, that may be permitted. Globally, MPAs are known to attract tourists interested in viewing and experiencing the values for which the areas have been protected, be they oceanographic, biological or cultural. A MPA in the Beaufort Sea, although a remote destination by most standards, could potentially be successfully marketed to tourists. The economic benefits of an enhanced tourism product, although not quantifiable at this time, would likely be felt by local tour operators and businesses in key communities that would act as staging areas for tours. The effects of not having a MPA, or of restricting tourism use within the MPA, would be equivalent to the current scenario that is guided by BSBMP and which prohibits all tourism activity within the Zone 1a areas.

#### Transportation

The impact of overflights on the beluga whales was raised during the course of the project. There was a general feeling from the air charter companies that air traffic did not affect beluga whales and there should be no need to re-route air traffic. This potential impact needs to be more closely examined, including the possibility of imposing minimum altitude restrictions over Zone 1a areas, maximum number of flights, and controls on noise impacts (e.g., due to different engine types). Concern was also raised about marine traffic causing whales to leave the area. However, it was also noted that whales generally return to the area after a short period of time. It is beyond the scope of this study to assess the environmental impact between marine traffic and whales. If studies are conclusive then options for modifying the shipping lane, particularly through Kugmallit Bay could be explored.

#### Research and Education

The Mackenzie Delta – Beaufort Sea region is an area rich in biophysical and archaeological research opportunities. Continuation of research within a MPA requires several considerations:

- there will be a need to maintain access to the lands adjacent to the Zone 1a areas for maintenance of communications sites and research facilities. Air traffic in general will need to be controlled and managed; and
- coordination of permitting processes, and means of communicating information about the MPA, should be considered for research activities.

#### Summary of socio-economic impacts, mitigation and enhancement options of a MPA

The negative and positive impacts of MPA designation on various socio-economic sectors are summarized in Table 10. Beyond the intended benefits of protecting beluga populations, habitat and traditional harvesting, MPA designation could also provide a research focus for biophysical and archaeological studies. These opportunities can be enhanced by embarking on a traditional use study of the area, co-ordinating the research permitting process and establishing a forum for communicating and sharing research results. However, MPA designation may also serve to attract visitors and potentially intrusive research which will need to be monitored. Depending on the level of restrictions, MPA designation may also alienate some economic activities such as petroleum exploration and production, tourism and transportation. The petroleum industry could face a loss of investment in



exploration and communities could lose employment opportunities. Tourism growth would have to be reliant on areas outside the MPA for growth. The transportation industry may be curtailed by lack of access or increased cost of circumventing Zone 1a areas. Negative impacts on these industries could be mitigated by permitting winter seismic activity, directional drilling, whale watching from shore or in months other than July and August, and low overflight restrictions during July and August. However, given that two of the three Zone 1a areas are within direct transportation marine and air corridors, transportation restrictions (e.g., through trips only, no stopping, minimum flight altitude) would be difficult to enforce.

**Table 10. Summary of Socio-Economic Impacts, Mitigation and Enhancement Options of a MPA**

<b>Socio-economic Sector</b>	<b>Negative Impact</b>	<b>Positive Impact</b>	<b>Mitigate/Enhance</b>
<b>Subsistence Harvesting</b>		<ul style="list-style-type: none"> <li>▪ Protected resource</li> <li>▪ Continuation of traditional use</li> </ul>	
<b>Archaeology/History</b>		<ul style="list-style-type: none"> <li>▪ Less disturbance to archaeological sites</li> <li>▪ Opportunities for further studies</li> </ul>	<ul style="list-style-type: none"> <li>▪ Traditional use study</li> </ul>
<b>Protected Areas</b>	<ul style="list-style-type: none"> <li>▪ Could serve to attract more visitors</li> </ul>	<ul style="list-style-type: none"> <li>▪ Beluga sanctuary</li> <li>▪ Node in MPA network</li> </ul>	<ul style="list-style-type: none"> <li>▪ Monitoring</li> </ul>
<b>Research and Education</b>	<ul style="list-style-type: none"> <li>▪ Impact of intrusive research</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provides a research focus</li> <li>▪ Opportunities for public education</li> </ul>	<ul style="list-style-type: none"> <li>▪ Monitoring</li> <li>▪ Co-ordination of permitting process</li> <li>▪ Forum to communicate research results</li> </ul>
<b>Petroleum Exploration and Production</b>	<ul style="list-style-type: none"> <li>▪ Loss of investment (compensation issues)</li> <li>▪ Loss of employment</li> <li>▪ Loss of revenue</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduced impact on beluga</li> </ul>	<ul style="list-style-type: none"> <li>▪ Winter seismic activity</li> <li>▪ Directional drilling</li> </ul>
<b>Mining</b>	-	-	-
<b>Tourism</b>	<ul style="list-style-type: none"> <li>▪ Restriction of activity</li> <li>▪ Growth reliant on areas outside Zone 1a areas</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduced impact on beluga</li> <li>▪ Reduced intrusion on traditional harvesting</li> </ul>	<ul style="list-style-type: none"> <li>▪ Whale watching except in July and August</li> <li>▪ Whale watching from onshore</li> <li>▪ Enforcement</li> </ul>
<b>Transportation</b>	<ul style="list-style-type: none"> <li>▪ Lack of access</li> <li>▪ Additional cost of circumventing Zone 1a areas</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduced impact on beluga</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low overflight restrictions in July and August</li> <li>▪ Enforcement</li> </ul>



