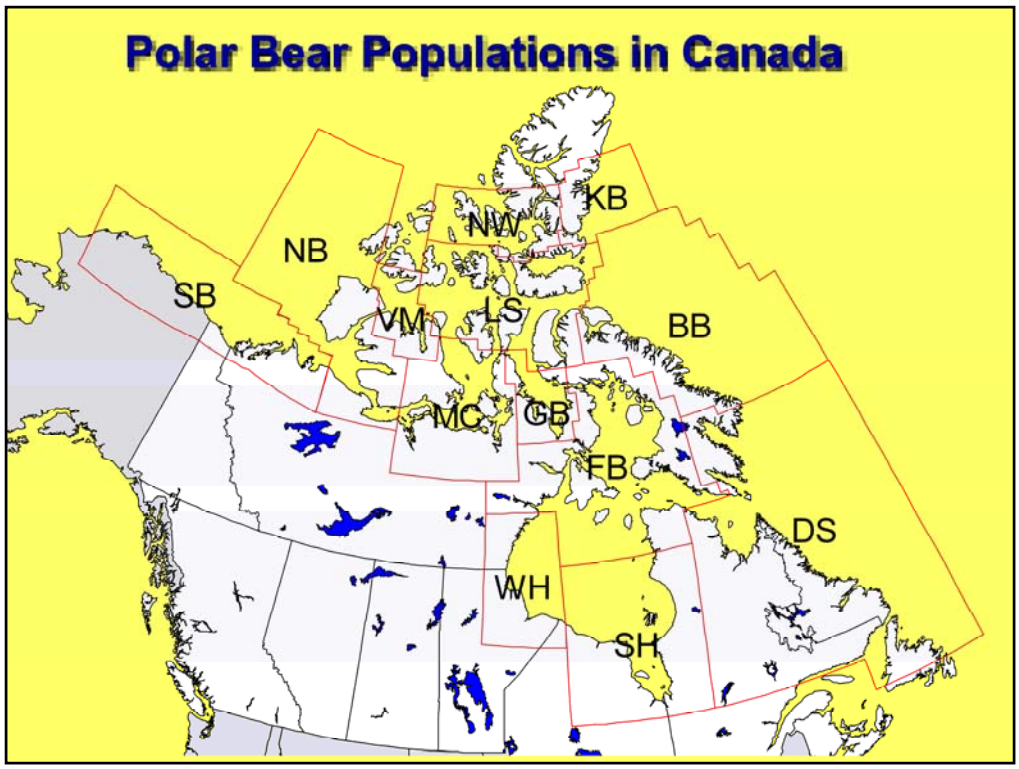
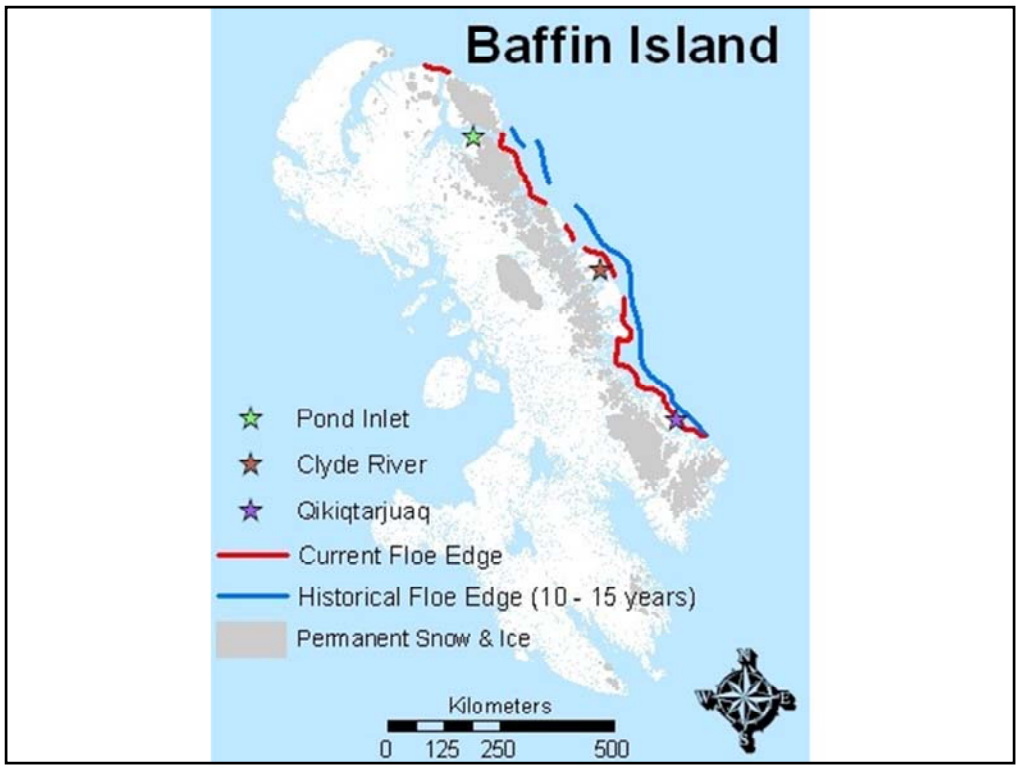
This presentation identifies management concerns for the Western Hudson Bay (WH) and Baffin Bay (BB) polar bear populations. The WH issues are related to a reduction in the total allowable harvest (TAH) caused by climate change impacts on survival and recruitment rates. The concerns in BB appear to be related to a dramatic increase in Greenland harvesting activities and a recent substantial quota increase for Nunavut BB communities.

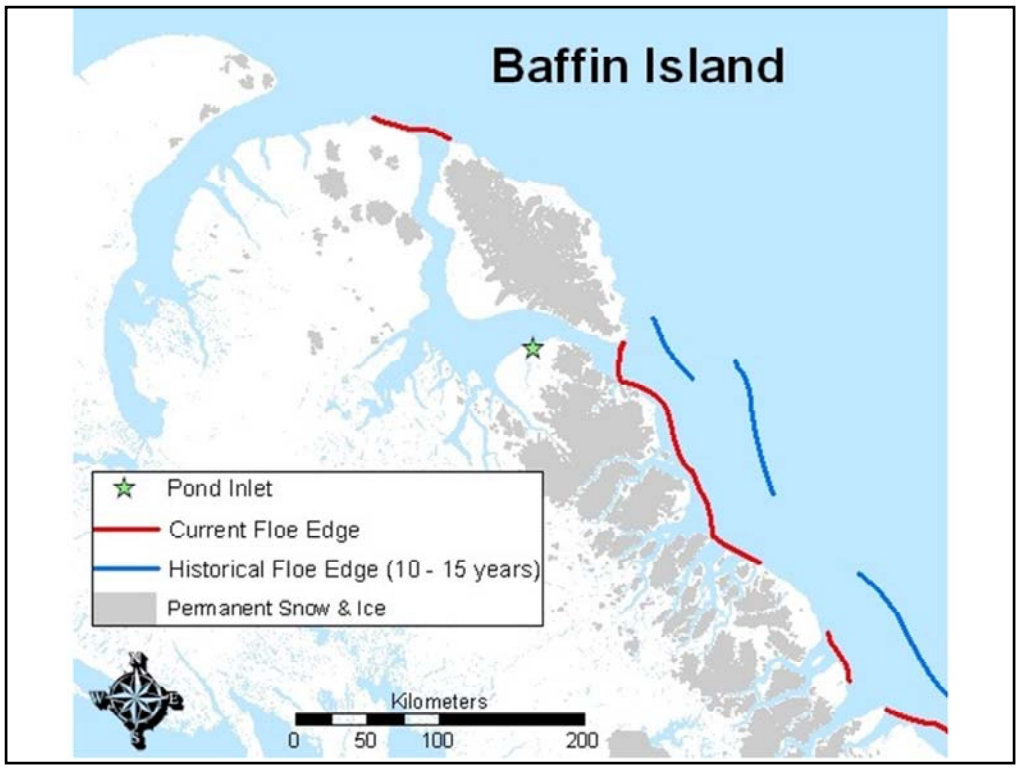


Polar bears in Canada are distributed in 13 different populations. Some are shared between Canada and Greenland. Some are completely within Canada but shared between Nunavut and other Territories or Provinces.

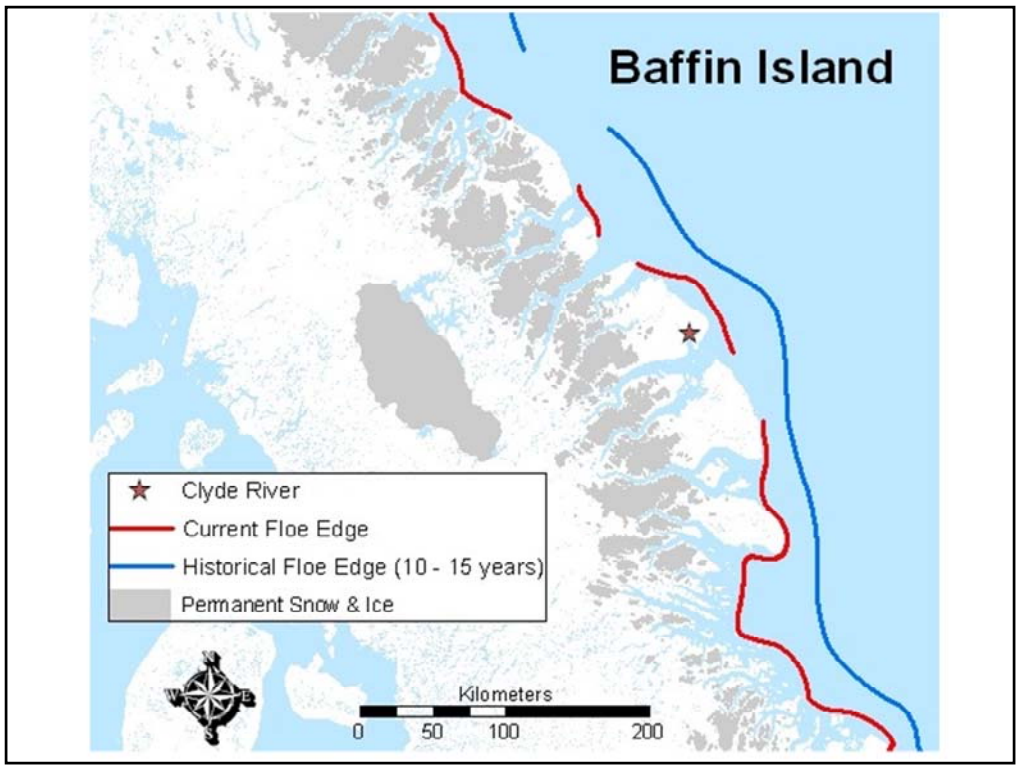
The information on effects of climate change in WH and BB may give us some idea about things that may happen in other areas in the future.



