Recent status of emperor penguin population in Northern Victoria Land, Ross Sea

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**Information Paper submitted by the Republic of Korea**

***Summary***

In the context of global warming, the emperor penguin population is projected to decline significantly even under the most optimistic scenario. To contribute to the protection and management as well as the review of Specially Protected Species Action Plan for the emperor penguin, the Republic of Korea provides monitoring information of the colonies in Northern Victoria Land, Ross Sea.

***Background***

The emperor penguin (*Aptenodytes forsteri* Gray, 1844) is well adapted for life on ice and endemic to Antarctica. Its colonies occur in coastal regions around Antarctica and most of the colonies depend on fast ice (Trathan et al. 2020). The population trend of the species is predicted to be strongly linked to the condition of ice cover around Antarctica. 80% of the emperor penguin colonies are projected to be quasi-extinct under business-as-usual greenhouse gas emission (Jenouvrier et al. 2020). However, under the most optimistic scenario, the global emperor penguin population is projected to decline by more than 50% (ATCM XLIV WP XX, draft Specially Protected Species Action Plan for the emperor penguin *Aptenodytes forsteri* Gray, 1844).

In this context SCAR introduced WP 37 *Projections of future population decline emphasise the need to designate the emperor penguin as an Antarctic Specially Protected Species* at CEP XXIII. The Committee agreed to establish an ICG to prepare a draft Action Plan to be presented to the ATCM XLIV-CEP XXIV.

The Action Plan shall be assessed and revised every 5 years. Each review should ensure that Action Plan information is up to date, based on the best available science. During the review, the Committee should take into account the scientific data and information provided by members (ref. draft Action Plan).

Since 2014, the Republic of Korea has run research and monitoring programmes on emperor penguin colonies in Northern Victoria Land, from Jang Bogo Station at Terra Nova Bay, Ross Sea. Korea Polar Research Institute (KOPRI) has conducted the programmes supported by the Ministry of Environment and Ministry of Oceans and Fisheries of the Republic of Korea. We believe that our results will contribute to the protection and management of the emperor penguin as well as the review of the Action Plan.

***Monitoring Methodology***

There are three emperor penguin breeding colonies located along the coast of Northern Victoria Land, Ross Sea. KOPRI conducted population monitoring survey on three emperor penguin colonies, Cape Washington (ASPA No. 173), Coulman Island and Cape Roget (Figure 1). The colony at Cape Roget was surveyed by researchers for the first time in November 2021. The emperor penguin chick counting on Cape Washington was conducted seven times during the austral summer seasons from 2014 to 2021. KOPRI surveyed the colony of Coulman Island, one of the largest colonies in Antarctica, four times from 2017 to 2021. We visited on the ground and counted chicks in November 2014 and December 2015, while we applied high-resolution aerial photography systems to determine the colony size of emperor penguins from 2016. We could not visit the colonies of Cape Washington and Coulman Island in 2020, because our field activities had to be suspended due to the COVID-19 pandemic.

***Population Status***

Table 1 provides the colony size of each breeding site with number of chicks in Northern Vitoria Land. A total of 16,793 emperor penguin chicks were counted on November 15, 2021. The minimum number of Cape Washington colony reported was 11,093 in 2002, and the maximum number was 26,511 in 1992 (Table 1). After 24,997 chicks were counted in 2015, the colony size of emperor penguin at Cape Washington was in downward trend, and decreased to 12,472 in 2017. However, from 2018 to 2021, the number has recovered and has shown a similar population size compared to 2014. The maximum number of emperor penguin chicks counted at Coulman Island was 34,765 in 1992 (Barber-Meyer et al. 2008), whereas the mean number of chicks were reported as 23,859. KOPRI have counted 23,223 chicks at the colony in 2021, which is a decreased of 1,241 individuals when compared to 24,464 chicks surveyed in 2019. The number of chicks counted at Cape Roget was 8,021 in November 2021.

***Discussion***

The number of emperor penguin chicks at Cape Washington showed fluctuation. This is thought to be influenced by the environmental conditions such as sea ice concentration and regional weather changes as reported in previous studies (Barber-Meyer et al. 2008, Jenouvier et al. 2009). On the other hand, it was difficult to describe the population fluctuation at Coulman Island due to a lack of census data.

Both Cape Washington and Coulman Island qualify the criteria (A1, A4ii) for Important Bird Area (IBAs) in Antarctica until 2021, and no significant decline in emperor penguin population were detected around these regions. Nevertheless, it is predicted that it will have a negative impact on the emperor penguin population if global warming and sea ice decreases continue in the future (Jenouvier et al. 2009, Trathan et al. 2020).

KOPRI has been conducting long-term monitoring to understand how environmental changes affect the dynamics of emperor penguin population at Northern Victoria Land, Ross Sea. ATCM, CCAMLR, and SCAR should encourage Parties to conduct relevant research and monitoring activities that will contribute to the protection and management of the emperor penguin.

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*Figure 1 – Emperor penguin breeding colonies (red boxes) in Northern Victoria Land, Ross Sea*

Mapa

Descripción generada automáticamente

Table 1 – Published counts and estimated number of emperor penguin chicks at colonies located in Northern Victoria Land, Ross Sea

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | Number of chicks | | | Data source | |
| Cape Washington | Coulman Island | Cape Roget |
| 1983 | 16,384 | 21,708 | 3,777 | Barber-Meyer et al. (2008) | |
| 1986 | 19,364 | - | - |
| 1989 | 22,819 | - | - |
| 1990 | 23,502 | 27,920 | 6921 |
| 1992 | 26,511 | 34,735 | 6478 |
| 1993 | 23,920 | 18,767 | 6551 |
| 1994 | 23,780 | 20,204 | 6358 |
| 1995 | 22,354 | - | - |
| 1996 | 17,896 | 19,471 | 7,207 |
| 2000 | 17,397 | - | - |
| 2001 | 18,734 | - | - |
| 2002 | 11,093 | - | - |
| 2003 | 13,163 | - | - |
| 2004 | 16,700 | - | - |
| 2005 | 23,021 | 24,207 | - |
| 2010 | 17,000 | - | - | ASPA No. 173 Management Plan (2013) | |
| 2014 | 16,280 | - | - | MOE  (2015-2020) | Nov. 01, 2014 / Ground |
| 2015 | 24,997 | - | - | Dec. 14, 2015 / Ground |
| 2016 | 19,402 | - | - | Nov. 09, 2016 / Aerial |
| 2017 | 12,472a | 16,571 b | - | Nov. 10, 2017 / Aeriala  Nov. 09, 2017 /Aerialb |
| 2018 | 16,874 a | 21,286 b | - | Dec. 10, 2018 / Aeriala  Nov. 09, 2018 / Aerialb |
| 2019 | 16,677 a | 24,464 b | - | Nov. 19, 2019 / Aeriala  Dec. 04, 2019 / Aerialb |
| 2021 | 16,793a | 23,223b | 8,021c | MOF (2022, in press) | Nov. 15, 2021 / Aeriala,  Dec. 03, 2021 / Aerialb  Nov. 19, 2021 / Aerialc |