Polar bear

Ursus maritimus

Class: Mammalia
Order: Carnivora

Review Status: Peer-reviewed **Version Date:** 03 April 2018

Conservation Status

NatureServe:	*Agency:*		
G Rank: G3	ADF&G: Species of Greatest Conservation Need	IUCN: Vulnerable	Audubon AK:
S Rank: S2	USFWS: Listed Threatened	BLM: Sensitive	

Final Rank

Conservation category: **II. Red**

high status and either high biological vulnerability or high action need

Category	Range	Score
Status	-20 to 20	18
Biological	-50 to 50	-6
Action	-40 to 40	-32

Higher numerical scores denote greater concern

Status - variables measure the trend in a taxon's population status or distribution. Higher status scores denote taxa with known declining trends. Status scores range from -20 (increasing) to 20 (decreasing). **Score**

Population Trend in Alaska (-10 to 10) 8

There is strong evidence that the Southern Beaufort Sea (SBS) stock has been declining since the early 2000s (Regehr et al. 2010; Rode et al. 2010a; Bromaghin et al. 2015). Data are lacking to determine the long-term population trend of the Chukchi/Bering Seas (CS) stock (PBSG 2019). Its short-term (2008-2016) population trend is considered "likely stable" (PBSG 2019).

Distribution Trend in Alaska (-10 to 10) 10

Sea ice habitat used by polar bears has decreased in recent decades because of climate change, and this decline is expected to continue (Fischbach et al. 2007; Durner et al. 2009; Rode et al. 2014). In some instances, polar bears have responded by increasing their use of terrestrial habitats (e.g. Schliebe et al. 2008; Atwood et al. 2016b), but at the population level, this strategy is unlikely to compensate for the loss of sea ice habitat (Fischbach et al. 2007; USFWS 2017b).

Status Total: 18

Biological - variables measure aspects of a taxon's distribution, abundance and life history. Higher biological scores suggest greater vulnerability to extirpation. Biological scores range from -50 (least vulnerable) to 50 (most vulnerable). **Score**

Population Size in Alaska (-10 to 10) -2

Combining estimates from both stocks yields a population size <10,000 individuals. Population size for the CS stock is estimated to be between 1,552 and 5,944 individuals (Regehr et al. 2018). The most recent analysis of the SBS stock estimates a population size of 900 individuals (90% CI = 606 -

1,212), but this estimate includes individuals that breed in northwestern Canada (Bromaghin et al. 2015). U.S. Fish and Wildlife Service published a draft stock assessment report in 2017 in which they estimated the minimum population size of the SBS stock at 782 individuals (Federal Register 2017).

Range Size in Alaska (-10 to 10) -10

Distributed across Alaska's Arctic waters (northern Bering Sea, Chukchi Sea, Beaufort Sea) and nearby terrestrial habitats (e.g. the Arctic Coastal Plain and coastal western Alaska). Two stocks are currently recognized in Alaska, though boundaries between them are fluid. The Chukchi/Bering Sea stock occurs across the Chukchi Sea, south to the northern Bering Sea and west to Russia (PBSG 2019). The Southern Beaufort Sea stock occurs from Point Lay, AK east to Tuktoyaktuk, Northwest Territories, Canada (PBSG 2019). The two populations overlap in the area between Point Barrow and Point Hope (Muto et al. 2017). Estimated range size >400,000 sq. km.

Population Concentration in Alaska (-10 to 10) -10

Although concentrations of den sites have been reported in other areas (e.g. Wrangel Island in Russia), den sites in Alaska are widely distributed (Amstrup and Gardner 1994; Federal Register 2010a). More than 390 den sites have been reported in Alaska (Durner et al. 2010).

Reproductive Potential in Alaska

Age of First Reproduction (-5 to 5) 1

Females reach sexual maturity between 4 to 6 years of age (USFWS 2016).

Number of Young (-5 to 5) 5

Females give birth to two (range: 1-3) cubs once every three years (USFWS 2016). Litter size from 2008 to 2011 averaged 1.59 (+/- 0.67) and 1.38 (+/- 0.58) for the CS and SBS stocks, respectively (Rode et al. 2014).

Ecological Specialization in Alaska

Dietary (-5 to 5) 5

Polar bears hunt on sea ice and rely heavily on ringed seals (78.5% of diet composition; Rode et al. 2014). To a far lesser extent, they also consume larger prey such as bearded seals, walrus, beluga, and bowhead whales (Thiemann et al. 2008; Rode et al. 2014; McKinney et al. 2017). Opportunistic foraging on fish, berries, bird eggs, and carrion have been reported (e.g. Derocher et al. 1993; Voorhees et al. 2014; Atwood et al. 2016a); however, given the high-energy requirements of active (i.e. non-fasting) polar bears, few food items could serve as an adequate substitute to ice-caught marine mammals (Rode et al. 2010b). Several recent studies have noted polar bears feeding on land on "bone piles" (remains of bowhead whales left behind by subsistence hunters) (Rogers et al. 2015; Atwood et al. 2016a; McKinney et al. 2017), but it remains unknown whether this resource is a long-term, sustainable alternative. Observed declines in polar bear populations have been linked to nutritional limitation as a result of changing climatic conditions (Rode et al. 2010a; Pagano et al. 2018).