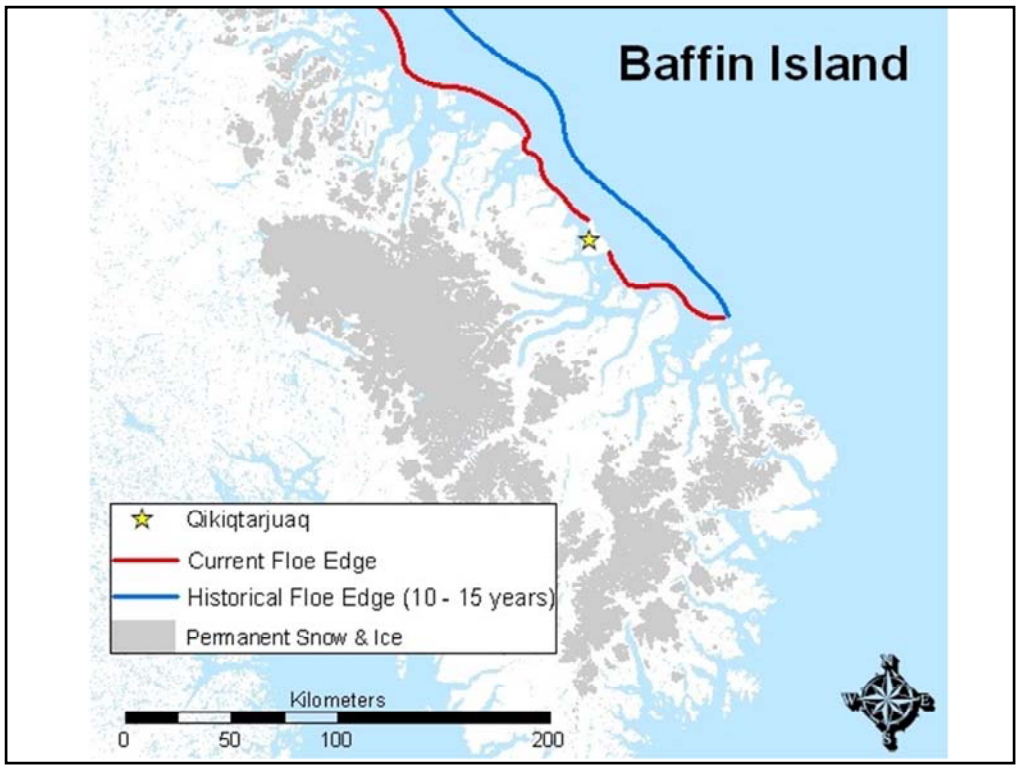
Inuit knowledge informs is that the floe edge along NE Baffin Island used to be further out than it is now. Hunters cannot safely go past the floe edge because it is drifting pack ice there. The reduced fast ice concentrates polar bears that come off the pack ice onto a smaller area now. This may cause hunters to see more bears even if the numbers are the same or declining.



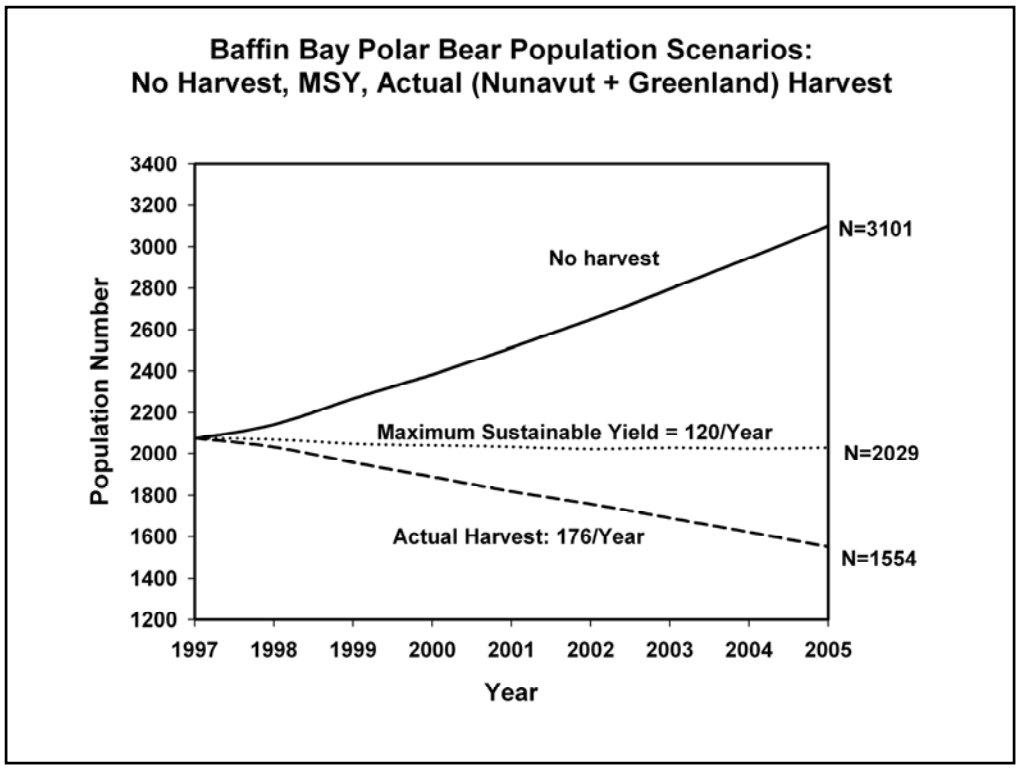
This is a close up view of the historical and current floe edge in the vicinity of Pond Inlet



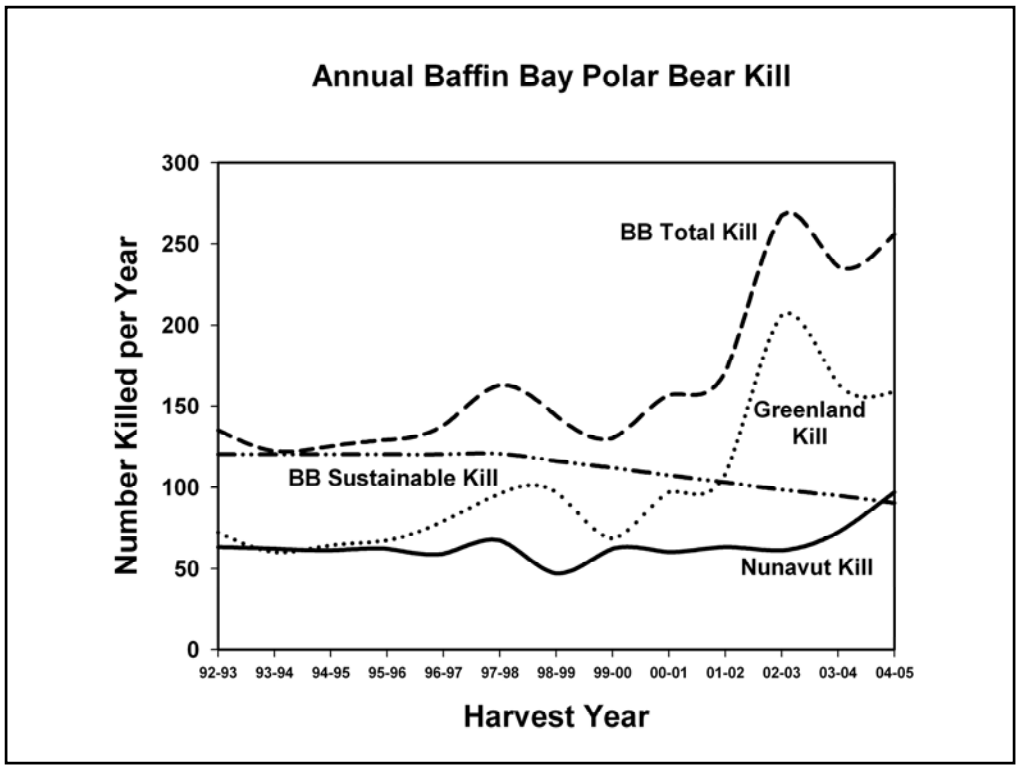
This is a close up view of the historical and current floe edge around Clyde River.



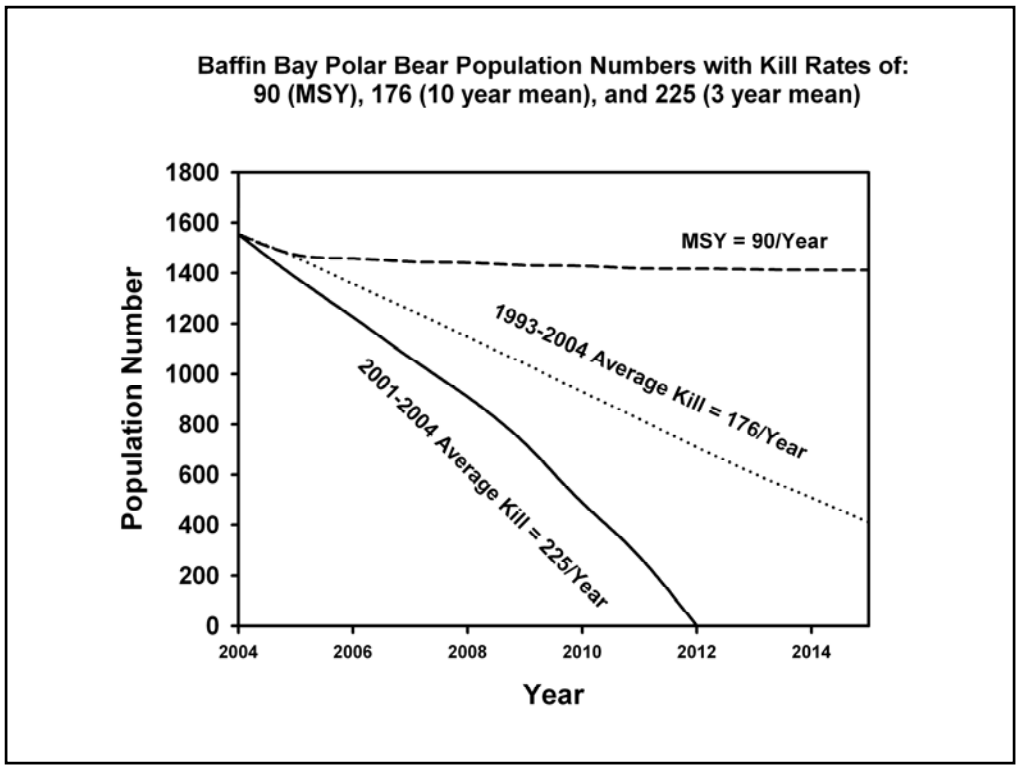
This is a close up view of the historical and current floe edge in the Qikiqtarjuaq area.



