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Minister of Environment
Minista Avatiliriṭjutinut
Ministre de l'Environnement

JUN 30 2009

Harry Flaherty
Chairperson
Nunavut Wildlife Management Board
PO Box 1379
Iqaluit, NU
X0A 0H0

RE: Request for a decision of the Nunavut Wildlife Management Board on a management response to conservation concerns with the Baffin Bay polar bear population

Dear Mr. Flaherty;

As you are aware there is a continued conservation concern in the Baffin Bay polar bear population (BB). The attached Request for Decision (RFD) of the Nunavut Wildlife Management Board (NWMB) describes the issue of decline and the recent history of management initiatives.

Based on the best available information the current rate of Total Allowable Harvest (TAH) is not sustainable and therefore represents an ongoing conservation concern. The attached request for decision of the (NWMB) is being submitted as a Ministerial Management Initiative as per Article 5.3.25 of the Nunavut Land Claim Agreement (NLCA). I request that you provide me with a decision in time for implementation in October 2009, which is when hunting generally begins in BB.

The attached RFD provides a number of options for the NWMB to review when considering this request. I of course recognize that the NWMB is in no way bound or obligated to decide upon any of these options, and will make the decision it deems appropriate.

It is critical for effective management that we get BB back on track. In addition to our overriding obligation for sustainable management, a failure to take management action can have serious implications for Nunavummiut. In recent years a number of international decisions have been made that can affect us. Those include the decision of the United States (US) to list all polar bears as threatened under the Endangered Species Act, preventing imports of polar bear products into the US, and effectively cutting off that large sport hunt market. Also

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in December 2008, European Union countries decided that they would no longer accept imports of polar bears from Baffin Bay, indicating that if Canada dealt with the conservation concerns, they would be open to reversing the decision. This decision prevents bears harvested by Inuit from being imported into European countries.

As you are aware, in preparation for the upcoming Conference of the parties to the Convention on International Trade in Endangered Species of Flora and Fauna (CITES) Canada is presently considering the preparation of a standing non-detriment finding (NDF) for polar bears. The management of BB polar bears is of course being scrutinized, and it seems clear that a management action on BB may have a direct impact on the outcome of the NDF – with potentially direct impacts on exports of both Inuit harvested bears and sport hunted bears. While the ability to export bears is not a wildlife management issue, it is an economic one, and I am aware that it is of direct concern to the communities. Therefore in considering this matter, I feel that your board members should be aware of these broader implications.

I am aware that your board members, as well as communities and HTO's, raised concerns that Greenland was not present at the April 2008 NWMB hearing on this issue. As an update on relations with Greenland, I am pleased to inform you that Environment Canada, in consultations with the GN and NTI, has finalized a draft co-management agreement that will be presented to Greenland for review in July of 2009.

If your staff requires any additional information they should contact Drikus Gissing, Director of Wildlife Management.

I look forward to your response.

Sincerely,

Daniel Shewchuk

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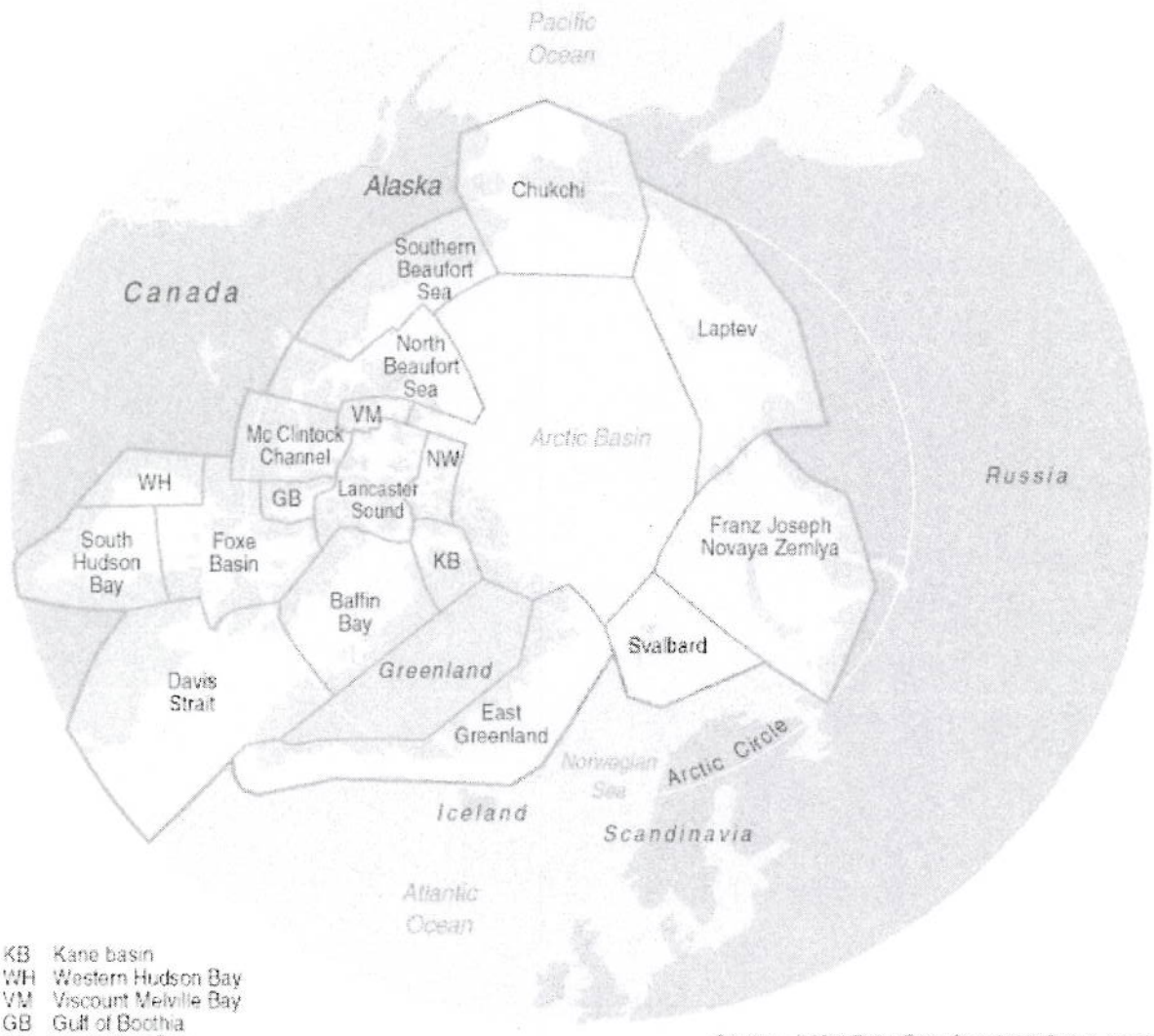


