Healthy Polar

Bears,

Less than Healthy Science

Dr. Susan J. Crockford, Zoologist and Evolutionary Biologist Adjunct Associate Professor, University of Victoria, Canada House of Lords, London: June 11, 2014

I am a zoologist with specialties in the identification of ancient animal remains and the evolution of new species











I bring a big picture perspective to contemporary polar bear issues



Geological history of Arctic sea ice

> Paleoecology and Zoogeography







Let's start with some polar bear basics



Area of polar bear habitat = ~ extent of ice in March (max), with a few exceptions

> Polar bears are well distributed throughout their available habitat



Polar bears can, and often do, live their entire lives on the sea ice

Including giving birth

USGS



For example, S. Beaufort bears of Alaska



During the open water period, about 5% of the Southern Beaufort population comes to land.

Western Hudson Bay and other eastern areas of N.A.

Polar bears spend 3-4 months on land during the ice-free period



SOURCE: CIS DAILY AND REGIONAL ICE CHARTS / SOURCE: CARTES QUOTIDIENNES ET RÉGIONALES DES GLACES DU SCG

Barents and Greenland Sea

Some bears spend the ice-free period on land, some stay with the sea ice as it

retreats



Sea ice thickness

30 cm



Each year newly-formed ice can get 6 1/2 ft thick (2 m). Bears can use ice 4 ¹/₂ ft thick (1.4 m) for over-wintering First year ice is the best all around for polar bears

Polar Bear Prey

Ringed seal – circumpolar, most common seal but the smallest, pop. > 4 million







Atlantic

Additional prey species













Photos NOAA & Wikipedia

The fatter the seals are, the better polar bears like them





USFWS

Bears Need Spring/ Early Summer Ice!





Seal pups are born March-April; most are weaned by June, when they are about 50% fat by wt !

Pregnant female in July 1984

218 lbs 8 months before!

910 lbs

From Ramsay & Stirling 1988

Efficient fat storage allows polar bears to survive months with little or no food – regardless of the time of year

Fat male – Alaska (no date)

Arctic marine mammals have been around for a long time

- All except the polar bear have existed as we know them today for at least 2 million years
- Polar bears are quite recent arrivals to the Arctic: they evolved from a brown bear ancestor, probably between 600,000 years & 1.2 million years ago (studies vary)







Photos NOAA & Wikipedia



Polar bears have lived through several Interglacials warmer than today!

Even if speciation occurred 350,000 YA



Age of oldest fossil



Computer models predicted near extinction of polar bears under conditions virtually identical to those polar bears survived handily during the last *Interglacial* (~130-115,000 years ago), when...

There was almost no sea ice in the Arctic Basin in summer (it was "virtually ice-free")
There was less ice in the Chukchi Sea in winter than at present

Durner et al., 2009

Rate of warming since 1950 – is it really more than polar bears have ever experienced?

- The interglacial (the Holocene) that followed the Last lce Age came with very rapid warming
- Warming (winter/spring) in the Arctic (IPPC AR5) was ~3°C over the last 30 years
- * ~11,500 years ago, 5-10° of warming took place within 30 years or less (Alley 2000).
- Conclusion? Polar bears previously survived a rate of warming much greater than we have experienced since 1950



The lowest level of sea ice comes in September since 1979, satellites have monitored this change

Most parts of the Arctic are icefree in late summer for 2-4 months



Fasting is Normal for Polar Bears

- Many bears fast for 2-4 months every summer this is why efficient fat storage is so important
- Many bears also fast in the darkest &/or stormiest part of the winter when seals are hard to find
- Polar bears are known as "walking hibernators" they can reduce their metabolism while awake & active



Despite these adaptations, starvation is the most common cause of death for all polar bears (young and old alike) and probably always has been



Conservation & Protection

Some history and perspective



IUCN Polar Bear Specialist Group

Created in 1968 as a branch of IUCN

- Solution Structure Stru
- Solution Used "future threats" due to global warming to convince the IUCN to put polar bears back on the 'threatened' status list in 2006 – after they had been off it for 10 years

In 2008, US PBSG biologists used the same strategy with the US Fish & Wildlife Service



PBSG has been given the task of producing periodic assessments of polar bear population & conservation status





Ian Stirling and Andrew Derocher 2012

"Climate warming is causing unidirectional changes to annual patterns of sea ice distribution, structure, and freeze-up.