A computer simulation model used the results of the last population inventory to calculate the rate of growth of the BB population if there was no harvest. The estimated maximum sustainable number that could be taken without causing the population to decline was 120/year. The population trajectory with the average kill for the last 10 years (176/year) is believed to have caused a decline.

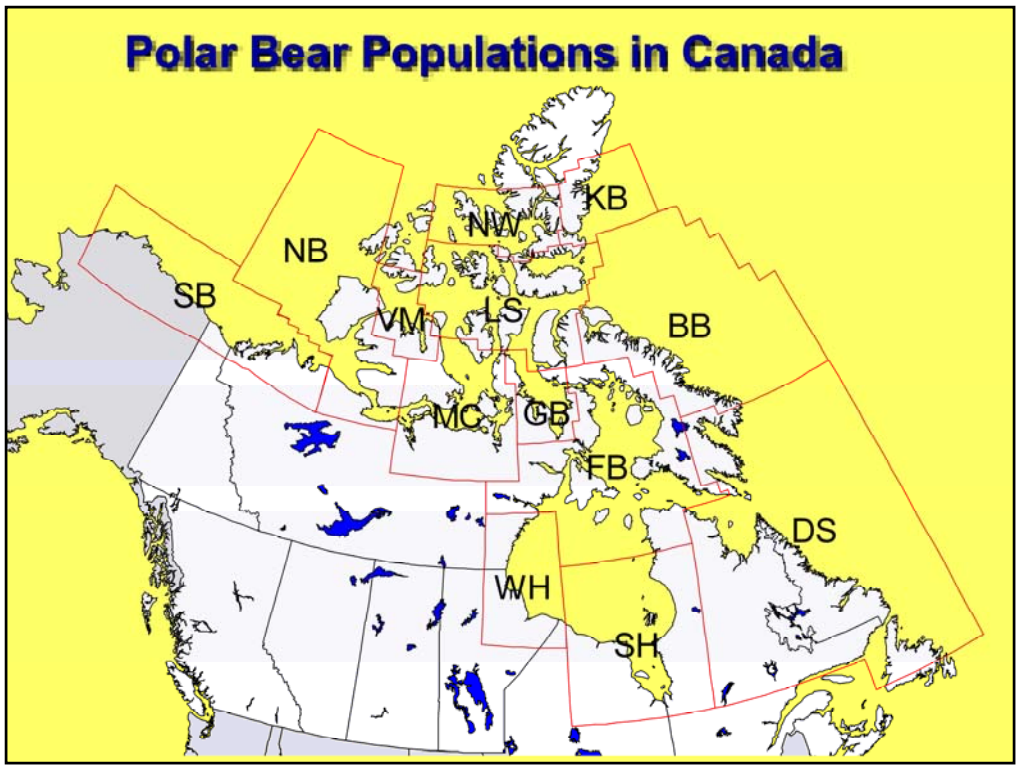


The number of bears killed per year is given for Nunavut, Greenland and for (Nunavut + Greenland). Also shown is the sustainable kill, which is declining because the number of bears in the population is being reduced by over-harvest. The heavy over-harvest begins in 2001-2002, and was accelerated by the 2004 Nunavut quota increases for this population.

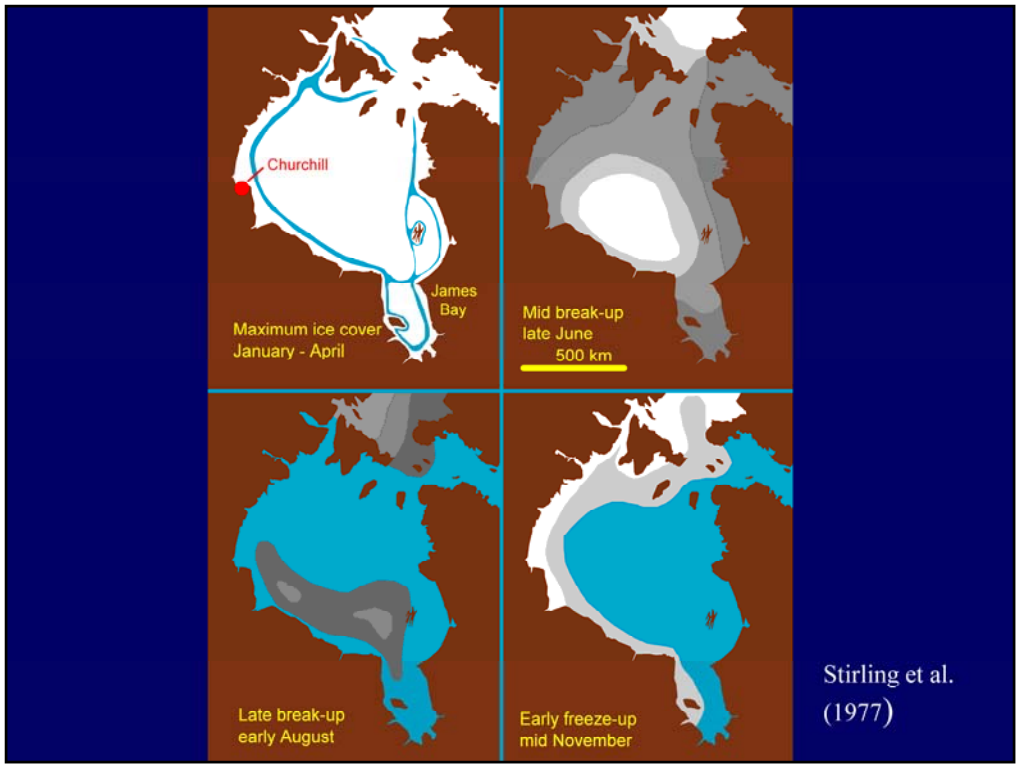


The prognosis for the future is not good. The reduced population will now sustain an annual kill of about 90 per year which has to be shared between Nunavut and Greenland. The current 10 year average is 176 per year, and if continued the population will decline. The average kill for the past 3 years is 225 per year, which will cause an even more rapid decline if continued.

Inuit knowledge was not consistent with scientific knowledge for the BB polar bear population.

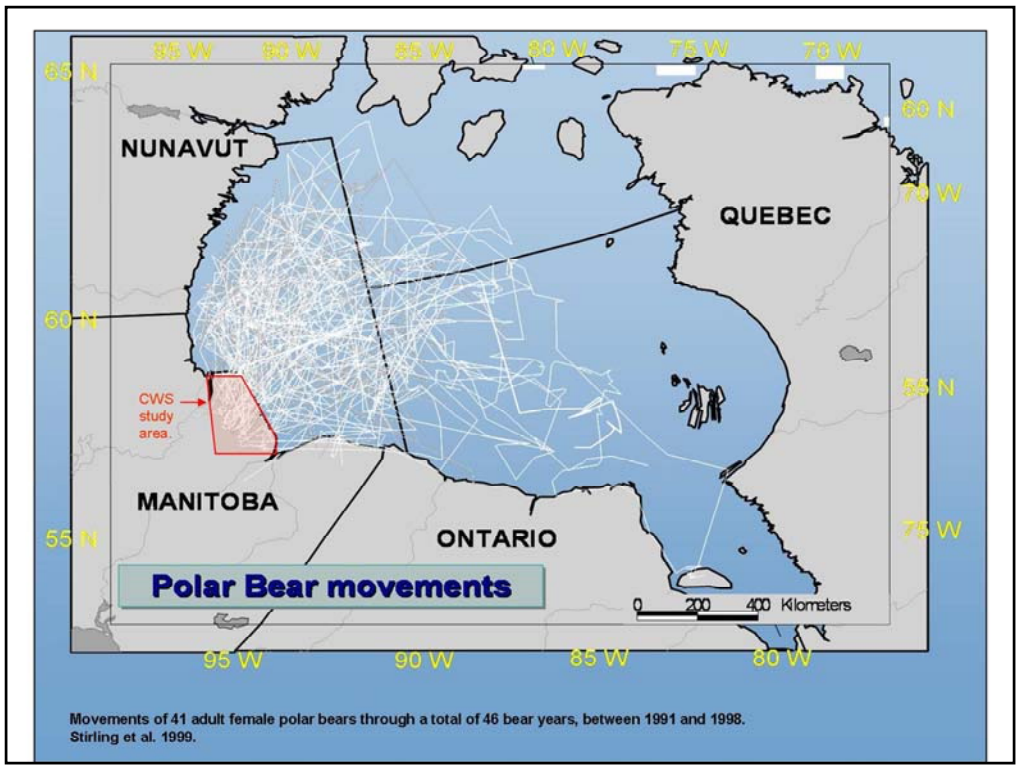


Polar bears in Canada are distributed in 13 different populations. Some are shared between Canada and Greenland. Some are completely within Canada but shared between Nunavut and other Territories or Provinces. The next few slides summarize a CWS study in Western Hudson Bay (WH)

