MANAGEMENT PLAN FOR BOWHEAD WHALES *(Balaena mysticetus)* IN THE NUNAVUT SETTLEMENT AREA

2002 UPDATE

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1. INTRODUCTION

The Department of Fisheries and Oceans (DFO) Central and Arctic Region is charged with the responsibility of managing the fish and marine mammal resources of the Northwest Territories, Nunavut, Yukon North Slope and adjacent marine areas. Within that geographic area the Department's objectives are to conserve Arctic fish and marine mammal resources, enhance the net value of the economic and social benefits received by Canadians from those resources and provide for the equitable distribution of benefits. With the signing of the Nunavut Land Claims Agreement (NLCA) in 1993 the Department incorporates the principles of co-management as it carries out its responsibilities within the area covered by the NLCA, the Nunavut Settlement Area (NSA).

Under the NLCA, while Government retains ultimate responsibility for conservation, the Nunavut Wildlife Management Board (NWMB) is the main instrument of wildlife management in the NSA, the main regulator of access to wildlife, and has the primary responsibility in relation thereto, in the manner described in the NLCA (S.5.2.33).

The NWMB, after careful consideration and pursuant to S.5.6.18 of the NLCA, established a total allowable harvest of one Bowhead Whale for the NSA in 1996, in 1998 and in 2000. These decisions were fully accepted by the Minister of Fisheries and Oceans The community of Repulse Bay landed a bowhead from the Foxe Basin/Northern Hudson Bay stock in August 1996. The community of Coral Harbour landed a bowhead from the Foxe Basin/Northern Hudson Bay stock in Foxe Channel in August 2000. The community of Pangnirtung landed a bowhead from the Baffin Bay/Davis Strait in Cumberland Sound in August 1998.

In March 2002, the Minister of Fisheries and Oceans accepted the NWMB's decision to allow the harvest of one bowhead whale from the Foxe Basin/Northern Hudson Bay stock during the open water season of 2002 or 2003. The hunting licence issued for this harvest authorizes the whaling captain to hunt and land one bowhead whale, or to strike two bowhead whales. The communities of Hall Beach and Igloolik will conduct a bowhead hunt in Northern Foxe Basin in August 2002.

This management plan, which includes the Amittuq Bowhead Hunt Plan developed by the communities of Hall Beach and Igloolik (Appendix 1), is based upon the collaborative efforts of the NWMB and the Department of Fisheries and Oceans. It has been approved by the NWMB, pursuant to its authority under S. 5.2.34(d)(i) of the NLCA.

This management plan reflects the principles of conservation, as described in S.5.1.5 of the NLCA. Those principles of conservation are:

(a) the maintenance of the natural balance of ecological systems within the NSA;

(b) the protection of wildlife habitat;

(c) the maintenance of vital, healthy, wildlife populations capable of sustaining harvesting needs; and

(d) the restoration and revitalization of depleted populations of wildlife and wildlife habitat.

In addition, the plan addresses the safety and licensing concerns of both the NWMB and the Department of Fisheries and Oceans, and attempts to ensure that the 2002 bowhead hunt will fully contribute to research efforts aimed at maintaining the continued recovery of bowhead populations within the NSA.

This version of the "Management Plan for Bowhead Whales in the Nunavut Settlement Area" is an update of the 1996 plan. It reflects the three previous bowhead harvests of 1996, 1998 and 2000, and includes information contained in the 2002 Hunt Plan.

2. STOCK INFORMATION

2.1 ABSTRACT

Eastern arctic bowheads were depleted by commercial whaling by about 1915, and since 1979, their harvest in Canada has been controlled through licensing. Hunters from many communities have reported an increase in bowhead numbers. There is little scientific information available on the status of eastern arctic stocks. However, ongoing research and traditional knowledge studies are addressing questions about stock relationships, trends in abundance, and distribution. In the Inuit Bowhead Knowledge Study (IBKS), Inuit elders report significant increases in the number of bowhead whales summering in northern Hudson Bay, northern Foxe Basin, and eastern and northern Baffin Island waters over the past 30 to 40 years (NWMB 2000).

2.2 INTRODUCTION

After the end of commercial hunting, subsistence hunts of bowheads in the eastern arctic occurred sporadically until 1979 when Canada introduced legislation, protecting bowhead whales in Canada from being hunted without a licence. Interest among Inuit in hunting these stocks for subsistence purposes has continued. The NLCA, ratified in 1993, states (S.5.6.18) that the NWMB must establish a total allowable harvest of at least one bowhead subject to conservation requirements. In response to questions about the possibility of hunting eastern

Arctic bowheads, the status of this stock was reviewed by DFO's Arctic Fisheries Scientific Advisory Committee (AFSAC) in 1989 and 1995 (Cosens *et al.* 1990, Cosens *et al.* 1998). More recently the NWMB, DFO and World Wildlife Fund (WWF) undertook a joint initiative to prepare a conservation plan for Eastern Arctic Bowhead Whales. The resulting "Conservation Strategy for Bowhead Whales in the Canadian Eastern Arctic" was completed in January 2002, and ratified by all three partners.

2.3 STOCK IDENTITY

Bowhead whales occur in the Bering, Chukchi, and Beaufort Seas, eastern Canadian Arctic, Baffin Bay and Davis Strait, and Svalbard/East Greenland areas. Gaps in distribution between these three areas are thought to separate four populations.

In eastern Canadian waters, bowhead whales migrate between wintering areas, where breeding likely occurs, and summering areas. There is some genetic information to suggest that bowhead whales seen in various areas in the summer belong to different management stocks (Maiers 1999). Relatively large numbers of bowhead whales are seen in Northern Foxe Basin in summer and western Baffin Bay in early fall. These whales probably do not intermingle in the summer, and although they may do so during the winter, microsatellite data collected to date suggest that this is not the case (Maiers 1999). While there currently do not appear to be significant genetic differences between bowhead whales from Northern Foxe Basin and Northern Hudson Bay (Maiers 1999, L. Postma, pers. comm. 2002), the relationship between these bowhead whales and those in the Gulf of Boothia and Hudson Strait in summer is unknown. The relationship between bowheads in Baffin Bay, Lancaster Sound, Davis Strait and Cumberland Sound are not known, although these animals appear to be more closely related to bowheads in West Greenland than those from Northern Foxe Basin and Northern Hudson Bay (L. Postma, pers.comm.2002).

