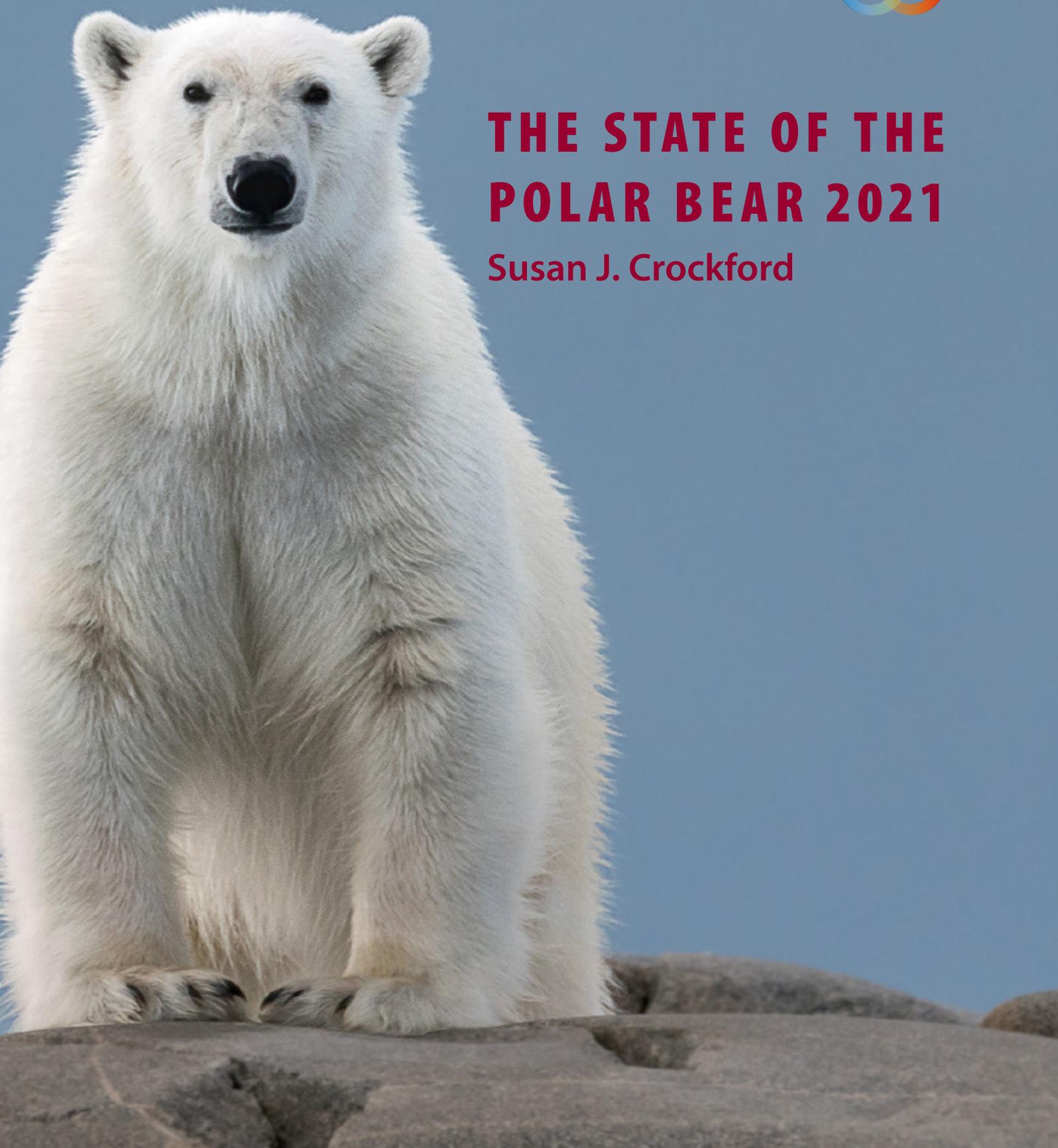




# **THE STATE OF THE POLAR BEAR 2021**

**Susan J. Crockford**



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## About the author

Dr Susan Crockford is an evolutionary biologist and has been working for more than 40 years in archaeozoology, paleozoology and forensic zoology. She is a former adjunct professor at the University of Victoria, British Columbia and works full time for a private consulting company she co-owns (Pacific Identifications Inc). She is the author of *Rhythms of Life: Thyroid Hormone and the Origin of Species*, *Eaten: A Novel* (a polar bear attack thriller), *Polar Bear Facts and Myths* (for ages seven and up, also available in French, German, Dutch, and Norwegian), *Polar Bears Have Big Feet* (for preschoolers), and the fully referenced *Polar Bears: Outstanding Survivors of Climate Change* and *The Polar Bear Catastrophe That Never Happened*, as well as a scientific paper on polar bear conservation status and a peer-reviewed paper on the distribution of ancient polar bear remains.<sup>1</sup> She has authored several earlier briefing papers, reports, and videos for GWPF on polar bear and walrus ecology and conservation. Susan Crockford blogs at [www.polarbearsience.com](http://www.polarbearsience.com).



