

NUNAVUT POLAR BEAR CO-MANAGEMENT PLAN

(to replace existing MOUs)

THIS DRAFT IS BASED ON INPUT RECEIVED FROM HTOs AND COMMUNITIES

PREFACE

Management of polar bears in Canada is conducted at the territorial and provincial level. In Nunavut, the management of all wildlife is ultimately governed by the Nunavut Land Claims Agreement (NLCA). Within the direction of the NLCA there must be an effective role for Inuit in all aspects of wildlife management. The management of polar bears will be based upon the best available scientific knowledge and *Inuit Qaujimajatuqangit* (IQ). The process for decision-making is clearly defined under the NLCA.

The Minister of the Environment and the Nunavut Wildlife Management Board (NWMB) hold the ultimate responsibility and primary responsibility for wildlife management respectively under the NLCA. The NWMB has the responsibility of approving management plans (Article 5 section 5.2.34 d(i)). This plan has been prepared with the cooperation of Nunavut Tunngavik Inc, the Department of Environment, Regional Wildlife Organizations, Hunters and Trappers Organizations, and the input and involvement of Inuit of all Nunavut communities.

Success in the management of polar bear depends on the commitment and cooperation of all the stakeholders that will be involved in implementing the directions set out in this plan.

Implementation of this management plan is subject to appropriations, priorities, and budgetary constraints.

EXECUTIVE SUMMARY

This management plan has been developed cooperatively by co-management partners to improve on the existing polar bear management regime in Nunavut. It replaces the Memoranda of Understanding that have directed management efforts up to this point. These management efforts have been instrumental in helping polar bear populations recover from the lows of the 1950s and, at the same time, providing harvest opportunities for Inuit.

This plan is intended to provide guidance and direction to the co-management partners that will help them with their decision-making and to identify goals and objectives for polar bear management. Improved communications, stakeholder participation, and cooperation will be fundamental to the plan's success.

Previous management relied heavily on scientific monitoring and modeling to determine sustainable harvest rates. This method has been effective and will continue to be used, but it has not allowed for the full participation of Inuit, despite significant improvement over the last decade. Improving the collection and use of *Inuit Qaujimajatuqangit* (IQ) and higher levels of Inuit participation in all aspects of management are central to the goals of this plan.

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1. INTRODUCTION

The management of polar bears in Nunavut predates the Nunavut Land Claims Agreement (NLCA) by several decades. In the 1960s and 70s, harvest restrictions were placed on Inuit with little or no consultation. Restrictions (e.g., limiting how many polar bears can be harvested per year per subpopulation) were the primary means of helping populations to recover that were deemed to be too low as the result of unsustainable harvest. Since those early days of polar bear conservation, the implementation of the NLCA and improved research and understanding of polar bears have strengthened the management of the species and the involvement of Inuit. Over the last 50 years, the objective of polar bear management has been to help polar bear numbers to recover. This objective has been achieved and the focus of polar bear management now needs to shift to maintaining, or even slightly reducing numbers in areas where public safety is at risk and/or where there are detrimental effects on the ecosystem because of an over-abundance of polar bears. This management plan is being developed to direct polar bear management in Nunavut for the next seven years and to improve the process of involving and engaging Inuit in the management of polar bears.

Inuit perception based on hunter observation (confirmed by scientific studies in most Nunavut subpopulations) is that polar bear numbers have increased since the observed lows of the 1950s and 60s. During this time period polar bears did not pose a serious threat to human safety; Inuit did not worry about going camping in those days and life generally existed in seasonal camps where families were safe. Today, however, there are safety concerns as a result of the increase in polar bear numbers in most subpopulations in Nunavut. Despite science and traditional knowledge/IQ agreeing that polar bears have increased since the 1950s, there is still conflict between Inuit observations and the general public's perspective on the status of the species. Pressure from national and international environmental and non-governmental organizations, climate change advocates, and the general public at large to conserve and protect polar bears has created contention about whether polar bear populations still need to increase, despite the fact that Inuit believe there are now so many bears that public safety has become a major concern. Public safety concerns, combined with the observed effect on other species (e.g., ringed seal and water fowl populations) have made it apparent that in many Nunavut communities the polar bear has exceeded the co-existence threshold of Nunavummiut, and it is likely that the ecological carrying capacity in some areas has been reached as well.

"...in my lifetime we have seen opposite ends of the spectrum where when I was a child we saw no bears and now we can see 40 bears a year near town" Sandy Akavak, Elder, Kimmirut

In Canada, polar bears have been managed to increase populations since the 1970s through sustainable hunting practices. Historically, polar bears were predominantly harvested by indigenous peoples. With the onset and expansion of whaling and sealing activities, as well as the growing fur trade and Arctic explorations and expeditions during the late 1800s and early 1900s, polar bear populations across the

Arctic were put under immense pressure from hunting. The five polar bear range states, Russia, Canada, the United States, Norway and Denmark, realized that polar bears needed protection to prevent a further decline in numbers. Out of this conservation need, the International Agreement on the Conservation of Polar Bears and their Habitat was born and was signed in 1973. Aspects of the existing polar bear management regime include the setting of sustainable harvest levels, maximizing the harvest through sex-selective harvesting, reporting and submitting harvest data and samples, as well as non-quota limitations (NQLs) that include the protection of family groups. Although sometimes seen as restrictions on Inuit, these initiatives have received the support of Hunters and Trappers Organizations (HTOs) since their introduction.

Although Inuit support Nunavut's polar bear management efforts, it is also Inuit who are most affected by reduced harvests and polar bear damage to property, including to cabins and food caches. It is this contrast between restrictions that are perceived to be unreasonable during a time of comparative healthy population numbers and public safety concerns that undermine this critical support. Even the listing of polar bears as a species of special concern under the federal *Species at Risk Act* is at odds with the Inuit perspective. Despite the listing, Inuit do not believe there is a serious conservation concern because polar bears have increased in numbers over the last 50 years and are highly adaptable to some environmental changes.

2. GUIDING PRINCIPLES

The following principles will guide conservation and management decisions within the framework of the NLCA:

- To integrate Inuit societal values and Inuit traditional knowledge fully, collectively called Inuit *Qaujimaqatuqangit* (IQ), in polar bear management;
- To consider the best available scientific data and IQ when making management decisions;
- To consider public safety in management actions;
- To consider the ongoing social, cultural, and economic value of the polar bear in decision-making;
- To consider how the polar bear interacts with the ecosystem as a whole, including the cumulative effects that are the result of human activities;
- Where there are threats of serious or irreparable damage to polar bear populations, lack of certainty will not be a reason for postponing reasonable or precautionary conservation measures.

3. GOALS OF THE POLAR BEAR MANAGEMENT PLAN

- To maintain viable and healthy subpopulations of polar bears for current and future generations and to assure that they remain as a functioning part of the landscape;
- To consider other aspects of the ecosystem when we consider polar bears;
- To ensure that Inuit values remain a central foundation in polar bear management;
- *Inuit Qaujimajatuqangit* and western scientific knowledge will be considered in decision-making. When there is divergence between the two, both perspectives will be considered.

4. SPECIES DESCRIPTION

Inuktitut name – Nanuq, Nanuk

English name – polar bear

French name – Ours blanc

Latin name – *Ursus maritimus* (Phipps 1774)

4.1 Status:

Canada: Special Concern (*Species at Risk Act*)

IUCN: Vulnerable

4.2 General description

The polar bear is a top predator characterized by low reproductive rates, a long life span, and late sexual maturity. It is a member of the taxonomic family *Ursidae* and is well-adapted to life on the sea ice and in the water. The webbed and enlarged front paws make the polar bear a strong swimmer and its curved claws are well-suited for “hooking” seals, their primary food source. Other adaptations to the Arctic environment include furred pads on the paws and black skin. The black skin helps the polar bear to absorb solar energy and the furred paws offer improved insulation and enhanced traction on snow and ice. Polar bear fur usually appears to be white, but it also may be yellowish or off-white, depending on the time of year and sometimes the gender of the bear. Polar bears exhibit extraordinary strength when crushing through the sea ice, digging into birth and haul-out lairs of seals, and moving large boulders to get at meat caches. As adults, males are larger and heavier than females: males can weigh around 800-1000 kg, and reach lengths of up to 300 cm. Females do not usually exceed 400 kg in weight and 250 cm in body length.

4.3 Distribution

4.3.1 Global range

Polar bears occur as a circumpolar species in the sub-arctic and arctic regions of the northern hemisphere. It was initially believed that they originate from a single population that ranged throughout the Arctic, with animals being carried passively on

the sea ice by currents. However, satellite telemetry studies and mark-recapture data have shown that they do not wander throughout the Arctic, but rather show seasonal commitment to local areas. It is recognized that movements and distributions are mainly determined by how sea ice is generally used as a platform for feeding, mating, and denning. Globally, all polar bears are divided into 19 “subpopulations”, 13 (excluding bears of the Arctic Basin) of which are in Canada (figure 1). There is an estimated world population of between 20,000 and 25,000 polar bears. Approximately 14,000 to 16,000 polar bears are found in Canada (See *Appendix A* for current status). The majority of Canada’s polar bear subpopulations are found in Nunavut. Because of the environmental characteristics of the Canadian northern archipelago, two-thirds of the world’s polar bear population are found in Canada.

