Consideration of climate change within the Antarctic Protected Areas System

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**Information Paper submitted by the United Kingdom**

***Summary***

An Action within the CEP Climate Change Response Work Programme is to ‘*Review and revise where necessary existing management tools to consider if they aﬀord the best practical adaptation measure to areas at risk from climate change*’. In order to inform this work, this paper examines how climate change is represented within the CEP’s area protection guidance documents and protected area management plans.

***Background***

Antarctica is increasingly vulnerable to climate change impacts, with the continent predicted to warm by ~4 ◦C by 2100 under a ‘business as usual’ greenhouse gas emission scenario (see Figure 1). At a continent-wide scale, the higher temperatures are predicted to increase precipitation by about 30% and result in a 30% reduction in sea ice extent. Predicted warming could result in up to a three-fold increase in the area of ice-free ground in the central and northern Antarctic Peninsula, and ice retreat across coastal areas of continental Antarctica, with substantial impacts upon biological communities (see also [ATCMXLIII WP17](https://documents.ats.aq/ATCM43/wp/ATCM43_wp017_e.docx)).

The Climate Change Response Work Programme (CCRWP) provides a mechanism for identifying and revising goals and specific actions by the CEP to support efforts within the Antarctic Treaty System to prepare for, and build resilience to, the environmental impacts of a changing climate and the associated implications for the governance and management of Antarctica. Within the CCRWP issue ‘Change to the terrestrial (including aquatic) biotic and abiotic environment due to climate change’, Action 2(e) is to: ‘*Review and revise where necessary existing management tools to consider if they aﬀord the best practical adaptation measure to areas at risk from climate change*’. In an effort to provide information to support the Committee’s work on this Action, the United Kingdom undertook a review of how climate change is represented in the CEP’s area protection guidance documents and within the management plans for Antarctic Specially Protected Areas (ASPAs) and Antarctic Specially Managed Areas (ASMAs). The research is published in a peer-reviewed journal (see Attachment A): Hughes, K.A., Convey, P., and Turner, J. (2021). [Developing resilience to climate change impacts in Antarctica: An evaluation of Antarctic Treaty System protected area policy](https://www.sciencedirect.com/science/article/pii/S1462901121001490?via%3Dihub). Environmental Science & Policy 124, 12-22.

***Results***

Climate change is not mentioned explicitly in the Protocol on Environmental Protection to the Antarctic Treaty and is little considered in guidelines for the designation and management of the region’s existing protected areas. For example, climate change is not considered in those guidance documents concerning Historic Sites and Monuments, inspection of ASPAs, or consideration of new and revised draft ASPA and ASMA management plans.

Climate change was considered in approximately one third of ASPA management plans, but in almost all cases, this was primarily in the context of scientific research activities. Climate change impacts on the protected area were considered in only 17% of ASPA management plans. Only 6% of ASPA management plans noted that climate change had already caused changes to the management of the protected area (e.g., revisions to area boundaries), all of which were located in the Antarctic Peninsula and Scotia Arc. Overall, there was inconsistency regarding the most appropriate section(s) of the management plan for the consideration of climate change.

Climate change-related effects observed within protected areas included declines in emperor penguin populations (ASPA 107), declines in Adélie and chinstrap penguin populations (ASPAs 113, 128, 139), increases in gentoo penguin populations (ASPAs 128 and 139), substantial ice retreat (ASPAs 126, 128, 139), changes in vegetation cover, diversity and community composition (ASPA 113, 135, 151) and establishment of non-native plants (ASPAs 128, 134; ASMAs 1, 4).

***Conclusions***

An integrated protected area system is likely to provide Antarctic species and habitats with increased resilience to climate change. However, existing guidance on climate change impacts within protected areas has largely taken a limited view, focussing on protected areas as individual units. The provision of an integrated strategy that sets out the blueprint for the use of the wider Antarctic protected area system to provide climate change resilience has yet to be developed. Designation of a number of new protected areas (including a potential move toward designation of a smaller number of larger areas) and integration of existing areas are likely to be components of a practical solution. Facilitating this, researchers could provide information on the distribution of recognised biotic and abiotic values, the predicted spatial extent of climate change under different greenhouse gas emission scenarios and likely impacts upon biological groups, ecosystems and environments. Researchers could also consider the characteristics of locations that may act as climate change refugia, including candidate sites.

Ultimately, reducing global greenhouse gas emission will provide the greatest protection from climate change impacts within Antarctica.

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Figure 1. The projected 2 m annual mean air temperature changes between the means of 1970-1999 and 2070-2099 as determined from the mean of one ensemble member from each of the currently available models used in the Coupled Model Intercomparison Project 6 exercise. Data are shown for Shared Socioeconomic Pathways (SSPs) 245 (a) and 585 (b). The hatched areas indicate where < 50% of the models project significant change or where < 90% agree on the sign of the change. SSPs 245 and 585 represent respectively a stabilization of radiative forcing at 4.5 and 8.5 W per square metre by 2100, which can be regarded as essentially moderate or high greenhouse gas emission scenarios.