## Foreword

Every four years or so from 1972 until 2010,<sup>2</sup> the Polar Bear Specialist Group (PBSG) of the International Union for Conservation of Nature (IUCN) published comprehensive status reports, as proceedings of their official meetings, making them available in electronic format. After that, until 2018 – a full eight years after its last report – the PBSG disseminated information only on its website, updating status tables (without announcement) at its discretion. In April 2018, the PBSG finally produced a standalone proceedings document, based on its 2016 meeting,<sup>3</sup> although most people would have been unaware that it existed unless they visited the PBSG website. Two other status reports were issued, in 2019 and 2021. However, a reorganisation of the PBSG website in 2021 removed the archive of previous meeting reports, tables, and status documents, including the 2016 and 2019 reports.<sup>4</sup>

This *State of the Polar Bear Report* is intended to provide a brief update of the kind of content available in those occasional PBSG documents, albeit with more critical commentary on the inconsistencies and sources of bias in the literature. It sets out the most recent state of polar bears in the Arctic, relative to historical records, and is based on a review of the 2021 scientific literature and media reports. It is intended for a wide audience, including scientists, teachers, students, decision-makers and the general public interested in polar bears and Arctic ecology.

## Executive summary

- Recent survey results suggest the global polar bear population is at least 32,000, although the estimate has a wide range of potential error.
- Results from the 2017–2018 survey of the Davis Strait subpopulation indicated numbers stable at about 2,015 (range 1,603–2,588), but bears were fatter than in 2005–2007, with good cub survival.
- An aerial survey of the Chukchi Sea in 2016 generated a population estimate of 5,444 (range 3,636–8,152), about 2,500 greater than a previous survey, plausibly reflecting the excellent conditions for polar bears in this area.
- Reports that polar bears seem to be moving from Alaska to Russia in a ‘mass exodus’ may describe a real phenomenon that reflects the excellent feeding conditions for bears in the Chukchi Sea compared to Alaska, fueled by continued increases in primary productivity across the Arctic.
- Spring research in Svalbard, Norway in 2021 showed the body condition of male polar bears was stable, and that litter size of family groups was the same as it had been in 1994, but lower than 2019.
- A new paper reported that more polar bears in Svalbard seem to be killing and eating reindeer during the summer than they did during the 1970s, but the phenomenon was not exclusively tied to reduced sea ice.
- Markus Dyck, a renowned Canadian polar bear biologist, died tragically 25 April 2021 in a helicopter crash near Resolute Bay, along with two crew members, while undertaking a survey of the Lancaster Sound subpopulation for the government of Nunavut.
- There were three serious attacks by polar bears on people in 2021: in Foxe Basin (Canada) in August, Svalbard (Norway) in March, and northeast Greenland in August. There were no fatalities.





## **1. Introduction**

There were no reports from anywhere around the Arctic in 2021 that would suggest polar bears are suffering as a result of reduced sea-ice extent: no starving bears, no drowning bears, no acts of cannibalism, and no marked increases in bear conflicts with humans. Indeed, contrary to expectations, studies have shown that polar bears in several regions have been doing better with less summer ice, either because multiyear ice has been replaced with more productive seasonal ice, or because the increased primary productivity that has come with longer open-water seasons and thinner sea ice has been a net benefit.

## **2. Conservation status**

Polar bears currently have a relatively large population size and their historical range has not diminished due to habitat loss since 1979. The International Union for Conservation of Nature (IUCN), in their 2015 Red List assessment, again listed the polar bears as 'vulnerable' to extinction, just as it did in 2006.<sup>5</sup> Similarly, in 2016, the US Fish and Wildlife Service upheld its 2008 conclusion that polar bears were 'threatened' with extinction under the US Endangered Species Act (ESA).<sup>6</sup> In both of these instances, polar bear conservation status was based on computer-modelled future declines, not observed ones.

In contrast to the IUCN and the ESA, in 2018 the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) decided to continue to list the polar bear as a species of 'Special Concern', as it has done since 1991, rather than upgrade the status to 'Threatened'.<sup>7</sup> Since roughly two thirds of the world's thriving polar bear population lives in Canada, the recent COSEWIC decision means that most of the species is still managed with an overall attitude of cautious optimism. None of these official assessments changed in 2021.

