



**Environmental Change, Polar Bears and Adaptation in the East Kitikmeot:
An Initial Assessment
Final Report
November 23, 2006**

Compiled by
Darren Keith and Jerry Arqviq of the Kitikmeot Heritage Society

For
World Wildlife Fund Canada

Figure 1: Elders Simon Oleekatalik, Abraham Okuqtunnuaq and Guy Kakkianiun (left to right) discuss environmental change and polar bears at the Nuvutiruaq camp location.

**Environmental Change, Polar Bears and Adaptation in the East Kitikmeot:
An Initial Assessment
Executive Summary**

The Inuit of the East Kitikmeot communities of Gjoa Haven, Taloyoak and Gjoa Haven are observing many environmental changes in their area. Inuit experiences of these environmental changes have been documented by independent researchers in several different regions of the Canadian Arctic.

- Unstable weather, sudden shifting winds, change in prevailing wind; sudden storms; less clear stable days, more cloudy windy days that feel cold;
- Thinner freshwater and sea ice;
- Less multiyear ice throughout the year;
- Change in snow quality making it difficult to build an iglu;
- Change in the fat of seals, with more lean seals caught by Gjoa Haven hunters;
- Change in the fat of polar bears with more lean individuals;
- Increased numbers of polar bears, some in poor health, are stealing caches, damaging property, approaching camps, and entering settlements;
- Grizzly bears and other animals are being encountered further north than their traditional range.

Inuit subsistence has been impacted by these environmental changes which have introduced uncertainty, inconvenience and danger into land-based activities. Inuit have also been impacted by concurrent changes they have observed in wildlife species in the region. Inuit are experiencing an increased danger to personal safety, cached meat and personal property from: Grizzly bears which have moved north beyond their traditional range; and Polar Bears that have increased in number at the same time as their health and habitat are changing.

Inuit are adapting to these varied changes to their environment in several ways:

- being prepared for uncertainties and changeability in weather;
- delaying subsistence activities and being more cautious due to unpredictable ice conditions;
- being selective about wildlife that is harvested for human consumption;
- being cautious about camping and campsite location in polar bear country, especially when the whole family is out;
- being selective about the location of food caches;
- experimenting with bear proofing of food caches, cabins and campsites;
- developing local policy for defense kills of polar bears within the limitations of the polar bear management quota system.

For the Elders, Inuit life in the arctic can only adapt to continued environmental change from the foundation of a healthy body of Inuit knowledge. This report recommends: the establishment of land based Inuit knowledge camps; the purchase and installation of cache protection; and the purchase and installation of bear protection for camps.



Figure 2: East Kitikmeot Communities

“I don’t really have a question but you guys have to realize in these communities how the climate has changed since a long time ago [and] about the animals, land ice and so on. We all know the climate change from a long time ago to today as everyone else knows in the arctic.”

Kugaaruk Elder and HTO director Barthelemy Nirlungayuk, May 16, 2006

Introduction

This report is the result of a 10 day field trip to Gjoa Haven, Taloyoak and Kugaaruk taken during the period of May 8th to 17th, 2006, to meet with local hunters and trappers’ organizations, and Elders and hunters to discuss their observations of changes to the environment, wildlife, and particularly polar bears. The study is intended to be an initial assessment of how climate change is impacting the Eastern Kitikmeot with a focus on changes to polar bears and their habitat. Additional goals of the study were to document: what Inuit are doing to adapt to the changes they are experiencing; and, what they think must be done to continue to adapt in the future.

The report will begin by presenting the observations of environmental change of the Inuit of the East Kitikmeot and providing references to where similar observations have been made by Inuit elsewhere in the Arctic. From this general picture the report will turn to the specific situation of polar bears in the East Kitikmeot. The seasonal life of the bears as understood by Inuit will be presented, followed by a description of the changes that Inuit have observed in polar bear habitat, numbers, health, and behaviour. These changes

have resulted in conflicts between Inuit and polar bears and these conflicts and Inuit adaptation to these conflicts will be explored.

The report will conclude with the Elders prescription for continued Inuit adaptation to environmental change, and conclusions and recommendations.

Methods

As an initial assessment of the environmental change and human adaptation being experienced in the East Kitikmeot over a ten day period the research team's challenge was to get the best quality information in the brief time available. The selected format for the field trip was a mobile research team travelling by snow machine between the communities. Senior Researcher Darren Keith and Co-Researcher Jerry Arqviq made stops in each of the communities to meet with the HTOs and interview local Elders. All Elders interviewed during the project were signed participant consent forms that explained the nature of the project. Two very knowledgeable Elders from the communities of Taloyoak and Kugaaruk were invited to join the researchers and camp at a location selected by the Elders that would make a good backdrop for the discussion of environmental change and polar bears.

Led by Taloyoak Elders Simon Oleekatalik and Abraham Ohuktunnuaq the research team departed Taloyoak on May 12 and met with Kugaaruk Elders Guy Kakkianiun and Levi



Figure 2: Co-Researcher Jerry Arqviq (left) explains the participant consent form to Gjoa Haven Elder Ben Putuquq (right).

Illuitok at Nuvutiruaq to the south of Qikiqtarjuaq (Astronomical Society Islands) (see Figure 3). Group meetings were held on May 13th and May 14th. The Kugaaruk Elders led the researchers to Kugaaruk on May 15th.



Figure 3: Nuvutiruaq Camp Location in Relation to Taloyoak

The individual interviews in the three communities, and the group meeting used a semi-directed interview method based on an interview guide which was developed prior to the field trip. As Usher (2000) has discussed, the semi-directed interview has been a key method in TEK data collection during recent studies (Nakashima 1990; Ferguson and Messier 1997; Huntington 1998; Fienup-Riordan 1999; Keith and Scottie 2001; Keith et al 2005). To the extent possible the Elders interviewed and the Elders in the group meetings were encouraged to speak their mind and follow their own line of reasoning. Questions were used to steer the discussion when needed.

HTO meetings, interviews and group meetings were recorded on a digital voice recorder. Individuals that were interviewed were asked to sign an Inuktitut form that explained the purpose of the interviews and asked for their consent to use their statements. The Elders were also given an oral explanation of the form and the project. Maps were present during all interviews and any geographical data concerning the location of polar bear habitat were recorded. Co-researcher Jerry Arqviq translated interviews consecutively. Field notes were taken during all discussions. Transcripts were transcribed from the recorded consecutive translations.



Figure 4: Guide Samuel Takkiruaq of Gjoa Haven (left) speaks with Kugaaruk Elder Guy Kakkianiun at Nuvutiruaq camp.

The Region

The East Kitikmeot area has three settlements – Gjoa Haven, Taloyoak, and Kugaaruk (see Figure 2). Gjoa Haven is located on the southern coast of King William Island. Gjoa Haven hunters use a very extensive area for subsistence activities. Storis Passage (Ugjulik), Adelaide Peninsula (Iluilik), Simpson Strait (Quukilruq), the southern coast of King William Island (Qikiqtaq), Chantrey Inlet (Tariunnuaq), Murchison River (Kuuk), and the Back River are some popularly used areas. King William Island itself is used for caribou and muskox hunting and fishing. One popular fishing area is at Tununiq located close to Point Felix (Qikiqtap Nuvua). The sea off of the north, northeast coast of the island (Ki'muagiaq) is the most commonly used area for polar bear hunting, however since the quota for polar bears in the McClintock Channel management area have been drastically reduced to 1 or 2 tags in alternating years, the local HTO has been negotiating tags in the Gulf of Boothia management area from other HTOs who have tags in that area. Therefore Gjoa Haven polar bear hunters are now often travelling through Taloyoak and on to Itsuaqturvik for polar bear hunting. People in Gjoa Haven have family connections to the communities of Taloyoak, Kugaaruk, Baker Lake and Cambridge Bay. The most frequent family trips in the spring are to Taloyoak and Baker Lake by snow machine.

Taloyoak is located at the base of the Boothia Peninsula on its western shore. The town was located here for its deep water port allowing for a resupply connection to the western Arctic. Taloyoak's focus, when it comes to sea resources, however is the Gulf of Boothia or Itsuaqturvik which is accessed by lake and portage in the open water season. The ocean on the west side of the peninsula is well known and also used by the people of Taloyoak for seal and polar bear hunting, however it is known to be less biologically productive than Itsuaqturvik. Polar Bear hunting was conducted in Ki'muagiq in the McClintock Channel management area prior to drastic reductions in quota, they now get 1 or 2 tags per year there, and so most polar bear hunting is done in the Gulf of Boothia management area in the area of Itsuaqturvik. Taloyoak people have family connections to Gjoa Haven and Kugaaruk, as well as Cape Dorset and Baffin Island due to an historic relocation of Inuit engaged in the fur trade.

Kugaaruk is located on the eastern shore of Pelly Bay (Arviligjuaq) at the mouth of the Kugaaruk river in a small bay protected by islands. The hunters of Kugaaruk use the land on the west side of Pelly Bay, inland to the south and east, Akuli, Haatuq Peninsula, Pelly Bay (Arviligjuaq) and the islands to the north, northwest of Pelly Bay in Itsuaqturvik. Polar bear hunting is done in the Akuli, Arviligjuaq and Itsuaqturvik areas, all of which fall under the Gulf of Boothia management area. The people of Kugaaruk are related to those in Gjoa Haven, Taloyoak and Repulse Bay. The most frequent family snow machine trips are made to Repulse Bay and Taloyoak.



Figure 5: The skin of a recently caught polar bear dries outside a Taloyoak residence.

Inuit Observations of Environmental Change in the East Kitikmeot and the Arctic

The Inuit of the East Kitikmeot communities of Gjoa Haven, Taloyoak and Kugaaruk are observing many changes to their environment, including the weather, the land, the sea and the wildlife. Many of these changes have also been observed by Inuit in other areas of the Arctic. Table 1 is a list of the environmental changes being experienced in the East Kitikmeot and other Canadian Arctic communities, along with references of the different studies where these observations have been recorded. The remainder of this chapter presents the environmental changes being experienced in the East Kitikmeot in the words of the Elders of the East Kitikmeot.

Table 1: Environmental Changes Observed by Inuit in the Canadian Arctic

Observed Changes	Community: Sources
The sun is hotter when it is not obscured by clouds.	Gjoa Haven: NTI 2001: 7 Taloyoak: Keith and Arqviq 2006 Sanikiluaq: McDonald et al 1997: 27 Clyde River: Fox 2002: 32 Igloolik: Fox 2002: 32; : NTI 2001: 5 Iqaluit: Fox 2002: 32 Nain: Furgal et al 2002: 276 Kuujuaq: Furgal et al 2002: 276 Cambridge Bay: Thorpe et al 2002: 215 Kugluktuk: Thorpe et al 2002: 215 Kimmirut: NTI 2001: 7 Repulse Bay: NTI 2001: 10
Sun rises higher in the sky or change in path of the sun during the day and sun is higher around winter solstice. Change in the angle of the sun.	Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Cambridge Bay: Thorpe et al 2002: 215 Arviat: Keith and Scottie 2001 Igloolik: NTI 2001: 5, 10 Grise Fiord: NTI 2001: 6 Sanikiluaq: NTI 2001: 8
Warmer. Shorter winters and longer summers.	Gjoa Haven: Keith et al 2005: 134 Northwestern Hudson Bay ¹ : McDonald et al 1997: 46 Baker Lake: Fox 2002: 35 Aklavik: Kofinas 2002: 69 Sachs Harbour: Sachs Harbour: Jolly et al 2002: 95, 108 Tuktoyaktuk: Nickels et at 2002: 319 Aklavik: Nickels et at 2002: 319 Inuvik: Nickels et at 2002: 319 Sanikiluaq: NTI 2001: 13
Weather no longer predictable using Inuit knowledge.	Gjoa Haven: NTI 2001: 8; Keith and Arqviq 2006 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Baker Lake: Keith and Scottie 2001; Fox 2002 Arviat: Keith and Scottie 2001 Kugluktuk: Thorpe et al 2001: 167/168 Cambridge Bay: Thorpe et al 2001: 167/168 Bathurst Inlet: Thorpe et al 2001: 167/168 Sanikiluaq: McDonald et al 1997: 28; NTI 2001: 3

¹ The Hudson Bay Traditional Ecological Knowledge and Management Systems Study defined Northwest Hudson Bay as including all the communities from Arviat north to Repulse Bay, including Coral Harbour.

	<p>Clyde River: Fox 2002: 31 Iglolik: Fox 2002: 31 Iqaluit: Fox 2002: 31 Sachs Harbour: Jolly et al 2002: 95 Nain: Furgal et al 2002: 276 Kuujuaq: Furgal et al 2002: 276 Tuktoyaktuk: Nickels et al 2002: 319 Aklavik: Nickels et al 2002: 319 Inuvik: Nickels et al 2002: 319 Pond Inlet: NTI 2001: 3, 12 Hall Beach: NTI 2001: 5 Rankin Inlet: NTI 2001: 6 Kimmirut: NTI 2001: 7</p>
Unstable weather, sudden wind shifts, sudden storms.	<p>Gjoa Haven: Keith and Arqviq 2006 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Baker Lake: Keith and Scottie 2001; Fox 2002 Arviat: Keith and Scottie 2001 Kugluktuk: Thorpe et al 2001: 168 Cambridge Bay: Thorpe et al 2001: 168 Bathurst Inlet: Thorpe et al 2001: 168 Bering Sea: Huntington 2000 Aklavik: Kofinas 2002: 69 Sachs Harbour: Jolly et al 2002: 95 Tuktoyaktuk: Nickels et al 2002: 319 Aklavik: Nickels et al 2002: 319 Inuvik: Nickels et al 2002: 319 Pond Inlet: NTI 2001: 3</p>
Less stable clear days. More cloudy days.	<p>Gjoa Haven: NTI 2001: 8; Keith et al 2005; Keith and Arqviq 2006 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Baker Lake: Keith and Scottie 2001 Arviat: McDonald et al 1997: 29; Keith and Scottie 2001 Whale Cove: McDonald et al 1997: 29 Sanikiluaq: McDonald et al 1997: 29 Iglolik: Fox 2002: 13; NTI 2001: 5 Sachs Harbour: Sachs Harbour: Jolly et al 2002: 105 Rankin Inlet: NTI 2001: 6 Kimmirut: NTI 2001: 7</p>
Change in prevailing wind direction and one direction of wind is less dominant. Results in unreadable snow drifts.	<p>Gjoa Haven: Keith et al 2005: 134; Keith and Arqviq 2006 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006; NTI: 4 Baker Lake: Keith and Scottie 2001; Fox 2002: 37 Arviat: Keith and Scottie 2001; NTI 2001: 3 Hall Beach: NTI 2001: 5</p>
Thinner lake ice.	<p>Taloyoak: Keith and Arqviq 2006: NTI 2001: 13 Kugaaruk: Keith and Arqviq 2006 Baker Lake: Keith and Scottie 2001; Fox 2002: 36 Arviat: Keith and Scottie 2001 Kugluktuk: Thorpe et al 2001: 163 Cambridge Bay: Thorpe et al 2001: 163; NTI 2001: 3 Bathurst Inlet: Thorpe et al 2001: 163 Grise Fiord: NTI 2001: 6</p>
Later freeze-up of lake ice.	<p>Gjoa Haven: Keith et al 2005, Appendix 1: 9; Keith and Arqviq 2006</p>