## 7.0 REFERENCES

### 7.1 Reports

- ARC Financial Corporation. 2001. *Canadian Oil and Gas Industry Competitiveness and Financial Performance*. Study prepared for the Canadian Association of Petroleum Producers, April 2001.
- Aurora Research Institute. 1998. *Doing Research in the Northwest Territories: A Guide for Researchers*. Inuvik: Aurora Research Institute.
- Berkes, F. and H. Fast. 1996. Aboriginal peoples: The basis for policy-making toward sustainable development. In: A Dale and JB Robinson (eds.), *Achieving Sustainable Development*. Vancouver: UBC Press. pp.205-264.
- Brackman, C. 2000. *NWT Petroleum Exploration and Development Synopsis*. June 2000. Senior Resource Economist, Resources Wildlife and Economic Development, Minerals, Oil and Gas Division, NWT. <http://www.bmmda.nt.ca/background.htm>
- Bunce, L., P. Townsley, R. Pomeroy and R. Pollnac. 2000. *Socioeconomic Manual for Coral Reef Management*. Townsville, Australia: Australian Institute of Marine Sciences.
- Cartier, C. and J. Ruitenbeek. 2000. Review of the empirical biodiversity literature. Annex A. In: K. Gustavson, R.M. Huber and J. Ruitenbeek (eds.), *Integrated Coastal Zone Management of Coral Reefs: Decision Support Modeling*. Washington, DC: The World Bank. pp. 207-239.
- Canadian Wildlife Service (CWS). 1996. *Towards an Environment Canada Strategy for Coastal and Marine Protected Areas*. Report prepared by E. Zurbrigg on behalf of the CWS Marine Habitat Working Group. Hull, Quebec. Available online at: [dsp-psd.communication.gc.ca/Collection/CW66-201-1996E.pdf](http://dsp-psd.communication.gc.ca/Collection/CW66-201-1996E.pdf).
- Cesar, H. (ed.). 2000. *Collected Essays on the Economics of Coral Reefs*. Kalmar, Sweden: CORDIO.
- Community of Aklavik, Wildlife Management Advisory Council (NWT) and Joint Secretariat. 2000. *Aklavik Inuvialuit Community Conservation Plan*. June 2000.
- Community of Inuvik, Wildlife Management Advisory Council (NWT) and Joint Secretariat. 2000. *Inuvik Inuvialuit Community Conservation Plan*. June 2000.
- Community of Tuktoyaktuk, Wildlife Management Advisory Council (NWT) and Joint Secretariat, 2000. *Tuktoyaktuk Community Conservation Plan*. June 2000.
- Crosby, Michael P. 1994. A proposed approach for studying ecological and socio-economic impacts of alternative access management strategies for marine protected areas. In: D. Brunckhorst (ed.) *Marine Protected Areas and Biosphere Reserves: Towards a New Paradigm*. Proceedings of a workshop hosted by the Australian Nature Conservation Agency and supported by UNESCO. Canberra, Australia.
- Day, Billy. 2002. Renewable Resources of the Beaufort Sea for Our Children: Perspectives from an Inuvialuit Elder. *Arctic* 55(Supp.1):1-3.
- Department of Indian Affairs and Northern Development. 1984. *The Western Arctic Claim: The Inuvialuit Final Agreement (IFA)*. Department of Indian Affairs and Northern Development, Government of Canada, Ottawa
- Dickens, D., L. Martin, I. Bjerkelund, S. Potter, D. Erickson, J. Harper, P. Norton, S. Johnson and P. Vonk. 1987. *Environment Atlas for Beaufort Sea Oil Spill Response*. Prepared by DF Dickins Associates Ltd and ESL Environmental Sciences Limited for Environment Canada.



- Dressler, Wolfram Heinz. 1999. *Nature-based Tourism and Sustainability in the Beaufort Delta Region, NWT – An Analysis of Stakeholder Perspectives*. Master Thesis, Natural Resources Institute, University of Manitoba, Winnipeg.
- Eddy, Sara Melnyk. 2001. *Beaufort Sea Integrated Management Planning Initiative (BSIMPI): Coastal Resource Inventory*. Winnipeg: Oceans Programs Division, Central and Arctic Region, Fisheries and Oceans Canada.
- Environmental Impact Screening Committee (EISC). 2002. *Operating Guidelines and Procedures*. EISC: Inuvik, Northwest Territories.
- Fabijan, M., N. Snow, J. Nagy and L. Graf. 1993. *Inuvialuit Harvest Study Atlas of Wildlife Species Harvest Locations: Reported During: July 1987 – December 1992*. Prepared by the Joint Secretariat and the Department of Renewable Resources, Government of Northwest Territories. Inuvik, NWT. October 1993.
- Fast, Helen, Jack Mathias and Fleur Storache (with contributions from M.A.K. Muir and E. Meltzer). 1998. *Marine Conservation and Beluga Management in the Inuvialuit Settlement Region. Can Marine Protected Areas Play a Role?* Report prepared for the Fisheries Joint Management Committee, Inuvialuit Settlement Region.
- Fisheries and Oceans Canada. 1995. *1995 Survey of Recreational Fishing in Canada*. [http://www.dfo-mpo.gc.ca/communic/statistics/rec\\_e.htm](http://www.dfo-mpo.gc.ca/communic/statistics/rec_e.htm)
- Fisheries and Oceans Canada. 1998. *Marine Protected Areas Program*. Ottawa: Communications Directorate, Fisheries and Oceans Canada.
- Fisheries and Oceans Canada. 1999a. *Marine Protected Areas Policy*. Ottawa: Marine Ecosystems Conservation Branch, Oceans Directorate, Fisheries and Oceans Canada.
- Fisheries and Oceans Canada. 1999b. *National Framework for Establishing and Managing Marine Protected Areas*. Ottawa. Available online: [www.ncr.dfo.ca/oceanscanada/newenglish/htmldocs/mpas/newmpal/main\\_e.htm](http://www.ncr.dfo.ca/oceanscanada/newenglish/htmldocs/mpas/newmpal/main_e.htm)
- Fisheries Joint Management Committee. 1994. *Beaufort Sea Beluga Management Plan Tourism Guidelines Within the Inuvialuit Settlement Region*. Revised April 27, 1994. FJMC: Inuvik, NT.
- Fisheries Joint Management Committee. 2001. *Beaufort Sea Beluga Management Plan*. Amended Third Printing. Fisheries Joint Management Committee, Inuvik, NWT.
- Freeman, M.R., E.E. Wein and D.E. Keith. 1992. *Recovering Rights: Bowhead Whales and Inuvialuit Subsistence in the Western Canadian Arctic*. Canadian Circumpolar Institute, Edmonton, AB.
- Freeman, M.R., L. Bogoslovskaya, R.A. Caulfield, I. Egede, I.I. Krupnik and M.G. Stevenson. 1998. *Inuit, Whaling, and Sustainability*. Altamira Press, Walnut Creek, CA.
- Gal, Len. 2002. *Summary of Petroleum Exploration Activity and Land Dispositions In and Adjacent to Beluga Management Zone (1-A) areas*. INAC Working paper. Final Draft. 7pp.
- Gilman, A., E. Dewailly, M. Feeley, V. Jerome, H. Kuhnlein, B. Kwavnick, S. Neve, B. Tracy, P. Usher, J. Van Oostdam, J. Walker, and B. Wheatley. 1997. Chapter 4: Human Health. In: J. Jensen, K. Adare and R. Shearer (Eds.), *Canadian Arctic Contaminants Assessment Report*. Indian and Northern Affairs Canada, Ottawa.
- Government of the Northwest Territories Department of Education, 1991. *Inuvialuit Pitqusiit. The Culture of the Inuvialuit*. GNWT: Yellowknife, NT.
- Harwood, L.A., P. Norton, B. Day and P.A. Hall. 2002. The harvest of beluga whales in Canada's Western Arctic: hunter-based monitoring of the size and composition of the catch. *Arctic* 55(Supp.1):10-20.