## **3. Population size at 2021**

### **Global**

Since its inception in 1968, the PBSG has produced a number of estimates of the global polar bear population. The first, in 1981, of about 16,755–26,798, was based on very little survey data.<sup>8</sup> By 1993, there was more reliable data and the PBSG estimated polar bear abundance at about 21,470–28,370 (rounded to 22,000–27,000 in 1997).<sup>9</sup> This number was 'adjusted' to 21,000–25,000 in 2001, and 'further simplified' to 20,000–25,000 in 2005; the apparent decline since 1993 arises from the fact that some estimates used prior to 2001 were deemed to be not scientific enough, and were dropped from the totals.<sup>10</sup> In 2005, the US Geological Survey estimated the global population of polar bears at 24,500, based on PBSG data.<sup>11</sup> In 2014, the PBSG estimate was listed as 'approximately 25,000' (no range was given). The latest estimate, from July

2021, is the IUCN estimate of 26,000 (range 22,000–31,000) from 2015, unadjusted since then.<sup>12</sup>

Survey results postdating preparation of the 2015 assessment, including those made public in 2021 (for Davis Strait and the Chukchi Sea), plausibly brought the mid-point total to at least 32,000 (Figure 1). Survey results from Lancaster Sound, Western Hudson Bay, and Viscount Melville (results not yet made public) may put that global mid-point estimate well above 32,000.<sup>13</sup> While there is a wide margin of potential error attached to this figure, it is a far cry from the figure of 7,493 (6,660–8,325) to which the population was supposed to be reduced<sup>14</sup> given the sea ice conditions prevailing since 2007.<sup>15</sup>

### **Subpopulation survey results published in 2021**

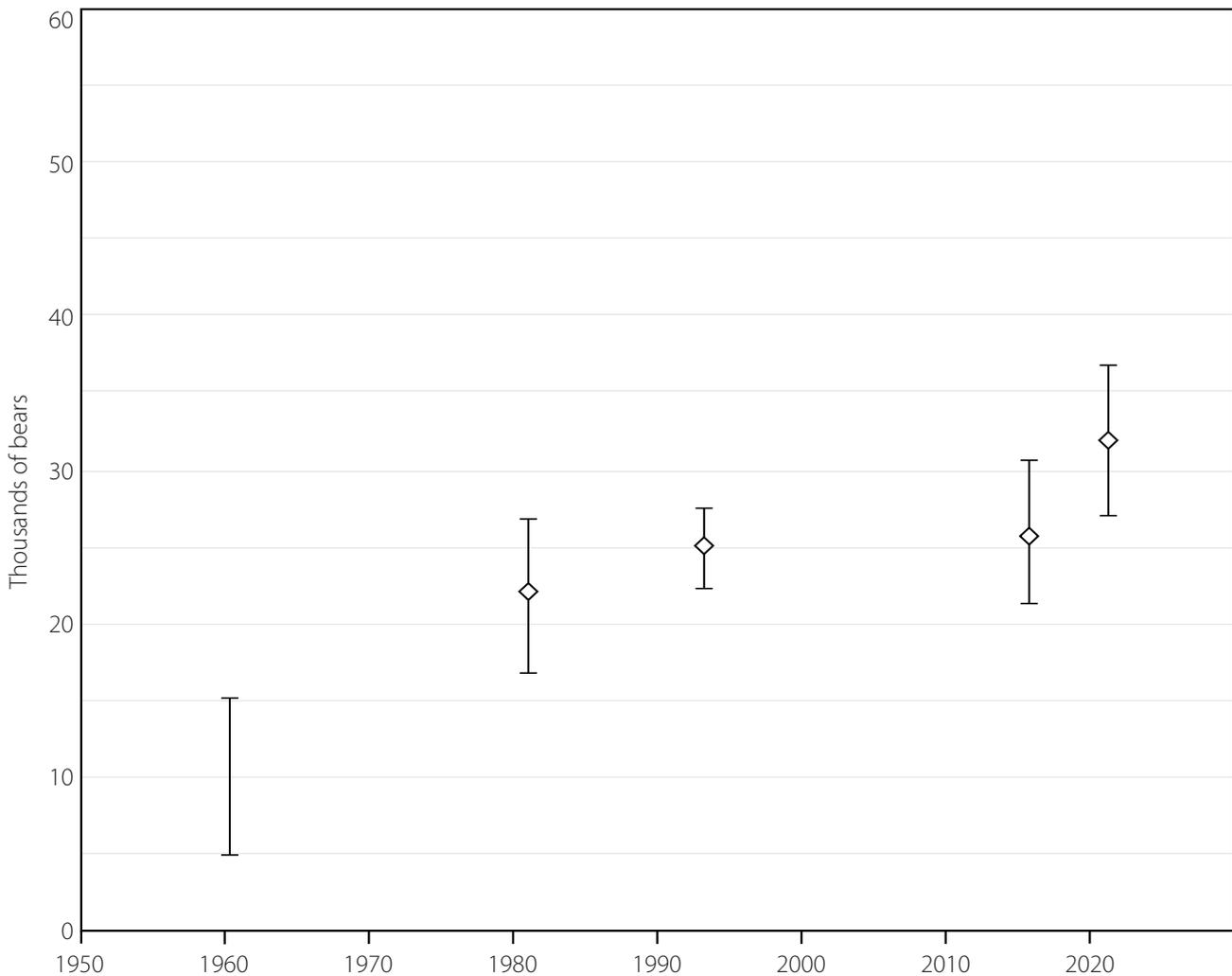
For a detailed discussion of the status of all 19 subpopulations, see last year's *State of the Polar Bear Report*.<sup>16</sup> Note that the 2021 IUCN/SSC PBSG Status Report discussions of individual subpopulations (like their 2016 and 2019 reports) did not include the Kara Sea estimate of 3,200 bears or the Laptev Sea estimate of 1,000 bears that were used expediently for the 2015 IUCN assessment.<sup>17</sup> It also used the lowest of three available 2016 estimates for the Chukchi Sea, as discussed below.<sup>18</sup>

