Can the Important Bird Area approach improve the Antarctic Protected Area System?

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ABSTRACT. The selection of sites that comprise the existing network of Antarctic protected areas has been largely *ad hoc*, driven by national interests rather than concerted efforts to ensure systematic and representative coverage of the Antarctic environment. Consequently there are gaps in coverage of all major ecosystems, in particular areas kept inviolate from human activity, inland lakes, and marine protected areas. Annex V of the 1991 Protocol on Environmental Protection to the Antarctic Treaty provides a list of values to be protected within a network of Antarctic Specially Protected Areas (ASPAs), but provides no quantitative methods for site identification and prioritisation. The Antarctic Important Bird Area (IBA) Inventory is a joint initiative of BirdLife International and the Scientific Committee on Antarctic Research Group of Experts on Birds (formerly the Bird Biology Subcommittee). The Antarctic IBA Inventory has identified 119 candidate IBAs, 97 of which are not currently protected as ASPAs. The IBA Inventory can improve the Antarctic Protected Area System (PAS) in that it provides a method by which to identify and prioritise sites for their potential inclusion in the Antarctic PAS.

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Introduction

Area protection and management has met with varied support and success in the Antarctic. Since its inception under the 1964 Agreed Measures for the Conservation of Antarctic Fauna and Flora (the Agreed Measures), through to its current status under Annex V of the 1991 Protocol on Environmental Protection to the Antarctic Treaty (the Madrid Protocol), the Antarctic Protected Area System (PAS) has evolved to better address environmental concerns. The most recent approach to a quantitative identification and assessment of protected areas in the Antarctic commenced in 1999 with the Antarctic continent Important Bird Area (IBA) Inventory. The IBA Inventory was considered an important pre-emptive and pro-active approach to the conservation of one of the most prevalent fauna of the Antarctic — birds. The Inventory has the potential to address some of the limitations of the Antarctic PAS. The IBA approach is not a mechanism for area protection. Instead, it is a means by which to identify and prioritise a network of sites based upon their bird values, so it can potentially supplement and strengthen the existing Antarctic PAS. Potential sites are assessed using systematic, quantitative criteria on the breeding seabird populations, and the Inventory is supported by the Scientific Committee on Antarctic Research (SCAR) Group of Experts on Birds (GEB: formerly the SCAR Bird Biology Subcommittee SCAR-BBS) database comprising more than 30 years of data. In order to assess the validity and application of the IBA approach in the Antarctic, this paper addressed the following questions:

1. In assessing the Antarctic PAS, what are its limitations within Annex V of the Madrid Protocol?
2. Can the IBA approach improve the Antarctic PAS, and if so, how?
3. What are the implications of not acting on the IBA Inventory outcomes?

In this study, the term Antarctic refers to the Antarctic Treaty Area (the entire region south of 60°S), and references to the Antarctic continent apply to the terrestrial Antarctic (south of 60°S) including the surrounding islands.

The concept of area protection in the Antarctic is not new. As early as 1915, Sir Douglas Mawson began campaigning with colleagues for the designation of Macquarie Island as a wildlife sanctuary (Selkirk and others 1990). Area protection was first formally addressed in 1960 by the SCAR Working Group on Biology at IV SCAR in Cambridge (SCAR 1960). Many of the recommendations from this meeting and the subsequent report (SCAR 1961) formed the basis of the Agreed Measures.

The Agreed Measures created a number of area protection classifications: Specially Protected Areas (SPAs), Sites of Special Scientific Interest (SSSIs), and Historic

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Table 1. The Antarctic PAS by the number and type of protected areas. Modified from: Foreign and Commonwealth Office 1997; Anon 2002a; Environmental Research and Assessment 2002. √ = required; (√) = required when HSM is designated as, or within, an ASPA; x = not required.