- Harwood, L.A. and T.G. Smith. 2002. Whales of the Inuvialuit Settlement Region in Canada's Western Arctic: an overview and outlook. *Arctic* 55(Supp.1): 77-93.
- Hinch, T.D. 1995. Aboriginal people in the tourism economy of Canada's Northwest Territories. In: CM Hall and ME Johnston (eds), *Polar Tourism: Tourism in the Arctic and Antarctic Regions*. John Wiley & Sons, New York. pp.115-130.
- Inuvialuit Game Council. 2002. Inuvialuit Game Council Annual Report 2001-2002. IGC, Inuvik, Northwest Territories.
- Kelleher, G. and R. Kenchington. 1992. Guidelines for Establishing Marine Protected Areas: A Marine Conservation and Development Report. IUCN. Gland, Switzerland. 79 pp.
- Kelleher, G., R. Kenchington and C. Bleakley. 1997. IUCN-CNPPA Marine Protected Areas Programme: Identification of Priority Areas for the Establishment and management of Marine Protected Areas. Report prepared for the IUCN and the Great Barrier Reef Marine Park Authority. Canberra, Australia.
- Kuhnlein, H.V., O. Receveur, H.M. Chan, and E. Loring. 2000. *Assessment of Dietary Benefit/Risk in Inuit Communities*. Centre for Indigenous Peoples' Nutrition and Environment (CINE), McGill University, Montreal, Quebec, Canada.
- Mackenzie Delta-Beaufort Sea Regional Land Use Planning Commission (MDBSRLUPC). 1991. *A Community-Based Regional Land Use Plan for the Mackenzie Delta-Beaufort Sea Region: A Land Use Plan*.
- Marsh, J. and S. Staple. 1995. Cruise tourism in the Canadian arctic and its implications. In: CM Hall and ME Johnston (eds), *Polar Tourism: Tourism in the Arctic and Antarctic Regions*. John Wiley & Sons, New York. pp.63-72.
- McGhee, R. 1974. *Beluga Hunters: An Archaeological reconstruction of the History and Culture of the Mackenzie Delta Kittigatiumiut*. Newfoundland Social and Economic Series No. 13. St. John's: Institute of Social and Economic Research, Memorial University of Newfoundland. 124 p
- McGhee, R. 1996. *Ancient People of the Arctic*. University of British Columbia press, Vancouver.
- Muir, M.A.K. 1997. *Analysis of the Inuvialuit Final Agreement and Marine Protected Areas Under the Oceans Act*. Arctic Institute of North America, University of Edmonton, and the Natural Resources Institute, University of Manitoba.
- National Energy Board. 1998. *Probabilistic Estimate of Hydrocarbon Volumes in the Mackenzie Delta and Beaufort Sea Discoveries*. National Energy Board, Calgary.
- Nuligak. 1966. *I, Nuligak*. M. Metayer (tr.). Peter Martin, Toronto.
- Phillips, A. (ed.). 1998. *Economic Values of Protected Areas: Guidelines for Protected Area Managers*. Task Force on Economic Benefits of Protected Areas of the World Commission on Protected Areas (WCPA) of IUCN, in collaboration with the Economic Service Unit of IUCN. World Commission on Protected Areas (WCPA) Best Practice Protected Area Guideline Series No.2. Cambridge, UK: Cardiff University and Gland, Switzerland: The World Conservation Union.
- Usher, P.J. 2000. Standard edible weights of harvested species in the Inuvialuit Settlement Region. Report to the Northern Contaminants Program, Department of Indian Affairs and Northern Development.
- Usher, P.J. 2002. Inuvialuit use of the Beaufort Sea and its resources, 1960-2000. *Arctic* 55(Suppl. 1): 18-28.
- Wildlife Management Advisory Council (NWT). 2001. Wildlife Management Advisory Council (NWT) Fourteenth Annual Report (2000/2001). Inuvik, NT: Wildlife Management Advisory Council.
- Weaver, P.A. 1991. *The 1987 Beluga (Delphinapterus leucas) Harvest in the Mackenzie River Estuary, NWT*. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2097. Fisheries and Oceans Canada, Winnipeg.



Wein, E.E. and M.M.R. Freeman. 1992. Inuvialuit food use and food preferences in Aklavik, Northwest Territories, Canada. *Arct Med Res* 51:159-172.

## 7.2 Interviewees

### Traditional Use

Aviugana, Donald. Secretary Treasurer, Aklavik Hunters and Trappers Committee, Aklavik

Binder, Richard. Inuvik Hunters and Trappers Committee, Inuvik

Carpenter, Larry. Wildlife Management Advisory Council (NWT), Inuvialuit Harvest Study Management Committee, Inuvik

Day, Billy. Inuvialuit Elder, Inuvik Hunters and Trappers Committee, Fisheries Joint Management Committee, Inuvik

Felix, Norman. Inuvialuit Elder, Tuktoyaktuk

Gordon, Danny C. Director, Aklavik Hunters and Trappers Committee, Aklavik

Gruben, Charles. Director, Tuktoyaktuk Hunters and Trappers Committee, Tuktoyaktuk

Kasook, Pat. Director, Aklavik Hunters and Trappers Committee, Aklavik

Kotokak, Max. Fisheries Joint Management Committee, Tuktoyaktuk

Pokiak, Frank. Tuktoyaktuk Hunters and Trappers Committee, Tuktoyaktuk

Rogers, James. Inuvialuit harvester, Inuvik

Smith, Duane. Chair, Inuvialuit Game Council, Inuvik

Voudrach, Paul. President, Tuktoyaktuk Hunters and Trappers Committee, Tuktoyaktuk