#### ***Davis Strait***

Estimates of the Davis Strait (DS) subpopulation have been repeatedly revised upwards: from 726 in the 1970s to 2,158 (range 1,833–2,542) after a comprehensive survey in 2007.<sup>19</sup> Subsequent growth in the harp seal population provided the potential for a further increase in polar bear numbers.<sup>20</sup> A short preview of the results from the latest 2017–2018 survey (the full report has been completed but not yet made public) revealed that the population has remained stable. The 2018 estimate was 2,015 bears (range 1,603–2,588), statistically indistinguishable from the 2007 estimate. However, bears were found to have been fatter than they had been in 2007, with good cub survival despite a relatively small average litter size of 1.42.<sup>21</sup> In 2021, the PBSG listed DS bears as 'data deficient' rather than stable, but this did not take into account the 2021 survey results.<sup>22</sup>

#### ***Chukchi Sea***

Considered 'declining' by the PBSG in 2009, based on existing and projected sea ice losses,<sup>23</sup> that assessment of the Chukchi Sea population changed to 'data deficient' in 2013 and to 'unknown' in 2014–17.<sup>24</sup> However, because a number was required for predictive computer models, the long out-of-date estimate of 2,000 was used for the 2015 Red List assessment.<sup>25</sup> Subsequently, a multi-year (2008–2016) capture-recapture survey of bears in a small area of the US portion generated a population size of about 2,937 (range 1522–5944) when extrapolated to the entire region, making it the largest subpopulation in the Arctic.<sup>26</sup> Larger-than-average family groups were also found,<sup>27</sup> corroborating previous studies indicating that CS bears were in good condition and reproducing very well.<sup>28</sup>



**Figure 1: Estimates of the global polar bear population, 1960 to date.**

The 1981, 1993, and 2015 estimates are from the IUCN PBSG, 1960 from Crockford 2019 (pp. 102–105) and Anonymous 1966 (p. 11), and the 2021 estimate is from this report.

However, an aerial survey conducted by a joint Russian/American team in 2016 generated two abundance estimates: 3,435 (range 2,300–5,131) – which unreasonably assumed no bears had been missed – and 5,444 (range 3,636–8,152), which assumed some bears were missed. The minimum estimate of 3,435 is slightly greater than the mark-recapture estimate, but even the larger estimate of 5,444 is within its potential error range.<sup>29</sup> Given evidence that the region is providing abundant food and that bears are reproducing extremely well (including a recent increase in numbers of bears counted on Wrangel Island, the region’s main terrestrial denning area),<sup>30</sup> the larger estimate seems more plausible as an average for this subpopulation, although the authors of the report did not draw that conclusion. In 2021, the PBSG listed the CS subpopulation as ‘likely stable’ (citing the lowest estimate of 2,937), but this may be an overly pessimistic assessment: it seems to give little weight to evidence that reproduction and survival rates of polar bears in the region are more like those seen in a growing population.<sup>31</sup>

## 4. Population trends

In 2021, the PBSG posted an updated assessment that takes the lowest estimate available for the Chukchi Sea and ignores figures used in the 2015 IUCN assessment for the Kara Sea and Laptev Sea. Figure 2 shows a more realistic representation of current polar bear population trends based on all available information (survey results, as well as studies on health and habitat status, published up to 31 December 2021), which gives the following classification totals at 2021:<sup>32</sup>

- three 'increasing' or 'likely increasing'
- four 'stable' or 'likely stable'
- eleven 'presumed stable or increasing'.