	<p>Taloyoak: Keith and Arqviq 2006 Baker Lake: Keith and Scottie 2001; Fox 2002 Arviat: Keith and Scottie 2001 Kugluktuk: Thorpe et al 2001: 158 Cambridge Bay: Thorpe et al 2001: 158; NTI 2001: 3 Bathurst Inlet: Thorpe et al 2001: 158 Tuktoyaktuk: Nickels et al 2002: 319 Aklavik: Nickels et al 2002: 319 Inuvik: Nickels et al 2002: 319</p>
Earlier break-up of lake ice.	<p>Gjoa Haven: Keith et al 2005, Appendix 1: 41 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Baker Lake: Keith and Scottie 2001 Arviat: Keith and Scottie 2001 Kugluktuk: Thorpe et al 2001: 158 Cambridge Bay: Thorpe et al 2001: 158 Bathurst Inlet: Thorpe et al 2001: 158 Tuktoyaktuk: Nickels et al 2002: 319 Aklavik: Nickels et al 2002: 319 Inuvik: Nickels et al 2002: 319</p>
Thinner sea ice.	<p>Gjoa Haven: Keith et al 2005: 124 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Arviat: Keith and Scottie 2001 Kugluktuk: Thorpe et al 2001: 163 Cambridge Bay: Thorpe et al 2001: 163 Bathurst Inlet: Thorpe et al 2001: 163 Bering Sea: Huntington 2000 Clyde River: Fox 2002: 33 Sachs Harbour: Jolly et al 2002: 108 Kuujuaq: Furgal et al 2002: 278 Nain: Furgal et al 2002: 277 Grise Fiord: NTI 2001: 6 Sanikiluaq: NTI 2001: 7, 14</p>
Later freeze-up of sea ice.	<p>Gjoa Haven: Keith et al 2005: 123 Taloyoak: Keith and Arqviq 2006 Repulse Bay: NTI: 4 Arviat: Keith and Scottie 2001 Sachs Harbour: Jolly et al 2002: 108 Tuktoyaktuk: Nickels et al 2002: 319 Aklavik: Nickels et al 2002: 319 Inuvik: Nickels et al 2002: 319 Pond Inlet: NTI 2001: 3 Rankin Inlet: NTI 2001: 6 Sanikiluaq: NTI 2001: 7 Kimmirut: NTI 2001: 7 Igloodik: NTI 2001: 10 Grise Fiord: NTI 2001: 11 Pangnirtung: NTI 2001: 11</p>
Earlier break-up of sea ice.	<p>Gjoa Haven: Keith et al 2005: 125 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Arviat: Keith and Scottie 2001 Kugluktuk: Thorpe et al 2001: 162 Cambridge Bay: Thorpe et al 2001: 162 Bathurst Inlet: Thorpe et al 2001: 162</p>

	<p>Barrow, Alaska: Huntington 2000 Sachs Harbour: Jolly et al 2002: 108 Nain: Furgal et al 2002: 278 Kuujuaq: Furgal et al 2002: 27 Tuktoyaktuk: Nickels et al 2002: 319 Aklavik: Nickels et al 2002: 319 Inuvik: Nickels et al 2002: 319 Pond Inlet: NTI 2001: 3 Grise Fiord: NTI 2001: 11 Pangnirtung: NTI 2001: 11</p>
Less multi-year sea ice.	<p>Gjoa Haven: NTI 2001: 7; Keith et al 2005: 126; Keith and Arqviq 2006 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Sachs Harbour: Jolly et al 2002: 95 Tuktoyaktuk: Nickels et al 2002: 319 Inuvik: Nickels et al 2002: 319 Igloodik: NTI 2001: 5 Pangnirtung: NTI 2001: 11 Baffin Bay: Dowsley 2005: 37</p>
Less annual snow accumulation.	<p>Gjoa Haven: Keith et al 2005: 129; Keith and Arqviq 2006 Baker Lake: Keith and Scottie 2001 Arviat: Keith and Scottie 2001 Nain: Furgal et al 2002: 277 Tuktoyaktuk: Nickels et al 2002: 319 Aklavik: Nickels et al 2002: 319 Inuvik: Nickels et al 2002: 319 Sanikiluaq: NTI 2002: 22</p>
Change in snow quality. Change in the normal make up of the snow layers.	<p>Gjoa Haven: Keith et al 2005: 130; Keith and Arqviq 2006 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Baker Lake: Keith and Scottie; Fox 2002:30, 35 Arviat: Keith and Scottie 2001; NTI 2001: 8 Nain: Furgal et al 2002: 278 Kuujuaq: Furgal et al 2002: 279 Sanikiluaq: NTI 2001: 8</p>
Ice crust on snow or glittery snow.	<p>Kugluktuk: Thorpe et al 2002: 227 Nain: Furgal et al 2002: 278 Kuujuaq: Furgal et al 2002: 279</p>
Earlier and more rapid snow melt.	<p>Gjoa Haven: NTI 2001: 8 Kugaaruk: Keith and Arqviq 2006 Repulse Bay: NTI 2001: 4 Northwestern Hudson Bay: McDonald et al 1997: 46 Kugluktuk: Thorpe et al 2001: 158 Cambridge Bay: Thorpe et al 2001: 158 Bathurst Inlet: Thorpe et al 2001: 158 Jolly et al 2002: 96, 108 Sanikiluaq: NTI 2001: 6 Pond Inlet: NTI 2001: 11</p>
Snow does not harden at night in the spring.	<p>Gjoa Haven: Keith and Arqviq 2006 Taloyoak: NTI 2001: 13 Repulse Bay: NTI 2001: 4, 10 Baker Lake: Fox 2002: 35 Rankin Inlet: NTI 2001: 6 Sanikiluaq: NTI 2001: 13</p>

Expansion of grizzly bears beyond their traditional range.	Gjoa Haven: Keith and Arqviq 2006 Cambridge Bay: Thorpe et al 2002: 215
Expansion of other species beyond their traditional range.	Baker Lake: Keith and Scottie 2001 Arviat: Keith and Scottie 2001: NTI 2001: 22 Kugluktuk: NTI 2001: 17 Grise Fiord: NTI 2001: 18
Change in the health of seals.	Gjoa Haven: Keith and Arqviq 2006 Taloyoak : Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Arviat: NTI 2001: 16 Sanikiluaq: NTI 2001: 19
Increasing number of polar bears sighted.	Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Northwest Hudson Bay: McDonald et al 1997: 42 Sachs Harbour: Jolly et al 2002: 108 Arviat: Keith and Scottie 2001; Tyrell 2005 Baffin Bay: Dowsley 2005: 37
Fewer polar bears.	Sachs Harbour: Jolly et al 2002: 108
Relocation of polar bears to areas of more abundant ringed seal populations or better access to ringed seals.	Gjoa Haven: Keith et al 2005 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Eastern Hudson Bay: McDonald et al 1997: 42
More lean polar bears encountered.	Gjoa Haven: Keith and Arqviq 2006 Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Arviat: Tyrell 2005: 203, 128/129 Northwestern Hudson Bay: McDonald et al 1997: 47 Sachs Harbour: Jolly et al 2002: 111 Baffin Bay: Dowsley 2005: 37
Increase in human/polar bear conflict from bears coming too close to settlements, cabins and camps, and bears stealing caches and damaging property.	Taloyoak: Keith and Arqviq 2006 Kugaaruk: Keith and Arqviq 2006 Arviat: (Tyrell 2005: 43, 54). Baffin Bay: Dowsley 2005: 37
Change in the health of caribou: too lean, diseased meat.	Kugaaruk: Keith and Arqviq 2006: NTI 2001: 19 Baker Lake: Keith and Scottie 2001; Fox 2002: 37 Kugluktuk: Thorpe et al 2001: 170 Cambridge Bay: Thorpe et al 2001: 170 Bathurst Inlet: Thorpe et al 2001: 170 Repulse Bay: NTI 2001: 19 Rankin Inlet: NTI 2001: 20 Kimmirut: NTI 2001: 22
Melting of permanent snow/ice fields.	Kugaaruk: NTI 2001: 4 Baker Lake: Keith and Scottie 2001 Sanikiluaq: McDonald et al 1997: 29 Repulse Bay: NTI 2001: 10
Decreased water level in rivers.	Gjoa Haven: Keith et al 2005: 134 Taloyoak: Keith and Arqviq 2006; NTI 2001: 16 Kugaaruk: NTI 2001: 4 Repulse Bay: NTI 2001: 4 Baker Lake: Keith and Scottie 2001; Fox 2002: 36 Arviat: Keith and Scottie 2001: NTI 2001: 8 Northwestern Hudson Bay: McDonald et al 1997: 46 Aklavik: Kofinas 2002: 69 Nain: Furgal et al 2002: 280

	Grise Fiord: NTI 2001: 6 Pond Inlet: NTI 2001: 14
Decreased water level in lakes.	Taloyoak: Keith and Arqviq 2006 Kugluktuk: Thorpe et al 2001: 165 Cambridge Bay: Thorpe et al 2001: 165; NTI 2001: 14 Bathurst Inlet: Thorpe et al 2001: 165 Baker Lake: Keith and Scottie 2001; Fox 2002: 36 Arviat: Keith and Scottie 2001 Aklavik: Kofinas 2002: 69 Nain: Furgal et al 2002: 280 Tuktoyaktuk: Nickels et al 2002: 319 Aklavik: Nickels et al 2002: 319 Inuvik: Nickels et al 2002: 319
Decreased water level in the ocean.	Gjoa Haven: Keith and Arqviq 2006 Kugluktuk: Thorpe et al 2001: 164 Cambridge Bay: Thorpe et al 2001: 164; NTI 2001: 14 Bathurst Inlet: Thorpe et al 2001: 164 Igloolik: NTI 2001: 5 Repulse Bay: NTI 2001: 26

Weather

Elders in the East Kitikmeot remark on how the weather has become unstable compared to the past. Long periods of stable sunny days with clear skies are no longer the norm, and they are now experiencing very changeable weather with many cloudy and windy periods. Changes in wind direction and force can be sudden.

A long time ago when I was younger there would be storms but not as strong as the storms these days. The number of nice days would be longer then but now there seems to be more storms ... [The wind]...seems to change to any direction. It won't even calm down. It calms down a little bit and then it suddenly changes direction... A long time ago when I was a child the wind would calm down slowly. And as it was calming down the clouds would change and it would stay calm for a long time... Now the wind seems to be stronger than a long time ago (Ben Putuguq of Gjoa Haven, Transcripts: 5 and 8).

But the weather changes. I feel the changes of the weather. Long ago we didn't really hear about or see small hurricanes in the north. But just last year or a couple of years ago at a place where we fish...There were a couple of cabins that were blown [off their foundations] from the wind. Two good sized cabins were blown right off the place from the wind. One was right down to nothing and the other one rolled over and the roof was on the bottom. I saw them a few days ago. That happened not this year but before. I believe in the change of the weather. I believe it is happening. And I believe there is going to be a very strong wind some day. I believe there is going to be sort of a hurricane in the north (Abraham Okuqtunnuaq of Taloyoak in Elders Meeting, Transcripts: 21).

Even the wind conditions [have changed]. The wind suddenly picks up from nowhere. We used to tell by the clouds how the wind is going to be. It is hard to tell now compared to how it used to be. Even back home in Kugaaruk the wind suddenly comes out of nowhere. Even when it looked like it was not going to come. It used to be calm in summer time. Calmer days. Whereas now even if it looks like it is going to be calm the wind will pick up out of nowhere. That is one of the scary parts. The person that was talking about the strong wind I agree with [him] (Guy Kakkianun of Kugaaruk in Elders Meeting, Transcripts: 22).

Stable, calm clear days were the norm in the past, but now the Inuit of the East Kitikmeot are experiencing long periods of cloud cover. This chronic condition is changing the way Inuit are feeling about the weather. Though they are experiencing warmer winters and earlier melting of snow and ice, they often talk about the weather as feeling colder. This might seem confusing until one considers the traditional definition of good weather. Good weather - referred to as hilattiavak - is weather that is clear and sunny. Good weather is defined independent of the temperature on the thermometer. In the arctic where the temperature is always relatively low when compared to areas further south a nice day is defined by three things: solar radiation on your face and body; low wind-chill; and, clear skies giving excellent visibility for hunting and navigating (Jerry Arqviq in Field Notes: 11). During the field trip the Elders were expecting to have clear, sunny, warm days without too much wind, as they always experienced in the same season in the past. Even though the thermometer showed a high temperature, they perceived it to be cold due to wind chill and lack of direct sunlight.

I noticed that it has changed from a long time ago to today in July and August. A long time ago it used to be nice and warm in the spring time. You could even see the [pujuq or steam] on top of the ocean. But as of today there seems to be more wind. But a long time ago it used to be nice and warm in the spring time. There have been quite a bit of changes since a long time ago. It used to be nice and warm for a long period of time. But now I noticed that as soon as the sun is out the sun is much warmer than a long time ago. But it doesn't stay out as long as it used to. But it seems to get colder faster because there is more wind. A long time ago fish used to stay close to the surface but you don't see that much any more nowadays because it has been colder. They are not feeding as much. I noticed that today when the sun finally comes out from behind the clouds the sun is hotter than a long time ago. It is very hot but it is not out as much as a long time ago. There is more wind then a long time ago. (Peter Peetoloot of Taloyoak, Transcripts: 11).

February, March and April should be warming up times but they are really cold. And in the fall time when it should be getting cold - October, November, December it seems to be warmer than the old times. Yes I believe in the warming in the Arctic – that it is happening (Abraham Okuqtunnuaq of Taloyoak in Elders Meeting, Transcripts: 21).

I agree with Guy that the weather conditions even around Taloyoak area seems to have changed. It is cold [then] next day warm and then warm the other day. In March and April when it is supposed to be warming up it seems to be really cold. It feels like [the time of year with] more daylight is colder than wintertime (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 19).

There is a lack of stability in the weather conditions with more windy days, strong winds and unpredictable wind shifts. These conditions have lead to a situation where there is no longer a consistent prevailing wind as in the past. The prevailing wind has traditionally provided Inuit with snow drifts or qimugjuit of a predicable orientation for navigation. However, under present conditions Elders who still travel by interpreting snow drift orientation are confused.

... even now the wind direction is different. It has been coming from different directions then it used to. It is not really from the north side anymore. The strong winds have changed – what we used to call strong wind a long time ago. I feel that the wind direction is different now. The reason that we know the wind changed is that the hunters that don't use GPS nowadays don't even know the direction they are going anymore because of the snow drift conditions. The wind direction is different. That is why the Elders that travel feel the difference (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcripts: 21).

They seem to be different from a long time ago. When there were no stars at night you used to be able to read them even at night time. But now it's harder to read. It is hard to understand the directions of the snow drifts.

Back then even if you just feel it with your feet when you are travelling by dog team you seem to know where you are because of the feel of the snow drifts. But right now it is hard to tell which way that snow drift is coming from. Even if you look at it or look at the shape of it. It is hard to tell. At night time, a long time ago, even if you just feel it with your feet while you are travelling you seem to know which direction you are travelling. Even if you go to sleep and wake up the next day you just had to look at the snow drifts and you would know which way to go. But now it is hard to tell which direction the snow drifts are coming from. It is hard to recognize the shape of the snow drifts.

Darren: One more question? Why do you think that you can't read the snow drifts anymore?

