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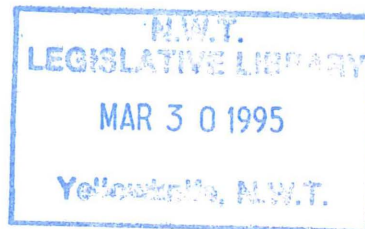
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**Co-Management Plan
for
Southeast Baffin Beluga**

**Prepared for
The Minister of Fisheries and Oceans**

**by
The Planning Committee for the Co-Management of
Southeast Baffin Beluga**

May 1994



P.O. Box 219
Iqaluit, Nunavut XOA OH0
May 13, 1994

Honourable Brian Tobin
Minister
Department of Fisheries and Oceans
200 Kent Street
Ottawa, Ontario

Dear Mr. Tobin:

The Planning Committee for the Co-Management of Beluga in the Southeast Baffin was established in 1991 at the request of the then Minister of Fisheries and Oceans the Honourable John Crosbie, to develop a co-management plan for Southeast Baffin Beluga.

The Planning Committee consulted with the communities of Pangnirtung, Lake Harbour, and Iqaluit during May 2 - 13, 1994 and received support from all three communities as attached.

The attached co-management plan presents a strategy for managing and conserving the co-existence of Inuit and beluga in the Southeast Baffin region. The Planning Committee also identified elements of incompatibility between past scientific information and indigenous knowledge and identified information gaps. The plan provides an initiative to make future studies acceptable to both parties to the co-management plan. The Plan suggests new approaches on a management framework on the co-management of the southeast Baffin beluga.

The Committee recommends that a Special Standing Committee modelled upon the present Planning Committee be established to provide active implementation of this co-management plan and ensure that future information collected by Inuit and Scientists is acceptable to each other.

On behalf of the Committee, please accept our thanks for the opportunity to participate in this important project.

Yours sincerely,


Joannie Ikkiluaq
On behalf of the
Planning Committee for
Southeast Baffin Beluga

Enclosure

cc - Ben Kovic, NWMB, Iqaluit
- B. Ayles, DFO, Winnipeg

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Executive Summary

Inuit and DFO have fundamentally different perspectives on the matter of conservation pertaining to beluga whales in the southeast Baffin region. DFO interprets conservation as managing this group or groups of whales to ensure their maximal long-term productivity. Inuit perceive the focus of conservation to be much broader, encompassing the full range of Inuit-beluga relationships. These differing perspectives have been manifested in this case in a cultural conflict characterized by lack of agreement on facts and by lack of concurrence about the values by which facts can be interpreted.

Verification of facts cannot be quickly achieved in these particular circumstances, and concurrence on values is not realistically sought or anticipated. It remains, in a co-management exercise in such an environment, to agree on a common goal and to mutually respect the range of knowledge and views pertinent to achieving it. This Co-management Plan for southeast Baffin beluga is the product of a strenuous effort undertaken by the Planning Committee on that basis. In the process of developing the Plan, a unique and positive working relationship evolved between the Department and the Inuit. This relationship was founded in a spirit of open-mindedness and goodwill. The members of the Planning Committee set out deliberately to compromise and co-operate in order to achieve an identified goal. Working in this setting, the Committee was able to confirm that co-management planning was both practical and achievable.

The common goal is to ensure the long-term relationship between Inuit and beluga whales in the southeast Baffin region. Traditional and scientific knowledge pertinent to that goal is presented and evaluated, and required studies and observations are identified. Until these studies and observations provide new insights as well as a basis for further significant reconciliation of perspectives, it is proposed that the status quo (as per 1993) be maintained in respect to beluga quotas for the three affected communities of Pangnirtung, Iqaluit and Lake Harbour.

There is agreement that relatively few beluga present themselves for the open-water hunts in the southeast Baffin region. There is also agreement that current catches can be maintained only if the number of available beluga can be shown to be increasing. Inuit agree to continue and to expand a number of local conservation initiatives in an effort to enlarge the numbers of beluga available. Inuit also agree to work simultaneously towards fully recovering the traditional elements of their association with southeast Baffin beluga, including particular attention to respectful treatment of the animals. A zoning system is proposed as well, for the protection of beluga habitat and beluga hunting activity.

It is mandatory that this Co-management Plan be implemented and updated in the context of the Nunavut Land Claims Agreement. To that end, and recognizing the singular significance and intensity of the issues at hand, it is proposed that the Nunavut Wildlife Management Board create a special standing committee to focus on the ongoing co-management of the relationship between Inuit and beluga in the southeast Baffin region. The existing Committee could serve as a template and nucleus for such a body. Such an arrangement would carry significant educational and training opportunities which should be exploited.

1. Principles and Objectives

This Co-management Plan sets out a long-term strategy for managing and conserving the co-existence of Inuit and beluga in the southeast Baffin region. For the purposes of this Plan, the southeast Baffin region is defined as encompassing the communities of Pangnirtung, Iqaluit and Lake Harbour, along with associated waters frequented by beluga whales in the hunting season (Figure 1). The Co-management Plan is designed to reflect the spirit and intent of the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty in Right of Canada* (hereinafter referred to as the *NFA*).¹

1.1 Planning Principles

The *NFA* lists (Article 5.1.2) a number of principles governing its treatment of wildlife. These principles are interpreted for specific reference to southeast Baffin beluga in the context of the present exercise and this Plan as follows:

- i) Inuit are traditional and current users of beluga;
- ii) the legal rights of Inuit to hunt beluga stem from their traditional and current use;
- iii) there is a need for an effective system of beluga management that complements Inuit hunting rights and priorities, and recognizes Inuit systems that contribute to the

¹ The language in Article 5 of the *NFA* has been enlarged somewhat to cover some of the concepts and terms pertinent to co-management as adopted for this Plan (see Section 3 of this document). While remaining consistent with the spirit of the *NFA*, the meaning of "conservation" in this Plan is broadened to refer to the preservation, maintenance, and enhancement of the traditional relationship between Inuit and the animals upon which the economic, social and cultural survival of Inuit depend. Anything that threatens to destroy this relationship, whether the cause be cultural (pollution, overhunting, etc.), or natural (disease, starvation, etc.), or any combination thereof, may constitute a conservation issue. Further to this interpretation, management is defined as the nurturing of the bond between Inuit and the animals upon which Inuit survival depends. Co-management is the shared responsibility of those parties who have a legal mandate or a cultural need to maintain this co-existence, with users having the primary, and government having the ultimate, responsibility.

"conservation" of beluga (as defined in the *NFA*)²; and to the protection of beluga habitat;

- iv) there is a need for systems of management, with respect to the land and animals, that provide optimum protection for the renewable resource economy;
- v) the management system and the exercise of Inuit hunting rights are governed by and subject to the principles of "conservation" (as defined in the *NFA*);³
- vi) there is a need for an effective role for Inuit in all aspects of beluga management, including research, and;
- vii) government retains the ultimate responsibility for beluga management.

1.2 Planning Objectives

The objectives of this Co-management Plan, adopted in accordance with the *NFA*, are to contribute to the establishment of:

- 1) A system of beluga hunting rights, priorities, privileges, and obligations that:
 - i) reflects the traditional and current levels, patterns, and character of Inuit beluga whaling;
 - ii) subject to availability, and taking into account the size of Inuit populations and the principles of "conservation"⁴, and adjusted as circumstances warrant, reflects Inuit rights to hunt beluga sufficient to meet their basic needs;
 - iii) avoids unnecessary interference in the exercise of Inuit rights and needs to hunt beluga;

and to the establishment of:

² The principles of "conservation" listed in the *NFA*, and "customized" for purposes of this Co-management Plan with particular reference to southeast Baffin beluga are:

- a) maintenance of the natural balance of ecological systems,
- b) protection of beluga habitat,
- c) maintenance of vital, healthy beluga populations capable of sustaining hunting, and
- d) restoration and revitalization of depleted populations of beluga and beluga habitat.

³ Ibid (principles of conservation).

⁴ Ibid (principles of conservation).

- 2) A management system that:
- i) is governed by and implements principles of "conservation";⁵
 - ii) acknowledges and reflects the primary role of Inuit in beluga whaling;
 - iii) serves and promotes the long-term economic, social and cultural interests of Inuit;
 - iv) as far as practical, allows for subsequent integration of all relevant species and habitats into management plans;
 - v) invites public participation and promotes public confidence, particularly amongst Inuit; and
 - vi) enables the Nunavut Wildlife Management Board to make management decisions pertaining thereto.

⁵ Ibid (principles of conservation).

2. Management Controversies: Historical Perspectives

2.1 Prelude to Confrontation

The seeds for controversy concerning beluga in the southeast Baffin region were planted long before the Department of Fisheries and Oceans (DFO) reduced quotas on the subsistence hunt in 1990. *Regulations for the Protection of Belugas* were first introduced in 1949 under the *Fisheries Act*. The original regulations, which have been amended on three subsequent occasions, allowed Inuit to hunt beluga as long as certain equipment was used, a reasonable attempt was made to recover all whales struck, and no edible parts were wasted. However it was not until 1979, when several Pangnirtung hunters were charged (and subsequently convicted in 1980) of exceeding the quota for narwhal in contravention of the new *Narwhal Protection Regulations*, that hunters began to feel angry and resentful towards DFO. The fact that Inuit felt that they were not consulted prior to being charged, and their lack of access to appropriate legal procedures pertaining to the defense of what they interpreted to be their aboriginal rights, intensified these feelings.

Serious concern about the status of beluga summering in Cumberland Sound (particularly in Clearwater Fiord) was conveyed to the Pangnirtung Hunters and Trappers Association (HTA) by DFO in 1978. Over the next three hunting seasons, and in response to the DFO concerns, the Inuit of Pangnirtung agreed to take initiatives to limit their beluga catch and to stop the inter-settlement trade in *maktaa*q. Although no one ever made much more than "gas money" from this trade, its termination did have a negative impact on some hunters.

In 1980 the Pangnirtung HTA took a new initiative to limit the take of beluga to 40 per year, marking the first time that quotas were exercised for beluga hunts. The acceptance of actual quotas represented a significant departure from traditional Inuit ways of thinking, since hunting was generally regarded as beneficial to animals (see Section 3). In exchange for this formal restriction on beluga hunting, the quota for narwhal was increased from 15 to 40, and the new quotas were enacted as amendments to the *Beluga and Narwhal Protection Regulations*.

Commencing in 1977, aerial and/or cliff-top surveys have been conducted in Clearwater Fiord and upper Cumberland Sound by DFO biologists on a fairly regular basis. In 1984, a sampling program was initiated as part of a beluga-group identification project. Inuit participated as guides and observers, and DFO held meetings to explain their plans, to solicit Inuit response, and to report results. However Inuit felt that they had no real influence in planning and decision-making, that their opportunity to participate was inadequate, and that their knowledge and observations were given little consideration. They were also offended by the lack of reference to their knowledge and experience in the analyses and reports prepared by DFO, and by the delay in these reports being made available to them.

An aerial photographic survey in Clearwater Fiord in mid-August of 1977 counted 624 visible beluga whales. Similar surveys in 1985 and 1986 counted 398 and 444 beluga respectively in the same

area. Since biologists had estimated that more than 5000 beluga used Cumberland Sound prior to white contact (Mitchell and Reeves 1981), DFO became alarmed that earlier commercial whaling had decimated these beluga to a point where even subsistence whaling could no longer be sustained.

Although most hunters remained unconvinced about the need to reduce the number of beluga killed, meetings with DFO and the community resulted in cooperative initiatives by the Pangnirtung HTA to control and monitor the hunt. By 1985, Inuit had decided to refrain from hunting in Clearwater Fiord and from disturbing calves, pregnant females, and females with calves. Some hunters continued to question the value of the formal quota system. They pointed out that a designated catch limit completely transformed the culture of the hunt. It tended to encourage competition among hunters in the region, and could even result in more whales being hunted than might be the case if no quota existed. They also suggested that quotas tended to prompt hunters to hunt in less-than-ideal conditions of preparation, weather, etc., thereby increasing personal danger and possibly also resulting in increased loss of wounded animals. For these and other reasons, many hunters advocated a return to their own system of self-limitation without formal quotas.

Beluga hunters from Pangnirtung felt it was unfair that they were the only ones in the entire Canadian arctic subject to a quota. Some of them also suggested that some Cumberland Sound beluga might be hunted by Iqaluit and Lake Harbour hunters as well as by themselves. DFO biologists and managers expressed their concern about the apparently small size of the beluga population in the southeast Baffin region (specifically in Cumberland Sound), and the relatively large size of the catch. Since Clearwater Fiord was/is the only major beluga estuary in the southeast Baffin region, and with no information to indicate otherwise, biologists assumed that beluga in Cumberland Sound were probably also hunted by Inuit in Frobisher Bay and at Lake Harbour. In an attempt to examine and address these issues and concerns, DFO conducted meetings with Inuit hunters from Pangnirtung, Iqaluit and Lake Harbour. Although DFO termed this exercise as constituting a "Beluga Management Committee" (or "BMC") there were never any formal appointments of Inuit members nor any actual empowerment. Inuit felt that they were being co-opted rather than consulted or involved in a meaningful way in actual beluga management. They felt that they had the role of observers rather than co-participants, a feeling which was reinforced by the constantly changing and arbitrary nature of Inuit participation as invited by DFO. Participants had no authority from their respective communities and in these circumstances hunters did not recognize the "BMC" as a duly-constituted body. Not surprisingly, the "BMC" failed to achieve consensus on the identity and status of beluga in the region. In fact, hunters from all three communities were resentful about the strong advice they heard at the meetings on how to "manage" beluga that Inuit had hunted for generations and which, in their opinion, showed no decline in numbers.

Inuit also suspected that DFO brought Iqaluit and Lake Harbour into the fray via these meetings in order to divert attention from Pangnirtung. In their view, sole focus on Pangnirtung would have attracted sympathy from the national media, which were becoming sensitive to the issue of aboriginal rights. By equating the Clearwater Fiord "stock" with the southeast Baffin "stock", the issue became one of "regional wildlife management" rather than one of aboriginal hunting rights of a particular Inuit community (Pangnirtung). DFO biologists and managers, however, by bringing together hunters from

the three communities for discussions, felt they were acting in the best interests of both the Inuit and the beluga.

Iqaluit and Lake Harbour hunters were caught off guard by DFO. Never before had hunters from these two communities heard the suggestion that their whales were the same as those hunted by Inuit from Pangnirtung. As there was no meaningful consultation with these two communities prior to the meetings, the Inuit were not able to discuss, explore, and respond effectively to these issues. Without due process or opportunity to develop or voice their knowledge and concerns, many Inuit were left alienated and confused.

DFO's alarm about the fate of southeast Baffin beluga intensified when hunters from Pangnirtung, Iqaluit, and Lake Harbour together landed more than 100 beluga whales each year from 1987 through 1989. In recognition of DFO's concerns, and acting further in the spirit of co-operation, Inuit hunters attempted to reduce struck-and-loss rates, to take only one beluga at a time when they were hunting in pairs, to take only one or two beluga from any particular group, and to continue the salvage of maktaaq from dead whales found by chance.

2.2 The Confrontation of 1990

By 1988 the viewpoints of DFO managers and biologists were being reinforced by the Arctic Fisheries Scientific Advisory Committee (AFSAC) which recommended that no "harvest" of beluga be undertaken in the southeast Baffin for 10 years in order to provide the best chance for the "stock" to recover to historic levels (Cosens et al. 1990). At about the same time, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) declared the southeast Baffin beluga to be endangered (Richard 1991). With these two reports in hand, DFO presented its position on southeast Baffin beluga to the Nunavut Wildlife Management Advisory Board (NWMAB) in January of 1990. DFO's position was that beluga whaling should be suspended for an indefinite period, and was based on the assumptions: 1) that beluga hunted by all three communities could be part of the "stock" summering at Clearwater Fiord, and 2) that this population would soon become extinct if measures were not taken to end the hunt.

Recognizing both the conservation problem and the cultural importance of beluga to southeast Baffin Inuit, the NWMAB recommended to the Minister of DFO that each of the three communities be allotted a quota of 5 beluga per year for each of 1990 and 1991. In the interim DFO, with the participation of resource users, was charged by NWMAB to: 1) conduct a new survey to validate the scientific information supporting this action, and 2) facilitate preparation of a co-management plan for southeast Baffin beluga. The Minister concurred with the NWMAB recommendations in March of 1990, and by June the new quotas had been formally incorporated into the *Beluga Protection Regulations* under the *Fisheries Act*.

Local opposition to these quotas was immediate and intense. Few hunters had ever heard of the NWMAB, and the new quotas introduced by DFO were considered to be an assault on Inuit hunting rights at a time when such rights were explicitly recognized in the Nunavut Land Claim

Agreement-in-Principle. In late May DFO held what turned out to be a very heated public meeting in Iqaluit to update local people and territorial government representatives on the new regulations. In early June the Executive Committee of the Baffin Regional Hunters and Trappers Committee (BRHTC) unanimously rejected the new quotas of 5 whales for each community and declared that these quotas would never be acceptable to Inuit. At the same time a dissident group of hunters called the Qalugiaq Wildlife Management Authority (QWMA) produced a petition and a declaration to BRHTC which stated that it, not the government, was the legitimate authority for wildlife in Nunavut. This authority was interpreted to stem from the fact that Inuit had occupied lands in Nunavut long before Canada came into existence. So outraged were members of the QWMA that they picketed and eventually occupied DFO offices in Iqaluit. BRHTC, however, rejected QWMA's actions as inappropriate to the issue, and announced that it would seek alternative ways to overturn the new quotas.

The new quotas of 5 beluga per community had a devastating impact on Inuit who described them as "a cruel act against the communities" (Southeast Baffin Beluga Review Committee 1991). This led to "feelings of uncertainty for the future because the issues seemed impossible to resolve" (ibid.). This uncertainty was described as "similar to the grief associated with losing a loved one" (ibid.). In addition, Inuit leaders felt that "they could not make any difference on behalf of the hunters and so felt that they were unworthy" (ibid.). The impact of the new quotas went "beyond the three communities affected directly", and there was concern that the government "might take similar action affecting other Inuit communities in the future involving beluga or other species" (ibid.).

This perceived intrusion into the Inuit way of life led to "a disregard for the law..., since Inuit know that the police cannot be everywhere at once" (ibid.). It had been understood that "[t]raditional hunting activities and diet were not controlled by government", but this view was shattered by the 1990 quotas, which "seemed to reaffirm government control over the lives of Inuit" (ibid.). The overwhelming majority opposition by Inuit to the new quotas reflected their perception that "democracy did not work for them". A climate of "spiteful motives" and "thoughts to disobey the law" developed (ibid.).

The anger and dismay felt by Inuit was so intense that it caused prejudice and division against non-Inuit in the communities (ibid.). Such feelings are not part of Inuit tradition. There is no doubt that the new quotas of 5 beluga per community changed the Inuit view of the world and of the future. With the events of Oka dominating the national scene, and still coping with the economic and cultural devastation of the anti-sealing campaigns, Inuit expressed fear that it would not be possible to pass on their cultural traditions to their children. Inuit became convinced that outsiders viewed them as little better than savages without respect for whales or other animals. Inuit felt that they were not given credit for their traditions and values which forbid the mass slaughter of any animal.

Opposition to the 1990 quotas also came from local and Inuit politicians. The MLA for Iqaluit and then Territorial Government Leader of the GNWT expressed his concern about the matter and took an active role in seeking a solution. The President of the Inuit Tapirisat of Canada (ITC) supported BRHTC's rejection of NWMAB involvement in setting the new quotas (Amagoalik 1990). He pointed out that Inuit hunters did not have opportunity to thoroughly review the scientific studies, nor to publicly debate the merits of the proposed regulatory changes, nor to present their knowledge on the

issue. He also noted that the NWMAB was only a provisional body with no authority to make decisions on such matters. BRHTC's rejection of the new quotas was also supported by the Tungavik Federation of Nunavut (TFN), the Baffin Regional Council (BRC), as well as by other Inuit organizations.

An atmosphere of charged confrontation existed throughout the summer of 1990. Media interviews with DFO personnel painted a bleak picture for the survival of the southeast Baffin beluga "stock", and the issue attracted unfavourable media comment. Believing DFO information to be inadequate and inconsistent with Inuit knowledge and experience, hunters deliberately went over quota. Nonetheless, no more whales were landed than was normally the case. Although the quotas per se were not actively enforced, the *maktaaq* of one Iqaluit hunter was seized. Charges were not laid, however, on account of reluctance to push an already volatile situation to a new level.

To make matters worse, divisions arose among Inuit politicians on the issue. In a newspaper interview in November, the Territorial Minister for Renewable Resources supported DFO's decision and authority to enforce the new quotas and was thereby isolated from other Inuit leaders in the Baffin region (Alooloo 1990).

Lack of progress in resolving the issue triggered the NWT Government Leader to bring the matter to the NWT Legislative Assembly (Patterson 1990a). In November he also wrote to the Minister of DFO (Patterson 1990b), suggesting a mechanism to deal with the southeast Baffin beluga controversy. In December the Minister of DFO, recognizing that the fate of this "stock" had brought Canadian management of small cetaceans to the attention of the world and that the confrontation remained unresolved, agreed to establish and fund an ad hoc committee to deal specifically with this issue (Valcourt 1990). After six months of strained relations and heated confrontation, progress was finally being made.

