Inuit Traditional Ecological Knowledge of the Hudson Bay Narwhal (*Tuugaalik)* Population

Prepared for

Department of Fisheries and Oceans
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TABLE OF CONTENTS

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1.0 INTRODUCTION

For generations people in the Repulse Bay area have hunted and observed narwhal accumulating important knowledge. Much of this knowledge has been passed down from one generation to the next. Also, hunters continue to learn about narwhal through their ongoing observations and contact with narwhal. Traditional ecological knowledge of narwhal is important information for all those involved in narwhal conservation, research and management.

This report documents traditional ecological knowledge on the Hudson Bay narwhal population. The collection of narwhal traditional ecological knowledge provides information on narwhal biology, ecology, population status and management. This knowledge combined with scientific information provides a more complete understanding of the narwhal population. The information in this report is based on the knowledge shared by a group of narwhal hunters and elders at a workshop in Repulse Bay in November and December 2000.

2.0 BACKGROUND INFORMATION

2.1 Narwhal Population

The narwhal is a medium sized whale found in the Arctic seas. Males reach a length of 4.7 meters and a weight of 1,600 kg while females reach a length of 4.2 meters and a weight of 900 kg (Strong, 1988). The narwhal is a unique whale with adult males developing tusks as long as 2 meters (Strong, 1988). In some rare cases females have tusks or narwhal have two tusks.

There are thought to be two populations in the Canadian arctic: the Hudson Bay narwhal and the Baffin Bay narwhal. The Hudson Bay narwhal population is small in comparison to that of the Baffin Bay population that is estimated to have approximately 20,000 animals. Summer aerial surveys of the Hudson Bay narwhal population in 1984 estimated that there were 1355 narwhal at the surface of the water (Department of Fisheries and Oceans, Stock Status Report E5-44). This number can at least be doubled to take into consideration the number of whales not counted due to narwhal diving during the survey or narwhal not being in the survey area (Department of Fisheries and Oceans, Stock Status Report E5-44). The survey was conducted in the main portion of the known narwhal summer range around Repulse Bay, Frozen Strait, Gore Bay and Lyon Inlet. Most narwhal are assumed to winter in eastern Hudson Strait or in open water in northern Hudson Bay and western Hudson Strait.

2.2 Narwhal Management System

The narwhal hunt is co-managed by the Nunavut Wildlife Management Board (NWMB) and the Department of Fisheries and Oceans (DFO). The management system has relied on a quota system where communities are allocated a number of narwhal they can hunt per year. These quotas were originally set based on historic hunting levels. A new community based management system is now in place in some communities.

The main community that hunts Hudson Bay narwhal, Repulse Bay, is a part of the community based management system. The trial period for community based management started in 1999 and continues

through the 2001 hunting season. Community based management translates into the quota system being lifted and the Hunter and Trappers Organizations (HTOs) managing the narwhal hunt using a set of community by-laws and rules. In Repulse Bay, the Arviq HTO has taken on this management role.

Communities have been requesting a change in management from the quota system for some time. Problems communities have with the quota system include:

- creating competition amongst hunters causing hunters to go out quickly and hunt wildlife before others do, with the hurry causing increases in the number of animals killed but lost;
- hunters feeling that they had to meet the quota goal causing there to be more animals hunted than would have been without quotas; and
- hunters feeling that the stock can uphold a higher level of hunting and in some cases hunters needs are higher that the quota set. (Papatsie, 2000)

In 1998 the NWMB, with the support of DFO, established the community based management pilot project for both beluga and narwhal. The pilot project is underway in five communities for narwhal (Repulse Bay, Pond Inlet, Qikiqtarjuaq, Arctic Bay and Kugaaruk), and two communities for beluga (Iqaluit and Kimmirut). For beluga, the initial three year pilot period was extended to five years subject to annual review. As part of the project all participating HTOs, including the Arviq HTO, are required to have developed community hunting rules or by-laws. The rules address the conservation and management of the narwhal population, the reduction of waste, as well as hunter education and safety. HTOs have also agreed to collect information on the number of narwhal wounded, killed and not landed.

When the pilot project was announced people in Repulse Bay people were happy with the change and the

> *fact that we could hunt in our own way without outside rules and quotas...the coincidence was that the time when we were going to start managing ourselves was the same time that the killer whales came in. (Workshop Transcripts)*

In 1999, Repulse Bay landed about six times its historical quota of 25 narwhal. A number of things coincided making this large harvest possible including killer whales driving narwhal inshore, as well as the lifting of the quota. The NWMB and DFO expressed concern about this catch level and the sustainability of this catch by the narwhal population. The Arviq HTO made some changes to its community hunting rules and limited the allowable number of narwhal landed to 100 and is continuing on with the pilot project. However, people in Repulse Bay are concerned that because of the community based management problems the quota system will be put back in place after the end of the pilot project.

To have a better and up-to-date estimate of the narwhal population and to more accurately determine if the level of hunting is sustainable, DFO conducted an aerial survey of the Hudson Bay narwhal population in August 2000.

This traditional ecological knowledge report also provides information on the health and status of the narwhal population. Both scientific information as well as traditional ecological knowledge will provide important information that the community can use to make management decisions.

3.0 METHODOLOGY

A number of groups have been involved in the planning and carrying out of this project. Initially the need for the collection of traditional ecological knowledge on the Hudson Bay narwhal population was discussed by the NWMB, DFO, Kivalliq Wildlife Federation and the Arviq Hunters and Trappers Organization. DFO took the lead in developing the project with these other groups continuing to play advisory roles.

The project was carried out in three phases:

In Phase 1 an agenda for a workshop and a list of potential questions for discussion was drafted for review. With input from the groups involved the agenda and format for the workshop were finalized.

In Phase 2, a three day workshop was held in Repulse Bay on November 29, 30 and December 1, 2000. There were 8 participants, 6 from Repulse Bay, 1 from Coral Harbour and 1 from Rankin Inlet. Most of the participants were from Repulse Bay as this community is the most active in hunting the Hudson Bay narwhal. Participants were local hunters and elders nominated by the Hunter and Trappers Organizations and the Kivalliq Wildlife Federation. The workshop was conducted in Inuktitut with the assistance of an interpreter. Through discussions and the use of maps, the facilitators collected information. The discussions were recorded on tape which were later transcribed and translated. The facilitators were Keith Hay and Neida Gonzalez.

The following is a list of the participants and the communities they represented:

Anthanasie Katorka – Repulse Bay
Paul Malliki -- Repulse Bay
John Tinashlu – Repulse Bay
Richard Angotialuk – Repulse Bay
Joe Angotinguar –Repulse Bay
Charlie Tinashlu – Repulse Bay
Joanasie Nakoolak -- Coral Harbour
Jerome Tatuinee – Rankin Inlet
Simeoni Natseck -- Repulse Bay (interpreter)

In Phase 3, the information collected was analyzed and a draft report and maps were prepared. In preparing the draft report a transcription and translation of audio tapes from the workshop was used. In addition, records collected by HTOs on narwhal and narwhal hunting were reviewed.