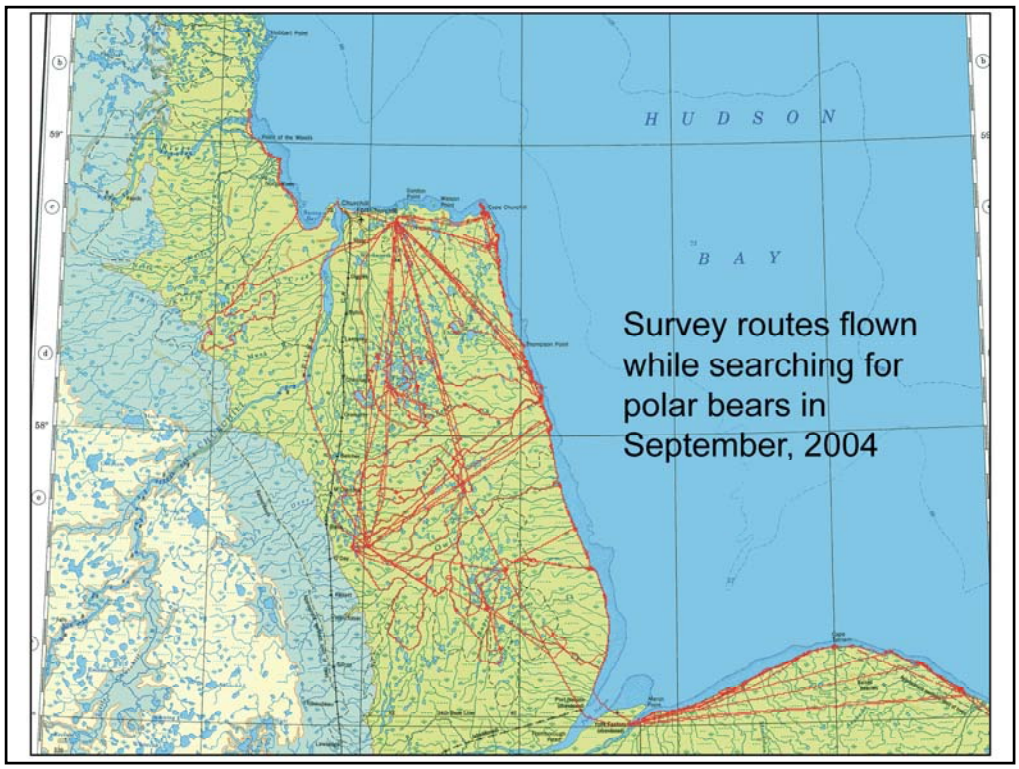


Hudson Bay is completely frozen during winter (top left). Open water in spring appears first in the NW. Southerly currents on the west coast and NW winds move the ice southwest (top right). The last ice melts off Manitoba and Ontario so bears from WH and SH go ashore there (bottom left). Freeze-up begins along the Kivalliq coast (bottom right).

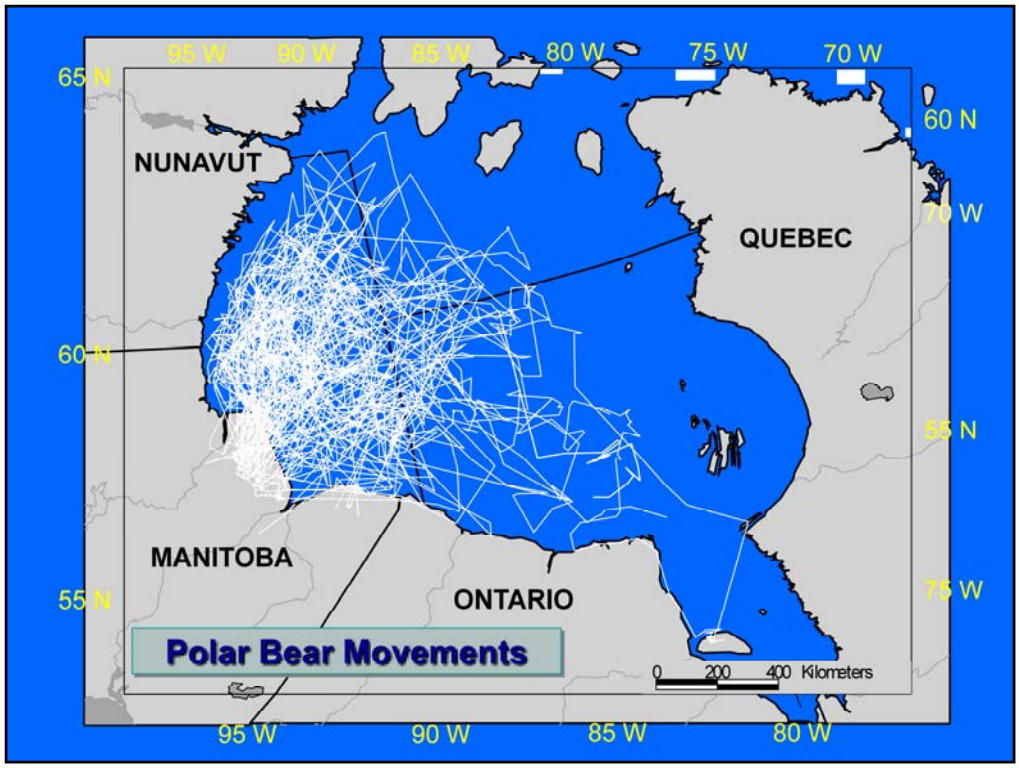
All polar bears in the WH population must fast on their stored fat for a minimum of 4 months and pregnant females must do so for 8 months. Thus, the amount of fat they can store before breakup is critical for their survival and reproductive success.



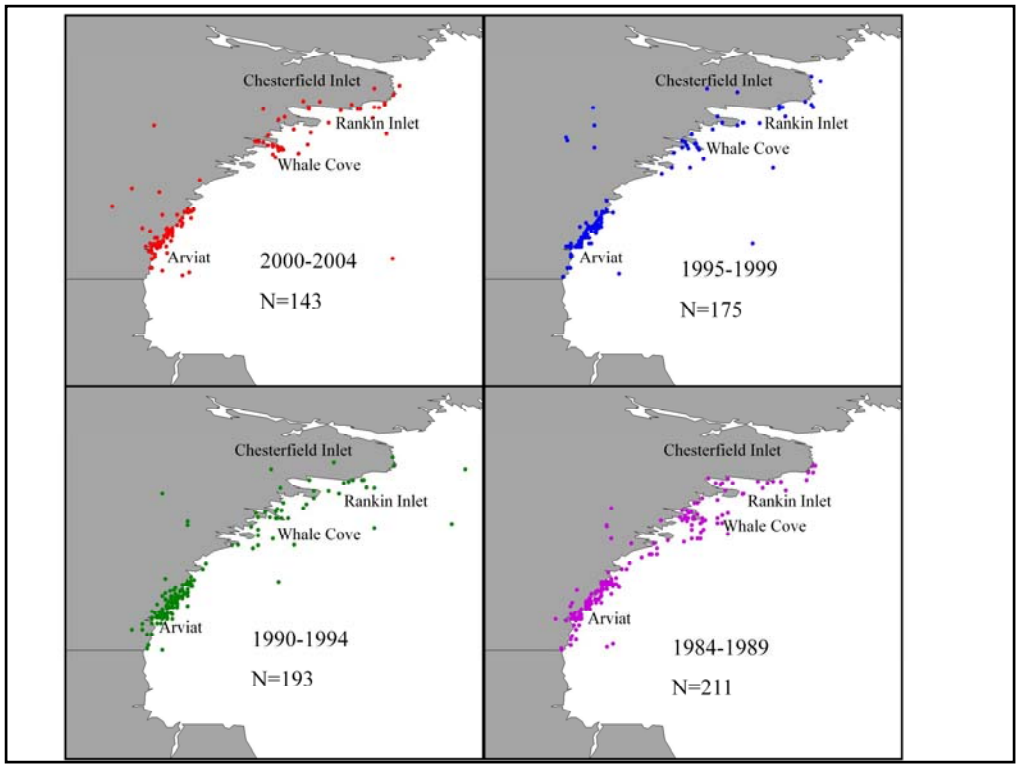
The main study area for the CWS research is in Manitoba south of Churchill because that is where most of the bears from the WH population are at the end of August and September. This allows for the most cost-effective sampling of the whole population. As the fall goes on, many of the bears from Manitoba move north into the Kivalliq region.



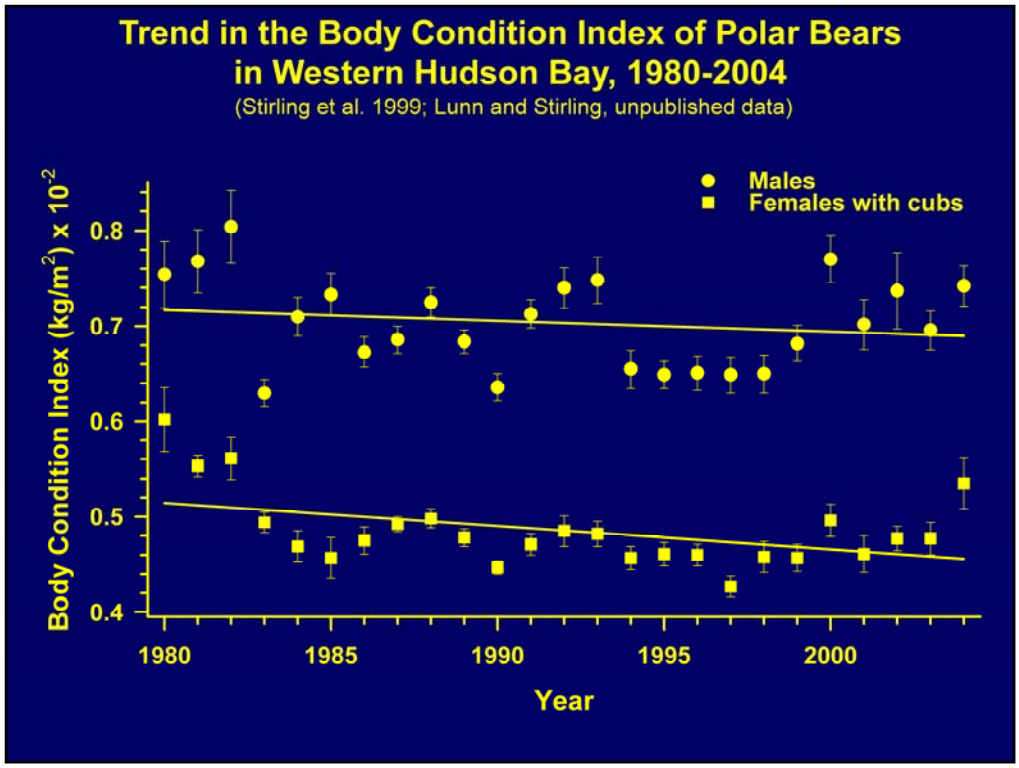
The red lines give an example (from 2004) of the effort made to spread out the sample and cover the whole area during a typical fall field season (August-September). CWS did search north along the coast toward the Nunavut border in several years but there are few bears there until later in the fall (late October-November). CWS feels it would have been too costly to survey north to Rankin Inlet or Chesterfield Inlet for the relatively small amount of bears that could be captured then. However, Kivalliq Inuit question the survey results because the entire area was not included.