2.3 Beyond Confrontation

The Southeast Baffin Beluga Review Committee began meeting in February 1991. The Committee consisted of the Chairman of BRHTC, the Executive Director of BRC, representatives of the HTAs from Pangnirtung, Iqaluit and Lake Harbour, a representative from DFO, and the Director of the Science Institute of the NWT. The Science Institute was contracted by DFO to facilitate the Committee's work, and the Director served as chairman. The mandate of the Committee was to prepare a report to the Minister with recommendations for his consideration, with the aim of finding a solution to the southeast Baffin beluga issue.

After several meetings and strenuous work, the Committee produced a report for the Minister in April of 1991. This document, *A Report to the Minister of Fisheries and Oceans on the Beluga Around Southeast Baffin Island Northwest Territories (Southeast Baffin Beluga Review Committee 1991)*, incorporated both DFO and Inuit views and concerns and was produced in both languages. It described the destructive impact of the new quotas of 5 beluga per community on Inuit economy, culture, and society (see above). It also reviewed existing scientific information and indigenous

knowledge to produce a picture of southeast Baffin beluga that differed substantially from that upon which government actions in 1990 had been based.

The Committee considered it most likely that beluga wintering in the southeast Baffin region divide into two or more summer groups, with one group entering Cumberland Sound after ice break-up and another migrating west through Hudson Strait into Hudson Bay. The latter whales were thought to be hunted by Lake Harbour residents in the spring from the *sinagna* (floe edge), and again during the fall when they returned. The identity of beluga taken by Iqaluit hunters was uncertain, although it seemed likely that they were part of a larger, mixed population that wintered off the floe edge, since very few beluga remain in Frobisher Bay after the ice is gone. The Committee also determined that there was no evidence of mixing of beluga between Frobisher Bay and Cumberland Sound during the ice-free period.

Most importantly, the Committee concluded that the number of beluga utilizing Cumberland Sound must be considerably larger than the number which had been estimated by DFO. This was based on the fact that the estimate of visible beluga present during aerial surveys of Clearwater Fiord in 1990 was greater than the number counted in 1985 and 1986, despite an annual catch of around 40 beluga by Pangnirtung hunters in the interim.

The Committee's report also detailed numerous observations about how surveys were conducted in the past and made several specific recommendations about how studies should be conducted in the future. Foremost among these were the need for equal representation by Inuit and DFO in the design and implementation of studies, incorporation of indigenous observations, experience and knowledge (which had been developed over many generations) into the conduct and interpretation of the surveys, and shared management responsibilities. Moreover, the Committee observed that any co-management initiative must be compatible with the provisions and processes of the *NFA*.

Based upon its review, the Committee incorporated in its report to the Minister a set of recommendations with respect to southeast Baffin beluga which are summarized as follows:

- 1) quotas for the three communities should be established independently,
- 2) quotas for each community should be set at 35 beluga for 1991, and
- 3) a co-management structure, compatible with the *NFA*, should be established.

The Committee recommended that an interim working group be established to initiate development of this co-management structure. It was proposed that this group consist of representatives from (then) BRC, BRHTC, DFO, and each of the three communities affected, as well as an independent party (the Science Institute of the Northwest Territories was specifically suggested) to serve as facilitator. The co-management structure to be developed was to include provision for "the design, planning, and conduct of beluga management studies as well as implementation of management plans", and with a view to "work toward integrating traditional and scientific knowledge" to provide a basis on which to "establish and review sustainable quotas with confidence".

In late June of 1991 the new Minister of DFO, Hon. John C. Crosbie, issued a press release in which he announced his agreement to: 1) establish a co-management regime for the protection of beluga in the southeast Baffin, and 2) accept the quotas proposed by the Committee, with the exception that the quota for Lake Harbour was to be set at 20 for the summer season, with unrestricted hunting for the rest of the year (Crosbie 1991). Co-management was stressed and the protection of the "stock" and the long-term continuation of beluga hunting were recognized to be the primary objectives of both Inuit hunters and the federal government. The Department subsequently implemented the new quotas for 1991 and 1992 (instead of just for 1991 as had been recommended by the Committee), and immediately set out to establish the "interim working group" with the aim of developing a formal co-management plan.

This new spirit of shared concern and responsibility carried over to the 1991 hunts, which were deemed a great success. HTAs managed the hunts in cooperation with DFO personnel and within the quotas. Hunters collected samples from beluga in order to provide information for future management decisions, and a short-term cliff-top survey was carried out in Clearwater Fiord to begin developing an index of beluga numbers. Aerial and cliff-top surveys in Frobisher Bay and around Lake Harbour were proposed but not undertaken.

2.4 Creation of the Planning Committee

By September of 1991 the interim working group was underway. Its efforts resulted in the development of terms of reference for the ensuing "Planning Committee for the Co-Management of Southeast Baffin Beluga". These terms of reference were formally communicated to the Planning Committee by the Deputy Minister of DFO as follows:

- 1) "Develop, in consultation with the concerned communities, appropriate Inuit organizations, DFO, and other experts in beluga management and biology, and propose by May 1993, a long-term plan for the management, sustainable use, and conservation of beluga in the southeast Baffin region which is consistent with the provisions of the TFN land claim agreement, including recommendations on:
 - a) objectives of beluga management;
 - b) co-management structures and roles (e.g. DFO, NWMB, HTAs);
 - c) control and monitoring of the hunt;
 - d) community quotas for 1993;
 - e) information necessary for management of southeast Baffin beluga and sustainable use by Inuit;

- f) ways of obtaining such information including research and use of traditional knowledge, stressing the involvement of hunters and community members;
 - g) protection of beluga and their habitat from development activities;
 - h) education, training, and communications.
- 2) Develop and propose interim co-management arrangements pending settlement and implementation of the TFN land claim agreement".

2.5 The Co-Management Planning Process

In May 1992 the Planning Committee held meetings in each of the three communities to inform Inuit of its mandate and objectives, explain the benefits of co-management, answer questions people might have, and seek input leading to the creation of a plan including identification of appropriate studies to conserve southeast Baffin beluga and ensure their continued use by Inuit.

Building on the success of the previous year's cliff-top survey and hunt-sampling program, these studies were repeated and enlarged in 1992. A cliff-top survey was conducted from a single location over a period of 17 days in Clearwater Fiord, and beluga were counted from seven other observation sites established in Cumberland Sound. Unique new study designs were employed, involving equal participation by DFO and Inuit. Samples from most of the whales landed in 1992 were collected by Inuit of the three communities and submitted to DFO for analyses. Interest and curiosity was and remains high regarding the DNA, contaminant, and other analyses still awaiting completion.

By December 1992 the Planning Committee had adopted criteria for a co-management plan, and preliminary drafts of various sections had been circulated among members for consideration. At the same time, recommendations for conducting beluga surveys in areas used by Iqaluit and Lake Harbour hunters were proposed according to suggestions obtained from the communities, and work began on developing a request for an extension in time of the quotas which had been enacted for 1991 and 1992.

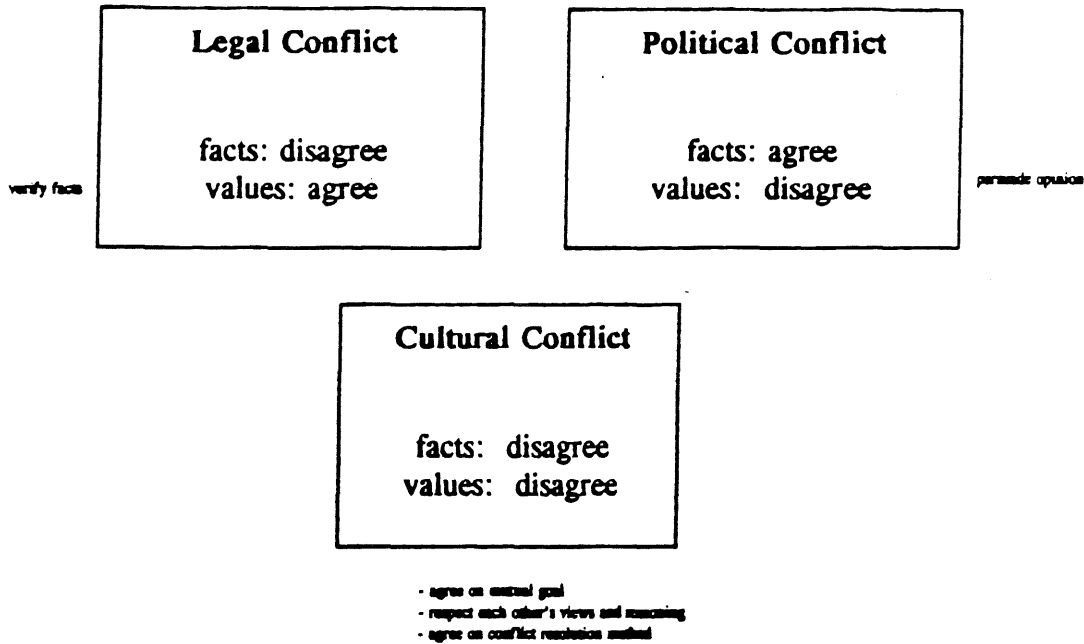
By January 1993 it became obvious that the goal of completing the co-management plan by spring was unattainable. Logistic and linguistic problems and barriers were formidable. Translation of written materials was tedious and time-consuming. Members needed adequate opportunity to get together and digest the information and materials provided to them, to formulate their respective opinions on the items addressed in the drafts, and to contribute their own knowledge on these subjects. For the interim, a recommendation by the Planning Committee for continuation of the existing quota variance for 1993 was accepted by the Minister, with the provision that a co-management plan be produced by early 1994. The sampling program continued during the 1993 beluga hunting season, but no additional surveys were conducted. ~~The samples obtained in 1993, and to a considerable extent from earlier years, are still being analyzed in DFO laboratories.~~

Different interpretations of the historic and ongoing conflict presented the greatest obstacle to drafting a co-management plan acceptable to both Inuit and DFO. It became apparent that this was not just a "political conflict" (defined here as involving agreement on facts but not on the values which provide the context for these facts: Diagram 1: next page). Nor was it a mere "legal conflict" (as when there is agreement on values, but not on facts). Had the problem been confined to either of these situations the matter would have been much simpler, since both scientific and indigenous knowledge can be used to "verify" facts in "legal conflicts" or to "persuade" opinion in "political conflicts." The southeast Baffin beluga controversy, however, was seen to represent a "cultural conflict" (sensu Barry 1993). In a "cultural conflict" there is not agreement on either the facts nor on the values by which the facts are interpreted. Under such circumstances, either party's system of knowledge and/or values offers few solutions to resolving the conflict, and becomes completely counterproductive if imposed on the other. Since rapid verification and persuasion will not be possible in such cases, co-management is achievable only if the parties: 1) agree to a common goal, 2) respect each other's views and knowledge in achieving this goal, and 3) agree on a process of conflict resolution.

Recognition of the workload which needed to be addressed, and also appreciation of the nature of the conflict which existed between the parties, prompted the Planning Committee to contract the services of an advisor to assist Inuit members to: 1) respond to DFO draft materials, and 2) consolidate their views on such issues as beluga numbers, group discreteness, and group structure. Inuit members responded by developing an alternative model of southeast Baffin beluga behaviour and population dynamics. This was a relatively abstract exercise for Inuit members who had never before attempted to formulate a comprehensive "paper" model of southeast Baffin beluga. Yet, based on indigenous knowledge, historical records, and their own interpretation of available scientific information, an alternative model was presented to DFO members for consideration.

Rather than accepting the interpretations of biologists at face value, the Inuit questioned the western philosophical traditions upon which certain scientific assumptions are based and the language in which these concepts are expressed. In not abdicating to western scientific ways of knowing and thinking about the issue, Inuit members preserved the integrity and richness of their own system of knowledge and beliefs.

Diagram 1. A "conflicts matrix" pertinent to co-management (after Barry 1993).



Facts: what is known to be true
Values: meaning assigned to facts

In the spirit of mutual appreciation and acknowledgment of each other's belief systems and concerns, members of the Planning Committee "agreed to disagree" on a number of matters. The members recognized the nature of the conflict, and adopted and subsequently held to the mutual objective of designing a long-term plan for managing and conserving the co-existence of Inuit and beluga in the southeast Baffin region.

Instead of retarding the work of the Planning Committee, this broadened objective served to facilitate the process of producing a draft plan acceptable to both parties. In October of 1993 a sub-committee was formed and charged with the task of drafting a plan for revision by the full Committee, with the aim of producing the actual Co-management Plan for the Minister by March 31. The results of this work constitute the remainder of this document, as set forth herewith.

3. Language, Knowledge, and Co-Management

3.1 Language and Cognition

All language reflects concepts, biases, and set ways of thinking that help shape the assumptions and conclusions of the speaker. Inuktitut and English are no exceptions. The language peculiar to wildlife management derives from an agricultural heritage which reflects a system of knowledge different from that which forms the basis of Inuit beliefs about animals. For Inuit, animals in the arctic are not like "cows or pigs" to be manipulated and controlled: Inuit would be ashamed to think that they could or should manage animals in such a manner. Inuit share a profound co-existence and special trust with the animals upon which their survival depends. *Qallunaat* (= "Europeans") have chosen other ways to depend upon animals without having to hunt them. For them, this dependence is satisfied through the agricultural system or through such ventures as commercial fishing. In these cases one component of the society makes its living by "raising" or "harvesting" food and other animal or plant products for consumption by other members of the society who do not have the means or the inclination to obtain these foodstocks directly for themselves. Inuit, by contrast, hunt animals more regularly throughout the year in order to provide food for their families and relatives.

If co-managers are aware of the implicit meanings and assumptions embedded within their use of language they are in a better position to understand and appreciate each other's perceptions. Neither party to co-management should be expected to adopt the other's ways of thinking about animals or to copy the other's relationship with nature. Rather, it is the recognition and appreciation of differences in ways of thinking and knowing about animals that is the starting point of this (or any successful) co-management plan.

Biologists interpret boundaries between groups of beluga or other animals based on genetic, morphometric, behavioural and geographical similarities and differences. By application of this method, biologists attempt to delineate groups of animals which have evolutionary significance (Dizon et al. 1992). These groups are then addressed by biologists (e.g. through AFSAC) and by "wildlife managers" (e.g. by DFO and NWMB) as basic "management units" for "conservation" actions.

In contrast, Inuit have no words for beluga that refer to units larger than what can be observed at one time or place. The relationship of observed beluga to unseen beluga has never been an issue to them. What has been and remains important to Inuit is whether or not beluga return each year. These and other conceptual differences pose a challenge for co-management, and one that must be addressed through the use of appropriate language to set out the concepts.

As one example, the word "stock" is defined in English dictionaries as "the total merchandise or goods a commercial establishment has on hand." More specific to the present context, the scientific language of DFO and the international community uses the word "stock" to refer to "a management unit" (see above), or "a population in particular areas where harvesting occurs, or as an isolated population, one which increases solely by reproduction and not through emigration from other populations" (Richard et al. 1990:32). Inuit for their part are not prepared to view Nunavut as

analogous to a big store with shelves full of "stock" to be depleted by customers and "restocked" by managers on demand. Inuit do not think of beluga or any other animals in these terms; animals will return on their own initiative each year as long as they are hunted, treated appropriately, and shown proper respect.

The word "stock" in the scientific context also implies to Inuit a sense of stability, permanence, and unchangingness that they are reluctant to attribute to most animal populations, and definitely not to beluga in the southeast Baffin region. Inuit, for example, believe that these whales vary over time and space in respect to behaviour, individual size, pod composition, and other characteristics. The season of the year, the condition and composition of the ice, food supply, weather, *pimungnirtuq* (highest and lowest tides, which *Qallunaat* reference to the full moon) and other conditions all play roles in determining the location of beluga. The profound understanding that Inuit have of animal and seasonal cycles renders the treatment of whales as "stocks" unacceptable to most of them.

Inuit recognize that biologists view pods of beluga as belonging to units larger than what can be observed at one time; for example that they treat beluga associated with specific estuaries as single units for management purposes. This has contributed in the past to a certain preoccupation with defining beluga hunted by all three southeast Baffin communities as being from one "stock". It is important, however, to understand that Inuit reject this way of thinking. Although behavioural, physical, and other differences have been noted among beluga frequenting different areas in the southeast Baffin, Inuit are reluctant to assign to these observations the same meaning or value as biologists do. This conceptual difference would pose a serious obstacle to co-management if the ultimate objective was to "manage and conserve wildlife stocks." However, if we accept that the goal of co-management is to "manage and conserve the co-existence of Inuit and the animals upon which Inuit survival depends", it becomes secondary whether biologists view beluga as groups larger than what can be seen at one time, provided they recognize that these are arbitrary concepts to be validated, rejected, or refined by further scientific and indigenous observation. If biologists believe that they can best contribute to this goal by viewing beluga as belonging to "groups" or "populations", that is their prerogative. However, they should not expect Inuit to adopt these concepts. Inuit have other ideas about how best to manage and conserve their traditional relationship with beluga.

The terms "wildlife management" and "harvest" also have unsatisfactory implications to Inuit for the purposes of this Plan. For Inuit, "harvest" implies the purposeful control of vegetables or grain to be gathered at particular seasons, or of domesticated animals in order for them to be slaughtered at specific times for economic gain. "Harvesting" is thus replaced in this Plan with the more culturally appropriate terms, hunting or whaling. Hunting is fundamental to Inuit identity and a way of life that involves human organization; logistical preparation; search, pursuit, and encounter tactics; knowledge acquisition; social recognition; and sharing, distribution, and reciprocity. For *Qallunaat*, hunting is a regulated recreational activity under strict and numerous government controls, not a primary expression of cultural identity or a prerequisite for cultural survival. *Qallunaat* hunt seasonally and for sport, in a concentrated time period, and with rules that Inuit hunters would consider very odd, such as the requirement to wear orange-coloured uniforms in order to heighten their visibility to other sport hunters.

Even terms such as "wildlife" and "yield" undermine traditional Inuit perceptions of animals and nature. "Wildlife" in Inuit perception exists only in the context of agricultural society, where animals are either domesticated and fenced-in or uncontrollable and "at large". In this light, the animals upon which Inuit survival depends are not "wild." Because "yield" is an agricultural concept relating to economics, the term "catch" is used here instead, to refer to the number and type of whales killed (more precisely, landed) during a hunt.

3.2 Systems of Knowing

Knowledge can be defined as the sum of what is known: the body of truth, information, and principles acquired by humankind. As humankind is made up of many cultures, it follows that there are many different kinds or systems of knowledge. Yet in most cultures knowledge derived by the scientific method, or international knowledge, exists side-by-side with indigenous knowledge, which has been defined as "the collective knowledge of any human group about any aspect of its world" (Hickey 1994).

3.2.1 Inuit Indigenous Perspective

Inuit indigenous knowledge is the accumulative knowledge of all generations of Inuit. As such, it provides a "blueprint" for Inuit economic, social, and cultural survival. Because Inuit indigenous knowledge is the product of generations of direct observation and experience handed down through oral tradition and memory, it provides information of a quality and time-depth rarely available to southern scientific researchers.

Inuit indigenous knowledge is primarily observational, qualitative, holistic, and practical in nature. While it tends to be regional in scope it is lengthy in time compared to most scientific knowledge which is universal in scope but tends to be brief in time (Hickey 1994). Indigenous knowledge is also incremental and current, for it is always being upgraded:

"hunters make thousands of critical decisions each year. The processing of this information leads into the domain of spirituality and metaphor, where accumulated knowledge, intuition and the subtlest of connections with the natural world can generate choices on a basis that is quicker and surer than a narrow rationality... By denying a reduction to a limited set of variables, the fullness of both culture and consciousness come to bear on each day's activities" (Brody 1987:93).

Although indigenous explanation of observed phenomena may at times be at odds with scientific explanation, what is important are the observations themselves. When Inuit state that animals which are hunted will be replaced many times over, or that there are subtle differences between animals of different areas, such statements may contain a wealth of information of use for co-management. The observations upon which indigenous knowledge is founded should not be dismissed on cultural or

ideological grounds. Nor should indigenous knowledge be trivialized through the use of standardized collection procedures. Indigenous knowledge derives its richness, in part, from the contextual linkages it provides among natural phenomena in the real world.

3.2.2 Scientific Perspective

Scientific knowledge is the end product of people participating in the process of "western" or international science. Scientists seek to preserve and improve this knowledge, while making it freely available by communicating their results to colleagues and by publishing them in journals and books.

The word science is commonly defined as the knowledge of facts and laws arranged in an orderly system. However science, as a way of knowing, is more than the collection of observations and the arrangement of facts or events. Science is better defined by how observations are ordered and used to arrive at the most appropriate explanations.

The scientific method involves a number of specific, sequential steps that are used to formulate and choose between possible explanations of observations. These explanations are called theories. Scientists actively select between competing theories by making different predictions of what will happen in the future, either naturally or in response to treatments. This is called hypothesis formulation and testing. Then, by carefully defining the conditions for their experiments such that each theory makes a different prediction, scientists select the best explanation based on the experimental results. Thus, scientific knowledge is upgraded with each experiment or set of critical observations. It is important to note that the scientific method can never prove that some explanation or theory is right. It can only show that an alternative theory is wrong or not likely when a critical prediction does not occur.

In contrast to indigenous knowledge, scientific knowledge is quantitative, sequential, theory-driven, and seeks to establish cause and effect relationships among phenomena.

