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This scene, photographed in August near Hudson Bay, may look idyllic, but the polar bear is halfway through a six-month fast. It can't hunt seals until the sea-ice reforms. Longer ice-free summers in the Arctic would extend the fasting season, so could have dire consequences for the species.

BEAR NECESSITY

Few animals divide conservationists, scientists and politicians as much as the polar bear. Is it doomed or doing fine? **JAMES FAIR** discovers that one thing will determine the future of this Arctic icon – ice.





It's August 2063, and pilot Bob Randall of the Arctic Bear Protection Force (ABPF) is preparing for a flight. Loaded onto his helicopter is 12,000kg of bear chow, which he's transporting from Iqaluit in the Canadian High Arctic province of Nunavut to the wild east coast of Baffin Island. There it will be dumped to feed an estimated 100 polar bears that became stranded in February when the sea-ice broke up – the earliest date on record – and are now beginning to starve.

Other ABPF pilots are getting ready for similar trips to other parts of the High Arctic. This co-ordinated response, drawn up by the last two remaining polar bear range countries of Canada and Greenland, is now a well-drilled routine. The idea of such 'supplementary feeding' is to help the world's remaining 2,500 or so polar bears manage the increasingly long ice-free periods until they can access their favourite food again, mainly harp seals these days, from the platform of the floating ice.

THE BEAR FACTS – OR HOT AIR?

Some people will probably view this hypothetical scenario with alarm – is it really possible that, in 50 years' time, the largest carnivore on Earth will be able to survive only with the intervention of humans? Others may consider it optimistic – we'll be lucky if there are any meaningful populations of polar bears left in the wild in five decades. And some will consider it irresponsible propaganda and little more than the product of the hysterical imaginations of climate scientists.

Whatever your view, the problem can no longer be ignored. In February, experts said that feeding polar bears may be necessary in future. In the journal *Conservation Letters*, the world's top polar bear scientists set out what the authorities could do if bears start to starve (see Agenda, p39). Geoff York, of WWF's Global Arctic Programme and a co-author of the paper, explains that they have spoken out because the bears' range countries are unprepared for the future.

"The authorities aren't ready for what happens when 100 bears in poor condition show up on their coastlines," he tells me. "What are they going to do? Feed them? Take other action? Or will they just do nothing?" The paper even suggests that "controlled reduction" of the population, or taking individuals into a zoo, could be the most humane ways to deal with the problem.

In the meantime, WWF has begun a campaign, called Arctic Home, to raise awareness about the threat of climate change to polar bears and undertake research. One key step includes identifying (with the help of local people) the areas where it is believed that sea-ice will persist for the greatest length of time, and to make sure that exploitation of natural resources does not make them uninhabitable.

"Some of [the best areas for sea-ice in] the High Arctic are likely to hold considerable reserves of natural gas," York says. "We are trying to get in early and make sure that management regimes are in place that

A bear feasts on a seal kill on an ice floe off the coast of Svalbard. Polar bears depend on sea-ice to catch these blubbery mammals, their favourite prey.

IS IT POSSIBLE THAT IN 50 YEARS, EARTH'S LARGEST CARNIVORE WILL SURVIVE ONLY WITH OUR HELP?



Polar bear tours boost the economy of remote areas such as Svalbard and Churchill on Hudson Bay, which might otherwise attract few tourists.

Top: Ole Jørgen Løkken/naturepl.com; right: Andy Rouse

allow development but avoid degrading the environment for ice-dependent species.” WWF also wants to fill in data gaps, so that we have a more complete picture of where polar bears live and in what numbers – areas such as the Arctic Basin and parts of the Russian coast are classed as ‘Zero’ simply because nothing is known about them.

THE ICE AND SEA BEAR

In many ways, the polar bear is badly named. It is found as far south as James Bay, the southernmost finger of Hudson Bay that’s at the same latitude as London and well outside the Arctic Circle, and on Newfoundland, too. Last year, a bear was shot in Greenspond on the east coast of Newfoundland – on the same latitude as Paris. This bear was part of a healthy sub-population of south-east Canada that numbers an estimated 2,200 individuals.