Site details	Main purpose	Management plan?	Permit entry?	No. sites
ASMA	ASMAs assist in planning and coordination of activies to improve cooperation and minimise environmental impacts	√	x	1
ASPA	ASPAs protect outstanding environmental scientific, historic, aesthetic, or wilderness values	√	√	59
CCAS seal reserves	Protect seal breeding areas or the sites of scientific research on seals. Killing or capture of seals is prohibited.	x	x	3
CEMP sites	Protect sites that contribute to the CCAMLR Ecosystem Monitoring Programme	√	√	2
HSM	Preserve and protect historic sites and monuments from damage and destruction	x	(√)	76

Sites and Monuments (HSMs). Other protected areas were adopted by Antarctic Treaty Parties (ATPs) — including Specially Reserved Areas (SRAs), Multiple-Use Planning Areas (MPAs), Marine SSSIs (MSSSIs) and Areas of Special Tourist Interest (ASTI) — but they did not enter into force under the Agreed Measures (Berkman 2002a and 2002b). The Agreed Measures were the driving force for site protection until the adoption of the 1991 Madrid Protocol. Provisions for site protection were also incorporated into the 1972 Convention for the Conservation of Antarctic Seals (CCAS), which has seen the designation of three seal reserves that provide complete protection to seals (Kriwoken and Keage 1989; Smith 1994). The 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) created CCAMLR Ecosystem Monitoring Program sites (CEMP); however, these primarily relate to marine resource management, so are not considered in detail here.

Site designation under the Agreed Measures was largely *ad hoc* (Kriwoken and Keage 1989; Cooper and others 2000). There was no systematic or structured approach to classifying representative examples of ecosystems, habitats, and species (Valencia 2000; Cooper and others 2000). The 1976 SCAR ecosystem matrices were formulated to identify potential gaps in the coverage of protected areas, and provide a 'systematic geographic-environmental framework' for area protection (SCAR 1977; Bonner and Smith 1985). An assessment of established protected areas demonstrated that the system was failing to create a balanced and representative PAS (Kriwoken and Keage 1989; Walton 2000). For example, it was noted that coastal sites were strongly represented, whilst marine sites and inland lakes were underrepresented (Bonner and Smith 1985). Annex V of the Madrid Protocol specifically addressed area protection and management. It attempted to overcome the inflexibility of the Agreed Measures to create a framework that could accommodate a variety of area protection requirements.

The Protocol on Environmental Protection to the Antarctic Treaty

The Madrid Protocol was adopted on 4 October 1991, and Annexes I–IV entered into force on 14 January 1998. Annex V was subject to different ratification, which occurred on 24 May 2002 (Committee for Environmental Protection 2002: para 67; Anon 2002a). The Madrid Protocol applies to the Antarctic Treaty Area (south of 60°S), and aims to comprehensively protect 'the Antarctic environment and dependent and associated ecosystems,' designating the entire continent as a 'natural reserve' devoted to 'peace and science' (Article 2). The Madrid Protocol signified a change of focus at Antarctic Treaty Consultative Meetings (ATCMs), from the once important priorities of security, peace, and non-nuclearisation, towards environmental considerations (Pinochet 1995; Boyd 2001). The five annexes of the Madrid Protocol contribute substantially to the comprehensive protection of the Antarctic environment, with Annex V outlining the measures for area protection and management.

The new PAS under the Madrid Protocol created one classification designed to protect areas, the Antarctic Specially Protected Area (ASPA), subsuming the SPA and SSSI. The second classification was predominantly for area management, the Antarctic Specially Managed Area (ASMA). HSMs can be designated as either ASPAs or ASMAs. Activities within ASPAs and ASMAs are 'prohibited, restricted or managed in accordance with Management Plans' which were made mandatory (Annex V, art 2). A permit is required for entry into an ASPA, and all activities must complete an Environmental Impact Assessment (EIA) before commencement (Annex I). Table 1 provides an overview of protected areas covered within the Antarctic PAS as at September 2002 (Anon 2002a; Environmental Research and Assessment 2002).

Annex V of the Madrid Protocol outlines values and examples of ASPAs (Annex V, art 3.1, and Annex V, art 3.2), stating that Parties should 'seek to identify, within

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Table 2. The Antarctic PAS: initiatives taken and future areas for improvement. Modified from: Smith and others 1994; Committee for Environmental Protection 1998; Valencia 2000. √ = further action required; x = completed.