3.2.3 Application of Scientific and Indigenous Knowledge to Co-management

It is incumbent on Inuit to recognize the value of the international scientific knowledge system. At the same time, it is incumbent on the scientific community to acknowledge the value of Inuit indigenous knowledge. The latter is particularly powerful in its recognition of the uniqueness and dynamics of discrete natural systems (Hickey 1994).

Beyond the acknowledgement and appreciation each other's respective ways of knowing, parties to co-management must determine what it is that will constitute evidence or proof towards resolving specific issues of contention. Once identified, these criteria must be accepted by each party and carry equal weight in decision-making, provided that observations are obtained in ways satisfactory to both parties.

The information contributed by Inuit and biologists should when possible complement, rather than duplicate, each the other. While indigenous knowledge may be best suited to providing direct

observations on distribution, behaviour, size, sex, age, pod composition, and changes in these characteristics over time, the scientific method can provide quantitative, synchronic, and specific biophysical information on phenomena not readily available to Inuit observation. Both systems of knowledge can contribute to better understanding of southeast Baffin beluga than either system could offer alone. Increasing recognition of how indigenous and scientific knowledge can complement each other will go a long way towards effective "management" and "conservation" of the co-existence of Inuit and beluga in the southeast Baffin region.

4. Significance of the Beluga

The very marked reduction in beluga quotas which was instituted in 1990 caused much anger and resentment toward DFO in particular, and toward *Qallunaat* in general, among Inuit in the southeast Baffin region and indeed throughout the Nunavut area. To understand why Inuit felt, and continue to feel, so strongly about this issue the significance of beluga to them must be appreciated. The significance of the southeast Baffin beluga to other people must also be acknowledged.

4.1 Significance to Southeast Baffin Inuit

Archaeological evidence in Cumberland Sound indicates a long tradition of hunting, or at least utilizing, beluga whales (Mitchell and Reeves 1981). This tradition probably existed elsewhere in the region as well, although the shallow bays at the head of Cumberland Sound were particularly favourable for beluga hunting (ibid.). The beluga has been and remains important to Inuit for many reasons. It is difficult to describe or to understand each reason individually because they are intimately related in the Inuit way of thinking. Nevertheless, the significance of the beluga must be outlined so that *Qallunaat* can appreciate the cultural importance of this animal to Inuit. Three kinds of needs that beluga whaling fulfils are identified below. Each is described separately, with the admonition that they are virtually inseparable in the minds of Inuit.

4.1.1 Food and other Products

The most tangible need that beluga whaling fulfils for Inuit, and the one most apparent to outsiders, is that of providing different types of nutritional food. The skin, muscles, internal organs, bones, and blubber all have dietary uses. The meat and *maktaa*q of beluga are eaten raw or boiled, and the *maktaa*q is sometimes aged (see below). The lighter meat joining the ribs and backbone (*aursiit*) is a delicacy reserved for elders. Organs, such as the liver, brain, intestines, lungs, and eyes (which are especially delicious) are also eaten, as are the soft bones.

In the course of butchering the beluga, the four outer layers (i.e. *qalirusiq*, *miqquk*, *majja*, and *uqsuq*) are taken as single-unit blocks from the rest of the body (see Diagram 2A, next page). Most of the *uqsuq* or blubber is later detached from the hide and cut into smaller pieces to be rendered for oil. If the remaining material (*maktaa*q) is to be aged, the pieces are usually piled in several layers. The *maktaa*q eventually becomes soft and yellowish in colour in the ageing process; at this point the hide is separated by forcing a length of twine between it and the *miqquk*. This is most easily done by two people working together; one grasping the hide while the other pulls the twine between the hide and the rest of the *maktaa*q (Diagram 2B). It can also be done by one person working alone; in this case the hide is gripped with the teeth, the block of material and one end of the twine are held down with one hand while the other hand forces the twine between the two layers.

Aged *maktaa*q obtained in this way is termed *signittaminiq*, and is a particular delicacy. The first portions available are always given to the elders; the remainder is shared by adults and their

children. The separated hide is cut into strips, dried, and made into rope. Other beluga components also have value. Denser bones and teeth are frequently used as objects of artistic expression. Oil rendered from beluga blubber is still used to fuel lamps (*qullit*) because of its superior lighting qualities.

Diagram 2A. Schematic representation of covering layers on a beluga whale.

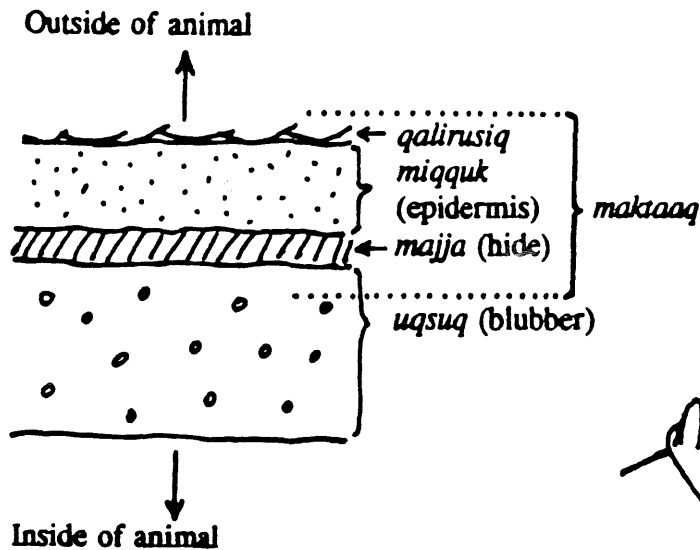
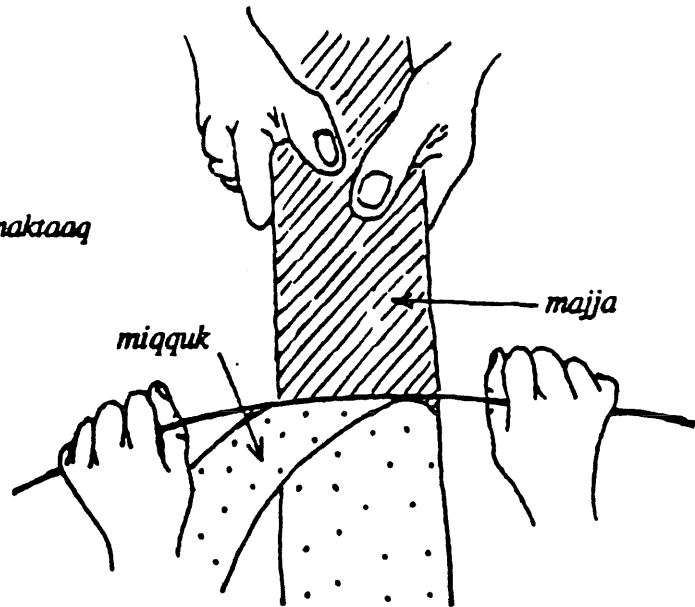


Diagram 2B. "Team method" of de-layering beluga *maktaaqa*.



Although the use of beluga products has varied over time according to changing needs and circumstances, the *maktaaqa* of the beluga whale remains one of the most sought-after foods. Inuit state that their bodies crave *maktaaqa* because of a nutritional dependency created by its consumption over the years. Unlike sealing which is conducted year-round, beluga whales are hunted only part of the year. This creates a craving and a desire which is well known to any person who has favourite seasonal foods. The consumption of beluga *maktaaqa*, organs and meat is thus a joyous seasonal event. It ends a craving which develops during the period when beluga are not available, and the body (of the consumer) becomes satisfied and energized (*kijjaulalatuq*). However when the price of gasoline and ammunition and the cost-depreciation of boats, motors and rifles are considered, beluga whaling makes little economic sense.

Inuit continue to hunt beluga when it is clearly not cost-effective to do so because they take into consideration the full range of values of beluga whaling. Adequate substitutes for beluga products and for beluga whaling cannot be found because the values associated with traditional foods "relate not just to their consumption, but (more) importantly to all phases of their acquisition, distribution, and processing" (Freeman 1992:43).

4.1.2 Cultural Value

Hunting and the use of animals are the activities that, above all others, sustain the full expression of Inuit cultural identity (Freeman 1992:5). In the southeast Baffin region, the communal hunting, sharing, and consumption of beluga embodies and allows appropriate expression, in the highest degree, of fundamental and enduring elements of this identity (Freeman 1992:10). This relationship has elicited considerable comment from *Qallunaat* over the years:

"The Cumberland Sound native seems to be a pretty fair sealer and whaler, but he is a very poor trapper. We know there is nothing new in this observation, but we also add that the best of the hunters are also the poorest trappers. He is essentially a whaler type of native brought up entirely on the whaling tradition. This symptom was noted in the early days at the Hudson Strait posts, but fortunately has almost disappeared. We have no doubt, however, that in time the Cumberland Sound natives will become better Hudson's Bay men." (HBC Archives, RG3/26B/8, Stewart 1939).

The Cumberland Sound Inuit did not, of course, become better "Bay men." Their whaling traditions continue to the present and remain a vital part of their cultural identity. Beluga whaling, in fact, encourages and promotes the survival of values and traditions associated with whaling through the transmission of knowledge about, and culturally appropriate attitudes towards, whales and whaling. The forced termination of beluga whaling in the southeast Baffin region would be seen as tantamount to denying Inuit their rights to exist as a distinct and vital society. Beluga whaling is just as culturally important as it ever was, so it is little wonder that Inuit felt such a profound sense of loss when the quotas of 5 whales per community were instituted in 1990.

Beluga whaling also reaffirms Inuit cultural identity through the maintenance of their relationship with the "land" and its animals. It is one of the few things that still separates Inuit from the rest of Canadian society which, although often unknowingly and despite the good intentions of the ill-informed, has continued to impose its will and institutions upon them.

Inuit have always had a special bond with animals and a great respect for their well-being. They believe that no one should say bad things about animals or engage in arguments concerning them. Many Pangnirtung hunters, including some elders, believe that beluga whales are now leaving Cumberland Sound earlier (in September rather than in October), or are beginning to go elsewhere during the summer, because of all the argument and controversy which has recently surrounded their use by Inuit.

The welfare of the animals upon which survival depended has always been of utmost concern and importance to Inuit. Before the arrival of missionaries, Inuit believed that the whale would give itself to the hunter if it was properly treated in life as well as in death. Both the body and spirit of the animal had to be properly treated and respected. For example, a successful hunter could not refuse to share his good fortune with others. Also, after a whale was caught a man had to wait five days

before hunting again. This was one of the practices embodied in the custom of *piktailiyuq* (abstinence), which also pertained with very specific rules to the taking of food, travel, sexual relations, etc. To show disrespect for the whale by harassing it, saying bad things about it, or not sharing it threatened human survival because the whale would no longer give itself to the hunter. The trust would be broken.

While Inuit now follow the Christian belief that only the human soul goes to its final reward after death, they also believe that animals return to be hunted again precisely because they do not have souls. Whereas the traditional (and technological) basis for the relationship between Inuit and the animals upon which they depend has been altered, the relationship itself has not. Inuit still believe that animals are given to them and that the animals will go away if they are not hunted or shared in a culturally appropriate manner. In fact, Inuit believe that if animals are hunted they will be replaced many fold. When the quota of 5 whales per community was introduced in the southeast Baffin region in 1990 it not only undermined the cultural identity of Inuit, but it threatened their relationship with one of the most important animals upon which this cultural identity depended and found expression. A loss similar to the "death of a loved one" was felt by many Inuit.

4.1.3 Social Value in Inuit Society

Inuit have always depended upon partnerships with animals and with other Inuit to maintain their culture and to perpetuate their society. The social elements of hunting and sharing remain among the most significant values of beluga whaling to the Inuit of the southeast Baffin region. In the increasingly face-paced world of imposed assimilation in which Inuit find themselves, beluga whaling continues to establish and reaffirm productive alliances and social relationships through the hunt and through the sharing of meat and *maktaaq*.

Traditional social order generally finds expression during beluga hunting and flensing. The oldest and most experienced members of the community generally assume the roles of leaders and decision-makers in these activities. This tends to be the reverse of general community life as it is currently evolving, which tends to see the younger men having the paid jobs and greater political acumen (in the "modern" sense) than their elders. At the same time, social and economic relationships within the community are created and maintained through the distribution and exchange of meat and *maktaaq*. In addition, elders are brought special parts of the whale as a sign of respect and affection, thus reaffirming their value and position in Inuit society.

Beluga whaling, then establishes and secures social relationships that are crucial to Inuit cultural existence and survival. The converse is also true; Freeman (1993) has observed that "for whaling and other forms of subsistence hunting to continue depends upon secure social relations". Subsistence whaling is not so much an activity as a set of "culturally established responsibilities, rights, and obligations" (ibid.).

4.2 Significance to Others

4.2.1 Significance to Other Inuit and to Aboriginal Canadians in General

Governments have come increasingly to recognize the benefits of co-operative bodies having representation from aboriginal peoples for the maintenance of arctic marine mammals. Anticipation that such bodies can be effective and efficient has been reflected in all land claims and resource management agreements with Inuit completed to date. The Alaskan Eskimo Whaling Commission, the (Inuvialuit) Fisheries Joint Management Committee, and the (Northern Quebec) Hunting, Fishing and Trapping Coordinating Committee have all, through practice, established co-management regimes pertinent to marine mammals in their respective settlement areas.

Aboriginal groups in Canada are aware that the equal participation of resource users in co-management bodies is long overdue, albeit precedent-setting, and that the credibility of these bodies as resource-user : resource-management agencies will have to be demonstrated over time. They are anxious to demonstrate and maintain high standards to ensure that co-management between governments and aboriginal Canadians will become the norm and the publicly accepted alternative to unilateral management by government agencies. All Canadian aboriginal groups thus have an indirect interest in the successful co-management of southeast Baffin beluga.

The Greenland Inuit have a direct interest in the southeast Baffin beluga because whales hunted by Inuit in Greenland may share the same wintering grounds. The Canada-Greenland Joint Commission on Narwhal and Beluga was formed in part in recognition of the fact that Inuit of both countries confront the same issues and share the same problems, and perhaps the same animals. Thus, Greenland Inuit have more than a passing interest in seeing that both Inuit needs and beluga whales are adequately protected in the southeast Baffin region.

4.2.2 Significance to DFO and to the Government of Canada

The Department of Fisheries and Oceans is responsible for a wide range of activities that support Canada's economic, ecological, and scientific interests in its oceans and inland waters. Providing for the conservation, development, and sustained economic utilization of the nation's aquatic resources rests with this department. Coordination of Canadian policies and programs respecting oceans is also part of DFO's mandate. Beluga whales in the southeast Baffin region fall within this overall DFO responsibility.

Specifically, the duties, powers, and functions of the Minister of Fisheries and Oceans include:

- 1) all matters over which the Parliament of Canada has jurisdiction, not assigned by law to any other department, board, or agency of the Government of Canada, relating to:
 - i) marine and inland fisheries;
 - ii) fishing and recreational harbours, hydrography, and marine sciences;

iii) policy and program coordination of the Government respecting oceans;

and

2) other matters over which the Parliament of Canada has jurisdiction relating to oceans, that are assigned to the Minister by law.

DFO's objective in managing the fish and marine mammal resources of the NWT and Yukon is:

"To conserve arctic fish and marine mammal resources, enhance the net value of the economic and social benefits received by Canadians from these resources, and provide for the equitable distribution of benefits."

4.2.3 Significance to Other Canadians and to the International Community

Whales have become the single most important *cause célèbre* for the environmental movement in Canada and the rest of the world. Whales are perceived by animal rights groups to be intelligent, gentle, graceful and caring animals. Based on information developed and provided by national and international management agencies, many whales are also believed by animal rights activists and others to be on the brink of extinction owing to commercial whaling, over-hunting, ocean pollution, and other human activities. Ironically, the plight of whales is felt by these same people to be so serious that only human intervention can save them.

The public has provided a great deal of moral and financial support to the cause of whale protection as whales have become a major symbol and rallying point in the campaign to save the environment. Recent activities such as the "Free Willy" campaign and the use of Russian icebreakers to rescue grey whales trapped in Beaufort Sea ice demonstrate the eagerness of the public to embrace whale conservation.

Concurrent with increasing concerns about ensuring the future of whales on this planet, there is growing recognition by the public of the rights of aboriginal people to hunt and fish in order to maintain their cultures and societies. Limited use of whales within the bounds of "conservation" in order to satisfy the nutritional, social, and cultural needs of traditional whaling communities is now acceptable to many people (Freeman and Kellert 1992).

Co-management for subsistence seems to be an acceptable middle ground between full protectionism and unlimited, unregulated use. Co-management bodies, in their efforts to fulfil their mandates, must therefore attempt to balance aboriginal needs with the public's desire for whale protection. Failure to achieve this balance will invite unnecessary interference from the international community in the conduct of aboriginal affairs. With this Co-management Plan, Canada is in a position to demonstrate to the world community, including the international regulatory agencies, such as the International Whaling Commission, that it has the initiative and capability along with the

responsibility to effectively conserve beluga whales in its area of jurisdiction and thereby foster those of its cultures which depend upon them.

5. Available Information on Southeast Baffin Beluga

5.1 Identity and Integrity of Beluga Aggregations

5.1.1 *Summer*

Beluga in the arctic are difficult to study because they are constantly moving and spend much of their time under water. Beluga are known to migrate between winter and summer areas. Migration is important when considering the biological, social, and other relationships of one aggregation of beluga to another. Biologists have assumed that whales entering Clearwater Fiord represent the summer concentration of the southeast Baffin beluga "stock" (e.g. Clarke et al. 1989, Cosens et al. 1990, Richard 1991). However, discontinuous distributions of beluga during the summer, differences in the size and behaviour of whales, and genetic testing and other scientific studies now suggest to them that whales in Cumberland Sound and Frobisher Bay could belong to different summer "groups". Inuit have stated that beluga migrating into Clearwater Fiord are larger, much harder to hunt, and have larger calves than beluga in Irvine Inlet on the southwest shore of the Sound. In fact, some Inuit claim to see closer similarities among beluga summering in Irvine Inlet (Cumberland Sound) and at Big Island (Hudson Strait) than among beluga summering in Irvine Inlet and Clearwater Fiord.

Aerial surveys indicate that very few whales are found in waters between the head of Cumberland Sound and Frobisher Bay during the summer. In fact, few beluga have been spotted in Frobisher Bay or along the north coast of Hudson Strait at times when beluga are found in the upper half of Cumberland Sound (Richard et al. 1990). Occasionally, however, substantial numbers of beluga enter Frobisher Bay during the summer. Such was the case in 1977, and again in 1993 when a pod of beluga, apparently unfamiliar with humans, became trapped near the head of the Bay.

Pangnirtung hunters have consistently maintained that beluga entering Clearwater Fiord are larger than beluga taken by hunters at Iqaluit and Lake Harbour. Preliminary scientific analyses support Inuit observations with respect to females, but there is no apparent statistical difference in the size of males taken by Inuit from the three communities (Pike 1993). The larger average body size and growth rate of female beluga in Cumberland Sound relative to those taken by Iqaluit and Lake Harbour hunters challenges the single-group model for southeast Baffin beluga. Further morphometric study, especially of males, is needed before beluga in the southeast Baffin region can be conclusively differentiated on the basis of size.

Pangnirtung hunters describe beluga at the head of Cumberland Sound as very difficult to hunt because they avoid boats and swim long distances under water in the direction of the open sea when pursuit begins. This is especially so for larger and older whales. This type of reaction is not usually displayed so strongly by beluga hunted in Frobisher Bay, near Lake Harbour, or even in Irvine Inlet. According to hunters, the tendency for the beluga in the latter locations is to remain closer to shore when hunted. Hunters also observe that beluga headed to and from Clearwater Fiord move in mid-channel whereas beluga elsewhere in Cumberland Sound or in Frobisher Bay stay closer to shore

during their migrations. Observed differences in the behaviour of beluga at the head of Cumberland Sound and elsewhere in the southeast Baffin region clearly support a more dynamic view of the biological, social, and other relationships of these beluga than is implied by a single-group model.

Preliminary genetic studies also support a more complex genetic make-up of beluga summering in the southeast Baffin region. A particular test which examines genetic material inherited exclusively from the mother (Brown and Clayton 1993) was applied to over 80 beluga and showed differences among whales taken by Pangnirtung, Iqaluit, and Lake Harbour hunters. However, half the whales sampled did possess a genetic marker shared by whales hunted by Inuit from all three communities. More recently, studies of Cumberland Sound beluga indicate very little genetic relationship between whales taken in 1986 and whales hunted in 1991 and 1992. Although this would seem to support Inuit observations about the immigration of beluga from outlying areas (see below), the meaning and significance of these genetic findings remain obscure. The findings do, however, illustrate the potential contributions of genetic analysis to understanding beluga relationships.

Other methods of determining the identity and biological relationships of beluga in the southeast Baffin region include other genetic and morphometric studies, and contaminant analysis. Consistently higher levels of PCB, DDT, and other organochlorines in six male beluga taken from Cumberland Sound, relative to whales from Hudson Bay and Baffin Bay, suggest this as a method for distinguishing whales in the southeast Baffin region (Muir et al. 1990).