The polar bear’s scientific name – *Ursus maritimus*, or sea bear – is much more appropriate; its Norwegian name – *isbjørn*, or ice bear – is better still. Above all, this species relies on ice to find its prey. Seals – mostly ringed, but also bearded, harp and hooded – are its main targets, and they are caught in a variety of ways: waiting by their breathing holes; stalking them across ice; swimming up to them on ice floes; and sniffing out the pups lying in snug lairs beneath the ice. Think of the polar bear in these terms and everything else makes sense.

Remember, too, what is easily forgotten: polar bears have been a huge conservation success story of the past 40 years. During much of the 20th century, commercial and sport hunting grew to unsustainable levels; by the 1950s, trophy hunters were tracking down bears in small planes off Alaska or shooting them from boats in Svalbard. One gruesome invention was the ‘set gun’, in which a high-powered rifle was mounted within a wooden frame and attached to a bait – when a bear investigated the food, the gun fired and the bear shot itself.

By the early 1970s, the number of polar bears worldwide had probably fallen to 10,000–15,000 animals (possibly fewer), a situation sufficiently alarming to warrant action from the range states: Canada, Denmark (which in those days negotiated on behalf of Greenland), Norway, the USA and the USSR. The international treaty they all signed up to did not ban the killing of bears, but it regulated hunting sufficiently so that, four decades later, the population has swelled to 20,000–25,000.

Over the same period, other large carnivores – such as tigers and lions – have fared considerably less well. The polar bear, it is said, is the only large carnivore still found throughout its historic range.

But the species’ dependence on sea-ice makes its conservation a political hot potato. It is the poster child



Though polar bears can feed on small animals, birds’ eggs and carrion, their survival ultimately depends on marine mammals such as seals. Here, a subadult bear climbs a cliff in the Russian High Arctic to eat guillemot eggs.

CHANGING FORTUNES

1600s

Europeans arrive in the Arctic in search of new natural resources to exploit, and the first commercial hunting of polar bears begins.

EARLY 1890s

Polar bear hunting gets serious – largely perpetrated by whaling fleets. It has been estimated that, between 1890 and 1935, 15,500 polar bear hides were traded in Hudson Bay alone.



Bear hunters confront their quarry in the 19th century.

1950s

Numbers of bears killed keep rising, as sport and trophy hunting come to the fore. By 1960, hunters are taking 700 bears a year; by 1970, the figure is an estimated 1,400 a year.

1965

Scientists meet in Alaska for the first polar bear conference. Their estimates of bear numbers vary: the Soviets say “up to 8,000”, Americans “over 10,000” and Canadians “more than 20,000”.

1966–67

Pursuit of polar bears enters a new phase: the capturing and marking of animals to gather data. Scientists realise that bears live in discrete sub-populations.



Norway finally bans ‘set gun’ polar bear traps in 1970.

1970

The IUCN’s newly formed Polar Bear Specialist Group meets for the first time. Delegates express concern that harvesting of bears might be too great in areas such as Alaska and Svalbard.



Polar bears are strong swimmers and can travel long distances, but they use up valuable energy doing so. Cubs are believed to have drowned while swimming with their mothers.

of campaigns to raise awareness about the detrimental impacts of climate change, because many of the most evident effects of global warming are being observed in the species’ Arctic home.

NUMBER CRUNCHING

Climate science is, of course, disputed by some politicians, campaigners and a small number of scientists, many of whom jump on figures that suggest polar bear numbers are relatively healthy. One headline on a US website called the *Daily Caller* declares: ‘An inconvenient truth: More polar bears alive today than 40 years ago’. The writer Zac Unger, author of *Never Look a Polar Bear in the Eye*, wrote in a magazine article: “Having assumed that polar bears were one missed meal away from extinction, I was surprised to find that worldwide population numbers were confusing and controversial.”

But Unger’s statement is either disingenuous or naive. No polar bear scientist has predicted the species’ demise

within even the next 50 or 60 years, and most would concur that a diminishing number of bears will make it to the end of this century.