Actions	Action required
'systematic environmental-geographical framework' development The New Zealand delegation reported on this issue (Anon 2001), and the CEP has encouraged a continuation of this work (CEP V, para 89). There is not agreement on the 'systematic environmental-geographical framework,' and investigations of the SCAR ecosystem matrices have found them to be helpful but not sufficient (Smith and others 1994: 4–5).	√
Site identification and prioritisation tools are required Some progress has been made here, such as the guidelines for implementation of the framework for protected areas set forth in Article 3, Annex V of the Environmental Protocol.	√
Management plan review SCAR now receive and evaluate all protected area proposals and make recommendations to the CEP and ATCM (Committee for Environmental Protection 1998, 2000; Anon 2000).	x
Management plan guidelines In 1998, guidelines for the preparation of management plans for ASPAs were adopted, but ASMAs have not yet been addressed (ATCM XXII, Resolution 2 (1998)).	√
Management plan updates to Annex V format All management plans, with the exception of two, have been updated to Annex V format (Anon 2002a).	√
Methodology for site monitoring/management SCAR has created a standard methodology for site monitoring and management, adopted at ATCM XXII. ASPAs are to be inspected every five years to ensure compliance with management plans.	x
Protected areas archive A protected areas database has been launched in September 2002 (Committee for Environmental Protection 2002; Environmental Research and Assessment 2002).	x
Align with international instruments ATPs acknowledged the need to consider international designations of areas of universal conservation values, however limited progress has been made to this end (Committee for Environmental Protection 1998; Wratt 2000).	√

a systematic environmental-geographical framework,' a network of sites, including:

- areas kept inviolate from human interference,
- representative ecosystems,
- important or unusual species assemblages, and
- type/only species localities.

Since sites can be designated for the protection of one or more values, the management plan details the values to be protected on the site, and the conditions under which a permit should be issued. Annex V, art 5 includes guidelines to assist parties in the formulation of management plans. These guidelines have been supplemented by the adoption of the *Guide to the preparation of management plans for Antarctic SPAs* in 1998 (ATCM Resolution XXII-2 1998).

Improving the Antarctic Protected Area System

Although Annex V only recently entered into force, ATPs have already adopted many of its measures (ATCM XVII, para 96). ATPs have applied themselves to the continued improvements of the PAS, facilitated by the principles of information exchange, reporting, and cooperation embedded in the Antarctic Treaty System (ATS). In 1992 a joint SCAR/World Conservation Union (IUCN) workshop on the Antarctic PAS was held (Smith and others 1994), with another workshop held in 1999 (Valencia 2000). These workshops identified a number of limitations to the Antarctic PAS, and ATPs have since implemented various initiatives to improve the Antarctic PAS (Table 2). Key limitations to the Antarctic PAS result from the *ad hoc* nature of site selection, which has led to gaps in coverage of all of the major ecosystems, including areas kept inviolate from human activities, inland lakes, and marine protected areas. Site identification and prioritisation were also recognised as requiring improvement, and the potential for the adoption of international approaches to improve the Antarctic PAS was acknowledged by Smith and others (1994), Rothwell (2000), and Valencia (2000). Efforts regarding Annex V have concentrated on its ratification, supporting documentation (management plans), and implementation (ATCM Resolution XXII-1 1998; ATCM Resolution XXII-2 1998; ATCM Resolution XXIII-6 1999, respectively). Updates to management plans to Annex V format have been completed for all but two of the 59 renumbered ASPAs as of September 2002 (ATCM XVII-3; Anon 2002a). Work towards the development of the 'systematic environmental-geographical framework' has been minor in comparison.

The guidelines for implementation of the framework for protected areas set forth in Article 3, Annex V of the Environmental Protocol were adopted under ATSCM XII, Resolution 1 (2000). These voluntary guidelines aimed to 'facilitate methodological assessment and designation of [ASPAs]' (ATSCM XII, Resolution 1 (2000): Section I-2), addressing the outstanding issue of formulating an

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approach for a 'systematic environmental-geographical framework.' The guidelines outline the factors to consider in the process of assessing, selecting, defining, and proposing new ASPAs: site values, designation objectives, site use, site quality, and finally threats/risks to the site (ATSCM XII, Resolution 1). The guidelines do not provide for the identification and prioritisation of sites, nor do they provide a process by which to improve the coverage and representativeness of the Antarctic PAS. So, whilst useful, the guidelines do not address all of the limitations of the Antarctic PAS.