DFO biologists believe that "group" discreteness of beluga during the summer is an important consideration for co-management, and that further studies are required on this matter. Inuit hunters believe that "group" discreteness in the wintering areas is a more important matter for co-management, and that studies of the "total population" are required to resolve the identity issue. Inuit, however, are reluctant to view beluga as belonging to a "stock" which is larger than what can be observed at one time, unless concrete evidence can be presented to support such a view. Until such time as Inuit and scientific knowledge agree on the utility of concepts such as "groups" and "populations", they will be considered by Inuit to be arbitrary.

5.1.2 Winter

The biological, social, and other relationships of the more than 25,000 beluga that winter in the pack-ice of Hudson Strait, Davis Strait, and the Labrador Sea are not well understood by DFO biologists. These biologists believe, however, that whales summering in Hudson Bay, Ungava Bay, and the southeast Baffin spend much of the winter in this area. Pangnirtung hunters observed that beluga seen at the floe edge in Cumberland Sound in the spring of 1993 were shorter and thinner than those that enter Clearwater Fiord after break-up. Their *maktaaq* was also thinner and smoother.

Beluga hunted near Lake Harbour are thought to be migrating along the southern Baffin coast, towards Hudson Bay in the spring and from Hudson Bay in the fall. Hunters at Lake Harbour observe the arrival of large groups moving in these directions at these seasons, with about a four-day lag time between arrivals at Lake Harbour and at Cape Dorset to the west (SEBBRC 1991). Hunters encounter virtually no beluga anywhere along the southern Baffin coast during the summering period. Beluga

hunted at Lake Harbour are also generally smaller than those taken in Cumberland Sound during the summer (Pike 1991), especially the females (Pike 1993). However, some beluga seen during the fall and spring in Frobisher Bay may also winter off the floe edge in Cumberland Sound. Further studies of beluga at the floe edge are required to better understand the integrity and distributions of summer associations of beluga during the winter.

5.2 Estimates of Beluga Numbers

5.2.1 Pre-Commercial Whaling Estimates

Biologists have estimated that more than 5000 beluga visited Clearwater Fiord annually prior to the arrival of commercial whalers (Mitchell and Reeves 1981). They have also concluded that this "population" was decimated by commercial whaling over several periods (ibid., also Reeves and Mitchell 1981). Relying on Inuit labour, British and American whalers between 1860 and 1890 occasionally "topped off" their tanks with the oil of beluga taken at the floe edge (Ross 1985). Around 1870, commensurate with a decline in the bowhead population, several attempts were made to capture beluga with nets at Midlurialik in Clearwater Fiord (Table 2). However these efforts barely paid expenses, and large-scale whaling operations were soon suspended (Clark and Brown 1887:247-248). Beluga in Clearwater Fiord again attracted some commercial interest after 1890, but these efforts were likewise carried out only sporadically.

Although there was some commercial whaling of beluga in Cumberland Sound in the late 1800s (Table 2) systematic whaling did not begin until after the Hudson's Bay Company established a post at Pangnirtung in 1921. Over the next two decades more than 5000 beluga were taken in Clearwater Fiord and nearby fiords (Table 2). Assuming that the recruitment rate (the addition of beluga to the "population" vulnerable to hunting, by growth from smaller size categories: Ricker 1958) and changes in this rate were small relative to other uncertainties in the technique, biologists have used this figure as a crude estimate of the size of the Cumberland Sound beluga "population" prior to commercial whaling (Mitchell and Reeves 1981:671).

In the 1940s the commercial hunt for beluga was scaled down by the Hudson's Bay Company as the industry was left entirely in the hands of Inuit leaders. During the 1950s commercial beluga whaling played a larger role in the local economy. However, by the early 1960s the capture of Cumberland Sound beluga for external markets had ceased. With the exception of 1966-1967 when an "extra" 124 beluga were killed for scientific and test fishery purposes (Brodie 1971), and again in 1976-1977 when the Pangnirtung Co-op bought and sold *maktaaq* for intersettlement trade, beluga during the last three decades have been hunted solely to satisfy local needs.

The pre-commercial whaling estimate of 5000+ beluga for Clearwater Fiord appears in both scientific and public literature, and has been used as a "measuring stick" for comparison with recent aerial surveys. However the 5000+ estimate is not directly comparable to current survey data, as a substantial proportion of beluga are not visible during an aerial survey. Furthermore, Inuit contend that there never have been so many beluga seen at one time in one place. Historical sources appear to

support this view as the largest number of beluga ever trapped and killed for commercial purposes at one time was 500. This occurred in 1871 (Clark and Brown 1887:247) and again in 1930 (Table 3). Catches of 600 and 800 whales may have been made in 1923 and 1924, but these were the cumulative totals of two or more drives.

The 5000+ estimate derives directly from the total number of beluga killed commercially during the period of peak catch, 1923-1941 (Mitchell and Reeves 1981). Mitchell and Reeves considered the effects of reproduction to be trivial for the purposes of this estimation, and did not incorporate their estimated recruitment rate of 9% per year in this calculation. It appears that Mitchell and Reeves equated the recruitment rate with the proportion of newborn calves, rather than with the actual recruitment rate of the "population." Southeast Baffin Inuit question this method because it does not allow for replacement by other beluga through immigration. Indigenous knowledge indicates that beluga summering in Clearwater Fiord may not be an unchanging aggregation of estuary-bound whales. Inuit believe that the number, ages, and other characteristics of beluga that visit Clearwater Fiord vary from one year to the next.

Current scientific evidence indicates a general recruitment rate for beluga whales of about 2.5%, rather than the 9% figure suggested by Mitchell and Reeves (1981). At such a recruitment rate (2.5%) an "initial group size" of even 5000 beluga in Cumberland Sound/Clearwater Fiord would not have been sufficient to have supported the commercial whaling activity which is a matter of record. These speculations aside, it is essentially impossible to estimate the actual number of beluga that visited Cumberland Sound prior to the onset of commercial whaling. Incomplete whaling records, insufficient information on the age and sex structure of the hunt, and an inadequate understanding of the relationship between total "population" size and rates of reproduction and death all conspire against making such an estimate.

No information exists to permit any assessment of the number of beluga summering in the vicinity of Frobisher Bay and Lake Harbour prior to and during the commercial whaling periods. It is known that these locations never supported any significant commercial whaling activity; the only place in the southeast Baffin region where beluga whale drives were attempted regularly for this purpose was at the head of Cumberland Sound (Mitchell and Reeves 1981).

5.2.2 Recent and Current Estimates of Beluga Numbers

Based on studies undertaken in Cumberland Sound during the 1960s, 1970s and 1980s, biologists became alarmed that the level of hunting to which southeast Baffin beluga were being subjected was much greater than the "population" could sustain. Surveys in 1985 and 1986 sighted fewer than 500 whales in Clearwater Fiord and adjacent parts of Cumberland Sound. This was less than the total number of whales counted in 1977 (Table 4). Given the large number of beluga hunted relative to the apparently small size of the "population", biologists became concerned that, unless the hunts were curtailed, beluga could soon be exterminated from Cumberland Sound and southeast Baffin waters (Clarke et al. 1989, Cosens et al. 1990).

Three aerial surveys undertaken at the head of Cumberland Sound in August 1990 estimated 454, 490, and 512 visible whales present. These estimates are slightly higher than the 398 and 444 whales encountered in aerial surveys in 1985 and 1986 respectively, despite an annual landed catch of about 40 animals in the intervening period. Actual removal is suspected to be between 1.09 and 1.43 times the landed catch due to loss of some struck animals (Clarke et al. 1989). If these whales are regarded as the summer concentration of the entire southeast Baffin beluga aggregation, removal from the "group" over this period was at least 100 animals per year (Table 2). Thus, the number of whales counted in Clearwater Fiord in 1990 was greater than DFO biologists had predicted would remain (Cosens et al. 1993):

"A stock of 500 animals cannot sustain removal of more than 12 animals per year, yet this stock had been subjected to much greater removals since 1967, without a decline in stock size being detected by aerial surveys. This suggests that the stock is larger than 500 animals and may be declining more slowly than was suspected."

In short, the aerial photographic surveys do not indicate a recent decline in Cumberland Sound beluga, although the trend in cliff counts (Table 4) is in a downward direction. The 1990 aerial surveys might in fact suggest that the current level of hunting in Cumberland Sound may be sustainable, which could only indicate much higher numbers of animals present and/or higher rates of reproduction and/or immigration than was anticipated by biologists. The fact that no statistically significant change in beluga numbers was observed in the aerial surveys between 1986 and 1990 is, in the prevailing circumstances, an indication that further surveys and other investigations are required.

No method has yet been developed that allows direct determination of the total number of beluga present in an area such as Cumberland Sound. Both aerial and cliff-top surveys produce counts that are smaller than the total number of whales present because some whales are submerged, while others are difficult to see on the surface owing to their colour (e.g. calves range in colour from brown to grey) or weather conditions (e.g. white-caps and fog render counting difficult). Furthermore, there is no assurance that the animals present in a confined area at a particular time represent the sum total of animals utilizing that area. When biologists use the number 500 as an estimate for Cumberland Sound beluga, they definitely err on the side of caution.

Inuit have no confidence at all in aerial surveys such as those conducted in Cumberland Sound between 1967 and 1990. They consider that there are too many inherent problems and the capabilities of the method are too limited to obtain any useful indication of numbers of beluga present. They point out that the camera which was installed in the aircraft had only straight-down viewing, which excluded areas to the left or right of the flight path. The aircraft itself flew much too fast, in their opinion. Many if not most of the surveys were conducted on windy days, which made it difficult or impossible to differentiate between beluga and white caps. The aircraft charters were always so expensive that the cost severely limited the number of affordable survey days. These surveys gave only a snapshot in time and location, whereas beluga are continually arriving and departing. In short, Inuit are entirely unconvinced about any validity of DFO surveys conducted under these conditions and constraints.

While acknowledging that aerial surveys are not realistically able to estimate the total number of whales present, the scientific community contends that they do provide an index for comparing the number of whales visible in a given area from year to year. They also can be used to compare beluga densities between different areas. A survey estimate of 500 visible whales in the upper half of Cumberland Sound would represent a density of 0.06 beluga seen per square kilometre surveyed. On the other hand, populations with greater total estimates, such as the 10,400 whales counted in the Canadian High Arctic, represent 0.56 beluga seen per square kilometre surveyed. Problems with this method notwithstanding, the comparative scarcity of beluga in the upper half of Cumberland Sound and Clearwater Fiord relative to some other areas has raised concerns among DFO biologists, AFSAC, and COSEWIC.

Aerial surveys (as in Cumberland Sound) are less sensitive to local movements of beluga than are cliff-top surveys since they cover larger areas. Cliff-top surveys (as at Midlurialik: Figure 5) may not be a fully satisfactory method of indexing the total number of beluga that visit Clearwater Fiord annually because whales at Midlurialik are either increasing or decreasing from one hour to the next (Figure 2). Even when cliff-top surveys are conducted over longer periods of time, there is no way to determine if the whales present in any particular period are the same as those counted the next. Because it is not possible to determine whether whales observed in successive counts are the same animals, maximum hourly counts of beluga in Clearwater Fiord underestimate, perhaps substantially, the total number of whales present in the area. The one real value that this technique possesses, assuming that other variables (time, date, location, observers, etc.), are held constant, is in demonstrating gross changes in relative abundance from one year to the next.

The 500 estimate of the present "population" is often compared with the pre-commercial-whaling estimate of 5000+ beluga in Cumberland Sound to justify the designation of beluga in Cumberland Sound and southeast Baffin as endangered. However, neither the 500 estimate, nor the 5000+ figure, nor their comparison, are acceptable to Inuit nor for that matter to DFO biologists. Both parties acknowledge the weaknesses in these estimates and the need to more accurately determine beluga numbers, and any changes in these numbers over time.

In support of DFO's concerns, some Inuit do believe that the number of beluga whales visiting Clearwater Fiord since the late 1960s has declined. However, only *Qallunaat* have assumed that this apparent reduction is the result of overhunting. Inuit believe that many other factors may account for this situation. The stranding and subsequent killing of a resident pod of 15-20 killer whales at the head of Cumberland Sound in 1978 has reduced the need for beluga to huddle in the shallows of Clearwater Fiord to avoid predation. Beluga whaling temporarily increased during the late 1970s, and more boats were purchased by hunters in Pangnirtung during this decade than any time previously. As beluga are sensitive to noise and boat traffic, they may be dispersing more widely than previously because of an increased amount of boating activity at the head of Cumberland Sound.

Some Inuit believe that the single most important factor contributing to the apparent decline in the number of beluga that can be observed in Cumberland Sound at any one time may have been the disappearance of a large male whom they called Luuq. Named after vocalizations unique to himself, Luuq was always seen surrounded by hundreds of other beluga. He was their *malintaq* ("the one who

is followed"). Inuit living in camps at the head of Cumberland Sound were instructed never to hunt this whale for it was known that, if he were killed, beluga would no longer concentrate in such large numbers. Luuq apparently disappeared around 1967 or 1968 (Jamasié Mike, pers. comm. 1994). Ever since then beluga have been more dispersed and more difficult to hunt. It is possible that there is a connection between the disappearance of Luuq and the taking of 124 beluga for scientific and test fishery purposes in 1966-1967.

5.3 Group Structure and Biology of the Cumberland Sound Beluga

5.3.1 Age and Sex

Biologists are concerned that the age profile of beluga in Cumberland Sound/Clearwater Fiord is such that not enough animals are being allowed to reach reproductive maturity for this "group" to sustain itself. Inuit question the assumptions upon which this conclusion is based.

Biologists and Inuit have both observed females accompanied by two and sometimes even three calves of different sizes in Clearwater Fiord. Such groups are also commonly seen among beluga in other estuaries. Biologists believe that female beluga give birth to a single calf once every three years on average (Brodie 1970, 1971), and that females must reach an average age of 15 years or more for a "population" to remain stable. Pregnancy is thought to last 14 months and nursing can continue for up to two years. Solid food is found in beluga calves as young as one year, although teeth do not usually erupt until animals are well into their second year (*ibid.*).

Inuit, however, feel that the reproductive rate for the Cumberland Sound/Clearwater Fiord beluga is higher, with calving perhaps on the order of once every two years. There is some evidence to support this belief; lactating females with calves and early first-term pregnancies were common in the sample of beluga taken by Brodie (1970). It must also be noted, however, that only about one-fifth of the adult females in Brodie's sample were pregnant.

A sample of beluga taken by Pangnirtung hunters in 1986 included no females over 17 years of age. In 1991 and 1992, however, at least two females over 20, and one over 25, were killed (Pike 1993). There are problems, however, in determining the actual age of individuals from teeth sections. Growth layers, which are deposited at a rate of two layers per year, are difficult to count after 16 layers owing to wear (Brodie 1970:35, 1971). Therefore, large animals with extensive tooth wear may be older than estimated by this method.

Inuit claim that the scarcity of older breeding females in these samples provides empirical support for what they have said all along: that Pangnirtung hunters actively avoid hunting female beluga with calves. The sex ratio of beluga taken from Cumberland Sound tends to support these Inuit contentions; for example the 1986 sample had a ratio of 25 males and 7 females. In fact, this reflects a conservation strategy that Inuit have practised for years (Southeast Baffin Beluga Review Committee 1991). However the proportion of older females tends to be much greater in populations of beluga for

which estimated population sizes are much larger. Moreover, on average, one-third of the adult females in these "groups" (from other areas) are pregnant.

Biologists are concerned that disproportionately too many of the larger adult beluga have been hunted from Cumberland Sound. Selective hunting of larger animals in the past, they believe, has resulted in a population dominated by young animals as indicated by the present catch composition. Biologists interpret this age structure to indicate depletion. The age distribution of the Cumberland Sound beluga catch is shown for two time periods in Figure 3A. Comparative age distributions of the catch from two other areas (Arviat and Alaska), where biologists interpret the beluga to have much greater population size and relatively lower hunting rates, are shown in Figure 3B. This interpretation is not supported by hunters who claim that they have always selectively taken younger animals because of a preference for their *maktaaq*.

Biologists interpret the age structure of Cumberland Sound beluga to indicate that only 75% of adult males survive until their next birthday. This inferred survival rate is considerably lower than that observed among beluga elsewhere. Inuit, however, contend that few older males are caught each year, not because they have been over-hunted and are thus not present, but because older animals are very difficult to approach. In other words, they believe that increased exposure to hunting and boat traffic has resulted in a catch dominated by less mature whales. Animals which were subject to hunting but escaped are not likely to be as vulnerable to hunting thereafter. Consequently, older males are rarely caught. An increase in the number of older males (maximum age 22 years) caught in Cumberland Sound in 1991 and 1992 compared to 1986 (Pike 1993), in addition to recent genetic results (see above), may constitute empirical evidence of the migration of new whales into the Sound from outlying areas.

Historical records are not incompatible with the possibility of substantial immigration during the peak period of commercial whaling (Table 3). Younger and/or less experienced whales may have moved in to occupy the ecological "elbow room" created by the capture and/or abandonment in/of the area of/by older animals.

5.4 Beluga In Frobisher Bay and Lake Harbour

Fewer summer aerial surveys have been conducted in Frobisher Bay and near Lake Harbour than in Cumberland Sound. Moreover, no systematic or statistically proportionate surveys have been conducted in these areas, as have been done for Cumberland Sound. In 1977, a single pod of at least 237 beluga was seen in Frobisher Bay in August, but no beluga were observed along the northern shore of Hudson Strait. Aerial surveys in August of 1985 and 1986 encountered few beluga in Frobisher Bay, and none near Lake Harbour (Table 4).

5.5 Critical Habitat

Most beluga, including those frequenting Cumberland Sound/Clearwater Fiord, use estuaries in summer. These estuaries appear to be especially important to females and their calves. It has been observed elsewhere that even repeated and severe hunting and other human disturbance does not prevent beluga from returning to estuaries (Caron and Smith 1990). The discharge of warmer, fresh water into most estuaries may increase thermal efficiency and growth of young as well as assist in nursing and nurturing (ibid.). Shallow estuaries provide protection from predation by killer whales, while abrasive estuary bottoms may facilitate moulting during periods of increased skin growth (ibid., and Sergeant and Brodie 1969). Whatever the reasons why beluga use estuaries, these habitats can be assumed to be critical to them.

Other habitats may be critical for beluga migration and feeding, and recent development of shrimp and other fisheries in the southeast Baffin region is noted in this context. The roles of such habitats in the welfare of beluga whales are not yet understood.

5.6 Interpretations and Remaining Questions

Southeast Baffin Inuit objected to the severe quota reductions in 1990 for many reasons. Foremost was their feeling that neither they nor their knowledge were included in the decision-making process. However with the subsequent involvement of Inuit and the examination of indigenous knowledge in a process committed to achieving a co-managed solution to the problem, biologists are refining their understanding of southeast Baffin beluga behaviour and dynamics. At the same time, Inuit are gaining an appreciation of the value and process of scientific investigation. Both Inuit and biologists are becoming more aware and appreciative of the reasons and rationale for each other's positions.

It is encouraging to see concrete evidence of previous errors being acknowledged, and a more positive future being charted:

"By simplifying the information we brought to them (Inuit), de-emphasizing the imprecision of our methods and over-emphasizing the certainty of our conclusions, we did ourselves (biologists) a disservice. Had we shown the detail of the results and acknowledged the imprecision and uncertainty, we could have explained that our alarm at the status of the stock is an educated guess based on various sources of data, not on certainty, and that the precision of the methods may not allow certainty until it is too late. This failure at openness about the detail of our results and the thought processes behind our conclusions and dire predictions had a very negative consequence (Richard and Pike 1993)."

Both Inuit and biologists now believe that beluga that spend the summer in the southeast Baffin region divide into at least two resident entities: one that concentrates at the head of Cumberland Sound and a more dispersed number of beluga that occupy the remaining coastline in the southeast Baffin. However, there remain a number of outstanding questions that current information simply cannot answer. How many summer concentrations of beluga are there in southeast Baffin, and what is their relationship to each other? Do they maintain their spatial and temporal distributions, behavioural characteristics, biological and social relationships, etc. from one year to the next? What are their current numbers and age and sex structures? How much variability exists in these characteristics from one year to the next? What is the relationship between summering and wintering beluga in the southeast Baffin? Do they interbreed? Do they maintain their spatial autonomy during the winter months?

Such questions need to be answered before a complete strategy can be designed to manage and conserve the co-existence of Inuit and beluga in the southeast Baffin. Answers must be sought in ways that will provide information that can be integrated with both indigenous and scientific systems of knowledge. How to achieve this constitutes a challenge to which we now turn.

6. Acquiring Information for Co-Management

6.1 Objectives

Two complementary objectives underlie the collection of information for co-management. The first objective is to integrate Inuit and scientific information and concerns as reflected in the *NFA*, and as prescribed in A Report to the Minister of Fisheries and Oceans (Southeast Baffin Beluga Review Committee 1991). This objective underscores the belief that both systems of knowledge can contribute to a more comprehensive understanding than either system can offer by itself. Agreement on what information is collected, by whom, and how it is to be used to make decisions are essential for effective co-management. The second objective is to undertake the studies necessary for the wise use of beluga and to address information conflicts between DFO and Inuit. Many knowledge gaps exist with respect to southeast Baffin beluga. Long-term use of these animals requires that these gaps be resolved as soon as and to the greatest extent possible.