KB Kane basin
WH Western Hudson Bay
VM Viscount Melville Bay
GB Gulf of Boothia
NW Norweglan Bay

Source : *IUCN Polar Bear Specialist Group 1997.*

SUBMISSION TO THE

NUNAVUT WILDLIFE MANAGEMENT BOARD

FOR

Information: **Decision: X**

Issue: **A management response to conservation concerns with the Baffin Bay polar bear population.**

Background:

In December 2004 the NWMB increased the TAH for the Baffin Bay (BB) polar bear population. Since that time new information in the form of higher than expected harvesting levels by Greenland has been received. Simulations using this new information indicate that the population has declined in number, and that the present TAH level constitutes an overharvest that will cause a continued decline.

The information provided by Greenland indicates that for a number of years their actual harvest was much higher than previously reported. Based on these harvest levels it is estimated that the BB population has declined from 2100 in 1997 to about 1500 due to the combined Nunavut and Greenland harvest. Greenland has since implemented a quota system that involved a phased reduction in each of the four years from 2006 to 2009.

In addition to the harvest information from Greenland, since last year we have inputted an additional 10 years of mark recovery data into the model. Analysis of these data indicates that the survival rates in BB have not changed.

Nunavut has continued to support the establishment of a management Agreement with Greenland through the federal Departments of Environment and Foreign Affairs. The NWMB has been kept informed of the progress and current status of this initiative. As of June 2009, the draft agreement has been developed in consultation with then GN and NTI, and will be presented to Greenland in July 2009.

Current Status:
In the fall of 2005 consultations were undertaken with communities that harvest from BB population. These consultations occurred as community and HTO meetings with Pond Inlet, Clyde River and Qikiqtarjuaq.

Local hunters expressed opinions that are not in agreement with the scientific assessment of the BB population. In general they do not believe there has been a decline in the population and therefore they do not support a reduction in TAH.

The reasons for this difference in perspective were discussed but not resolved. The summary of these consultations has been provided to the NWMB.

At an April 2008 NWMB hearing (held in response to a 2007 ministerial management initiative regarding BB), hunters again expressed their observations that the population has not declined.

Recommendations:
That the NWMB make a decision regarding the ongoing conservation concerns with the BB polar bear population. As per the attached letter, this request is a Ministerial Management Initiative as per section 5.3.25 of the Nunavut Land Claim Agreement. As such a decision of the NWMB is requested in sufficient time for a management response to be implemented in October 2009.

Attachments:

Appendix 1: Options for a management response to the conservation concern with the Baffin Bay population of polar bears.

Appendix 2: Supporting data on population status, trend, ice, and body condition of polar bears.

Appendix 1 - Options for a management response to the conservation concern with the Baffin Bay population of polar bears

NOTE: The present TAH for the Baffin Bay polar bear population is 105 annually. Each of the following options is a proposed reduction from that number. New information on this population is being developed through ongoing and planned research being conducted by the Department of Environment. As this information is reviewed and analyzed, the NWMB and the Minister of Environment will be more informed and in a better position to again consider the TAH for this population.

Greenland's current quota is 68. Current population simulations project that a sustainable combined harvest is approximately 90 bears per year in order to maintain the 2004 level of 1,500 animals. It is understood that without new information and a reassessment of the target value, a reduction in harvest to a sustainable limit would not be feasible. The following options are submitted as interim measures to demonstrate our intention of returning to sustainable management.

Option 1
Return to the historical TAH of 64 per year beginning with the 2009/2010 harvest year.

Option 2
Beginning with the 2009/2010 harvest year impose a harvest moratorium in BB (reduce the TAH to 0) until the population has increased to the target number of 2074 polar bears, as identified in the MOU.

Option 3
Review the BB MOU and the target number. Consider lowering the target number, and setting a new TAH appropriate to the new target number.

Baffin Bay Polar Bear Population
Department of Environment, Government of Nunavut Submission

Current population size: 1,546 ± 428 (SE) as of 2004. This population estimate is a simulated estimate, derived from population viability analysis projections from the 1997 estimate of 2,074 ± 266 (SE). Population size was derived from physical mark-recapture, using data from 1221 marked polar bears from 1974 to 1997 (Taylor et al. 2005).

Demographic parameters: Birth and death rates were estimated from mark-recapture data between for 1994 – 1997; these rates are used these population projections.