For the purposes of calculating possible removals, the most probable stock groupings are the summering distributions in Baffin Bay/Davis Strait and in Foxe Basin/Northern Hudson Bay (Cosens *et al.* 1998). This approach was consistent with the two stock hypothesis proposed by Reeves *et al.* (1983). A stock is defined as a management unit that can be exploited and managed independently of other groups (Royce 1972). This two-stock hypothesis has since been supported by the results of a recent stock identification studies using genetic markers (Maiers *et al.* 1999, L. Postma, pers. comm., 2002). In addition, the history of commercial whaling activity supports the description of stock relationships used in this management plan.

Recent and Current Research: Skin samples are being collected to answer questions about stock relationships. In 2000, skin samples were collected from

whales near Arctic Bay, Pond Inlet, Pelly and Repulse Bays. In 2002, skin samples were collected in northern Foxe Basin. Figure 1 (L. Postma, pers. comm., 2002), summarizes the results of genetic analysis conducted to date on Canadian bowhead whales, using skin samples. The Igloolik Hunters and Trappers Organization has done photo identification of naturally marked individuals, to examine year-to-year site use. Results from the IBKS include maps of bowhead distribution during the six Inuktitut seasons recognized by Inuit. The IBKS (NWMB 2000) indicates that bowheads spend the summer (Aujaq in Inuktitut) in many different areas of Nunavut (i.e. Prince Regent Inlet, Pelly Bay, N. Foxe Basin, Roes Welcome Sound/Repulse Bay/Frozen Strait, N. shore of Hudson Strait, Cumberland Sound, and along the east coast of Baffin Island from Cape Dyer to Pond Inlet) (Figure 2). New information from the study indicates that bowhead whales also summer in the Pond Inlet area, Admiralty Inlet, Lancaster Sound, and Jones Sound (NWMB 2000). Information on the summer distribution of bowheads in Nunavut from the IBKS may be useful in identifying stocks of bowheads in the NSA.

2.4 POPULATION SIZE AND TREND

2.4.1 Baffin Bay/Davis Strait

Counts made during the 1970s and 1980s of whales migrating past Cape Adair, and during the 1990s of bowheads migrating past and feeding in Isabella Bay (Igalirtuq) produced an under-estimate of 375 (315 to 435, lower and upper 95% Confidence Interval; Zeh *et al.* 1993). Numbers are under-estimates because, at Cape Adair, some whales may not have been at the surface and some at the surface may not have been seen as they passed. At Isabella Bay, only some of the whales photographed were used in the sighting-resighting estimate. In August 1992, 28 bowhead whales were seen in Cumberland Sound from shore stations with at least 1 calf being present (Stephenson unpublished data, Innes unpublished data). Similar observations of bowheads during the summer have been made near Broughton Island (D. Pike, pers. comm. 1994). The IBKS suggests that the numbers of bowheads seen by hunters and elders have increased at all locations since the end of commercial whaling (NWMB 2000).

Elders and senior hunters from the communities of Clyde River, Broughton Island, Pangnirtung and Iqaluit have reported that numbers of bowhead whales have increased markedly in the nearshore waters of eastern Baffin Island over their lifetimes (NWMB 1995, 2000):

I have only heard that since then, the population had reduced, that the numbers of the bowhead whales near our community have gone down, due to the commercial whalers hunting them. Then later on in the years, I have noticed the bowhead near our community increasing. (Koalie Kooneeliusie, Broughton Island)

Yes, I know it very well, back then when I was a young lad, there were hardly any bowhead whales around, we would infrequently see one bowhead in the summer time, just recently when I was becoming an old man I have seen a lot of bowhead whales, I guess the stock had finally increased since the time when the Scottish had depleted them, they have only increased in population just recently, when I became an old man that is what I have noticed. (Ipellie Qillaq, Clyde River)

I can say to you today that when I first moved to Iqaluit when there were hardly any bowhead whales around, but today they are increasing in numbers, because we see more bowhead whales more frequently. (Josie Papatsie, Iqaluit)

Nowadays we see large numbers of bowhead whales and the Whalers had never encountered this many bowhead whales while whaling at Ummanagjuaq (Blacklead Island). There were very few bowhead whales then and they only harvested whales they found which weren't that many - and that's the way my father explained it. Today I had observed a lot of bowhead whales in groups going into the Fjord in the summer and early spring. I had even seen a good number of surfaced bowhead whales in one group and you see them everywhere and my father tells me that there weren't this many bowhead whales. (Lypa Pitsiulak, Pangnirtung)

Recent and Current Research: In addition to interviews with hunters and elders carried out during 1995 (NWMB 1995), small-group workshops were conducted in Pond Inlet, Arctic Bay, Pangnirtung, Broughton Island, and Clyde River (NWMB 2000). The results of these workshops support the observations and conclusions of the preliminary report (NWMB 2000).

Research on the numbers and behaviour of bowheads at Isabella Bay has been conducted since the early 1980s by K. Finley (Finley 1990). Only anecdotal observations have been made elsewhere.

The Baffin Bay/Davis Strait stock may have numbered approximately 12,000 whales in 1825 (Woodby and Botkin 1993) but by the end of Euro-American whaling this stock may have been reduced to a few hundred whales (Mitchell and Reeves 1981, Innes 1995). There is no information on the present rate of increase of this stock.

In 2001, the Igaliquttuq Bowhead Whale Habitat Stewardship Program began to document bowhead numbers, behaviour and habitat characteristics of Isabella Bay. The joint WWF-DFO-NWMB Conservation/Recovery Plan for Eastern Arctic Bowhead Whales was completed and ratified in January 2002. An aerial photographic survey of bowhead summering areas south of Barrow Strait and Lancaster Sound will be conducted in August 2002, to document numbers and age classes of bowheads using these areas.