Ben: There seem to be more wind changes, more often than usual. The first snow drifts that have been drifted before. Then a different wind direction spoils the snow drifts. So it is hard to understand which direction the snow drifts are coming from (Ben Putuquq of Gjoa Haven, Transcripts: 7).

The snow conditions of the snow drifts on the snow [are] called qimugjuk. They used to be even in the older days. But now it is hard to tell how the qimugjuk is. They are not even on the snow anymore. They would be little spots of snow drifts here and there. That is unusual nowadays.

There is another type of snowdrift called uluangniq. They are also different from a long time ago. A long time ago they used to be smooth but nowadays their ends are really high. They seem to be high on one spot or the other side of the drift. They are also not even anymore (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 20).

The use of snow drifts for navigation is testimony to the keen environmental observation of Inuit hunters. Remarkably, in their lifetime of living in the Arctic they have recently noticed a change in the path of the sun and the moon, and the height that the sun reaches.

I noticed that the moon is a lot higher than usual. Now it is way higher than was usual a long time ago (Peter Peetoloot of Taloyoak, Transcripts: 11).

I go fishing for the last four years on February 20th and 21st and I know that the sun has been getting higher over the last four years (Sam Tulurialik, Field notes: 7).

I noticed in Kugaaruk that the sun has changed. It used to be lower but now it is way up, it goes way over.

I know that the sun rising and the morning light they are not in the same place as a long time ago. They are more south than where they used to rise - The morning light and the sunrise. The sun seems to rise faster than the old days and it goes way over the community nowadays then at sunset it drops down instead of setting slowly. Same with the moon. I feel the same way as the sun. It goes way up and then it drops right down when it sets (Guy Kakkianun of Kugaaruk in Elders Meeting, Transcripts: 21)..

About the sun and the moon I noticed the difference too. At that time it used to not go very high, but now it seems to go very high and just drop down at the end. Maybe the world has shifted since a long time ago (Jose Angutingurnirk of Kugaaruk, Transcripts: 39).

This observation was shared by the Elders of Kugaaruk and Taloyoak, but it has also been independently recorded in Cambridge Bay and Arviat.

There is a change in the distance of the sun...from years back. The sun seems to be higher than it was a long time ago...In the past, the sun was lower than it is now in July. It seems to shine higher than it used to. (Frank Analok of Cambridge Bay in Thorpe et al 2002: 215)

Starting about two years ago [about 1999] we noticed that the brightness of the days is so bright. That is when we started hearing about the climate change. The hunters had been asking each other "why are the days so bright that it hurts your eyes". Also they are asking - in the past in *ukiuq*[winter] the sun would just peak up and it would be red, but now it is much brighter. Why is that (David Uluadluak of Arviat in Keith and Scottie 2001, Appendix D: 13)?

The Sun is brighter now than before. Also, during the shortest days the sun remains higher in the sky. Before it would just barely peek over the horizon causing a reddish light. Now it's always bright. This is another noticeable change in *ukiuq* [winter] (Louis Angalik of Arviat, Keith and Scottie 2001, Appendix D: 38).

This phenomenon seems incredible, but as it has been observed independently by Elders from different parts of the Canadian Arctic it deserves to be taken seriously, and an explanation should be sought.

Snow Conditions

In 2001, Elders and polar bear hunters interviewed in Gjoa Haven remarked on the fact that they were observing less snow cover than in the past, and that the accumulated snow or snow cover was not the same quality as in the past. There was a hardness to the snow, and it was very difficult to find snow that was appropriate for iglu building. In 2006 Inuit in the East Kitikmeot area are continuing to observe the change in the quality of the snow. An immediate result of this change is the ongoing problem that hunters have in finding good iglu building snow. Iglus are still used for shelters on hunting trips conducted in the colder months.

Just recently nowadays the snow seems to have more air. Hard snow and soft snow layers. Back then the snow was the same throughout its depth but now there seems to be more layers of soft snow and hard snow (Ben Putuguq, Gjoa Haven, Transcripts 6).

It used to be deeper snow when I was a kid. In the 1970s in May the snow would get soft during the day and then harder at night for traveling. But now it seems to stay soft through the night. In May the top of the snow used to be soft and the bottom was hard. Qaliariik – different snow types on top of the other. Snow used to be good for iglu in late October and the beginning of November. You didn't have to search for good iglu snow. Now some snow gets really hard and now you have to look around to find the right snow (Samuel Takkiruk of Gjoa Haven in field notes: 11).

Now you have to wait until mid November and sometimes even later than that [to find good snow]. In early winter sometimes there is hardly any snow on the land or even on the ocean because of the stronger wind (Jerry Arqviq of Gjoa Haven in field notes: 11).

Snow is now mostly puqaq (powdery). Good snow is hard to find. (Abe Aqqaq of Taloyoak in field notes: 9).

According to the area's Elders the snow used to be of uniform consistency through its depth and now it is much harder on the surface, and then flaky underneath. Elder Guy Kakkianiun of Kugaaruk attributed the flaky nature of the lower layers to the weather during the fall when the snow first accumulated.

Right now I don't really build an iglu so I am not sure about the iglu building right now. In the fall time it has been really warm and more snowy conditions. And the snow was not there all at the same time. They had snow in different times in different areas. I think the reason that this year the snow is bad is because in early fall we had snow and then it rained. The rain destroyed the fresh snow and now it is pukaq - flaky snow. That is what makes it difficult to build an iglu. It is not all the same but I feel that now the snow conditions are bad starting in the fall. That is why that other person was talking about having difficulty building an iglu this year. Because of the conditions from the fall (Guy Kakkianiun of Kugaaruk in Elders Meeting, Transcripts: 20).

Yes I feel the same and this is a topic that I know - about the snow. Nowadays the snow is - even in winter time - some of the snow when you hit it with the snowmobile it feels like ice, its really hard and then all of a sudden it is really soft. That is why it is difficult to build an iglu. A long time ago it never used to be that way. Because it would almost be the same from fall to winter to spring. Even when you are travelling people notice that when you are travelling on the snowmobile some of the snow reflects [in] your eye even in winter time. It is like ice - hard snow. Sometimes you can't even see your skidoo [track] on the snow when it hits the hard snow.

When you slip on the hard snow you hurt yourself because the snow is so hard. A long time ago even when you fell on the hard snow - what we used to call hard - it was not hard you couldn't even feel it. I agree with Guy about some of the snow being hard snow and some being soft. Sometimes you can't even cut through the hard snow with your snow knife nowadays (Levi Illuitok of Kugaaruk in Elders Meeting, Transcripts: 20).

For Simon Oleekatalik the changes in the snow quality in recent years have caused the traditional knowledge that the Elders learned as kids to be less useful for modern conditions.

When I was younger travelling with my parents by dog team my parents used to know just by looking at the snow conditions they would know where the good snow is to build an iglu. Now they are trying to do the same because of our parents. We used to watch our parents how they read the snow to build an iglu. It is almost difficult to understand the snow nowadays, because even when you are trying to work with your snow knife you can't even cut through some of the snow. And the layers are not the same. Some of it is too soft and some of it is too hard. Yes the snow conditions are different from a long time ago to today. A long time ago when we built an iglu the first blocks on an iglu used to have a good place to sit on. The blocks used to sit really good on the snow. Now when you put the first blocks on the snow don't want to sit right because of the snow conditions (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 20).

These changes in snow quality are being observed by Inuit in many areas of the Canadian Arctic (see Table 1). Inuit in Nain, Labrador are making many of the same observations regarding changing snowfall and snow conditions as the Elders in the East Kitikmeot area. These observations include the presence of a crust on top of the snow which "glitters".

The amount and composition of snowfall and the composition of the snow has been changing over the last two to three decades as well. Many participants report that the first snow now arrives later in the year (often not until December); that there is less snow now than fifteen to twenty years ago; and that the snow today is more “granular” and lighter. They also say that the snow in the mountains north of Nain, once visible year round, now melts each year, leaving the hills bare in the summer months. During the winter months, “glitter” (frozen crust on top of snow) is observed as being more common. The presence of “glitter” on top of the snow during the winter is described as impacting the health of both caribou and ptarmigan, since it blocks their access to valuable food resources during cold months (Furgal et al 2002: 278).

Even when you are travelling people notice that when you are travelling on the snowmobile some of the snow reflects [in] your eye even in winter time. It is like ice – hard snow. Sometimes you can’t even see your skidoo [track] on the snow when it hits the hard snow (Levi Illuitok of Kugaaruk in Elders Meeting, Transcripts: 20).

For Guy Kakkianium of Kugaaruk the differences in the amount of snow accumulation or snow depth on the ground or ice are not unusual when he considers the normal variability of snow accumulations over the years. The change in snow quality is very real however, and he attributes these changes to machines that put exhaust into the air.

It doesn’t seem much different in snow depth. In different times and in different years the snow depth is not always the same. I feel the snow thickness is still the same. It is just the snow condition is changing because of what we were talking about before. I don’t see any difference from a long time to today with the snow thickness. The snow is coming from the sky and the world is going around and there is more smoke coming from what we use such as snow machines. I feel there is more war and they use smoke equipment. I feel that is why the snow condition are changing (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcripts: 21).

While a reduction in snow accumulations can be understood in the context of the normal variability of the Arctic climate, many Elders and hunters in the region and in other areas of the Canadian Arctic are observing a reduction in snow cover (see Table 1). In the Labrador region this lack of snow is having impacts on seals which depend on a snow cover for their breathing holes and dens.

The lack of snow on the ice is associated with the growing amount of scraped and wounded seals caught by hunters and with a decrease in the number of breathing holes and dens in the area, the latter increasing the pups exposure to predation on ice (Furgal et al 2002: 277).

Sanikiluaq Elder Joe Arragutainaq expressed concern about seal pups with the snow melting early on the sea ice in his region.

As well, the snow cover on the sea-ice has started to melt. If it keeps up, the seal pups will be exposed and will get sunburned without their maternity dens (Joe Arragutainaq in NTI 2001: 8).

However, when the Elders were asked about the possible implications of the changing snow conditions to denning animals such as seals and polar bears in the East Kitikmeot, they were not concerned at present about the ability of these species to find suitable conditions for denning.

As long as snow keeps coming up to the north the denning is possibly going to be still the same even if the snow conditions are different because they use their claws to build up their dens. Even if the seal if the snow keeps coming. I feel the seals will be denning and the polar bears will remaining the same. As long as the snow keeps coming up to the north. It might be different if the snow is not ever going to come. It is not going to be the same. But if the snow keeps coming then I feel the polar bear and seal denning is going to be the same (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 22).

I also say the same. As long as the snow keeps coming and the wind is still there it is still going to harden the snow. I feel the denning is still going to be the same as long as the snow hardens conditions are still the same each winter. Even if there is less snow they will find a place where there is snow in different areas.

I have also heard that the polar bear might even be better if the snow is softer because of their breathing. I also hear that polar bears move up to the softer areas for their breathing. Even if the snow is not that hard I think the denning will be the same.

To clarify, when the den of the polar bear starts to get hard it is harder to breath. That is when they move to a softer area. One time I was hunting for a denning polar bear. I couldn't find it and that is when I realized that polar bears move under the snow (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcripts: 23).

I wanted to add to what they were saying. As long as the snow keeps coming the polar bears and seals are going to be denning. Myself I found that polar bears move to different places for their dens. In the land called Qilirut I noticed that in fall time the polar bear den is right on the bottom, as the snow gets thicker the polar bear keeps going up. Even with the seal I feel the same. If the snow keeps coming I feel it will still be the same (Levi Illuitok of Kugaaruk in Elders Meeting, Transcripts: 23).

Though the snow conditions at present in the East Kitikmeot do not seem to be affecting seal breathing holes and dens, the experiences of Inuit in the Labrador and Sanikiluaq regions are testimony to the possibility of this becoming an issue in the future.

Ice Conditions

As in many areas of the Canadian Arctic (see Table 1) the Inuit of the East Kitikmeot are experiencing milder and shorter winters that are causing them to observe thinner ice conditions, later freeze-up and earlier break-up of freshwater and sea ice. For Ben Putuguq what was the normal process of ice formation is being affected by the increase in overcast skies, and the instability of the temperature and the winds.

Back then when I was at a younger age we would have long clear days when the ice was starting to freeze whether the ocean or lake. And they would freeze evenly a long time ago. But nowadays they seem to freeze and thaw out and then be cloudy. Then start to freeze a little more and start to thaw out. And the ice seems to be dangerous for a long time then long ago. Nowadays the ice seems to stay dangerous for a longer period. A long time ago it was nice and clear days and the ice would start to freeze up and the sun would start to get reddish. But now it is hard to see the sun when it is trying to freeze and there are a lot of white clouds.

Darren: So back in those old days you would expect the ice to be safe to travel on at what time?

Ben: When he was younger it might be late September or early October that it was about that time of the year that it would be safe enough to stay on the ice. Lake and ocean.

Darren: And how does that compare today?

Ben: I am not sure what causes that. Maybe the months of the year have changed. It seems to be that we have to wait until mid-November before we start running on the ice (Ben Putuguq, Transcripts: 8).

A later freeze-up and generally milder temperatures are leading to the lake and sea ice not attaining the seasonal depths that they did in the past.

Since about 1955 the ice condition used to be really thick. I agree with the person that was talking about the ice this year. It is really thin. I still feel that this winter is suddenly cold and then next day really mild. Even right now [though] it should have been warm it feels cold. A long time ago at this time of the year it should be nice and warm. But right now it feels cold. I feel that when it starts to melt it melts suddenly [ice and snow] (Guy Kakkianun of Kugaaruk in Elders Meeting, Transcripts: 19).

I agree with Guy that the weather conditions even around Taloyoak area seems to have changed. It is cold [then] next day warm and then warm the other day. In March and April when it is supposed to be warming up it seems to be really cold. I noticed in fishing lakes it used to be really thick. Even the fishing holes made by an auger nowadays. They seem to get smaller [thinner or less deep] just in a day. That never used to happen. It feels like more daylight [time] is colder than wintertime. And it stays cold. But in wintertime with less daylight seems to be warmer. I also hear from two other communities that this year the lakes are thin or ice conditions are thin (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 19).

Even the hunting area for seal hunting this year [Itsuaqturvik]- the ice seems thin and the snow is different on the ocean also (Abraham Ukuqtunnuaq of Taloyoak in Elders Meeting, Transcript: 17).

Daniel Tulurialik of Taloyoak said that the ice on Itsuaqturvik [Gulf of Boothia] is quite thin this year, and it is also very smooth as there is no multiyear ice (hikutuqaq) or icebergs (piqalujat) around. This caused the ice to freeze smoothly and the flow edge (hinaaq) to be quite far out (Daniel Tulurialik, Field notes: 5). The amount of multiyear ice normally expected to form part of the sea ice north of King William Island, and in the Gulf of Boothia has been drastically reduced from the past. Elders reported a significant reduction in multiyear ice in the area north of King William island in a 2001 study of Inuit knowledge (Keith et al 2005:126). Elder Ben Putuguq of Gjoa Haven confirmed that this condition has continued since that time (Ben Putuguq, Gjoa Haven, Transcripts: 5).

A long time ago there was more older ice [hikutuqaq] that would come and go. But nowadays you don't even see that old ice anymore in the Gulf of Boothia. Some old ice would have weeds or rocks on top. The name for those is auhuittuq (Peter Peetoloot of Taloyoak, Transcripts: 11).