6.2 Information Needs and Priorities

6.2.1 "Group" Identity and Relationships

Biologists believe that there is a need to determine the biological, social, spatio-temporal, and other relationships among beluga hunted by the three communities. In other words they consider it important to know to which summer and winter "groups" that individual beluga taken by each community belong. This reflects the biologists' view that beluga can be "managed as discrete groups or units." While Inuit hunters do not think this way (see Section 3), they do believe that research aimed at determining relationships among southeast Baffin beluga may assist them to maintain their co-existence with this animal.

A key ongoing aspect of Inuit co-operation with and participation in this process will be continued sampling of the catch in order to provide tissue samples, measurements, and other observations. Present methods of identification (e.g. genetic typing, contaminant burdens, morphometric analysis, and behavioural observation) will need to be evaluated to determine the most appropriate procedures. New techniques, such as the use of hydrophones to determine the acoustic signatures of beluga, may need to be explored. Even the study of beluga remains from archaeological sites may provide a basis for evaluating contemporary genetic and other differences among beluga in the southeast Baffin region.

Determination of the methods to be used and how these studies will be designed and conducted will be worked out and agreed upon by Inuit and DFO biologists for each community. It is particularly important that Inuit knowledge contribute in a meaningful way to the resolution of this issue. Both contemporary observation and traditional knowledge will provide important information on differences and similarities among southeast Baffin beluga. The greater access of Inuit to beluga

and their ability to detect even the subtlest of distinctions will complement the sophisticated scientific techniques and procedures used by biologists.

Once sufficient information has been collected in a manner acceptable to both parties in co-management, decisions will be made jointly by Inuit and DFO representatives, and recommendations will be forwarded to the NWMB for its consideration, as per the *NFA*. It is acknowledged that this information will need to be successively upgraded owing to the dynamic and complex nature of beluga behaviour and the development of emerging techniques and understanding. These factors will permit new questions to be asked/answered and additional issues to be addressed. These ongoing and expanding efforts will foster progressively greater confidence in future co-management decisions.

6.2.2 Estimating Beluga Numbers: Past and Present

Estimation of pre-exploitation beluga numbers for anywhere in the southeast Baffin region is a matter of low priority because such numbers can never be known with any degree of certainty. A goal of co-management is to maintain the number of beluga and to increase them in situations where they are depleted. However both Inuit and biologists (Cosens et al. 1990) question the need to restore beluga numbers to historic levels. Given the multiplicity and complexity of human actions that now affect arctic marine ecosystems ("because unknown ecosystem changes may have altered carrying capacity", *ibid.*) a return to historic levels may not be attainable or supportable (Freeman 1993).

Biologists and Inuit believe that there is an urgent need to produce an aerial survey estimate of beluga for the whole of the southeast Baffin, based on a proportionate surveying procedure, utilizing better and more appropriate technology, and including emphasis on Frobisher Bay and northern Hudson Strait. This concern is fuelled, in part, by the importance that the international community attaches to whale numbers as indicators of "stock status." Previous aerial surveys carried out at Cumberland Sound provide important lessons about procedure (see Section 5) and will need to be taken fully into account.

Beyond estimating the total number of beluga seen at the surface, biologists also identify a need to determine the actual number of whales in the southeast Baffin region. This should be done using as many independent methods as possible. For example, an estimate of the actual number of beluga using Clearwater Fiord or other estuaries might be made using mark/recapture techniques based on individually-identifiable whales, on genetic typing methods, or on tagging. Alternatively, aerial surveys could be corrected for submerged and other whales present but not visible in photographs. This would entail the calculation of a better correction factor, including determination of how this factor varies with respect to location, critical habitat, season, age and sex of beluga, etc.

While Inuit concur that counting whales may have some practical application, they, like biologists, recognize the difficulties in obtaining counts that are comparable from one year to the next: every year is different. For example, factors that affect the degree to which beluga congregate in one location, include weather (wind, precipitation, temperature, visibility, etc.), tidal conditions or *pimungnirtuq* (ebb, slack, etc.), ice cover, available daylight, etc. The time of the year is also critical as beluga will concentrate in varying numbers depending upon whether they are arriving, milling

about/relaxing, getting ready to leave, etc. Combined with their beliefs that: 1) the number and composition of beluga that enter Cumberland Sound and Frobisher Bay vary from year to year, and 2) all animals vary in numbers over cycles of a few years to several generations, Inuit are not confident that actual counts are the best method of determining if beluga numbers are increasing or decreasing.

Other ways Inuit can tell if there are more or less beluga from one year to the next include: 1) the number of times per hunting trip that beluga are encountered, 2) the size of beluga pods observed, 3) the proportion of calves, pregnant females, and nursing females present in a pod, 4) the number of naturally beached whales found, 5) the simultaneous discovery of whales in old and new areas, and 6) the susceptibility of whales to hunting, with immigrant whales and beluga in larger pods being easier to hunt. Combined with counts from specific locations deemed suitable by hunters, information of this type should allow Inuit (and biologists) to formulate a defensible opinion about whether beluga numbers are changing or remaining the same.

Inuit and DFO personnel should carry out their studies jointly to the greatest extent possible. Both Inuit and DFO studies should be conducted over a span of several seasons, sufficient to satisfy each party that any observed trend is the result of an actual change in numbers and not just natural variation related to other factors. If both Inuit and DFO agree that there is a change in numbers over a prescribed period, this would signal a need for management action. For example, if surveys and other studies produce information to show that beluga are increasing, regulations such as the standing quota of 5 beluga for each community could be revised in order to provide more immediate benefits and comfort to Inuit. Alternatively, if beluga numbers are remaining constant or declining, further restrictive actions may be warranted. Such actions might include reducing the duration of the beluga hunting season, expanding "no hunting zones", or increasing the relative proportion of beluga taken at the floe edge. Actual proposals for management actions in the event that indigenous and scientific knowledge agree that beluga numbers are: 1) increasing, 2) remaining the same, or 3) decreasing are given in Section 7.

While Inuit and DFO biologists bring different skills and resources to bear on the matter of estimating beluga numbers and changes in those numbers, the actual methods employed should be worked out jointly to take full advantage of each other's knowledge and expertise. In turn, co-management actions should: 1) be based on mutual agreement achieved through discussion, 2) be commensurate with circumstances and needs, and 3) involve the NWMB and, if necessary, the Minister of DFO.

6.2.3 Population Biology and Structure

Biologists believe that the age and sex composition of the Cumberland Sound/Clearwater Fiord beluga exhibits signs of overhunting. Inuit suggest an alternative explanation for the relative scarcity of older beluga, and of older males in particular, in the catch: they believe that younger whales are easier to hunt. As beluga killed by Inuit represent a selective or biased sample, the age and sex structure of any larger "units" to which these whales belong will be difficult or impossible to extrapolate. To investigate how many whales avoid capture and what their age and sex characteristics are, marine mammal observation cards developed and used by the Inuit Circumpolar Conference could

be modified in order to collect hunter observations. Traditional knowledge should also be used as a basis for comparing the present composition of beluga pods with those of the past.

In turn, biologists should begin to investigate the impact of beluga avoidance behaviours on the projections of their population models. While low-level photogrammetry may assist in assessing age and sex structure of pods, the most appropriate methods of determining these characteristics need to be decided jointly by a process similar to that described above.

There is some discrepancy between scientific and indigenous interpretations of the reproductive rate of female beluga (see Section 5). Determining how often adult female beluga give birth is a high priority. An information exchange meeting should be held between DFO biologists and local HTOs (defined as per *NFA*). If a consensus cannot be reached, a joint study should be designed to investigate the matter.

6.2.4 Critical Habitat

The understanding of critical habitats used by beluga is not well developed. Both Inuit and biologists know that estuaries are critical to beluga. Considerable effort should be made to identify the key elements and habitats necessary to maintain vital beluga numbers in the southeast Baffin region. An information collection system, again based on the ICC Marine Mammal observation cards, could be used to enhance the knowledge of critical habitats. Traditional knowledge should also be collected to address this issue, along with the question of habitat change over time. Satellite-linked tags may prove useful in defining habitats critical to beluga. Studies on feeding ecology and behaviour, utilizing Inuit skills and resources, should also be carried out to better understand the food chain and the potential impact of fisheries and contaminants on beluga whales.

7. Managing and Monitoring the Hunt

7.1 Hunting Levels

7.1.1 *Scientific Advice*

"Safe hunting levels" for beluga are set by DFO managers (this responsibility now to be assumed by the NWMB) based on advice developed by AFSAC. AFSAC uses available scientific information and, increasingly, indigenous knowledge to assess whether a "group" of animals is large enough to sustain a particular hunting level. For large "groups", AFSAC uses information and assumptions about the relative birth and death rates, as well as "population" estimates, to calculate high-, medium-, and low-risk "total allowable removals" (TAR).

TAR estimates are referenced to all animals that are struck and killed, whether landed or not. Low-, medium-, and high-risk levels of removal are calculated by multiplying, respectively, the lower, mean, and upper 95% confidence intervals of the "population" estimate by the expected rate of increase, which is currently assumed (from the best available information) to be 2.5%. A low-risk TAR is considered to have a low probability of causing a decline in "group" size, while a high-risk TAR is considered most likely to result in a decline in numbers. TAR projections incorporate no inherent provision to foster recovery of depleted groups.

AFSAC has advised that the ability of small "groups" of whales to sustain any level of hunting is uncertain (Cosens et al. 1993). For the southeast Baffin beluga, AFSAC has proposed that "population" size not be allowed to fall below the current "population" index survey estimates (ibid., Cosens et al. 1990). AFSAC has further recommended no removals from this particular "population" to give it the best chance to recover. DFO managers, based on AFSAC advice, have attempted to reduce the quotas for beluga in the southeast Baffin region. Quotas of 5 beluga per community were established by regulatory amendment in 1990, but since then have been increased by means of annual variations by the Department as permitted in the regulations.

7.1.2 *Inuit Advice*

Inuit do not traditionally believe in the concept of "safe hunting levels" as outlined by AFSAC and DFO managers. Inuit believe instead that hunting is beneficial to animals, including beluga, as well as to humans. This belief has qualified support among biologists who acknowledge that some level of hunting will result in increased recruitment owing to higher rates of reproduction, increased survival of young animals, and perhaps increased immigration from other areas when animal numbers are reduced below carrying capacity. In particular, beluga belonging to hunted "groups" are expected to grow faster, have more blubber, and have less disease than beluga from "groups" that are at or near carrying capacity. It was a considerable break from tradition, then, when Inuit agreed to participate in a system involving "safe hunting levels" and "quotas."

Notwithstanding these concessions, Inuit realize that their lives are not the same as they used to be. In the meeting and articulation of Inuit and western societies, Inuit hunting technology has become more efficient and powerful with the introduction of rifles, motors and other modern gear. While traditional Inuit social organization, decision-making, and leadership roles have all suffered in the new society, the traditional skills as described in Section 4 are still practiced today. Acceptance of safe hunting levels and quotas were interpreted by Inuit as interim measures, to allow them to preserve their values and traditions at a time when they considered their culture to be under seige. It is a fundamental goal of Inuit to preserve their culture, and they believe that one particular way to do this is to demonstrate to DFO and to the rest of Canadian society that they can effectively manage and conserve their relationship with beluga whales without outside interference.

7.1.3 Co-management Advice

Balancing scientific and Inuit advice, needs and concerns in a spirit of co-operation is a key determinant of this Co-management Plan. Scientific advice cannot always be accepted by Inuit because of the great social and cultural importance of the beluga to them. At the same time, the repudiation of formal regulations pertaining to the hunting of wildlife as integral to the preservation of Inuit cultural identity, values and traditions is not presently acceptable to DFO or to the Canadian public. Co-management thus requires, for example, acceptance of higher quotas than scientific advice would indicate, but more restrictions on hunting than Inuit deem appropriate or necessary.

The present variance on beluga quotas for the three communities in question is referable to Central and Arctic Region Beluga Close Time and Quota Variation Order No. 1993/94-02. It is specifically recommended that this variance be maintained for 5 years, or until such time as scientific and indigenous information agree that further co-management action is necessary. Thus, annual quotas should remain in effect until March 31, 1999 as follows:

- i) 35 beluga for Pangnirtung,
- ii) 35 for Iqaluit, and
- iii) 20 for Lake Harbour from June 1 - September 30; no quota the rest of the year.

If by March 31, 1999, no new information has been developed or obtained to indicate a need for change to these restrictions, a thorough review of the situation should be conducted under the auspices of the NWMB.

The higher risk associated with these quotas (in the view of DFO) is balanced by: 1) the assured collection and evaluation of information at a rate greater than would be the case under circumstances deemed to be less urgent, and 2) the identification (this Plan, Section 7.3.3 and Table 5) of specific management actions in the event that beluga numbers in the southeast Baffin region, as jointly seen and acknowledged by Inuit and DFO, are found to be increasing, decreasing, or remaining the same.

7.2 Managing the Hunt

7.2.1 DFO Perspective

The Minister of DFO requires that measures be in place to control the hunting of animals that come under the purview of the *Fisheries Act*. This includes beluga that summer in the southeast Baffin region. DFO presently uses quotas and open/closed seasons to manage this "group" of whales, and has not yet introduced other restrictions on the hunt. DFO managers hope that further actions to restrict the hunt will not be necessary owing to effective Inuit management or increasing numbers of beluga, or both.

7.2.2 Inuit Perspective

i) *Traditional Conservation Measures*

Inuit traditionally practised a variety of measures to ensure that the animals upon which they depended returned each year. To kill more than was necessary, to speak disparagingly about animals, or not to share beluga food products would show disrespect, and thus threaten human survival. Waiting for a specified period of time before hunting again, giving seals and whales a drink of water before butchering, and preparing and disposing of animals in a culturally appropriate manner (meat of land and sea animals must not be cooked or eaten together, and their bones must be returned to their respective domains) are among the unwritten laws that maintained the trust between Inuit and the animals upon which they depended. It is the firm belief of Inuit that continued instruction and practice in the proper use, preparation, and disposal of beluga will help to manage and conserve their co-existence with this animal.

ii) *Current Conservation Measures*

Current measures employed by Inuit to ensure the continued availability of beluga are firmly grounded in tradition. They also reflect the concerns of the scientific community and the Canadian public. Pangnirtung Inuit no longer hunt in Clearwater Fiord and they do not pursue all the beluga they see. They presently operate within quota and, except in 1990, have done so without enforced compliance since 1980. Calves, females with calves, and pregnant females are not disturbed or hunted, despite a cultural preference for the *maktaaq* of younger animals. Inuit have worked to reduce wounding and loss of beluga, and have continued to utilize of dead whales encountered by chance. A self-imposed pattern has developed whereby two boats actively cooperate to take one whale at a time. The next time out, the other hunter will take the whale, if an opportunity arises. Hunters also actively avoid decimating entire groups of beluga, taking only one or two from any particular group being hunted.

Despite the fact that the number of beluga that summer at the head of Cumberland Sound appears to be stable, if not slightly increasing, the Pangnirtung HTA has introduced two additional conservation measures with respect to the hunt. To alleviate the competition and anxiety created by the introduction of quotas, Pangnirtung hunters have been taking more

beluga at the floe edge. This pattern is now being made more firm. Ten of the 35 beluga taken by Pangnirtung hunters will now come from the floe edge in the spring, where whales encountered tend to be smaller and thinner than those that travel to Clearwater Fiord in the summer. Of the remaining 25 beluga, 5 will be taken for community use. Finally, the Pangnirtung HTA will expand the "no hunting zone" for the 1994 and 1995 seasons by about 150 square km. Thus the line beyond which beluga cannot be hunted will now be located between Tiquoraluk (just north of Bon Accord Harbour) and Nuvujatuit (Figure 4).

7.3 Managing Future Hunts

In undertaking these additional conservation measures, Inuit have demonstrated to DFO and to the rest of Canada that they have the initiative and capability to manage and conserve their relationship with beluga. However, if new scientific and indigenous knowledge agree that beluga numbers are declining, or even remaining the same, further conservation measures will be required. Alternatively, if beluga numbers are agreed to be increasing, current restrictions could be relaxed or eliminated, including amending the regulations under the *Fisheries Act*. Actions that might be taken in the event that beluga numbers are increasing, remaining the same, or decreasing are presented in Table 5.

Crucial to the success of future co-management actions is agreement between Inuit knowledge and scientific knowledge. While DFO managers will be looking for statistically significant changes in beluga numbers, Inuit will attempt to arrive at a consensus based on a variety of indicators. It will be necessary to develop and pursue a continuing process to reconcile and integrate these observations; this is seen as a key function for a continuing Committee. In the unexpected event that agreement cannot be reached between DFO and Inuit, the matter will be referred to NWMB. Decisions of the NWMB will be binding on both of the parties to co-management, whereupon the two parties will negotiate an appropriate course of action. Again, this is seen as a role for a standing committee. Any new management action would signal a need for additional studies in order to determine the effectiveness of the action, as well as the accuracy of the information upon which it was based.

Both Inuit and DFO believe that further management actions are required even if no changes in beluga numbers are detected. The fact that natural events (such as ice entrapments) can unduly stress even large "populations" of beluga, coupled with the fact that the Inuit population is steadily increasing, necessitates management action should no change in beluga numbers be apparent. Pangnirtung HTA has explicitly recognized these facts by increasing the "no hunting zone" for 1994 and 1995.

If and when Inuit and biologists both agree that beluga numbers are declining, additional protective measures beyond those listed in Table 5 might also be considered. These might include: 1) increasing the narwhal quota in concert with decreasing the beluga quota in order to divert hunting effort, 2) conducting drives of small pods of beluga to reduce struck-and-loss rates, and 3) licensing families instead of individuals to reduce competition and rivalry under further quota restrictions. All management actions will have to be negotiated in discussions between HTOs and DFO managers, presented to the communities for ratification, and then submitted to the NWMB and the DFO Minister for implementation. A standing committee could facilitate these processes.

7.4 Hunt Monitoring

DFO biologists assert that there is a need for monitoring beluga hunts, especially when annual catches are thought to exceed recruitment rates. Hunt monitoring is particularly important when a "group" is considered to be small or when a conservation issue has been established. The present hunt monitoring program in the southeast Baffin region acquires information on nearly all beluga landed and is necessary and appropriate for addressing the conservation issue. Monitoring provides information on size and sex, and collects samples to determine age, reproductive rate, reproductive condition, genetic diversity, contaminant burdens, and stomach contents. The present level of hunt monitoring has been successfully maintained owing largely to the efforts of the three HTAs involved, and should be continued with appropriate revision to take account of community needs and concerns. Hunt monitoring should also be refined, using appropriate methods of data collection, to provide information on beluga struck but not landed, pursued but not struck, and observed but not hunted.

Inuit believe that hunt monitoring can provide information that will assist them in maintaining their co-existence with beluga. Intensive hunt monitoring also demonstrates to "outsiders" that Inuit are responsible and concerned about the welfare of animals upon which their survival depends.

8. Roles and Responsibilities in Co-Management

8.1 Hunters and Trappers Organizations (HTOs)

As the sole users of beluga in the southeast Baffin region, Inuit have the primary role and responsibility for managing beluga hunts. Inuit derive their legitimacy to regulate hunts at the local level through their Hunters and Trappers Organizations (HTOs). HTOs, in turn, will provide local representation to the BRHTC (or designated Regional Wildlife Organization), and finally to the NWMB. Through their HTOs, Inuit hunters will decide who can hunt, and when, where and how they can hunt. HTOs will also be responsible for implementing the sampling and hunt monitoring programs, and will actively encourage and monitor compliance with local regulations and with the *Fisheries Act*.

Hunters will provide to HTOs all relevant information about beluga hunts, catches, and encounters. HTOs will also be responsible for the active implementation of the Co-management Plan on a day-to-day basis. HTOs and their members will be responsible for conducting contemporary and indigenous knowledge studies on beluga numbers, relationships, biology, and habitat, as outlined in Section 6. Finally, HTOs will undertake discussions with DFO on appropriate measures should studies determine a need to revise management actions.

8.2 Department of Fisheries and Oceans

The Minister of DFO retains the ultimate responsibility for conservation of beluga in the southeast Baffin region. Through the process defined in the *Nunavut Final Agreement (NFA)*, the Minister can take action whenever there is a conservation issue. DFO has for 15 years believed that there is a conservation issue with respect to beluga in the southeast Baffin region. With this Co-management Plan, the Minister has a framework that includes a long-term strategy for managing and conserving the co-existence of Inuit and beluga in this area.

DFO will maintain habitat protection, management, research and enforcement roles as outlined in the *NFA*. DFO's prime responsibility is to maintain the presence of beluga in the southeast Baffin region. Integral to this responsibility must be the realization that the welfare of beluga and Inuit are intimately intertwined. DFO's primary research role will be to conduct studies in order to derive a better understanding of beluga numbers, habitat, and biological and other relationships as outlined in Section 6. DFO's enforcement role will come into effect if HTOs cannot expeditiously resolve violations of regulations at the local level.

8.3 Nunavut Wildlife Management Board

The NWMB is responsible for the wise use of animals in the Nunavut Settlement Area. The Board is responsible for defining regulations, developing management plans, and conducting and directing research in accordance with the *NFA*. Government departments, including DFO, will consult with, and take direction from the NWMB about routine activities, research priorities, and national and international issues affecting Inuit-animal relationships in the Nunavut Settlement Area.