2.4.2 Foxe Basin/Northern Hudson Bay

Surveys of bowheads aggregated north of Igloolik, in northern Foxe Basin (Cosens *et al.* 1997) produced an under-estimate of 270 (210 to 331; lower and upper 95% Confidence Interval). This is an under-estimate because some whales would not have been at the surface, and the whole range was not surveyed. Some bowheads at the surface would also have been missed by observers. Cosens and Innes (2000) surveyed northwestern Hudson Bay in 1995 and estimated 75 bowheads to be present in the waters of Roes Welcome Sound, Repulse Bay and Frozen Strait. By combining these two estimates (as supported by traditional knowledge and recent genetic evidence) the minimum number of bowheads known to be present in the stock is about 345 animals (DFO, 1999). The status of this stock at the end of Euro-American whaling is difficult to assess. Although whaling vessels did not operate in northern Foxe Basin (Ross 1975), hunters have not seen many bowheads in the area until recently (Anonymous 1995). It has been estimated that the Northern Hudson Bay stock may have numbered 450-575 in 1859 (Woodby and Botkin 1993).

Elders and senior hunters from the communities of Repulse Bay and Coral Harbour (NWMB 2000) and Igloolik and Hall Beach (NWMB 1995, 2000) have reported that numbers of bowhead whales have increased markedly in northern Hudson Bay and Foxe Basin over their lifetimes (NWMB 1995):

Yes, I came to Igloolik and Hall Beach before there were hardly any bowhead whales; in the 1960s I was in Hall Beach and in 1964 I came to Igloolik before there were too many bowheads in and around Igloolik. Even when you travel through water in and around Maxwell Bay and the Foxe Basin, there were hardly any bowhead whales - perhaps one could see a bowhead whale every so often. It seemed that from 1964 onward the bowhead whales seemed to be increasing annually in numbers in our waters. I used to go hunting in the Maxwell Bay area and the open waters in the summertime. And crossing from Maxwell Bay to Igloolik you begin to see bowhead whales more frequently to date. For example, when you look at the year 1964 and compare it to today there are so many bowhead whales close by. We even on occasion see bowhead whales at the floe edge during the month of May and June between Baffin and Igloolik. While on the other hand before that time you wouldn't dream of ever seeing a bowhead whale at the floe edge. About 2 years ago I took part in traveling to Baffin area by boat in the fall when it was getting dark. When we were traveling back home, it was a very calm day and we ran out of gas and had to fill up our tank - as we were filling up our tank we could hear bowhead whales everywhere and we got concerned that we might accidentally hit a bowhead whale in the dark because there were so many. At the present day, bowhead whales are seen even before the actual ice break up; they are present in between ice floes and they are

usually close to each other. … You could even see bowhead whales close to the shore where the shore line is deep in the Maxwell Bay area. This is also evident in and around Igloolik, when you compare it back to 1964 when there was none, you could now observe them as they are visible from the shore line even in Igloolik. Even when you travel to Hall Beach by boat you could now spot bowhead whales. (Simon Iyyiriaq, Igloolik)

Comparing the present situation of abundance of bowhead whales was not the case when I first started to hunt. They seemed to have multiplied considerable since the time of the Whalers. No, we hear hunters fear possible accidents with bowhead whales, i.e. whale surfacing on a boat, or bumping into bowhead whales; basically hunters are concerned with bowhead whales and their abundance. I've heard of a near accident with a canoe where the bowhead whale almost surfaced on a canoe. (Albert Nuvviaq, Hall Beach)

Recent and Current Research: The numbers in this population were surveyed in 1994 (northern Foxe Basin) and 1995 (northern Hudson Bay). Studies have been completed on behavioural factors such as grouping patterns, behaviour and habitat selection (Thomas 1999). Photo identification conducted by the Igloolik Hunters and Trappers was assessed for usefulness as a mark-resight method of estimating stock size. Aerial photographs have been used to estimate age classes of bowheads summering in northern Foxe Basin.

In addition to interviews with hunters and elders carried out during 1995 (NWMB 2000), small-group workshops were conducted in Coral Harbour, Repulse Bay, and Igloolik (with both Igloolik and Hall Beach participants) (NWMB 2000). The results of these workshops support the observations and conclusions of the preliminary report (NWMB 2000).

Satellite telemetry studies of the movements and migrations of the Foxe Basin/Northern Hudson Bay bowhead stock are ongoing; the joint WWF-DFO-NWMB Conservation Strategy for Eastern Arctic Bowhead Whales was completed and ratified in January 2002.

2.5 VITAL RATES

Limited data are available for the stocks in eastern Canada. Most of the following estimates are based on data from the Bering/Chukchi/Beaufort Seas stock of bowhead whales, except where noted. Rates in the eastern arctic may differ from those estimated for the Bering/Chukchi/Beaufort Seas stock.

Female Age at Sexual Maturity: First calving occurs between 12 and 17 m based on cow-calf associations observed in the Beaufort Sea (Koski *et al.* 1993) and in northern Foxe Basin (Cosens and Blouw 1999). Age at maturation is not known and

could be as old as 20 years (Schell and Saupe 1993, George *et al.* 1999).

Calving interval: Calves are produced every 3-4 yr. based on pregnancy and ovulation rates (Koski *et al.* 1993).

Annual birth rate: 1.2 to 11.7% of total population based on summer aerial surveys (Koski *et al.* 1993).

Recruitment Rate: 0.1 to 6.2%, mean 3.0% per year (Zeh *et al.*1993) with possibility of positive bias due to increased experience in collecting, detecting and observing bowhead whales.

Natural mortality rate: Unknown. According to models, adult mortality cannot exceed 1%.

In the IBKS, many Inuit elders and hunters report their observations of calves and small bowheads in all areas, in recent years (NWMB 2000). However, there were no comments or observations regarding sighting frequency or changes in sighting frequency of calves/small whales over the years. Other information (NWMB 2000) indicates that Inuit are no longer making the effort to observe such population subtleties, as bowheads are no longer a regularly-hunted species in the NSA.