Oleekatalik said that a long time ago in years when they were young there was more old ice. In the last three years or so, the ice has been very smooth.

Question: Were there big piqalujat [icebergs]?

They weren't really piqalujat [icebergs] around here just the flat hikutuqaq [pans of multiyear ice]. The big icebergs couldn't make it up here. It is too shallow. Last summer most of the old ice was gone. And it has been very smooth this winter. Yes you would expect to have big pieces of old ice around in the summer (Simon Oleekatalik, Field notes: 10).

As Taloyoak Elder Simon Oleekatalik stated above, multiyear ice was part of the normal make up of sea ice over in the Gulf of Boothia in the past and significant amounts of multiyear ice were expected to remain on the shores in the summer. However the multiyear ice was not present for the most part in the summer of 2005.

With the ice achieving a thinner overall depth in the winter, and with warmer temperatures early in the year, the sea and lake ice is breaking up sooner than in the past.

... I noticed also that the ice breaks up faster than a long time ago. I feel that maybe it is because of the warm weather that is coming up that is making the ice go faster in the lakes in spring time (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 19).

Even in the lifetime of middle aged hunter and guide Samuel Takkirug of Gjoa Haven the difference in the timing of spring break-up and the open water or boating season is significant.

Now boating is possible early in July and it used to be later in July. Wind changes a lot now and sometimes it just goes right around [shifts 360 degrees]. In the early 90s one time the ice was gone in early July. Because of the change in the wind. It seems to be stronger coming from the north. Sometimes it breaks up the ice right away. Maybe because it is not as thick as it used to be. Sometimes in the middle of August when I was a kid we would be picked up by bigger boats to take us to Gjoa Haven for school. Sometimes it would be that late that the ice was broken up. That was in the 1970s. It seems like the ice goes away early nowadays (Field notes: 11).

In Gjoa Haven, the combination of thinner seasonal sea ice and warmer temperatures are leading to unsafe ice conditions, such as areas of open water, earlier in the year.

Last week Wednesday we took off from Gjoa Haven to go to Cambridge Bay. Raymond said “Uriash is that open water down there” and I said “holy cow this time of the year!” It never used to happen at this time of the year. There were three of them [open water areas] there – huge.

Darren: I saw them, I didn’t know what it was. Was that at Iitaq [An island in Simpson Strait (Quukilruq)]?

Uriash: Yes it is open water. Somewhere around Iitaq. We know that area usually open a small area but there is a huge open water down there. I said to Raymond “ people aren’t expecting this open water. They are going to go travelling in a storm using GPS. We have got to tell them there is open water close by. (Uriash Puqiqnak of Gjoa Haven in Field notes: 3/4).

I noticed that there have never been current on the ocean. There is more open water. They open earlier in the spring time and there are more currents on the shallow parts where there have never been currents (Ben Putuguq of Gjoa Haven Transcripts: 5).

Ben Putuguq’s reasoning that new areas of current account for the earlier areas of open water where they were never seen before may have some truth to it, however his understanding can also be traced to the fact that in the past only areas that had strong current would have open water so early in the year. What he may in fact be seeing is simply the result of an earlier process of ice melt and break-up.

The earlier transformation of the snow and ice environment of the ocean in the spring time also triggers behaviours in wildlife. Co-researcher Jerry Arqviq commented that he was seeing seals pulled up on the ice earlier than he expected during pre-trip planning telephone conversations. The mayor of Gjoa Haven Uriash Puqiqnak was also surprised by the early emergence of the seals.

I was not expecting [it]. Two weeks ago. I wasn't expecting seals are going to be on the ice already. My brother in law Paul Eleeheetok and Huumittuq spotted some seals on the ice already.

Darren: So how early is that?

Uriash: I don't know. Two weeks ago it was raining already?

Jerry Arqviq: Late April.

Uriash: Ya this is wrong. The calendar is one month late (Uriash Puqiqnak, Transcripts: 4).

Traditionally Inuit marked the seasons, and marked time by the changing of environmental conditions, and by seasonal wildlife movements and behaviour. To Uriash if the seals up on the ice then the season or the month has advanced to a certain point. In his estimation these seasonal changes no longer correspond to the calendar that was introduced to Inuit by Euro-Canadians.

Northern Expansion of Grizzly Bear Range

Hunters and residents of Gjoa Haven are reporting an increase in the number of grizzly bears close to the coast on the mainland, and the arrival of grizzlies onto King William Island.

I never saw any grizzlies in Back River when I was a kid. Jacob Akaituq got a grizzly bear just this past week at Amurat [at the mouth of the Back River]. They are starting to come around. Also at Pangniqturaarjuk towards [south of] Richardson Point two brother-in-laws got grizzly bears. This is not usual (Uriash Puqiqnak of Gjoa Haven in Field notes: 4).

Project Co-researcher Jerry Arqviq felt that it was around 1999 or 2000 that the number of grizzly bears went up in the area and people started killing them for food more frequently. One was even caught on the ice in Storis Passage (Ugjulik) recently by local hunter Sam Hiqiniq (Jerry Arqviq of Gjoa Haven in Transcript: 1).

The Mayor of Gjoa Haven, Uriash Puqiqnak remembered that it was the summer of 2005 when the first grizzly was seen on King William Island. He said wolverines and wolves are also unusual and when Uriash first moved to Gjoa Haven in the 1960s and 70s the island was clean, with only fish and rabbits (Field notes: 4).

We are trying to figure out why the grizzlies are coming to this area. Maybe it is warming up. People are starting to camp on the islands because of grizzlies (Uriash Puqiqnak, Field notes: 4/5).

The same phenomenon has occurred to the East where grizzlies have now populated Victoria Island. Grizzlies were first seen crossing from the mainland towards Victoria Island in 1999 (Thorpe et al 2002: 215). There has also been an increase in grizzly numbers on the mainland coast south of Victoria Island (Thorpe et al 2002: 215), mirroring the situation with King William Island.

As Mayor Uriash Puqiqnak stated above people in Gjoa Haven are already altering their behaviour and camping on islands due to concerns over the presence of grizzly bears on King William Island. He went on local radio to give advice to the residents of Gjoa Haven.

This summer I think, there was somebody that went on local radio [saying] there was a grizzly bear on the island. I said on local radio “we are not expecting that kind of animal on the island. We have to be careful because we are not expecting these kind of animals at all. We heard a lot of grizzly bears in Qamanittuaq or somewhere. They are damaging cabins that belong to the community. We told the Gjoa Haven community that we are not expecting any kind of animals like that. Next year it would be nice to have a dog with you all the time because we’re not expecting these kind of animals in this community (Uriash Puqiqnak of Gjoa Haven in Transcripts: 1).

Change in Range of Other Species

The grizzly bear is not the only species that is expanding its range in the region. Caribou returned to King William Island in the early 1980s after many decades absence (Personal Communication, Jerry Arqviq July 6, 2006). Caribou had been there during Rasmussen’s visit in 1923. The first caribou were the smaller peary caribou, but now the year round resident population is thought to have come over from Victoria Island (Personal Communication, Jerry Arqviq July 6, 2006). After the arrival of the caribou, muskox occupied the island, and the population has been increasing ever since.

Wolverines have also made their way further north and have been caught on an island between the mainland and King William Island, and on King William Island itself.

There is something kind of strange happening too. Two years ago in Havgaard Island [Aqigiqtuuq]. Around that area I was seal hunting and I got one seal. I was with somebody else. I started going home because the daylight was getting closer. Around that area – Aqigiqtuuq – I spotted something really dark about that high (shows with hands). It was kind of stormy with snow blowing. It was going down and moving. I was not expecting anything like that. I thought somebody lost a dog or something. I went closer to see what was over there. It was a wolverine. I got the wolverine. Around Gjoa Haven area on the ocean. Never usual. I got a seal the same time and I got a wolverine that day. Strange (Uriash Puqiqnak of Gjoa Haven in Transcript: 1).

Somebody got a wolverine again on this island in ukiuq [winter]. Bob Konana. He got a wolverine this year twenty kilometers from here (Uriash Puqiqnak of Gjoa Haven in Transcript: 2).

Three or four years ago Alan Kalhoun and Paul Aalliq of Gjoa Haven saw a dead bowhead whale calf (arviaq) close to Richardson Point and near Starvation Cove which is on the mainland across from King William Island. They brought a flipper back to town (Jerry Arqviq and Samuel Takkiruaq of Gjoa Haven in Field notes: 10). The Elders from Taloyoak have observed changes in the location of bowhead whales. Bowheads have

now expanded their range south deep into the Gulf of Boothia in the Itsuaqturvik area as of approximately 1995. Simon Oleekatalik told the research team about the frequent sightings of bowhead whales (arviq) in Itsuaqturvik around Netsikhiurvik, where they have never been seen before. He thought this started around 1995 (Simon Oleekatalik of Taloyoak in Field notes: 9). Oleekatalik said that since 1995 many bowheads are being seen in the Itsuaqturvik, Gulf of Boothia area where they didn't notice bowheads at all a long time ago (tapsamani). In the summer of 1995 there were quite a few. In 2002 the first sighting of a bowhead was in just outside of Netsikhiurvik (see Figure 3) in September (Oleekatalik, Field notes: 10).

Caribou have expanded their range further north coming very close to Taloyoak, and also up into the Simpson Peninsula close to Kugaaruk. This expansion is a reoccupation of an area where they were in the lifetime of Elders today. However, the health of the animals is of concern to Kugaaruk Elder Jose Angutingurnirk.

The caribou itself hasn't changed but the meat seems to have changed from a long time ago. A long time ago the caribou used to be good. We never used to see white pus or white stuff around the meat a long time ago. Ever since the caribou herd came to this area they seem to have white spots on their meat.

A long time ago when we used to have caribou long ago it never used to be like this. But since then caribou keep coming around closer and they have white stuff. I think it is from the equipment, house and plane exhaust. The smoke that is coming to the earth.

Also I notice that around caribou meat there seem to be live worms that I have never seen on the caribou meat... Even the young caribou with their moms with the white stuff on the meat. The calves also have white stuff on their meat. I also noticed about the skin skinning the caribou they seem to tear easier. The [look] of the animal has not changed but the skin and the meat has changed since a long time ago (Jose Angutingurnirk of Kugaaruk, Transcripts: 38).

Repulse Bay Elder John Kaunak also mentioned the change in the caribou skins at a 2001 Elders conference.

The caribou are now infested with brucellosis and the change in the sun's rays has affected their skin quality. I have heard of complaints from the women of the skin's change in durability. It tears easily and the hunters have started to find that the skins are ripping right off as they are attempting to butcher the carcass (John Kaunak of Repulse Bay in NTI 2001: 19).

Inuit of the East Kitikmeot and other areas of the Canadian Arctic are observing the expansion of the range of different species into the areas they use (see Table 1).

Change in Health of Seals

The Elders and hunters of the East Kitikmeot are reporting issues with the health of seals on both sides of the Boothia Peninsula. It is important to note that these two areas are not seen as equivalent environments by Inuit. The west side of the peninsula including James Ross Strait and the area of the McClintock Channel north of Gjoa Haven are seen as less productive habitat for seals, when compared to the relative richness of the Gulf of Boothia/Itsuaqturvik area. Taloyoak hunters hunt both sides of the peninsula and they

know that when Inuit go to the west side they need to have a good team of skilled seal hunters to get anything (Daniel Tularialik, Field notes: 6).

On the west side of the Boothia Peninsula, Gjoa Haven hunters are talking about there being more seals that are lean. Although Elder Ben Putuguq did not notice any changes himself he:

...noticed somebody is talking about less healthy seals. The meat seems to be spoiled or something is wrong with the meat. And less fat...I heard it from the seal hunters in the community (Ben Putuguq of Gjoa Haven, Transcripts: 6).

Hunter and project guide Samuel Takkiruq mentioned to Taloyoak Elders Simon Oleekatalik and Abraham Okuqtunnuaq that he caught a very skinny seal that had very little fat and bad tasting meat right by Gjoa Haven last year. They responded by saying that Itsuaqturvik was very different from around Gjoa Haven and that due to the richer food source they had never seen skinny seals in Itsuaqturvik. In the Gjoa Haven area however there have always been some lean seals and they have a term for them – malatuq (Field notes: 10/11).

Although lean seals are understood to be somewhat common on the west side of the Gulf of Boothia, Gjoa Haven hunters know this too and one must assume that they are seeing more than the normal number of malatuq or lean seals.

In the Gulf of Boothia and Pelly Bay, although they are not reporting lean seals, they are observing a significant number of unhealthy seals.

And about the seals. I seal hunt quite a bit. The condition of the seal, the meat and especially the fat. Sometimes I notice that when I am cutting up a seal, just between the skin and the blubber sometimes there are yellow stripes between the skin and the blubber, the fat. I don't know where it is coming from. It doesn't look too good for a meal for the family. I am not sure where the yellow is coming from between the fat and the skin (Abraham Ukuqtunnuaq of Taloyoak at Elders Meeting, Transcripts: 18).

Yellow stripes associated with the blubber have been observed by the late Arviat Elder Tony Otok in bearded seals (NTI 2001: 16).

Just last year I caught a seal that was unusual. That was in spring when we were out on the land camping. I went out seal hunting and I got a seal with my rifle. It was only 100 yards or maybe not even. The seal looked strange. The seal was afraid, but it was unusually afraid. I could get really close to it. When I shot it when I went to go pick it up there was something different about it. On the back it had no skin right to the meat. Just round – about 6 inches round – it had no skin and it was open right to the meat. Ever since then I haven't felt like having adult seal anymore after what I saw about the seal. Even in winter time when people are asking people to get some seal meat on the local radio- I want to have a taste of the seal but that [seal he] caught in the past keeps coming to my mind. Maybe that is a sick seal too that this guy is talking about to pick up. For sure I could eat a young seal as long as it is a young seal. I love seal. I also agree what the others are talking about. The seal condition. What they used to look like before and now (Levi Illuitok of Kugaaruk in Elders Meeting, Transcripts: 18/19).

When somebody catches a seal in the sealing area they gather together to have the seal liver. Nowadays we have been seeing around the edges of the liver is a different color. It seems to be a whitish color. I also feel it is the change in the weather on the animals. It never used to be that way. The liver used to be all

the same. Now some of the seals have a liver with white around the edges. I also agree with the people that were talking about the seal conditions before.

A long time ago we used to use the meat of the seal, the fat. We used to be able to use anything that is cut up on the seal and all the parts have names that has been cut up. They never used to look that way. They have different colors on the meat and even on the bones it looks different on some seals. I know that this didn't happen long before (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 19).

Taloyoak Elder David Igutsaq spoke about unhealthy seals in 2001 at an Elders Conference on Climate Change.

We have started to notice that the seals are starting to be affected by climate change or pollution. It used to be unheard of to catch or even see a seal that had no fur. It is something we have started hearing of these last ten years. This was the first time that an Inuk caught a seal with no fur. This was in the fall near Taloyoak. Due to the fact that it was unknown within Inuit Qaujimagatuqangit, the seal was left behind because of the uncertainty of the effects of the meat. The skin was bare of fur and very easy to rip. It looked as if it was sunburned or something (David Igutsaq of Taloyoak in NTI 2001: 18/19).