The outstanding actions for improving the Antarctic PAS relate to the need to establish a 'systematic environmental-geographical framework' of protected areas. Some of the issues outlined in Table 2 are not necessarily limitations of Annex V itself, but limitations of ATPs in their implementation of Annex V. National authorities within the ATS have in some cases interpreted and implemented the Madrid Protocol differently, and ATPs are attempting to create standardised guidelines to avoid further discrepancies (Committee for Environmental Protection 2002, paras 26 and 77). There is a growing recognition amongst ATPs of the need to consider alternative international area protection approaches that may supplement and strengthen the measures currently in place for environmental protection (Committee for Environmental Protection 1998; Rothwell 2000).

Important Bird Areas

The global IBA Programme is an initiative between BirdLife and the World Conservation Union (IUCN) and seeks to identify and protect a network of sites critical for the viability of naturally occurring bird populations across their range (Barnes 1998; Fishpool and Evans 2001). Some sites play a crucial role in the survival of the taxa dependent upon the habitats and ecosystems in which they occur. Protection of critical sites is an effective and recognised approach in the conservation of many species. Since seabirds often congregate in high numbers and diversity, sites that support many bird species can be selected as IBAs (Pritchard and others 1992; Barnes 1998; Fishpool and Evans 2001). IBAs may be biologically diverse, therefore the conservation benefits for other species can be significant if these sites are identified and subsequently protected (Cooper and others 2000). IBAs are selected by the application of quantitative and robust criteria that provide a strong foundation for site identification. Table 3 outlines the IBA criteria and describes those adopted for the Antarctic IBA Inventory with the associated species.

The IBA Programme is a voluntary approach that aims to protect the world's bird populations and habitats, with BirdLife anticipating the identification of up to 20,000 IBAs worldwide (Fishpool and Evans 2001). The IBA concept evolved when the European Union (then the European Economic Community or EEC) compiled an inventory between 1979 and 1981 to identify sites eligible for designation under the EEC Wild Birds Directive. This inventory was revised to cover the whole of Europe (Grimmett and Jones 1989), leading to escalated interest in international initiatives for conservation. Five regional inventories have been undertaken since, with another three planned or underway. A further 43 national inventories have been completed or are underway, and two are planned. The growing support for the IBA Programme indicates the substantial contribution it has made to habitat-based conservation on a global scale (for further detail on the objectives of the IBA programme, refer to Fishpool and Evans 2001). The majority of signatories to the Antarctic Treaty (40 of 45) have undertaken or participated in IBA Inventories either at a national or regional scale (J. Harris, unpublished data).

Under Annex V of the Madrid Protocol, ATPs are obliged to identify and protect a network of sites, including, *inter alia*, 'representative examples of major terrestrial, including glacial and aquatic, ecosystems and marine ecosystems' (Annex V, art 2(b)) and 'areas with important or unusual assemblages of species, including major colonies of breeding native birds or mammals' (Annex V, art 2(c)). The Antarctic PAS can accommodate the IBA approach within Annex V of the Madrid Protocol, since IBA Inventories can either be incorporated into an existing PAS or form the basis of a new PAS (Fishpool and Evans 2001). IBAs do not conflict with the objectives of the Madrid Protocol as they are not protected areas; instead they are sites that are identified as having values of conservation significance on the basis of quantitative and systematic criteria. The Antarctic IBA Inventory can therefore assist ATPs in meeting their international obligations under Annex V.

The initiative to undertake an IBA Inventory for the Antarctic continent was proposed by BirdLife to the SCAR-BBS in 1998 (SCAR 1999; Dunn and others 1999). The SCAR-BBS has compiled all available data covering more than 30 years on the distribution and abundance of Antarctic breeding birds (for example, Woehler 1993; Croxall and others 1995; van Franeker and others 1999; Patterson and others, unpublished data). These data are the basis for the Antarctic IBA Inventory (Woehler and others 2002). The Antarctic IBA Inventory is the first practical attempt to take a systematic approach to site identification and prioritisation in the Antarctic.

Preliminary results

In May 2002, a joint SCAR-BBS and BirdLife workshop was held in Germany to compile a draft list of candidate Antarctic IBAs (Anon 2002b). Based upon the compiled seabird data, 119 candidate IBAs were identified. Of these, 22 candidate IBAs are already protected within 26 ASPAs, whilst the remaining 97 candidate IBAs are not currently protected under Annex V. All 33 remaining ASPAs were not identified as candidate IBAs, as they were designated to protect non-bird values.