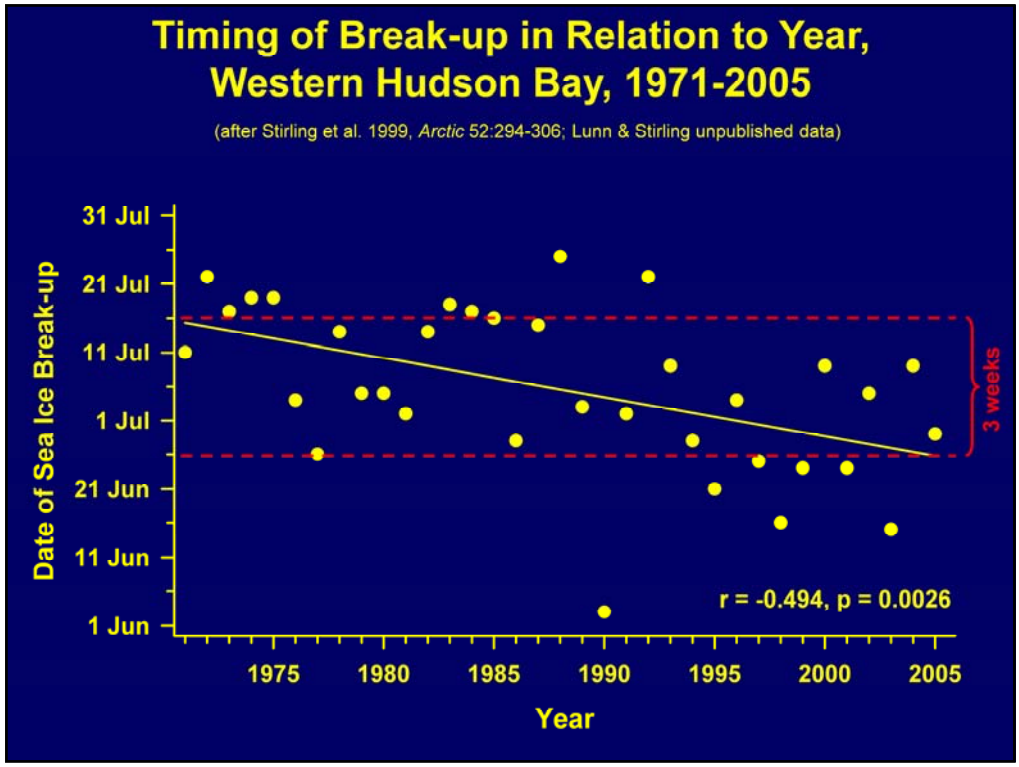
These are the year-round tracks of adult female bears with satellite collars deployed on the Manitoba coast between 1991 and 1998. Most movement remains within the present boundaries of the Western Hudson Bay polar bear management zone.



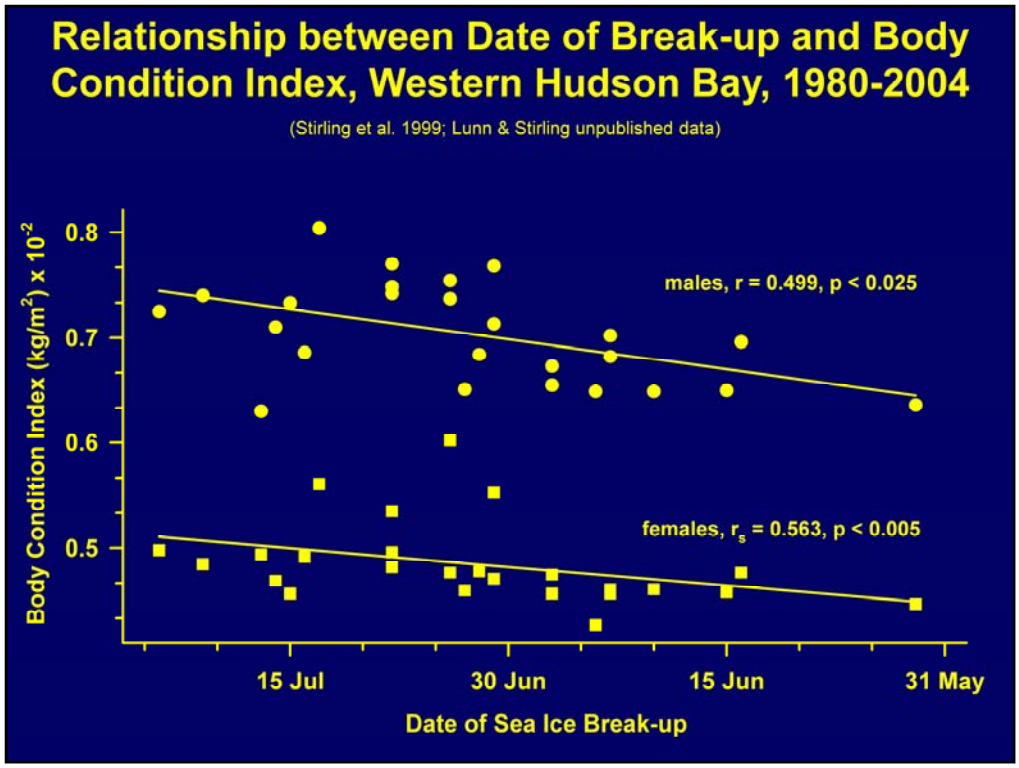
This slide shows where almost 500 polar bears tagged in Manitoba were shot in the Kivalliq area, in the past 20 years, divided into 5 year blocks. These figures suggest the distribution of tagged bears being shot has not changed over the past 20 years. Thus, a change in the distribution of bears of more bears from Manitoba moving into the Kivalliq area does not explain why more bears are being seen near settlements and outpost camps along the Kivalliq coast.



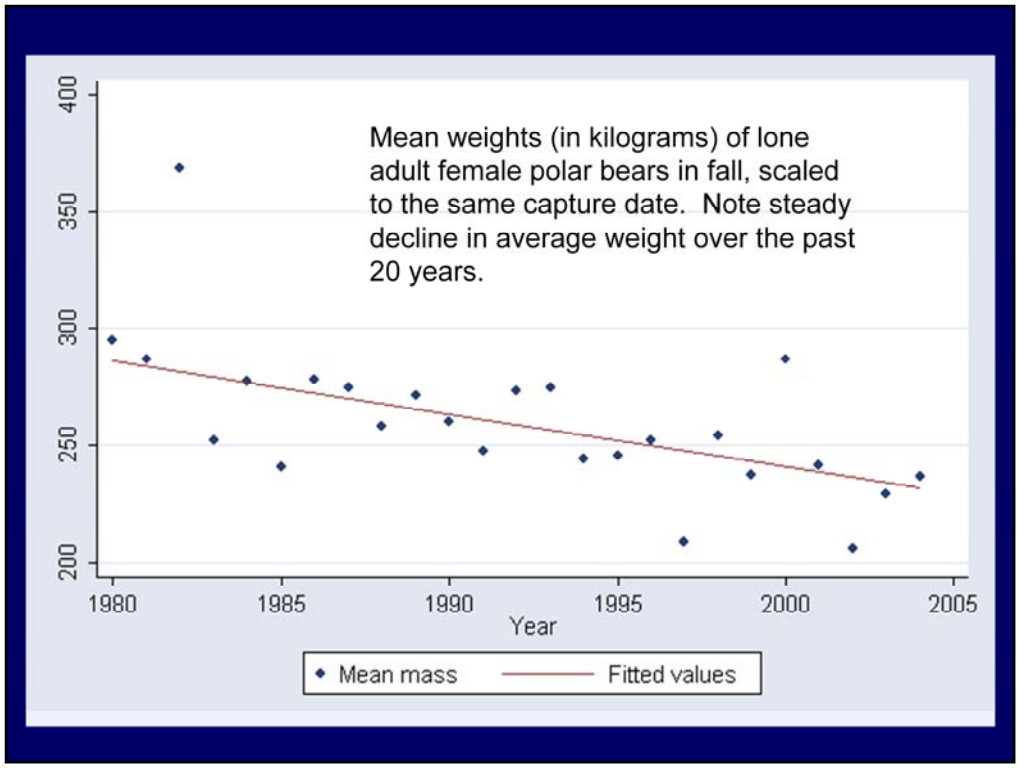
This slide shows that the condition (fatness) of adult males (top) and adult females with cubs or yearlings in the fall has declined steadily over the last 20 years. The condition varies between years, but the overall trend is down. There is more variation between years and within years in the adult males (top) than in the adult females with dependent young (bottom). This is probably because the females have to support themselves and 1 or 2 cubs from their fat. Males only have to support themselves and, while on the ice, are able to scavenge and steal carcasses from smaller bears.



This graph shows that the average date of breakup of the sea ice in Western Hudson Bay is now about 3 weeks earlier than it was 30 years ago. (Breakup is defined as the point where the ice is 50% ice and 50% water.) The breakup date is calculated for the area defined within the boundary of the Western Hudson Bay polar bear management zone.