Inuit knowledge is indicating that the health of ringed seals on both sides of the Gulf of Boothia is in question, though the observations are different on both sides.

Polar Bears

The Polar Bear Seasonal Round in the Gulf of Boothia

Fall

During the fall polar bears are found along the shore of the Gulf of Boothia and Pelly Bay waiting for the ice to develop and waiting for the snow to accumulate enough to establish dens. At this time of year the flow edge is not very far off shore in Itsuaqturvik.

In the fall time [ukiaksaq] the polar bears seem to be along the shore line of Boothia on Itsuaqturvik around Netsikhiurvik. In ukiaksaq the hinaaq [flow edge] is close to the Netsikhiurvik area. When it gets colder it goes further down (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcript: 23).

There is the same connection around Kugaaruk. The polar bears are close to shore in the fall time. All around the islands, behind Kugaaruk and close to Kugaaruk. When we get old ice around Arviligjuaq close to Kugaaruk we spot tracks on the old ice in the fall time...(Guy Kakkianiun of Kugaaruk in Elders Meeting, Transcript: 23).

When the snow accumulates to a sufficient depth the polar bears establish dens which they use intermittently until the weather gets very cold in the winter.

As soon as there is snow around the denning areas they will be going back and forth to their den and going out. And in October if there is snow in September they will go in September. As soon as there is enough snow for a den they will start going to the den.

One time I was out going fishing in the fall at the end of September. I noticed that they were starting to den in one area because there was lots of snow. At one time last year we went fishing and I caught some fish

on a lake and there were some dens towards the high areas. One morning I went out of my cabin and I saw a bear eating my fish and I had to shoot the bear. It was coming from its denning area. That was in October (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 24).

Even towards the Taloyoak area they do the same thing – as soon as there is enough snow they will den and go back and forth – in and out (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 24).

Polar bears tend to make their den on land in locations where the topography favours the early and fast accumulation of snow (All Elders present at Elders Meeting, Transcript: 24; Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 25). The Elders were asked to identify what they understood to be traditionally important denning areas for polar bears. The locations they identified on the map are presented in Figure 6. It is not unheard of however for polar bears to make their dens on the ice.

I also noticed that one of my older brothers – who is no longer alive – spotted a bear just on the ice that had a den. That is the only one [instance] I noticed where someone saw a bear denning on the ice (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 24).

Winter

Although cubs that are the size of their mother (namiariit) and full grown males (anguruat) are thought to either come out of their dens early or not den at all, other bears are denning when the cold weather comes in the winter months.

As soon as the weather gets cold enough they stay in their den. But in fall time they go in and out of their den. The cubs that are almost the same size as their moms. I figure they go in and out all winter. But the big males as soon as they see the sunlight I have heard that they go out of their dens (Levi Illuitok of Kugaaruk in Elders Meeting, Transcript: 24).

The polar bears, some of them don't even den. The big bears and even the cubs that are close to their mother's size – some of them don't den all winter. When the big bears go out we don't really know but for

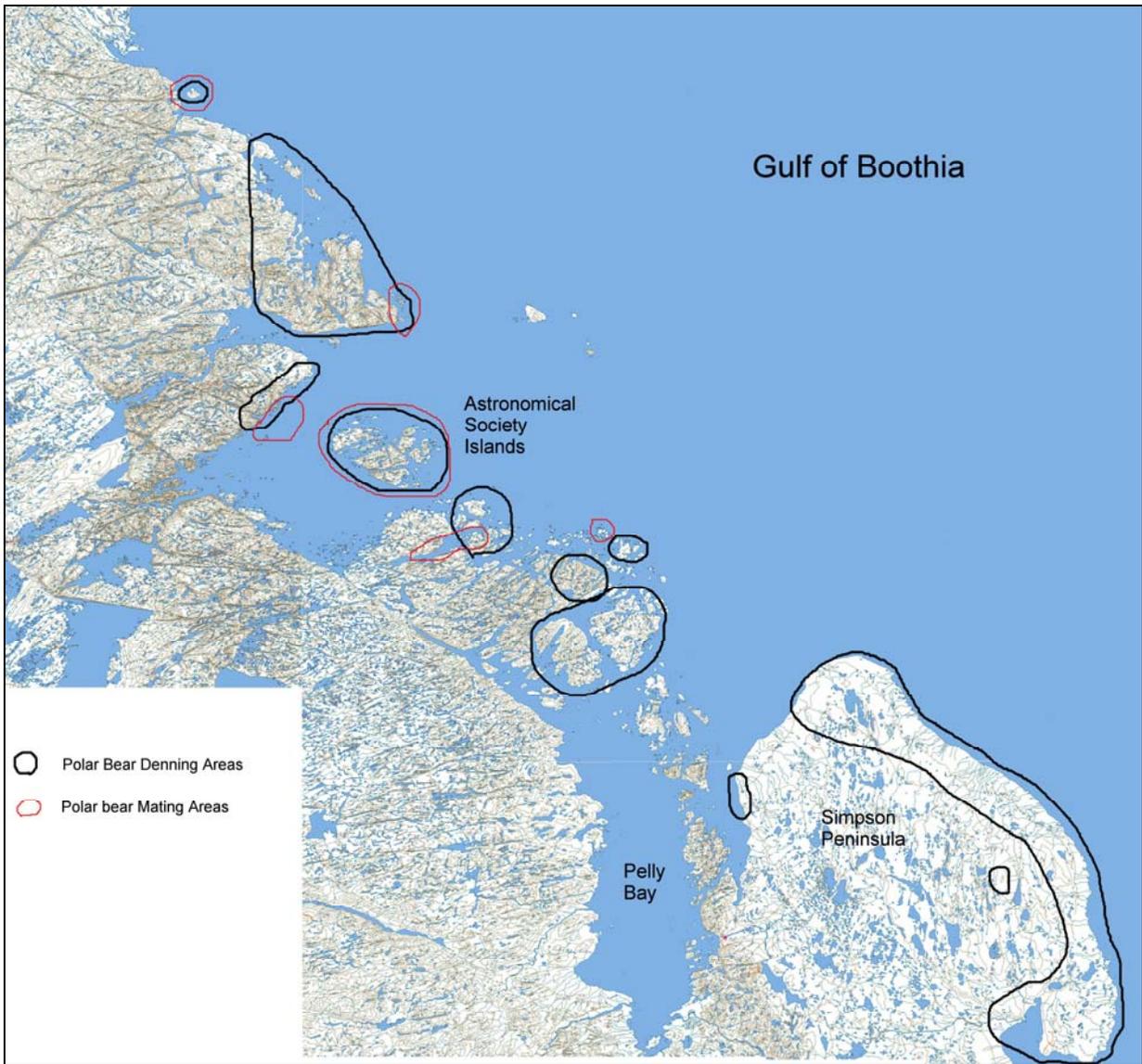


Figure 6: Polar Bear Denning and Mating Areas Identified by Guy Kakkianium, Levi Illuitok, Simon Uleekatalik and Abraham Okuqtunnuaq

sure they will be seal hunting around the sea ice. Where ever they can find an easy spot (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 25).

When asked whether bears are using the flow edge (hinaaq) at this time of year Kugaaruk Elder Guy Kakkianium responded that it was not so much the flow edge that forms the good hunting habitat at this time of year but the floating ice pans beyond.

I don't really know about polar bears really hunting on the hinaaq. But there is some floating ice down there. That is where the most hunting areas are for polar bears. Big chunks of ice. On this area there are big chunks of ice floating and that is where there are easy spots for polar bears to hunt (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 25).

Darren: What time of the year?

Guy: At the coldest time of the season, and then they come up this way [towards the area of the camp at Nuvutiruaq] when it gets warmer (Guy Kakkianiun of Kugaaruk in Elders Meeting, Transcript: 25).

Spring

As Guy Kakkianiun mentioned above, polar bears move in from the floating ice and flow edge as the sun gets higher and the weather gets warmer. They congregate in certain areas both to find mates, and also to hunt seal pups or nattiak. There was some difference in the time of year the Elders feel the mating begins and ends.

Darren: What time of year will they be rutting?

Abe: April (Abe Ukuqtunnaaq of Taloyoak in Elders Meeting, Transcripts: 25).

[Rutting] May start in February to the beginning of April (Guy Kakkianiun of Kugaaruk in Elders Meeting, Transcript: 25).

The mating I saw in person was around May around this area. When they're mating their reactions are different. They are not scared of anything and they seem to come to anything they see. I agree with the other Elders about when mating seems to start. But the one I really saw in person was in May (Levi Illuitok of Kugaaruk in Elders Meeting, Transcript: 25).

The Elders that were camped out for the Elders meeting at Nuvutiruaq were asked where the important areas were for mating. They all agreed that mating could occur in any location, but they identified areas on the map that were known to be congregation areas (Transcript: 26). Those areas are presented in Figure 6 above. One of the most well known areas is at Qikiqtarjuaq (the Astronomical Society Islands).

Darren: Are there any specific areas that are important for that?

Guy: There are different areas that I have seen. They gather for only a few days and then they leave and go somewhere else. Around here and around Qikiqtarjuaq [Astronomical Society Islands] (Guy Kakkianiun of Kugaaruk in Elders Meeting, Transcript: 25).

When they are in the rut both males and females are thought to be actively searching for mates. They can behave quite boldly at this time, even approaching hunters.

I used to hear that the females favour their mates sometimes. They have a favourite mate – the female. So they will be moving looking for their mates (Levi Illuitok of Kugaaruk in Elders Meeting, Transcript: 26).

Guy: I spotted a female looking for a mate in this area. I thought it would be afraid but it moved towards the hunters (Guy Kakkianiun of Kugaaruk in Elders Meeting, Transcript: 26).

Guy and Simon: [They will be looking around for mates. The males will be looking for their mate and also the females will be looking for mates. So they will be walking around looking for mates] (Elders Meeting, Transcript: 26).

Throughout the spring period polar bears are hunting seal pups which are easier to catch for polar bears and Inuit alike. Guy Kakkianiun explains a hunting strategy that he has witnessed mother bears employing with their cubs.

I have seen some polar bears with cubs seal hunting, hunting baby seal.. The polar bears clear out all the snow around the hole and all the nattiaq [seal pup] holes they can find – they clear out all the snow. Polar bears are not going to miss that seal for sure (Guy Kakkianiun of Kugaaruk in Elders Meeting, Transcript: 26).

As the mating season comes to an end around May and the ice conditions start to deteriorate Inuit find polar bears hard to spot.

From now until spring and break-up. Especially when there starts to be water on the ice they seem to be harder to spot. After the mating season they seem to be harder to see down on the ice (Guy Kakkianiun of Kugaaruk in Elders Meeting, Transcript: 26).

Break-up and Summer

As the ice conditions move into the break-up time the mobility of Inuit hunters is reduced and they are not in a position to observe the locations and activities of polar bears. The Elders at the Nuvutiruaq camp agreed that normally the bears are not on land in the summer time but they stay with the ice (Transcripts 26).

Darren: When the break up happens are there areas where the bears are concentrated?

Guy: I think they are harder to see on the shore and on the land because this area has big chunks of ice and old ice. I think they would stay down on the ice instead of on the land (Guy Kakkianiun of Kugaaruk in Elders Meeting, Transcript: 26).

When we get old ice around Arviligjuaq close to Kugaaruk we spot tracks on the old ice in the fall time and even in summer time. Even the guys who go whaling in summertime around those areas see polar bears in the summer time. People go around Kugaaruk this area summertime, when there is the chance – when there are less icebergs or ice. Every time they go around this area they seem to spot polar bears in different areas (Guy Kakkianiun of Kugaaruk in Elders Meeting, Transcript: 23).

When the old ice is grounded close to shore polar bears are sometimes seen close to and on the land.

When the old ice comes to the shore I have spotted some coming close to the shore with the icebergs (Abe Ukuqtunnuaq of Taloyoak in Elders Meeting, Transcripts: 26).

We spotted some polar bears on the drifting ice – hikutuqaq. The bears that have caught their seal cover their seal with snow on top of the ice to keep the meat from spoiling (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 26).

Polar Bear Numbers, Health and Human-Polar Bear Conflict

In recent years the Elders have been observing that there are more lean bears being seen on both sides of the Boothia Peninsula.

There is a change in the polar bears and they are not as fat as they used to be (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 16).

Long ago when we finally caught a bear they used to have healthy meat, healthy fat and healthy skin. But nowadays some bears that have been caught their fat seems kind of loose. It is not the usual fat on the polar bears (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 17).

I don't really know about the skin condition but the fat condition seems to be more skinny bears than a long time ago. I think the reason that more bears are skinny is that more bears are around. Maybe it is because there are too many bears. That is why they are not as fat as usual (Peter Peetoloot of Taloyoak, Transcripts: 15).

I noticed that there are more bears nowadays...I noticed that there are more bears than a long time ago...Just recently I caught a bear around this area – a small one – and it had no fat. It was hungry and when I opened the stomach and there was only clam or a lobster in the stomach and there was nothing else.

In another place, I caught one [a big male – anguruaq] on an island. He was nice and fat but he had some bad skin. It had sores on the skin. I couldn't sell that one for a long time because of the bad skin (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcripts: 16).

I agree with the topic and I feel the same way. Back when I was younger polar bears had healthy looking meat. But right now just by looking at the animal that has been caught – it looks different and it seems to taste different.

I feel the same as the other Elders that [about] the taste and the meat health. A long time ago the meat was nice and red on a polar bear and the skin and the fur was healthy. But now even just looking at the meat of the polar bear I am wondering how it is going to taste and I remember the old times and how it used to taste. I agree with the Elders... (Levi Illuitok of Kugaaruk in Elders Meeting, Transcripts: 16).

I agree with the Elders about the polar bear health. When I was a child I was able to have polar bear frozen. Raw polar bear meat with fat. After I heard that the animals have something in their meat I can't even eat the raw polar bear meat anymore. And you even see polar bears -after you skin them the meat looks different. They seem to be different. There seems to be black spots on different parts of the body of the polar bear. And also the fat is different from a long time ago (Abraham Ukuqtunnuaq of Taloyoak in Elders Meeting, Transcripts: 17/18).



Figure 7: Fresh track of a mature male or Anguruaq seen just southwest of Qikiqtarjuaq (Astronomical Society Islands) during the field trip to Nuvutiruaq, May 12, 2006.

Elder Peter Peetoloot of Taloyoak has made a connection between starving or lean bears and the presence of bears in unusual places such as on the land stealing caches, and in towns.

I feel that when I was a teenager there were hardly any bears. We caught whatever we saw. Nowadays there seems to be a lot of bears....On this side of the ocean I feel that there are more bears now than a long time ago. The reason I think that now is that recently there have been bears coming up to the community of Taloyoak that are really hungry. Even when people from the community have a cache of seal for themselves in the winter. They never used to be taken but now they are being taken by bears (Peter Peetoloot of Taloyoak, Transcripts: 11).

Increased instances of bears foraging inland and using areas where they are not normally seen supports the view that bears are having difficulty finding sufficient food. On the Gjoa Haven side of the Boothia Peninsula bears are being seen in the Storis Passage (Ugjulik) area west of Simpson Strait (Quukilruq); down south in Chantrey Inlet (Tariunnuaq); and on the ocean between Gjoa Haven and Taloyoak. All areas where they are not normally seen.