The 12 recognized subpopulations in Nunavut are:

Baffin Bay, Davis Strait, Southern Hudson Bay, Western Hudson Bay, Foxe Basin, Kane Basin, Lancaster Sound, Norwegian Bay, Gulf of Boothia, M’Clintock Channel, Viscount Melville, and Southern Beaufort.

4.3.2 Nunavut range

As of 2015, there are 12 recognized subpopulations of polar bear within Nunavut. Eight of these subpopulations are shared with other jurisdictions and user-groups and four are entirely within Nunavut (figure 1). A more detailed background and description of Nunavut’s polar bear subpopulations is provided in *Appendix B*.

4.4 Biology

4.4.1 Life cycle and reproduction

Breeding occurs between March and June. When a male mates with a female, ovulation is induced, although implantation of the fertilized egg is delayed until October. Female age at first reproduction varies among the subpopulations and usually ranges between four and seven years of age, with most subpopulations having females producing litters at relatively high rates by age six. By age six, male polar bears are normally reproductively mature, but younger males are often not able to reproduce because the older and bigger males prevent them from doing so. It appears that most males do not enter the reproductive segment of the population until they are between eight and ten years old.

Pregnant females prepare and enter maternity dens in late fall and the cubs, normally one or two, are born between November and early January. IQ suggests that the timing of birth varies with latitude. Dens are generally excavated in snow, and are then covered and closed by snowdrifts. They are frequently located on islands or land that is near the coast and adjacent to areas with high seal densities in spring. An anomaly to this pattern of behaviour is the maternity dens for the Western Hudson Bay polar bears: their dens are up to 120 km inland at traditional denning areas, and initially dug in soil.

At birth, cubs weigh approximately 0.6 kg. They are nursed inside the den until sometime between the end of February and the middle of April. By this time, cubs

weigh 10-12 kg. A new litter is produced after three years of raising cubs, making the average inter-litter interval approximately 3.6 years.

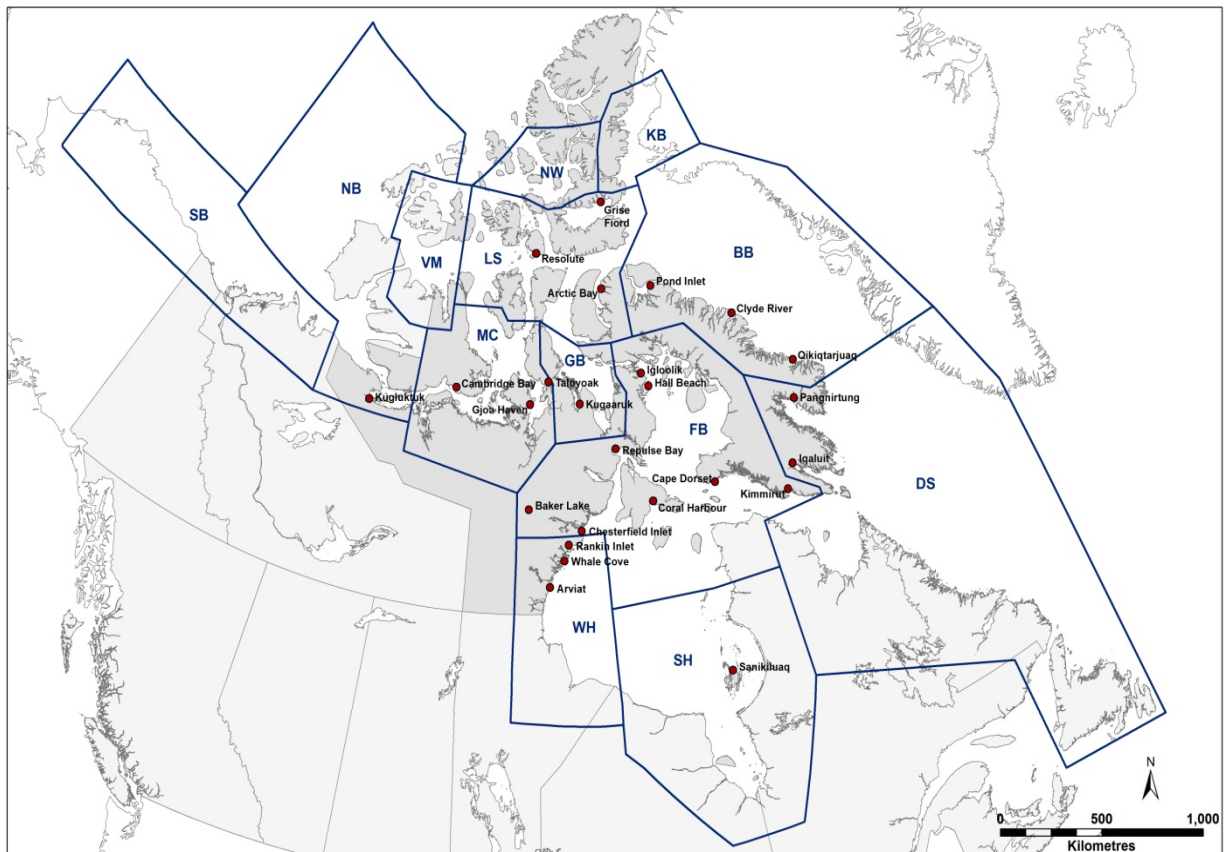


Figure 1. Canadian and Nunavut (dark grey) polar bear subpopulations [BB = Baffin Bay; DS = Davis Strait; SH = Southern Hudson Bay; WH = Western Hudson Bay; FB = Foxe Basin; GB = Gulf of Boothia; MC = M'Clintock Channel; LS = Lancaster Sound; KB = Kane Basin; NW = Norwegian Bay; VM = Viscount Melville; NB = Northern Beaufort; SB = Southern Beaufort.

4.4.2 Natural mortality and survival

Aside from humans, polar bears have been observed and documented as posing a threat to other polar bears. Inuit have observed predation by wolves on polar bear cubs-of-the-year. Walrus have also been reported to kill polar bears in self-defense but this is infrequent. Every main life stage of a polar bear has different challenges; therefore the survival rates vary accordingly. Moreover, the survival rates for these life stages also vary slightly among Nunavut's polar bear subpopulations because of the differences in ecosystem productivity. In general, biologists recognize four important age categories: 1) cubs-of-the-year (COYs); 2) yearlings and sub-adults, 3) prime-age adults, and 4) senescent adults. These categories are also divided by gender because males generally have lower survival rates than females. In the wild, the maximum age a polar bear can reach is estimated to be 30 years.

Inuit recognize 11 different age categories/class of polar bears. They are 1) *Atiqtaqtaq* – a newborn cub, 2) *Atciqtaq* – a cub, 3) *Piaraq* – a cub that is with its

mother, 4) *Advarautaq* – a cub that is about one year old, 5) *Nalitqaihiniq* – when a cub is a little bigger than an *advarautaq* (a bit bigger than a sled dog, about the height of the mother’s belly), 6) *Namiasq* – offspring that is the same size as its mother, 7) *Nukaugaq* – a young male, 8) *Tadzaq* – an adult female, 9) *Anguruaq* – a full grown male, 10) *Arnaluit* – a pregnant female, 11) *Piaralik* – a female with cubs. Although some of these age categories are general and specific for the same age, they represent the diverse understanding Inuit have of polar bears.

4.4.3 Diet

Polar bears are highly carnivorous. Throughout their Nunavut range, the ringed, bearded and harp seal make up most of the polar bears’ diet. Other species like walrus, Beluga whale, narwhal, bowhead whale, birds, and harbour seal are also preyed upon opportunistically and polar bear also eat eggs, berries, and seaweed,

The polar bear diet varies throughout the year and across its range. Primary feeding tends to be in spring when seal pups are abundant; however, polar bears will hunt and scavenge throughout the year, feeding opportunistically on almost anything. For example, in seasonally ice-free areas where bears move on shore, vegetation, berries, eggs, birds, and other terrestrial or marine-based food items are consumed. Fish and ringed seals are also successfully preyed upon when there is little or no sea ice in summer.

Polar bears are energetic marvels that are well-adapted to times of food abundance and shortages. When food is in high abundance, polar bears can increase their body mass significantly. When food becomes scarce or unavailable, polar bears can live off their stored fat reserves.

4.4.4 Habitat

Polar bears can be found in all areas of the Canadian subarctic and arctic. Access to land is essential for both ice-free periods and for denning mid-winter. They also use the marine environment for hunting marine animals. Polar bears have adapted to all types of sea ice. They are also strong swimmers and are capable of traveling long distances in open water. Inuit have observed that bears can exist in open water and on sea ice for the majority of their lives (the Inuktitut term for this is *tulayuituq*).

In Nunavut, polar bears den mostly on land. Denning sites are locations that have sufficient snow cover in early winter for the construction of the dens. Dens can also be found in the moving multi-year ice and areas of annual rough ice. All maternity denning sites are important areas because they provide shelter for the mother and offspring. All maternity denning sites are protected under the *Wildlife Act*.