The draft report was reviewed by all participants and groups involved before a final report was produced.

4.0 WORKSHOP RESULTS

4.1 How are the workshop results reported?

As much as possible results are reported in the way workshop participants expressed the information. In many cases knowledge was conveyed in the form of stories or examples. Whenever possible the style of writing keeps true to the way the hunters and elders explained their stories and knowledge. Whenever possible quotes are used to express the views of participants. *All quotes in the workshop results are from workshop participants.*

4.2 What is included in the workshop results?

Workshop results focus on the actual information provided by the workshop participants. Analysis and discussion of the information is found in the following section called *Discussion and Recommendations.*

Workshop results are divided into three main topic areas:

- Narwhal Hunting;
- Hunters Knowledge of Narwhal; and
- Narwhal Use and Narwhal Management Issues.

The first two topic headings reflect the original intent to collect information on narwhal hunting and traditional ecological knowledge on narwhal abundance and distribution over time, narwhal behaviour and other biological information. The third topic documents peoples' information and views on issues related to the use of narwhal and narwhal management.

Throughout the workshop participants talked about the Inuit use of narwhal over time and the cultural importance of narwhal. Inuit knowledge about narwhal stems from their relationship with narwhal over generations and how this relationship has changed with time as the community has changed. Currently, there is a new situation where Repulse Bay is being given an opportunity to manage narwhal hunting after many years of outside groups taking this role on for them. This new community based management system gave workshop participants the chance to reflect on how narwhal was managed by the community before the arrival of non-Inuit, how narwhal is managed now, and how narwhal should be managed in the future. Traditional ecological knowledge is documented in this report within this context.

4.3 Narwhal Hunting

There are many differences between the way narwhal hunting takes place today and how hunting took place in the past. The techniques, equipment and rules have changed. How a narwhal is used has also changed with time. But a number of things remain the same. Narwhal continues to be an animal that is highly valued by the community. It is still shared amongst the hunters, their families and the community as a whole. Narwhal have been a part of life in Repulse Bay for generations and people want to observe and hunt narwhal from their community in the future.

The following is the information provided by hunters and elders on narwhal hunting.

4.3 – 1 Hunting: 50 Years Ago

"We used to paddle to narwhal when they were [resting at the surface] and then harpoon them" remembers an elder. You had to be close to the animal to harpoon it. Kayaks were used then and seal skin floats which made very good floats.

"Hunting was not a mad dash then", and the whales were hunted near shore. Not many whales were hunted at the floe edge as you had to get out there by dog team. Most hunting happened in the open water season between mid to late July until the end of August.

4.3 – 2 Hunting: 35 Years Ago

"In the 1960s we would hunt by running along the coast and shooting seaward of whales to scare them inshore, whales and seals could be shot from shore and retrieved with boats". When wooden boats went out after narwhals they moved quietly. Usually only 4 or 5 boats went out at a time keeping narwhal near the shore.

Boats were powered by 3-5 horsepower motors or men paddled in a freighter canoe. Four men would navigate a canoe; two men on each side of the canoe would be ready to harpoon the narwhal. Rifles were being used as well (30.30, .303).

4.3 – 3 Hunting: Today

"Hunting methods today are more powerful, it is easier to get narwhal, today we can go 50 miles per hour and with high powered rifles". Whales are usually shot first and then harpooned, though most hunters agree that it is better to harpoon first. A harpoon marks a narwhal for an owner so when there are many boats "we try to harpoon". Harpoons with modern floats are used to make sure narwhal are retrieved. Narwhal that are wounded and escape, or are killed and sunk, are mostly ones that are not harpooned.

Using harpoons also allows hunters to get closer to the narwhal to identify them as male or female. If hunters approach pods that are just females or females with calves they will often move on and radio other boats with the information. In the case of females with calves, it is against regulations to hunt them. There are no restrictions on hunting females without calves, although hunters often do not as they prefer to hunt older tusked males. Hunters will also use radios to inform other hunters about the presence of large tusked males. Radios are a good tool for locating narwhal and co-ordinating narwhal hunting increasing the chances of landing narwhal.

Many times narwhal are chased today. One hunter explains, "today...narwhal [are] being chased by more boats, there is lots of noise and disturbance". In an open water hunt over 30 boats may go out for as few as 10 narwhal. The boats work as a team but not all boats get a narwhal. "Many days there [are no narwhal landed]...we try to get them when we have a chance of getting them". At the floe edge the hunt is different. Hunters skidoo to the floe edge and wait for narwhal. Not often do hunters take a boat out from the floe edge. Most often hunters shoot from the floe edge, then try to retrieve the narwhal with a boat.

Some younger hunters still paddle if there is no urgency to hunt and they are away from the community. Hunters will paddle using a freighter canoe or smaller boat in the middle of the bay. They will first get out to the middle of the bay using a motor and then "quiet the outboard and paddle toward resting narwhal". On occasion, paddling also occurs from the floe edge out to resting narwhal.

Workshop Participants' Hunting Tips for Younger Hunters

- *Hunting is harder when water is clear, narwhal are more easily approached in rough, mirky water.*
- *To kill a narwhal shoot on the bone or hit an artery, if you just hit the back of a narwhal it can heal.*
- *Hunt at the floe edge when there is a back splash as the waves hit the ice and narwhal will not hear your footsteps.*
- *When paddling keep your outboards up to avoid whales touching the prop.*
- *For paddling, paddles must be smooth and unblemished to approach animals.*

4.3 – 4 Rules for Hunting: Yesterday and Today

"Our ancestors had policies". Elders remember some basic rules that all hunters followed:

- Spoiling or wasting of any part of the animal was not allowed;
- Hunters were not allowed to take more than they could use;
- Hunters only shot when they could retrieve the animal, they did not shoot in deep water where they could lose an animal; and
- The first animals to arrive at a hunting area were never hunted as other animals did not follow if the first ones were killed.

Today, not all hunters have been taught the rules of their elders. In the now larger community, some hunters go by what they know and not by community rules. Some hunters describe the narwhal hunt as "sort of unregulated" and "absent of leaders". Today you can see "animals left behind and wasted...the situation needs to be improved". One young hunter talked about "hunting everything we see".

The Arviq HTO today is working hard to provide leadership to hunters. The three year trial community based management system for narwhal hunting is providing hunters with incentive to work together. The Arviq HTO is establishing and enforcing rules and many hunters are changing their hunting techniques in an effort to minimize narwhal losses. Losing a narwhal is not taken lightly as one hunter explains: "when we lose a narwhal whether we can not find it or it sinks it affects us tremendously and we are very disappointed". To avoid narwhal losses hunters are trying to harpoon first before shooting the narwhal as this increases the chances of retrieving it.

