Status Report on the World's Polar Bear Subpopulations

IUCN/SSC Polar Bear Specialist Group

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Status Table Structure and Definitions

Column primary heading: ***Subpopulation***
Column secondary heading: ***BLANK***
Example in table: Gulf of Boothia

Subpopulations are defined as geographically or otherwise distinct subgroups of the total global population between which there is little demographic or genetic exchange, following the IUCN Red List Categories and Criteria (IUCN 2017). Polar bear subpopulations may not meet the IUCN criteria of no more than one successful migrant individual per year on average, and are characterized by different levels of demographic, ecological, and genetic distinctness (Thiemann *et al*. 2008). Subpopulations are used for demographic assessments, harvest monitoring, and other research and management activities. The IUCN/SSC PBSG recognizes 19 subpopulations (Durner *et al*. 2018). Modifications to subpopulation boundaries are assessed based on the best available scientific information.

Column primary heading: ***Subpopulation size***
Column secondary heading: ***Estimate and uncertainty***
Example in table: 1592 (95% CI = 870-2314)

Subpopulation size is the total number of individuals (i.e., including dependent young) that are alive and rely primarily upon habitats within a subpopulation boundary for a significant part of the year, and are not enumerated as part of a different subpopulation. Subpopulation size may be observed, estimated, or projected (definitions in IUCN 2017, pages 19-20). The scientific basis for subpopulation size should be publicly available (e.g., as a report or journal publication). Estimates of subpopulation size are typically associated with uncertainty due to sampling error, natural variability, and other sources. When possible, uncertainty should be characterized by an interval estimate derived using quantitative methods (e.g., 95% Confidence Interval) that is listed in parentheses. If an observed, estimated, or projected value of subpopulation size is not publicly available, it may be listed as Data Deficient.

Column primary heading: ***Subpopulation size***
Column secondary heading: ***Method and type of evidence***
Example in table: Physical capture-recapture (estimated)

A brief description of the quantitative or qualitative method of assessment used to determine subpopulation size. The type of evidence on which the estimate is based (definitions in IUCN

2017, pages 19-20) should be listed in parentheses. Example entries include but are not limited to: Total count (observed), Capture-recapture (estimated), Distance sampling (estimated), and Matrix-based projection (projected).

Column primary heading: ***Subpopulation size***
Column secondary heading: ***Year and citation***
Example in table: 2000 (Taylor et al. 2009)

The year to which the most recent value of subpopulation size applies. For example, if the most recent subpopulation assessment provided an average estimate of subpopulation size for the period 1998-2000, year would be listed as 2000. A citation for the value of subpopulation size should be listed in parentheses.

Column primary heading: ***Change in subpopulation size***
Column secondary heading: ***Long term (approx. 3 polar bear generations)***
Example in table: Likely stable (2000 to 2017)

Change in subpopulation size over a period of approximately three polar bear generations (34.5 years; Regehr *et al*. 2016), ending with the most recent estimate of subpopulation size. The range of years to which the trend is referenced should be listed in parentheses. Change in subpopulation size may be observed or estimated (as defined by IUCN 2017, pages 19-20) based on comparison of two or more point estimates of abundance. Possible values for change in subpopulation size are: Increased, Stable, Decreased, and Data Deficient. The change may or may not meet standard criteria for statistical significance. The listed value should be preceded by a modifier reflecting the likelihood of the change, as determined statistically, by weight of evidence, or by expert opinion, using likelihood terms established by the IPCC (Table 1.2 in Cubasch *et al*. 2013). Subpopulations for which a biologically-meaningful change cannot be assessed with a likelihood of "Likely" (i.e., 66-100% probability of being true) or higher, should be listed as Data Deficient. If available, information on historic changes in subpopulation size (i.e., extending more than three polar bear generations into the past) can be included in the column Comments, vulnerabilities, and concerns.