In 2003 or 2004 we started to notice that we were seeing polar bear tracks towards Chantrey Inlet. And Jimmy Arqviq saw a really skinny one that spring that was towards Chantrey Inlet – Tariunnuaq. [We started] Seeing bears between Gjoa and Taloyoak 2003-2004 (Jerry Arqviq in Field notes: 3).

Bears today are not as fat as they used to be. I noticed this for the last four years. And they are all over the place all over town and the mainland. They used to be only on the ocean (Abe Aqqaq of Taloyoak in Field notes: 9).

Uriash: We are caching caribou in this island here, not too far from Gjoa Haven. North from here. Two years ago or a year ago. A lot of people lost their pirujaq [cached meat] because the polar bear pulled them out and ate them.

Darren: You've never heard of that before?

Uriash: No (Uriash Puqiqnak of Gjoa Haven, Transcripts: 2).

The polar bears too are coming around. I was seal hunting just across from town. I had a dog to find the seal hole. I spotted a polar bear track. A mother and cub.

This year someone spotted a polar bear north from Gjoa Haven. He came back the same day [as he was only] about 30 km [out]. Polar bears are not usually that close.

George Konaq (Konana) spotted a polar bear behind the garbage dump in February 2006. Polar bears are getting closer. It is scary (Uriash Puqiqnak of Gjoa Haven, Field notes: 4).

Hunters further west were recorded observing polar bear tracks in the spring of 2000 in the Elu Inlet area and this was the first time that people remembered seeing polar bears so far south in that area (Thorpe et al 2002: 215). These bears likely also came down from the McClintock Channel area.

The Inuit understanding of polar bear movements is that polar bears move freely when in search of better hunting areas. The bears that have been coming into Taloyoak lately are considered to be bears from the McClintock Channel side of the Boothia Peninsula. Daniel Tularialik of Taloyoak said that two bears that had to be destroyed this winter had obviously come from the McClintock Channel side of the Boothia Peninsula and they were starving. He said that it is much harder to get seals on that side and when Inuit go there you need to have a good team of seal hunters to get anything (Daniel Tularialik of Taloyoak, Field notes: 6).

Darren: These starving bears that you were talking about. Do you know if they were coming from one side of the [Boothia] peninsula or the other?

Peter: The hunters were tracking them on this side of the ocean. Most people think they are coming from this side of the ocean [Taloyoak is located on the west side] (Peter Peetoloot of Taloyoak in Transcripts: 12).

Darren: Do you know if polar bears travel over to the Itsuaqturvik side from here?

Ben: I think that [is true] and I have heard the Elders say that the animals have no home. Each year the hunting is different on different sides of the ocean. So if the bears think that the hunting will be better on this side this year then they will be moving back. And if they notice that the hunting is really good on that side then they will stay until hunting gets tougher in a different year (Ben Putuguq of Gjoa Haven, Transcripts: 9).

What conditions have changed on the McClintock Channel (Ki'muagiq) side of the Boothia Peninsula to cause the bears to look for new hunting territory? As already stated on page 22 the McClintock Channel side of the Boothia Peninsula has always been understood to be less productive for seals. However as this has always been the case what is a more recent change that might be significant? Ben Putuguq of Gjoa Haven reasons that the lack of multiyear ice might be part of the answer.

Down by the Ki'muagiq area they're saying that there are less bears. I think one of the reasons might be that we are not seeing so much of old ice anymore. Piqalujaq [iceberg]. Maybe because of the less piqalujaq and hikutuq [old or multiyear ice]. Maybe that is why polar bears are not staying on those areas. Maybe they are going towards where there are more piqalujaks. When I was younger my parents used to say that on the old ice that is where the ocean animals are. Maybe the seals aren't there anymore and maybe the polar bears are where there are more animals. My father used to say the old ice is where the cracks are and that is where the seals are... We used to live down by the Ki'muagiq area (Ben Putuguq, Transcripts: 5).

When I was young, in the time when we almost finished using dog teams, there used to be big icebergs (piqalujaq) and now there are none. There used to be lots of icebergs when there were lots of polar bears. As the icebergs disappeared there seemed to be [fewer] polar bears (Bob Konana of Gjoa Haven, 1991 in Keith et al 2005: 126).

That is their home – old ice. They don't live on the land, they live on the ice – that is there home. That is the reason why they stick with the old ice. They rarely hunt on the land, they hunt in the ocean (Gideon Qitsualik of Gjoa Haven, 1991 in Keith et al 2005, Appendix 1: 31).

The connection between multiyear ice, seals and polar bears is also understood further west at Sachs Harbour, NWT.

When there is no old ice, there is not very much seal too. They travel on the old big ice. Long ago when the old ice came in, we would head for the big ice out there...Used to be old ice coming from the North all the time. And when it freeze-up with old ice, seems to be more bears all the time (Geddes Wolki of Sachs Harbour in 1999 in Jolly et al 2002: 111).

Ben Putuguq reasons further that the freezing and thawing and windy conditions in the fall are causing the ice to break up and freeze tightly and perhaps that is making it harder for the seals to find breathing holes.

Darren: Do you think there are any effects on the animals of all these changes of ice?

Ben: I am not sure what is the difference. But I think the new way of the ice freezing up. That broken ice packs harder than the old times and the seals have a harder time getting breathing holes in that kind of ice. So they leave that area. I think that because the food of the polar bears are not in that area anymore I think that that is one of the reasons that the polar bears have moved to a different area (Ben Putuguq, Transcripts: 9).

Whatever may be the cause of a shortage of food for bears on the McClintock Channel side of the Boothia Peninsula the Elders believe that the bears are moving to more productive sealing grounds, including the Gulf of Boothia. Polar bear hunter Sam Tularialik of Taloyoak pointed out some known routes the bears take through the Boothia Peninsula on a map(See Figure 8). Sam felt that this movement accounts for the decline

registered by biologists in the McClintock Channel population and the increase found in the population in the Gulf of Boothia.

Biologists say the bears have declined by 700 on the McClintock Channel side. They have been killed. Four years later they did a study in the Gulf of Boothia and they said it went up by 700 and something. The Elders said that they move and the biologist think they didn't move... The Elders say they go through Paisley Bay and Wrottesley Inlet and Ikirahaq (Bellot Strait)...They go where the seals are plentiful and they also follow the floe edge. (Sam Tularialik, Field notes: 7/8)

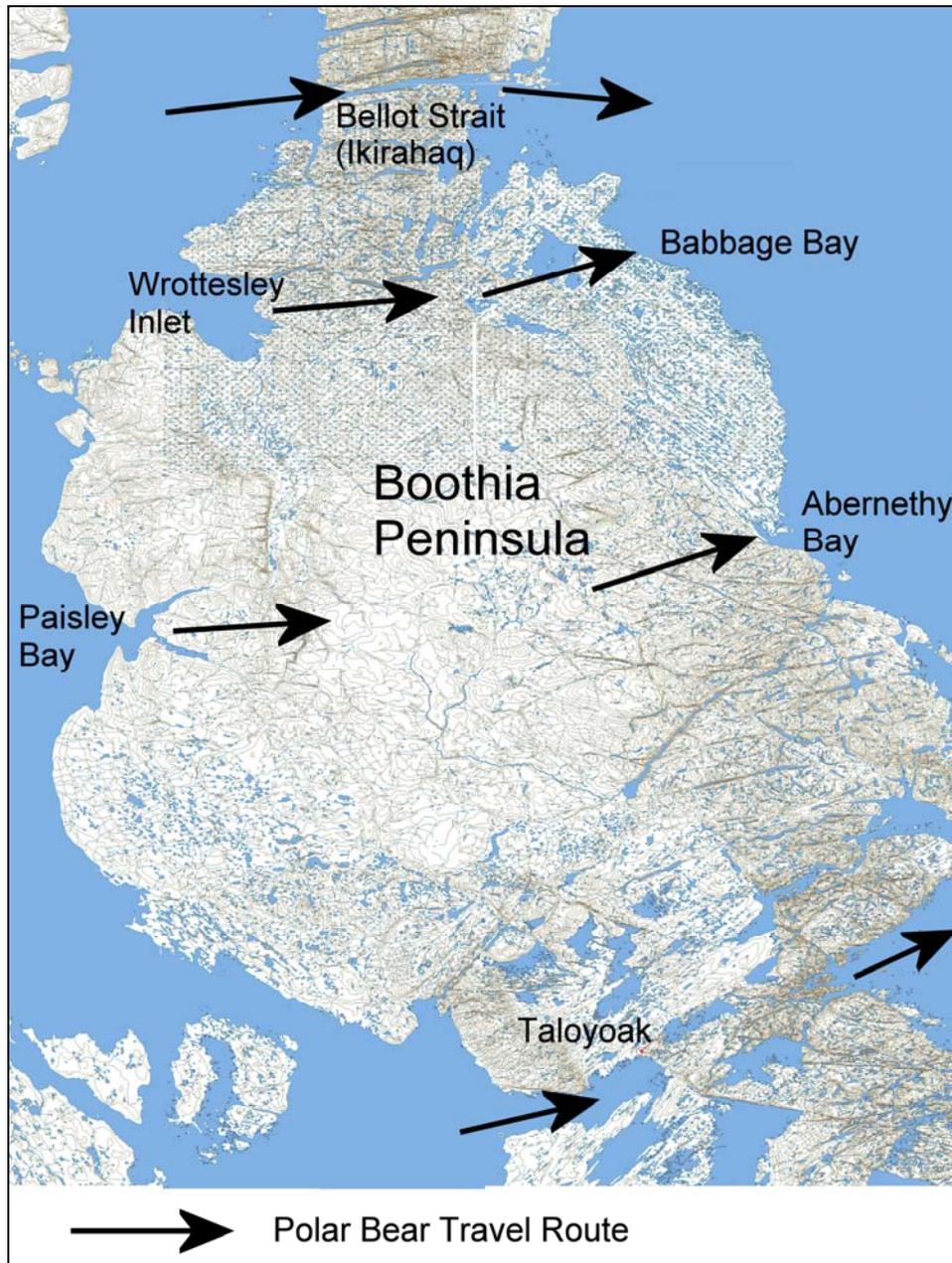


Figure 8: Polar Bear travel routes through Boothia Peninsula

The increased number of polar bears in the Gulf of Boothia/Pelly Bay area; the movements of polar bears through the land; and the interest of polar bears in caches, cabins, camps and settlements is raising fears among Inuit in the region about safety.

I noticed that in summer time there is more old ice and when it starts to cool down in the fall time the ice seems to go out of that area. The reason that people who go out camping in that area in summer time have more problem with bears is because old ice is staying around in that area. Even when they just cut up a seal or ugjuk [bearded seal] on the old ice and they just leave it they notice that there is a bear there already eating what is left of the cut up animal on the old ice. I feel that it is more dangerous than a long time ago. There are more bears in summertime. In fall time the old ice seems to go out of the bays.

Even recently when I go out towards that way [Gulf of Boothia] there was a bear swimming from the ocean to the camp. Even though we were trying to scare it was not even scared. When it got on the shore it started attacking the camp because of the food and we had to destroy the animal because of that. The animal we destroyed was not far from the entrance. When the polar bear was approaching my wife was on the radio. Even as she was talking the polar bear was attacking the camp and we had to destroy the polar bear. At that time I was with Simon Uleekatalik... Yes it is more dangerous now then. The reason why is that a long time ago we used to just lay on the ground to take a nap in the spring time. Now the people are more in danger. You can't even take a nap on the ice because there are more bears (Peter Peetoloot of Taloyoak, Transcripts: 12).

I feel the same way about camping areas from now to a long time ago. A long time ago when I was younger I was able to camp anywhere in this area that is called polar bear area. But now if I try to camp alone even just for overnight I might not even sleep at all because there are more bears than a long time ago. The bears are easier to spot than a long time ago. I agree with the family camps. I am also afraid to take my family out anywhere because the polar bears are anywhere now (Abraham Ukuqtunnuaq of Taloyoak in Elders Meeting, Transcripts: 17/18).

Darren: Are you more concerned about polar bears now?

More concerned. Yes. Because there are more bears coming in (Sam Tulurialik, Field notes: 8).

Long ago we used to get what we see and the polar bear. But nowadays when we travel even just for camping for the weekend or to camp for the summer we feel scared all the time. We are afraid all the time because we are not allowed to catch the animals. Even if we want to have fun out on the camp we are afraid that something is going to approach them. Because of there is more polar bears than a long time ago, but you can't get them just like that now, you have to have a tag (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 16/17).

I feel that they are more dangerous than a long time ago. Even just to go hunting you need to be aware of polar bears nowadays, they seem to come around. Even when you are just hunting for something else. Just last year on Qikiqtarjuaq there was a broke down machine and I went to go pick it up and it was ripped up already by a polar bear. The seat was gone and some other parts were wrecked. Yes it is dangerous. More dangerous than a long time ago just to go camp for a few days (Abraham Okuqtunnuaq of Taloyoak in Elders Meeting, Transcripts: 27).

I feel that there are more bears than a long time ago. Because we used to cache our meat further from the community, but now you can't even cache close to the community because the caches are taken by the bears. And they broke someone else's cabin close to town. It is even scary to put a cache close to town because the bears are getting at them. I agree that it is scary to camp even for a few days. You have to always watch out for something. You are always scared of something nowadays (Levi Illuitok of Kugaaruk in Elders Meeting, Transcripts: 27).



Figure 9: Guy Kakkianium shows the damage done to his son's cabin by a polar bear.

The cabin I was talking about before (see Figure 9) that I saw this winter was wide open from the back because the bear pushed it in. The belongings inside the cabin were taken out and the bed was broken by the bear. When you see some items broken from the animal it is not very good to see while someone is using it. It is supposed to be reported to the wildlife officer (Levi Illuitok of Kugaaruk in Elders Meeting, Transcripts: 28).

About the animals [polar bears] being more than there used to [be]. It is hard to have a cache close to here. A long time ago we used to have caches a way down everywhere a way down on the south side and now they are always taken by bears. As we all know there seem to be more bears than there used to be. We are always scared of bears. I guess either way [we are scared]. There might be less bears in the future due to no ice, but right now there are more bears than usual. So we are scared mainly both ways – no more bears or too many bears.

Especially when your transportation costs so much up here. Such as gas and equipment. When you bring [them] to your own cabin the stuff you are going to use in the future and the bear takes them. It is very impolite for animals to do that it is hard to get belongings back to the person – stuff they were going to use for later (Barthelemy Nirlungayuk of Kugaaruk in HTO Meeting, Transcripts: 34).

We know. The whole town in here we know that there are more bears. We see them even in the summer time when we are boating we see them. Yeah there's bears (Makabe Nartok of Kugaaruk in HTO Meeting, Transcripts: 36).

I haven't seen any difference about the polar bear. They are the same polar bear. Except I always see that polar bears are skinny and I think the reason is that there are too many bears. They will eat anything even plants.

The thing about skinny bears it has been happening ever since I was a child. I think it hasn't changed since I was a child. But there seem to be more than a long time ago.

Even close by you can't have a cache anymore. A long time ago the polar bear hunters would try and catch whatever they see, before there were tags, but some would even come home without an animal. Nowadays even if there are tags, people that go hunting with tags people seem to catch one right away and come back with a bear. But a long time ago even cubs were hard to see (Jose Angutingurnirk of Kugaaruk, Transcripts: 39).