In an effort to make community management work, hunters are willing to follow the rules established by the HTO. They are seen as being "their own rules" and not those of outsiders. Some of Arviq HTO rules include:

- No hunting of a female narwhal with a calf or a narwhal calf;
- No wasting of any edible parts of a narwhal; and

- No more than 100 landed narwhal in one season.

The Arviq HTO can stop a narwhal hunt if too many narwhal are being wounded and lost or if the hunt is not safe. The HTO "will observe the narwhal hunting at the floe edge and if we find that there are too many losses of narwhal due to sinking we can put an end to the narwhal hunt". In the spring of 2000 the HTO stopped the hunt because the ice was soft and it was not safe to continue hunting.

Also for the 2000 season the HTO asked hunters to avoid hunting all females not just those with calves. It was explained that

> *we would like to manage the narwhal the best way that we can which is why we do not go after the younger ones or the females...we see a lot of narwhal, we go up to them, if they are the wrong kind we just leave them alone as much as we would like to hunt them.*

The total number of females killed in 2000 was down to 26 from 41 in 1999. However, 26 females in 2000 represents 53% of the total number of narwhal landed. One of the reasons given for the taking of females is the difficulty in recognizing females from males as many times hunters do not see whether a narwhal has a tusk until after it is wounded.

4.3 – 5 Hunting Areas – Yesterday and Today (See Map 1)

Today, hunters from Repulse Bay hunt mainly at the floe edge in the spring and in the bay in August when the ice goes out. A few hunters may go along Frozen Strait as far as White Island. Some years pack ice prevents hunters from travelling along Frozen Strait.
Many hunters would like to go out further than the bay but it is too costly to do so.

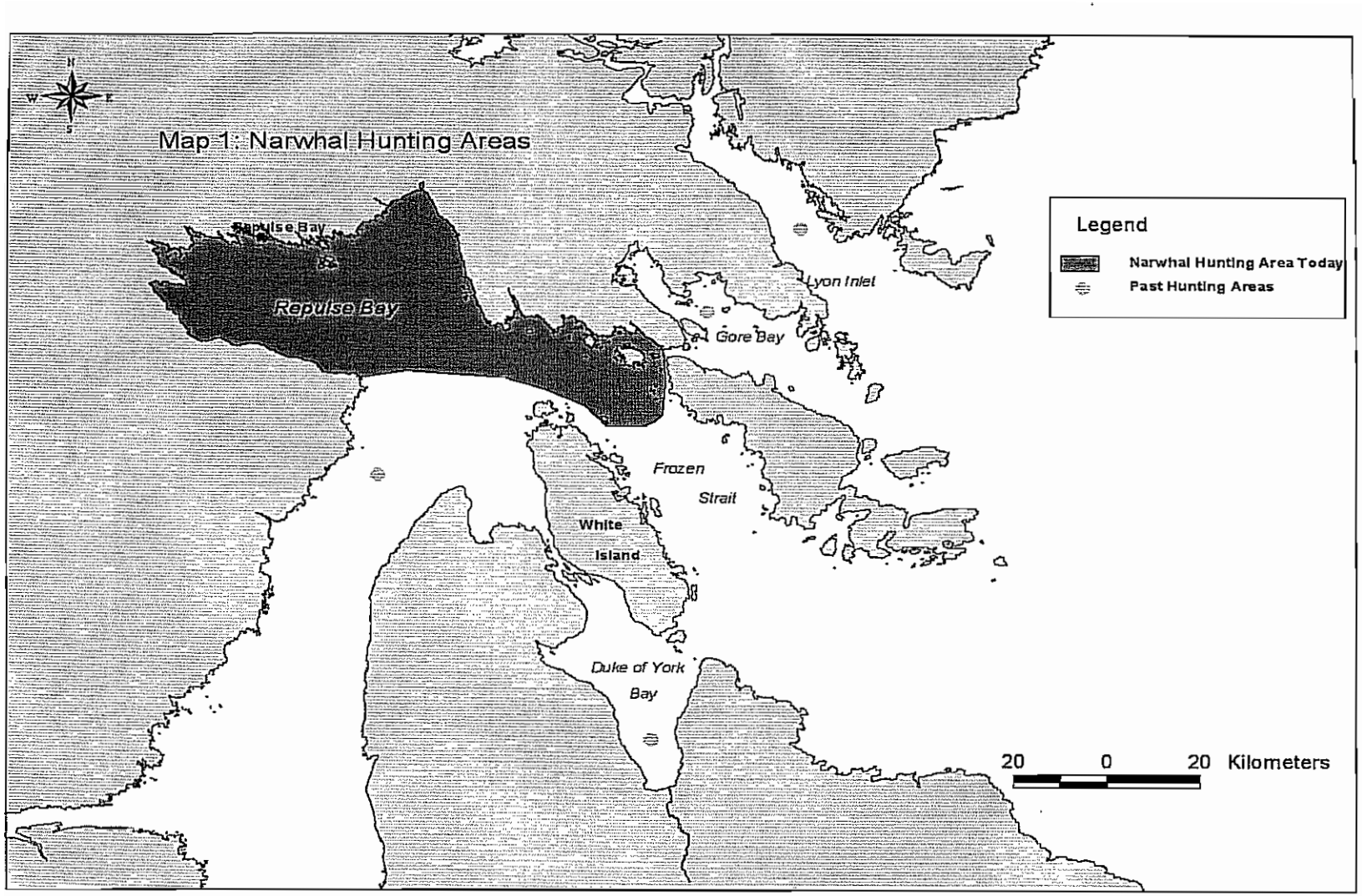
In the past when hunters spent time regularly at summer or permanent camps, narwhal were harvested from various locations. Floe edge hunting was not common until hunters started to use snowmobiles as their main mode of transportation. Places where people from Repulse Bay used to hunt narwhal include:

- Duke of York Bay,
- Lyon Inlet, and
- Gore Bay.

Occasionally hunting may still occur in these areas. Hunters from Igloolik and Hall Beach hunt narwhal at Lyon Inlet. At Gore Bay there is an outpost camp where from time to time hunters from Repulse Bay hunt narwhal. A small number of migrating narwhal are hunted at Coral Harbour every few years.

4.3 – 6 Hunting Season

The hunting season starts at the beginning of July. Hunters go to hunt at the floe edge which is across the mouth of Repulse Bay. Narwhal are sometimes already at the floe edge so it's hard for hunters to know when they first arrive. One hunter indicated that "the earliest we have ever seen narwhal at the floe edge is at the end of June". If it is a nice spring hunters don't hunt narwhal right away as they wait until seal season is over.


Map 1: Narwhal Hunting Areas
Repulse Bay
Repulse Bay
Lyon Inlet
Gore Bay
Frozen
Strait
White
Island
Duke of York
Bay
Legend
Narwhal Hunting Area Today
Past Hunting Areas
20 0 20 Kilometers

Sometime from mid July to the end of July the ice at the floe edge becomes too unstable to hunt from and hunting stops until the ice goes out and hunters are able to use their boats. The narwhal season ends in mid to late August when the narwhal start to migrate out. Narwhal are known to be around Lyon Inlet after they have left the Repulse Bay area. You can see narwhal around Lyon Inlet in early September.