Recent and Current Research: A records survey of bowhead cow-calf historical distributions in northwestern Hudson Bay has been completed, and a manuscript discussing the results of this project is in preparation.

Summary: It can be inferred from scientific and hunter knowledge based on the frequency and distribution of sightings and minimum-numbers-known-alive estimates that these stocks have increased since 1920. This increase can not be quantified but has occurred while some bowheads were being killed for subsistence.

2.6 PROTECTION

Bowhead whales are protected by the Marine Mammal Regulations (Section 22) made under the Fisheries Act. Under these regulations, only aboriginal food hunts are allowed, and these must be conducted under a DFO Ministerial licence.

Bowhead whales (*Balaena mysticetus*) in the Canadian Arctic were hunted for commercial purposes until the early 1900s, during which time their numbers

were severely reduced. In 1950, the International Commission on Whaling (later the IWC) banned the killing of bowhead whales with the exception of aboriginal subsistence hunting (Anonymous, 1950). In 1977, the International Whaling Commission (IWC) also banned aboriginal subsistence hunting, excepting only the Alaskan Inupiat who now hunt under a quota system (Bollen 1977, 1979). Bowhead whales in the eastern Canadian Arctic are listed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Eastern and western Arctic populations were originally designated endangered in 1980; and reconfirmed as endangered in 1986 (Mansfield 1985, Campbell 1991). It is important to note that COSEWIC has not reviewed the status of the western Arctic bowhead stock as a separate entity, and that the present designation is largely a result of the status of the eastern Arctic Stock. Inuit do not consider the eastern Arctic bowhead stock to be endangered, and current scientific information suggests that the status of this stock should be reassessed (DFO 1999).

International trade in bowhead whales is regulated by listing on Appendix 1 of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES). Appendix 1 species are endangered and could become extinct if their trade is not severely restricted. Both export and import permits are required. Trade for primarily commercial purposes is prohibited.

2.7 EXPLOITATION

Hunt Levels:

Between 1919 and 1981 at least 21 bowheads were killed, and 10 bowheads were struck and lost in Hudson Bay or Foxe Basin. One bowhead whale was killed near Igloolik in 1994. During the same period at least four bowheads were killed and two were struck and lost in other areas of the eastern Canadian Arctic and off West Greenland. The last bowhead whale removed from the Foxe Basin/Northern Hudson Bay stock was killed under licence in Repulse Bay in 1996; from the Baffin Bay/Davis Strait stock, the last bowhead whale was killed under license in Pangnirtung in 1998.

In addition to the 24 bowhead whales harvested or found dead by Inuit according to Mitchell and Reeves (1982) between 1915 and 1979, the IBKS found evidence of an additional 12 hunts (8 landings) (NWMB 2000). Both Mitchell and Reeves (1982) and the IBKS (NWMB 2000) report that these reported hunts and strandings represent only a portion of those that actually occurred during this period. Four definite, and two probable additional post-commercial whaling kills of bowheads have been reported by Inuit for northern Hudson Bay since 1919, and one for the Kivituuq area, north of Broughton Island (NWMB 1995). Of the northern Hudson Bay kills, three were reported in the Southampton Island area (Seahorse Point) between 1939 - 1942.

Although scientific studies and anecdotal reports suggest that few bowheads may enter Cumberland Sound and northern Hudson Bay, many Inuit elders and senior hunters have recently observed large numbers of bowheads and report marked increases in population numbers over the past several decades in these area (NWMB 1995, 2000).

Impact of past hunts:

These catches have reduced the rate at which bowhead whale populations are recovering to an unknown extent.

Future hunts:

Any future hunt would have the least impact on the two putative stocks if bowheads were taken from the areas where they are most numerous. The most appropriate areas would include the summering area in Foxe Basin and the fall migration path along eastern Baffin Island (Baffin Bay stock). Both of these areas are known to have more than 200 bowhead whales. Inuit have indicated that Northern Hudson Bay and Cumberland Sound are also summering areas for large and increasing numbers of bowheads (NWMB 1995, 2000).

2.8 OTHER IMPACTS

Killer whales (*Orcinus orca*) have been observed killing and eating bowheads in western Baffin Bay (D. Pike, pers. comm. 1994, M. Taylor pers. comm. 1998). Some scarring patterns seen on bowhead whales in Foxe Basin appear to have been caused by killer whale attacks (Weins 1998). In Isabella Bay the scarring rate of adult bowheads has been estimated at 31% (Finley 1990). Killer whales have been seen in the vicinity of Baffin Island, in Hudson Bay and in Foxe Basin. Parasites, disease, and other aspects of natural mortality are unknown. Beached carcasses are occasionally reported, but examination of these carcasses generally does not identify cause of death (DFO 1999). There were at least 4 beached bowhead whale carcasses found in Northern Hudson Bay / Foxe Basin in 1999. Ice entrapment is a known but poorly documented cause of natural mortality. The impact of harassment, pollution and human encroachment on habitat on bowheads is undocumented. Bowheads are considered by the tourism and whale-watching industries to be a valuable resource (DFO 1999), the impact of this industry on bowhead whales is unknown.

In the IBKS, Inuit report many first- and second-hand observations of killer whales (arluit) attacking or harassing bowhead whales, with some detailed descriptions of the attacks and their outcomes (NWMB 2000). Inuit also report numerous observations on the effects of vehicle harassment and noise on bowheads, and provide their informed speculation on the effects of oil spills and

tanker/ship traffic on bowheads (NWMB 2000). Inuit also provide observations of bowhead feeding, social, migratory and other behaviours, although their interest in observing bowheads has diminished over the years owing to the bowheads' current non-utilized status.

3. HUNT PLAN

3.1 GENERAL

The Hall Beach and Igloolik Hunters and Trappers Organizations (HTO) Bowhead Hunt Planning Committee developed and approved the Amittuq Hunt Plan (see Appendix 1). The terms and conditions of the licence will incorporate aspects of this Hunt Plan and will be strictly adhered to.