### Oil and Gas Exploration and Development

Butcher, Delona. Chevron Canada, Calgary

Buzan, Larry. Senior Landman, New Ventures, Unconventional Reservoirs, Burlington Resources Canada Ltd. Co., Calgary

Collier, David. General Manager, Frontier, Shell Canada, Calgary

Hunt, John. Senior Advisor, Stakeholder Relations, Environmental Health and Safety and International, PetroCanada, Calgary

Jefferies, Rob. Anadarko Canada, Calgary

Lewis, Patti. SunCor Energy Inc., Calgary

Lukasavitch, Rick. Imperial Oil Resources, Calgary

MacEachern, Bruce. Environmental Health and Safety, EnCana (AEC West Ltd.), Calgary

Meyer, Rod. BP Canada Energy Co., Calgary

Millman, Peter. Devon Canada (formerly Anderson Exploration), Calgary

Plesuk, Brian. Conoco-Phillips, Calgary

Scott, Ian. Canadian Association of Petroleum Producers, Calgary

Taylor, Tim. Team Leader, Technical and Project Support, Environmental Health and Safety and International, PetroCanada, Calgary

### Transportation

Craig, Mike. Base Manager, Canadian Helicopter, Inuvik

Dalton, Ken. Base Manager, Aklak Air, Inuvik



Falsness, Carl. President, Arctic Wings Ltd., Inuvik  
Hagen, Willard. Beaudel Air, Inuvik  
Knott, Roger. Stage Air, Inuvik  
Hladun, Doug. Base Manager, TransNorth Helicopters, Inuvik  
Lewis, Jason. Base Manager, Highland Helicopters, Inuvik  
Maher, Tom. Canadian Coast Guard, Hay River  
Newmark, Russell. E. Grueben's Transport, Inuvik  
Whitlock, Greg. Manager, Environment & Regulation, Northern Transportation Co. Ltd., Inuvik

#### Tourism

Cournoyea, John. Regional Tourism Officer, Resources, Wildlife and Economic Development, Inuvik  
Kisoun, Gerry. Inuvialuit Hunter and Tourist Guide, Inuvik  
Venaas, Judith. Regional Tourism Officer, Resources, Wildlife and Economic Development, Inuvik  
Zimmerman, Dennis. Manager of Inuvialuit Tourism, Inuvialuit Development Corporation, Inuvik

#### Science and Research

Branigan, Marsha. Wolf/Bear Biologist, RWED, Inuvik  
Dickson, Lynn. Canadian Wildlife Service, Edmonton  
Hart, Elisa. Archaeological Consultant to Inuvialuit Social Development Program, Inuvik  
Harwood, Lois. Stock Assessment Biologist, Fisheries and Oceans Canada, Inuvik  
Hines, Jim. Senior Biologist, Canadian Wildlife Service, Yellowknife  
Larter, Nick. Biologist, Resources, Wildlife and Economic Development, Inuvik  
Latour, Paul. Habitat Biologist, Canadian Wildlife Service, Yellowknife  
Stephenson, Sam. Fisheries Management Biologist, Fisheries and Oceans Canada, Inuvik  
Wall, Jim. Manager, Scientific Services, Aurora Research Institute, Inuvik.

#### Regulatory/Management

Baetz, Conrad. Resource Management Officer II, Indian and Northern Affairs Canada, Inuvik  
Clarkson, Peter. Mayor of Inuvik  
Fehr, Alan. Superintendent, Western Arctic Field Unit, Parks Canada, Inuvik  
Korec, John. National Energy Board, Calgary  
Saunders, Bob. Captain, Department of National Defence, Yellowknife  
Snow, Norm. Executive Director, Joint Secretariat, Inuvialuit Renewable Resources Committees, Inuvik  
Staples, Lindsay. Chair, Wildlife Management Advisory Council (North Slope), Whitehorse  
Taptuna, Fred. Permit Officer, Fisheries and Oceans Canada, Hay River  
Thiesenhausen, Katherine. Resource Person, Wildlife Management Advisory Council (NWT), Inuvik  
Walker, Robert. Resource Management Officer III, Indian and Northern Affairs Canada, Inuvik

#### Other

Ewins, Peter. Director, Arctic Program, World Wildlife Fund, Toronto.

### **7.3 Websites**

Beaufort-Mackenzie Mineral Development Area - <http://www.bmmda.nt.ca/>



Bureau of Statistics, Government of the Northwest Territories - <http://www.stats.gov.nt.ca/>  
Canadian Association of Petroleum Producers - <http://www.capp.ca>  
Canadian Energy Research Institute - <http://www.ceri.ca/>  
Canadian Environmental Assessment Agency - [http://www.ceaa-acee.gc.ca/index\\_e.htm](http://www.ceaa-acee.gc.ca/index_e.htm)  
Canadian Polar Commission - <http://www.polarcom.gc.ca/homepage.htm>  
Canadian Wildlife Service - <http://www.qc.ec.gc.ca/faune/faune/html/historic.html>  
Department of National Defence - <http://www.forces.gc.ca/eng/index.html>  
Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories - <http://www.gov.nt.ca/RWED/>  
Energy Sector, Natural Resources Canada - [http://www.nrcan.gc.ca/es/main\\_e.htm](http://www.nrcan.gc.ca/es/main_e.htm)  
Environment Canada website - <http://www.ec.gc.ca/introec/mandate.htm>  
Fisheries and Oceans Canada - [http://www.dfo-mpo.gc.ca/home-accueil\\_e.htm](http://www.dfo-mpo.gc.ca/home-accueil_e.htm)  
Fisheries Joint Management Committee – <http://www.fjmc.ca/>  
Government of the Northwest Territories - <http://www.gov.nt.ca/>  
Imperial Oil Resources - [http://www.imperialoil.com/news/news\\_releases/mn\\_news\\_020107.html](http://www.imperialoil.com/news/news_releases/mn_news_020107.html)  
Indian and Northern Affairs Canada - <http://www.ainc-ianc.gc.ca/>  
Indian and Northern Affairs Canada (mandates) - [http://www.ainc-inac.gc.ca/ai/mrr\\_e.html](http://www.ainc-inac.gc.ca/ai/mrr_e.html)  
Indian and Northern Affairs Canada (Oil and Gas Rights) - [http://www.ainc-inac.gc.ca/oil/act/lan/dig/index\\_e.html](http://www.ainc-inac.gc.ca/oil/act/lan/dig/index_e.html)  
International Energy Agency - <http://www.iea.org/>  
Inuvialuit Regional Corporation - <http://www.irc.inuvialuit.com>  
Kendall Island Bird Sanctuary website – <http://www.pnr-rpn.ec.gc.ca/nature/migratorybirds/sanctuaries/kendall/dc10s01.en.html>  
Mackenzie Valley Environmental Impact Review Board - <http://www.mveirb.nt.ca/>  
Mackenzie Valley Land and Water Board - <http://www.mvlwb.com/>  
National Energy Board, Government of Canada - <http://www.neb-one.gc.ca/>  
Natural Resources Canada - [http://www.nrcan-rncan.gc.ca/inter/index\\_e.html](http://www.nrcan-rncan.gc.ca/inter/index_e.html)  
Northwest Territories Legislative Assembly - <http://www.assembly.gov.nt.ca/index.html>  
Parks Canada - [http://parksCanada.pch.gc.ca/parks/main\\_e.htm](http://parksCanada.pch.gc.ca/parks/main_e.htm)  
Prince of Wales Northern Heritage Centre - <http://pwnhc.learnnet.nt.ca/>  
Statistics Canada - <http://www.statcan.ca/>  
Transport Canada - <http://www.tc.gc.ca/>  
Wildlife Management Advisory Council (North Slope) – <http://www.taiga.net/wmac/>