5. BACKGROUND

5.1 Historical perspective

The current polar bear management system in Nunavut dates back to the Northwest Territories prior to the creation of Nunavut. This system includes the setting of harvest quotas (now called Total Allowable Harvest or TAH), instituting harvest seasons, and harvest reporting and sample submission. After the creation of Nunavut, co-management agreements for each subpopulation were implemented to guide harvest and management.

5.2 The Nunavut perspective

Management in Nunavut has focused on sustainable harvest, based on population estimates derived from scientific studies. Although populations were low prior to the 1970s (the reason for the International Agreement on the Conservation of Polar Bears) they have recovered or increased since that time, and as of 2015 remain largely stable or are slightly increasing under current harvest levels.

Nunavummiut also believe that polar bears are currently less afraid of humans and more likely to damage property, such as cabins and food caches, as the result of an overabundance in some areas. In Nunavut, human safety and the right of Inuit to harvest polar bear are high priorities. This combination of more bears and a right to protect human safety and property has led to an increase in defense kills. This can lead to a situation in which the community harvest is reduced to account for defense kills, resulting in a loss of opportunity for traditional harvesting activities.

Polar bears are effective and opportunistic predators. IQ suggests that they are resilient and capable of adapting to various environments, as indicated by their wide range of occupancy in the subarctic and arctic. Polar bears can survive and hunt on land and in open water as well as on sea ice. Polar bears have also been documented and observed feeding on multiple sources of food, including berries, seaweed, fish, birds, eggs, walrus, bowhead, narwhals, beluga, and other types of seals.

Although southern portions of the polar bears' range may be experiencing longer ice-free periods, with negative effects on body condition and survival, there are areas where multi-year ice has been replaced by annual sea ice, suggesting that such areas may improve productivity and become more beneficial to polar bears.

5.3 Legislative frameworks and agreements

In Nunavut, wildlife is managed according to Article 5 of the Nunavut Land Claims Agreement. Article 5 sets out the creation of the Nunavut Wildlife Management Board (NWMB), which is the primary instrument of wildlife management in Nunavut. It defines the roles of the NWMB, government, Hunters and Trappers Organizations (HTOs), and Regional Wildlife Organizations (RWOs).

In 1973, Canada was a signatory to the International Agreement on the Conservation

of Polar Bears. The Agreement holds member states accountable for taking action to protect the ecosystems in which polar bears live, paying special attention to places where polar bears den, feed, and migrate. Range states also must manage polar bear populations in accordance with proper conservation practices, based on the best available scientific data. Recently, the range states have agreed to include Inuit traditional knowledge as part of the body of knowledge to be considered for polar bear conservation and management.

In 2011 the polar bear was listed under the federal *Species at Risk Act (SARA)* as a species of special concern. While there are no associated effects on Inuit harvest or management actions, a national management plan must be developed to prevent a species from becoming threatened or endangered. The Nunavut-based plan will form part of the national plan.

The Nunavut *Wildlife Act* sets out harvest management, licensing, reporting and sample submission. Further details on management, including research, harvest, and TAH determinations have been detailed in previous Memoranda of Understanding (MOUs) developed for all subpopulations (12) jointly with Regional Wildlife Organizations (RWOs), Hunters and Trappers Organizations (HTOs) and the Department of Environment (DOE). These MOUs are intended to be replaced with this management plan.

In Nunavut, each of the co-management partners fulfills its respective role as defined in the NLCA. This plan applies to the Nunavut Settlement Area as defined in section 3.1.1 of the Nunavut Land Claim Agreement.

6. POLAR BEAR CO-MANAGEMENT IN NUNAVUT

6.1 Nunavut Tunngavik Inc.

Nunavut Tunngavik Incorporated represents all Inuit beneficiaries in the Nunavut Settlement Area, in line with the NLCA that was signed in 1993 by the Inuit of Nunavut and the Government of Canada. The NLCA is constitutionally protected under Canada's *Constitution Act*, 1982.

6.2 NWMB

The NWMB's role is defined in the NLCA, sections 5.2.33 and 5.2.34. Its role consists of, but is not limited to, setting Total Allowable Harvest rates (TAH) and Non Quota Limitations (NQLs). In addition, it approves management plans and the designation of rare species.

6.3 RWOs

The role of RWOs is defined in section 5.7.6 of the NLCA. Its role includes, but is not limited to, regulating the activities of HTOs in their regions, including allocating TAH among communities, and distributing any accumulated harvest credits as required to cover accidental, defence, or illegal kills. The RWO may also return credits annually to augment a community's harvest. Credits may not be transferred between communities that share a population without the written consent of the community that accumulated the credit.

6.4 HTOs

The role of HTOs is defined in sections 5.7.2 and 5.7.3 of the NLCA. These roles include, but are not limited to, regulating the harvesting activities of their members, including all beneficiaries within the community. They allocate tags for species with TA, and set harvest seasons. As per the NLCA, the HTOs may develop rules for non-quota limitations. They may also open and close their polar bear hunting seasons to optimize polar bear hunting for their communities.

6.5 GN-DOE

The Minister of Environment retains the ultimate authority over wildlife management in Nunavut as per the NLCA. DOE staff conduct research, work to collect IQ, and make management recommendations to the NWMB for decision. Conservation officers enforce the *Wildlife Act* and its regulations. DOE implemented new programs starting in 2013 to reduce human-bear conflicts, and to reduce and compensate for damage to property as a result of bears.

7. CONSERVATION ISSUES AND CHALLENGES

7.1 Industrial activity and tourism

There is considerable potential in Nunavut for industrial activities to be harmful to polar bears and their habitat. There are several active and proposed mines, and other industrial pursuits in Nunavut that could affect bears through their direct activities, or through increased shipping traffic and pollution. Noise and disturbance from humans or exploration activity in any form near dens could cause disturbance, the abandonment of offspring, or the displacement of denning bears if it is not carefully planned and controlled. Any shipping activities through primary feeding areas may lead to disturbance and reduce the hunting success of polar bears. These activities could also increase the abandonment of seal dens. If any industrial activities (e.g., oil or gas exploration and development, shipping, mining exploration and operations) lead to an oil spill in sea ice habitat, polar bears and seals will be directly exposed to oil, with effects ranging from ingestion, hair loss, kidney failure, and ultimately death. Any increase in industrial activities will cause an increase in the local human population, the amount of refuse, and other wildlife attractants. As a

consequence, bear-human encounters are also likely to increase, leading to a potential increase of injury and/or mortality.

There always has been a great interest in the Arctic and its resources and wildlife. This interest has recently grown as the result of easier access to remote destinations across the Arctic. An increase in human activity (e.g. by boat, ATV and snowmobile traffic) increases the amount of disturbance to polar bears. Currently, Nunavut does not have a polar bear viewing tourism industry as sophisticated as Manitoba, but various locations in Nunavut offer similar opportunities that could become focal points for intense polar bear viewing. Although some side effects of tourism can be controlled by proper policies and management, the cumulative impact of several negative stressors (e.g. disturbance, environmental changes, contaminants) is not clear and therefore warrant heightened awareness.

7.2 Pollution/contaminants

Polar bears are at the top of the Arctic food chain, and as such accumulate high levels of various environmental pollutants through the food they ingest. A majority of these polluting compounds, mostly organochlorines, reach the Arctic via wind and ocean currents from industrialized areas. These compounds are usually fat soluble and remain in fat tissue, with concentrations accumulating progressively at higher levels throughout the food chain. It has been demonstrated that various organochlorines are passed from mothers to cubs through their milk.

How these pollutants and chemical compounds affect polar bear populations and their health and fitness over the long-term is not well known. However, it is very likely that their survival and their immune and the reproductive systems are negatively affected. With new pollutants and their uncertain long-term effects being detected in polar bears, a combined and reinforced response to these and other stressors is anticipated.

7.3 Habitat alteration

7.3.1 Climate change

Climate change is affecting both the terrestrial and marine environment in Nunavut, however, the impact on polar bears is not clear at this time. It is challenging to predict and mitigate the effects of climate change on the polar bear sea ice habitat. Adaptive management and increasing the frequency of subpopulation assessments will allow for more responsive decision-making in response to climate change. The loss of annual sea ice in southern subpopulations may be offset by improvements to heavy multi-year ice in other portions of the range. Subpopulation boundaries may shift as bears adapt to fluctuations in their environment.

*“..people (in the south) think climate change will hurt polar bears
but the bears will adapt, and there will always be an arctic and ice”
Leopa Akpalialuk, Pangnirtung HTO board member*

7.3.2 Denning

Other important habitat includes denning and summer retreat areas. In Nunavut, polar bears den mostly on land, either along the slopes of fiords, or on peninsulas or islands. All maternity denning sites are important areas because they provide shelter for the mother and offspring, and contribute to the growth of the population

A significant amount of polar bear habitat, including known denning areas, are currently protected by national parks, territorial parks, or other protection areas, such as bird sanctuaries. Existing protected areas will play an increasingly important role in the face of growing development in the Arctic.