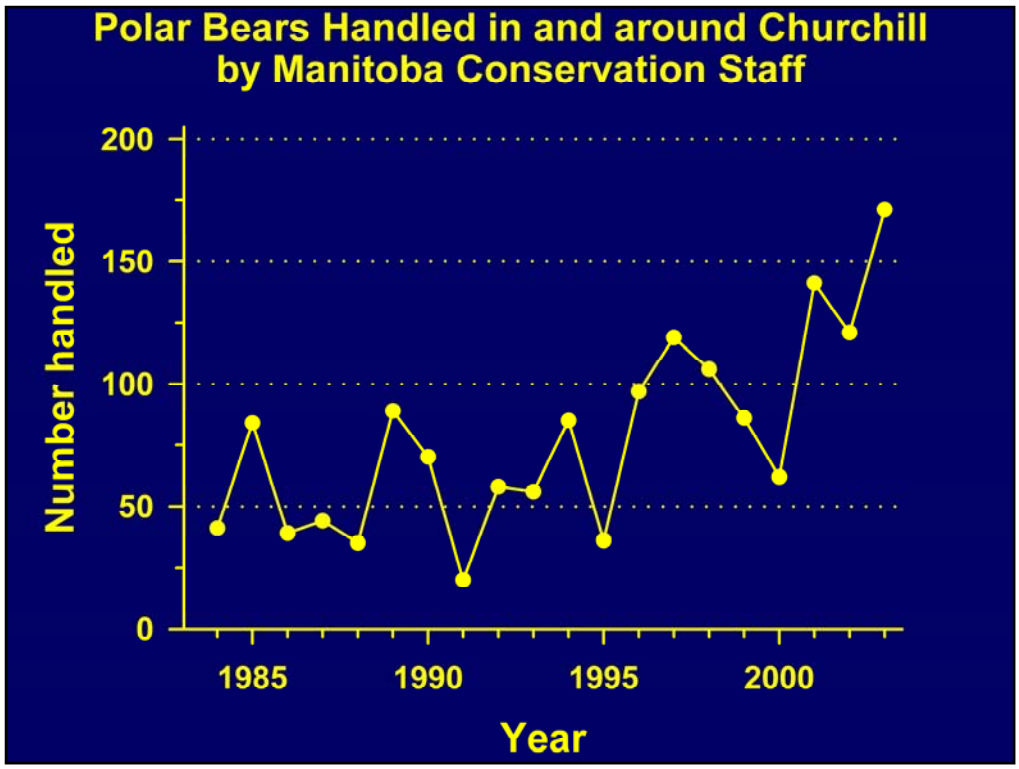


This slide shows the relationship between the date of break up and the body condition of the bears. Late breakup is on the left and early breakup is on the right. Condition is on the vertical line so being higher up indicates being in better condition than being low. Note that the lines for both males and females decline as breakup becomes earlier. This means that the earlier breakup is, the poorer condition the bears will be in, and when breakup is late, the bears are in much better condition. Again, there is some variability between years but the trend is clear.

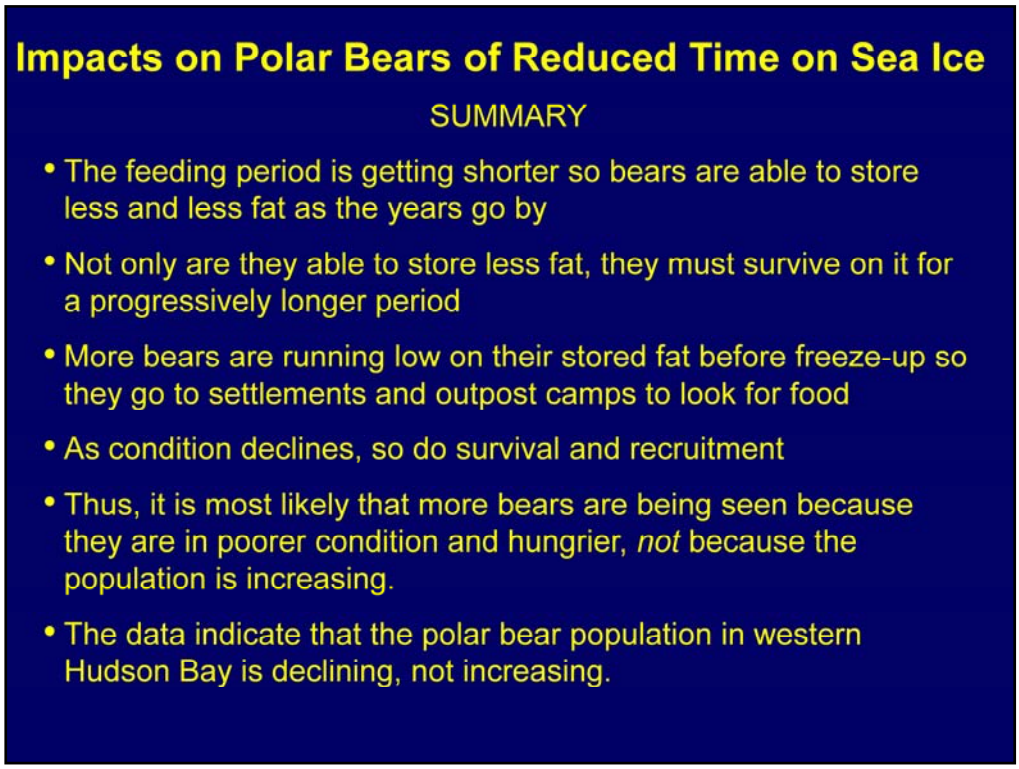


The average weights of lone adult females captured in the fall, and scaled to the same day, has declined steadily over the last 20 years. Some are in or near dens while others are not. Most are expected to be pregnant although some are not. No females weighing less than about 190 kg in the fall have been recorded with cubs the following spring. The downward slope of the average weights suggests that in 20-30 years, the proportion of females still fat enough in the fall to be able to produce cubs (i.e., greater than 190-200 kg) will be greatly reduced.

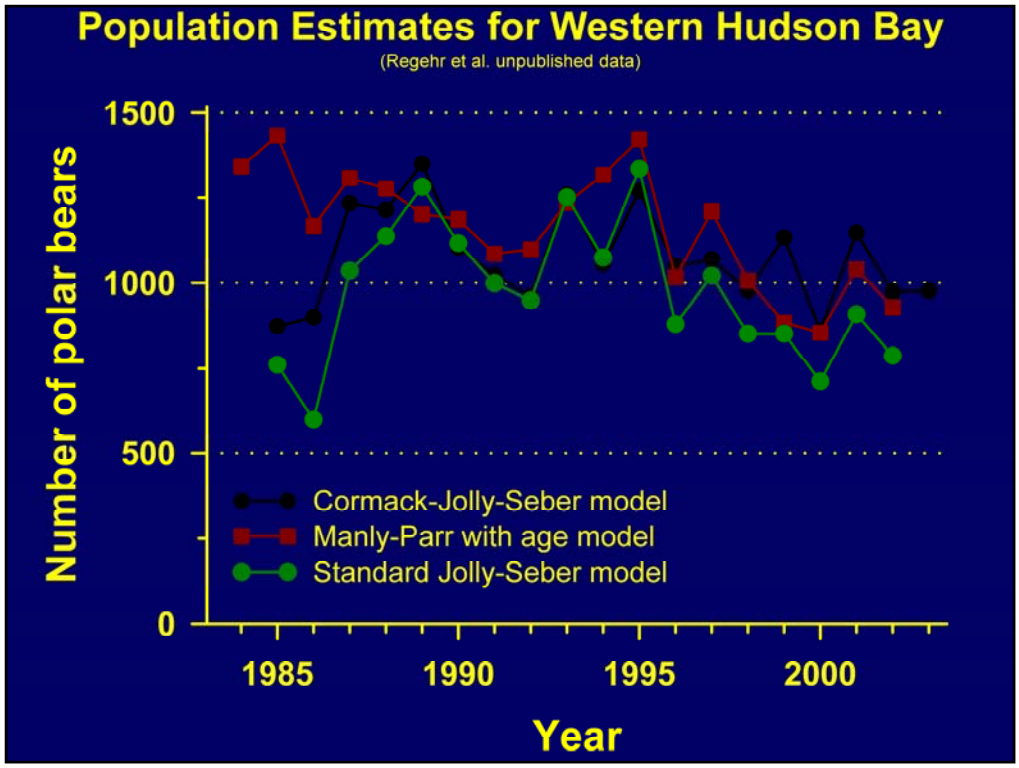
Hungry bears look for food in towns and around outpost camps or hunting camps. In towns, the smell of garbage attracts bears. Around hunting camps, or areas where people travel and hunt, there are often remains of whales, seals, caribou or other animals and these attract hungry bears. Bears that have fed around human settlements and camps may become less fearful of humans. Also, thin bears may be very difficult to scare away because they are very hungry. Those bears are quite dangerous. Manitoba has not permitted polar bears to feed at the Churchill dump for the past 15 years.