4.3 – 7 Numbers of Narwhal Landed

Elders explain that these days they do not hunt many narwhal. One elder remembers that in one summer in the 1950s he caught over 100 whales (narwhal and belugas) to feed his dogs. He explained that "in those days we caught the most narwhal and we shared the food with others…we also hunted many more females than they do today".

Over time things have changed. In the 1960s "narwhal used to come in right next to town and they weren't always hunted, more often [they were] observed than pursued". Belugas were preferred because they were easier to hunt. Also there were fewer dog teams and less meat was needed.

Today, hunters hunt according to availability. Some years the bay is filled with pack ice and there is less hunting. In the last few years hunters have had the opportunity to take more narwhal because of killer whales and because quotas have been lifted (see Table 1). Narwhal flee killer whales and move to shallow waters making them easy targets for hunters. With today's powerful hunting tools (motorized boats, snowmobiles and radio communication) when narwhal are accessible they are more easily killed than before.

Table 1: Narwhal Catch (Department of Fisheries and Oceans, 2001)

Community (Quota)	**93-94**	**94-95**	**95-96**	**96-97**	**97-98**	**98-99**	**99-00**	**00-01**
Repulse Bay (25)	13	5	4	10	35	18	156	49
Rankin Inlet (10)	0	0	*6	*7	0	NA	NA	7
Coral Harbour (10)	1	0	10	10	9	4	0	0
Chesterfield In. (5)	0	0	0	0	0	3	5	3
Whale Cove (5)	0	0	0	0	1	0	2	0
Cape Dorset (10)	0	1	0	0	0	0	0	0

*caught in Repulse Bay by Rankin Inlet hunters NA: not available

4.3 – 8 Use of Narwhal: Yesterday and Today

In the 1950s and in earlier times all parts of the narwhal were used. One elder explains, "we used the blubber for heat and light, meat for dog food.... and food for people". Some of the organs of narwhal like the intestines were eaten and sinews were made into thread for sewing.

Today, the maktaaq is the main part of the narwhal that people eat. The quality of the maktaaq today is good. There have been some issues with the quality of beluga maktaaq but not that of narwhal. Some people eat the meat but many people do not like to eat it. Hunters who do not have dog teams and do not like to eat the meat will often leave the meat behind. Narwhal sinews are still highly favoured for sewing.

4.4 Hunters Knowledge of Narwhal

People in Repulse Bay and other communities where narwhal migrate have the opportunity not only to hunt narwhal but also observe narwhal in their environment. Over the years through observation they have gathered valuable information and knowledge about narwhal.

The following is an account of narwhal knowledge as provided by elders and hunters.

4.4 – 1 Changes: Narwhal No Longer Seen Close to Repulse Bay Community

Up to the 1960s, narwhal (as well as belugas) could be seen in the bay from land. The narwhal "would come into the bay and just float and drift all day". Narwhal used to be seen eating Arctic cod in the shallow waters of the bay. Today you only see whales close to shore if killer whales scare them in.

There are two explanations given by hunters as to why narwhals no longer come in shore at Repulse Bay:

1) narwhal avoid near shore waters because of noise pollution, and
2) there are no longer Arctic cod inshore for narwhal to eat.

Narwhal are very sensitive to noise. One person described watching a narwhal that was resting calmly just below the surface of the water and "all of a sudden it went under the water in a big hurry, a little while later... I hear a rifle shot". Many times they can sense "your footsteps on the ice" as you walk towards them. For this reason hunters believe that noise caused by aluminium boats and outboards keep narwhal away from inshore areas. At the floe edge there is also the noise of the snowmobiles pushing the whales away. One person explains that "when there is blasting for gravel at the quarry there are no marine mammals" in the area.

Arctic cod which narwhal feed on may also be affected by noise. "Outboards tend to disperse and scare away both narwhal and cod". There used to be lots of Arctic cod in shore, on both sides of the bay, but they are not there now. Today, hunters see cod in the middle of the bay. No one is positive why Arctic cod are no longer found inshore. The most common theory is that noise has driven away the Arctic cod as well as narwhal.

4.4 – 2 Narwhal Population Numbers and Abundance

"Narwhal numbers are not depleting" is the overall feeling in Repulse Bay. Hunters acknowledge that numbers and distribution of narwhal change year to year but overall the number of narwhal are believed to be the same over time. Hunters have not noticed a decline in narwhal numbers. They also see narwhal calves every year indicating to them that narwhal are reproducing and the population is not declining.

Narwhal are considered to be more plentiful in some areas than in others. Narwhal are known to occur in bigger numbers around Lyon Inlet.

Hunters believe that the population estimates made by DFO on the number of narwhal may be low. An elder explained that during the last aerial survey conducted to estimate the narwhal population in August, 2000, many narwhal were not counted. There was a large number of narwhal in Wager Bay that had been driven in there by killer whales that were not counted as the survey was being conducted towards Igloolik. Also narwhal could be diving "just a few meters below the surface and you would not see them".

4.4 – 3 Where can Narwhal be Seen in the Summer? (See Map 2)

If you were to go looking for narwhal in the summer the best places to look would be at:

- Repulse Bay out to White Island,
- Frozen Strait,
- Foxe Channel,
- Gore Bay, and
- Lyon Inlet.

The majority of narwhal move back and forth in this general area. Narwhal are not known to move north of Lyon Inlet towards Igloolik.

Sometimes you can see small numbers of narwhal in Wager Bay or Duke of York Bay. It is less common to see narwhal along the Hudson Bay Coast. One elder remembered that narwhal were seen around Marble Island near Rankin Inlet in the 1980s, but this is a rare occurrence. At the end of the summer, hunters often see and hunt a few narwhal around Coral Harbour as they migrate through the area (see Narwhal Migration).

Narwhal summer distribution is affected by the presence of killer whales. In the summer of 2000, a large number of narwhal were seen in Wager Bay due to killer whales forcing them in there. In the Coral Harbour area some hunters believe narwhal are coming in closer to shore because of killer whales.