7.4 Population boundaries

The division of polar bears into subpopulations is based on movement patterns from satellite telemetry, as well as tag returns of harvested bears. Although this system is accepted for management purposes, it is understood that bears do not remain within these man-made boundaries at all times; in fact, they move and respond to their environment. These boundaries have formed the basis for management actions for over four decades and have been beneficial to managers for setting harvest levels and for researchers focusing their population assessment studies.

Inuit believe that polar bears travel regularly between different geographic areas of Nunavut and that there may be fewer than 13 subpopulations in Canada. As our understanding of the genetic structure of polar bear populations improves, there will be an ongoing need to review this information in the context of management unit delineation. Current and future studies using satellite telemetry collars may provide information that could result in boundary changes. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has designated one unit for polar bears in Canada based on the known genetic structure at the time, as well as criteria for defining designatable units. The committee recognizes the need for existing management units and makes its assessment based on those known units.

7.5 Polar bears and people

Inuit have been living in close proximity to polar bears for thousands of years. Historically, bear population levels were lower and, as a result, bears were more scattered on the landscape. The human population in Nunavut is currently higher than it has ever been and continues to grow, with most of the population concentrated in 25 communities. At the same time, it is recognized that, in many areas across Nunavut, there are more bears now than 40 or 50 years ago thanks to more rigid harvest monitoring and controls over this period. As a result, bear-human interactions are increasing, leading to an increase in defense of life and property kills of polar bears (DLPK). These DLPKs are taken into account in the TAH and the community harvest and have the negative effect of reducing Inuit hunting opportunities. However, they do not increase the overall harvest because they are not added to the existing harvest. This situation occurs not only in communities, but also on the land in hunting and fishing camps. Inuit have been storing/caching meat

for centuries in traditional meat caches, but nowadays there is a greater impact when caches of healthy and nutritious food become susceptible to depredation by polar bears. The loss of healthy and nutritious country food comes at a significant cost to Inuit.

Over the last decade, in many areas of Nunavut, the number of bears encountered in communities and on the land has been increasing to a point where Inuit families no longer feel safe in camps without armed monitors, dogs, and/or electric fences for protection. This is a serious public safety issue, which requires appropriate management action by co-management partners. Public safety will be considered when establishing harvest levels. It is standard practice to consider human-wildlife conflict when setting harvest levels on most big game species. Although co-management partners have committed to the development of community polar bear-human conflict plans, continued efforts at implementation, training and the funding of these plans is needed to ensure greater success.

Losing the opportunity to hunt and the loss of meat and hide are only part of the impact Inuit feel from harvest restrictions. There is also an on Inuit knowledge and culture over time when restrictions are put in place.

“...it is like ripples in a pond, we lose the hide and the meat and the hunt but there is also loss of culture and knowledge. We no longer travel to the areas we used to hunt polar bears so a generation has no knowledge of the land and traditional camping areas, we no longer have sport hunters so we no longer keep dog teams and we cannot pass on that knowledge, we no longer have skins to handle and women cannot pass on the skills to prepare and sew.”

David Irqut, HTO Director and Elder, Taloyoak

7.6 Inter-jurisdictional considerations

In Nunavut, eight of 12 polar bear subpopulations are shared with other jurisdictions. The shared populations are Northern Beaufort, Viscount Melville, Foxe Basin, Southern Hudson Bay, Western Hudson Bay, Davis Strait, Baffin Bay, and Kane Basin. It is anticipated that ongoing efforts to develop and implement inter-jurisdictional agreements for the protection and conservation of polar bears will continue. Cooperative efforts on research and consultation between jurisdictions should be encouraged as part of these efforts. Current jurisdictional efforts to consider combined total allowable removal levels and allocation between jurisdictions are a positive step for cooperative management.

7.7 International trade

The 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has been in effect since July 1975. Polar bears are included in *Appendix II* to the Convention.

In Canada, CITES is implemented through national legislation: the *Wild Animal and Plant Protection and Regulation of International and Inter-Provincial Trade Act* (WAPPRIITA). As the responsible authority for the implementation of CITES, Environment Canada must determine if the export or import of a species would be detrimental to the survival of that species. Such “non-detrimental findings” (NDFs) are a requirement of the Convention. Given the shared jurisdiction for wildlife in Canada, coordination with provincial and territorial jurisdictions is required to ensure that total removal by all jurisdictions from shared subpopulations is sustainable and defensible at the national and international level.

As of 2015, the export of polar bears from Canada is allowed under CITES because a Non Detriment Finding (NDF) has been developed (with the exception of bears harvested from the Baffin Bay subpopulation). Significant efforts have gone into maintaining ongoing export by all stakeholders.

The ongoing domestic and international export of polar bear parts, such as hides, depends on sound harvest reporting and sustainable harvest levels. These rules must apply to all jurisdictions if they are to be successful. Ensuring strict reporting of all mortality and maintaining adequate harvest records should be a benchmark for all jurisdictions. In Nunavut, this is currently done and export is continued as the result of the combined efforts of stakeholders. Communities have unanimously supported efforts to maintain international trade options for polar bears as an important component of community economic development. Uplisting polar bears to CITES *Appendix I* will have a negative impact on conservation efforts in that the economic benefit will be reduced and the incentive to manage for abundant populations will be lost.

7.8 Harvest coordination

Polar bears are classified as “presumption as to needs” species in the Nunavut Land Claims Agreement (Article 5, section 5.6.5). The TAH is allocated to Inuit. An Inuk is required to have a tag/allocation in order to harvest a bear.

In Nunavut, all human-caused polar bear mortality (regular, non-beneficiary, DLPK, illegal, accidental) is recorded and deducted from the TAH.

7. 8.1 Defence of life and property kills

When a DLPK happens, the hide, meat, and all parts of harvested polar bears are turned over to the local HTO after the conservation officer has determined that it is a legitimate DLP kill. When there is an irregular or illegal kill, the conservation officer will seize the parts of the bear necessary to complete the investigation. The specimens of the killed bears are collected as normal. When it has been determined that the kill was accidental or a DLPK, the conservation officer shall ensure that all seized parts from the kill are turned over to the local HTO. The cleaning and drying of the hide is the responsibility of the HTO because the HTO retains the hide. In all cases, the hides in question must be properly stored and preserved and returned to the HTO as soon as possible to prevent damage and loss of economic revenue.

If there is any dispute about the distribution of the hide, meat, or parts of the bear from a DLPK, the decision is deferred to the appropriate RWO. There is no payment to the HTO or the hunter for specimens, or for cleaning and drying the hide of a bear taken illegally. As per the *Wildlife Act*, all seized parts from bears taken illegally are disposed of as directed by the judicial authority.

8. MANAGEMENT PLAN OBJECTIVES

There are five main components to help co-management partners achieve the goals of the plan. They are:

- Harvest management (*Angujaujunnagtunik Aulattiniq*)
- Information and knowledge gathering (*Qanuqtuurniq*)
- Habitat management and environmental stewardship (*Avatitinnik Kamatsiarniq*)
- People and bears (*Inuillu Nanuillu*)
- Working together (*Piliriqatiginniiq*)

8.1 Harvest management and objectives (Angujaujunnagtunik Aulattiniq)

8.1.1 Harvest management

Legislated harvest restrictions have been the primary management tool to increase polar bear populations from the lows of the 1950s and 60s. The use of Non Quota Limitations (NQLs), such as harvest seasons, sex selective harvest (the harvest of two males to every one female), and the protection of family groups have been important tools for increasing bear populations. However, the sustainable harvest of females has always been an overriding management consideration. The sustainable removal rate of females is considered to be 1.5% of the population, which allows for harvest at the maximum level. In most areas, the number of bears has exceeded what Nunavummiut consider acceptable for public safety and the ecosystem. All communities report that current polar bear levels are having a negative effect on other species, such as ringed seals and waterfowl.

All human-caused polar bear kills are recorded and taken from the TAH of the nearest community. In the event that the human-caused mortality exceeds the TAH, additional tags will be issued and they will be deducted and counted as part of the next year's TAH. Unused tags will not be carried over for use in a subsequent hunting season. After June 30th of each year, all unused tags will be returned to DOE. The returned tags will be counted as credits and administered by the appropriate RWO (see flexible quota *Appendix D*). A naturally abandoned cub or yearling will be counted as a natural death.

Agreements that are independent to this plan (Inuit Impact Benefit Agreements or IIBAs) also exist between regional Inuit organizations and other organizations that also deal with DLP kills, such as mining companies and Parks Canada. Tourism operators or researchers who conduct activities on the land should be encouraged to

establish prior arrangements with HTOs for compensation, should a bear be killed during their activities.

No person shall hunt:

- Any member of a family group. If the female of a family group of cubs, yearlings, or two-year olds is killed, the cubs, yearlings, and two-year olds will be regarded as killed as well.
- Occasionally cub(s) may stay with the female into their third year and reach the same size or greater as the mother. Inuit refer to this as *Namiaq*, offspring that are the same size or larger than the mother. This age class is not considered a cub under the regulations and may be harvested.
- A female polar bear that is in a den or a female polar bear that is constructing a den.