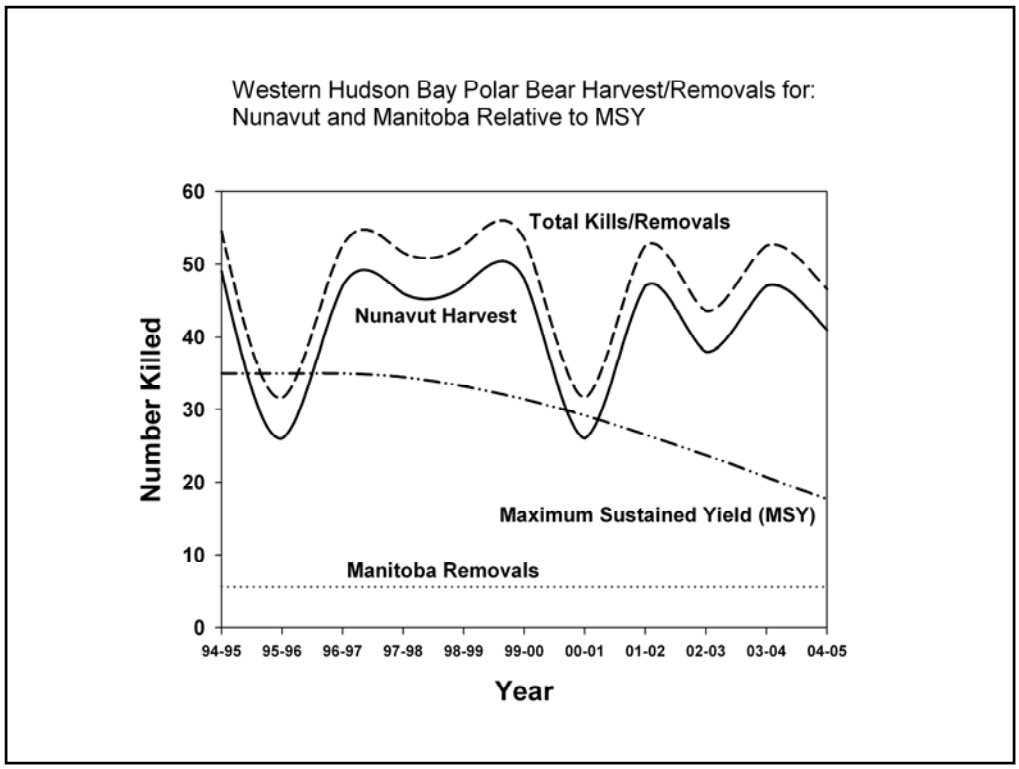
The number of problem bears handled in Churchill has increased greatly in recent years as the ice is breaking up earlier and bears are getting hungrier. Although they are seeing more bears in Churchill, it is not because the population is increasing. This is the same pattern of increase that Inuit are seeing in settlements on the Kivalliq coast. There is a direct and statistically significant relationship between the date of breakup and the number of problem bears handled by the control program. The earlier the breakup is, the more problem bears there are.



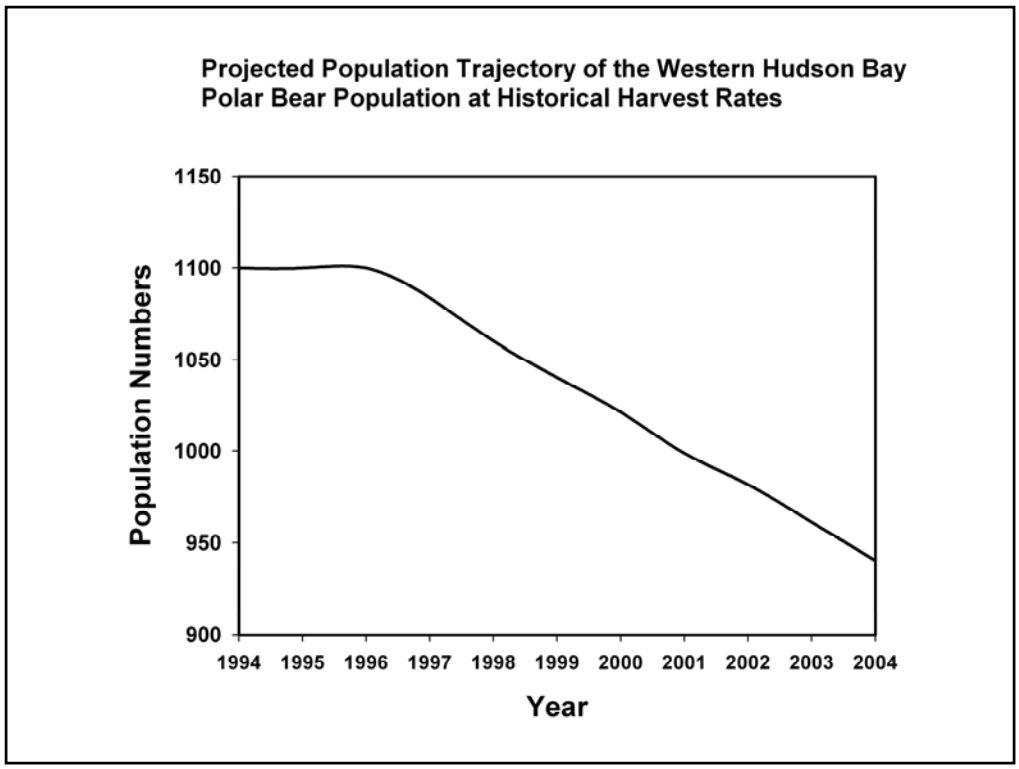
The CWS information is summarized in point form.



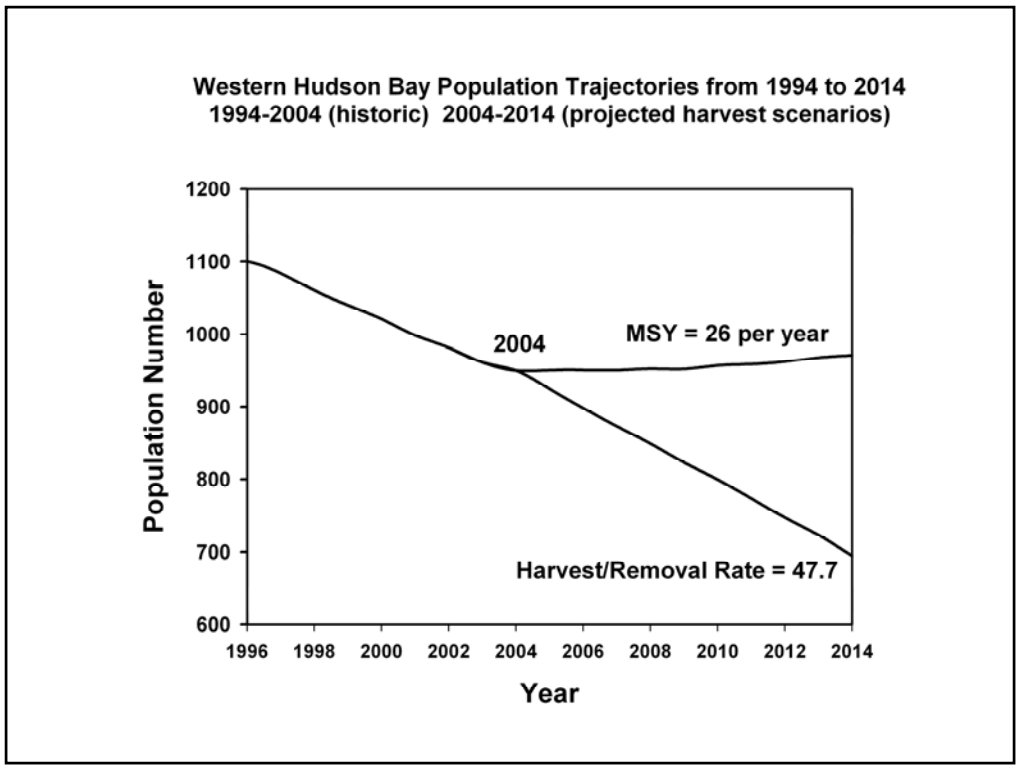
This analysis of the mark-recaptuer data collected by the Canadian Wildlife Service was done in collaboration with the US Fish and Wildlife Service. Three different analysis models were used. The data collected before 1994 was difficult to interpret because it was not collected in a way that is consistent with the analysis models. After 1994 the data collection was better, and the models essentially agree the population declined from about 1100 in 1994 to 950 in 2004. This analysis is not to be cited or reproduced without permission of CWS.



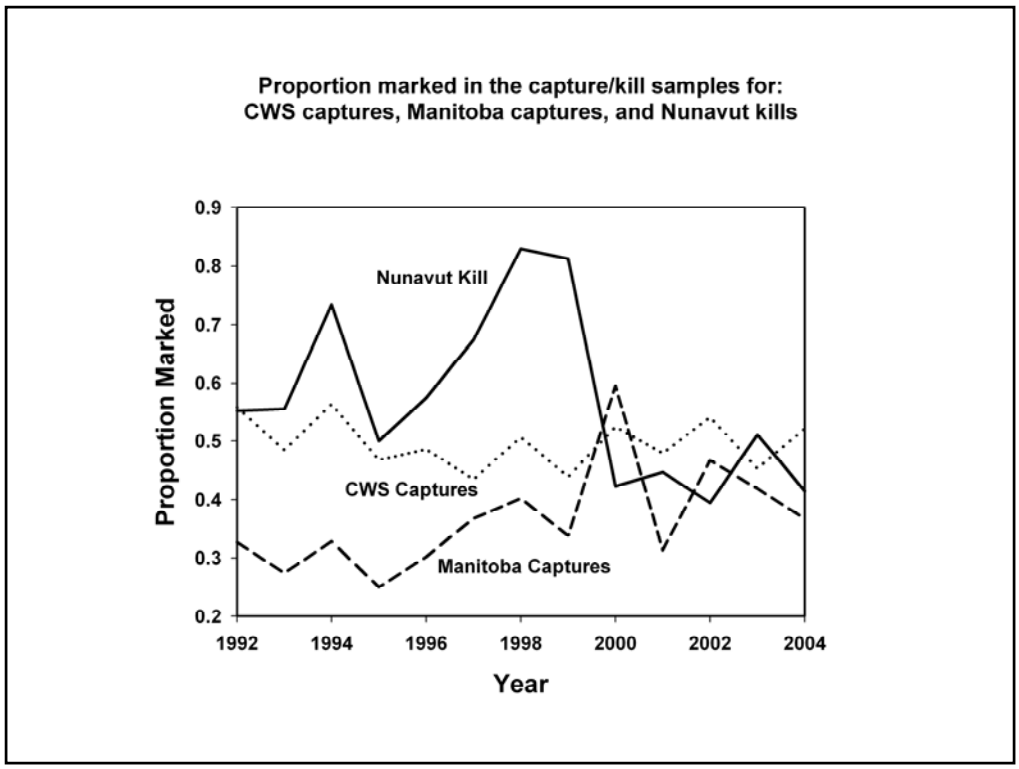
The average removal from Manitoba and the Nunavut harvest is shown from 1994-95 to 2004-05. Also shown is the estimated sustainable removal rate. The combined removal rate from Nunavut and Manitoba was close to sustainable until climate change reduced survival and recruitment rates. Currently the population and sustainable harvest is declining, partly due to over-hunting.