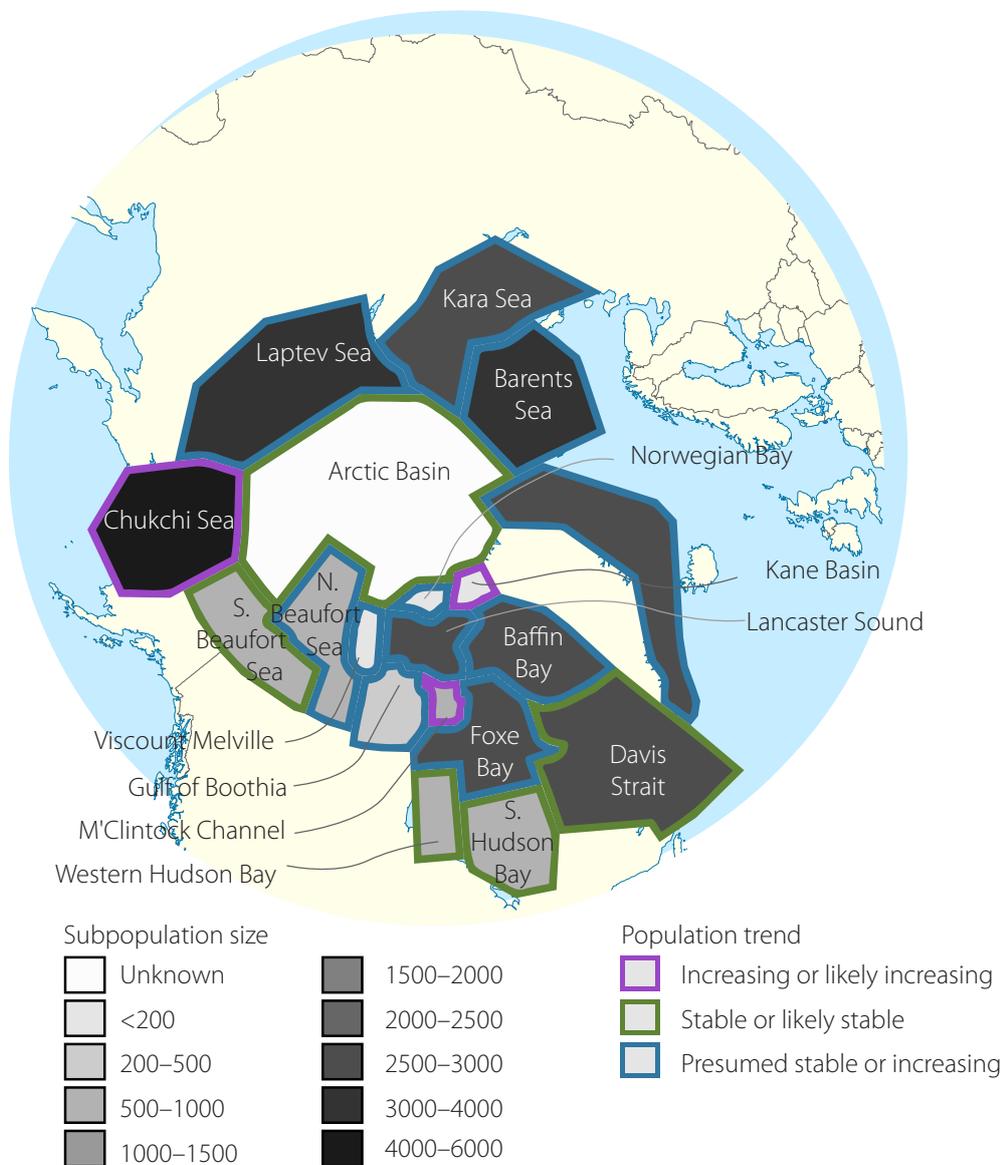


Figure 2: Trends in polar bear subpopulations at 2021.

Number of bears per subpopulation. Former 'data deficient' regions are marked 'likely stable or increasing' to reflect current research on studied populations.