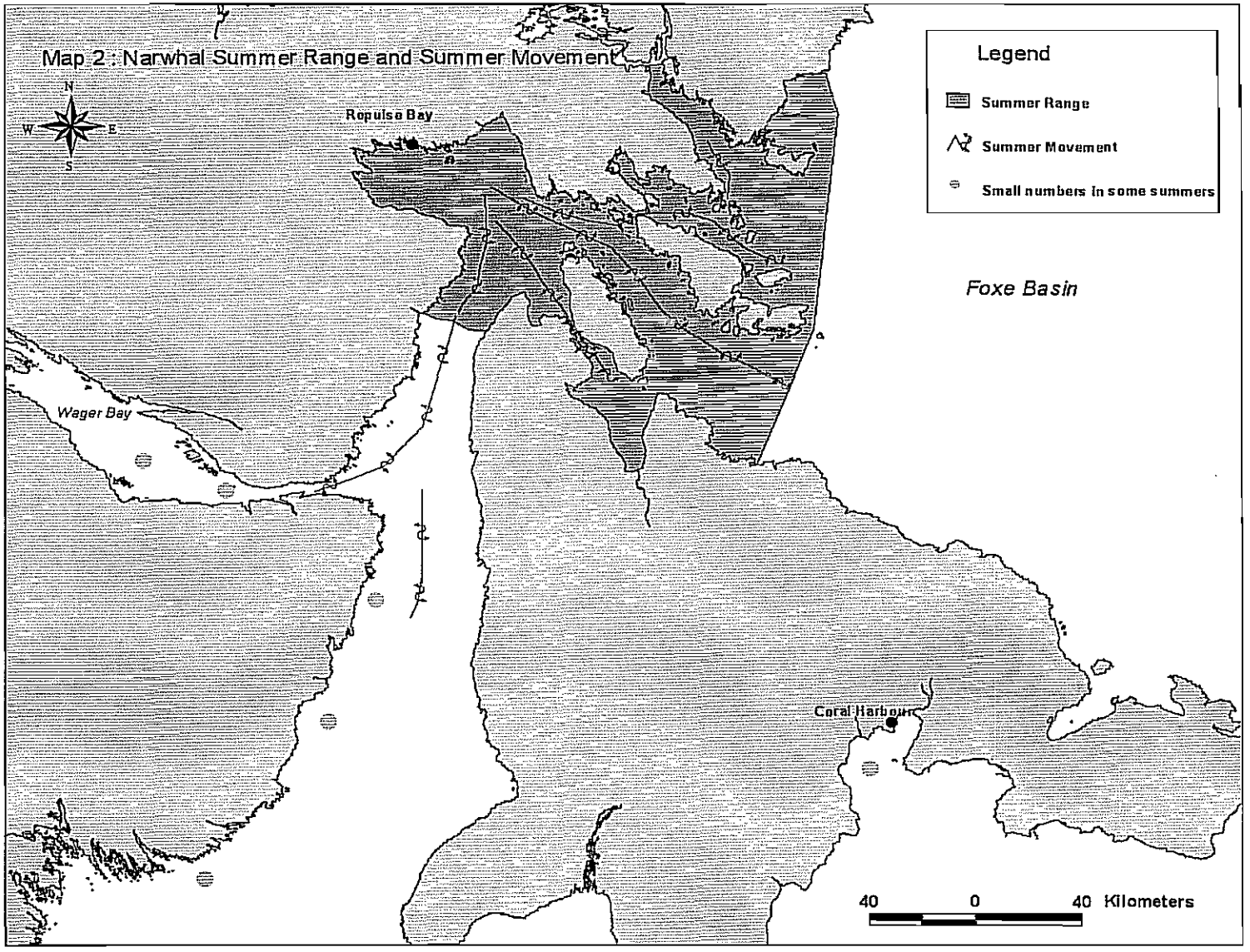
4.4 – 4 Narwhal Migration (See Map 3)

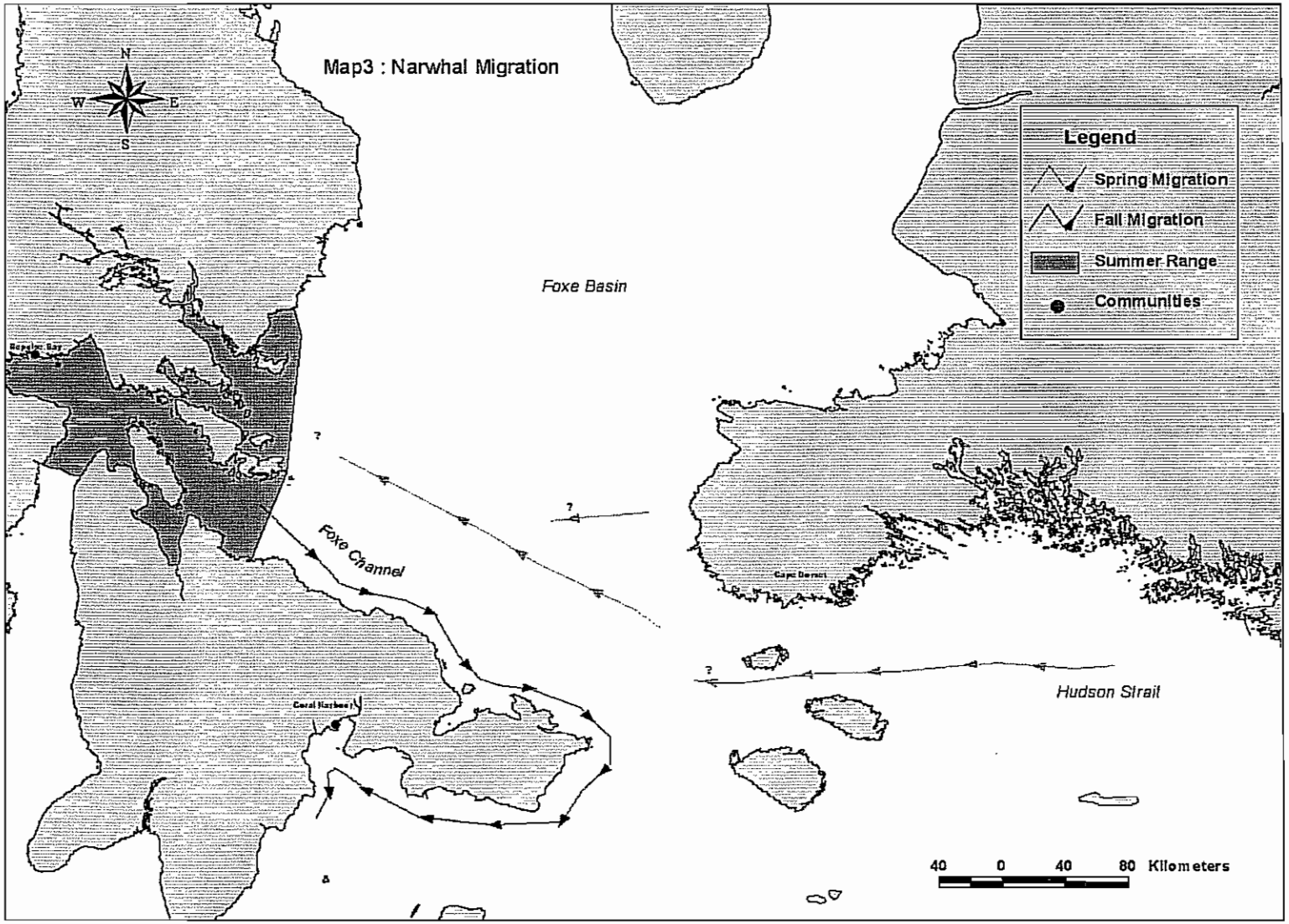
During migration narwhal are said to be "following fish and they travel according to food source". In general hunters had more information on the fall narwhal migration than the spring migration.