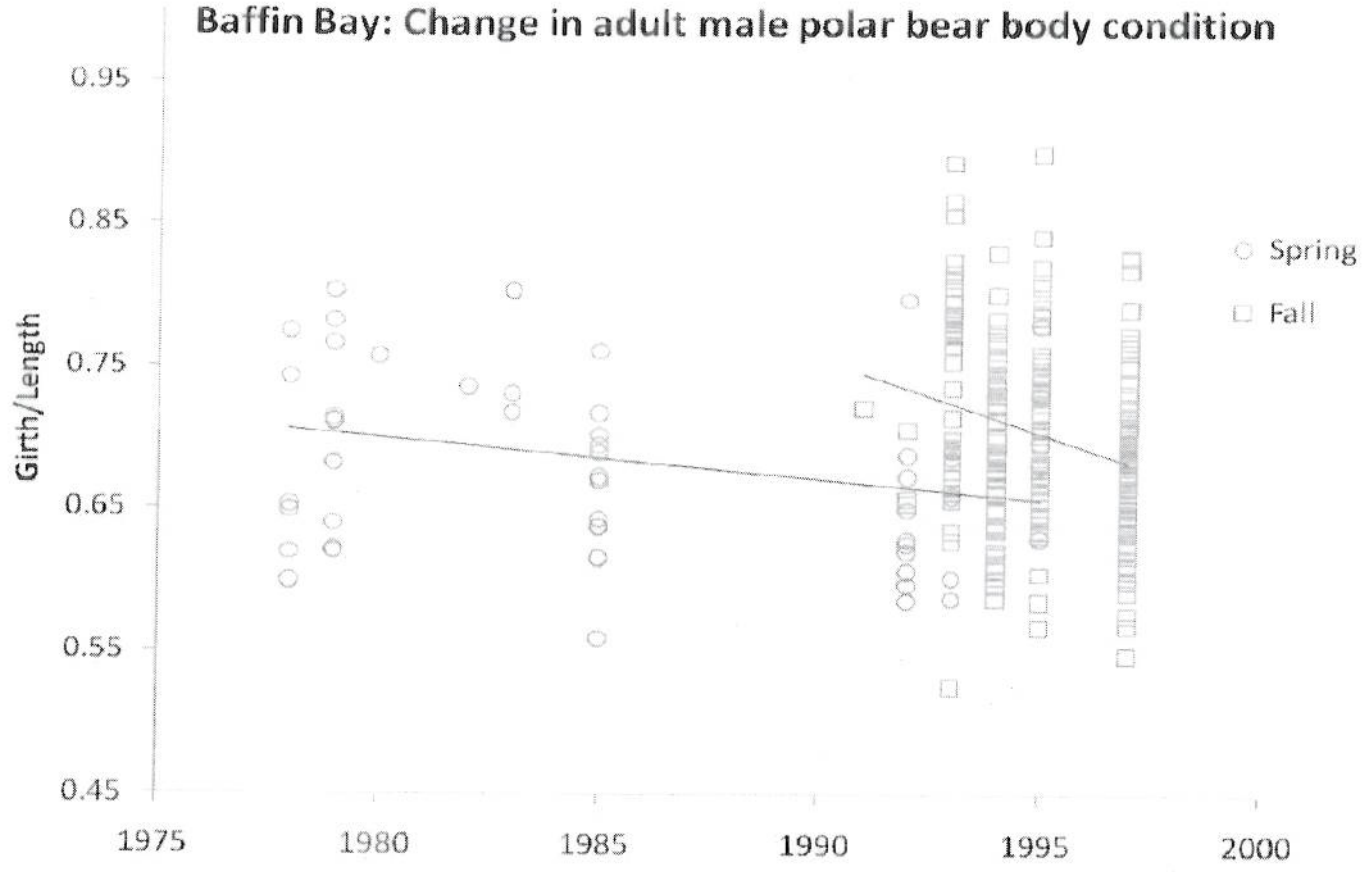
Quota: Current Total Allowable Harvest (TAH) in Baffin Bay is 105 polar bears per year (Nunavut) and 71 (Greenland – 2008 (will go to 68 in 2009)). A total harvest of 176 bears/year is permissible under these quotas. In Nunavut, the quota is divided between Qikiqtarjuaq (30), Clyde River (45) and Pond Inlet (30).

Harvest: The 5-year mean harvest is 232 (2002 – 2007). The 3-year mean harvest is 219 (2004 – 2007). These include the time period before Greenland's quota system, which started January 2006. The most recent year's harvest (2006 – 2007) was 174 animals (just below the regulated quota).