## 5. Habitat status

### Global sea ice

Summer sea-ice extent (at September) has declined markedly since 1979, but winter ice (at March) has declined very little. Moreover, there has been essentially no trend in March sea-ice coverage since 2004, and no trend in summer ice since 2007 (Figure 3).<sup>33</sup> As a consequence of continued low summer sea-ice extent and reduced ice thickness (which allows beneficial under-ice phytoplankton blooms in summer), primary productivity has continued to climb.<sup>34</sup>

### Breakup and freeze-up in Hudson Bay

Breakup of sea ice along Western and Southern Hudson Bay came earlier than it has done for the last few years, with a few bears coming onshore in late June, but the majority in early July. Most bears appeared to be in good condition. In the fall, freeze-up was quite late (early December), but there were no reports of starving bears or an increase in human-bear interactions.<sup>35</sup>

Breakup and freeze-up dates since 2015 have yet to be incorporated into the scientific literature.<sup>36</sup> However, a 2021 report on a broad expanse of very thick (18-m) ice along the west coast of southern Hudson Bay and James Bay in 2018 provides a possible explanation for why these areas of Hudson Bay are usually the last to melt every year, sometimes surviving into August.<sup>37</sup> See last year's report for a summary of recent conditions, which shows that, since 1998, the time polar bears in the Western and Southern regions of Hudson Bay spend onshore has not increased, as was predicted.<sup>38</sup>

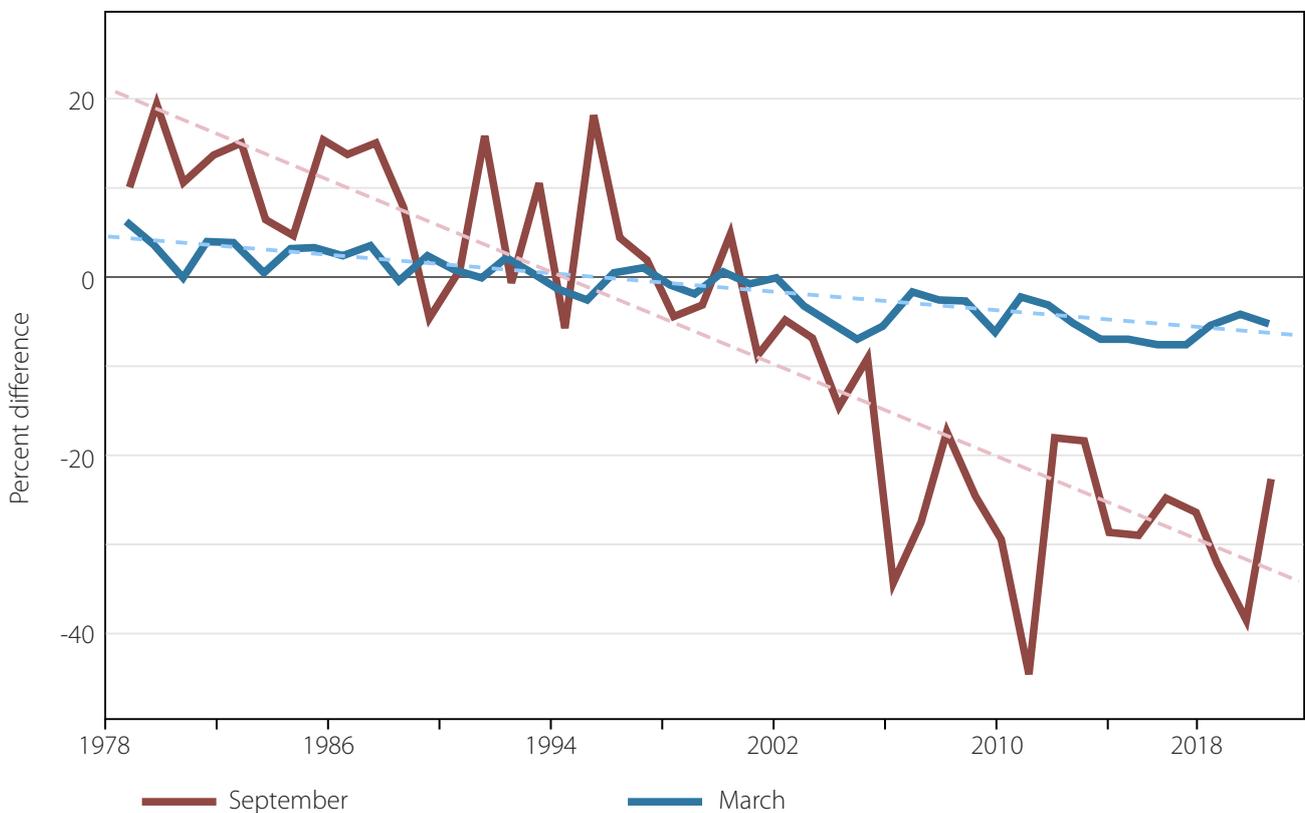


Figure 3: Sea ice extents, 1979–2021.