8.4 Southeast Baffin Beluga Committee

It is proposed that a successor to the Planning Committee continue to serve under the NWMB. The main role of the Committee would be to provide active, ongoing implementation of the Co-management Plan, and to update the Plan as needs arise and as new information indicates. Upon acceptance of the Plan and provision of funding, the Committee could assist HTOs and their members in conjunction with DFO to design and carry out studies to collect information for co-management as outlined in Section 6, and to implement co-management as outlined in Section 7. A key aspect of these functions would be the ongoing development and pursuit, by the Committee, of processes for reconciling and integrating the information and the aspirations of the co-management partners. Other roles of the Committee could be to: 1) provide education and training for biologists and Inuit undertaking studies, 2) advise and foster communication between DFO personnel and HTOs, and 3) communicate the work, results of studies, and co-management decisions of the Committee to the communities and to other interested parties.

9. Protection of Beluga Habitat and Beluga Hunting

9.1 Objectives

In order to protect beluga habitat and traditional beluga hunting activities by Inuit, this Section sets out a possible/optional framework for:

- 1) input into comprehensive land-use planning,
- 2) guidelines to assist industry in preparing development proposals, and
- 3) guidelines to assist HTOs, the NWMB, the Nunavut Impact Screening and Review Process, and government in evaluating development proposals and impacts.

In order to facilitate the protection of beluga habitat and beluga hunting, the Planning Committee suggests that the southeast Baffin region would be divided into zones based on the nature and intensity of actions required in order to influence land- and water-use activities. Guidelines proposed for each zone would assist HTOs, NWMB and government agencies in evaluating development, industry, and other proposals and in considering special regulations, codes of conduct, and international agreements needed to ensure that beluga habitat, and the opportunities for Inuit to hunt beluga are protected.

9.2 Restricted Zones

Zone 1: Designated Estuaries

Zone 1 would encompass estuaries that are frequented by beluga on a regular or occasional basis. One such area is Clearwater Fiord (see Figure 5). Estuaries such as Clearwater are vitally important to beluga, perhaps especially to females and their calves. On the basis of currently available knowledge and in the context of the present Co-management Plan, the application of Zone 1 would be confined to the vicinity of Clearwater Fiord (see Figure 6). Since 1980 the Pangnirtung HTA has used local regulations to stop beluga hunting in Clearwater Fiord. This restriction has protected females and calves from disturbance caused by hunters attempting to take males or females without calves. The Pangnirtung HTA will now extend the "no hunting zone" somewhat beyond Clearwater Fiord (see Figures 4 and 6). Zone 1 designations place severe restrictions on hunting, fishing, and any development activities.

Proposed Guidelines for Zone 1

Local HTO regulations will be developed as deemed appropriate by the communities to prohibit seal and whale hunting activities in certain estuary areas, and to require motorized boats to travel slowly in such areas and not approach beluga within specified distances. The use of non-motorized watercraft (e.g. kayaks) for tourism or other purposes in such areas will be similarly restricted.

Harassment of beluga from aircraft overflights or other activities will also be prohibited in Zone 1 areas.

Parties proposing activities, including sport fishing or whale watching, for Zone 1 areas will be required to seek the advice of the nearest (in this case Pangnirtung) HTO. HTOs will also develop regulations to govern use of land (e.g. caribou hunting) within specified distances of designated estuaries. HTOs should be consulted by government regarding any licenses, permits, or operating procedures approved for activities in Zone 1.

Zone 2: Public Safety Areas

These areas would be set aside, at the discretion of the communities, to ensure the safety of local inhabitants.

Proposed Guidelines for Zone 2

Where such a public safety area is created, beluga hunting would not be allowed within a designated distance (say 5 km) of a hamlet or community.

9.3 Protected Hunting Zones

Zone 3: Traditional Beluga Hunting Areas

These areas would include all traditional and current beluga hunting areas and waters in and near Cumberland Sound, Frobisher Bay, and Hudson Strait (Figure 6), except for Zones 1 and 2 (if applicable).

Proposed Guidelines for Zone 3

All development, industrial, and resource extraction activities (including shipping, mining, and commercial fishing) in Zone 3 would require consultation with, and support from, local HTOs. Guidelines to prevent undue harassment of beluga or beluga hunting from aircraft overflights or other activities in Zone 3 would be prepared by HTOs, with the assistance of the NWMB. Guidelines for activities outside of Zone 3 (e.g. hydroelectric development) would also be required so as to influence the actions of those who might indirectly and adversely affect water quality, ocean bottom conditions, and the stability and integrity of ice in Zone 3 waters.

Activities that could directly interfere with beluga hunting in Zone 3, such as tourism, would require the support of local HTOs and will need to follow HTO guidelines. As tourism and beluga hunting are not necessarily compatible, HTOs would prepare guidelines for their respective hunting areas to control the amount and type of tourism. Disturbance or harassment of beluga can be controlled through the *Marine Mammal Regulations* and local HTO guidelines. General guidelines for tourism can be supplied by DFO to the NWMB, HTOs, and tour operators.

9.4 General Habitat Management Zone

Zone 4: Other Beluga Habitat

This is the portion of southeast Baffin beluga habitat not encompassed by Zones, 1, 2, and 3 (Figure 6). To the extent possible, activities in this zone should be managed and monitored in order to reduce impacts on beluga. For example, commercial fishing in the off-shore winter range of beluga has the potential, unless properly managed, to adversely affect beluga productivity and the ability of beluga to withstand hunting in Zone 3.

Proposed Guidelines for Zone 4

Development and industrial activities would be acceptable in Zone 4 to the extent that: 1) they do not affect beluga, beluga habitat, and/or beluga hunting in the other zones, and 2) they are conducted in a controlled and responsible manner. Assessment of proposed activities in Zone 4 must consider both direct impacts (such as contamination, disruption, displacement) and indirect effects (such as altered food supply, and integrity and stability of ice). Commercial fishing proposals for Zone 4 should be evaluated and regulated with regard to species that serve as food for beluga. Assessment of development proposals must also consider the potential for both cumulative impacts and long-term effects.

It would be incumbent upon parties proposing development, government agencies evaluating development proposals, and others interested in undertaking activities in Zone 4 to involve and seek advice from HTOs. To ensure the protection of beluga, beluga habitat, and beluga hunting, HTOs should be consulted regarding issuance of any licences, permits, or operating procedures pertaining to activities within all zones.

10. Education, Training, and Public Awareness

10.1 Education

One goal of this Co-management Plan is to set out a framework to encourage and permit equal participation of Inuit hunters and DFO managers/biologists in the design of studies, the collection of information, and the analysis and interpretation of data. Inuit will be responsible for gathering information on a variety of questions which they are best situated to address (see Section 6), employing methods which they feel are appropriate. Alternatively, biologists will bring their knowledge, skills, and resources to bear on specific issues that can best be resolved by them (see Section 6). How studies should be conducted, and by whom, will be determined in discussions between HTOs and DFO personnel. Where possible, Inuit and biologists will avoid duplication of effort. Where feasible and desirable, studies will be conducted jointly to minimize effort and expense, and to maximize information return and exchange.

In the design and implementation of studies, it is incumbent upon each party in co-management to understand and respect the basis for the other's reasoning and methodology. Agreement on what should be done, who should do it, and how the information will be used is crucial for effective co-management. Although co-management does not require that each party adopt the other's way of thinking, mutual agreement on the types of studies to be conducted, and by whom, will lead to heightened awareness and appreciation of each other's basis for interpretation. Increased awareness of each other's system of understanding and reasoning in the design and implementation of studies, and in the interpretation of the results, will head off conflicts before they arise, and facilitate resolution when they do.

10.1.1 Educating Each Other

The role of education in the co-management framework proposed here is to increase mutual awareness and understanding of each other's respective systems of knowledge, especially between HTO members and DFO personnel. What does it take to be a hunter? What training and processes are involved in becoming a hunter? What are the many things involved in beluga hunting? What does a hunter look for when he goes after beluga? What are the various kinds of information that can be collected when a hunter encounters beluga? What can biologists learn from Inuit? What are a hunter's responsibilities to his family, to his community, etc.?

Alternatively, what does it take to be a marine biologist? What does a marine biologist learn or know that could benefit Inuit? What is the relevance to Inuit of the scientific method and international knowledge systems? Why are marine biologists interested in certain things, and not others? What is the basis for their inferences, interpretations, and conclusions? What are biologists' responsibilities to their employer, to their professional colleagues, etc.?

Inuit hunters and DFO managers and biologists have much to learn from one another in their mutual desire to effectively manage and conserve the co-existence of Inuit and beluga in the southeast Baffin region. Understanding the basis for each other's respective rationales, beliefs, values, and inferences will facilitate realization of this objective.

10.1.2 Educating Others

Educating other Inuit and non-Inuit not directly involved in co-management is important. As future hunters and users of beluga, Inuit school children should receive formal and informal instruction on beluga, beluga whaling, and the principles and objectives of co-management. Programs could be developed jointly by beluga hunters, DFO personnel, and educators. Particular emphasis should be placed on the unique value and richness of indigenous knowledge which has thus far taken a "backseat" to western science and international knowledge in the formulation of school curricula. Local HTOs could also provide opportunities and programs for school children to gain practical experience and understanding in the proper use of beluga.

10.2 Training

HTO members require a more formal grounding in the scientific method and in marine biology in order to be more effective co-managers (e.g. to help design studies incorporating both indigenous and scientific knowledge). Such requirements will need to be accommodated. Similarly, opportunities will need to be made available to DFO managers, marine biologists, and other non-Inuit involved in co-management to give them a more thorough grounding in and understanding of Inuit indigenous knowledge.

It is recommended that the NWMB hire a trainee to work directly with the Board to implement and update this Co-management Plan. Through direct experience with the southeast Baffin beluga issue, this individual will come to appreciate the meaning and value of, and the processes involved in, co-management in Nunavut. This individual will learn the strengths of indigenous and scientific knowledge, and how these two knowledge systems can complement each other in co-management. This trainee will acquire the necessary skills and experience to be an effective co-manager when conservation issues arise, and will become a valuable asset to the NWMB and the people of Nunavut.

Note: Inuit members of the Planning Committee will be developing material for this section to reflect their perspectives on training and public awareness, and to further educate the national and international communities through various public awareness initiatives and prepare training material for DFO personnel and Inuit.

10.3 Public Awareness

10.3.1 Communication Objectives and Target Audiences

Communicating the substance of this Plan to Inuit and to non-Inuit is a high priority. The major objective of communication in the context of this Plan will be to increase awareness and understanding of southeast Baffin beluga regarding, in particular:

- 1) the principles and objectives of co-management,
- 2) the history of the southeast Baffin beluga controversy, and how the Committee has proposed a long-term solution to the problem,
- 3) the strengths of Inuit indigenous and scientific knowledge, and how the two systems of knowledge can complement each other in co-management,
- 4) the significance of beluga to southeast Baffin Inuit and to other Canadians,
- 5) Inuit and DFO assessments of the current status of the southeast Baffin beluga (including areas of agreement and disagreement), and how the positions of DFO and Inuit have moderated since 1990,
- 6) the types of studies that are required to fill information gaps, and who will carry them out,
- 7) processes for managing and monitoring the hunt,
- 8) roles and responsibilities in co-management,
- 9) measures for protecting beluga habitat and beluga hunting, and
- 10) education and training opportunities and initiatives.

The aim of communication must be to increase awareness and understanding about southeast Baffin beluga among the following:

- 1) Inuit of the three communities and throughout Nunavut,
- 2) HTOs and other Inuit organizations (Nunavut Tunngavik Incorporated, Inuit Taparissat of Canada, etc.),
- 3) the NWMB, and other joint Inuit-government boards (e.g. the International Joint Commission for the Conservation and Management of Narwhal and Beluga),

- 4) appropriate federal and territorial government departments (e.g. DFO, Canadian Wildlife Service of DOE, External Affairs, Department of Indian Affairs and Northern Development, GNWT Renewable Resources, and GNWT Economic Development),
- 5) scientific committees with a role in conserving Canadian "wildlife" (e.g. AFSAC, COSEWIC),
- 6) local, national, and international media,
- 7) international commissions (e.g. IWC, NAMMCO), and
- 8) other parties requiring or interested in updated information (animal welfare and animal rights organizations, aquariums, museums, etc.)

10.3.2 Communication Messages and Procedures

It will be important to inform the various audiences about the ongoing beluga co-management process in the southeast Baffin region. A key subsidiary message to be delivered is that co-management is achievable in Nunavut, but only with mutual cooperation and agreement on specific goals and on procedures for conflict resolution. A crucial element in the process is recognition and respect by the co-management partners for each other's ways of knowing and thinking about animals. Imposition of one group's system of knowledge on the other will inevitably undermine co-management initiatives. It is essential that the Department and the Inuit develop and implement improved and more timely ways of informing each other of new knowledge and interpretations as they emerge.

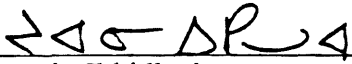
Numerous methods are available to increase awareness and understanding about southeast Baffin beluga, and about the challenges of co-management in Nunavut. Written materials including flyers, brochures, and books aimed at broad audiences can be very useful. Other methods that might be effective include posters, videos, and other visual formats. At the local level, presentations to community gatherings will provide opportunities for information exchange and feedback. Visual media and face-to-face communication may be the most effective ways to increase public awareness. Whatever methods and formats are selected, addressing the information needs of Inuit must be of highest priority.

11. Summary of Recommendations

1. That this Co-management Plan be accepted and implemented by the Nunavut Wildlife Management Board and by the Department of Fisheries and Oceans.
2. That the Plan be implemented in the holistic context in which it was developed, with the aim of ensuring the long-term relationship between Inuit and beluga whales in the southeast Baffin region, and recognizing that this relationship has material, cultural, social, and ecological dimensions all of which are inter-related.
3. That the status quo (as per 1993) be maintained in respect to beluga quotas and open/closed seasons for the communities of Pangnirtung, Iqaluit and Lake Harbour for the next five years (until March 1999), or until new information and interpretations confirm the need for adjustments.
4. That general conservation initiatives already practised by Inuit be maintained and expanded, with Inuit working to fully recover the traditional elements of their association with southeast Baffin beluga.
5. That hunters at Pangnirtung actively shift some of the focus of their beluga hunting activity away from the upper end of Cumberland Sound by:
 - a) Taking at least one-third of their quota at the floe edge.
 - b) Enlarging the no hunting zone protecting Clearwater Fiord.
6. That present scientific and traditional studies and observations be continued and that new studies be immediately developed and undertaken to provide better insights and a basis for further reconciliation of perspectives regarding the status and make-up of southeast Baffin beluga. A broad outline of required studies and observations is presented.
7. That current hunting rates be maintained only if the number of available beluga can be shown by these jointly-developed studies and observations to be increasing. If scientific and indigenous knowledge agree that beluga numbers are remaining the same or declining, further hunting restrictions will be required. Alternatively, if beluga numbers are agreed to be increasing, current restrictions could be relaxed or eliminated. A co-management action framework appropriate to these different eventualities is presented.
8. That communities, through their HTOs, consider introducing zoning systems to guide land- and water-use activities so as to protect beluga habitat and beluga hunting within their areas of concern in the southeast Baffin region. An optional framework for such a zoning system is presented.
9. That education, training and public awareness be adopted and vigorously pursued as integral elements in the implementation of this Co-management Plan.
10. That the Nunavut Wildlife Management Board seriously consider creating a special standing committee, modelled upon the present Planning Committee, to provide active implementation of this Co-management Plan, including ongoing updating of the Plan and ongoing mediation and reconciliation of the perspectives of the co-management partners.

12. Transmittal

This Plan presents a long-term strategy for managing and conserving the co-existence of Inuit and beluga in the southeast Baffin region. It is the hope of the Inuit of Pangnirtung, Iqaluit, and Lake Harbour that this Co-management Plan will be accepted and implemented by the NWMB and DFO. It is hoped that this Plan and its implementation will provide a model for preserving Inuit values and traditions, and the animals upon which Inuit culture depends.

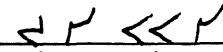


Joannie Ikkidluak

Meeka Kilabuk



Levi Evik



Josie Papatsie



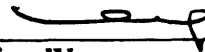
Mikidjuk Kolola



Gordon Koshinsky



Stuart Innes



Brian Wong

Table 1. Chronology of events pertinent to the southeast Baffin beluga controversy and its resolution.

1949	<i>Regulations for the Protection of Beluga</i> introduced under the <i>Fisheries Act</i> .
1966-1967	Biologist (P. Brodie) oversees taking of 124 beluga primarily for scientific and test fishery purposes.
1976-1977	Inuit increase hunt of beluga for intersettlement trade.
1977	Pangnirtung hunters charged and convicted under <i>Narwhal Regulations</i> for exceeding narwhal quota.
1980	Pangnirtung hunters agree to a quota of 40 beluga annually.
1980-1986	Aerial and boat surveys in Cumberland Sound by DFO with Inuit guides and observers.
1984	Sampling program on landed beluga begins.
1985	Inuit adopt further "conservation" measures.
1986	Four-day aerial survey encounters fewer than 500 beluga in southeast Baffin.
1986	BMC formed to assess status of southeast Baffin beluga.
1986-1989	Inuit adopt further "conservation" measures.
1986-1989	Inuit from the 3 communities take about 100 beluga annually.
1988	AFSAC recommends no hunting of southeast Baffin beluga for 10 years.
1989	Southeast Baffin beluga declared "endangered" by COSEWIC.
1990	DFO presents position on southeast Baffin beluga to NWMAB.
1990	NWMAB recommends to the Minister of DFO that a quota of 5 beluga be established for each community, and that studies be undertaken with resource users to validate the scientific information.
1990	Minister agrees with NWMAB proposals and introduces new quotas.
1990	Introduction of new quotas angers and frustrates Inuit hunters.
1990	Dissident group of Inuit hunters (QWMA) challenges DFO authority.
1990	Hunters deliberately exceed quotas.
1990	Surveys during summer count slightly more beluga than in 1986.
1990	Inuit organizations and politicians support Inuit rights and denounce government actions.
1990	NWT Government Leader intervenes on behalf of Inuit and writes to Minister of DFO requesting funding for a committee to study the issue, incorporating Inuit views and knowledge.
1990	Minister establishes the Southeast Baffin Beluga Review Committee.
1991	Committee produces report for the DFO Minister recommending establishment of a co-management structure and an increase in beluga quotas to 35 for each community for 1991.
1991	DFO Minister accepts Committee's recommendations on quotas for two years, except that Lake Harbour is restricted to 20 beluga during the open-water season only.
1991	DFO Minister establishes Planning Committee for Co-management of Southeast Baffin Beluga.
1991	Beluga hunts are cooperatively managed and monitored, with samples collected and cliff-top surveys undertaken.
1991	Planning Committee develops its terms of reference.
1992	Terms of reference approved.
1992	Public meetings in the three communities.

- 1992 Hunt monitoring, cliff-top surveys, and other studies conducted.
- 1992 DFO members present drafts of various sections of the Co-management Plan for Inuit response.
- 1993 Inuit members hire advisor and prepare response.
- 1993 Sub-committee formed to draft Co-management Plan for approval by Committee.
- 1994 Draft Co-management Plan presented to Committee (pending).
- 1994 Co-management Plan finalized; submitted to DFO and communities for ratification (pending).
- 1994 Ratified Co-management Plan submitted to DFO Minister and to NWMB (pending).

Table 2. Commercial and subsistence catch statistics for beluga in the southeast Baffin, 1868-1993.

Year*	Pangnirtung	Iqaluit	Lake Harbour	Source
1868	640	.	.	Mitchell and Reeves 1981
1871	500	.	.	Clark and Brown 1887
1872	200	.	.	Clark and Brown 1887
1877	2	.	.	Mitchell and Reeves 1981
1892	340	.	.	Lubbock 1955
1901	418	.	.	Lubbock 1955
1903	4	.	.	Mitchell and Reeves 1981
1909	1	.	.	Mitchell and Reeves 1981
1910	25	.	.	Mitchell and Reeves 1981
1911	5	.	.	Mitchell and Reeves 1981
1912	5-6	.	.	Mitchell and Reeves 1981
1921	1	.	.	Mitchell and Reeves 1981
1922	65	.	.	HBCA.B455
1923	600	.	.	Soper 1928
1924	800	.	.	Soper 1928
1925	422	.	.	HBCA.B455, PAC RG85
1926	248	.	.	HBCA.B455
1927	235	.	.	HBCA.B455
1928	325-350	.	.	HBCA.B455, PAC RG85
1929	240	.	.	HBCA.B455
1930	272	.	.	HBCA.B455
1931	283	.	.	Mitchell and Reeves 1981
1932	183	.	.	HBCA.B455
1933	424	.	.	HBCA.B455
1934	180	.	.	HBCA.B455
1935	200	.	.	HBCA.B455
1936	240	.	.	HBCA.B455
1937	no drives	.	.	PAC RG85
1938	no drives	.	.	PAC RG85
1939	150	.	.	Mitchell and Reeves 1981
1940	424	.	.	HBCA.B455
1944	drive poor	.	.	HBC (DFO)
1945	drive poor	.	.	HBC (DFO)
1948	145	.	.	HBC (DFO)
1949	211	.	.	Brodie 1971
1950	127	.	.	Brodie 1971
1951	332	.	.	Brodie 1971
1952	244	.	.	Brodie 1971
1953	253	.	.	Brodie 1971
1954	228	.	.	Brodie 1971
1955	295	.	.	Brodie 1971
1956	165	.	.	Brodie 1971
1957	144	.	.	Brodie 1971
1958	183	.	.	Brodie 1971
1959	153	.	.	Foote 1966
1960	155	.	.	Foote 1966
1961	60	.	.	Foote 1966
1962	52	.	.	Peyton (pers. comm.)
1963	46	.	.	Peyton (pers. comm.)
1964	69	.	.	RCMP

Table 2 (cont'd). Commercial and subsistence catch statistics for beluga in the southeast Baffin, 1868-1993.