#### 7.4 Other Information Sources

Aurora Research Institute. 2001. Database of research permits. Search conducted by Jim Wall, Manager Scientific Services, Aurora Research Institute. December 2001.  
Prince of Wales Northern Heritage Centre, 2001. Database of archaeological sites.  
Resources, Wildlife and Economic Development, Wildlife Division. 2001. Search conducted by Suzanne Carriere, Ecosystem Management Biologist, Resources, Wildlife and Economic Development, Yellowknife. December 2001.



## APPENDIX A. Interview Protocols

The following questions were used as guidelines for discussion. Interviewees were asked questions based on their experience in the area and their expertise.

Date of Interview: Interviewer: In Person/Phone

Name: Organisation:

### BACKGROUND AND PREAMBLE

---

Fisheries and Oceans Canada in partnership with the Inuvialuit are assessing the areas referred to as Zone 1a in the Beaufort Sea Beluga Management Plan (BSBMP) as a potential marine protected area. These three Zone 1a areas are all located within the Mackenzie River estuary. The BSBMP calls for these Zone 1a areas to be treated as protected areas. Currently these areas are being treated by the regulatory agencies as protected but this is on a voluntary basis as the BSBMP has no regulatory powers. The Fisheries Joint Management Committee (FJMC) has requested DFO to assess these three Zone 1a areas for protection under the *Oceans Act*.

Further discussions with the Inuvialuit led to the formation of a Senior Management Committee and a Working Group to implement the Beaufort Sea Integrated Management Planning Initiative (BSIMPI) with the initial task of assessing the BSBMP Zone 1a areas as a potential Marine Protected Area.

The *Oceans Act* defines a MPA as an area that has been designated for special protection for one or more of the following reasons:

- a) the conservation and protection of commercial and non-commercial fishery resources, including marine mammals, and their habitats;
- b) the conservation and protection of endangered or threatened marine species, and their habitats;
- c) the conservation and protection of unique habitats;
- d) the conservation and protection of marine areas of high biodiversity or biological productivity; and
- e) the conservation and protection of any other marine resource or habitat as is necessary to fulfill the mandate of the Minister (of Fisheries and Oceans).

The overall assessment of the potential MPA is being conducted through three assessment studies. These are ecological, socio-economic and technical assessments.

After completion of the assessments in January, these reports will be reviewed by a joint meeting of the FJMC and BSIMPI Working Group. This review would lead to one or more recommendations to the Senior Management Committee (SMC) for their comment and/or decision. If the recommendation was favourable to having these areas become a MPA and the recommendation was accepted by the SMC then further



consultations would occur and a management plan developed for the potential MPA. After consultations and the approval of a management plan by the SMC a regulatory impact assessment would have to be completed by the federal government prior to the areas being designated as a MPA.

If one or more of the three Zone 1a areas were to become a MPA, the management plan would be required to be consistent with the Inuvialuit Final Agreement (IFA). All subsistence hunting and fishing would be allowed to continue as it does at present. Also the main shipping channel through Kugmallit Bay would still be accessible to shipping traffic.

As part of this process, the Beaufort Sea Integrated Management Planning Initiative (BSIMPI), which is overseeing the planning for this proposed MPA, has directed Kavik-AXYS to undertake a socio-economic assessment of the proposed MPA and surrounding area. The objective of the socio-economic assessment is to provide a general description of current uses in the study area and to evaluate potential socio-economic impacts of the proposed MPA, specifically:

- How would the establishment of a MPA affect human activities in and around the proposed MPA?
- How can socio-economic benefits of the MPA be enhanced or the costs reduced?

You are being asked to participate in this interview because of your knowledge regarding a specific type of activity in the proposed Beaufort Sea Marine Protected Area. When answering the questions, please keep in mind that we are asking you to respond with knowledge regarding your own use of the area, but also knowledge of the whole of the activity (*i.e.*, all individuals or organizations involved).

The information you provide will be held strictly confidential and will only be reported by aggregating with other information so that the source of information can not be determined.

*NB*

1. *Interviewers should recognize that most interviewees will have been asked similar questions during other studies. Interviewers should bring copies of the Community Conservation Plan and ask if it is still valid or what updates need to be made, or additions need to be included.*
2. *Not all these questions are relevant to each interviewee. Select the set of questions that is most relevant to the interviewee. After which, ask the interviewee if they are familiar with any of the other activities covered in this survey for which they would like to contribute some information.*
3. *These questions can also be used for telephone interviews, in which case the interviewee can be asked to send (email or fax preferred) the relevant information to answer the questions.*



---

**Part A – HUMAN USE**

---

**Traditional Uses**

(See note 1 above regarding Community Conservation Plans)

1. Do you hunt or fish in the area?
2. Which species do you harvest?
3. Which areas do you **mainly** use (on map)?
4. How often do you hunt/fish in these main areas?
5. Which other areas do you use **less frequently** for hunting/fishing?
6. How often do you hunt/fish in these secondary/other areas?
7. What other sites (e.g., camps, caches) do you use for hunting/fishing?
8. How many people generally join you in your hunting/fishing party?
9. How long have you been hunting/fishing in the area?
10. How important are these areas relative to other areas outside the study area?
11. Please describe how your hunting/fishing varies between seasons, *i.e.*, does the activity take place throughout the year? Are there certain areas which are used in particular seasons? (on map)
12. How much do you harvest in a year?
13. What types of equipment and gear do you use? What other supplies do you require (e.g., fuel)? Can you estimate the total cost of your equipment and supplies on an annual basis? Do you purchase your equipment and supplies locally?
14. Have you noticed a change in harvest (hunting or fishing) in recent years?
15. What do you use the catch for, e.g., food, trade, clothing?
16. Other than food that you consume, are there other **social** or **economic** benefits that you receive from your harvesting activities?
17. Do you or your community engage in activities other than hunting or fishing in the study area? If so, where and what kind of activities (on map)?