## 6. Prey base

Ringed and bearded seals, and particularly their pups, are the primary prey of polar bears worldwide.<sup>39</sup> In some regions, other seal species, walrus, beluga, and narwhal are consumed as well,<sup>40</sup> and bears may also scavenge whale carcasses.<sup>41</sup>

Modest declines in summer sea ice were expected to negatively affect Chukchi Sea ice-dependent seals, but previous research has shown that the opposite occurred: body condition and reproduction in both ringed and bearded seals increased with less summer ice.<sup>42</sup> A similar phenomenon has now been found in the Svalbard region of the Barents Sea: a 2021 study revealed that body condition and reproductive measures for ringed seals had not changed appreciably between the early 1980s and 2018, despite a profound decline in sea-ice habitat, especially on the west coast of Spitsbergen.<sup>43</sup> On the east coast of Canada, a recent survey of harp seals – important prey for Davis Strait polar bears – reveals they have continued to increase in abundance.<sup>44</sup>

Polar bears rarely consume terrestrial prey, but in 2021, a paper documented a Svalbard polar bear driving a reindeer into the water, killing it by drowning and then dragging it to shore to consume it (the report was accompanied by a graphic video and still photographs).

It appeared other bears had recently killed reindeer in a similar manner. This information was portrayed in the media as being a result of reduced sea ice caused by climate change, but the authors of the report pointed out that more bears and more reindeer in the region since the 1970s likely contributed to an increased number of such events being witnessed, as did the fact that some bears now spend more time on land during the summer.<sup>45</sup>

Polar bears are quite flexible in their choices of prey. A recent study on polar bear prey consumption in Foxe Basin found evidence of greater bowhead whale carcass consumption during 2010–2018 compared to 1999–2003, which the authors speculated could be due to more bowheads being killed by orcas in recent years (although overall, bowhead whales were a minor prey species, at less than 2%). Ringed seals remained the primary prey, although at a somewhat lower percentage (36%, vs 45% earlier) and consumption of bearded seals increased significantly (ca. 20% vs ca. 2% earlier). Walrus consumption, especially by adult male bears, increased in the northern portion of the region, which is also where walrus are most abundant.<sup>46</sup>



## **7. Health and survival**

A report on Davis Strait bears published in 2021 found that body condition had improved compared to those examined in 2007, despite continued loss of summer sea ice.<sup>47</sup>

In the Svalbard region of the Barents Sea, the body condition of male bears in the spring of 2021 was somewhat worse than it had been in 2019, but within the natural range of variation since 1993. Litter sizes in 2021 (1.75) were also down somewhat compared to 2019 (2.0). However, 'production of cubs' (i.e., the proportion of females with cubs of the year) was above what it had been in 2019.<sup>48</sup>

Recent data collected from across the Arctic, but especially in the Chukchi and Barents Seas, do not support the assumption, stated repeatedly by polar bear specialists, that sea-ice loss inevitably leads to reduced body condition of polar bears, or that reduced body condition is invariably followed by population decline.<sup>49</sup>

## **8. Human/bear interactions**

### **Winter/spring**

#### ***Svalbard, problem bears winter/spring***

One member of a two-person film crew suffered head injuries during a polar bear attack on 2 March on the east coast of Spitsbergen. The bear was subsequently shot and killed by the other crew member. The six-year-old male bear, said to have weighed 231 kg (about 509 lbs), was underweight for his age, but this is typical for bears in late winter. Sea ice was abundant in the area.<sup>50</sup>

#### ***Russia, unusual sighting winter/spring***

In the Yakutia region of Russia, a young female (about two years old) was tracked for a distance of about 1,086 km (675 miles) in late March/early April. She apparently survived by stealing food set out for dogs and responded aggressively when approached. She returned towards the coast, and when finally captured in May, she was emaciated and was reported to have a variety of medical issues, including tooth problems, which may have left her unable to hunt. Health issues aside, young bears such as this one are inexperienced hunters and routinely have problems getting enough to eat. Suggestions that lack of sea ice explained her overland sojourn were unfounded: ice was still locked against the Laptev Sea coast that spring, as usual.<sup>51</sup>

### **Summer/autumn**

#### ***Russia, problem bears in summer/autumn***

In early August, on the northern tip of the Yamal Peninsula on the Kara Sea, seven polar bears, including an injured female with two cubs, had to be driven off by helicopter after they

killed a reindeer and a dog belonging to reindeer herders, and otherwise acted aggressively. It is normal for bears in this region to spend time on land during the summer.<sup>52</sup>