Following the identification of sites, the IBA Inventory can assist in their prioritisation by incorporating the number of criteria each site met in its selection. Table 4

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Table 3. Summary of global Important Bird Area categories and criteria. Modified from BirdLife (2002) and Dunn and others (1999). * = For exact wording, refer to BirdLife (2002). ** = These criteria have been taken from the Convention for the Conservation of Wetlands of International Importance (RAMSAR), see http://www.ramsar.org/key_criteria.htm

Category		
A1: Globally threatened species	The site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern.	gentoo penguin (*Pygoscelis papua*) macaroni penguin (*Eudyptes chrysolophus*) southern giant petrel (*Macronectes giganteus*)
A2: Restricted-range species	Site holds species of restricted range.	Not used in the Antarctic IBA Inventory
A3: Biome-restricted assemblage	Site holds species whose distributions are largely restricted to one biome.	Not used in the Antarctic IBA Inventory
A4: Congregations	(i) ** Site is known or thought to hold, on a regular basis, more than 1% of a biogeographic population of a congregatory waterbird species.	kelp gull (*Larus dominicanus*) Antarctic tern (*Sterna vittata*) blue-eyed cormorant (*Phalacrocorax atriceps*)
	(ii) Site is known or thought to hold, on a regular basis, more than 1% of the global population of congregatory seabird or terrestrial species.	Antarctic petrel (*Thalassoica antarctica*) snow petrel (*Pagodroma nivea*) emperor penguin (*Aptenodytes forsteri*) Adélie penguin (*Pygoscelis adeliae*) chinstrap penguin (*Pygoscelis antarctica*) gentoo penguin (*Pygoscelis papua*) rockhopper penguin (*Eudyptes chrysocome*) Cape petrel (*Daption capense*) subantarctic skua (*Catharacta lonnbergi*) Antarctic skua (*Catharacta maccormicki*) greater sheathbill (*Chionis alba*) southern giant petrel (*Macronectes giganteus*) Wilson's storm petrel (*Oceanites oceanicus*) black-bellied storm petrel (*Fregetta tropica*) southern fulmar (*Fulmarus glacialoides*) Antarctic prion (*Pachyptila desolata*)
	(iii) ** Site is known or thought to hold, on a regular basis, more than 20,000 waterbirds or 10,000 pairs of seabirds of one or more species.	As for 4 (i) and 4 (ii)
	(iv) Migratory species at bottleneck sites.	Not used in the Antarctic IBA Inventory

outlines the number of candidate IBAs that met each criterion used in the selection process. Candidate IBAs can meet one or more criteria. Of the 119 candidate IBAs, five meet all four criteria used; eight meet three criteria; 39 meet two criteria and the remaining candidate IBAs (67) meet just one criterion.

The 13 candidate IBAs that meet three or four criteria are likely to be high priority sites worthy of immediate consideration for their inclusion in the Antarctic PAS based on bird values. As of June 2003, five of these candidate sites are already ASPAs (SCAR-BBS unpublished data). Assessment of the remaining candidate IBAs could be considered less urgent in the short term. Decisions regarding treatment of candidate IBAs are at the discretion of the responsible national authorities. Having demonstrated that the IBA Inventory can assist in site

Table 4. Candidate IBAs by the IBA selection criteria met. Source: SCAR-BBS (unpublished data). * = Candidate IBAs can meet multiple criteria; therefore the sum total of categories A1 to A4 is not equal to the total number of candidate IBAs identified.

Category		Candidate IBAs
A1	IUCN conservation status	21
A4 (i)	Congregatory waterbirds (>1% regional population)	21
A4 (ii)	Congregatory terrestrial/seabirds (>1% global population)	78
A4 (iii)	Congregations > 20,000 waterbirds and/or >10,000 terrestrial/seabirds	68
Total candidate IBAs		119

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Table 5. ASPA No. 102: Rookery Islands, candidate IBA status. Source: SCAR-BBS (unpublished data). √ = criterion met.

Category		Status	Bird breeding populations
A1	IUCN conservation status		
A4 (i)	Congregatory waterbirds (>1% regional population)		
A4 (ii)	Congregatory terrestrial/seabirds (>1% global population)	√	45,000 pairs Adélie penguin (*Pygoscelis adeliae*)
A4 (iii)	Congregations > 20,000 waterbirds and/or > 10,000 terrestrial/seabirds	√	45,000 pairs Adélie penguin (*Pygoscelis adeliae*)

identification and prioritisation, two case studies are used to assess the contribution that IBAs can make to the Antarctic PAS.