18. Do you feel that other activities presently occurring in the study area affect your subsistence harvesting (see list below)? If so, how and to what degree do they affect your harvesting?

- a. oil and gas;
- b. mining for sand and gravel;
- c. transportation;
- d. tourism; and
- e. science and research.
- f. other \_\_\_\_\_

19. Do you feel that other activities presently occurring in the study area bring economic benefits to the community (see list below)? Why or why not?

- a. oil and gas;
- b. mining for sand and gravel;
- c. transportation;
- d. tourism; and
- e. science and research.
- f. other \_\_\_\_\_

20. Do you have anything you would like to add or any additional comments regarding your traditional use of the area?



## Oil and Gas Exploration and Development

1. What is the oil/gas potential of the Zone 1 Area?
2. Are there any oil/gas tenures in the Zone 1 Area or in the vicinity of the area? If so,
  - a. Where are they located (coordinates preferably)
  - b. What is the status of each tenure?
  - c. For what commodity is the tenure?
  - d. How much has been produced to date and what is the estimated future production?
  - e. What is the method of extraction? (please be specific about the activities, *i.e.*, drilling from artificial island or land, etc.)
  - f. How and by what route is the product or commodity transported?
  - g. Who owns the tenure?
3. If the Zone 1a areas were available for development, describe the estimated/proposed scope of oil/gas activity in the Zone 1a areas, including:
  - a. Type/range of operations;
  - b. The location of operations;
  - c. Primary equipment used;
  - d. Size and frequency of the operations;
  - e. Seasonality of use; and
  - f. Organisations involved.
4. If the Zone 1a areas were to remain closed, could you suggest any measures or alternatives that could be used to mitigate the impacts of a regulated closure on your operations?
5. Are there any plans for future exploration and/or development in areas adjacent to the Zone 1a areas? If so,
  - a. What plans are being considered?
  - b. Where would they occur?
  - c. When would they occur and for how long?
  - d. What exactly would be involved directly and indirectly with moving ahead with exploration and/or development plans?
6. In general terms, describe the current scope of oil/gas activity in the **region**, including:
  - a. Type/range of operations;
  - b. The location of operations;
  - c. Primary equipment used;
  - d. Size and frequency of the operations;
  - e. Seasonality of use; and
  - f. Individuals involved.



7. Describe the recent history of the oil and gas activity in **region**, including:
  - a. Changes in the type/range of operations;
  - b. Changes in the location of operations;
  - c. Changes in the size and frequency of operations; and
  - d. Changes in the organisations involved.
  
8. Do you have anything you would like to add or any additional comments regarding oil and gas activities in the area?



### Transportation

1. What types of vessels/aircraft travel through or close to the study area?
2. What is their purpose in the area?
3. What is their typical origin and destination?
4. How many vessels/aircraft travel through the area per day (shipping density)?
5. How often do these vessels/aircraft travel through the area and do they make any stops in the vicinity of the study area? What are the seasonality constraints?
6. Are there any alternative routes for these vessels/aircraft? Are there any related activities associated with the passage of these vessels? (e.g., additional small boat traffic from cruise ships, training activities for Canadian Coast Guard, SAR or the military, etc.)
7. Describe the recent history of the activity in the study area, including:
  - a. Changes in the type/range of operations;
  - b. Changes in the location of operations;
  - c. Changes in the size and frequency of operations; and
  - d. Changes in the individuals involved.
8. Do you have anything you would like to add or any additional comments regarding transportation activities in the area?



### **Tourism Operations**

1. What types of tourism use occur in the study area (on map)?
2. Do you presently use the study area for tourism or have you used the area in the past? If yes, please provide specific details on this use, including:
  - a. length of time operating in study area;
  - b. size of company (in terms of staff, offices);
  - c. types of activities offered;
  - d. locations of use (using map);
  - e. number and frequency of trips;
  - f. duration of trips;
  - g. mode(s) of transport;
  - h. equipment used; and
  - i. number of clients (per trip and per year).
3. If a user, what key factors, features or values (e.g., landscape, culture, wildlife, accessibility, etc.) influence your use of this area?
4. Are you planning to use the area in the future for your tourism operations? If yes, please provide locations and specific details to the extent that you are able (see above, question 2).
5. Please describe how your activity varies between seasons, *i.e.*, does the activity take place throughout the year? are there certain areas which are used in particular seasons?
6. Are you aware of, or do you perceive, any conflicts between the different types of tourism occurring? If yes, please elaborate.
7. Are you aware of, or do you perceive, any conflicts between tourism use and other types of activities occurring (e.g., oil and gas, traditional fishing, beluga harvest, or research activities)? If yes, please elaborate.
8. Describe the recent history of the activity in the study area, including:
  - a. Changes in the type/range of operations;
  - b. Changes in the location of operations;
  - c. Changes in the size and frequency of operations; and
  - d. Changes in the individuals involved.
9. Do you have anything you would like to add or any additional comments regarding tourism uses in the area?