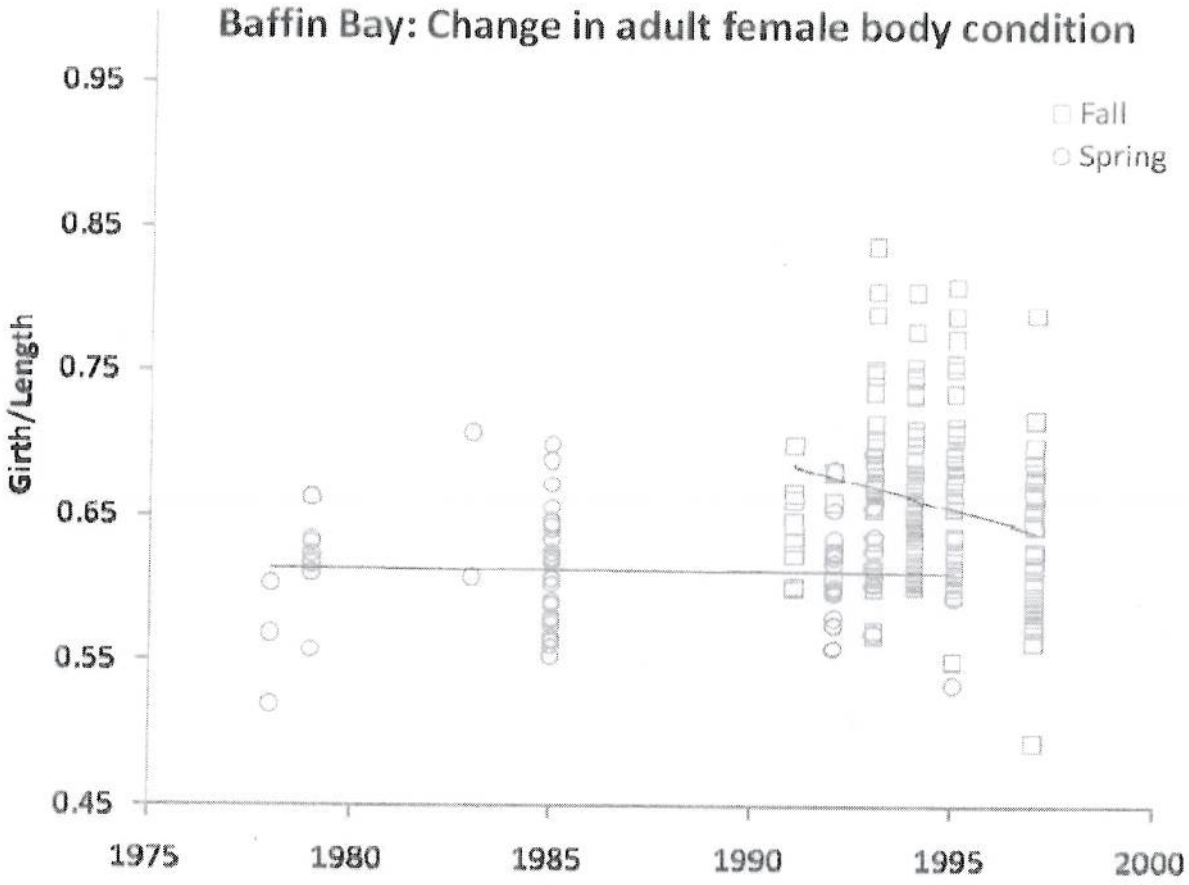
Population viability: Under the current harvest conditions and using demographic data from Taylor et al. (2005) there is a 100% likelihood of population decline. The estimated sustainable rate of harvest would be a combined (Greenland + Nunavut) harvest of 90 bears – if the objective is to remain at present numbers. However, it is likely that because of ice and body condition declines (see graphs below), demographic rates are lower than when they were estimated in the late 1990's (there is evidence that body condition relates with reproductive output and survival in polar bears); Population viability analyses currently do not take into account any changes in survival or birth rates in the future. It is possible that the population size decline has been more dramatic, and further that the even with 90 bears taken a year, population size may still decline.

Current research: The Government of Nunavut, polar bear research program is engaged in a genetic study to better discern the boundary between Davis Strait, Baffin Bay and Kane Basin, to better understand directional movement. Secondly, we will be analyzing genetic data to evaluate and/or corroborate and changes in effective population size in Baffin Bay. Lastly, we are using stable-isotope analyses to understand whether diet has changed in Baffin Bay over the last 15 years. The next population inventory is currently planned to start in 2014.

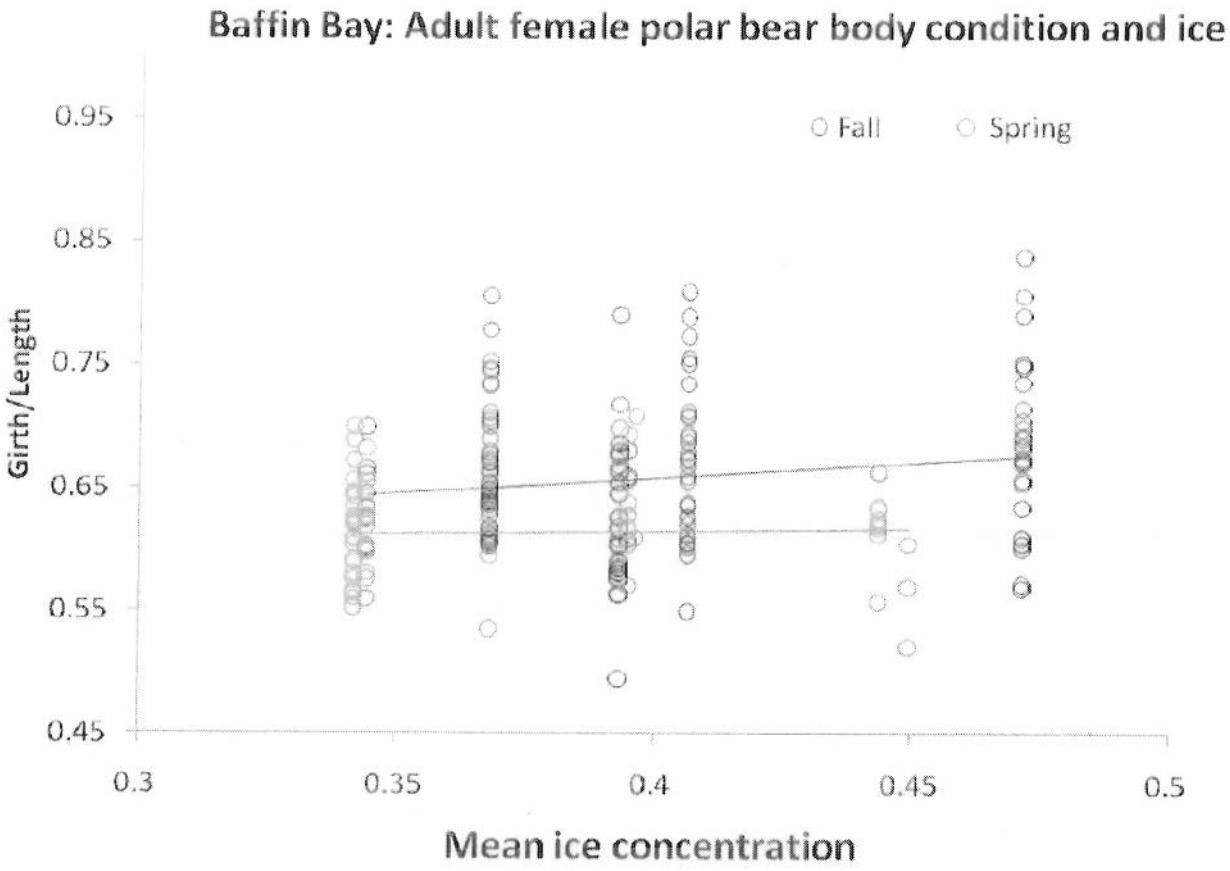
Summary of Graphs and Data Presented Below: These graphs and tables show that the body condition (axillary girth divided by straight-line length) of polar bears in Baffin Bay has decreased over time – using capture data from 1976 through 1997. The more rapid decrease in body condition has occurred in the 1990's. These data also demonstrate that body condition is related to average annual ice condition in Baffin Bay – more ice, better body condition of polar bears. Finally, ice coverage in Baffin Bay has been decreasing since the 1970's (the graph presented shows data from the 1990's); ice conditions are expected to continue to decline. Thus, we can expect body condition of polar bears to continue to decline, if the observed relationship between body condition and ice continues. See section on **Population Viability** above which relates these body condition data to survival/recuitment, population growth and harvest.