Narwhal leave the Repulse Bay area in late August or early September. They travel south easterly through Frozen Strait following the east coast of Southampton Island and can be seen from a number of points from land including Bell Peninsula and Leyson Point. Communities along the Hudson Bay coast (Rankin Inlet, Chesterfield Inlet, Whale Cove) do not see narwhal migrating at any time of the year along their coast or on the west side of Southampton Island. About every three years adult narwhal are seen in Coral Harbour in late August or early September. Hunters from Repulse Bay and Coral Harbour do not know where the narwhal go after they have been seen in Coral Harbour.

In late June or early July, Coral Harbour hunters occasionally see one or two narwhal at their floe edge as they hunt beluga. Narwhal are not seen at the Coral Harbour floe edge frequently. As narwhal are not often seen at this time of the year by Coral Harbour hunters it is believed that they do not migrate near the shore of Southampton Island in the spring.

Floe edge sightings have also been reported in Igloolik. In June 2000, Repulse Bay hunters heard over their radios that hunters from Igloolik were harvesting narwhal at the Igloolik floe edge before they had been seen in Repulse Bay. These narwhal would probably be from the Hudson Bay stock as the area north of Igloolik is still frozen in June making it impossible for narwhals from the Baffin Bay stock to travel towards Igloolik. However, without verifying where the Hudson Bay narwhal are wintering, it is difficult to pinpoint the spring migration route towards Repulse Bay.


Map 2 : Narwhal Summer Range and Summer Movement
N
W
E
S
Repulse Bay
Wager Bay
Foxe Basin
Coral Harbour
Legend
Summer Range
Summer Movement
Small numbers in some summers
40 0 40 Kilometers


Map3 : Narwhal Migration
N
W
E
S
Legend
Spring Migration
Fall Migration
Summer Range
Communities
Foxe Basin
Foxe Channel
Hudson Strait
Repulse Bay
Coral Harbour
Cape Dorset
40 0 40 80 Kilometers

4.4 – 6 When and Where do Narwhal Calve?

Hunters start to see newborns in Repulse Bay in August. They are "very small (less than1.5 metres or 5 feet) and can hardly stay under water". Most calving occurs within a one month span in the summer. At the floe edge in July, you can see one year old calves with their mothers but there are very few newborns.

Repulse Bay is a calving area for narwhal. Newborns can be spotted through out the bay to White Island. "Calves seem to grow fast, at birth [they are] very awkward but grow quickly and become good divers".

There were some questions about the length of narwhal pregnancy. Hunters are not sure that the pregnancy period of 15 months documented by scientists is right. It seems too long to some. A few hunters thought it was possible that 15 months could be correct as they did not think narwhals have a newborn every summer. As well when hunters have harvested pregnant narwhal, foetuses look like they are about to be born (full term) or they are very small (10-30 centimetres in length). This may suggest a gestation period for narwhal of over one year.

4.4 – 7 Do Narwhal Fight?

Narwhal "look dangerous but are gentle". Hunters see narwhal sparring with tusks but they are hesitant to call it fighting. Generally, narwhal are not aggressive and they do not go after each other like belugas do. "The bigger [narwhal] bulls especially will show their tusks in the air and it looks like they are comparing [tusks]". You can also see tusks playing out of the water, criss crossing, but not like they are fighting.

4.4 – 5 Where do Narwhal Winter?

No one is sure where narwhal winter. There are many theories about where they may be. The three main theories are that they are wintering:

- in open water in Foxe Basin,
- in open water in Hudson Bay, or
- somewhere in or beyond Hudson Strait.

A clue as to where they may winter is that narwhal "are nice and fat when they come in the spring so you can tell that they come from a place of good eating".

Hunters asked if there would be more research done to pinpoint where the narwhal winter. Some questions they have about where narwhal winter include:

- *Are the narwhal seen in winter along Hudson Strait or beyond Hudson Strait?*
- *Are these narwhal being hunted in other areas in the winter?, and*
- *Is the food supply of these narwhal being fished?*

4.4 – 8 How long do Narwhal Dive for?

Narwhal diving times depend on the situation. When they are relaxed and feeding they sometimes dive for as long as 15 to 20 minutes. When they are being chased they can dive for up to 30 minutes the first time and for less time afterwards as they get tired. Older animals can dive for longer times than younger ones.

Narwhal surface more often when they are being chased in shallow water as they tire out or when they are swimming during migration. In deep water, narwhal can dive for longer time periods. When being pursued in deep water, narwhals reappear in unexpected places after diving.

4.4 – 9 What do Narwhal Eat?

When hunters check the stomachs of narwhals they usually just see "uugaq" or Arctic cod. Other things narwhal sometimes eat include shrimp, clams and smaller fish. In the spring they feed on Arctic cod hiding under the ice and in cracks and holes. Arctic cod is associated "with dirty ice where the narwhal feed".

When narwhal are eating they swim back and forth along the area where they are feeding. Usually feeding areas are where the current is strongest as this is where the fish are.

4.4 – 10 How do Older Narwhal Behave in Comparison to Younger Ones?

In general older narwhal with "big tusks are a lot smarter than the younger narwhal".
When hunting narwhal:

- older narwhal are found in offshore areas where the water is deeper;
- older narwhal with tusks stay in the middle of the bay while younger ones and females with young are more likely to come close to the shoreline; and
- younger ones are observed breaking thin ice making it easy to harpoon them from a boat.

4.4 – 11 How do Narwhal Behave when they are Frightened?

"Silent narwhal are scared narwhal taking caution". To avoid making any noise they will sometimes "breathe out under water before surfacing so you don't hear them". They also get very still looking like rocks in the water. Narwhal group together in large numbers when they are frightened.

"Narwhal get spooked easier than other marine mammals". Noise frightens narwhal and as the hunting season progresses narwhal scare away more easily. But the number one thing that frightens narwhal are killer whales. The reaction to killer whales is described as "panic' as narwhals almost beach themselves and ignore the presence of people. While narwhal will normally react to people by leaving the area, the presence of killer whales drives them into shallow water and immobilizes them.

4.4 – 12 Narwhal Groups

Narwhal typically travel in pods of 10 to 20 animals. When they are frightened or in danger narwhal group together. Otherwise narwhal separate out into all male and female groups. Male groups further divide depending on age and size. "Big ones stick together....and don't spend time with young ones generally". Younger male narwhal that are just beginning to get their tusks travel together as a group. Sometimes there is one or two larger narwhal with the younger narwhal. Females also travel together with their calves.