Habitat (-5 to 5) 5

Sea ice habitat is essential for many aspects of polar bear ecology, including hunting, traveling, migration, resting, and denning (Amstrup and Gardner 1994; Federal Register 2010a). Den sites, which can also be built on land, are strongly tied to the presence of snow and are therefore often in areas that have some degree of topographical complexity and that tend to accumulate more snow than surrounding areas (Durner et al. 2003). Terrestrial habitats are typically used in late summer and fall when sea ice is at its minimum (Federal Register 2010a). However, recent changes in sea ice have led to concomitant changes in polar bears' habitat use (Ware et al. 2017). Bears are spending less time in their preferred sea ice habitats and more time in suboptimal habitats, with implications to population dynamics (Schliebe et al. 2008; Atwood et al. 2016b; Ware et al. 2017).

Several authors agree that increased use of terrestrial habitats is unlikely to compensate for the loss of sea ice habitat (Fischbach et al. 2007; USFWS 2017b; Ware et al. 2017).

Biological Total: -6

Action - variables measure current state of knowledge or extent of conservation efforts directed toward a given taxon. Higher action scores denote greater information needs due of lack of knowledge or conservation action. Action scores range from -40 (lower needs) to 40 (greater needs). **Score**

Management Plans and Regulations in Alaska (-10 to 10) -10

Protected by the Marine Mammal Protection Act of 1972 and by the Endangered Species Act. Subsistence harvest is allowed and currently it is not federally regulated (but see Federal Register 2016). Incidental take is also allowed by U.S. citizens working in oil and gas exploration on the coasts of the Chukchi and Beaufort Seas (50 CFR §§ 18.111-18.129). A conservation plan is in place for this species (USFWS 2016).

Knowledge of Distribution and Habitat in Alaska (-10 to 10) -10

The distribution of polar bears in Alaska is well-known, and habitat associations have been studied (e.g. Garner et al. 1990; Amstrup and Gardner 1994; Amstrup 1995; Amstrup et al. 2000; Durner et al. 2001; Durner et al. 2003; Wilson et al. 2014b; reviewed in Federal Register 2010a and in USFWS 2016).

Knowledge of Population Trends in Alaska (-10 to 10) -2

Trend data are available for the SBS stock (PBSG 2017; Muto et al. 2017) and this stock has been the subject of long-term monitoring efforts (e.g. Hunter et al. 2007; Regehr et al. 2010; Rode et al. 2010a). Comparatively fewer data are available for the CS stock and long-term trends are unavailable (PBSG 2019). Data have recently been applied to determine short-term trends for the first time (PBSG 2019).

Knowledge of Factors Limiting Populations in Alaska (-10 to 10) -10

Adult survival, and particularly female survival, is the most important parameter in ensuring population growth and stability (Amstrup and Durner 1995; USFWS 2017b). Currently, the primary threat to polar bear populations is the loss of sea ice habitat as a result of climate change (Atwood et al. 2016b; USFWS 2017b). Loss of sea ice habitat is affecting several aspects of polar bear ecology, including: their distribution, movement and denning behaviors, hunting success, body condition, energetic expenditure, and survival (e.g. Fischbach et al. 2007; Schliebe et al. 2008; Regehr et al. 2010; Bromaghin et al. 2015; Durner et al. 2017; Olson et al. 2017; USFWS 2017b; Ware et al. 2017). Reduced sea ice also affects the distribution and abundance of their primary prey, the ringed seal (Ferguson et al. 2005; Ferguson et al. 2017). Several lines of evidence suggest that the SBS stock is nutritionally stressed as a result of declining sea ice habitat, and this has been linked to population-level declines (Rode et al. 2010a; Rode et al. 2014). However, declines in body conditions and in recruitment have not been observed in the CS stock, despite the stock also facing a decline in sea habitat (Rode et al. 2014). Differences in prey availability, reproductive output, or distribution trends may contribute to geographic and interannual differences in survival and abundance (Rode et al. 2014; Bromaghin et al. 2015). Subsistence hunting, disease, and organic pollutants are not considered major threats to the CS and SBS stocks at this time (McKinney et al. 2011; USFWS 2017b).

Action Total: -32

Supplemental Information - variables do not receive numerical scores. Instead, they are used to sort taxa to answer specific biological or management questions.

Harvest:	Not substantial
Seasonal Occurrence:	Year-round
Taxonomic Significance:	Monotypic species
% Global Range in Alaska:	<10%
% Global Population in Alaska:	<25%
Peripheral:	No

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