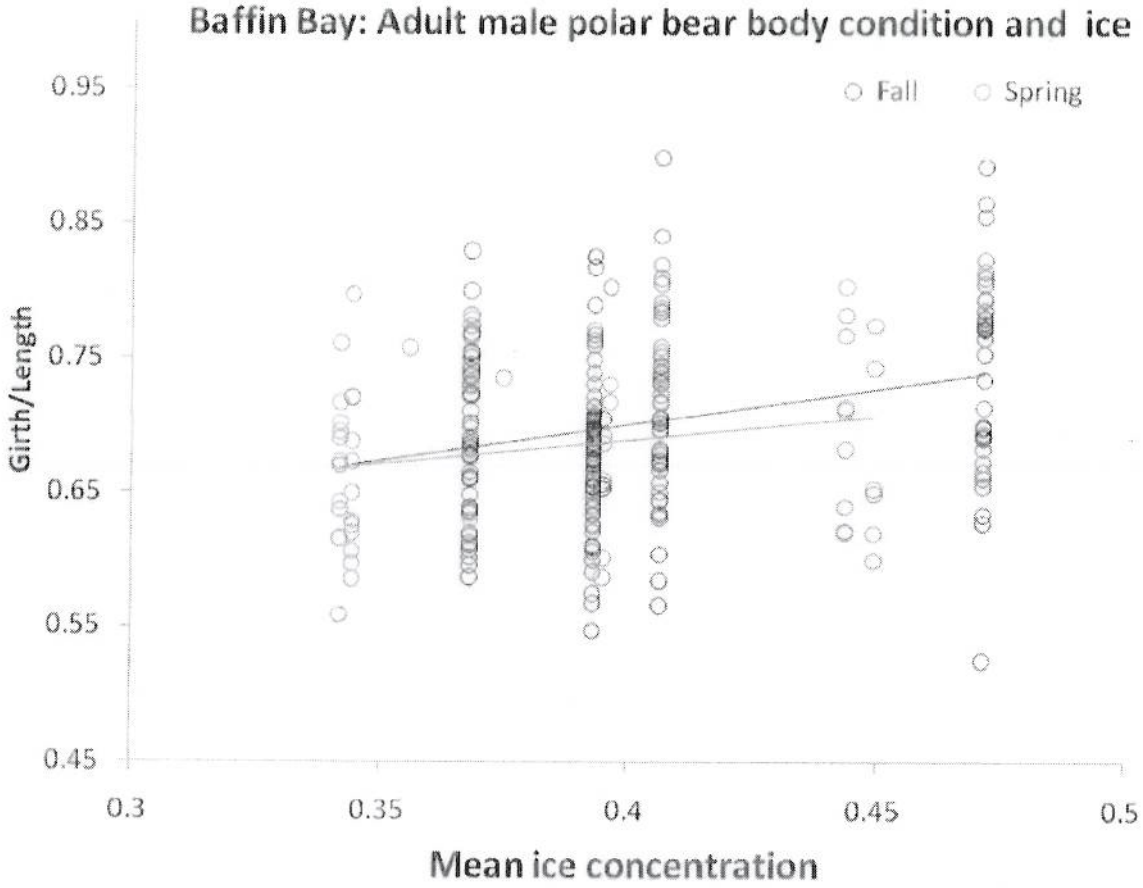
The statistics for these relationships are shown in footnote 2, Table 2.



The statistics for these relationships are shown in footnote 3, Table 2.



This graphs shows a non-significant relationship; it was just presented as an example where the effect of ice is not demonstrated. This graph shows the relationship with respect to a continous variable, however the statistical test used categorical variables. AXG: Less ice, 125.8 ± 6.9 cm, More ice, 129.0 ± 12.2 cm; Equal variances. Final model, F = 4.3, p = 0.007. Encumbrance, F = 8.8, p = 0.004; Capture Date, F = 6.6, p = 0.012, Ice = 0.92.