4.4 – 13 Influence of Tides

In extreme high tide all animals get more active including narwhal. There is also more narwhal movement with the morning tide than the evening tide. Generally they travel with the current and flow of tide.

4.4 – 14 Identifying Narwhal

Male narwhal are identified by their tusks. Very rarely does a female narwhal have a tusk. On occasion a large female will be taken by mistake as "it is difficult for some of us to figure out which ones are female and which are male sometimes, because they are hard to see, if we [had] a better way of finding that out, perhaps we would go after males".

There are physical differences between individual narwhal but most hunters cannot recognize an individual narwhal from year to year. One hunter talked about darker narwhal that have a larger tusk than the lighter narwhal.

4.4 – 15 Ice-Stranded Narwhal

From time to time narwhal get stranded in ice. One of the places where this happens is near White Island. People also remember narwhal being stranded at Ross Bay inland from Lyon Inlet in the mid 80s. The quality of the maktaaq of stranded narwhal is not as good as that of regular narwhal.

4.4 – 16 Killer Whales

Killer whales are a growing concern to hunters. In the past few years they have been seen with increasing frequency and hunters feel they are a real threat to narwhal and other marine mammals.

The presence of killer whales was predicted by an elder who passed away in the 1940s. He said "we would see an animal that we hadn't seen before come into the region, and then the killer whales came". The first time anybody remembered seeing killer whales was in 1945. They "came in like a river" chasing belugas and narwhal. Repulse Bay was packed with belugas and narwhal.

The incredible ability of killer whales to attack and kill their prey has been witnessed by hunters. In one incident where a bowhead whale was being attacked, an elder saw as killer whales worked as a team to overpower the bowhead. One killer whale "went over the blow hole and others attacked its flippers, they worked as a pack like wolves". This particular bowhead was broken to pieces by the ramming of the killer whales but it was not eaten.

Killer whales do not always eat their prey. Hunters have seen narwhal and belugas torn to pieces "but not eaten too much...sometimes you see maktaaq floating on top of the water". When people had dog teams, hunters would collect the left over meat that killer whales left behind and cache it for their dogs.

Killer whales disturb all marine mammals including all seals and whales. The only animals that killer whales seem to leave alone are walruses. Tusked narwhal are also not a target of killer whales. They definitely prefer non-tusked narwhal. Hunters have only found dead beached non-tusked narwhal with their bones crushed. Swimming narwhal have also been seen with tooth marks on their tails.

There are many concerns about killer whales including:

- there are more killer whales now than ever before and they seem to be around almost every summer;
- killer whales are killing too many narwhal as well as other marine mammals such as bowhead whales and seals;
- the narwhal population may be affected by killer whale predation;
- fear that killer whales may over turn boats; and
- the potential relationship between increases in killer whales in the Arctic and climate change.

Hunters think something needs to be done about killer whales. They wonder how the number of killer whales can be reduced. Hunters posed a number of questions:

- *Should the killer whale population be controlled?*
- *How can they be scared away?*
- *Can a walrus tusk (or another white object) be used to scare away killer whales?*
- *Can DFO do something?*
- *Are hunters allowed to kill the killer whales?*

Killer whales can also make it much easier to hunt narwhal and other marine mammals.
In the summer of 1999 "too many narwhal were killed because of killer whales... we exceeded our quota". In 1998, killer whales made narwhal hunting easier and in 2000 hunters from Hall Beach were getting narwhal in Lyon Inlet because of killer whales.

4.5 Narwhal Management Issues

The workshop stimulated discussion not only on Inuit knowledge of narwhal but also on social and economic issues related to narwhal and narwhal management. Narwhal and other wildlife play a vital role economically and culturally in Repulse Bay.

4.5 – 1 How Important is the Tusk?

People hunt narwhal both for food and tusks. Narwhal tusks are an important source of income for hunters and their families in Repulse Bay. There are few jobs in the community and hunters "need money to keep hunting" narwhal and other wildlife that supply food and other income. One of the reasons that hunters stay close to Repulse Bay when hunting is because it is cheaper. For many families hunting is their main source of income.

Narwhal tusks can provide a substantial amount of money to a hunter and his family. As described,

> *we see the ones with big tusks and we see money because we do not have jobs. We see males with tusks, we pass them because we are looking for the biggest one. Because what we are thinking of is with the bigger tusks we can get some money to buy gas so we can hunt for our families or we could go hunting into different or more productive areas.*

There is also a growing human population in Repulse Bay and increasing need for maktaaq and meat. An elder commented that "there are people who are hungry in Repulse Bay...we need that meat and maktaaq". "Without jobs our younger generation will continue to hunt more and more narwhal because they do not have any other way of earning a living either for food or for income". Without "more employment and income" there will not

be less hunting. In particular for narwhal hunting "how can we slow down the hunt when the tusk gives so much money?".

4.5 – 2 Relationship with DFO

Hunters want community based management to be a success and are ready to work with DFO to achieve this goal. Hunters want to have a positive relationship with DFO. They would like to see a hunter and scientist meeting or workshop in the future where people can talk face to face about issues. They feel there have been misunderstandings in the past but it is "only a quarrel" that can be overcome.

Hunters are happy that traditional knowledge research is taking place and feel that Inuit knowledge is as important as scientific work. When research takes place they believe that hunters need to be involved in the process from beginning to end. In some cases researchers come into the community and work with hunters and then no one hears about the results. It would be better if hunters could work more closely with groups like DFO.

There is a sense of urgency on dealing with narwhal management. People are worried that "if we don't set up a proper narwhal community management system, DFO may intervene and impose a system on us". Going back to a quota system is not what the community wants. Hunters would like to work with DFO to avoid this. The quota system is considered a negative situation that "forces us to do things we do not want to do".

4.5 – 3 System for Narwhal Information Collection

At the workshop a number of times hunters referred to information they collected and gave to the HTO. Information including:

- the approximate location where narwhals were hunted,
- the number of animals wounded and lost,
- the size and sex of the animals,
- where the animal was struck on the body,
- any marks seen on the animal, and
- the date animals were hunted.

This information could not be found at the HTO office. Members of the HTO thought the information had been sent to DFO in Winnipeg, although they were not sure who the information was sent to. Although hunters dutifully collect the information it is done because it is a requirement and not because it is useful to them.

In fact a number of different groups ask HTOs to collect information. Under the quota system DFO requires HTOs to have tags issued for animals landed and collect some basic information, such as the date the narwhal was killed and the sex of the animal. For the community based management system HTOs agreed to develop a recording system for all narwhal landed, wounded and escaped, and struck and lost. The NWMB also requests hunting information. There are other information requests from time to time linked to other research projects.

Information collection at this time is not co-ordinated and it appears that at least some information is being lost. Even if it is not being lost it is not being used as a resource at the community level.

5.0 DISCUSSION AND RECOMMENDATIONS

The discussion is set out in the same topic areas as the workshop results:

- Narwhal Hunting;
- Hunters Knowledge of Narwhal; and
- Narwhal Management Issues.