Year*	Pangnirtung	Iqaluit	Lake Harbour	Source
1965	65	.	.	DFO
1966	120**	.	.	DFO
1967	100**	.	.	DFO
1968	50	.	.	DFO
1969	50	.	.	DFO
1970	100	.	.	DFO
1971	50	.	.	DFO
1972	50	.	.	DFO
1973	43	.	.	Richard and Orr 1986
1974	44	.	74	Richard and Orr 1986
1975	50	10	10	Richard and Orr 1986
1976	120***	10	41	Richard and Orr 1986
1977	178***	.	26	Richard and Orr 1986
1978	82	5	3	Richard and Orr 1986
1979	70	2	35	Richard and Orr 1986
1980	43	18	12	Richard and Orr 1986
1981	45	63	21	Richard and Orr 1986
1982	47	39	4	Richard and Orr 1986
1983	42	8	8	Richard and Orr 1986
1984	40	10	9	Richard and Orr 1986
1985	44	19	9	Richard and Orr 1986
1986	26	20	19	DFO
1987	40	36	34	DFO
1988	46	44	9	DFO
1989	40	42	19	DFO
1990	36	35	15	DFO
1991	31	11	4	DFO
1992	35	31	34	**** HTAs
1993	15	35	13	HTAs

* Missing years indicate no records available for Pangnirtung (Cumberland Sound) owing either to lack of documentation and/or to the fact that no beluga were taken during these years. Catch statistics for Lake Harbour and Iqaluit begin in the mid-1970s. Beluga were undoubtedly hunted by Inuit from these communities for many decades previous, although perhaps not to the same extent that they were hunted in Cumberland Sound.

** The increased take of beluga in Cumberland Sound for 1966 and 1967 was the result of scientific and test fishery investigations undertaken by P. Brodie for the Department of Indian Affairs and Northern Development.

*** The increased take of beluga during 1976 and 1977 was due largely to the inter-settlement trade of maktaaq.

**** Quota and non-quota seasons combined.

Table 3. References to commercial beluga catches in post journals from Pangnirtung, Cumberland Sound, 1922-1943 (from Hudson's Bay Archives, Provincial Archives of Manitoba).

Date	Reference	Source
18 August 1922	"52 whales secured at Kingua on first drive"	HBCA. B455/a/2
11 August 1923	"600(?) whales taken"	HBCA. B455/a/6
24 July 1925	"successful drive of white whales having secured something like 400, which was rather less than last year"	HBCA. B455/a/6
14 August 1925	"844 half hides" (i.e. 422 whales)	HBCA. B455/a/6
18 July 1926	"boats with returns from whale drive, 14 whales"	HBCA. B455/a/7
1-2 August 1926	"returned over 200 whales. The whaling place at Oshualuk was tried out... was a failure and we next tried the head of the Gulf which also failed. On our way back we again tried Kingua, fortunately with much better results"	HBCA. B455/a/7
18 August 1926	"finished today, 496"	HBCA. B455/a/7
15-21 July 1927	"drive of 180 whales at Kingua. This is the smallest during the last three years and I think the reason is the whales were not as plentiful on this particular occasion"	HBCA. B455/a/8
30 July 1927	"took 40 whales at Oshualuk"	HBCA. B455/a/8
3 August 1927	"15 whales driven ashore"	HBCA. B455/a/8
18 July 1928	"Successful drive of 325 to 350 whales"	HBCA. B455/a/9
28 July 1929	"180 whales, many not fully grown"	HBCA. B455/a/9
11 August 1929	"60 large whales driven at Oshualuk"	HBCA. B455/a/9
7 July 1930	"drove approx. 500 whales but killed only what we considered we could handle letting 300 go out the following tide. Whales were very plentiful in waters around Kingua. Total of whales killed, 272"	HBCA. B455/1/10
24 July 1932	"Three drives at Kingua. Whales not so plentiful this year... first drive = 120, very few big ones amongst them... 40 small whales in nearby fiord on next drive, very few whales on third drive at Kingua"	HBCA. B455/a/12
24 July 1933	"790 half hides salted to date"	HBCA. B455/a/13
25 July 1933	"large numbers of whales still ... around Kingua"	HBCA. B455/a/13
4 August 1933	"848 half hides"	HBCA. B455/a/13
23 July 1934	"200 whales caught... the larger part of them were big ones. The white whale are not so numerous now as in previous years... this probably owing to them getting wise to the methods of killing so are entering some other fiords"	HBCA. B455/a/14
1941	"460 whales (424 white, 36 narwhal), 4 drives, one drive produced 361 whales"	HBCA. RG3/26B/36 Annual report of the Pangnirtung Post, Outfit 271, by J.A. Thom
1943	"whales, but mostly of smaller variety. (On another occasion) there were a great number of "big fellas" which made the drive very difficult on account of breaking out. Second drive held but none caught due entirely to too many big whales in the drive and they were impossible to hold."	HBCA. RG3/74B/10, Summary of Events, 1943, by N. Ross

Table 4. Aerial survey and cliff-top beluga counts in southeast Baffin region, 1967-1992.

<i>Beluga seen in Cumberland Sound, including Clearwater Fiord</i>			
A. Aerial visual surveys (actual unadjusted counts)			
Date	Number	Coverage	Reference
30 August 1967	465	Clearwater Fiord	Brodie 1971
12 October 1979	~550	NW Cumberland Sound	MacLaren-Marex 1979
5 August 1980	500+	NW Cumberland Sound	Richard and Orr 1986
5 August 1981	268	NW Cumberland Sound	Richard and Orr 1986
21 August 1982	282	NW Cumberland Sound	Richard and Orr 1986
B. Aerial photographic surveys (actual unadjusted counts)			
Date	Number*	Coverage	Reference
16 August 1977	624	Clearwater Fiord	MacLaren-Atlantic 1978
20-23 August 1985	398	Clearwater Fiord	Richard et al. 1990
23-24 August 1986	444	Clearwater Fiord	Richard et al. 1990
8 August 1990	367 (1)	Clearwater Fiord	Richard (pers. comm.)
9 August 1990	465 (2)	Clearwater Fiord	Richard (pers. comm.)
10 August 1990	379 (3)	Clearwater Fiord	Richard (pers. comm.)
C. Cliff-top surveys (highest number counted during reiterations of that particular survey)			
Date	Number	Coverage	Reference
2 August 1979	400-500	Clearwater Fiord	Richard and Orr 1986
25 July-25 Aug 1983	379	Clearwater Fiord	Richard and Orr 1986
6-8 August 1990	320	Clearwater Fiord	Pangnirtung HTA
2-3 August 1991	250	Clearwater Fiord	DFO and Pangnirtung HTA
28 July-24 Aug 1992	257	Clearwater Fiord	DFO and Pangnirtung HTA

The three aerial photographic surveys in 1990 missed some coverage between transects. The three photographic counts have been expanded (Richard, pers. comm.) to make them comparable to the counts from previous years (in which complete coverage was achieved) as follows:

- (1) Estimate of visible beluga present = 490 (90% C.I. = 215 - 766)
- (2) Estimate of visible beluga present = 512 (90% C.I. = 294 - 729)
- (3) Estimate of visible beluga present = 454 (90% C.I. = 260 - 648)

Table 4 (cont'd). Aerial survey and cliff-top beluga counts in southeast Baffin region, 1967-1992.

<i>Beluga seen in Frobisher Bay</i>			
Date	No. Seen	Type of Survey	Reference
23 August 1977	237+	aerial, visual	MacLaren-Marex 1980
16-18 August 1985	9	aerial, visual	Richard et al. 1990
16-18 August 1986	1	aerial, visual	Richard et al. 1990
10-14 August 1990	22	aerial, visual	Richard (pers. comm.)
<i>Beluga seen near Lake Harbour</i>			
Date	No. Seen	Type of Survey	Reference
18 August 1985	0	aerial, visual	Richard et al. 1990
12 August 1990	1	aerial, visual	Richard (pers. comm.)

Table 5. Co-management actions referenced to beluga numbers if these are found to be increasing, decreasing, or remaining constant.

	<i>Community Quota</i>	<i>No hunting Zones</i>	<i>Open & Closed Seasons</i>	<i>Additional Measures</i>
<i>Numbers Increasing</i>	remove, or increase by a number agreed to by both parties	reduce, or no change	remove, or no change	none
<i>Numbers Remaining Constant</i>	no change	enlarge	reduce open season, or no change	increase take of beluga at floe edge
<i>Numbers Decreasing</i>	reduce by a number agreed to by both parties	enlarge	reduce open season	increase take of beluga at floe edge, and/or take other measures

Figure 1. Orientation map of the southeast Baffin region.

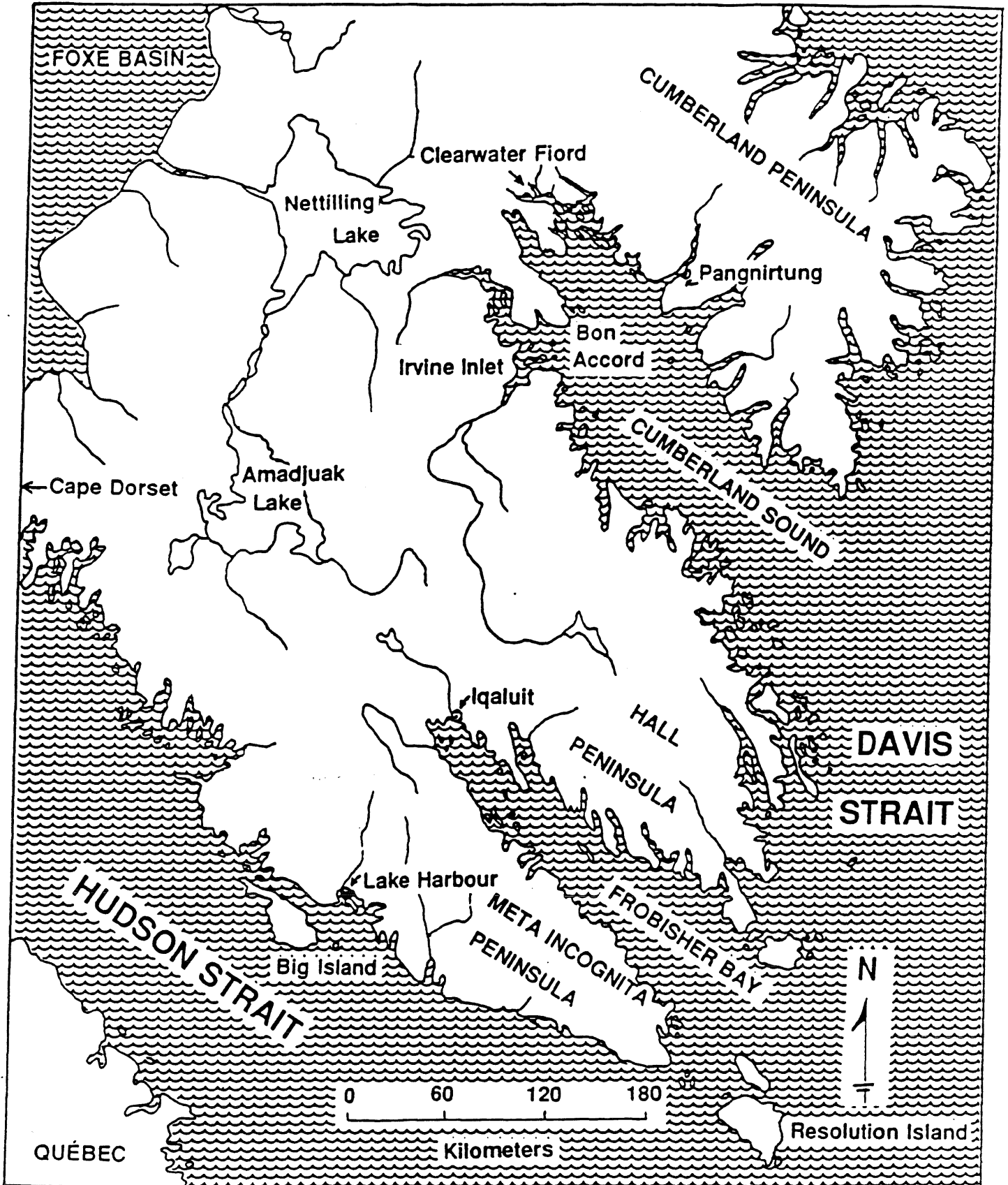


Figure 2. Cliff-top counts of beluga whales at Site B, Clearwater Flord, 4 August 1991. Dots represent numbers of whales counted separately and at one-hour intervals by participating biologists and Inuit.

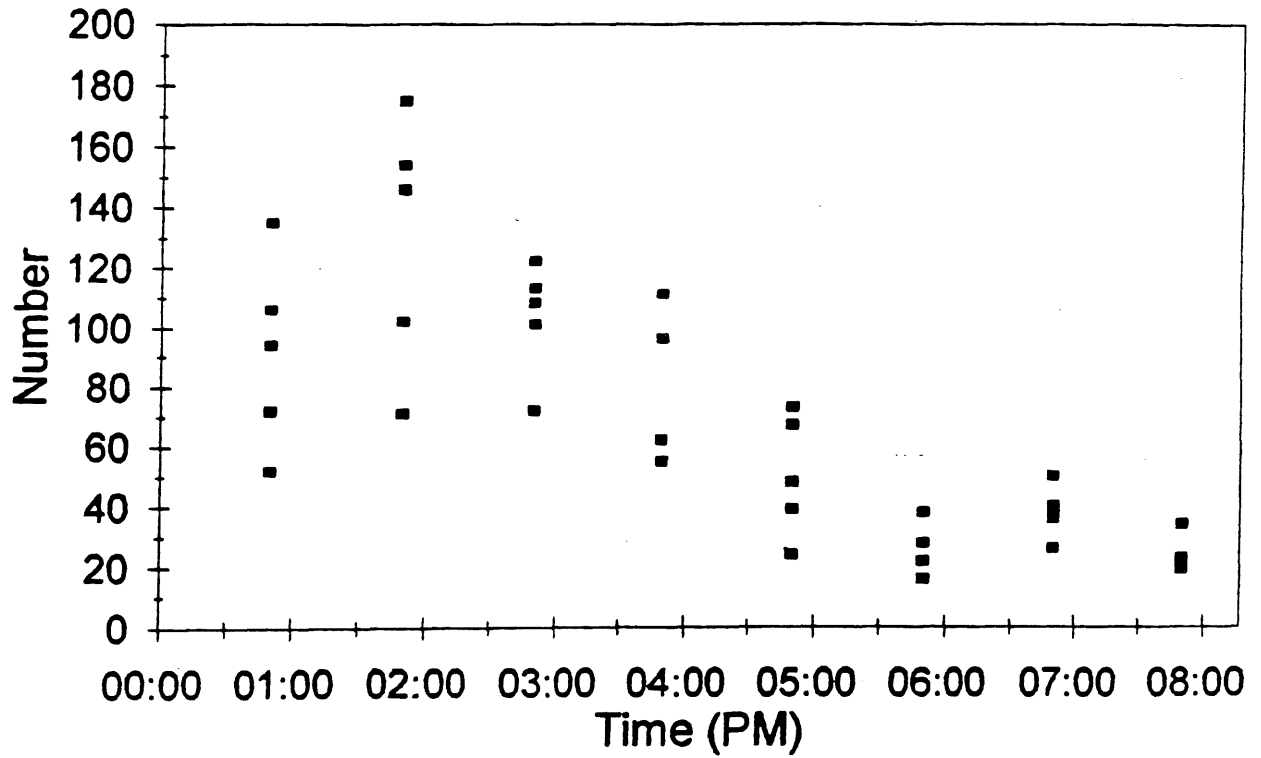
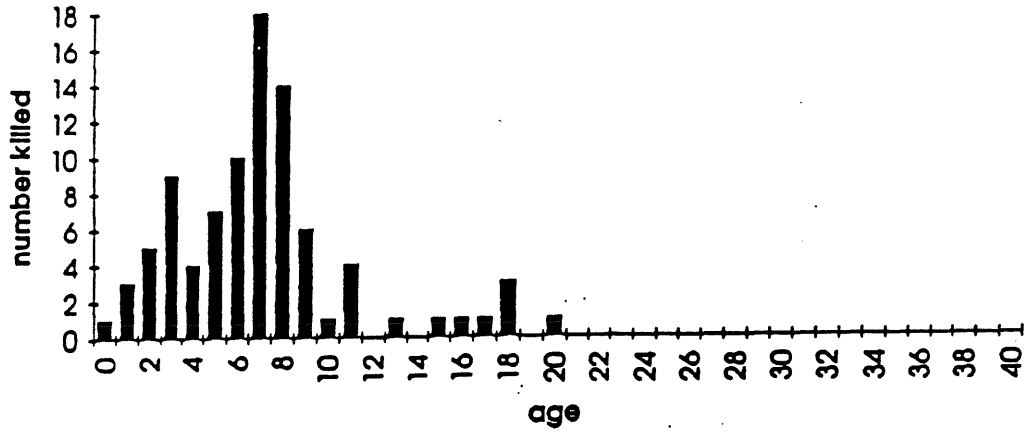


Figure 3A. Age distribution of the beluga catch from Cumberland Sound, 1966-1967 and 1980s.

Cumberland Sound 1966 & 1967



Cumberland Sound 1980's

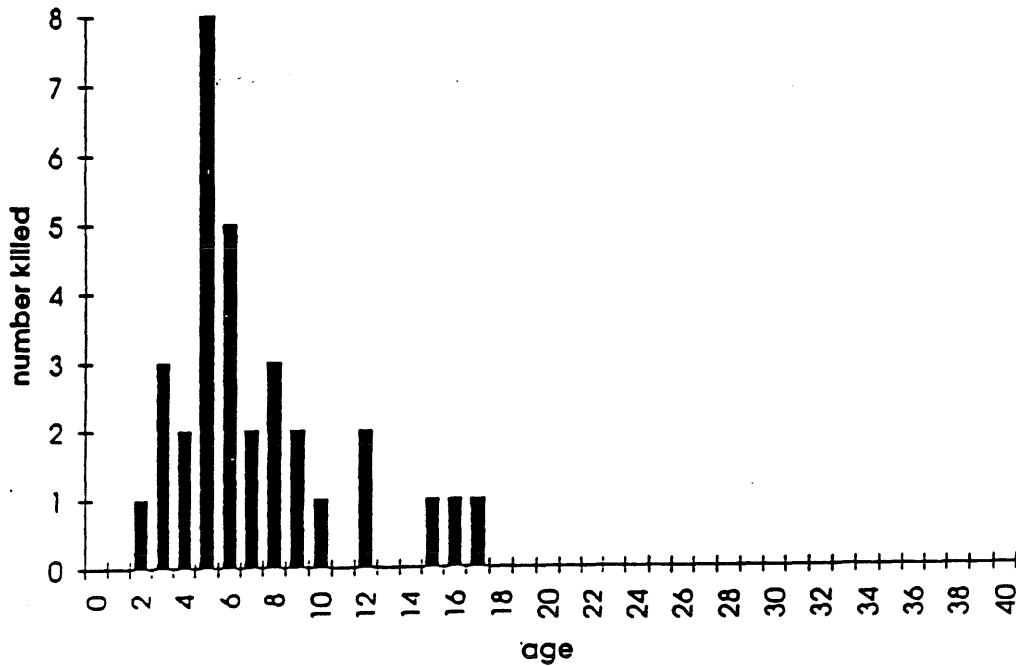


Figure 3B. Age distribution of the beluga catch from Arviat (1980s) and from Alaska (1978-1981).