This graph is a representation as a continuous function. However, the statistics done were categorical: AXG with levels of current year ice: Less, 148.1 ± 19.8 Average, 150.1 ± 14.7, More, 161.0 ± 19.2. Equal variances. Final model, F = 15.7, p = 0.000, Age, F = 40.3, p = 0.000, Capture Date, F = 10.9, p = 0.001. Ice, p = 0.00

Baffin Bay: Changes in mean annual ice concentration

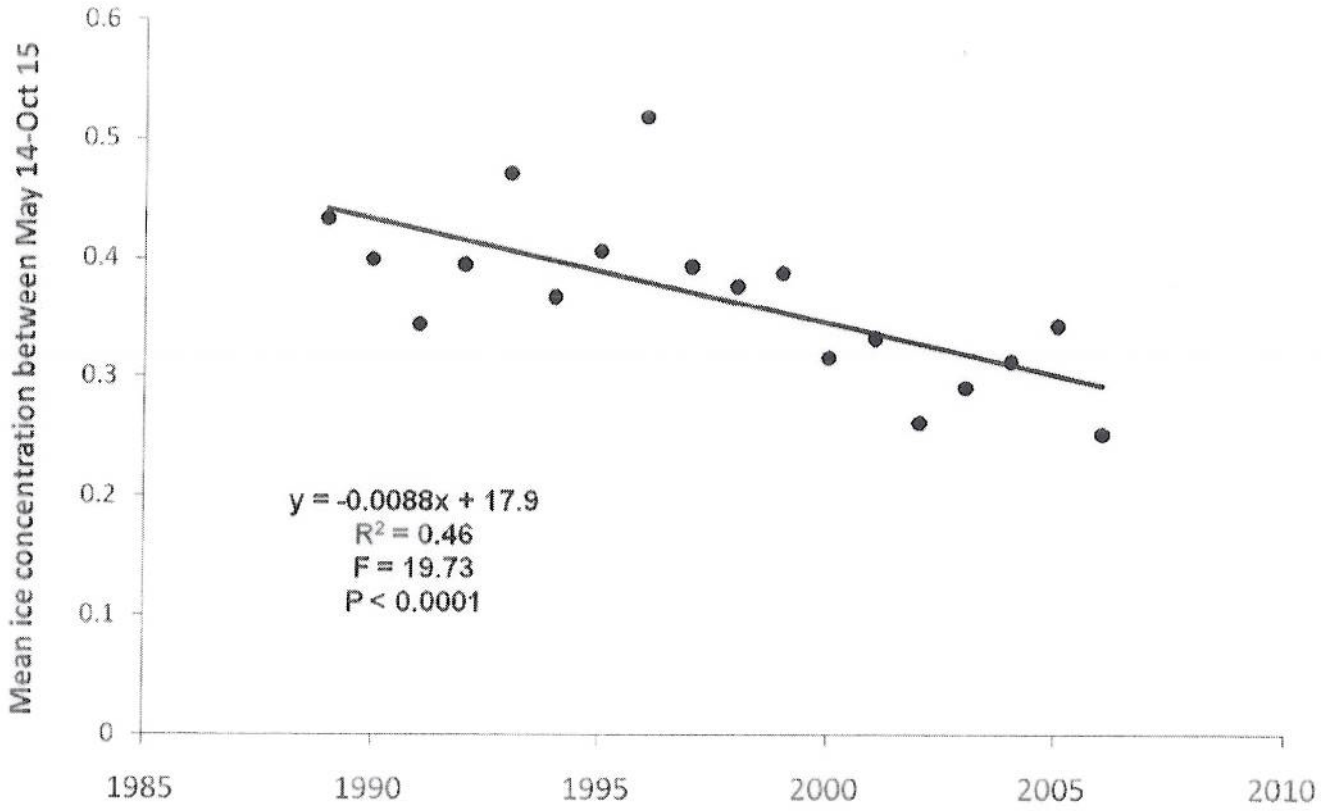


Table 1. Summary table of statistical results regarding changes in body condition (AXG is axillary girth (cm), controlled by SLEN (straight line length and/or age) of Baffin Bay polar bears with respect to ice conditions. Cells highlighted indicate statistically significant results; All analyses were performed at $\alpha = 0.05$. **All analyses, incorporated relevant covariates from this list: sex, age, capture date, number offspring, encumbrance (only significant effects of these covariates and interactions are noted below). If the covariate and/or interaction is significant, it is kept in the final model).**

Ice variable	Grown males	Growing males	Subadult males	Grown females	Growing females	Subadult females	Yearling	Cubs-of-the-year
Prior year ice	no effect	Trend to fatter with more ice	Fatter with more ice (1)	Fatter with more ice (2)	Fatter with average ice than less and more ice (3)	Fatter with average ice than less and more ice (4)	Fatter in spring with more ice (5)	no effect in fall
Ice concentration	no effect	Fatter with more ice (6)	Fatter with more ice (7)	no effect	Fatter with more ice (8)	Fatter with more ice (9)	Fatter in fall with less ice (10), not measured in spring	no effect in fall; not measured in spring
Prior year freeze up	no effect	Fatter with earlier ice (11)	no effect	Fatter with earlier ice (12)	trend to fatter with earlier and later freeze up than average	Fatter with later and earlier ice than average (13)	Fatter in spring with earlier ice (14)	no effect in fall
Break up	Later break up, fatter (15)	Later break up, fatter (16)	no effect	no effect	Later break up, fatter (17)	no effect	Not measured in spring; no effect in fall	Not measured in spring; no effect in fall

Footnotes: Information for covariates and interactions are given only if they appear in the final model as significant

1 – AXG with levels of prior year ice: Less, 114.8 ± 7.7, Average, 127.0 ± 15.9, More, 129.1; Equal variances. GLM Final model, F = 18.7, p = 0.00, with significant effect of covariate: age, F = 48.5, p = 0.00; Ice, p = 0.04.