Major issues for each topic area are reviewed and recommendations are made.
The majority of the recommendations are directed to the Arviq HTO, NWMB and DFO as they are the main groups involved in the community based management system.

5.1 Discussion and Recommendations: Narwhal Hunting

There are a number of issues related to narwhal hunting:

- Hunting Techniques and Practices;
- Providing Direction for Young Hunters;
- Establishing a Sustainable Hunting Level for the Hudson Bay Narwhal; and
- Community Based Management of the Narwhal Hunt.

5.1-1 Hunting Techniques and Practices

Workshop participants identified how they were improving hunting techniques and practices in order to minimize narwhal losses and waste. One of the techniques described was using a harpoon before shooting the animal. Another practice that was discussed was approaching pods to identify whether animals were male or female and then only hunting those that were male (saving the reproductive females). These are techniques being adapted to improve hunting practices and strengthen community based management.

All practices and techniques that are improving how narwhal are hunted and reduce loss rates should be reviewed and encouraged at the community level. One possible way of accomplishing this is to amend the community hunting rules or Arviq HTO by-laws to reflect these hunting practices.

Recommendation:

The Arviq HTO should review positive hunting practices already being used by hunters and amend by-laws to require all hunters to use these hunting practices that minimize narwhal loss rates and reduce waste.

5.1 –2 Providing Direction for Young Hunters

A number of times it was mentioned throughout the workshop that information and traditional knowledge needs to be passed on to the younger generations. Everything that is possible should be done to pass on Inuit knowledge to younger hunters and youth. The long term future of community based management will depend on the involvement of younger people.

Workshop participants discussed some hunting tips for younger hunters. The information provided is a good beginning for a booklet on hunting tips that could include where and how to harpoon and shoot a whale, what equipment is needed to hunt, how to butcher a whale as well as much more information.

Recommendations:

DFO, the Arviq HTO and hunters should work together on an information package for younger hunters and youth on narwhal hunting that promotes positive hunting practices and the involvement of younger people in hunting.

DFO, the Arviq HTO and hunters should work together on making information from the narwhal traditional ecological knowledge workshop available to young people.

5.1 – 3 Sustainable Hunting Level for the Hudson Bay Narwhal

There is a difference of opinion between the Arviq HTO and DFO on what is a sustainable hunting level for Hudson Bay narwhal, the sustainable hunting level meaning that the number of narwhal hunted is not more than can be replaced naturally by the population through reproduction. The DFO quota for Repulse Bay is 25 narwhal per year (based on historical hunting levels) while the Arviq HTO has set their maximum allowable of landed narwhal per year to 100. This is a significant difference that needs to be addressed.

The Arviq HTO and DFO need to work together to come to an understanding as to the status of the narwhal population. The information in this report and the results of the DFO aerial survey, conducted in August of 2000, should be a starting point for discussions between the Arviq HTO, DFO, NWMB and all other groups involved in the management of the narwhal population. The Repulse Bay hunters have requested a meeting or workshop with DFO to discuss this issue as well as other issues. Consensus needs to be reached on this issue.

Recommendation:

DFO should meet with the Arviq HTO and Repulse Bay hunters to review current information on the population numbers of the Hudson Bay narwhal and discuss what level of hunting is sustainable.

5.1 – 4 Community Based Management System in Repulse Bay

The change from the quota system to community based management is a large one. It is not surprising that there have been some problems. The Arviq HTO is trying to address concerns expressed by DFO and NWMB over the catch level in 1999. In the workshop hunters clearly expressed their preference for working through the HTO to solve management problems. Hunters are more willing to work with the HTO instead of outside groups to address issues. The sense of responsibility and ownership provided by community based management can not be underestimated as a positive force for better management.

However, for community based management to be viable in the long term there needs to be more co-ordination and communication with other management groups. At present most feedback on the new system happens when there is an obvious problem. At least once a year a formal meeting of all the groups participating in the community based management system should take place to review progress made as well as issues.

Recommendation:

A formal review process be designed by all management groups including the Arviq HTO to provide yearly feedback to Arviq HTO on community based management of narwhal.

5.2 Discussion and Recommendations: Hunters Knowledge of Narwhal

Discussion on narwhal knowledge focuses on information gaps identified by workshop participants. In particular more information is needed on killer whales, narwhal wintering areas and migration routes.

5.2 – 1 Killer Whales

Killer whales from the perspective of Repulse Bay hunters are a management issue.
They take an unknown number of narwhal and local knowledge shows that they prefer female narwhal. They may be having an impact on the narwhal population. More research is required to assess the impact of killer whales on narwhal.

Killer whales also make narwhal hunting much easier and they appear to be in the Repulse Bay area more often. The Arviq HTO should consider a hunting management strategy for when killer whales are in the area to avoid over hunting and narwhal losses.

Recommendations:

DFO should develop a research project aimed at assessing the impact of killer whales on narwhal including numbers of killer whales, trends in abundance, seasonal occurrence and distribution.

The Arviq HTO should develop a management strategy for narwhal hunting when killer whales are in the area.

5.2 – 2 Narwhal Wintering Areas and Migration Routes

Although there are a number of theories as to where narwhal winter there is no one definitive answer. Identifying wintering areas will also help identify narwhal migration routes particularly in the spring. More scientific research is required to pinpoint narwhal wintering areas and migration routes. Local knowledge may also be helpful in identifying narwhal population boundaries, wintering areas and migration routes. People in other communities such as Igloolik and Cape Dorset may have information on narwhal sightings during the spring, fall or winter.

Recommendation:

DFO, through scientific research and local knowledge studies in other communities, should investigate where the wintering areas and migration routes are for the Hudson Bay narwhal population.

5.3 Discussion and Recommendations: Narwhal Management Issues

The overall workshop focus was community based management of narwhal. One aspect of community based management not yet covered is narwhal information collection.

5.3 –1 Narwhal Information Collection

Information on narwhal is being collected at the community level for various projects. For the community based management pilot project the Arviq HTO is collecting information on the number of narwhal wounded, lost and landed. They also collect information on the size of narwhal, location where narwhal were taken and other information. The information collected at the community level for outside groups needs to be better co-ordinated. Outside groups need to provide more support to the community for information collection. With better co-ordination and support more efficient information collection could take place.

Records of all information collected should be available at the HTO office as well as the offices of the groups using the information. Records at the HTO office should show:

- for what project the information is being collected;
- why the information is being collected;
- who the contact person is on the project and where this person can be reached;
- what information is being collected; and
- data collected to date.

Feedback to the community on information collection results and how the information is being used is important. Results and analysis of the information collection should be made available to the Arviq HTO in order that they can use the information for narwhal management.

Recommendation:

Groups that require information collection such as DFO should work with the Arviq HTO to better co-ordinate information collection, information storage and timely feedback to HTO of results.

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