The Department of Fisheries and Oceans (DFO) will inspect the equipment to ensure it is in good working order, and will ensure there is sufficient manpower to carry out the hunt in a safe manner.

3.2 DATE AND LOCATION OF HUNT

The hunters will leave Hall Beach on or about August 5, 2002 and will set up a base camp at Kangiq (69.18° N, 81.32° W), midway between Hall Beach and Iqloolik. If necessary, the hunt will continue until August 30, 2002.

3.3 BOWHEAD HUNT CREW

The Amittuq Bowhead Hunt Planning Committee have identified a Captain, Co-Captain and two hunting teams (one from Hall Beach, the second from Igloolik). Four boats will be involved in the hunt and two additional boats will be on standby in the event of trouble or breakdown.

There will also be one boat operated by the Department of Fisheries and Oceans. This boat will hold a crew of three.

3.4 BUTCHERING CREW

"The committee appointed two people to supervise the butchering where one supervisor will be a night shift supervisor and the other is a day supervisor. People from both communities have volunteered to butcher the whale. It is anticipated that there will be approximately 200 plus people will be at the base camp." (See Appendix 1: minutes of Meeting with DFO & Bowhead Hunters, 24 July 2002).

The Amittuq Bowhead Hunt Plan also identifies a three-person Packaging Crew from each community, and notes that the two Camp Supervisors can assist in the supervision and control of the butchering.

3.5 EQUIPMENT ON HAND

The Amittuq Hunt Plan (Appendix I) identifies an Equipment Care Taker and a Trainer for the Shoulder Gun and Harpoon Gun, in addition to a description of equipment on hand, which includes:
Shoulder Gun
Harpoon Gun
Harpoons
Flensing tools
Niutaq
Lances
Global Star Satellite Telephone
Floats (Sealskin, Rubber & Styrofoam)
Ropes of different sizes and length
Global Positioning System

3.6 COST

"Only the hunt participants (Selected & Appointed only) will be getting paid, and that the two communities will be volunteering. The committee at this time has $32,000.00 and still more commitments to come." (See Appendix 1: minutes of Meeting with DFO & Bowhead Hunters, 24 July 2002).

3.7 TRANSPORTATION OF MEAT AND MAKTAK

"All the maktak and meat will be brought to both communities and stored and the bones will be left behind to age." (See Appendix 1: minutes of Meeting with DFO & Bowhead Hunters, 24 July 2002).

"The Committee agreed that the maktak and meat will be shipped to other communities upon request." (See Appendix 1: minutes of Meeting with DFO & Bowhead Hunters, 24 July 2002).

3.8 STORAGE

For transporting, plastic bags, plastic containers and fish boxes are available and community residents will be asked to bring their own containers. Both community freezer has been serviced recently and are in working order. (See Appendix 1: minutes of Meeting with DFO & Bowhead Hunters, 24 July 2002).

3.9 KILLING METHOD

The Organizing Committee agreed that the landing of the harvested bowhead would be to the base camp. If required due to weather they will land the bowhead whale closest to the land appropriate for butchering and for sampling purposes.

3.10 COMMUNICATION PLAN

1) The Organizing Committee appointeda Media Spokesperson and a Media/Film Crew Guide from each community.

2) The Hunt Plan indicates that "All participating people mentioned above for the Amittuq bowhead hunt would hold meetings as everybody will know their tasks, responsibility and have full information."

3.11 SCIENTIFIC SAMPLING

The Department of Fisheries and Oceans will sample with the help of a local trained person from each community.

3.12 HUNTER TRAINING

The Hall Beach Hunters and Trappers Association is given the responsibility for the equipment shipped in by WEB and NTI for bowhead hunt preparation and after the hunt takes place. The Amittuq Bowhead Participants (Igloolik and Hall Beach) were trained on July 22 to July 24, 2002.

4. COMPLIANCE AND HARVEST STATISTICS PLAN

4.1 ACTS, REGULATIONS AND BYLAWS

The bowhead harvest in the NSA is subject to all sections of the Fisheries Act and the Marine Mammal Regulations that are consistent with the Nunavut Land Claims Agreement.

A Variation Order, under subsection 6(1) of the Fishery General Regulations, will be issued by the DFO at the request of the NWMB.

4.2 LICENSING

The NWMB agrees that the bowhead harvest in the NSA area will take place only under the authority of a licence issued by the Minister of Fisheries and Oceans pursuant to section 4(1) of the Marine Mammal Regulations. The

Licensee(s) is bound by any conditions, decided on by the NWMB, and applied by the Minister to the licence.

The DFO Eastern Arctic Area Office, Iqaluit, will ensure that the Hunt Captain is aware of the conditions of the licence at a pre-hunt meeting.

4.3 ENFORCEMENT

Enforcement of the Fisheries Act, the Marine Mammal Regulations and licence conditions is the responsibility of DFO. An operational enforcement plan is to be developed by DFO.

4.4 HARVEST INFORMATION

DFO will monitor the hunt, and collect harvest information as appropriate. The Licensee(s) will cooperate with the DFO, with regard to the provision of other harvest information or biological material which may, from time to time, be required.

5. SAMPLING AND MONITORING

5.1 BIOLOGICAL SAMPLING OF LANDED WHALE

DFO Science, in cooperation with the DFO Eastern Arctic Area, and the people involved in hunting and butchering the whale, is responsible for collecting the following samples from any landed bowhead and to investigate the biology, physiology and genetic make-up of the stock.

1) Complete morphometrics following the American Society of Mammologists guidelines.
2) Observations of any wounds or scars.
3) Samples of endoparasites and ectoparasites.
4) Samples for aging (baleen).
5) Samples for feeding analysis.
6) Samples for stock analysis (genetics) studies.
7) Samples for heavy metal and pesticides analysis.
8) Other observational data as appropriate.

DFO Science will take the lead role in developing a standardized sampling protocol and sample archiving system.