2 – AXG with levels of prior year ice: Less, 122.4 ± 7.3, More, 129.4 ± 11.8; Equal variances. GLM Final model, F = 5.4, p = 0.006. Significant covariates: Encumbrance, F = 6.8, p = 0.01 (encumbrance effect is in the direction as expected, encumbered, lower AXG. No interactions of variables. Ice, p = 0.02.

3 – AXG with levels of prior year ice: Less, 118.8 ± 6.7 Average, 128.4 ± 11.4 More, 122.4 ± 10.5; Unequal variances. NPGLM Final model, F = 14.0, p = 0.00. Significant covariates: capture date, F = 19.2, p = 0.00. Ice, p = 0.00 (Note, threshold effect)

4 – AXG Less, 107.1 ± 13.1, Average, 118.8 ± 8.6 More, 109.9 ± 10.2 Final model, F = 12.3, p = 0.00. Age, F = 14.9, p = 0.000. Ice, p = 0.00(Note, threshold effect)

5 - AXG with levels of prior year ice: Less, 87.0 ± 10.1, More, 95.9 ± 5.8. Equal variances, Final Model, F = 4.5, p = 0.019; NumYearlings (F = 13.78, p = 0.003); CaptureDate (F- 10.9, p = 0.006), Ice = p = 0.01.

6 – AXG with levels of current year ice: Less, 148.1 ± 19.8 Average, 150.1 ± 14.7, More, 161.0 ± 19.2. Equal variances. Final model, F = 15.7, p = 0.000, Age, F = 40.3, p = 0.000, Capture Date, F = 10.9, p = 0.001. Ice, p = 0.00

7 – AXG with levels of current year ice: Less, 113.0 ± 6.9Average, 126.8 ± 13.8, More, 134.1 ± 18.5. Equal variances. Final model, Post-hoc, Tukey HSD suggests the difference is driven by the categories Less v. More, p = 0.016. Ice, = p = 0.009

8 – AXG with levels of current year ice: Less, 118.4 ± 6.2 , Average, 122.9 ± 9.9, More, 133.0± 15.3. Unequal variances. NP GLM. Final model, p = 0.00. Ice, p = 0.00

9 – AXG with levels of current year ice: Less, 108.9 ± 13.2, More, 114.6 ± 10.2. Equal variances. Final model, F = 9.3, p = 0.00, Age, F = 21.5, p = 0.00. CT*Age, F = 9.3, p = 0.003; p = 0.003.

10- AXG with levels of current year ice: Less, 109.5 ± 10.6 More, 108.1 ± 12.2. Equal variances. Final model, F = 12.8, p = 0.000. CaptureDate*CTCat, F = 7.4, p = 0.008. CaptureDate, F = 7.4, p = 0.008, Ice, p = 0.01.

11 – AXG with levels of prior year freeze up: Earlier, 159.7 ± 20.5, Later, 149.0 ± 14.1. Equal variances. Final model, F = 18.4, p = 0.00. Age, F = 38.1, p = 0.00, CaptureDate, F = 21.1, p =0.000. Ice, p = 0.01.

12 - AXG with levels of prior year freeze up : Earlier, 131.7 ± 12.6, Later, 127.7 ± 11.3. Equal variances. Final model, F = 5.8, p = 0.001. CaptureDate, F = 10.5, p = 0.002, Ice, p = 0.05

13 – AXG with levels of prior year freeze up: Earlier, 115.0 ± 9.5, Average, 108.0 ± 11.4, Later, 114.6 ± 11.6. Final model, F – 4.0, p = 0.00. Age, F = 15.0, p = 0.00. Capture Date, F = 10.1, p = 0.002. Ice, p = 0.02. (Note threshold effect).

14 – AXG with levels of prior year freeze up: Earlier, 96.2 ± 8.0, Later, 89.8 ± 9.1. Equal variances. Final Model, F = 4.5, p = 0.019; NumYearlings (F = 13.78, p = 0.003); CaptureDate (F- 10.9, p = 0.006), Ice, p = 0.01.

15 – AXG with Breakup; Regression, Beta = 0.17, F = 3.8, p = 0.05.

16 – AXG with breakup; Regression. Final model : F = 26.9, p = 0.00. Age, F = 35.7, p = 0.00, Ice: Beta = 0.28, F = 16.67, p= 0.00

17 – AXG with breakup; Regression. Final model, F = 13.5, p = 0.00. Age, F = 4.6, p = 0.03. CaptureDate, F = 14.3, p = 0.000, Ice: Beta = 0.21
F = 6.8, p = 0.01

Table 2. Summary table of statistical results regarding changes in body condition of Baffin Bay polar bears with respect to time. Cells highlighted indicate statistically significant results; All analyses were performed at $\alpha = 0.05$. All measurements in footnotes are centimeters. All analyses incorporated covariates of age, capture date; for adult females the effects of presence of cubs; for adult females and cubs of the year - the effects of number of cubs.

