Management Plan for
Antarctic Specially Protected Area No. 117
AVIAN ISLAND, MARGUERITE BAY, ANTARCTIC PENINSULA

1. Description of values to be protected

Avian Island (Latitude 67°46' S, Longitude 68°54' W, 0.49 km^2), is situated in northwestern Marguerite Bay, 400 m south of Adelaide Island on the western side of the central Antarctic Peninsula. It was originally designated as Site of Special Scientific Interest (SSSI) No. 30 under Recommendation XV-6 in 1989 after a proposal by the United Kingdom. Included was the island together with its littoral zone, but excluded was a small area near a refuge on the northwestern coast of the island. Values protected under the original designation were described as the abundance and diversity of breeding seabirds present on the island, that the southern giant petrel (*Macronectes giganteus*) colony is one of the most southerly known breeding population of this species, and that the blue-eyed cormorants (*Phalacrocorax atriceps*) are breeding close to the southern limit of their range. The Area was therefore considered of outstanding ornithological importance, meriting protection from unnecessary human disturbance.

Designation as an SSSI was terminated with redesignation of Avian Island as a Specially Protected Area (SPA) through Recommendation XVI-4 (1990, SPA No. 21) after a proposal by the United Kingdom. The boundaries were similar to the original SSSI, but included the entire island and the littoral zone without the exclusion zone near the refuge on the northwestern coast. The values protected were the same as for the SSSI, but with attention drawn to the additional important values of:

- "35,600 pairs of Adélie penguins (*Pygoscelis adeliae*), which is the largest Adélie colony on the Antarctic Peninsula, containing a third of the total breeding population of the region";
- "670 pairs of blue-eyed cormorants, which are close to the southern limit of their breeding range, and one of the largest known breeding colonies in the Antarctic, representing approximately 85% of the total population breeding south of the Antarctic Circle".

While the size of the Avian Island Adélie penguin colony on the Antarctic Peninsula is not substantiated by recent data, this colony and those of several other resident species are nonetheless some of the largest in the region, and the values noted in the original SSSI and subsequent SPA designations are generally reaffirmed in the present management plan. Further values evident from scientific descriptions of Avian Island are also considered important reasons for special protection of the Area. These values are:

- the outstanding and unique attribute of being the only known site on the Antarctic Peninsula where seven seabird species are breeding in such close proximity to each other within the confined space of a single, small island, with unusually high population densities and virtually the whole island occupied by breeding birds throughout the summer;
- Representation of seven of the seabird species breeding along the Antarctic Peninsula;
- the southern giant petrel colony is one of the two largest on the Antarctic Peninsula, comprising about one-fifth of the population south of the South Shetland Islands, and these birds are extremely vulnerable to disturbance;
- the kelp gull (*Larus dominicanus*) colony is also large and is breeding near the southern extent of its range;

- the southernmost record of breeding brown skuas (*Catharacta loennbergi*) in the Antarctic Peninsula region was noted on Avian Island in 1978-79;
- the moss *Warnstorfia laculosa* (=*Calliergidium austro-stramineum*) on Avian Island is at the southern limit of its known range.

The boundaries of the Area designated under Recommendation XVI-4 have been changed in this management plan to include offshore islets and rocks previously excluded.

2. Aims and objectives

Management at Avian Island aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance;
- allow scientific research on the ecosystem and physical environment, particularly on the avifauna, provided it is for compelling reasons which cannot be served elsewhere;
- minimise the risk of introduction of pathogens which may cause disease in bird or mammal populations within the Area;
- minimise the possibility of introduction of alien plants, animals and microbes to the Area;
- gather data on the population status of the seabirds on the island on a regular basis, preferably for all resident breeding species at least once every five years;
- allow visits for management purposes in support of the aims of the management plan.