6. RESEARCH

The DFO's Arctic Fisheries Scientific Advisory Committee recommended that data be collected on the size, discreteness and structure of stocks to evaluate the impact of removals on stock recovery and assess stock status (Cosens *et al* 1998)(Table 1). There is scientific and traditional evidence that the stock sizes are increasing. The impact of removals at rates greater than in the past are unknown; at some rate of removal a stock will begin to decline.

The IBKS has uncovered at least 8 additional post-commercial kills of bowheads by Inuit (NWMB 2000) and further hunting attempts on bowheads by Inuit (since 1915) are likely.

Changes in stock status can also result from non-hunt related factors, thus basic data on environmental factors that can affect stock status should be collected.

6.1 STOCK SIZE

Estimates derived to date from aerial surveys do not account for animals submerged during the survey or those not detected because grouping patterns, habitat choice or behaviour that make them difficult to see. Behavioural data has been collected to identify factors useful to correct future survey results (Thomas, 1999).

Documentation of bowhead sightings by Inuit observers can complement future scientific studies of bowheads in Nunavut, and provide an alternate means of tracking movements and distribution. DFO has received sighting records, decoded location data and plotted the locations on maps. This project is currently being evaluated.

The size of the Baffin Bay/ Davis Strait stock must be estimated. The large geographic area included in the summering range makes estimation of the size of this stock logistically difficult. Nevertheless, DFO and NWMB should discuss options and select one that will provide at least a minimum count and an index for tracking relative stock size. In August 2002, an aerial photographic survey of summering areas south of Barrow Strait and Lancaster Sound will document numbers and age classes of bowheads using these areas.

6.2 STOCK DISCRETENESS

The relationships between bowhead whales seen in aggregation areas of northern Hudson Bay, Foxe Basin, Lancaster Sound, Isabella Bay, Broughton Island, and Cumberland Sound should be determined. Data on genetic relationships and on distribution and movements of known individuals are required to describe these relationships. Skin samples have been collected for genetics analysis from Repulse Bay, northern Foxe Basin and Cumberland Sound. Samples are also collected and analyzed from beached carcasses and

landed animals. In 2000, skin samples were taken from whales near Arctic Bay, Pond Inlet, Pelly Bay and Repulse Bay. In 2002, skin samples were taken from whales in Foxe Basin.

Satellite telemetry studies of the movements and migrations of bowhead whales in Foxe Basin/Northern Hudson Bay are ongoing.

As in 2.3, past and ongoing observations of bowheads by Inuit in the NSA may contribute to resolving the questions about stock discreteness/inter-relationships.

6.3 STOCK STRUCTURE

Small stocks can be subject to random changes in sex ratio and age distribution, therefore knowing the proportion and distribution of calves, juveniles and males and females in the stocks would help managers evaluate the impact of a renewed hunt on stock recovery. It is not known to what degree eastern Arctic bowheads segregate according to age or reproductive status and, therefore, what part of the stock is available to hunters at different times of year and in different locations. For example, it may be possible to select a time or location for hunting that minimizes removals of reproductively active females and, therefore, minimizes the impact of the hunt on stock recovery. Whales summering in northern Foxe Basin are now known to be juveniles and cow-calf pairs. Other areas should be surveyed as well.

A records survey of bowhead cow-calf historical distributions in northwestern Hudson Bay has been completed, and a manuscript discussing the results of this project is in preparation.

Through the IBKS, observations by Inuit of calves, juveniles, and adult bowheads could prove useful in determining age-, sex-, and reproductive status-related segregation of bowhead groupings/concentrations in the NSA.

6.4 REMOVAL RATES

All bowheads caught should be examined and sampled by researchers. This is to monitor the condition of animals in the stock. These data can also contribute to other studies such as stock discreteness.

6.5 ENVIRONMENTAL FACTORS

Baseline data on contaminant levels should be collected through the biological sampling program (Section 5.1). Factors affecting the distribution of bowheads should also be examined. Changes in water currents or ice conditions could affect both the distribution and numbers of bowheads. Changes in

distribution could in turn affect hunter access to the animals. For example, in 1999, bowheads were not observed during aerial surveys in northern Foxe Basin during the open water season. Their whereabouts or reasons for leaving Foxe Basin during that time are not known.

Killing of bowheads by killer whales may be a significant cause of mortality. Some scarring patterns seen on bowheads in northern Foxe Basin and Isabella Bay appear to have resulted from killer whale attacks (Finley 1990). Killer whales have been seen in the vicinity of Baffin Island and in Hudson Bay and Foxe Basin. Collecting data on predation rates is not feasible, but hunters and other travellers should be encouraged to report sightings of killer whales and any observations of attacks on bowheads.

Through the IBKS, Inuit are providing information that may contribute to an understanding of environmental conditions that impact upon bowhead whales (also 2.8 above).

7. CULTURAL SIGNIFICANCE OF THE BOWHEAD WHALE

Inuit have retained a deep cultural attachment to the bowhead whale. Their detailed testimony attests to the traditional and continuing cultural importance of the bowhead (NWMB 2000).

7.1 CULTURAL ATTACHMENT

Due to the breakdown of the extended family and a variety of related external influences, opportunities to show respect and affection for elders have declined in recent decades. The hunting and sharing of bowhead whales represent a new opportunity to demonstrate respect for elders and thus to assist the survival and enhancement of Inuit culture in the face of massive and continuing forces of change (NWMB 1995):

... since there are not too many elders living today, I'm sure that they are craving for it since they grew up on it, and I'm sure that they love to eat it again while they are still alive, so, we Inuit think that they should try and harvest one as soon as possible. Especially the elders think like that, the elders who are left would like to have bowhead whale meat again before they die, they should be given their wishes while they are still alive, never mind when they die. So this is what I hear from the elders themselves. Yes, that's how it is today. (Nauya Tassugat, Clyde River)