ASPA 102, Rookery Islands

Under the Agreed Measures, Australia nominated SPA 2 (now ASPA 102) at 1966 ATCM IV-2. The Rookery Islands are located at 67°37'S 62°33'E, approximately 12 km west of Mawson Station. At the time, there were no prerequisites regarding the information required for designations, and management plans were not required. In 1992 a management plan was adopted at ATCM XVII-2, following the structure outlined in Annex V, art 5. The management plan describes in greater detail the site's features, values, management objectives and activities, restrictions, and permit conditions. ASPA 102 is protected for its bird assemblages and congregations, recognising the importance of preserving their habitat, and the need to ensure that human activities and scientific research do not affect the southern giant petrel population due to its elevated conservation status (ATCM XVIII-2).

ASPA 102 has been identified as a candidate IBA as it meets two of the four global IBA criteria applied in the Antarctic (Table 5). The first criterion is A4(ii), 'greater than 1% of the global population of a species.' The Rookery Islands host approximately 2% of the global population of Adélie penguins. Also, because the Adélie penguins (*Pygoscelis adeliae*) congregate in such high numbers, it meets criterion A4(iii), 'over 10,000 birds congregating' within the ASPA. The IBA candidacy verifies the importance and conservation values of the Rookery Islands ASPA with regard to bird values as outlined in Table 5, and quantifies the bird values against globally recognised and comparable criteria.

Scullin and Murray Monoliths

Scullin and Murray Monoliths (67°23′S 64°02′E) are located in Mac.Robertson Land, approximately 160 km east of Mawson Station. Both have experienced an increase in commercial tourist visitation in the last decade (E.J. Woehler, unpublished data). Neither Monolith is currently protected under Annex V of the Madrid Protocol. Scullin and Murray Monoliths have been identified as a candidate IBA on the basis of meeting criterion A4(ii), 'congregations of >1% of the global population of a congregatory terrestrial/seabird,' and criterion A4(iii), 'congregations > 20,000 waterbirds; and/or >10,000 terrestrial/seabirds' (Table 6). The site is habitat for more than 31% of the known global breeding population of Antarctic petrels (*Thalassoica antarctica*), 2% of Adélie penguins, and 1200 snow petrels (*Pagodroma nivea*). The high numbers and diversity of species assembling at the Monoliths supports its high conservation value. The designation of Scullin and Murray Monoliths as an

Table 6. Scullin and Murray Monoliths, candidate IBA status. Source: SCAR-BBS (unpublished data). √ = criterion met.

Category		Status	Bird breeding populations
A1	IUCN conservation status		
A4 (i)	Congregatory waterbirds (> 1% regional population)		
A4 (ii)	Congregatory terrestrial/seabirds (> 1% global population)	√	157,000 pairs Antarctic petrel (*Thalassoica antarctica*)
		√	50,000 pairs Adélie penguin (*Pygoscelis adeliae*)
A4 (iii)	Congregations > 20,000 waterbirds and/or > 10,000 terrestrial/seabirds	√	157,000 pairs Antarctic petrel (*Thalassoica antarctica*)
		√	50,000 pairs Adélie penguin (*Pygoscelis adeliae*)
		√	1200 pairs snow petrel (*Pagodroma nivea*)

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Table 7. Analysis of Annex V versus the IBA approach. √ = criterion met; (√) = criterion partially met; x = criterion not met.

	Criteria	Protocol (Annex V)	IBAs
'Systematic environmental-geographic framework'	Site identification process	x	(√)
	Quantitative assessment	x	√
	Site prioritisation process	x	√
	Values-based	√	√
	PAS framework	√	x
	Dependent and associated ecosystems	(√)	(√)
	International support	(√)	√

ASPA would be likely to have positive implications for other Antarctic fauna and flora present (E.J. Woehler, unpublished data).