3. Management activities

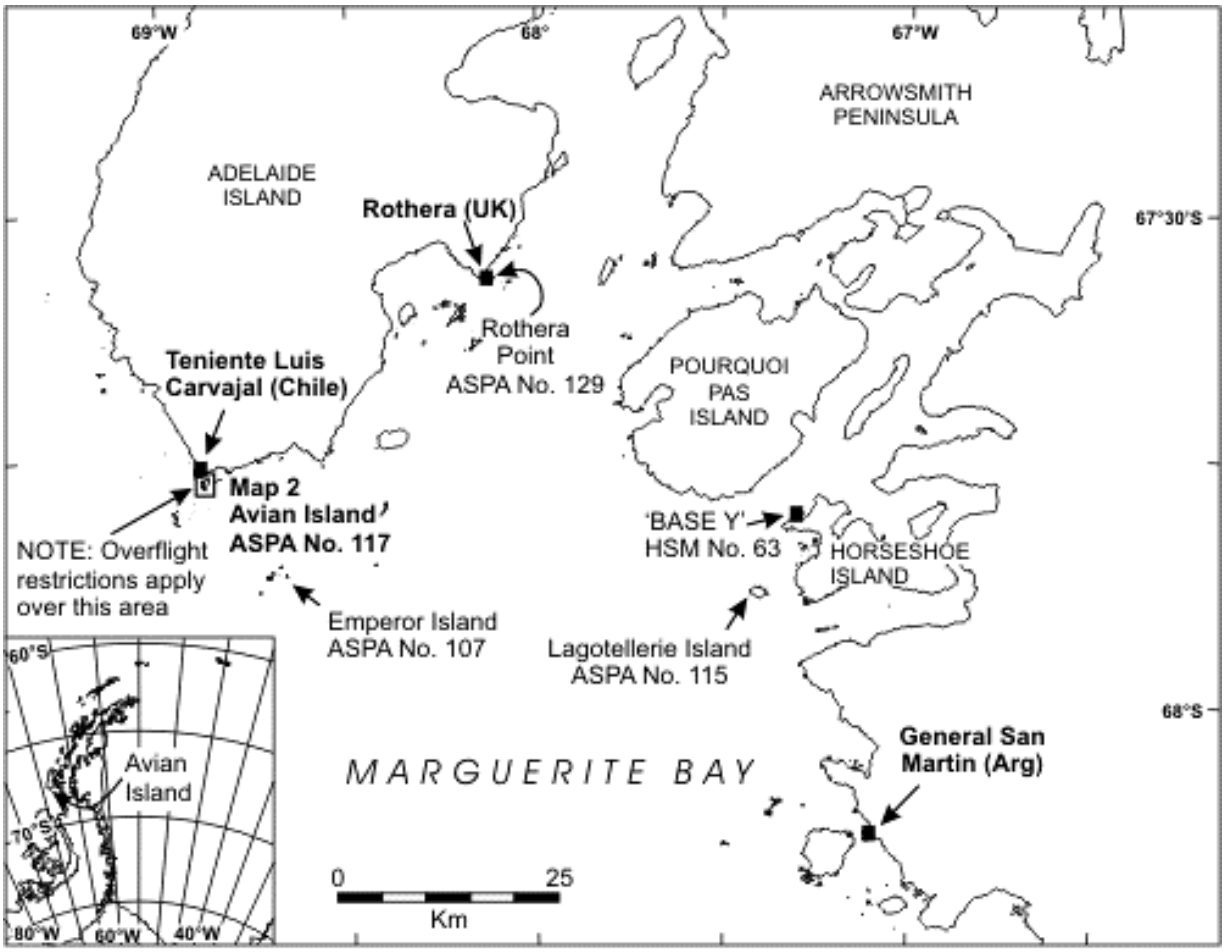
The following management activities shall be undertaken to protect the values of the Area:

- A map showing the location of the Area (stating the special restrictions that apply) shall be displayed prominently at the stations Teniente Luis Carvajal (Chile), Rothera (UK) and General San Martín (Argentina), where copies of this management plan shall also be made available.
- Signs showing the location and boundaries of the Area with clear statements of entry restrictions shall be placed in prominent positions on the northwestern and eastern coasts of the island (Map 2), to help avoid inadvertent entry.
- Markers, signs or other structures erected within the Area for scientific or management purposes shall be secured and maintained in good condition or removed.
- Visits shall be made as necessary (no less than once every five years) to assess whether the Area continues to serve the purposes for which it was designated, and in particular to conduct bird censuses, and to ensure management and maintenance measures are adequate.