Column primary heading: ***Subpopulation trend***
Column secondary heading: ***Short term (approx. 1 polar bear generation)***
Example in table: Likely stable (2000 to 2017)

Subpopulation trend over a period of approximately one polar bear generation (11.5 years; Regehr *et al*. 2016), ending with the most recent year for which trend has been assessed. The range of years to which the trend is referenced should be listed in parentheses. Short-term trend may be observed, estimated, projected, or inferred (as defined by IUCN 2017, pages 19-20). Possible values for recent trend are: Increase, Stable, Decrease, and Data Deficient. The trend may or may not meet standard criteria for statistical significance. The listed value should be preceded by a modifier reflecting the likelihood of the trend, as determined either statistically or by expert opinion, using likelihood terms established by the IPCC (Table 1.2 in

Cubasch *et al*. 2013). Subpopulations for which a biologically-meaningful trend cannot be assessed with a likelihood of "Likely" (i.e., 66-100% probability of being true) or higher, should be listed as Data Deficient. The timeframe for short-term trend may extend into the future if appropriate population projection methods have been used (e.g., quantitative Population Viability Analysis).

Column primary heading:	***Sea-ice metrics***
Column secondary heading:	***Change in date of spring sea-ice retreat and change in date of fall sea-ice advance (days per decade)***
Example in table:	-9.8 (days per decade spring retreat) / 14.3 (days per decade fall advance)

Subpopulation-specific change in date of spring sea-ice retreat and change in date of fall sea-ice advance (days per decade) over the period 1979-2018, calculated using the methods of Stern and Laidre (2016). Every year, the area of sea ice reaches a maximum in March and a minimum in September. To measure the timing of the seasonal change in sea ice, we find the date each spring when the area of sea ice has dropped to a specific threshold, and the date each fall when the area has grown back to that same threshold. The region-specific threshold is halfway (50%) between the mean March sea-ice area and the mean September sea-ice area, where the means are calculated over the 30-year reference period 1981-2010.

Column primary heading:	***Sea-ice metrics***
Column secondary heading:	***Change in summer sea-ice area (percent change per decade)***
Example in table:	-12.2

Subpopulation-specific change in the summer (01 June to 31 October) sea-ice area (percent change per decade) over the period 1979-2018. Percent change is calculated relative to the average summer sea-ice area during the period 1981-2010.

Column primary heading:	***Human-caused removals (20XX to 20XX)***
Column secondary heading:	***5-year mean quota (bears per year)***
Example in table:	72.4

The mean annual harvest quota over the five-year period, as determined and authorized by the jurisdictions and agencies with management authority for the subpopulation. The five-year period may be based on calendar years or harvest years, which are typically defined as 01 July in year t to 30 June in year t + 1. For subpopulations that are not subject to a legal harvest, the value "n/a" is used.

Column primary heading:	***Human-caused removals (20XX to 20XX)***
Column secondary heading:	***5-year mean actual (bears per year together with what this represents as percentage of total population in parenthesis)***
Example in table:	61.8 (3.9%)

The mean annual number of bears that were actually removed from the subpopulation over the five-year period, including all forms of direct human-caused mortality.

Column primary heading:	***Comments, vulnerabilities, and concerns***
Column secondary heading:	***BLANK***
Example in table:	Ongoing population assessment

The status of each polar bear subpopulation is assessed using the best available scientific data including population abundance, population trend, vital rates, movements and habitat use, human caused removals, and changes in habitat availability. The Comments, vulnerabilities and concerns column provides additional background information on population re-assessments, bear health, population modelling and ongoing research programs that contribute to the current scientific knowledge of the status of each subpopulation. This column may also be used to highlight potential vulnerabilities and concerns that exist for the subpopulation.

References

Cubasch, U., Wuebbles, D., Chen, D., Facchini, M.C., Frame, D., Mahowald, N., and Winther, J.-G. 2013. Introduction. Pp. 504–515 In Stocker, T.F., Qin, D., Plattner, G.-K., Tignor, M., Allen, S.K., Boschung, J., Nauels, A., Xia, Y., Bex, V., and Midgley, P.M. (eds.). Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK and New York, New York, USA.

Durner, G.M., Laidre, K.L., and York, G.S. (eds.). 2018. Polar Bears: Proceedings of the Eighteenth Working Meeting of the IUCN/SSC Polar Bear Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK, xxx + 207 pp.

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