We summarize evidence that documents how loss of sea ice, the primary habitat of polar bears

(Ursus maritimus), negatively affects their long-term survival"



Diminishing sea ice is a threat to polar bears.

Polar Bear Status Updates 2013 (according to IUCN PBSG) BERING SEA SEA OF GULF OF OKHOTSK ALASKA Alaska Russia LS Canada ARCTIC BASIN MC WHB GBLS KS ED SHB Greenland Lescap BS EG DS

NORTH ATLANTIC

OCEAN

 \cap

Formerly 'stable' - still 'stable' Formerly 'declining' or 'data deficient' - now 'stable' Formerly 'increasing' - still 'increasing' Formerly 'declining' - still 'declining' Formerly 'declining' - still 'declining' (over-hunting) Formerly 'declining' - now 'data deficient' (an upgrade) Formerly 'data deficient' - still 'data deficient' Formerly 'data deficient' (never surveyed) - still no data North Pole SJ Crockford PolarBearScience May, 2014

Norway

PBSG Status update 2013

There are hidden nuances in the PBSG categories. Two of the four 'declining' populations (light blue) are declining due to suspected over-hunting, not reduced sea ice

Three of the 'data deficient' populations represent upgrades from 'declining' status (the grey dots) The assessments of the two 'declining' populations have some serious methodological issues A number of populations have out of date info

Global polar bear population estimates since 2005 have excluded almost half of all polar bear territory without explicitly saying so



PBSG Chairman Dag Vongraven told me in an unsolicited email that the global population estimate was "simply a qualified guess given to satisfy public demand."



Western Hudson Bay research

- Last capture-recapture survey was 2004.
- Data on cub survival and body condition of females used to support a 'declining' status were collected prior to 2004.
- Latest published sea ice data was for 2009.
- A recent aerial survey (2011) suggested the population has not continued to decline as predicted but rather, has been stable since 2004.
- New capture-recapture data has been collected since 2004, supposedly supporting the claims of continued decline but none of it has been published, even in preliminary form.





S. Beaufort Sea study 2004-2006

 Found a small, statistically insignificant decline in population size.

Did not take into account the known movement of polar bears between this region and the Chukchi Sea to the west and Northern Beaufort to the east. This flaw, which the PBSG only recently admitted (2013) was significant & potentially invalidates the results. This study was used to support the change in conservation status in the USA from "least concern" to 'threatened."



Red herring in the Southern Beaufort Sea

- Every 10 years or so, the sea ice off Alaska gets too thick for ringed seals in the spring.
- When this happens, many of the seals (and many bears) move into the Chukchi Sea.
- Without baby seals to eat, some mothers with new cubs can't find food and their cubs starve.
- Documented for 1974, 1984, 1992, and 2004.
- The last survey of polar bears in the Southern Beaufort (and a population count) coincided with years of heavy spring ice (2004-2006)

Condition of Southern Beaufort bears

- Poor condition of a few bears, in recent years, has been used to suggest that global warming is harming this population.
- * Thick spring ice conditions in 2004-2006 were blamed on the ice being "thin" and "easily deformed" (Durner et al. 2009), even though the worst known example of this recurring phenomenon occurred in 1974 – well before sea ice declines were an issue.
- Polar bear biologists seem to be trying to rewrite history they now find inconvenient – hoping no one will check the older literature.





Chukchi Sea study 2008-2011

Bears were in excellent condition (fat). They were reproducing well. There were lots of seals, also reproducing well. These are usually indicators of a stable or an increasing population. However, the PBSG changed its status in 2013 from "declining" to "data deficient"



Computer models used to predict the future of polar bear populations over the next century have assumed these two regions (the Chukchi Sea and the Southern Beaufort) – purple areas in above map – will respond similarly to declining summer sea ice.

Less than healthy science - summary

- Biologists have failed to publish data on W. Hudson Bay studies used to support a contention of continued harm – no new info since 2004 or before.
- Biologists continue to insist that levels of late summer/fall sea ice are crucial for polar bears when it is well known that spring/early summer is the critical period for feeding.
- Biologists have disregarded past episodes of heavy spring ice documented in the Eastern Beaufort and associated high mortality due to starvation and blamed the most recent episode (2004-2006) on "thin ice" due to global warming.
- Biologists have minimized the good news (& what it means) regarding the status of Chukchi Sea bears.



The perceived "threat" to polar bear populations is based on computer models of future conditions – and recent studies refute many of the assumptions used in those models.



My blog: www.polarbearscience.com

Thanks for your attention