### **Science and Research**

1. Are you aware of any science or research use occurring within the marine study area or in adjacent areas?
2. What types of science or research studies have occurred or are occurring in the study area?
3. Do you / your organization presently use the study area for science or research activities, or have you used the area in the past? If yes, please provide specific details on this use, including:
  - a. how long you have been conducting research (duration of study);
  - b. topic(s) of research;
  - c. location(s) (using map) for each distinct study;
  - d. number and frequency of research trips;
  - e. duration of trips to study sites;
  - f. mode(s) of transport;
  - g. base of research (e.g., communities or research camps); and
  - h. the number of researchers on each trip.
4. Are you planning to use the area in the future, or might you consider using the area in the future for science or research studies? If yes, please provide specific details to the extent that you are able (see above).
5. Use maps to denote known current or planned areas and types of science or research activities.
6. Why is your research conducted specifically in the area(s) noted? (Prompt for specific reasons such as location of study subject, accessibility, source of funding, etc.)
7. What types of equipment and gear do you use? What other supplies do you require (e.g., fuel)? Can you estimate the total cost of your equipment and supplies on an annual basis? Do you purchase your equipment and supplies locally?
8. How do you perceive science and research contributing to the social or economic well-being of the people in the ISR?
9. If results of studies are available (and are relevant to socio-economic use), could we receive a copy of the results?
10. Describe the recent history of the activity in the study area, including:
  - a. Changes in the type/range of operations;
  - b. Changes in the location of operations;
  - c. Changes in the size and frequency of operations; and
  - d. Changes in the individuals involved.
11. Do you have anything you would like to add or any additional comments regarding science and research activities in the area?



---

## PART B – ECONOMICS

---

*Note: Focus on this question should be on uses which occur within, or traverse through, the Zone 1a study area.*

Preamble: We have asked you a number of questions regarding your use of the study area. To complete a socio-economic study we also require information on economic benefits of the activities in which you participate. Please remember that any responses you provide are treated as confidential and will not be reported in any way that might identify you or your operations.

1. Would you be willing to discuss questions of an economic nature, *i.e.*, costs and revenues?

If yes, ask questions 2 and 3 informing the interviewee that if they do not have the information available at the time of the interview, they can provide it at a later time by phone or in writing (Note: stress time constraints of project and need to receive information as soon as possible).

2. For **marketed** direct uses of the study area, describe:
  - a. The gross annual revenues generated (for your use, if not all users involved);
  - b. Recent changes in the gross annual revenues;
  - c. Any costs to operations that are unique to the use of the area; and
  - d. Recent changes in cost structure.
3. For **non-marketed** extractive uses of the study area, describe:
  - a. The total annual harvest;
  - b. Recent changes to the annual harvest that have affected the economic benefits received from this activity;
  - c. Any costs to activities that are unique to the use of the area; and
  - d. Recent changes in cost structure.

---

## PART C – CONCLUDING QUESTIONS

---

1. Do you think it is worthwhile to continue with the process of assessing whether or not the Zone 1a areas should be designated as a Marine Protected Area?
2. We are talking to groups/organizations X,Y,Z. Do you think we have missed anyone? If yes, could you provide specific details about how we can contact these individuals?
3. Do you have any other comments at this time?



## APPENDIX B. A Primer on Economic Valuation

Recently, interest has focused on describing economic uses and quantifying the economic values associated with marine protected areas (MPAs) (e.g., Phillips 1998; Bunce *et al.* 2000; Cesar 2000). There are three broad options regarding the approach for an economic analysis – any one or a combination of these may be employed.

1. document the characteristics of the activities (e.g., structure of the economic activities, economic linkages, frequency and extent of use, use patterns);
2. explore the economic impacts associated with the current use of the study area (e.g., the gross financial revenues generated, the value added to the larger economy by the activities, and the direct and indirect employment attributed to the use of the area); and
3. more specifically examine the economic benefits associated with the use of the environment by estimating net values.

Total economic value includes marketed and non-marketed direct use values, indirect use values, potential use values and non-use values.

Marine environment valuation studies have focused not simply on use values, but more broadly on identifying:

- the values attributed to tourism and recreation, harvested products, education and research (information values);
- ecological functions or services (e.g., biodiversity maintenance, ecological support of harvested products);
- existence (utility from knowing the marine system exists in a given state or condition, although there is no actual or potential use of the environment); and
- optional uses (the value of a potential benefit or having the option to use the environment in the future) (e.g., see review by Cartier and Ruitenbeek 2000).

Specific approaches to valuation and the selection of methodologies should be driven by the specific policy or management questions, the types of values that one wishes to quantify, and the socio-economic and environmental context of the study site.

Quantifying direct use values that are marketed is a matter of estimating the net production values associated with the economic activities (e.g., commercial fishing, resource extraction, wildlife watching tours). In addition to the market value information, it is also desirable to quantify utility or indirect use values (consumer surplus) – that is, the value to the consumer above the costs to purchase. Quantifying indirect use values can be more problematic, often because there is little known about the linkages between the environment and the economic activities it indirectly supports. Potential use benefits and non-use benefits can also be methodologically difficult to quantify. Option and existence values are often estimated through:



- the creation of hypothetical markets (*i.e.*, values revealed through contingent valuation surveys);
- the examination of surrogate markets (*e.g.*, differences in property prices related to attributes of the environment); or
- other behaviours that reveal the value of the benefits (*e.g.*, the value of the time one is willing to forsake to visit and enjoy the environment).

All methodologies currently available for estimating option and existence values have notable deficiencies and should be chosen to fit the specific study context.



**APPENDIX C. Biophysical Research in the Vicinity of Zone 1a Beluga Protection Areas,  
1996-2001 (Aurora Research Institute 2001)**

<b>Year</b>	<b>Lead Researcher &amp; Agency</b>	<b>Approximate Locations</b>	<b>Title</b>	<b>Description</b>
1996	Burn, C.R. Carleton University	Richards Island (Illisarvik), Garry Island	Investigation of Ground Ice Development in Sediments of the Mackenzie Delta Area	Continuation of nearly 20 years of investigations of ground ice conditions at Illisarvik on Richards Island. A series of benchmarks was installed to monitor how the ground deforms around ice wedges as they expand and contract each year.
1996	MacKay, J.R. University of British Columbia	Garry Island, Illisarvik, pingo 20 km west of Tuktoyaktuk and Paulatuk	Permafrost Studies: Western Arctic Coast	Continuation of studies on the origin of permafrost and processes that helped to create the present geocryologic environment. On Richards Island, the study focused on pingos, their origin, growth and stability.
1996	Melling, H. Institute of Ocean Sciences	Offshore Beaufort Sea	Ice Thickness Topography Study - Beaufort Sea	Ice measurements were made by untended instruments operating beneath the sea throughout the year. Surveys of water properties were also conducted at 15 selected sites in the offshore using a ski-equipped Twin Otter as a flying laboratory.
1996	Chiperzak, D. Fisheries and Oceans Canada	Shingle Point, Coney Lake, outer Mackenzie River Delta, and Mackenzie River (Aklavik)	Inconnu Anchor Tagging and Radio Tagging Migratory Study	A total of 34 inconnu were fitted with radio transmitters at four locations including fourteen that were fitted at Shingle Point. Fish were tracked primarily with fixed-wing aircraft to determine their movements.