4. Period of designation

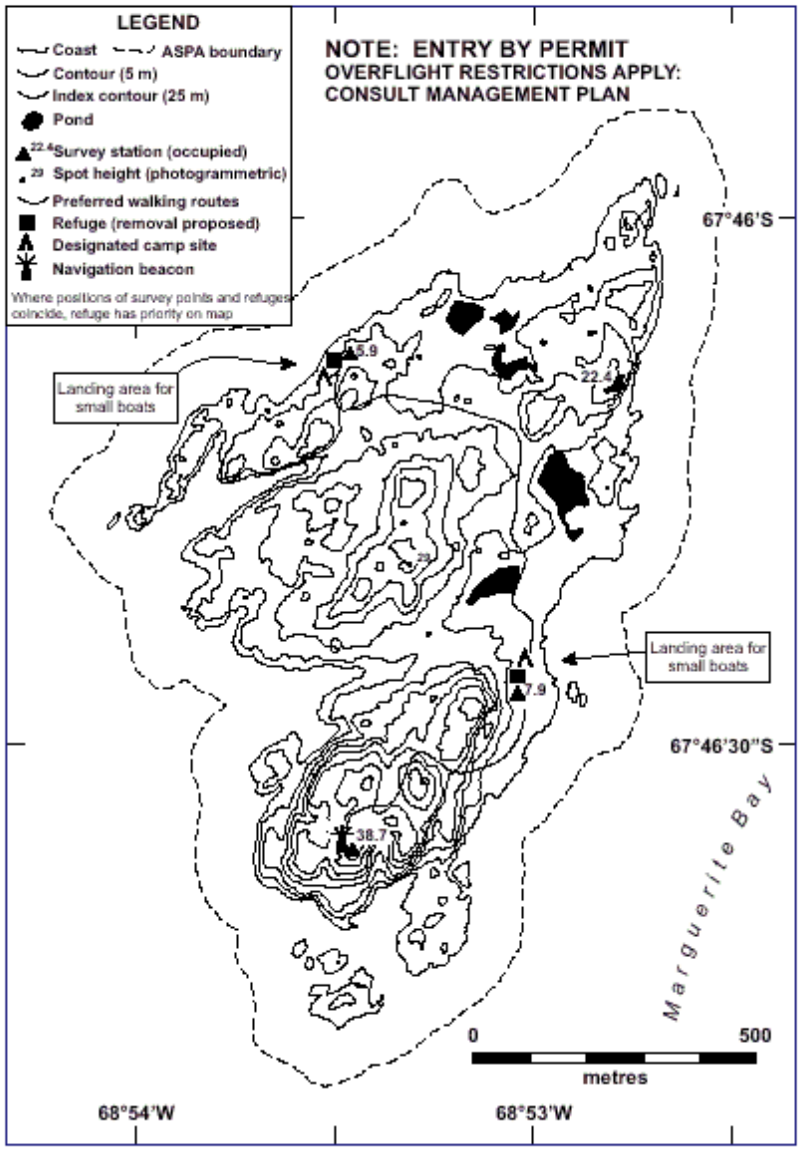
Designated for an indefinite period.

