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Area protection in Antarctica: How can conservation and scientific research goals be managed compatibly?

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ABSTRACT

The footprint of human activities within Antarctica is increasing, making it essential to consider whether current conservation/protection of environmental and scientific values is adequate. The Antarctic protected area network has developed largely without any clear strategy, despite scientific attempts to promote protection of representative habitats. Many Antarctic Specially Protected Area (ASPAs) Management Plans do not state clearly if conservation or science is the priority objective. This is problematic as science and conservation may have conflicting management requirements, i.e. visitation may benefit science, but harm conservation values. We examined recent estimated mean annual levels of visitation to ASPAs. On average, ASPAs protecting scientific research interests were visited twice as often as ASPAs conserving Antarctic habitat and biological communities. However, ASPAs protecting both science and conserving habitat were visited three times as often as ASPAs conserving habitat alone. Examination of visitation data showed that the proportion of visitors entering ASPAs for science, environmental management and/or education and tourism purposes, did not reflect the primary reason for designation, i.e. for science and/or conservation. One third of APSAs designated since the Environmental Protocol entered into force (1998) did not describe clearly the main reason for designation. Policy makers should consider (i) for all Management Plans stating unambiguously the reason an area has ASPA designation, e.g. either to protect habitat/environmental values or scientific research, in accordance with adopted guidance, (ii) designating new protected areas where visitation is kept to an absolute minimum to ensure the long-term conservation of Antarctic species and habitats without local human impacts (possibly located far from areas of human activity), and (iii) encouraging the use of zoning in ASPAs to help facilitate the current and future requirements of different scientific disciplines.

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1. Introduction

It is over one hundred years since the parties of Amundsen and Scott reached the South Pole. At that time Antarctica was

largely unknown, unmapped and visited by very few people (Headland, 2009). Today, Antarctica hosts over 100 research facilities, c. 4000 national operator staff and up to 33,000 tourist landings each year (COMNAP, 2012; IAATO, 2012) with some areas, particularly within the northern Antarctic

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Peninsula and Ross Sea Region, experiencing high levels of concentrated long-term activity (Braun et al., 2012). Antarctica is a continent dominated by ice with only 0.34% ice-free (c. 45,000 km²), and only c. 6,000 km² both ice-free and within 5 km of the coast. Due to the less severe climatic conditions found at coastal locations, compared with the interior of the continent, the majority of Antarctic macrobiota are found within this small area, although communities dominated by microorganisms are found at inland locations. Biological communities in ice-free coastal areas, particularly in the Antarctic Peninsula region, are likely to be most exposed to climate change impacts, but their level of resilience is largely unclear (Turner et al., 2009). It is in the coastal ice-free areas that the great majority of research stations (c.80%) and other infrastructure are found as here access is comparatively easy and research opportunities most diverse. Coastal stations continue to be built, with three having been constructed on ice-free ground in the past nine years (COMNAP, 2012). Consequently, Antarctica's special values, features and habitats are more exposed to potential impacts created by the expanding human footprint (Tin et al., 2009; Hughes et al., 2011; Chown et al., 2012; Convey et al., 2012). Therefore, a comprehensive and robust protected area system is required to provide an effective framework for the conservation of Antarctica's environmental and scientific values (Morgan et al., 2007; Hughes and Convey, 2010; Terauds et al., 2012).

1.1. Specially Protected Areas (SPAs)

The Antarctic Treaty (signed in 1959, came into force 1961) says little about the conservation of Antarctica with only one reference relating to the preservation and conservation of living resources in Antarctica (Article IX, 1(f)). However, at the third Antarctic Treaty Consultative Meeting (ATCM) in Brussels in 1964, following substantial encouragement and support from the Scientific Committee on Antarctic Research (SCAR), the Agreed Measures for the Conservation of Antarctic Fauna and Flora were drawn up. In the Preamble it was stated that the Parties consider the Antarctic Treaty area as a Special Conservation Area, although it is not clear how this designation has been defined. More specifically, Article VIII sets out the measures for the designation of Specially Protected Areas (SPAs) to preserve the area's 'unique natural ecological system'. Within an SPA, driving any vehicle was prohibited, as was the collection of any native plant, except in accordance with a permit. The allocation of a permit was only considered appropriate if it was issued for a compelling scientific purpose which could not be served elsewhere, and the actions permitted would not jeopardise the natural ecological system existing in the SPA. To strengthen the existing measures further, at ATCM VI (Tokyo, 1970), a recommendation was made that Parties prohibit entry by their nationals into SPAs, except in accordance with a permit (Recommendation ATCM VI-8). Furthermore, at ATCM VII (Wellington, 1972), Recommendation ATCM VII-2 suggested that the existing SPAs be reviewed and should include:

- (a) representative examples of the major Antarctic land and freshwater ecological systems;
- (b) areas with unique complexes of species;

- (c) areas which are the type locality or only known habitat of any plant or invertebrate species;
- (d) areas which contain specially interesting breeding colonies of birds or mammals;
- (e) areas which should be kept inviolate so that in the future they may be used for purposes of comparison with localities that have been disturbed by man.

However, a recommendation for SPAs to have Management Plans, to control and regulate activities within the SPA, did not occur until 1989 (Recommendation ATCM XV-8).

1.2. Sites of Special Scientific Interest (SSSIs)

In the Preamble to Recommendation ATCM VII-3 (1972) it was made clear that areas of non-biological interest could not be made SPAs, which left a large gap in the protected area system. In addition, soon after the initiation of the SPA system, it became clear that measures designed to protect biodiversity and habitats within SPAs were also being used by Parties to protect scientific activities from external interference (Smith, 1994). This is an important distinction, as management action may vary markedly depending upon whether scientific activities or conservation have priority at a location. This issue was resolved, following a proposal from the Scientific Committee on Antarctic Research (SCAR), with the designation of a new class of protected area called a Site of Special Scientific Interest (SSSI) at ATCM VIII (Oslo, 1975; Recommendation ATCM VIII-3). SSSIs were designated to protect areas where scientific investigations were undertaken (or planned to be undertaken in the future) from wilful or accidental damage or interference. It was agreed that the SSSI systems should be used only to protect sites where harmful interference was generally recognised to be likely. SCAR recommended that individual Management Plans should be drawn up and applied to regulate access to and activities within the site. This stimulated a change in designation of several SPAs to SSSIs to allow scientific uses (see http://www.ats.aq/documents/ATCM34/WW/atcm34_ww003_e.pdf).

1.3. Special Reserved Areas (SRAs) and Multiple-use Planning Area (MPA)

In 1989 an additional category of protected area known as a Special Reserved Area (SRA) was proposed to protect areas of outstanding geological, glaciological, geomorphological, aesthetic, scenic, or wilderness value (Recommendation ATCM XV-10, Paris, 1989). However, the North Side of Dufek Massif was the only area ever proposed as an SRA (ATCM XVI, Bonn, 1991). Another category of protected area proposed at the same meeting was the Multiple-use Planning Area (MPA) (Recommendation ATCM XV-11) which was to assist in planning and co-ordinating activities to avoid mutual interference and minimise cumulative environmental impacts in high-use areas. However, like SRAs, MPAs were never formally adopted.

1.4. The Protocol on Environmental Protection to the Antarctic Treaty

A major revision of the Antarctic protected area system came about with the entry into force of the Protocol on

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