A snapshot of terrestrial biodiversity protection in Antarctic Specially Protected Areas
A snapshot of terrestrial biodiversity protection in Antarctic
Specially Protected Areas

Information Paper submitted by SCAR and Australia

Summary
This paper summarises recent research undertaken as a collaboration between the Australian Antarctic
Program (AAP) and the Scientific Committee on Antarctic Research (SCAR)\(^1\). In this research, the authors
present the first continent-wide assessment of terrestrial biodiversity protection within Antarctic Specially
Protected Areas (ASPAs). Despite ASPAs covering less than 2% of Antarctica, 44% of species (including
seabirds, plants, lichens and invertebrates) are found in one or more protected areas. However, protection
was found to be regionally uneven and biased towards easily detectable and charismatic species like
seabirds. The authors conclude that systematic processes to prioritize area protection - using the best
available data - will maximize the likelihood of ensuring long-term protection and conservation of Antarctic
biodiversity.

Introduction
An important function of the CEP is to provide advice to the Parties on the ‘operation and further elaboration
of the Antarctic Protected Area system’\(^2\). The CEP Five-Year Work Plan prioritises work on the issue of
‘Overview of the protected area system’, numerous submissions have been made to the Committee by
Members and Observers, and two dedicated workshops have been held to explore ways of further developing
protection of Antarctic values through ASPAs. More recently, the Committee supported the convening of the
Joint SCAR/CEP Workshop on Further Developing Area Protection in Antarctica, held in Prague from the

Annex V of the Protocol calls for ASPAs to be identified “within a systematic environmental-geographic
framework”, and to include ‘representative examples of major terrestrial, including glacial and aquatic,
ecosystems and marine ecosystems’ and ‘areas with important or unusual assemblages of species’. There is
-growing discussion in both the CEP and scientific literature on the need for ASPAs to address future threats.
Quantifying the representation of biodiversity within existing protected areas is not only consistent with
these calls, but crucial to supporting further discussions and improving area protection in the face of
increasing human activities in Antarctica.

Research findings
In 2016, SCAR, through its Scientific Committee on the Antarctic Treaty System (SC-ATS) and the
Scientific Research Programme – State of the Antarctic Ecosystem (Ant-ECO) initiated a study, in
 collaboration with the Australian Antarctic Program, to assess the representation of biodiversity in ASPAs
across terrestrial Antarctica. A key output of this study was the recent publication of Wauchope et al.
(2019)\(^1\), which presents an overview of biodiversity protection in terrestrial Antarctica, at both a continental
and regional scale, utilizing the most comprehensive Antarctic biodiversity dataset yet compiled. These
analyses were underpinned by an updated spatial layer that accurately defines the ASPA locations and
associated boundaries\(^3\), and spatially explicit species occurrence records extracted from each ASPA

Communications. Published online 26 February 2019. https://doi.org/10.1038/s41467-019-08915-6.

\(^2\) Article 12(g) of the Protocol on Environmental Protection to the Antarctic Treaty.

\(^3\) The updated ASPA spatial layer is available as both polygon and point data from the Australian Antarctic Data
Management Plan. The authors quantified the species found within ASPAs, identified taxonomic biases in coverage, and assessed regional species protection.

 Continent wide, the study found that 44% of species (including birds, plants, lichens and invertebrates, but not microbes or marine species), occur within ASPAs and that for species occurring in ASPAs, 52% only occur in one ASPA. All vertebrate species considered (all of which are birds) were found in at least one ASPA. In contrast, only one-third of plants and lichens, a group predominantly made up of algae, mosses, liverworts and lichens, occur within ASPAs while just over half of invertebrate species are found in at least one ASPA (Figure 1a).

 At the regional scale, the protection of biodiversity within ASPAs is uneven across the 16 Antarctic Conservation Biogeographic Regions (ACBRs). Four ACBRs do not contain any ASPAs. In those ACBRs where ASPAs are present, the proportion of species occurring in at least one ASPA ranges from 8-95%. However, the uneven distribution of taxa across the continent means that an ACBR with a high proportion of species in ASPAs may not necessarily protect a high proportion of all Antarctic terrestrial biodiversity (Figure 1b).

 Assessing the actual level of protection afforded to species through their occurrence within ASPAs requires consideration of the reason for which each ASPA was designated, and the provisions of the Area management plan. In some cases, biota found within non-biodiversity designated ASPAs (e.g. designated to protect historic or scientific values) may be afforded little to no more protection than those outside of the ASPA. While most species found in ASPAs are located within ASPAs designated for biodiversity, 9% of species are only found in non-biodiversity designated ASPAs (Figure 1c). These findings highlight the opportunity to consider managing ASPAs for multiple objectives, ensuring appropriate management for the original designation, the associated biodiversity, and any other values that are present. Such an approach is also consistent with Annex V, which explicitly states that ASPAs can be designated to protect a combination of values.

 Overall, the species found in the greatest number of ASPAs across the taxonomic groups were south polar skuas Catharacta maccormicki, the algae Prasiola crispa and lichen Usnea antarctica, and the springtail Cryptopygus antarcticus and mite Stereotydeus villosus. Two of the four Antarctic penguins (Adélie penguin – Pygoscelis adeliae and chinstrap penguins – P. antarcticus) were in the top 10 vertebrates, and most of the top 10 plants and lichens were lichens (6) or mosses (2). There is considerable variability in the spatial extent of taxa across the continent, which is likely to explain some of these differences both within and between broad taxonomic groups.

**Conclusions**

This study provides an important spatial- and species-specific assessment to inform systematic area protection for terrestrial Antarctica. The authors conclude that systematic processes to develop and prioritize area protection, based on the best available data, will maximize the likelihood of meeting the objectives of the Protocol and ensuring long-term protection and conservation of Antarctic biodiversity. Specifically, this assessment clearly highlights opportunities to enhance regional and taxonomic representativeness of terrestrial biodiversity within ASPAs.

---

4 Biodiversity data from ASPA management plans is publicly available from the Australian Antarctic Data Centre.  
Figure 1 (Adapted from figures in Wauchope et al. 2019 *Nature Communications*)

A SWAPSHOT OF ANTARCTIC BIODIVERSITY PROTECTION

The number of species occurring in ASPAs are:

- **Plants and Lichen**: 469 of 1145
- **Invertebrates**: 154 of 302
- **Vertebrates**: 21 of 21

44% of species are found in Antarctic Specially Protected Areas.

Antarctic life is largely confined to ice-free areas, which are split into 16 Antarctic Conservation Biogeographic Regions (colours). The % of species in each ACBR that occur in Antarctic Specially Protected Areas is shown in bold. The % of all Antarctic species that occur in ASPAs within each ACBR is shown in brackets.

9% of species within ASPAs only occur in non-biodiversity ASPAs.

Access to 16 ACBRs have no ASPAs.

The 10 vertebrates (left), plants and lichen (middle) and invertebrates (right) that are found in the greatest number of Antarctic Specially Protected Areas:


52% of species within ASPAs are only found in one ASPA.

All of Antarctica is designated a reserve for peace and science under the Protocol on Environmental Protection to the Antarctic Treaty.