All polar bears that are not members of a family group (i.e., are by themselves) may be harvested. If a cub or yearling is found without its mother, it may be harvested, but it must be reported to the conservation officer and the HTO as soon as possible.

The HTO may apply to the Superintendent for a Wildlife Management Permit to allow cubs or yearlings to be harvested for food and cultural purposes. The permit must be issued in advance, with a copy sent to the conservation officer. The HTO must monitor the hunt to ensure that the female (i.e., the mother) and a possible second or third cub are not harmed. A cub that is taken under this permit is applied to the TAH.

If a decline in a population is noted by science/local traditional knowledge (TK) and the objective is to increase or maintain the population, actions may include;

- Reduce the TAH or moratorium until the desired target number is reached

If an increase in a population is noted by science/TK and the objective is to decrease or maintain the population, actions may include;

- Increase or maintain the TAH
- If the TAH is increased, appropriate monitoring must be conducted as a follow-up to measure the success of the management action

Any changes to harvest management in terms of changing management objectives or TAH require a decision of the NWMB. In either case, community involvement and consultation must precede the decision-making process with the NWMB.

In general terms, most Inuit feel there are enough or too many bears and that continuing to increase populations is inappropriate. The following general objectives have been established to maintain populations and maximize harvest.

- Where appropriate or requested by communities, change the harvest to equal the sex ratio, 1 male: 1 female, and adjust TAH to ensure that the management objective is achieved.

- Maintain the flexible quota system (*Appendix D*) but revise it to reflect an equal loss of TAH or accumulation of credit for over or under harvest, respectively.

8.1.2 Harvest monitoring

Harvest reporting and sample collection have been essential components in past management and in maintaining international trade in polar bear parts. The following body parts shall be collected from each polar bear harvested and hunters will be paid for samples accordingly. In the event of defence of life and property kills the director of wildlife may authorize payment for samples collected by HTOs or individuals on behalf of the department, in the absence of a conservation officer in the community:

- (a) lower jaw
- (b) baculum, as proof of sex in the case of males
- (c) ear tags, if present
- (d) lip tattoos, if present
- (e) straight line body length and chest girth
- (g) other samples or measurements, as required.

Alternative population survey methods that do not include the capture and handling of bears physically provide less information about population status and health. Therefore, additional samples and measurements may be required to help address this loss in information. It is recognized that consultation and training may be required before additional information can be collected.

The parts that show the age, sex and species of a polar bear are teeth for the age; the jaw or skull for the species; the baculum for the gender, and a meat sample for genetic identification of the sex if no baculum was provided. DNA determination will constitute evidence of the sex. If the reported sex is different from the genetic result, the genetic result shall be considered the final sex determination for TAH purposes.

According to traditional knowledge, polar bear cubs are born in November and December. The age of a cub will be determined by the degree of canine tooth eruption for cubs, and the annular rings for cubs, yearlings, and two-year olds when the skull, jaw or a tooth is present.

8.2 Information and knowledge gathering (*Qanuqtuurniq*) and objectives

8.2.1 Gaining knowledge

Information gathering on polar bears has largely focused on scientific studies to estimate polar bear populations and trends, and to define subpopulation boundaries. Inuit resistance to these research methods has caused a shift to less invasive methods, including genetic mark-recapture studies and aerial surveys.

In addition to ongoing scientific research and monitoring, improvements are being made in the collection of IQ for use in decision-making. Inuit observe bears year round and provide the current and historical knowledge that help in decision-making. Harvester observations of body condition can be used to infer health, as can observations of

reproductive success, such as bears with single cubs, twins and triplets. On its own, this information may not be enough to make a judgment, but when combined and used to augment other sources of knowledge, the decision making process is strengthened.

The following objectives are aimed at providing information that will help in making decisions;

- Improve the frequency of population surveys
- Continue to increase Inuit involvement and participation in research
- Improve and continue gathering and archiving IQ in relation to polar bears and their habitat
- Continue to develop and evaluate new and less invasive methods of research
- Consider not only the effects of ecosystem changes on polar bears, but also how polar bears affect other species, specifically ringed seals and eider ducks
- Continue genetic research and collaring to clarify potential boundary changes further
- Continue to review developing knowledge when considering boundary changes to reflect Inuit knowledge
- Improve information reporting related to polar bears and bear-human interactions
- Improve the analysis of interaction to determine causes and potential mitigation
- Continue traditional mark-recapture and delineation studies using collars, where needed and supported by communities, or when alternative studies do not provide sufficient data for management decisions

8.2.2 Research

The intention is to conduct population inventory studies every 10 years to determine the population estimates for subpopulations. Harvest statistics are also fundamental information for management and will continue to be collected. The results of these studies will guide the future management of polar bears. When possible, a concurrent IQ study will be conducted to complement the population inventory. A schedule of subpopulation inventories and IQ studies is found in *Appendix F*.

Community residents (with priority to HTO members) shall have the opportunity to participate in polar bear research projects. HTOs will have input into the proposed studies and IQ will be used to guide research efforts.

In addition to ongoing population monitoring conducted by DOE partners, organizations and individuals are conducting ongoing research on polar bears, including on contaminants and climate change impacts, ecological studies, feeding studies and others. The information gathered in these projects, whether DOE partnered or not, will be considered in management decisions.

The shift to less invasive methods of research has been driven by community concerns, but they can come at a cost of less information. Aerial surveys, for example, need to be conducted at multiple time intervals in order to determine population trends. Where possible and when supported, physical mark-recapture methods may still be used, perhaps in cases where more detailed information is needed (i.e. a severe decline).

Any damage to the hide from research activities will be compensated for based on the reduced amount of the hide's market value. When the meat has been made unfit for human consumption by chemical immobilization within 45 days of the date of harvest, \$1000.00 compensation will be paid to the hunter who harvested the polar bear. Any bear killed in or during polar bear research activities by DOE will receive a tag from the nearest community and the community will be paid \$5,000.00 in compensation. HTOs are encouraged to work out compensation packages with other researchers or companies that may be forced to destroy a bear in defence of life and property when the community reviews the research or development permits.

8.3 Habitat management and environmental stewardship (*Avatitinnik Kamatsiarniq*) objectives

Polar bears use most parts of the Arctic and sub-arctic habitat in which they live. From annual and multi-year ice, to open water and land, they are always moving. Ensuring that habitat remains available and usable will take significant effort because of the magnitude of the Arctic and the fact that many threats originate elsewhere. Stewardship can be partially achieved through regulatory processes that occur within Nunavut. However, contaminants that are brought north by wind and ocean currents and climate change are issues that occur far beyond Nunavut.

Existing habitat stewardship is further supported by the existing parks and protected areas in Nunavut, including national parks, territorial parks and bird sanctuaries.

Objectives that promote stewardship and protect habitat must be local and also consider the broader causes and issues. These objectives include:

- Ensure that stakeholders have the resources and information to participate effectively in regulatory reviews, such as Environmental Impact Assessments
- Improve monitoring for contaminants in order to respond to potential health concerns resulting from consumption
- Consider how increasing shipping and resource development activities may affect individuals and populations, both individually and cumulatively
- Focus research to improve the understanding of climate change impacts, both negative and positive, on ecological conditions that are important to polar bears and that inform conservation and management actions
- Identify important habitats for polar bears and implement appropriate habitat protection measures through cooperation with appropriate agencies.

- Consider the creation of special management areas, parks, and other land use designations for additional habitat protection and stewardship.

8.4 People and bears (*Inuillu Nanuillu*) and objectives

Inuit have lived in close proximity to bears historically and currently. They have witnessed the recovery of subpopulations from the lows of the 1950s and 60s to their current levels. The polar bear maintains a position of significant cultural importance to Inuit. The respect for the bear and its power and hunting abilities is central to a culture that values hunting prowess. Harvesting polar bears for meat, tradition, and economic benefit is still very important and the harvest of one's first bear is a significant milestone in a hunter's life. Ensuring that defense kills are minimized and the traditional harvest is maintained are important to all communities.

The following objectives are aimed at reducing bear-human conflict:

- Continue to develop and implement community bear plans
- Hire bear monitors when needed and train and equip them
- Continue to develop and improve methods for protecting people, property, and meat caches
- Ensure that the Wildlife Damage Compensation and Wildlife Damage Prevention Programs are functional and being used.
- Improve communications to the public about bear safety, deterrence, and available programs
- Work with Hamlets and HTOs to improve local storage for meat in camps and communities as part of the bear-human conflict prevention program.

8.5 Working together (*Piliriqatiginniiq*) and objectives

8.5.1 Within Nunavut

This plan was developed with the direction of a co-management working group and the participation of all HTOs and communities. This is a positive step in improved cooperative management, but more can be done.

The following objectives will help to foster improved cooperation within Nunavut:

- Involve Inuit in research, including design, field studies and reporting
- Improve the collection and archiving of IQ so that it is accessible for planning and decision-making.