Discussion

The Antarctic continent is governed by various measures for environmental protection contained within the instruments of the ATS. The Madrid Protocol provides a strong framework for area protection, advocating a precautionary approach. Annex I ensures that an EIA is completed for all proposed activities in the Antarctic. Annex II regulates human activity regarding treatment of flora and fauna, incorporating a permit system and creating Specially Protected Species. Many national authorities have their own guidelines regarding conduct in the Antarctic (for example, Harris 2001). These measures contribute to the protection of the Antarctic environment beyond Annex V of the Madrid Protocol.

Annex V of the Madrid Protocol recognises that some sites require greater protection than that provided within the Antarctic Treaty and the Annexes I to IV of the Madrid Protocol. Annex V provides a legal framework within which to designate protected areas, which are protected and managed as appropriate. Annex V, art 3 can assist in site identification as it outlines values to be protected. Annex V does not, however, provide a quantitative methodology by which to identify or prioritise sites for protection.

The data used for the Antarctic IBA Inventory are considered comprehensive and geographically balanced (Cooper and others 2000). The application of IBA criteria to the SCAR-BBS database allows for the identification and prioritisation of terrestrial sites based on their bird values, partially addressing the need for a 'systematic environmental-geographical framework' required within Annex V. IBAs provide a quantitative, values-based approach to site identification. No such approach has been applied to the Antarctic PAS before.

The IBA Inventory can be used to nominate sites for inclusion within the PAS. Although the IBA Programme is voluntary and not legally binding, Annex V can compensate for these limitations if sites are nominated under Annex V. These decisions are at the discretion of national authorities. There is growing international support for the IBA Programme, manifested by the increasing selection of IBA sites globally. The CEP will be assessing the outcomes of the IBA Inventory to apply the results to the Antarctic as appropriate (Committee for Environmental Protection 2002, para 47). The IBA approach advocates the protection of dependent and associated ecosystems in that it takes habitat- and species-based approaches to conservation. A comparison of Annex V and the IBA approach is presented in Table 7, which demonstrates how the IBA approach can make a positive contribution to the Antarctic PAS.

The Antarctic IBA Inventory takes a holistic approach to site identification on the basis of bird values and supports the need for significant breeding bird sites to be identified and possibly protected as ASPAs. Both ASPA 102 and Scullin and Murray Monoliths (among other sites) have been identified as candidate IBAs. The values identified for ASPA 102 supplement the existing information on the site and verify its status based upon bird values. Scullin and Murray Monoliths' IBA candidacy highlights their importance to national authorities and the designation of the Monoliths as an ASPA would have positive implications for birds and other biota present on the site.

Completion of the Antarctic IBA Inventory is anticipated during 2005. National authorities can then choose whether or not to implement protection measures for sites listed in the Inventory. For those national authorities that choose to maintain the status quo, the Inventory will nevertheless provide baseline data for sites within their area of management. If there are no threats to identified sites, national authorities may be able to justify maintaining the status quo. Conversely, where a site has exceptionally high conservation values (for example, Scullin and Murray Monoliths with more than 30% of the known Antarctic petrel population breeding on-site), there may be justification for immediate protection, potentially as a site kept inviolate from human activities.

Adoption of the IBA Inventory should promote and assist in the prioritisation and designation of new sites for protection in the Antarctic, addressing some of the outstanding issues of the PAS. However, a number of issues will require further attention, and are not resolved by the IBA approach in isolation. These include:

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- addressing the establishment of a network of sites within a 'systematic environmental-geographical framework' — particularly coverage issues pertaining to identification and prioritisation of sites with non-bird values
- the identification of marine protected areas to be incorporated into the PAS
- resolution of site management issues — promoting consistency of management plans, compliance, effective implementation, and monitoring
- political will, cooperation, and implementation at a national level
- promotion of environmental protection, and compliance and regulation of non-ATPs.

The IBA Inventory is not intended as a stand-alone instrument for site protection, nor does it override pre-existing determinations regarding the values and management of sites. Instead, the IBA Inventory supplements the existing PAS by providing quantitative and internationally recognised criteria, improving the information that can be incorporated into the next revision of the site's management plan. National authorities can use this information, together with their own knowledge and assessment of the site, to determine how it should be managed in the light of any threats to the preservation of its values and to modify the management plan if appropriate. Here we have undertaken the first assessment of applying the IBA approach to improve the existing Antarctic PAS. The assessment has identified strengths of the IBA approach for site identification and prioritisation and highlighted the contribution that can be made by the adoption of the Antarctic continent IBA Inventory.

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