I know that there are more bears than a long time ago and the bears are always close by. I passed through an island one time and there were 5 bears on the island and it was wavy on the boat. When there is no more daylight, when it gets dark it seems scary to just camp out there. Even just to camp or overnight it seems you can't sleep even when you are trying to rest for the night when you are out on the land. I think there are more bears than a long time ago. Our stuff is being broken. The community's belongings are being broken more often by bears. I am not sure why that is happening. Maybe the other communities [areas] on the Baffin Island side have less feeding for the bears and that's why they come up here for more feeding than in other parts of the area. It is scary to just camp out when it is 24 hour daylight. You have to be aware of being scared all the time. A long time ago it was different. You could camp out there all the time and you seemed to have to worry less about what is going to come around (Columban Pudjuarjok of Kugaaruk in HTO Meeting, Transcripts: 35).

Gjoa Haven is not experiencing problems with the damage of cabins by polar bears at this time.

I don't really hear but in the old times they used to get at peoples things but there are not too many belongings of people quite a distance from Gjoa Haven. But there are quite a few cabins close to Gjoa Haven but they [polar bears] haven't really got that close (Ben Putuguq of Gjoa Haven, Transcripts: 10).

However, Mayor Uriash Puqiqnak's cabin which is located a short distance north of Gjoa Haven was damaged by a grizzly bear in June 2006 after he was interviewed for this project (Personal Communication, Jerry Arqviq June 29, 2006).

When asked if there was a certain time of year where there are more bear problems in Taloyoak and Kugaaruk the Elders and hunters indicated that late summer and fall were the worst times.

The main time is [ukiakhaaq] early fall, late summer. That seems to be the worst time that bears get into our camps and the stuff we leave behind (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 27).

Darren: Is there any sea ice around at that time?

Simon: Yes there is sea ice around at that time.

It seems to be not as bad as in the Taloyoak area, but still in the fall time we have noticed we get damaged equipment and camps. In the winter time too close to denning time too they start staying around the shoreline. Most times there are open water areas and that is when we start to see bears in the fall time (Guy Kakkianiun of Kugaaruk in Elder Meeting, Transcripts 27).

I noticed that it hasn't really changed but there are always bears close by but it seems to be increasing... The bears always come right to the community. There are always bears close by, even right to

the community. Most likely they come in the fall time when it is freezing up... in the winter too (Makabe Nartok of Kugaaruk in HTO Meeting, Transcripts: 35).

Inuit of the East Kitikmeot are observing an increase in the number of polar bears, and the number of lean bears in the Gulf of Boothia/Pelly Bay area and this increase represents a threat to public safety, cached meat and personal property.

Responses, Adaptations and Challenges

In response to the situation where bears are coming into settlements and camps, stealing caches and damaging property, Inuit are already reacting in several ways. First due to the fear that hunters are expressing about taking their families out camping, they may already be making decisions not to do family camping trips, or they are doing so while being much more vigilant than in the past.

Due to the number of caches that have been stolen by polar bears, hunters in Kugaaruk have begun to put the caches much closer to the settlements so that they can be watched over and protected.

When I really want to cache whatever I catch I bring it right to the community and cache it where I can see it (Barthelemy Nirlungayuk of Kugaaruk in HTO Meeting, Transcripts: 35).

Like everybody else we try to bring our meat close to the community and cache them...A long time ago we used to cache our food for our dogs out on the land further from the community, but nowadays when we travel fast we take our stuff to the closest islands or close to the community to cache it (Makabe Nartok of Kugaaruk in HTO Meeting, Transcripts: 35).

In Taloyoak the problem of cache theft by bears has been addressed by installing a bear proof cage to protect caches. There is only one at present in one location and therefore it is not used by everyone, but for those caches that are put in the cage it is working.

The one we saw on the way here were those cages. We are using them just recently and the bears don't get at our things that way. We get them through the renewable resource [Nunavut Department of Environment] officers. They provide those cages for the community to use. We cached some right out of the cage and everything cached outside the cage are taken by the bear and the ones inside the bear were never touched. They have been saved (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 30).

In Kugaaruk and Taloyoak a program has been put in place to compensate hunters who have their equipment damaged by polar bears.

And also if we find a cabin or place wrecked from a polar bear the community or wildlife officer have agreed to put some money on that damage (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 28).

There is some concern by the Elders that hunters be treated fairly in the compensation process.

In both communities when people are trying to receive something back for the damage they sometimes disagree with the wildlife officers or the hunter. Even if the hunter is telling the community the truth about

the damage that has been done by an animal. You have to get a perfect estimate. They try and agree to get some money back or some kind of equipment back to the hunters. There are a lot of disagreements. They think that hunters are doing it on purpose [trying to benefit].

Just this fall they had one on Middle Lake. A camper left his tent due to weather reasons. It was bad weather and he was going to get back to it. But the bear got to his tent before the hunter got back to the tent and it was damaged. Those kind of things make it hard to get agreements or get the stuff back or get some money out of it. They are saying that you should have never left that camp or left that equipment there.

There was another spring camp or cabin and they left their machine there for the summer to pick it up when the snow is back. That was also damaged by a polar bear and they didn't get anything out of that. The hunter couldn't get anything out of that because the same bear was attacking the camp.

I also disagree with what is happening in the past. People are out there to make their food for the winter and they have their camps and they leave their vehicles at the camp. They don't get any replacement on the items even when they are asking the wildlife officers. It is not very polite. I am not very happy myself. They should all be treated equally (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 28).

For the equipment damage from the animal I feel that everyone should be treated the same – equally. I feel that the person with the camp and equipment that is damaged. If that person is working and his equipment and cabin is damaged – maybe they are looking at that fact that he is working. I think everyone should be treated the same instead of giving them a hard time (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 28).

An electric fence has been installed by one hunter in Taloyoak to provide security for the camp.

There is only one camp that has an electric fence around that camp. There is only one person's camp (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 31).

Taloyoak Elder Abraham Okuqtunnuaq liked the idea and felt that the fences should be installed in other camps.

I also feel that all the campsites should have the same kind of equipment in the polar bear areas (Abraham Okuqtunnuaq of Taloyoak in Elders Meeting, Transcripts: 31).

As for the increase in instances of bears coming close to or coming into the settlements there have been two responses. One response is to inform youngsters to be more aware of their surroundings.

Even the community of Taloyoak are telling the youngsters to look more often because the bears are coming into the community and they can sneak up to a person without letting the person know that they are coming close (Peter Peetoloot of Taloyoak, Transcripts: 12/13/14).

The other response is to destroy the offending animal. It is the policy of both the Taloyoak and Kugaaruk hunters and trappers organizations that polar bears should be caught if their behaviour threatens the camp safety.

This fall we had a bear really close to town – to Kugaaruk – we were waiting for it to come up the shore. Someone wanted to go meet the bear but it was too dangerous to go down to the ice. Somebody went to

go close to it [to hunt it] but they lost it... In Kugaaruk area as soon as they notice there is a bear close by someone always catches it (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 28).

From the Kugaaruk side the HTO committees agreed with the community to catch the animal if it is acting differently and approaching the camps (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 28).

The policy between Kugaaruk and Taloyoak is pretty much the same. The HTO committee agreed also in Taloyoak to destroy the animal if its reaction is different coming up to the camp or the hunters. Also with renewable [wildlife], you have to report it (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 28).

The killing of polar bears in the interest of public safety is the traditional Inuit response to animals coming too close to settlements and camps. However, in the context of polar bear management defense kills must be justified, and they result in a tag being taken from the community quota. This creates a situation where Inuit must consider social and legal implications when making a decision about destroying a bear.

I noticed that more bears are attacking people's belongings as close as Middle Lake. There was a tent that had just been put up for a camp. There was no one in there and it had been attacked by a bear already. And that was a very nice bear but I didn't shoot it because I didn't want to spoil the tags of the community (Peter Peetoloot of Taloyoak, Transcript: 12).

I caught a bear recently at Middle Lake because the bear was eating peoples caribou caches. The wildlife [officer] at that time was telling him that he should not have caught that bear. He was going to take me to court. I was not afraid at that time because the bear was taking peoples' caribou caches and I know that the bear was close to the community. Who knows what would happen if the bear got into the community because the community's children were staying out at night and they don't know when that bear is going to get to the community. The last answer I got, the wildlife told me it is okay, he would not take me to court for the good reasons I gave (Peter Peetoloot of Taloyoak, Transcript: 12).

The situation is even more difficult for leaders and decision makers in Gjoa Haven where the quota has been cut back to 1 or 2 tags in alternating years.

We can't do anything without quota. We can't do anything without quota. I just can't send the people to go kill that polar bear. Because the law. It's the law we are not allowed to catch polar bears. We can't push them there unless we have a quota. That way the polar bear is not going to be coming too close. They don't have a home. They want to get closer. They walk walk walk hunting. We don't mind caribou around on the island. Yes it has changed. Wildlife, any wildlife are coming around. Any wildlife, and this we never used to have before (Uriash Puqiqnak, Transcripts: 3).

In the settlements the Elders were very concerned about the need for the wildlife officer to be contacted before a polar bear that has entered town can be destroyed. They feel that it has endangered people in the past and will continue to put lives in jeopardy when quick action is needed.

Also this winter there were two bears that got right to the town. There were some other bears that were close to town but didn't get right to town. For that reason I feel that it takes too long to get the wildlife officer contacted, because the bears don't have the mind of a human. They can attack suddenly or they might not even attack at all. Since the population is getting big in the communities and there have been lots of kids playing out whenever they want to play out. And they are not aware of what is coming into the community. We think that as soon as the animal gets to the community and somebody notices it we should

not wait for the wildlife officer to kill the animal before it gets to anybody (Abraham Okuqtunnuaq of Taloyoak in Elders Meeting, Transcripts: 29).

In Kugaaruk an old person got attacked by a polar bear. Because the people were saying that you have to go through renewable [wildlife officer] before catching the bear. The person was trying to protect the kids. The person was attacked by the polar bear and the person that was watching was not very happy about what is going on. I think as soon as the bear is known to be approaching the community or as soon as somebody realizes in town it should be destroyed or killed by any person that sees the bear going right in the community. Some bears come in a few times into Kugaaruk. I don't have anything to add to what the other people were saying. I think they should be destroyed right away by whoever sees it first (Levi Illuitok of Kugaaruk in Elders Meeting, Transcripts: 28).

I also think that we should not have to wait for renewable's [wildlife officer's] permission. This fall we had a bear in front of town in Kugaaruk. I wanted to go myself to go get the bear because it was too close to the community. The wildlife [officer] got there and said you can't get it. It has to be done by a wildlife officer. So he [the officer] went himself and when he came back that guy told me that he never even saw the tracks so I went to go check and sure enough the bear tracks were there. When I got back to the officer I told him if you should have let the hunters go get it we would have got it, you are not a hunter, you can't even spot the track of a polar bear that has been seen. These kind of things we are worried about. If we wait we are waiting for our own death instead of trying to save somebody else's life. I think that if the bear is spotted by a hunter it should be destroyed right away.

In the past, two bears got to Kugaaruk. A small adult and he was big enough to attack a person even if it was small. The weather is not always clear in the communities and the kids love to play out. It seems like when it is worse out they like to play close by to the house. That small bear go into Kugaaruk in a storm. Someone noticed and they chased it away out of town. Just enough to get organized for the kill. Sure enough the bear got back and it was destroyed.

The old man who was attacked, if he didn't have to wait for any permission to kill the bear he would never have been attacked. And he would have been okay instead of being attacked. That kind of thing we think that we shouldn't be waiting for any kind of permission to kill the bear. He was interviewed on CBC radio and he had a scar on his head and a claw scar on his back and he had some bites around his body. At that time his son saved his life. If his son was not there he would have been killed by a bear already. He was saved by his son. His son shot the bear on the back part and when the bear felt that bullet wound it let go of the person.

There are a lot of kids around and with the increase in the [bear] populations there are more coming into the community. There should be something organized in the community such as killing the bear right away (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 28).

Anthropologist Martina Tyrell has documented Arviarmiut having a very similar experience with their polar bear situation.

The law effectively prohibits any shooting of polar bears outside of the regulated open season, which begins at midnight on October 31st of each year. If a hunter finds himself in a dangerous situation while away from the community he is encouraged to fire shots in the air to frighten the bear away with noise. Closer to the community, if a bear is encountered, the wildlife officer or the RCMP must be notified ...During a radio report in 2002 a Nunavut wildlife officer thanked people for not harvesting bears too early. He said he realised there were a lot of bears around that year (something noted by everyone I spoke to), but rather than shooting them and taking the fur, he encouraged people to "shoo" the bears away from places where they should not be. Many in Arviat feel that, especially away from the community, some hunters take unnecessary risks, as shooting is an offence that must be dealt with through the appropriate channels. ...In the past a man would shoot a bear if he felt threatened by the animal; today shooting a bear

is seen as a last resort, when all other avenues towards safety are blocked. Increasingly, both along the coastline and in the community, it is felt that bears are posing a risk to human well-being as more than ever they have adapted to human habitation and pose an increasing threat to human life (Tyrell 2005: 179-181).

The quota system is a challenge to Inuit who are trying to adapt to the situation of a large number of polar bears and increasing instances of polar bear/human conflict. As Anthropologist Martina Tyrell has documented among the Inuit of Arviat, there is a feeling that the protection of polar bears through quota is putting human lives at risk.

Arviarmiut believe there are too many bears too close to the community. They feel that the quota system, as it currently stands, denies them the flexibility to kill bears when they need to, and therefore the bears pose a threat to life within the community and to hunters on the land or sea ice who take unnecessary risks around bears. They feel that despite claims to co-management made by the authorities, the opinions of local people are ignored and lives are put at risk (Tyrell 2005: 185).

In the case of polar bears, the biggest concern is for human safety and there is general agreement that the quota needs to be raised or the entire quota system overhauled. The quota system as it currently stands puts lives in danger and provides greater protection to bears than to humans (Tyrell 2005: 184).

Elders don't agree with policy to scare the bears as animals understand when they are in the presence of a predator and conversely when they are not threatened.

Just recently at our camp there was a small pond and there was a mother and three cubs staying around that lake. Even when we tried to scare them off they weren't scared. So I decided to scare the bear with the rifle. I tried to shoot close to the bear and I guess the bear realized how close it was and it was in danger. I was shooting at the ground and the rocks were starting to hit the bear... [before that] I was shooting a further distance from the bear. Even if the hunters and campers scare the bears they keep coming back to the camp because of the meat. Unless we really try and scare them away (Peter Peetoloot, Taloyoak, Transcripts: 13).

I am not happy about in the community is that we have wildlife, and the town is listening to the wildlife down south asking them to scare the bear away. That is what I am not happy about. Unless it is a real danger then people would have to destroy the animal. If they realize that it is not that dangerous, even then if they scare it away it seems to come back more often. I figure that a long time ago, even when there were no bears [few], we used to just destroy the bear when it was too close to the community (Peter Peetoloot, Taloyoak, Transcripts: 14).

In the understanding of Elders and other hunters the only way to keep the proper relationship to the animals is to hunt them.

It is a lot [more] danger [compared] then a long time ago because we are not catching small bears we are getting big bears. In camping areas we are seeing more bears because we are not allowed to catch them. They are lifting more caches where we cache our meat for the winter. They are not there anymore when we go pick them up. They seem to be breaking more items or cabins and stuff like that around close to the town (Guy Kakkianium of Kugaaruk in Elders Meeting, Transcript: 27).