8.5.2 Between jurisdictions

Working together should also take place at the inter-jurisdictional level. Polar bear inter-jurisdictional agreements should be developed for all subpopulations that are shared with Nunavut. These agreements are underway for some subpopulations domestically and already exist between Canada and the United States, and Canada and Greenland. User-to-user groups should also pursue agreements on shared

populations; one such agreement already exists in the western portion of the Kitikmeot and the Inuvialuit in NWT.

The following objectives will help to foster improved cooperation beyond Nunavut:

- Foster user-to-user agreements between Inuit organizations and other jurisdictions
- Work toward developing compatible management regimes for shared populations
- Build cooperative research programs in areas such as population monitoring, contaminants monitoring, and traditional knowledge studies.
- Continue to improve coordination between different levels of government and stakeholders. The Canadian Wildlife Service, Parks Canada, the Department of Environment, RWOs and HTOs all have a role and an interest in implementing the objectives of this plan.
- Work toward joint decision-making processes involving all the boards linked to a shared subpopulation.

8.5.3 Sharing information and knowledge

Simply having knowledge is not enough to manage the species. Ensuring that knowledge and information are shared will help all stakeholders to make better informed decisions. Currently, information flow is sporadic and all parties need to make improvements. This is best done by formalizing information sharing through communications and outreach:

- Develop a communications strategy for sharing information
- Develop data sharing agreements with other agencies and jurisdictions
- Ensure that the results of studies, both scientific and IQ, are shared with all stakeholders.

9. IMPLEMENTATION OF THE PLAN

Achieving the objectives identified above will require the cooperation of stakeholders, jurisdictions and a significant investment of financial and human resources. No changes to existing TAH will occur until new information becomes available. Therefore, the current management objective of managing for maximum sustainable harvest will continue. Once new information is available (see *Appendix F*) the new information will be presented to the NWMB along with a review of the management objective for the subpopulation and a review of any new scientific research or IQ study. At that time, a new TAH will be recommended to achieve the objectives of the plan.

Actions other than changes to TAH are fundamental to this plan. *Appendix C* contains a number of potential actions that could help to bring about the objectives

above. Prior to action being taken, there will be appropriate consultation and dialogue with co-management partners and neighbouring jurisdictions to ensure success.

10. PLAN REVIEW

In order to be sure that the goal and objectives of this management plan have been realized, it is essential to measure progress as the plan is implemented. The review of this management plan will take place with co-management partners as new information becomes available. Ongoing management actions will continue, as required.

The number of polar bears in each subpopulation and the trends (population, reproduction, survival rates etc.) in each subpopulation, the conservation of habitat (largely the sea ice, but also denning areas), and incorporation of IQ are all key performance measures with which to measure the success of polar bear conservation. After seven years, the objectives in the plan will be reviewed with respect to the progress made. Where objectives have been met, they will be revised according to current needs. Where objectives have not been met, additional actions and new timelines may be identified. Management is an ongoing effort that evolves in line with available knowledge and information.

An annual review on the plan's specific progress and actions will be conducted by a committee composed of a representative staff member from each of the co-management partners. This committee will provide a report to all co-management partners, and specifically to the NWMB and the RWOs.

APPENDICES

Appendix A

Subpopulation Status table Subpopulation	Population estimate	±2 SE or 95% CI	Year of population estimate	Status	Observed/ historical trend	Local and/or TEK assessment
Baffin Bay	2,074	1544-2604	1997	reduced	decline	stable
Davis Strait	2,158	1798-2518	2007	not reduced	increase	increased
Foxe Basin	2,572	2018-3126	2009/2010	not reduced	stable	n/a
Gulf of Boothia	1,592	870-2314	2000	not reduced	stable	increasing
Kane Basin	164	94-234	1997	reduced	decline	n/a
Lancaster Sound	2,541	1759-3323	1998	not reduced	stable	n/a
M'Clintock Channel	284	166-402	2000	reduced	likely increase	n/a
Northern Beaufort Sea	980	670-1290	2006	not reduced	stable	increasing
Norwegian Bay	190	102-278	1998	data deficient	data deficient	n/a
Southern Beaufort Sea	1,526	1210-1842	2006	reduced	likely decline	moving
Southern Hudson Bay	951	396-950 (ON), 70-110 (James Bay)	2005	not reduced	stable	n/a
Viscount Melville	161	121-201	1992	data deficient	data deficient	increasing
Western Hudson Bay	1030	754-1406	2013	not reduced	stable	increased

This status table has been developed by the federal/provincial/territorial Polar Bear Technical Committee and approved by the Polar Bear Administrative Committee. It represents the best available knowledge, both science and IQ, of all Canadian jurisdictions that manage polar bears. This table will be updated as new status tables become available.

Appendix B – Subpopulations and status

Appendix B I – Baffin Bay (BB) subpopulation status

Brief history

A 1989 subpopulation estimate of 300-600 bears was based on mark-recapture data in which the capture effort was restricted to shore-fast ice and the floe edge off northeast Baffin Island. However, Inuit knowledge indicated that an unknown proportion of the subpopulation is typically offshore during the spring and was unavailable for capture. A second study (1993-1997) was carried out during September and October, when all polar bears were on land and the estimated number of polar bears in BB was 2,074. In 2004, abundance estimates were revised to fewer than 1,600 bears, based on population viability simulations using vital rates from the capture study and new information that included Greenland's harvest records. This resulted in significant reductions in TAH that are still in place in 2015. A genetic mark-recapture survey was completed in 2013 and a new population estimate will be available in late 2015.

Current Status: 2,074 bears (1997)

Science – reduced

IQ – stable

current TAH – Nunavut 65

– Greenland 67

Subpopulation recommendations:

- Maintain current population abundance and review management objectives and TAH when the new inventory study is complete.
- Communities believe that the population size is sufficient and should not be managed for increase. New combined TAH for Nunavut and Greenland will be based on new population estimates and recommendations from scientific working groups on what a sustainable harvest would be to keep the population stable at that level.
- Seek removal of non-detrimental findings to allow for the export of hides and other bear parts.
- Re-assess the population boundary between BB and KB
- Increase cooperation among all jurisdictions that share this population to ensure a sustainable harvest

Appendix B II – Davis Strait (DS) subpopulation status

Brief history

The initial subpopulation estimate of 900 bears for DS was based on an estimated correction from the original mark-recapture calculation of 726 bears, which was felt to be too low. In 1993, the estimate was increased to 1,400 bears and then to 1,650 in 2005. These increases were to account for the bias as a result of springtime sampling, the fact that the existing harvest appeared to be sustainable and was not having a negative effect on the age structure, and traditional knowledge that suggested more bears had been seen over the last 20 years. The most recent inventory of this subpopulation was completed in 2007; the new subpopulation estimate is 2,158.

The population is characterized by low recruitment rates and high population density where sea ice conditions are deteriorating and variable.

Current status: 2,158 bears (2007)
Science – not reduced
IQ – increased
current TAH – NU = 61
– Nunavik = 32
– Nunatsiavut = 12
– Greenland = 3

Subpopulation recommendations:

- Maintain current population abundance and review management objective and TAH when a new inventory study is complete.
- Re-assess the FB/DS boundary near Kimmirut.
- Increase cooperation among all jurisdictions that share this population to ensure a sustainable harvest
- Hold joint hearings of relevant boards
- Encourage inter-jurisdictional discussions between user groups to identify appropriate allocation between regions

Appendix B III – Southern Hudson Bay (SH) subpopulation status

Brief history

The initial estimate of population numbers came from a three-year (1984-1986) mark-recapture study, conducted mainly in the Ontario portion of the subpopulation. This study and the more recent telemetry data have documented seasonal fidelity to the Ontario coast during the ice-free season, and some intermixing with the Western Hudson Bay and Foxe Basin subpopulations during winter months. In 1988, a population-modeling workshop suggested an increase in the calculated subpopulation estimate from 900 to 1,000 bears, because portions of the eastern and western coastal areas were not included in the area during original sampling. Additionally, the area away from the coast may have been under-sampled due to difficulties in locating polar bears inland (i.e., below the tree line). Thus, some classes of bears, especially pregnant females, were believed to be under-sampled. A new analysis of the 1984-1986 capture data produced an estimate for the study area of 634 and, for 2003-2005, 673. In addition, there are some areas in which it is unsafe to capture bears. An aerial survey conducted between 2011 and 2012 by Ontario estimates the SH abundance at 951 bears, and the status as stable.

Current status: 951 bears (2012)
Science – stable
IQ – increasing
current TAH – NU = 25 (Voluntary agreement reduced it to 20)
– Ontario = 3
– Quebec = 22 (Nunavik and Eeyou Cree)

Subpopulation recommendations:

- Maintain current population abundance and review management objective and TAH when a new inventory study is complete.
- Increase cooperation among all jurisdictions that share this population to ensure a sustainable harvest
- Help Quebec to develop a management plan and system to ensure that TAH is respected and followed and all harvesting is reported.
- Continue with inter-jurisdictional user-to-user discussions to ensure agreement on the fair allocation of the agreed TAH.