The consensus appears to be that the impacts of climate change are starting to affect certain populations adversely. Take one of the best-studied populations of all, in Western Hudson Bay. A frequently quoted statistic is that numbers here dropped by 22 per cent between 1987 and 2004, from about 1,200 to 935 individuals. (For other research showing the impact of climate change on polar bears, see box *opposite*.)

If, as the data suggests, sea-ice in the Bay is breaking up earlier in the year than 30 years ago, then to a polar bear scientist it is obvious that the animals will have less time to gorge on seals before they are confined to land and must lead a hungry existence until the ice reforms once more.

THE POLAR BEAR IS THE ONLY LARGE CARNIVORE STILL FOUND THROUGHOUT ITS HISTORIC RANGE.

CLIMATE IMPACTS

How changing conditions are affecting polar bears.

THE BAD NEWS

Of the world’s 19 polar bear sub-populations, just one is increasing. Of the rest, eight are declining, three are stable and we don’t know about the other seven.

In western parts of Hudson Bay, the average mass of solitary adult female polar bears declined from 290kg in 1980 to 230kg in 2004 – any female weighing below 189kg is unlikely to breed.

A survey of Western Hudson Bay’s polar bears in 2011 found very low proportions of cubs (7 per cent) and one-year-old bears (3 per cent). Researchers say this suggests that cub survival rates are poor.

Polar bears are having to swim greater distances

because the sea-ice is breaking up earlier in the year, and this exacts a greater energy toll on them. Between 2004 and 2009, 50 swims of between 54km and 687km were recorded.

A bear spotted by an Inuit hunter in 2010 was recorded as the first-ever second-generation polar-grizzly cross. Scientists say that climate change is allowing grizzlies to move north, causing interbreeding.

AND THE GOOD NEWS

The 2011 survey of the Western Hudson Bay bears estimated the population at about 1,000 animals, roughly equal to numbers recorded in 2004, suggesting there has been no decline in that time.

From top: Daniel J. Coe/NaturalExposures.com; Thorsten Milse; Ole Jørgen Løkken



Polar bears have always lived in fluctuating conditions that affect breeding success and survival. Heavy ice faced by two sub-populations in the mid-1970s and mid-1980s “caused significant declines... in the natality of polar bears and survival of subadults, but the population recovered quickly when conditions improved again”, according to expert Ian Stirling.

Productivity of female bears is critical to the species’ prospects.



Researchers weigh a tranquilised bear cub from the Beaufort Sea sub-population off the northern coast of Alaska.

“The magic number is about 180 days,” York tells me. “If the bears are onshore, away from their favoured habitat, for longer than this, you will see reduced adult survival and reproductive failure.” Put another way, polar bears can survive six months without their preferred food, but not much longer.

GOING HUNGRY

Polar bears are resourceful, intelligent and adaptable animals. So, couldn’t the individuals stranded on land switch to other sources of food as the ice-free periods lengthen in a warmer future? Sadly, no. Some bears do supplement their main diet by feeding on whale carcasses, other large mammals and even birds’ eggs, but this will not help at a population level.

I call Ian Stirling, author of *Polar Bears: The Natural History of a Threatened Species*, which is often referred to as the bear ‘bible’. “Polar bears might occasionally kill a reindeer on Svalbard, or scavenge from a carcass,” he says, “but serious scientists don’t think this changes anything.” ►

CHANGING FORTUNES

1973

‘Agreement on the Conservation of Polar Bears’ is signed in Oslo. Hunting is regulated, but indigenous peoples retain the right to a harvest by traditional means, which continues today.



Churchill calls itself ‘polar bear capital’ of the world.

1980s

Polar bear tourism begins in the tiny Canadian town of Churchill, on the west coast of Hudson Bay in the province of Manitoba.

1999

The Canadian Wildlife Service says Hudson Bay sea-ice breaks up three weeks earlier than in 1979. Their report is one of the first to warn that climate change could affect polar bears.

2007

A US Geological Survey team concludes that the number of polar bears will fall by two-thirds worldwide by 2050 if greenhouse gas emissions continue at the same rate.