5. Maps and photographs



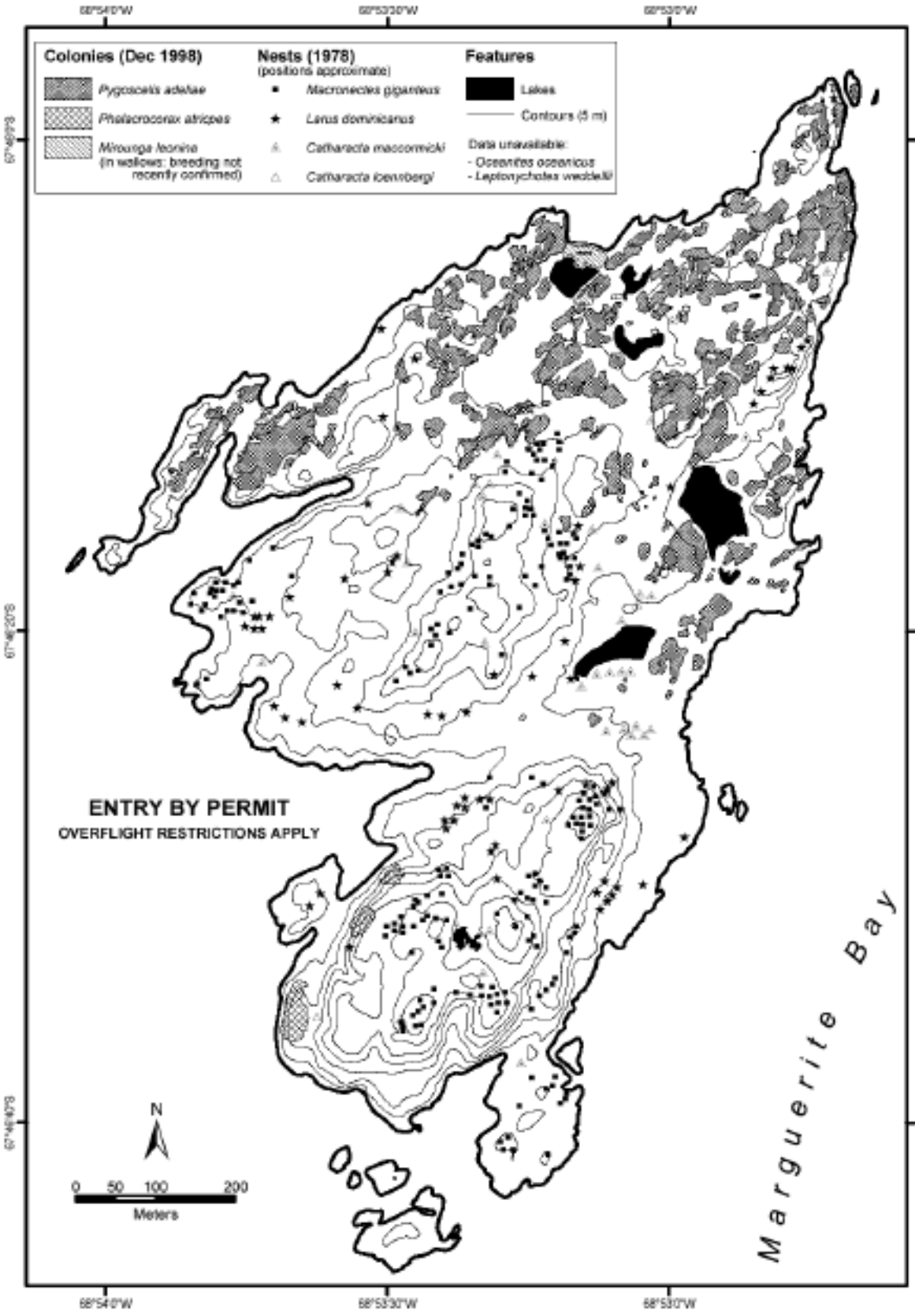
Map 1. Avian Island, ASPA No. 117, Marguerite Bay, Antarctic Peninsula, location map.

Map 1: Avian Island, ASPA No. 117, in relation to Marguerite Bay, showing the locations of the stations Teniente Luis Carvajal (Chile), Rothera (UK) and General San Martín (Argentina). The location of other protected areas within Marguerite Bay (ASPA No. 107 at Emperor Island (Dion Islands), ASPA No. 115 at Lagotellerie Island, and ASPA No. 129 at Rothera Point) are also shown. Inset: the location of Avian Island on the Antarctic Peninsula.



Map 2. Avian Island, ASPA No. 117
Marguerite Bay, Antarctic Peninsula
Topographic map

Map 2: Avian Island, ASPA No. 117, topographic map. Map specifications – Projection: Lambert Conformal Conic; Standard parallels: 1st 67°30'00"S; 2nd 68°00'00"S; Central Meridian: 68°55'00"W; Latitude of Origin: 68°00'00"S; Spheroid: WGS84; Datum: Mean sea level; Vertical contour interval 5 m; Horizontal accuracy: ± 5 m; vertical accuracy ±1.5 m.



Data sources:
Poncet, S. 1982. *Le Grand Hiver.*
BAS aerial photography Dec 1998.

Map 3. Avian Island, ASPA No. 117
Distribution of breeding wildlife

Prepared by:
Environmental Research and Assessment
Cambridge, July 2002

Map 3: Avian Island, ASPA No. 117, distribution of breeding wildlife. Map derived from ground survey and digital orthophotography (ground pixel resolution 25cm; source aerial photography taken 15 December 1998 by the British Antarctic Survey). Adélie penguin (*Pygoscelis adeliae*) and elephant seal (*Mirounga leonina*) distributions are digitised from the orthophotograph. Nests of other species are derived from a sketch map and ground survey conducted in 1978 (Poncet 1982), with positions approximate. Note: data on distributions for other breeding species are unavailable. Map specifications are the same as for Map 2.