Appendix B IV – Western Hudson Bay (WH) subpopulation status

Brief history

The subpopulation was estimated to be 1,194 in 1987 and 935 in 2004. Before 1998, the subpopulation had apparently remained the same, indicating that DOE research conducted in 2011 using aerial surveys provided a new estimate of 1,030 bears. However, this estimate and the previous one have overlapping confidence intervals, suggesting no change, although techniques of past research projects differed.

Current status: 1,030 bears (2013)

Science – stable

IQ – increase

current TAH – NU = 24

– Manitoba = 8

Subpopulation recommendations:

- Maintain current population abundance and review management objectives and TAH when a new inventory study is complete.
- Increase cooperation with Manitoba

Appendix B V – Foxe Basin (FB) subpopulation status

Brief history

A total subpopulation estimate of 2,119 was developed in 1996 using mark-recapture analysis based on tetracycline biomarkers. IQ suggests that the subpopulation of polar bears has increased (GN consultations in FB communities 2004-2009); the subpopulation estimate was increased to 2,300 bears in 2005 based on IQ. The 2009-2010 aerial surveys produced a new population estimate of 2,572, but the confidence intervals overlap with the previous survey, suggesting that the population is stable.

Current status: 2,572 bears

Science – stable

IQ – increasing

current TAH – NU = 123

Subpopulation recommendations:

- Maintain current population abundance and review management objectives and TAH when a new inventory study is complete.
- Increase cooperation among all jurisdictions that share this population to ensure a sustainable harvest
- Hold joint board hearings and meetings

Appendix B VI – Gulf of Boothia (GB) subpopulation status

Brief history

Based on IQ, a recognition of sampling deficiencies, and polar bear densities in other areas, an interim subpopulation estimate of 900 was established in the 1990s. After a mark-recapture survey between 1998 and 2000, the subpopulation was estimated to number 1,592. The status of GB is stable, or slightly increasing. A new population study will begin in 2015.

Current status: 1,592 bears (2000)
Science – not reduced
IQ – increasing
current TAH – NU = 74

Subpopulation recommendations:

- Maintain current population abundance and review management objectives and TAH when the new inventory study is complete.

Appendix B VII – M’Clintock Channel (MC) subpopulation status

Brief history

An estimate of 900 bears was derived from a six-year study undertaken in the mid-1970s. Following the completion of a mark-recapture inventory in the spring of 2000, the subpopulation was estimated to number 284. A moratorium was put in place, followed by a significantly reduced harvest that is in place today with the objective of managing the population for recovery. A genetic mark-recapture study was started in 2014 and will be completed by 2017. Communities indicate that there has been a recovery in the bear population since the TAH reduction and that bears are seen in areas now where in previous years none were present. The number of bears currently in MC was deemed to be "about right" by locals, with few if any individuals supporting an increase above the current population level. The new estimate will be available in 2017.

Current status: 284 bears (2000)
Science – reduced, but likely increasing
IQ – increasing
current TAH – NU = 3

Subpopulation recommendations:

- Maintain current population abundance and review management objectives and TAH when the new inventory study is complete.

Appendix B VIII – Lancaster Sound (LS) subpopulation status**Brief history**

The subpopulation estimate of 2,541 is based on an analysis of both historical and current mark-recapture data up to 1997. This estimate is considerably larger than a previous estimate of 1,675 that included Norwegian Bay. Currently, there are no data available to assess the population size.

Current status: 2,541 bears (1998)

Science – stable

IQ – n/a

current TAH – NU = 85

Subpopulation recommendations:

- Maintain current population abundance and review management objectives and TAH when a new inventory study is complete.

Appendix B IX – Kane Basin (KB) subpopulation status**Brief history**

The size of the subpopulation was estimated to be 164 bears, based on a mark-recapture study undertaken between 1994 and 1998. The small population was believed to be in decline due to overharvesting, and a collaborative study between Greenland and Nunavut was begun in 2011 to examine population boundaries and abundance. The final year of a genetic mark-recapture study was completed in the spring of 2014. A new estimate will be available during 2015.

Current Status: 164 bears (1997)

Science – reduced

IQ – stable

current TAH – Nunavut = 5

Greenland = 3

Subpopulation recommendations:

- Maintain current population abundance and review management objectives and TAH when the new inventory study is complete.
- Re-assess population boundaries between BB and KB
- Work closely with Greenland to ensure that a sustainable harvest occurs

Appendix B X – Norwegian Bay (NW) subpopulation status

Brief history

The current (1993-97) estimate is 203. Data collected during mark-recapture studies and from satellite radio tracking of adult female polar bears, indicate that most of the polar bears in this subpopulation are concentrated along the coastal tide cracks and ridges along the north, east, and southern boundaries.

Current status: 203 bears (1998)
Science – data deficient
IQ – n/a
current TAH – NU = 4

Subpopulation recommendations:

- Maintain the current population abundance and review management objectives and TAH when the new inventory study is complete.

Appendix B XI – Viscount Melville (VM) subpopulation status

Brief history

The current subpopulation estimate of 161 was based on a mark recapture survey completed in 1992. GNWT is currently completing a mark-recapture study and a new estimate should be available in early 2015.

Current status: 161 bears (1992)
Science – data deficient
IQ – increasing
current TAH – Nunavut = 3
– GNWT = 4

Subpopulation recommendations:

- Maintain the current population abundance and review management objectives and TAH when the new inventory study is complete.
- Increase cooperation among all jurisdictions that share this population to ensure a sustainable harvest.

Appendix B XII – Northern Beaufort (NB) subpopulation status

Brief history

The 1998 subpopulation estimate was 1,200 bears. A 2006 mark-recapture survey suggested that the size of the NB subpopulation has remained stable at approximately 980 bears.

Current status: 980 bears (2006)
Science – stable
IQ – increasing

current TAH – Nunavut = 6
 – GNWT = 71

Subpopulation recommendations:

- Maintain the current population abundance and review management objectives and TAH when the new inventory study is completed.
- Increase cooperation among all jurisdictions that share this population to ensure a sustainable harvest.

Appendix C

The following actions were identified by co-management partners as potential areas where additional effort should be directed. These are directions for co-management partners and are not to imply actions that will be undertaken. They are a starting point for further discussion and collaboration.

Potential actions relating to harvest management

Action
Undertake a review of the 1.5% sustainable removal rate of females.
Expand and increase harvest bio-characteristics reporting upon peer review of research objectives.
Improve handling of hides taken as defense kills to ensure no loss in value.
Ensure harvest reporting and sample submission is adequate to address needs.
Develop a training program for Inuit in communities to establish an Inuit data collection program for hunter effort and interviews and collection of polar bear bio-characteristics.

**Potential actions relating to habitat management and environmental stewardship
 (Avatitinnik Kamatsiarniq)**

Management action
Develop a knowledge and information sharing framework for co-management partners.
Gather local and Aboriginal knowledge and incorporate it into planning and decision-making.
Strive to increase the involvement of Inuit in research, planning, and decision-making.
Conduct population assessments as per the inventory schedule and make the results publicly available in a timely manner.
Continue to develop, evaluate and apply research techniques that will provide the essential information with minimal or no impact on polar bears.

Build partnerships with external researchers and governments to increase DOE capacity for both science and IQ, and implement the 25- year research strategy through outside funding and partnerships.

Potential actions relating to information knowledge and sharing

Management action

Encourage the development, sharing and implementation of best management practices with stakeholders, tourism operators, and industry.

Seek to build capacity in all co-management organizations so that they are better able to participate in the regulatory review processes.

Expand the contaminant monitoring program for polar bears.

Potential actions relating to people and bears (*Inuillu Nanuillu*)

Management action

Implement the community bear monitor training program.

Train, hire, and equip bear monitors as and when needed in high priority communities.

Develop educational material (e.g., posters and fact sheets, website material) for communities, tourists, mining camps, etc., on best practices to minimize human-bear interactions.

Develop, adopt, and implement community bear management plans and community human-bear-interaction protocols

Develop a communications plan for public outreach for bear safety.

Conduct a review of damage compensation and damage prevention programs to ensure that they are accessible to the public.

Potential actions relating to working together (*Piliriqatiginniiq*)

Management action

Seek cooperative research partners to build further capacity in IQ studies and scientific research.

HTOs to provide support and participation in research projects.

Identify inter-jurisdictional agreements near completion and finalize these, where possible

Identify inter-jurisdictional agreements that are needed and pursue

Improve cooperation with federal agencies, such as Parks Canada and Canadian Wildlife Service, so that their land management efforts also support this plan.

Appendix D – Flexible quota system

Rationale and administration of the flexible quota system

INTRODUCTION

The flexible quota system for polar bears assumes that the annual maximum sustainable yield of males and females for a given population has been divided between the communities that share the population. Each community receives its share of the maximum sustainable harvest of males and females as an annual baseline allocation. For polar bears, the maximum harvest that can be sustained is realized when the harvest is two males for every female. However, not every community can harvest exactly two males per female every year. In some years, the full allocation may not be taken. In other years, the kill may exceed the annual base allocation of males or females. The flexible quota calculation takes these variations into account:

- 1) Any “credits” from previous years when not all the bears were harvested,
- 2) The total number of males killed or removed from the population, and;
- 3) The total number of females killed or removed from the population.