... but I would like to help my fellow Inuit by saying that the elders should be considered more often, for they have real concerns, like I do all the time. They (Inuit) should catch a bowhead whale, while the elders are still around

today. … so therefore, I feel that the elders, who had gone bowhead whale hunting and have been raised on it, should be given an opportunity to eat it again, since the elders crave for it so much, while some of the ones left are still around, I would be really happy, and I am in support of it. (Mosesie Qappik, Broughton Island)

We older people do miss eating the maktak. (Edith Nuvviaq, Hall Beach)

He (my father) also used to tell of the time when he used to eat maktak - this was when he was quite old and he used to talk a lot about that - as for me I was not particularly concerned, as I never ate them. You must miss them a lot if you used to eat them when you were growing up, and he died without ever tasting maktak again. (Gemma Piallaq, Hall Beach)

As younger Inuit have never seen an actual bowhead whale hunt … well, the Inuit today do not usually crave for bowhead maktak or meat, because we did not grow up on it, if we did grow up on it, it would be a different case. No wonder the elders crave for it for they grew up on maktak of the bowhead. I think the reason why the elders crave is a good reason to give them what they crave for, it is also not nice not to allow them what they had grown up on, so I would be in support of giving them what they want before they die, that is my thought, never mind the younger ones, if at least they could give some to the elders again. (Josie Papatsie, Iqaluit)

It is evident that bowhead whales did have tie to Inuit traditional way of life - and I also had an occasion to take a bite of maktak recently and it's delicious. As traditional meat is very important, as if one does not eat meat for awhile it's almost like you are thirsty - and I am sure that our elders who grew up with bowhead whale for food do miss eating it and it is unfortunate that most have passed away without ever tasting the maktak and meat of bowhead whales. (Takealook Temela, Lake Harbour)

I don't think it is really necessary to have protestors (animal rights activists?) of bowhead whales - instead it should be realized that our ancestors lived by consuming the wildlife of the land and that we must live on the spoils of the land. That's how we managed to survive to today. And I am sure that our elders do hunger for food that they grew up on. As the bowhead whale was one of the main subsistence and it would be in everyone's favour if bowhead whale could be harvested once in awhile in Baffin region. (Takealook Temela, Lake Harbour)

I remember my aunt and some other older Inuit when they were anxious to eat some bowhead whale meat and maktak. As I grew up during that time I remember people cutting and distributing the bowhead whale maktak and meat. (Mosesee Nuvaqiq, Pangnirtung)

Elders must still have use for them, because, the elders today that have consumed maktak in the past still crave for maktak today, as for Netilingmiut, they don't crave for them because most of them never taste it. I tried one this summer but I still don't have a craving for it, but some elders are still craving for it. (Jose Angutingungniq, Pelly Bay)

Personally, I have never tasted maktak myself, it wouldn't make any difference to me if there is no quota for Netilingmiut communities, I fully support a quota for Baffin Region or Keewatin because elders in those regions are craving for maktak. Since the bowhead whale population has increased, because I don't think one whale would really hurt the population. (Jose Angutingungniq, Pelly Bay)

... my father used to crave for the fat and maktak because he used to eat them before, my mother died around 1945, my father died around 1950. None of the animals that were hunted for food and clothing were wasted, they do have all the hunting tools like they do today, anything that was killed for food was never wasted. (Guy Kakkianiun, Pelly Bay)

7.2 BOWHEAD HUNT

Many Inuit feel that the bowhead hunt should continue, to ensure the continuance and renewal of this tradition, as younger people generally are not knowledgeable about this aspect of their culture and as the elders with knowledge and experience of whaling are not going to be around for many more years. Inuit recognize that when animals are not utilized any further, they may lose interest in the animal, along with caring, concern, and respect for the animal, accompanied by a loss of knowledge of the animal and the skills involved in hunting it (NWMB 1995):

... - basically, I won't mind if one could be harvested in Baffin, I am sure that people could learn a lot from a hunt of bowhead whales, they would learn how the meat is used and how the bowhead whales are harvested. It would mean learning something that we may be forgetting now in regards to the harvesting of bowhead whale. (Timoon Toonoo, Cape Dorset)

But looking at the present situation, young people today may not be particularly concerned with bowhead whales as our elders are. My feeling is that if they are not being taught how to harvest a bowhead whale and know how they taste - and if we are not going to be allowed to harvest bowhead whales in say 20 years time, and unfortunately elders are dying. Let's say that in 20 years time if I am still alive, I am sure that I am not going to be particularly concerned with bowhead whales as opposed to the present elders. Presently elders are in favour of harvesting bowhead whales and they miss eating maktak

- but the present generation of Inuit I feel are not going to be concerned with bowhead whales. (Simon Iyyiriaq, Igloolik)

As for the one that was harvested over the summer (in 1994), it was harvested because of an elder. I am thankful for that, it was done for a purpose. But later on in time if we are finally allowed to harvest bowhead whales after so many years, it may well be that people won't be thinking too much about harvesting bowhead whales. But if people are given the okay to start harvesting bowhead whales now it would be okay, given that elders are still around and they miss eating maktak. (Simon Iyyiriaq, Igloolik)

It is unfortunate that those who lived through the whaling era had to die without ever tasting bowhead whale meat and maktak. I think it is essential that we learn about the bowhead whale, how it tastes and its other uses. (Lypa Pitsiulak, Pangnirtung)

8. COMMUNICATION PLAN

8.1 The NWMB, DFO, Hall Beach and Igloolik HTOs and the Amittuq Bowhead Hunt Planning Committee will maintain communication links to ensure dialogue between managers and users, throughout the period of this plan.

8.2 A meeting between DFO, Hall Beach and Igloolik HTOs and the Hunt Captain will be held prior to the commencement of hunting to ensure a common understanding of all licence conditions and responsibilities.

8.3 DFO and NWMB will both designate spokespersons for the harvest. These spokespersons will respond to questions on conservation-related issues, management and technical aspects of the hunt as appropriate.

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Table 1. Scientific research activities that are either ongoing or suggested for addressing management requirements of a subsistence hunt for bowhead whales.