Year	Lead Researcher & Agency	Approximate Locations	Title	Description
1996	Forbes, D. Bedford Institute of Oceanography	Tuktoyaktuk Peninsula, Richards Island, modern Mackenzie Delta front	Coastal Impacts of Climate Change	Field work was performed from the Alaska border to the Tuktoyaktuk Peninsula and included sites in the outer Mackenzie Delta. The program consisted of surveys of the beach and nearshore using a combination of high resolution GPS and echosounding systems which allowed the development of a 3-D picture of the shape of the beach.
1997	Reimer, K. Environmental Services Group	Komakuk Beach (BAR-1), Nicholson Peninsula (BAR-4)	Delineation of Komokuk Beach and Nicholson Peninsula	An environmental delineation of the BAR-4 radar site and Komakuk Beach (BAR-1) was conducted. The study was undertaken to provide an up-to-date estimate of the volume of soil to be remediated prior to issuing specification for remediation of the site, and to determine PCB content of paint at the site.
1997	Burn, C.R. Carleton University	Richards Island (Illisarvik), Garry Island	Investigations of ground ice development in sediments of the Mackenzie Delta area.	Continued investigations of ground ice conditions at Illisarvik on Richards Island. A geophysical survey of the drained lake bed was also initiated to investigate changes since a similar survey in 1982.
1997	Mackay, J.R. University of British Columbia	Garry Island, Illisarvik, pingo 20 km west of Tuktoyaktuk, and Paulatuk	Permafrost Studies: Western Arctic Coast	Two weeks of field work were carried out along the coast to the west and east of Tuktoyaktuk in association with C. Burn of Carleton University. Samples were collected at the top of permafrost to determine the ice (water) content. At Garry Island, measurements on the growth and deformation of ice wedge polygons were extended to more than 30 years.



Year	Lead Researcher & Agency	Approximate Locations	Title	Description
1998	Burn, C.R. Carleton University	Richards Island (Illisarvik), Garry Island, Inuvik area	Permafrost Investigations: Western Canadian Arctic	Field investigations were conducted at Illisarvik, a drained lake on Richards Island, to study the growth of a small pingo which appeared in 1995, 17 years after the lake had drained. Also examined the doming up of pond ice in the lake bottom which occurs every winter.
1998	Murton, J. University of Sussex	Liverpool Bay and Eskimo Lakes area	The Origin of Deformed Massive Ice, Pleistocene Mackenzie Delta	Geological field work to study massive underground ice and sediment that have been deformed beneath a glacier that previously covered this region.
1999	Kovalench, S.	Beaufort-Mackenzie Delta	Geographic Information Systems (GIS) Range Management Feasibility Study for Kuññek Resource Development Corporation	N/A
2000	Riseborough, D. Carleton University		The Influence of Snowcover on the Ground Surface Temperature in Permafrost	N/A
2000	Nagy, J. NWT RWED Wildlife Division		Cape Bathurst Caribou Study	N/A
2000	Branigan, M. NWT RWED Wildlife Division			N/A
2000	Riseborough, D. Carleton University		The Influence of Snowcover on the Ground Surface Temperature in Permafrost	This study attempts to understand and predict how cold the ground surface gets in the winter under snow.



Year	Lead Researcher & Agency	Approximate Locations	Title	Description
2001	Burn, C. Carleton University	Richards Island (Illisarvik), Garry Island, Inuvik area	Permafrost Investigations in Western Arctic Canada	At Illisarvik, the research team will investigate heave of the lake bottom and growth of permafrost in the drained lake. Changes in the ground due to uplift, associated with the growth of a pingo, and sideways movements due to the growth of ice wedges, will be measured. Air, ground, and lake water temperatures will also be measured.
2001	Riseborough, D. Carleton University		The Influence of Snowcover on the Ground Surface Temperature in Permafrost	This study will attempt to understand and predict how cold the ground surface gets in the winter under snow.
2001	Murton, J. University of Sussex	Tuktoyaktuk coastline	Arctic Sand Sheet Development	The project objectives are to establish the natural controls on, and timing of, aeolian sand sheet development during the last glacial-interglacial cycle in the Tuktoyaktuk Coastlands.
2001	Blasco, S. Bedford Institute of Oceanography	Beaufort Sea	Evaluation of New Technologies for Environmental Impact Assessment in the Offshore, Canadian Beaufort Sea	This project will evaluate new technologies that could prove effective in assessing the environmental impact of offshore pipelines on the renewable resources of the Beaufort Sea. The Coast Guard vessel CCGS <i>Nahidik</i> will be used as a research platform to conduct offshore surveys in the Beaufort Sea. A regional grid of survey lines which were first surveyed in the 1980s will be resurveyed.
2001	Nagy, J. NWT RWED Wildlife Division	Large area in the western arctic south of Tuktoyaktuk	Cape Bathurst Caribou Study	Movement of female caribou of the Bathurst Herd.



<b>Year</b>	<b>Lead Researcher &amp; Agency</b>	<b>Approximate Locations</b>	<b>Title</b>	<b>Description</b>
2001	Branigan, M. NWT RWED Wildlife Division	North-eastern Mackenzie Delta	Assessment of Grizzly Bear and Black Bear population Size	Obtain current estimates of the number of grizzly and black bears in the NE portion of the Mackenzie Delta. Assess the potential for use of DNA capture techniques to estimate numbers of grizzly and black bears in the NE portion of the Delta.
2001	Komers, P. Inuvialuit Environmental & Geotechnical Inc.	North-eastern Mackenzie Delta	Biophysical Survey of Baseline Data for Plant Communities and Animals	Map vegetation communities and wildlife habitats in the region, including bird communities, using GIS remote sensing and spatial modelling. Ground truthing and mapping analyses based on satellite imagery.
2001	Lois Harwood	Baby Island or Kendall Island	Beaufort Sea Beluga: Reproduction – Year 2	Collect stock-specific data for the Beaufort Sea beluga. Collect reproductive tracts from females, on site, for five summers. Blood, tissue and organs for contaminants, genetics and disease studies will be collected concurrently. These items will be analysed and reported separately.