ADMINISTRATION/ACCOUNTING

The flexible quota system is nothing more than a system for administering the portion of the total population maximum sustainable yield. First, the sustainable yield of males and females for a given population must be identified. Then the base annual allocation for each subpopulation is established and the flexible quota system is used to adjust the TAH as required to keep the harvest within sustainable limits.

Simulation modelling has shown that, for polar bear populations, about twice as many males as females can be harvested. The sustainable number of females is defined as the number that can be removed without causing a decline in the number of females in the population (generally considered to be approximately 1.5 % of the population). However, it is different for the males. Because the males do not produce the cubs, twice as many can be taken. A 2M:1F harvest sex ratio DOEs reduce the number of males in the population to about 70% of the number that would be present if the harvest were unselective. The mean age of the males in the population is also reduced by about two years. However, this has the effect of focusing the harvest on younger males in the more abundant age classes. We assume that the females can still find mates and that younger bears mate just as successfully as older bears. The available data support this. There is no evidence of diminished reproduction, even in populations where it is clear that over-harvesting has depleted the males. Males are reproductively mature by the time they are 4-5 years old, and on average females are only available to mate every two years because of extended parental care.

The annual base allocation value is an annual allotment that does not vary. However, if a community over-harvests either males or females in a given year, that over-harvest must be compensated for by reducing the annual actual allocation. The actual allocation is reduced in two ways. The first is a simple numerical reduction to “pay back” the over-harvested males or females. The second is that if the females are over-harvested, then the community has shown it cannot harvest at a 2M:1F sex ratio. The current allocation for females always gives the maximum number

of females that can be taken. However, when an over-harvest of females has occurred in the previous year, the current allocation for males is based on both:

- 1) The current allocation of females, and
- 2) The actual proportion of females in the harvest (P_F).

The current allocation of males is determined by the equation for calculating the sex ratio:

$$P_F = \# \text{ Females} / \# \text{ Males}$$

$$\# \text{ Males} = \# \text{ Females} / P_F$$

The value of P_F cannot be less than 0.33 or the take of males would be too large (unsustainable). For that reason, if the actual P_F value is less than 0.33, we still use 0.33. If the actual value of P_F is greater than 0.33, the actual value is used.

The actual sex ratio is only taken into consideration when the kill of females has exceeded the sustainable number (i.e., the actual allocation for that year). The reason is to avoid penalizing a community that shuts down the harvest when the last female has been taken. It is the number of bears taken that really matters. The proportion of females in the harvest is only an indication of what the sex ratio for the next year will be. As long as a community has not exceeded the allowable kill of males or females, there is no reduction in TAH, regardless of the sex ratio of the kill.

Credit is given for any unused current allocation of males and females. The credits can be either male or female. Credits are specific to a given subpopulation and cannot be used for other subpopulations. Credits shall be administered by the responsible RWO and the RWO shall make the allocation of credits as appropriate. If a female credit is requested, there must be a male credit available to exchange, because there cannot be more negative male credits than positive female credits. It is sustainable to over-harvest the males as long as an equivalent number of females is under-harvested. As long as there is at least one positive female credit for each negative male credit, there is no reduction to the TAH. This means that as long as the total TAH is not exceeded, and as long as the females are not over-harvested, the TAH for the following year will stay at the maximum base allocation.

Credits are a special case because they represent individuals that were not taken, so they are in addition to the estimated population. Credits are administered separately. Credits accumulate until the next population inventory, and then they are zeroed because the total population is taken into effect when the new TAH is determined.

1. All human-caused mortality to polar bears will be taken from the TAH of the nearest community. In the event that the human-caused mortality exceeds the TAH, extra tags will be issued and the TAH for the following year will be correspondingly reduced in line with the flexible quota system.

2. A naturally abandoned cub will be counted as a natural death and not counted against the TAH.
3. Any bear that is found near death can be killed as a humane action and, once the conservation officer has certified that the bear was near death, the humane kill will not be counted against the TAH.
4. When a Nunavut beneficiary kills a bear, the tag will come from that person's home community if that community has a TAH in the population that the bear was harvested from. Otherwise, the nearest community must provide the tag.
5. When a female with cubs, yearlings, or juveniles is killed, the cubs, yearlings and juveniles are also regarded as killed (even if they run away). For TAH determination purposes, the cubs and yearlings are counted as males and only $\frac{1}{2}$ tag each. The juveniles are counted as whole tags of whatever sex they are. If the cubs run away after the female is killed, the cubs are counted as $\frac{1}{2}$ tag and all male, however the yearlings and the juveniles are each counted as whole tags and the sex is counted as $\frac{1}{2}$ male and $\frac{1}{2}$ female.
6. If credits are available, they may be used to address all types of kills, including accidental, illegal, and defence kills.
7. If a community shuts down its harvest after exceeding the maximum allowable females, the unused tags are counted as harvested males **for calculating the proportion of females only** so as not to penalize the community for shutting down the harvest before filling all the tags. If a community DOES not exceed the current allocation for females, for TAH calculation purposes the harvest sex ratio is assumed to be 0.33 (i.e., 2M:1F).
8. Subpopulation credits accumulate until the next population inventory results are final. Then all credits are set back to zero because the new TAH is based on the new population information, and the entire sustainable take is allocated to the new TAH. Any credits will be realized as TAH increases if the population information was accurate and the credits are not used. The communities then resume collecting credits from the new start, as before.

Appendix E – Research schedule

Proposed schedule to conduct subpopulation status by scientific method and collection of IQ

Subpopulation	Previous survey year and method	Next survey year and method	Previous IQ survey	Proposed IQ survey
Baffin Bay	2011-2013 Genetic mark-recapture	2021 To be determined	2005	2014-2015
Davis Strait	2005-2007 Mark-recapture	2017-20 Genetic mark-recapture	2007-2008	2017
Foxe Basin	2010-2011 Aerial survey	2017 Aerial survey	2008-2009	2017
Gulf of Boothia	1998-2000 Mark-recapture	2015-2017 Genetic mark-recapture		2015-2017
Kane Basin	2012-2014 Genetic mark recapture and aerial survey	2021 To be determined		2024
Lancaster Sound	1997 Mark-recapture	2018-20 To be determined		2018-20
M'Clintock Channel	1998-2000 Mark-recapture	2014-2016 Genetic mark recapture	2002-2006	2015-2017
Northern Beaufort Sea	2006 Mark-recapture	2019		
Norwegian Bay	1998 Mark-recapture	2018 To be determined		2018
Southern Hudson Bay		2016 Aerial survey		
Viscount Melville	2012-2014 Mark-recapture	TBD		
Western Hudson Bay and Southern Hudson Bay	2011 Aerial survey	2016 Aerial survey		2021

This schedule is tentative and assumes full availability of funds and human resources. The priorities and needs may shift over the coming years, which will affect timing of this schedule.

Appendix F – Current harvest rates by community

Cambridge Bay	VM	3 (2:1)
Nunavut total	VM	3
Cambridge Bay	MC	1 (0.67:0.33)
Gjoa Haven	MC	2 (1.33:0.67)
Nunavut total	MC	3
Gjoa Haven	GB	5 (3.33:1.67)
Hall Beach	GB	4 (2.67:1.33)
Igloolik	GB	11 (7.33:3.67)
Kugaaruk	GB	24 (16:8)
Repulse Bay	GB	5 (3.33:1.67)
Taloyoak	GB	25 (16.67:8.33)
Nunavut total	GB	74
Arctic Bay	LS	25 (16.67:8.33)
Grise Fiord	LS	25 (16.67:8.33)
Resolute Bay	LS	35 (23.33:11.67)
Nunavut total	LS	85
Grise Fiord	NW	4 (2.67:1.33)
Nunavut total	NW	4
Grise Fiord	KB	5 (3.33:1.67)
Nunavut total	KB	5
Qikiqtarjuak	BB	22 (14.67:7.33)
Clyde River	BB	22 (14.67:7.33)

Iqaluit	DS	28 (18.67:9.33)
Kimmirut	DS	9 (6:3)
Pangnirtung	DS	24 (16:8)
Nunavut total	DS	61
Arviat	WH	10 (6.67:3.33)
Baker Lake	WH	0 (0:0)
Chesterfield Inlet	WH	0 (0:0)
Rankin Inlet	WH	7 (4.67:2.33)
Whale Cove	WH	7 (4.67:2.33)
Nunavut total	WH	24
Sanikiluaq	SH	25 (16.67:8.33)
Nunavut total	SH	25
Cape Dorset	FB	12 (8:4)
Chesterfield Inlet	FB	10 (6.67:3.33)
Baker Lake	FB	1 (.67:.33)
Coral Harbour	FB	42 (28:14)
Hall Beach	FB	11 (7.33:3.67)
Igloolik	FB	13 (8.67:4.33)
Kimmirut	FB	12 (8:4)
Repulse Bay	FB	14 (9.33:4.67)
RWO Floating	FB	8 (5.33:2.67)
Nunavut total	FB	123