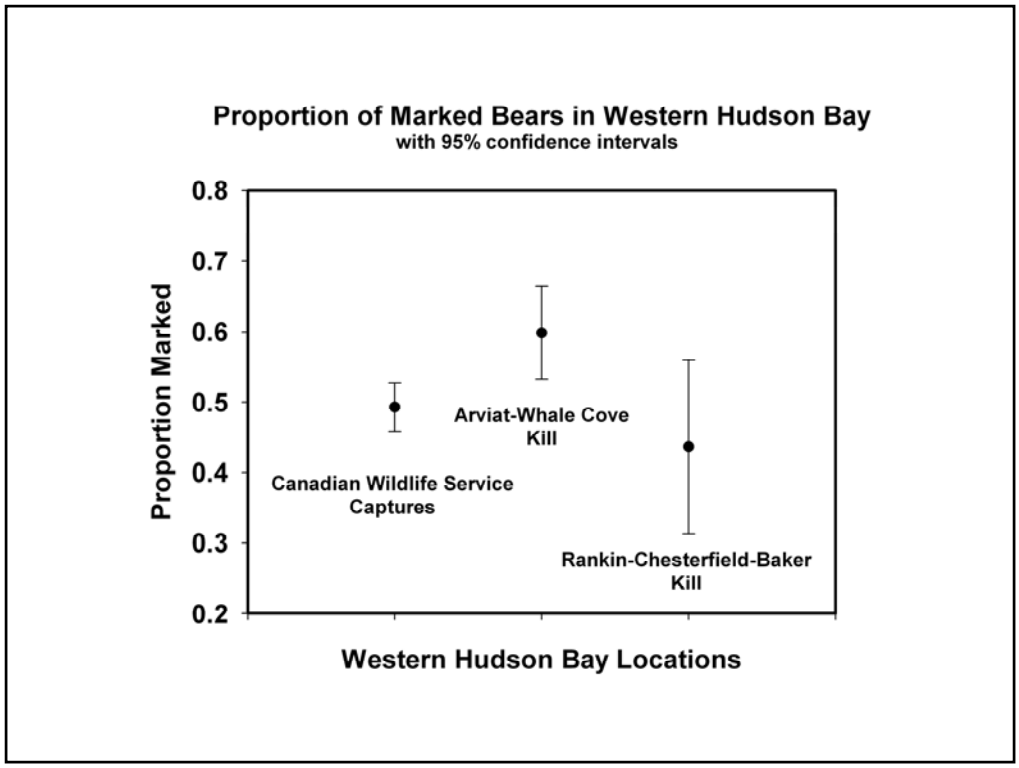
The estimates of survival and recruitment from the CWS study were used to simulate the population trajectory using the actual removals from WH. The decline in numbers using this information supports the independent mark-recapture estimates. The projected decline is from 1100 in 1994 to 940 in 2004, which is almost exactly the same as that actually estimated.



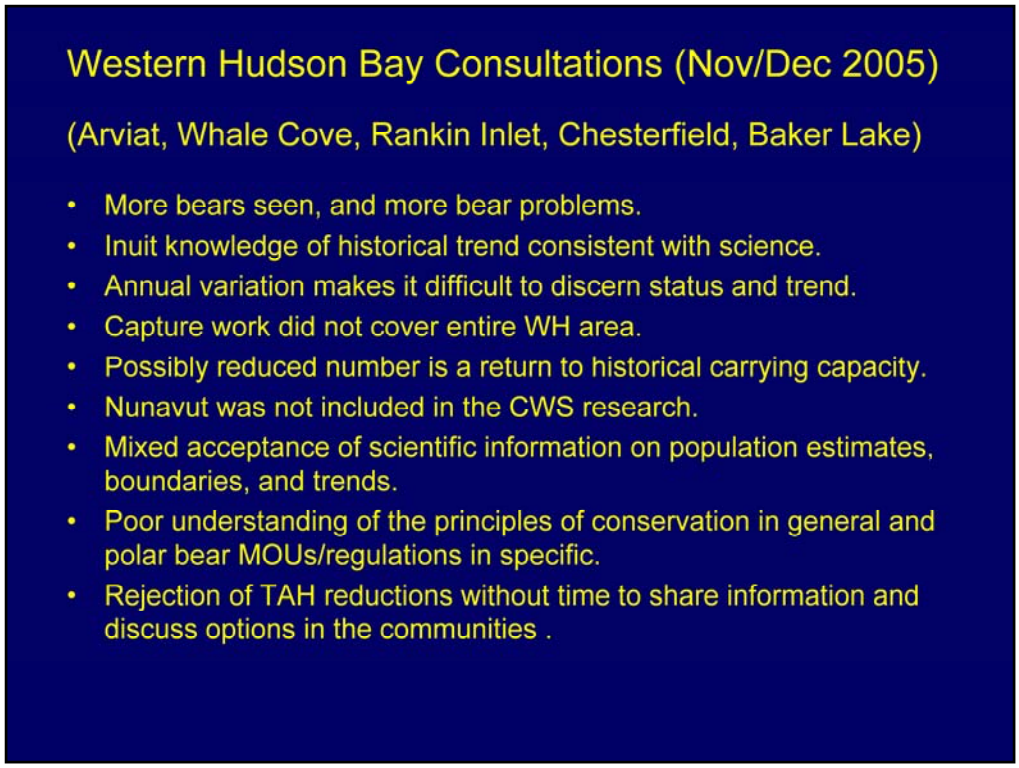
Currently the maximum sustainable removal rate is 26 per year. The current average removal rate is 47.7 per year, which is causing a decline. Manitoba removes about 8 bears per year for control activities. This leaves a sustainable harvest of about 18 Nunavut hunters.



Kivalliq residents have suggested that the CWS study is flawed because CWS capture teams did not search north of the Seal River, Manitoba. However, the ratio of marked to unmarked bears in the CWS capture sample, Manitoba control sample, and the Nunavut harvest has been about he same since 1999. This suggests the bears seen by these three groups are a single group, not three separate groups.



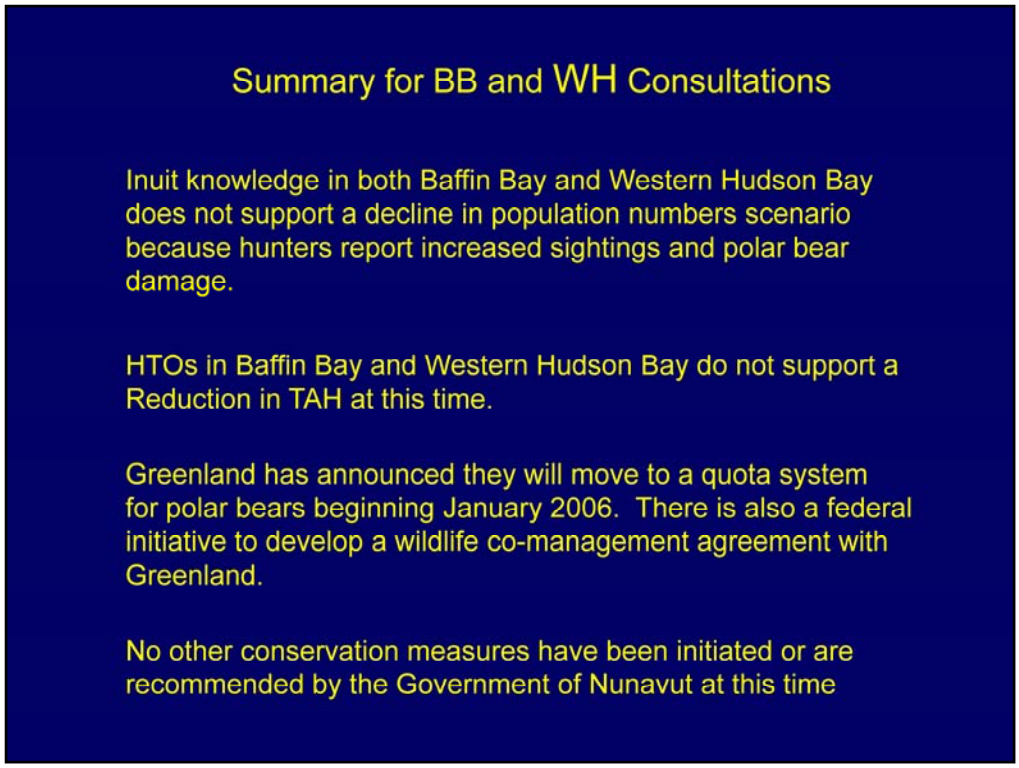
Kivalliq residents have suggested that the CWS tagging crews missed polar bears north of the Seal River, and that the population estimate could be low as a result. However, there is no significant difference in the marked to unmarked ratios seen in Manitoba (CWS captures), southern Kivalliq (Arviat-Whale Cove), or northern Kivalliq (Rankin-Chersterfield-Baker Lake). In fact, marked bears were relatively more abundant in the southern Kivalliq harvest sample suggesting that there was no reservoir of unmarked bears in the Kivalliq that were missed by CWS.



Inuit knowledge on polar bear numbers in WH was not consistent with scientific information in some respects.

WH Option	Positive	Negative
Do Nothing	Uncertain data, slow decline (~23/year at present)	Loss of credibility, reduced N, reduced TAH
Consult with Communities	Gain community support	Cost, Time, Loss of credibility, reduced N, reduced future TAH
Moratorium (as per MOU)	Strong conservation response, MOU works	Loss of TAH for 12 years, Not useful if K has declined
Reduce TAH to sustainable	Strong conservation response, NU co-management credibility	56 → 16 (90% risk level) 56 → 18 (MSY)
Phased Reduction	Appropriate conservation response, NU co-management credibility	Future generations will have reduced TAH levels
Additional Research	Resolve Science versus IQ, Inuit participation	Cost, who will do it?, delayed response, continued decline: N & TAH
Defer Decision to NWMB	1' instrument of wildlife management	NWMB usually responds to initiatives, rarely initiates independent decisions.

The following table of options was developed at the WH consultations, and the HTOs decided to they would consult with their communities before supporting any other action.



Inuit knowledge and scientific knowledge are in opposition on polar bear population trends in BB and WH. Scientific information suggests both populations are currently declining, but Inuit knowledge does not support this conclusion.

Inuit hunters also had other issues which are summarized in point form.