In early September, a photographer used a drone to capture many photos of more than a dozen polar bears making themselves at home in and around the dilapidated buildings of an abandoned weather station on Kolyuchin Island. This small isle is located on the Chukchi Sea coast near the Cape Serdtse-Kamen beach complex, made famous in recent years by the enormous herds of Pacific walrus (about 100,000) that haul out there. This was apparently the first time bears had been spotted on the uninhabited island, which is also a haulout spot for walrus in autumn.<sup>53</sup>

#### ***Greenland, problem bears in summer/autumn***

In early August, a polar bear put his head through the partially opened window of a research cabin near the military base at Daneborg, in north-east Greenland, and bit the hand of a film crew member who was inside, causing him serious injury. The bear returned twice after the attack, before being driven off. Officials said it had already been involved in five previous incidents in the area, and would be shot if it returned again. Media reports linked the incident to a short-lived local 'heat wave' in Greenland, although there is no evidence this was the case, since some bears in Greenland routinely spend time on land during the summer.<sup>54</sup>

#### ***Western Hudson Bay, problem bears in summer/autumn***

All Western Hudson Bay polar bears are forced ashore by melting ice in the summer, and Churchill, Manitoba is located near a primary staging area for many dozens of bears that wait for the ice to form in the autumn. In 2021, even though bears did not leave the area until early December due to a late freeze-up of Hudson Bay ice, Churchill's Polar Bear Alert Program did not publish weekly reports of problem bears for the entire last month of the season, so the number of incidents cannot be compared to previous years (e.g. *State of the Polar Bear Report 2020*, comparison of incidents 2015–2020).<sup>55</sup>

#### ***Foxe Basin, attack in summer/autumn***

On 10 August, near some seasonal cabins used by the community of Sanirajak, Nunavut, a polar bear was accidentally interrupted while feeding on a carcass of an unidentified animal. It attacked and badly injured three residents, before being shot by other members of the community. The reports contained no mention of its condition. Sea-ice charts showed abundant ice in the region, similar to conditions in 2018 when a bear in good condition attacked three hunters from Naujaat, leaving one of them dead.<sup>56</sup>



## 9. Discussion

The current health and abundance of polar bears continues to be at odds with predictions that the species is suffering serious negative impacts from reduced summer sea ice (blamed on human-caused climate change).

In 2021, there were no reports of widespread starvation of bears, acts of cannibalism, or drownings that might suggest bears were having trouble surviving the ice-free season. Overall, there were fewer reports of problems and/or attacks by bears than usual, and no deaths.

Studies that presented data up to and including 2021 showed that primary ecosystem productivity in the Arctic has continued to increase because of longer ice-free periods and thinner sea ice. This explains to a large degree why polar bears are thriving in the Chukchi and Barents Seas.

Results of two polar bear surveys were published in 2021, and the subpopulations (in the Chukchi Sea and Davis Strait) were found to be either stable or increasing. Overall, studies published in 2021 indicate that the most up-to-date global population total should be at least 32,000 (and possibly higher), up from about 26,000 in 2015.



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## Endnotes

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- 4 As of 26 January 2022 <https://www.iucn-pbsg.org/>; see also Durner et al. 2018; PBSG 2019.
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- 12 Anonymous 1968; PBSG 2021; Wiig et al. 2015.
- 13 It has been argued (Crockford 2017; 2019b) that a plausible and scientifically defensible ‘best-guess’ estimate at 2018, extrapolated from ‘known’ to ‘unknown’ subpopulations within sea ice ecoregions, would be about 39,000 (range 26,000-58,000), although a more pessimistic best-guess (Hamilton and Derocher 2019) based on a greater variety of ecosystem traits (including prey diversity and sea ice cover) came out much lower, at 23,315 (range 15,972-31,212); see also Bromaghin et al. 2021; Crockford 2021; Conn et al. 2021; Dyck et al. 2021; COSEWIC 2018 (‘Total Abundance’ section); <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/polar-bear-2018.html>.
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- 17 Durner et al. 2018; PBSG 2019.
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- 20 COSEWIC 2018; DFO 2020; Kovacs 2015; also [https://www.canada.ca/en/environment-climate-change/services/biodiversity/maps-sub-populations-polar-bears-protected.html#\\_fig02](https://www.canada.ca/en/environment-climate-change/services/biodiversity/maps-sub-populations-polar-bears-protected.html#_fig02).
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- 24 SJC personal archive of online PBSG status table updates; Durner et al. 2018; PBSG 2021.
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- 26 Regehr et al. 2018:2; see also Aars et al. 2006:34; Belikov 1995; Wiig et al. 1995:24.
- 27 Regehr et al. 2018 supplementary data.
- 28 Rode et al. 2014, 2015, 2018, 2021.
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- 47 Dyck et al. 2021.
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