2008

The US Fish and Wildlife Service lists the polar bear as Threatened under the USA’s Endangered Species Act.



The longest recorded polar bear swim lasted 232 hours.

2008

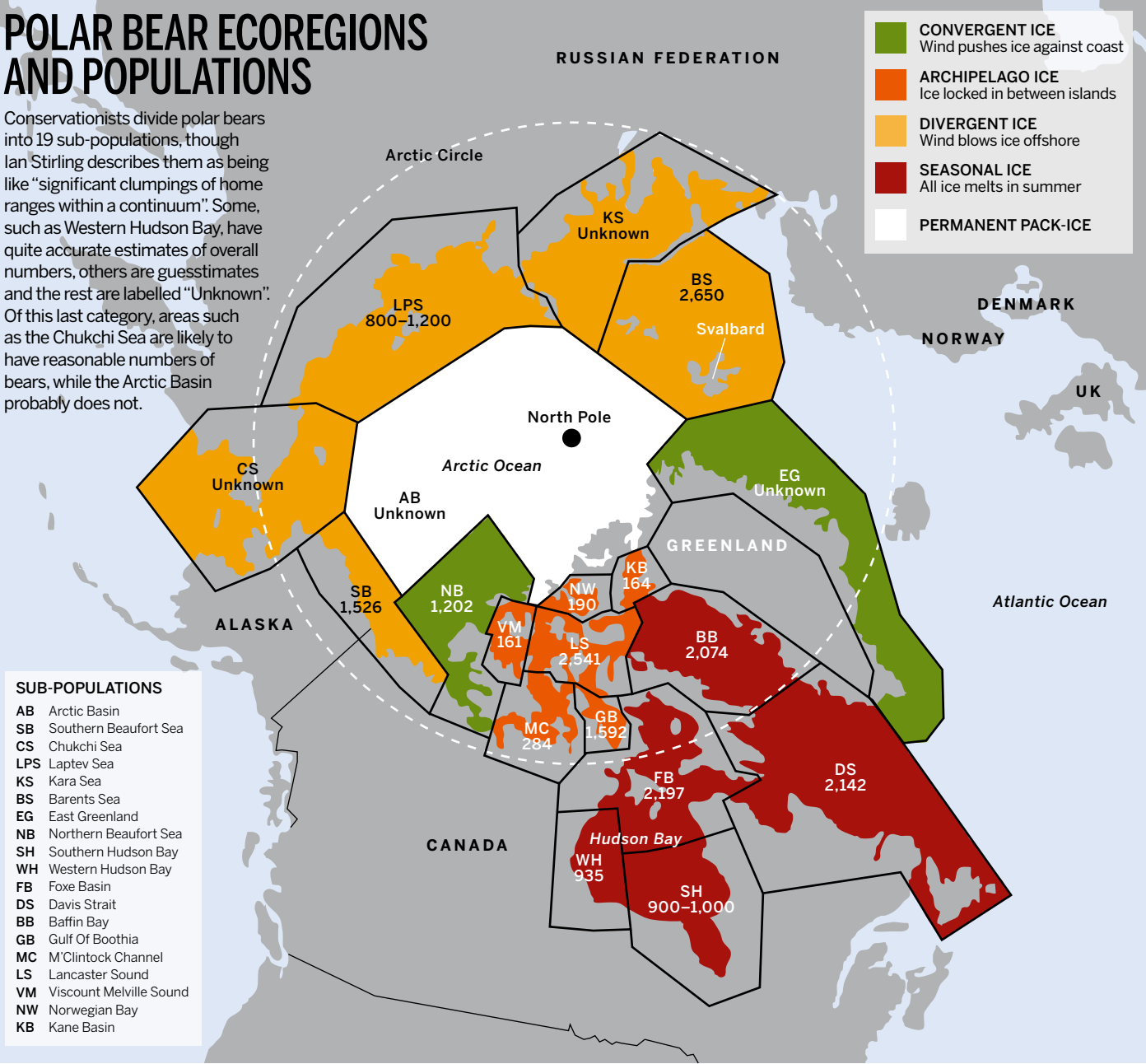
As concerns grow over melting sea-ice, a radio-collared female bear makes a non-stop 687km swim in the Beaufort Sea.