Body metric	Grown males	Growing males	Grown females	Growing females	Yearling	Cubs-of-the-year
Straight-line length	No change	No change	No change	No change	Decrease from early 1990's to late 1990's (1)	No change
Axillary girth	No change	Decrease from early 1990's to late 1990's (2)	No change	Decrease from early 1990's to late 1990's in fall (3)	Decrease from early 1990's to late 1990's in fall (4)	Decrease from early 1990's to late 1990's in fall (5)
Skull width	No change	No change	No change	No change	No change	No change

1 – SLEN – 1990 – 94, 163.28 ± 8.7; 1995 – 97, 159.07 ± 8.8; y = 159.07 – 4.21yearcat; $F_{1,96} = 9.28$, P =0.003

2 – AXG – 1990 – 94, 151.3 ± 18.5; 1995 – 97, 143.8 ± 17.6; equal variances, no interactions, capture date: F = 5.5, P = 0.02, age: F=114.46, P<0.0001; and yearcat: F=3.62, P=0.059; y = 173.36 – 4.22yearcat + 5.03age -0.19cdate; $F(model)_{3,187} = 43.74$, P<0.0001

3 – AXG – 1990 – 94, 120.4± 8.2, 1995 – 97, 114.5 ± 9.5. (Fall): no capture date effect; $F_{1,44}$=0.72, P=0.40; year effect: $F_{1,45} = 5.24$, P=0.027; y = 114.46 – 5.93yearcat. (Spring): **Sample size is too small; no capture date effect ($F_{1,16} = 0.13$, P = 0.72); no year effect ($F_{2,14} = 0.2$, P=0.85).

4 – AXG – 1990 – 94, 113.0 ± 12.3 ; 1995 – 97, 104.16 ± 10.07. y = 190.55 – 6.67yearcat – 0.28cdate; model: $F_{2,95} = 16.18$, P<0.0001; yearcat $F_{1,95} = 9.28$, P =0.003

5 – AXG – 1990 – 94, 87.1 ± 8.9; 1995 – 97, 82.1 ± 12.7. Fall AXG: y = 82.12 – 4.81yearcat; $F_{1,155} = 7.47$, P =0.007; variances were slightly heterogeneous (levene's p-value = 0.10) but were not corrected with transformation.

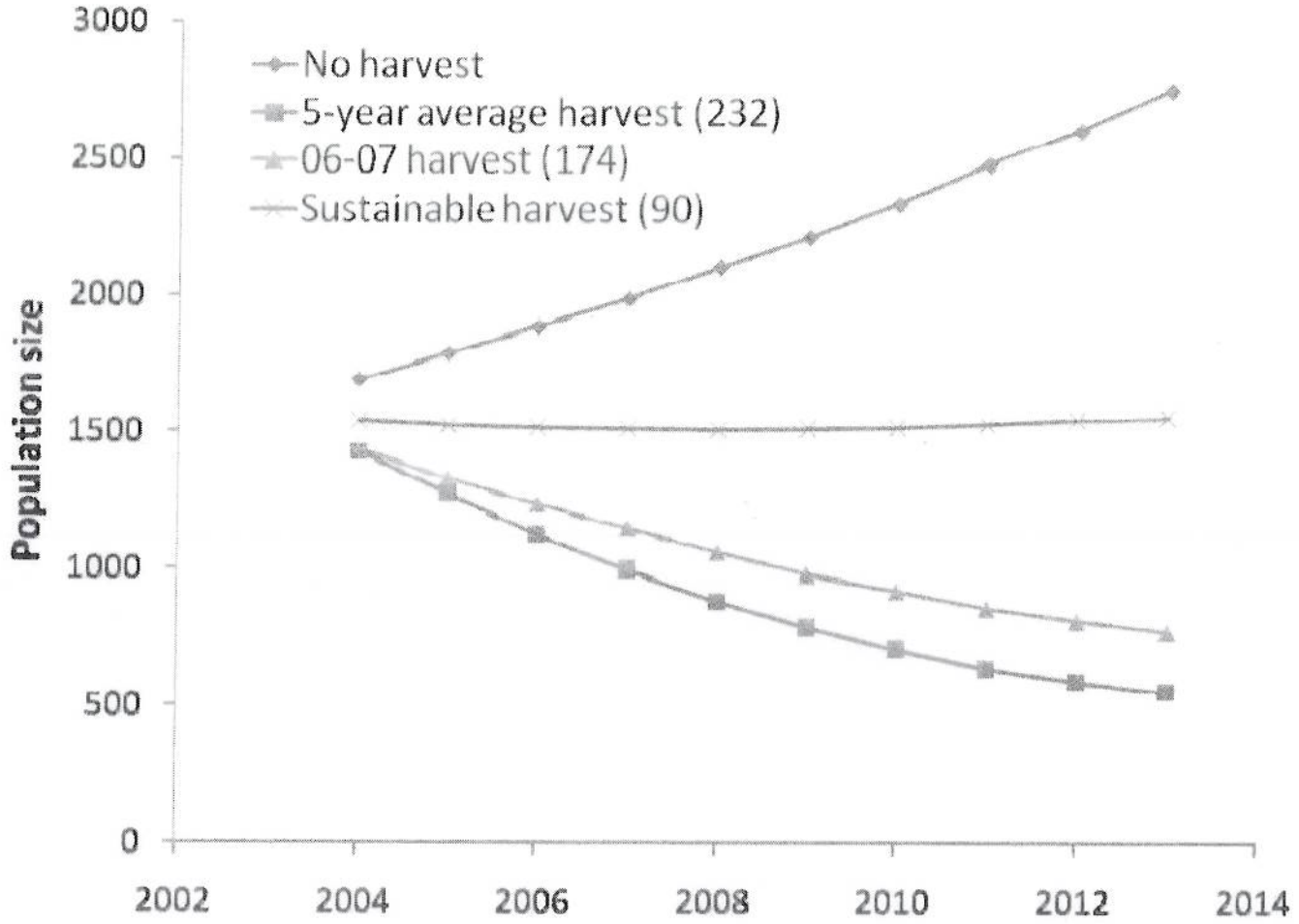


Figure showing 10-year population projections for the Baffin Bay polar bear population from a population size of 1,546 in 2004 using Population Viability Analysis and survival and birth rates measured with mark-recapture in Baffin Bay from 1994 – 1997.