Because of the quota changes, since a year ago and before that. I noticed that I have been tracking more bears close by compared to when we had tags. I think that more animals are coming closer to the communities because the people are not hunting them. I noticed that all kind of animals that are not hunted

often they seem to want to be around things that don't bother them much. Like a caribou or another animal that has been less hunted they seem to come around more to things that don't bother them (Ben Putuguq, Gjoa Haven, Transcripts: 6).

One of the main environmental changes to which the Inuit of Taloyoak and Kugaaruk must adapt are the increased instances of polar bears entering camps and settlements, stealing caches and damaging property.

Ideas for Adaptation in the Future

During an interview with Elder and polar bear hunter Ben Putuguq, Ben was asked whether he felt people were more concerned about more polar bears being around Gjoa Haven. His response was a recommendation for how young community members can become more knowledgeable about being on the land and dealing with the potential threat of polar bears and grizzly bears.

I think that because the population is getting bigger in the communities and people are not afraid of what is coming up in the north. Like in spring time when it starts to warm up when people go out on the land just for fun. Or just to see the scenery. I think they should be aware of the danger of the animals that are coming up to the north...they should be taught and maybe at school. Because young kids go to school. Or in different public gatherings. The HTO should do more work with the community...At school they have Elders that teach young people how to survive and how to work on stuff we use now and long ago. I think that those people should be the ones to tell or they should be notified that they should talk to the students about what are the coming dangers (Ben Putuguq of Gjoa Haven, Transcripts: 9/10).

Ben sees a role for the Elders in passing on Inuit knowledge to the youth, but he also sees a role for the HTO in providing information to the community to ensure safe use of the land.

During the Elders meeting held out on the land at Nuvutiruk in Itsuaqturvik, the Elders from Taloyoak and Kugaaruk were asked what could be done from this point forward to help the communities and to help people continue to live as Inuit in the face of these changes. Their responses were very similar to the recommendations of Ben Putuguq. For the Elders response and adaptation to the changing Arctic environment will be rooted in a healthy foundation of Inuit knowledge. Guy Kakkianiun worries that the settlement-based youth of today will not have the depth of Inuit knowledge to engage in studies of this sort in the future.

If the Inuit say they are Inuit they should be going out on the land too to learn about the traditional life of Inuit. If anyone who is not going to be us in the future and learns only their culture in the town – if they are trying to do the same thing as us, what we are trying to do right now, and they don't know anything about the land – the white people will call this person an Inuit that doesn't know anything about the land. I think this should be taught now to keep this going for the future for what is going to happen in the north. Even then a long time ago when we were kids our parents used to tell us every year is different in the north. Some years might not get cold and it won't freeze the ice, but maybe in the later future ice and snow is going to start coming back again. Because of this I think it should be taught to the young people who are in the town (Guy Kakkianiun of Kugaaruk at Elders Meeting, Transcripts: 31).

Taloyoak Elder Simon Oleekatalik is keenly aware that Inuit youth are not reaping the full benefits of non-Inuit education and knowledge, though they are starting to speak English as a first language. He feels they should be knowledgeable in how to live in one tradition or the other, and both if possible.

I think that the young people in the north are good at speaking English but don't know what the white people do such as construction work, mechanic work, house building. They don't know how to do these things even if they know how to speak. I think that if they are going to learn that way then they should also know how to live. How to fix their equipment. How to build their own house. They should know what white people do. If they are only going to learn in English language. Even then they should know a little bit about Inuit culture or what Inuit do. I feel that a lot of young people don't know Inuit stuff such as hunting or taking care of their own people. I am not against them but I am hoping they can learn one way or another slowly a little at a time. Somebody should teach them or they should want to learn – either way. I wonder what is going to happen in the future if they keep doing this. Not knowing anything and not knowing Inuit language.

I am hoping in a way that these young guys are learning. They should learn Inuktitut ways of living too to do what we are able to do in the north. They should know how to speak their own dialect instead of mixing things. Maybe in the beginning they should learning one thing first such as Inuit culture and Inuit stuff. Once they get to learn more then they can start to learn English. I am hoping in the future to see that. Instead of not knowing what is going on.

I myself I work at the school doing the Inuit art and how Inuit survive for the winter. And how to get food for the winter and cache animals and such. But the young Inuit in school they get translated from Inuktitut from their teacher. The teacher translates Inuktitut for the young people that are in school. Because these young people are Inuit they should not need a translator. They should be able to speak Inuktitut before they are learning [about the] Inuit way of life (Simon Oleekatalik of Taloyoak in Elders Meeting, Transcripts: 32).

Simon is already engaged in the Education system, teaching youth. He suggests an early education of exclusively Inuktitut, and the teaching of Inuit survival skills. These should be done without Inuktitut to English translation for the students.

The loss of the Inuktitut language is personal for Kugaaruk Elder Levi Illuitok as his grandson does not understand him. He too supports youth becoming knowledgeable in both Inuit and non-Inuit ways.

Myself I see it in real life. I have a grandchild. When he was old enough to walk around with me. When I asked my grandchild to pick up something that I need to work with I tell him in Inuktitut. The grandchild starts wondering what is going on, what to take. I think that this little child is in-between the Inuktitut and the white. I think this little person doesn't really know either way. He knows a little bit of qablunaaq [Euro-Canadian] way and a little bit of Inuit way but he is not sure how to do it. When I ask him to get something for me the child starts wondering what to get or what to do. He is not sure what to get but he knows how to do it. The understanding there is mixed. Myself I have been going out with these new equipments such as snowmachines, radios and whatnot but once I have a problem I have to fix it. I am also learning white peoples way. I feel that I am learning something just like in school. I feel the child should understand both ways instead of just learning one way like what they are learning right now. Maybe in the future that person is going to start helping me fix things and he will know what is going on. But I am not against which way is which as I also have to learn.

I think they should know both ways equally. White man's way and Inuit way. They should learn because they are out there already. Myself I try to teach, when I am out on the land, these young people how to survive on the land. Even if it looks like I am not teaching I am not forcing them to learn all these [thing]

they should learn slowly. Also I feel that sometimes when a young person is pushed a little bit too hard they don't want to learn anymore. They have to work for it. I think the people who are teaching these young guys should have patience when they are teaching their youngsters. That way they can learn slowly and they can keep the things that have been taught by somebody. I feel they are learning both ways (Levi Illuitok of Kugaaruk in Elders Meeting, Transcripts: 33).

Levi too is already teaching youth out on the land. Elder Abraham Okuqtunnuaq agrees with the emphasis on passing on Inuit knowledge to youth and he proposes that a funded program be started to support the Elders in starting a land-based program to teach the youth.

I agree with all the others that talked about how to learn. Myself I feel that someone should give the Elders some kind of budget to teach out on the land. Even just a few distance from the community. They can tell stories in Inuktitut and showing them in action how to survive. I think that the Elders are there at this time but the money is the problem nowadays in the north. I think that if there is money available for the Elders to start their action, teaching of how to survive in the north such as putting nets out through the ice, cutting caribou, building iglus all these wildlife things (Abraham Okuqtunnuaq of Taloyoak in Elders Meeting, Transcripts: 33).

Conclusions and Recommendations

In the old days my parents used to tell me if it would never freeze in the north they were afraid where the animals are going to be. Right now we are seeing less old ice and that is where the polar bears are in the summer. If that's gone the polar bears are going to have to be on the land. There might be more polar bear danger on the land or maybe there would not even be polar bears anywhere in the future. I am aware myself of what is happening. I like this idea of what we are doing right now [in this project]... (Guy Kakkianiu of Kugaaruk in Elders Meeting, Transcripts: 18).

As we all know there seem to be more bears then there used to be. We are always scared of bears. I guess either way [we are scared]. There might be less bears in the future due to no ice, but right now there are more bears than usual. So we are scared mainly both ways – no more bears or too many bears (Barthelemy Nirlungayuk of Kugaaruk in HTO Meeting, Transcripts: 34).

The Inuit of Gjoa Haven, Taloyoak and Kugaaruk are experiencing many of the same environmental changes that are being observed by Inuit in other Canadian Arctic communities. These changes have introduced unpredictability into the East Kitikmeot environment. Inuit knowledge, which has developed over centuries in this geographical area has been able to adapt to gradual environmental change, and was robust enough to handle the normal variability that the environment presented. However, the changes that these communities have experienced in recent years have brought new weather, snow, ice and wildlife conditions that are inconsistent with Inuit knowledge.

For the day to day continuation of the Inuit subsistence way of life this situation calls for caution and increased attention for sudden changes in the weather. Seasonal changes in snow and ice coverage have delayed and shortened seasonal mobility and made ice travel more dangerous. Wildlife species have expanded their ranges further north, most notably

the grizzly bear which presents a threat to public safety, cached meat supplies and property.

The snow and ice habitat of the polar bear has undergone change in recent times. The polar bears of the East Kitikmeot have been observed to include a significant number of lean individuals; they are being seen or tracked in unusual areas on the ocean or far inland; they are showing more interest in camps and settlements and they are stealing caribou and seal caches. Their changed health status along with this pattern of foraging in new and marginal areas suggests that they are having a hard time gaining sufficient sustenance in their normal sea habitat. A number of factors could form part of explanation for this situation:

- increased numbers of polar bears;
- delayed freeze-up, early and rapid break-up;
- reduction of multi-year ice throughout the year including the summer;
- changes in the health of ringed seals

For Inuit, the most immediate issue arising out of the situation of the polar bear is the threat they pose to public safety, cached meat and personal property. The HTOs and hunters have been responding to the situation through defense kills that are subtracted from their quota. There is limited use of bear protection for caches and camps and where these technologies are employed they are working. However, the use of deterrents in human/polar bear conflicts is frowned upon by the Elders who see it as creating a situation where bears become habituated to human contact, and unafraid. Instead, the continued hunting of polar bears, and the destruction of threatening animals will maintain the traditional predator/prey relationship between Inuit and polar bears.

The Elders involved in this study were unanimous in their prescription for Inuit adaptation to environmental changes in the future. Inuit life in the arctic can only adapt to continued environmental change from the centuries old foundation of Inuit knowledge. Therefore they would like to see a program that would ensure the passing on of Inuit knowledge to the younger generations, so that they will have basis for continuing to adapt the Inuit life to changing conditions.

Recommendations:

1. A land-based, Elder directed, Inuktitut-only program be established for the transmission of Inuit knowledge and skills;
2. More cache protection installations be purchased for the communities;
3. More camp protection technology be purchased for the communities (bear fences).

References

Dowsley, Martha. 2005. Inuit Knowledge Regarding Climate Change and the Baffin Bay Polar Bear Population. Nunavut Department of Environment, Final Wildlife Report No.1.

Ferguson, Michael A.D. and Francois Messier. 1997. Collection and Analysis of Traditional Knowledge About a Population of Arctic Tundra Caribou. *Arctic* 50(1): 17-28.

Fienup-Riordan, Ann. 1999. Yaqulget Qaillun Pilartat (What the Birds Do): Yup'ik Eskimo Understanding of Geese and Those Who Study Them. *Arctic* 52(1): 1-22.

Fox, Shari. 2002. These are Things That are Really Happening: Inuit Perspectives on the Evidence and Impacts of Climate Change in Nunavut. In Krupnik, Igor and Dyanna Jolly (eds). *The earth is faster now: Indigenous observations of Arctic environmental change*. Fairbanks, Alaska: Arctic Research Consortium of the United States. Pp. 13-53.

Furgal, Christopher M., Daniel Martin, Pierre Gosselin. 2002. Climate Change and Health in Nunavik and Labrador: Lessons from Inuit Knowledge.

Huntington, H.P. 1998. Observations on the utility of the semi-directive interview for documenting traditional ecological knowledge. *Arctic* 51(3): 237-242.

Huntington, Henry P. 2000. Native Observations Capture Impacts of Sea Ice Changes. *Witness the Arctic* 8(2): 1-2.

Jolly, Dyanna, Fikret Berkes, Jennifer Castleden, Theresa Nichols and the community of Sachs Harbour. 2004. We can't predict the weather like we used to: Inuvialuit Observations of climate change, Sachs Harbour, Western Canadian Arctic. In Krupnik, Igor and Dyanna Jolly (eds). *The earth is faster now: Indigenous observations of Arctic environmental change*. Fairbanks, Alaska: Arctic Research Consortium of the United States. pp. 93-125.

Keith, Darren and Joan Scottie. 2001. *Inuit Qaujimagatuqangit Hilap Alangurninganut/Inuit Traditional Knowledge of Climate Change: A Sample of Inuit*

Experiences of Climate Change in Nunavut, Baker Lake and Arviat, Nunavut. Consulting contract report for the Department of Sustainable Development, Nunavut Government.

Keith Darren, Jerry Arqviq, Louie Kamookak, Jackie Ameralik and the Gjoa Haven Hunters' and Trappers' Organization. 2005. *Inuit Qaujimaningit Nanurnut: Inuit Knowledge of Polar Bears.* Edmonton: Canadian Circumpolar Institute.

Kofinas, Gary. 2002. Community Contributions to Ecological Monitoring: Knowledge Co-production in the U.S.-Canada Arctic Borderlands. In Krupnik, Igor and Dyanna Jolly (eds). *The earth is faster now: Indigenous observations of Arctic environmental change.* Fairbanks, Alaska: Arctic Research Consortium of the United States. Pp. 55-91.

Krupnik, Igor. 2002. Watching Ice and Weather Our Way: Some Lessons from Yupik Observations of Sea Ice and Weather on St. Lawrence Island, Alaska. In Krupnik, Igor and Dyanna Jolly (eds). *The earth is faster now: Indigenous observations of Arctic environmental change.* Fairbanks, Alaska: Arctic Research Consortium of the United States. Pp. 55-91.

McDonald, Miriam, Lucassie Arragutainaq and Zack Novalinga. 1997. *Voices from the Bay: Traditional Knowledge of Inuit and Cree in the Hudson Bay Bioregion.* Ottawa: Canadian Arctic Resources Committee.

Nakashima, Douglas. 1990. Application of native knowledge in EIA : Inuit, eiders and Hudson Bay oil. Hull: Canadian Environmental Assessment Research Council.

Nickels, Scott., Christopher Furgal, Jennifer Castleden, Pitseolalaaq Moss-Davies, Mark Buell, Barbara Armstrong, Diane Dillon, Robin Fonger. 2002. Putting the Human Face on Climate Change through Community Workshops: Inuit Knowledge, Partnerships and Researcher. In Krupnik, Igor and Dyanna Jolly (eds). *The earth is faster now: Indigenous observations of Arctic environmental change.* Fairbanks, Alaska: Arctic Research Consortium of the United States. Pp. 301-333.

Nunavut Tunngavik Incorporated. 2001. Elders Conference on Climate Change: Final Report. Cambridge Bay: Nunavut Tunngavik Incorporated.

Thorpe, Natasha et al. 2001. *Thunder on the Tundra: Inuit Qaujimajatuqangit of the Bathurst Caribou.* Tuktu and Nogak Project.

Thorpe, Natasha., Sandra Eyegetok, Naikak Hakongak and the Kitikmeot Elders. 2002. Nowadays it is not the Same.: Inuit Qaujimajatuqangit, Climate and Caribou in the Kitikmeot Region of Nunavut, Canada.