2013

A proposal by the Russian and US governments to upgrade the polar bear’s listing to Appendix I on the Convention on International Trade in Endangered Species is rejected.

POLAR BEAR ECOREGIONS AND POPULATIONS

Conservationists divide polar bears into 19 sub-populations, though Ian Stirling describes them as being like “significant clumpings of home ranges within a continuum”. Some, such as Western Hudson Bay, have quite accurate estimates of overall numbers, others are guesstimates and the rest are labelled “Unknown”. Of this last category, areas such as the Chukchi Sea are likely to have reasonable numbers of bears, while the Arctic Basin probably does not.



Other suggestions that polar bears could start eating fruit, like brown bears, are given equally short shrift. “Polar bears are big animals and they got that way by eating seals, not berries,” Stirling wrote in one co-authored report.

Which leads us neatly back to the ice (with polar bears, everything does). Another argument adopted by those who feel that the threats are overplayed is that their range will move north as the climate warms. Indeed, Steven Amstrup of Polar Bears International accepts that some northern populations may even benefit from warming conditions.

“We have data going back decades that shows that, where the ice is thinner and more sunlight gets through, this stimulates greater marine productivity,” Amstrup tells me. So a warming world might cause an increase in seal numbers and thus of polar bears in some areas.

Ultimately, though, this thesis is flawed, Amstrup explains. First, as these ‘improved conditions’ migrate north, they will eventually reach the Arctic Basin. Here,

the deep seas are not as productive as the shallow continental shelf, and this will cancel out the benefit of higher temperatures and seal numbers. (This is the reason why polar bears are most numerous on seasonal sea-ice surrounding land, as opposed to the permanent pack-ice of the far north.) Second, if temperatures continue to rise, bears will be unable to move any further north.

The survival of the species depends on us taking action to curb greenhouse gas emissions to save its Arctic home. The polar bear has survived other warming periods, but only 1°C above current temperatures.

Sceptics argue that, whatever climate models appear to show, we cannot predict what will happen. Susan Crockford, a zoologist attached to the University

GEOFF YORK OF WWF SAYS THAT POLAR BEARS WILL HANG ON IN REFUGES SUCH AS THE HIGH ARCTIC.

Map adapted from Polar Bears by Ian Stirling (Bloomsbury, 2012); top: Oscar Westman; bottom: Steven Kazlowski/naturepl.com



Polar bears have enormous home ranges that dwarf those of all other bear species. A few hundred square kilometres is typical.



of Victoria in British Columbia, writes a blog arguing that concern about polar bears is crystal-ball gazing. “Survival of polar bears over 100,000 years (at least) of highly variable sea-ice coverage indicates that those biologists who portend a doomed future for the polar bear have underestimated its ability to survive,” she has claimed. But Crockford has not carried out her own research into climate and polar bears.

ANECDOTAL EVIDENCE

To get a different, not purely scientific, perspective on this issue, I contact Martin Gray, a former Arctic guide who spent 15 summers in Svalbard and Greenland from 1994 to 2008. When he first arrived it was unheard-of for polar bears to eat reindeer, but in the late 1990s Gray started coming across carcasses that had been killed or scavenged by bears. “We often found them in areas that would have been good for an ambush,” he tells me. “Was this the bears’ response to the stress of the sea-ice melting early?”

On another occasion, Gray says, he encountered a dead sperm whale with 17 bears feeding on it. This prompts an odd discussion – can it ever be ethical to kill whales in order to save polar bears, we wonder?

Geoff York of WWF has a more hopeful scenario. He reckons that polar bears will hang on in sufficient numbers in a few refuges – most likely the High Arctic, plus perhaps Svalbard and Russia’s Wrangel Island – while the supertanker that is climate change is slowly turned around. We would all settle for that, I suppose – with or without the helicoptered bear chow. 🐻

FIND OUT MORE

For more information, visit:
www.polarbearsinternational.org
www.arctichome.com
www.npolar.no/en
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