	Research Requirement					
Information Need	**Foxe Basin**		**Northern Hudson Bay**		**Western Baffin Bay/Davis Strait**	
	Done/ongoing	**To do**	**Done/ongoing**	**To do**	**Done/ongoing**	**To do**
Stock size	Monitor numbers Develop correction factor for aerial surveys	Develop and assess mark-recapture estimate using genetic markers	Estimate numbers	Develop correction factor for aerial surveys	Aerial survey of summering areas south of Barrow Strait and Lancaster Sound (August 2002)	Select method and produce an estimate
Stock Discreteness	Track movements Sample skin Analyze DNA	Track movements	Sample skin Analyze DNA	Track movements	Track movements – (Greenland) Sample skin Analyze DNA	Track movements
Stock structure	Estimate sex ratio (Using DNA extracted from skin samples) Describe age structure and segregation patterns		Estimate sex ratio (Using DNA extracted from skin samples)	Describe age structure and segregation patterns	-	Describe age structure and segregation patterns
Removal rates	-	Count strikes and landed, measure landed and sample tissues	-	Count strikes and landed, measure landed and sample tissues	-	Count strikes and landed, measure landed and sample tissues
Environmental factors	Identify factors affecting distribution	Sample tissues	-	Sample tissues, identify factors affecting distribution	Identify factors affecting distribution (Isabella Bay)	Sample tissues

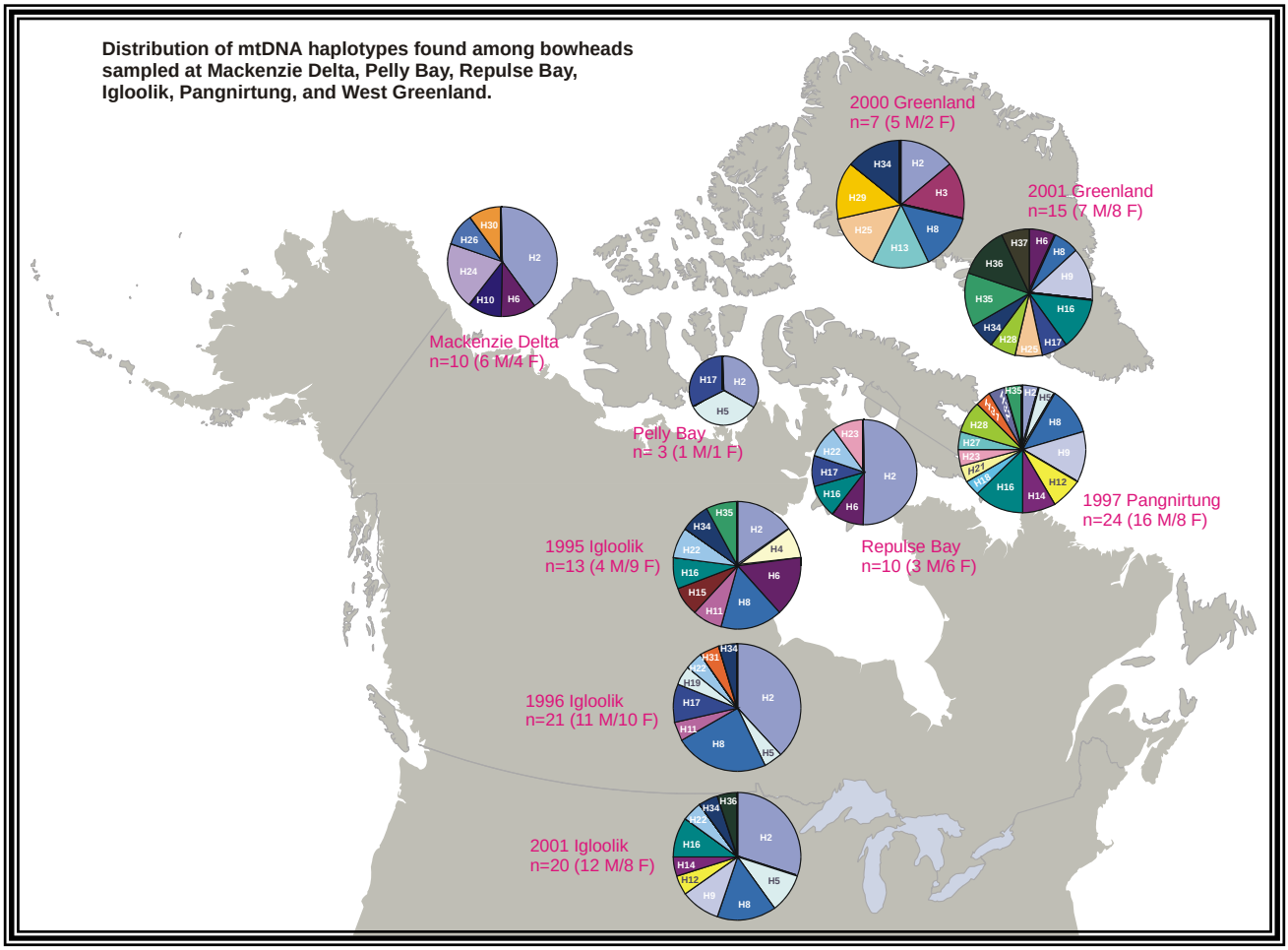

Figure 1. Distribution of mtDNA haplotypes found among bowhead whales *(Balaena mysticetus)* sampled at Mackenzie Delta, Pelly Bay, Repulse Bay, Igloolik, Pangnirtung and West Greenland between 1990 and 2001.

Figure 2. Distribution (shaded areas) and migration routes (arrows) of bowhead whales *(Balaena mysticetus)* during Aujaq (summer), as plotted by Inuit informants from Coral Harbour, Repulse Bay, Igloolik, Hall Beach, Pelly Bay, Cape Dorset, Lake Harbour, Iqaluit, Pangnirtung, Broughton Island, and Clyde River (NWMB 2000). (Aujaq is the time of open water, still long but decreasing day length, no snow on the land, and warm temperatures).