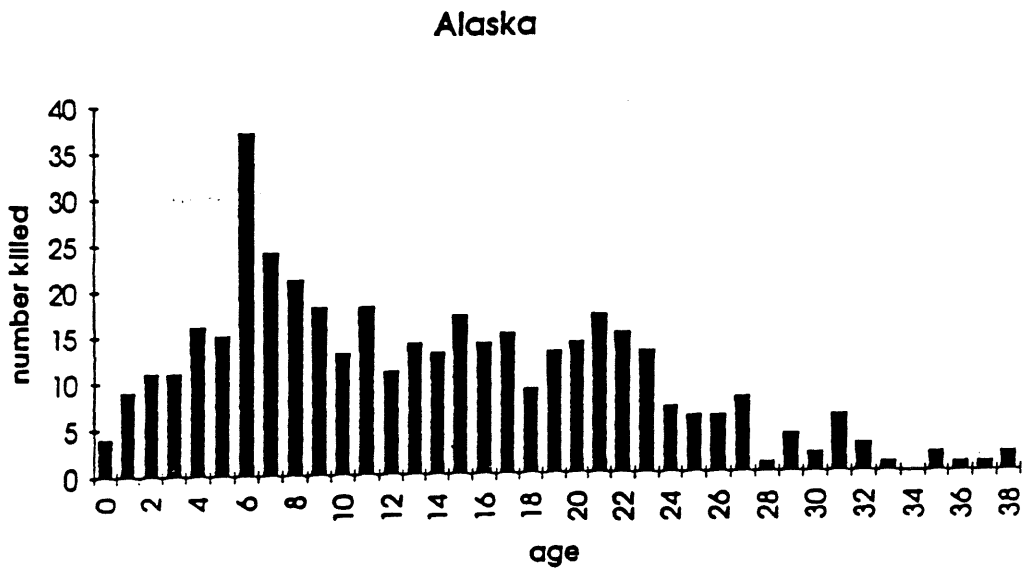
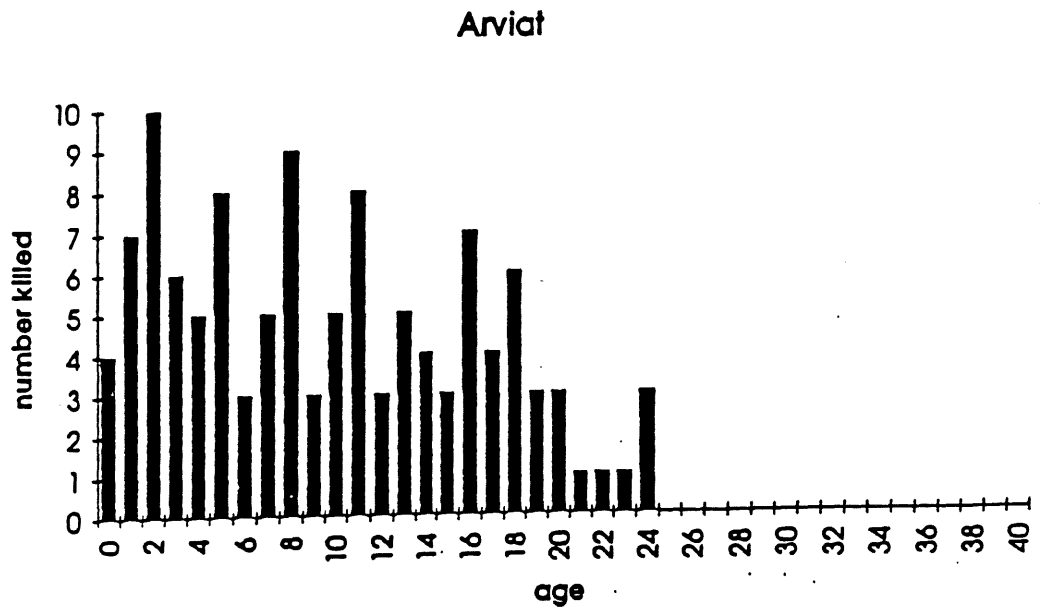


Figure 4. Map of the head of Cumberland Sound, showing present and proposed "no hunting zone." Line A = southern limit of the "no hunting zone" in 1993; Line B = southern limit of the "no hunting zone" for 1994 and 1995.

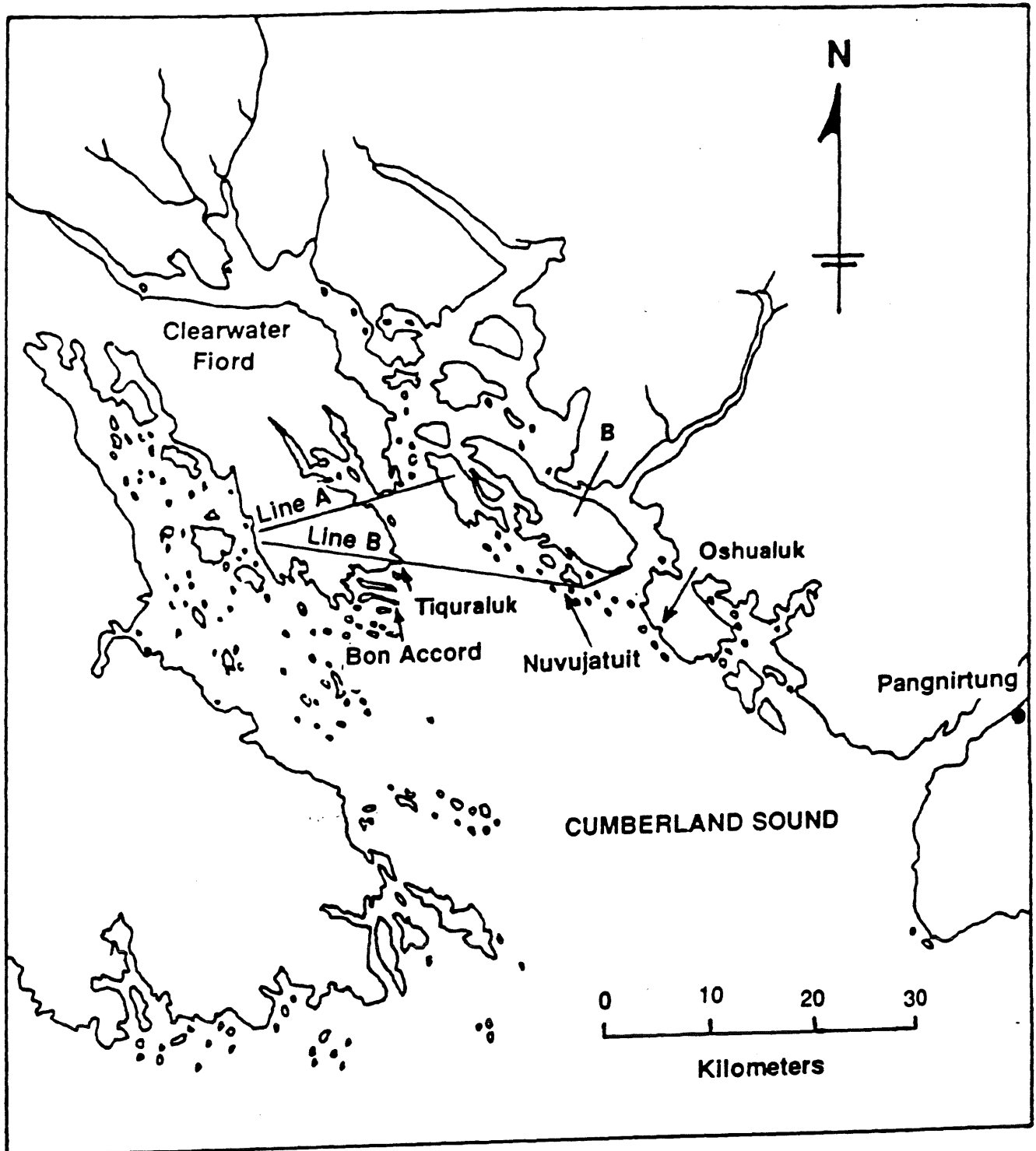


Figure 5. Map showing areas heavily utilized by beluga in Clearwater Fiord. From Richard, pers. comm. and modified by Levi Evik.

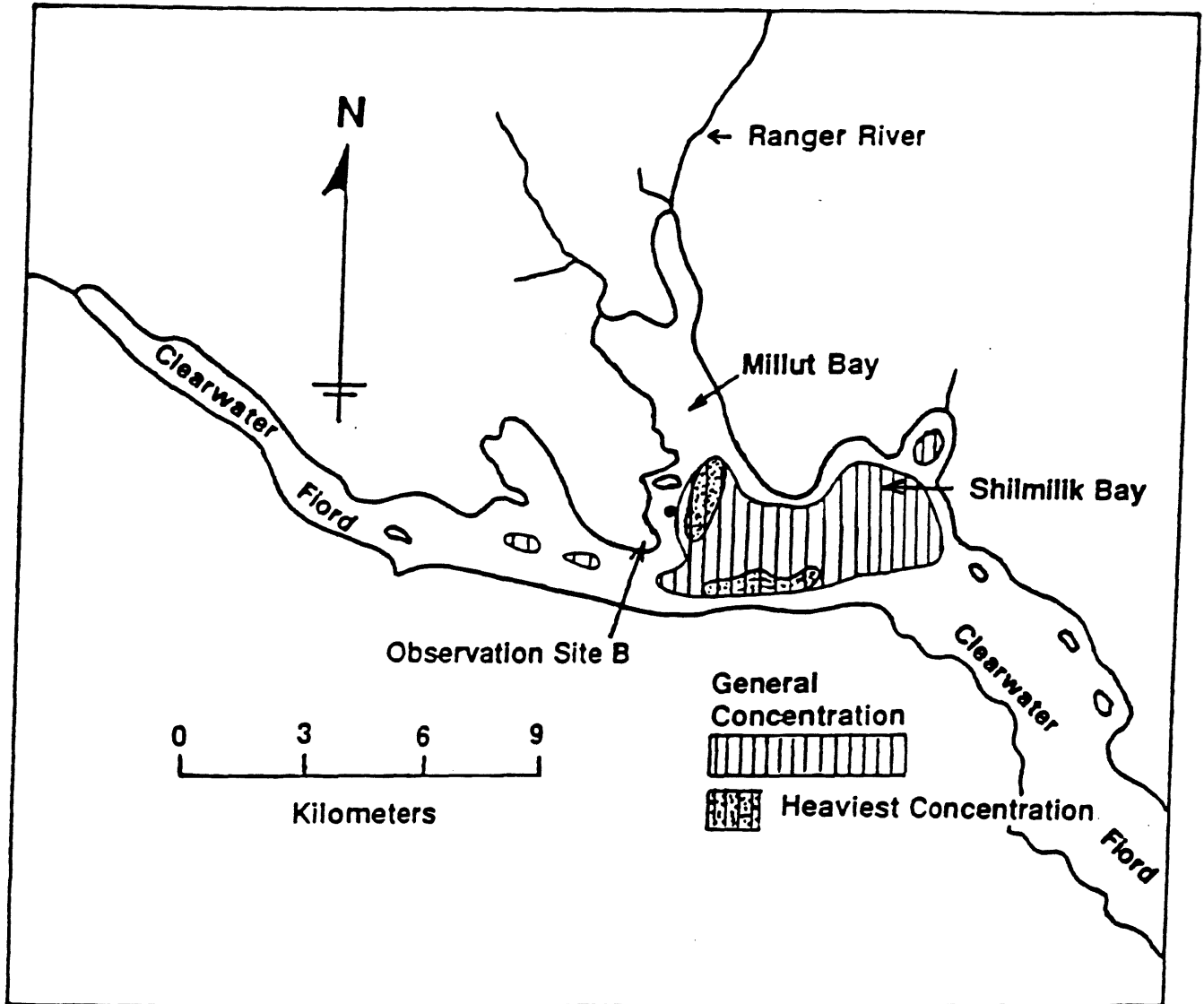
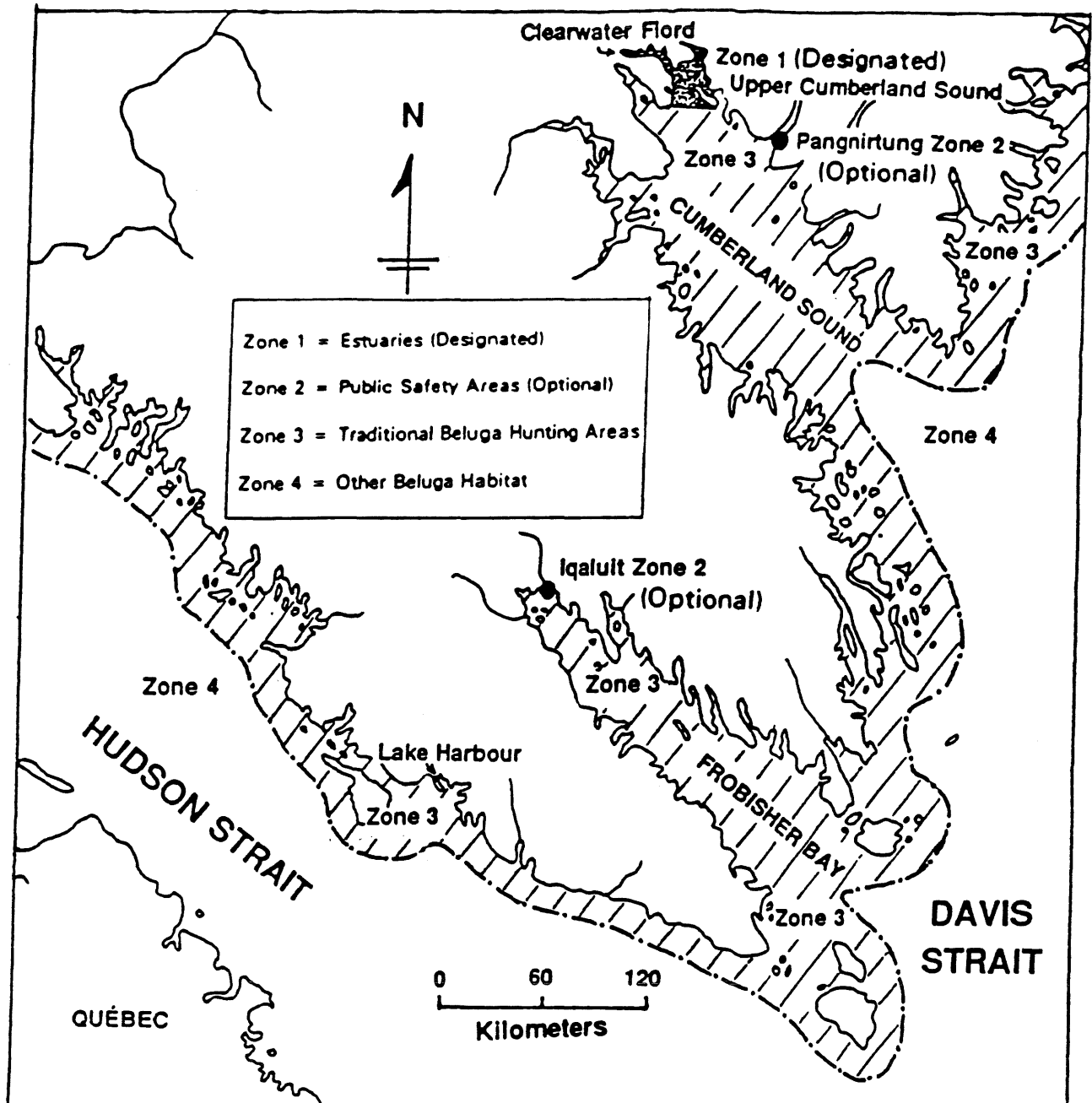


Figure 6. Proposed Habitat Management Zones for beluga in the southeast Baffin region.



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B. Personal Communications and Other Acknowledgments

The Committee sincerely thanks the Minister(s) of the Department of Fisheries and Oceans and their officials for supporting the work financially, and especially for their patience and forbearance. The financial contribution of the Nunavut Wildlife Management Board is also gratefully acknowledged.

The Committee is particularly grateful to the hunters in the three communities of Pangnirtung, Iqaluit and Lake Harbour who, both independently and through their HTAs, gave freely of their insights and supported the work of the Committee by providing information, analysis and interpretation, and hospitality. Hamlet councils and mayors in the communities facilitated the work of the Committee. Special thanks go to school children in the region who participated so enthusiastically in the Committee's poster contest, and to all those who prepared entries for the logo contest.

The Committee acknowledges the important role played by Dr. Marc Stevenson in his capacity as scientific advisor to the Inuit members and his seminal contribution in drafting this report. The Iqaluit firm of Management Dynamics Inc., and in particular the on-site principal Mr. Jim Currie, performed very capably as the local administrator for the Committee. DFO Area Managers Grant Scott and Tim Surette served as ex officio Committee members and, along with their staff, facilitated numerous local logistic arrangements. The Committee was fortunate to have the services of translators who provided excellent verbal and written work; they included: Ms. Elisapie Ikkidluak, Ms. Oleepeeka Ikkidluak, Ms. Leetia Janes, Mr. Michael Kilabuk, Mr. Adamee Komoartok, Mr. Joe Krimmidjuak, Ms. Rebecca Mike, Ms. Mary Nashook, Ms. Alice Ningeogan, Ms. Elisapie Percy and Ms. Blandina Tulugarjuk.

Finally, it is acknowledged that many organizations and individuals were supportive throughout the work of the committee, and provided direct and indirect contributions to this report and plan. Those who provided actual material are cited as personal communications in the text.

**Appendix 2. Members of the Planning Committee for Co-Management of Southeast Baffin
Beluga**

Joannie Ikkidluak
Chairman
Baffin Region Hunters and Trappers Committee
Lake Harbour, Nunavut

Meeka Kilabuk
(Then) Executive Director
Baffin Regional Council
(Now) Member at large
Iqaluit, Nunavut

Levi Evik
HTA Representative
Pangnirtung, Nunavut

Josie Papatsie
HTA Representative
Iqaluit, Nunavut

Mikidjuk Kooloola
HTA Representative
Lake Harbour, Nunavut

Gordon Koshinsky
Department of Fisheries and Oceans
Winnipeg, Manitoba

Stuart Innes
Department of Fisheries and Oceans
Winnipeg, Manitoba

Brian Wong (replacing Gerald Yaremchuk)
Department of Fisheries and Oceans
Ottawa, Ontario

Appendix 3. Endorsements

1. Letter from Mayukalik Hunters and Trappers Association at Lake Harbour.
2. Motion by Amatok Hunters and Trappers Association at Iqaluit.
3. Motion by Pangnirtung Hunters and Trappers Association at Pangnirtung.

PLANNING COMMITTEE for CO. MANAGEMENT
of BELUGA WHALE in SOUTHEAST BAFFIN

MAY 10, 1994

Dear Committee Members;

The Hunters and Trappers Association at Lake Harbour would like to thank the Planning Committee for coming to Lake Harbour to talk to us about the work of the Committee and to obtain our input.

We were especially please that there was opportunity to review the 10 draft summary recommendation in detail and for both the H.T.A and the public here at Lake Harbour to discuss them with the Committee.

We were impressed by the achievement of the Committee as demonstrated by its recommendations and by the scope and depth of the Committee work.

We are pleased to convey the full support of our community and of our H.T.A to the recommendation as they were presented to us.

Yours very Truly



Sandy Akavak , Vice Chairman
Mayukalik Hunters and Trappers
Association
Lake Harbour, N.T

MOTION

Date: May 5, 1994

Meeting No. 02

Whereas: The Amaroq Hunters and Trappers Association and the hunters at the public meeting of the Planning Committee for the co-management of Beluga in the Southeast Baffin have reviewed the draft recommendations of the Co-management plan.

Therefore: The Amaroq Hunters and Trappers Association, including the hunters at the public meeting support and approve the recommendations as listed below.

Summary of Recommendations

1. That this CO-management Plan be accepted and implemented by the Nunavut Wildlife Management Board and by the Department of Fisheries and Oceans.
2. That the Plan be implemented in the holistic context in which it was developed, with the aim of ensuring the long-term relationship between Inuit and beluga whales in the southeast Baffin region, and recognizing that this relationship has material, cultural, social, and ecological dimensions all of which are inter-related.
3. That the status quo (as per 1993) be maintained in respect to beluga quotas and open/closed seasons for the communities of Pangnirtung, Iqaluit, and Lake Harbour for the next five years (until March 1999), or until new information and interpretations confirms the need for adjustments.
4. That general conservation initiatives already practiced by Inuits be maintained and expanded, with Inuits working to fully recover the traditional elements of their association with southeast Baffin beluga.
5. That hunters at Pangnirtung actively shift some of the focus of their beluga hunting activity away from the upper end of Cumberland Sound by:
 - i) Taking at least one-third of their quota from flow edge.
 - ii) Enlarging the no hunting zone protecting Clearwater Flord.

6. That present scientific and traditional studies and observations be continued and that new studies be immediately developed and undertaken to provide better insights and a basis and make-up of southeast Baffin beluga. A board outline of required studies and observation is presented.
7. That current hunting rates be maintained only if the number of available beluga can be shown by these jointly-developed studies and observations to be increasing. If scientific and indigenous knowledge agree that beluga numbers are remaining the same or declining, further hunting restrictions will be required. Alternatively, if beluga number are agreed to be increasing, Current restrictions could be relaxed or eliminated. A co-management action framework appropriate to these different eventualities is presented
8. That communities, through their HTOs, consider introducing zoning systems to guide land- and water-use activities so as to protect beluga habitat and beluga hunting within their areas of influence and in the southeast Baffin region. An optional framework for such a zoning system is presented.
9. That education, training and public awareness be adopted and vigorously pursued as integral element in the implementation of this Co-management Plan.
10. That the Nunavut Wildlife Management Board seriously consider creating a special standing committee, modelled upon the present Planning Committee, to provide active implementation of this Co-management Plan, including ongoing updating of the Plan and ongoing mediation and reconciliation of the perspectives of the Co-management partners.

Mover: Goola Nakashook
 Seconder: Luccassie Nutaraluk

In favour/ 11
 Against/ 0
 Abstain/ 0

Carried
 Not carried / 0

Motion No. 94-07

S. Natter



Pangnirtung Hunters and Trappers Association
Pangnirtung, N.W.T.

Motion

Date: May 10, 1994

I move that the summary of Recommendations as listed by the Planning Committee for Co-Management of Southeast Baffin Beluga be approved by the people attending the public meeting.

Moved by: Tommy Evic *Tommy Evic*
Seconded by: Ipeelee Kilabuk *I. Kilabuk*

For: 25
Against: 0
Abstentions: 0

AK 667