6. Description of the Area

6(i) Geographical coordinates, boundary markers and natural features

GENERAL DESCRIPTION

Avian Island (Latitude 67°46' S, Longitude 68°54' W, 0.49 km^2), is situated in the northwest of Marguerite Bay, 400 m south of the southwestern extremity of Adelaide Island (Map 1). The island is 1.45 km long by 0.8 km at its widest, and is of roughly triangular shape. It is rocky with a low relief of generally less than 10 m in the north, rising to about 30 m at the centre, and 40 m in the south where several rock and ice slopes of up to 30 m drop steeply to the sea. The coastline is irregular and rocky with numerous offshore islets, although there are several accessible beaches on the northern and eastern coasts. The island is usually ice-free in summer. It contains habitat particularly suitable for a variety of breeding birds: well-drained north-facing slopes suitable for blue-eyed cormorants (*Phalacrocorax atriceps*); broken rock and boulders with crevices suitable for small nesting birds such as Wilson's storm petrels (*Oceanites oceanicus*); elevated rocky heights suitable for southern giant petrels (*Macronectes giganteus*); extensive expanses of snow-free ground for Adélie penguins (*Pygoscelis adeliae*). The presence of the latter attracts skuas (*Catharacta maccormicki* and *C. loennbergi*) and kelp gulls (*Larus dominicanus*). For a detailed description of the geology and biology of the Area see Annex 1.

BOUNDARIES

The designated Area comprises the whole of Avian Island and the littoral zone, offshore islets and rocks, and a buffer zone of the surrounding marine environment (including sea ice when present) within 100 m of the shoreline of the main island (Map 2). Boundary markers have not been installed because the coast forms a visually obvious reference for the marine boundary.

6(ii) Restricted and managed zones within the Area

None.

6(iii) Structures within and near the Area

Two small abandoned refuges and two beacon structures are present within the Area. A refuge erected by Chile in 1962 is located on the northwestern coast of the island at latitude 67°46'16" S, longitude 68°54'00" W. A refuge constructed by Argentina in 1957 is 650 m SE of this position, on the eastern coast at latitude 67°46'39" S, longitude 68°53'35" W. Both refuges

were in a poor state of repair in February 2001. Further deterioration of the huts has potential to impact on nesting birds.

An old iron frame structure, believed to have been erected by the UK during the operation of Adelaide Base, and used as a navigational aid, is located at approximately 38 m near the highest point of the island. The structure remains standing, although it is rusting.

A new beacon was constructed by Chile in February 1998 on an adjacent site at a similar elevation. This structure is a solid cylindrical painted iron tower of approximately 2 m diameter and 2.5 m in height, set in a concrete pad of approximately 2.5 x 2.5 m. A lit beacon, protective rails and solar panels are affixed to the top of the structure. No other structures are known to exist on the island.

Four survey control markers were installed on the island on 31 January 1999 (Map 2). The southernmost marker is located adjacent to the navigation beacon and consists of a survey nail in bedrock covered by a cairn. A similar marker is installed on the high point of the low ridge on the northeastern coast of the island, also covered by a cairn. The remaining two markers are survey nails affixed to the roof of each of the refuges. Two signs marking the Area shall be installed in prominent positions on the northwestern and eastern coasts of the island.

The nearest scientific research station is 1.2 km northwest at Teniente Luis Carvajal (Chile), on southern Adelaide Island (latitude 67°46' S, longitude 68°55' W). Since 1982 this has been operated as a summer-only facility, open from October until March. Over this period the station has generally accommodated up to 10 personnel. Formerly, this facility was established and operated continuously by the UK from 1961 until 1977.

6(iv) Location of other protected areas within close proximity of the Area

The nearest protected areas to Avian Island are the Dion Islands (ASPA No. 107) about 12.5 km SSE, Rothera Point (ASPA No. 129) 40 km to the NE, and Lagotellerie Island (ASPA No. 115) 65 km east (Map 1).

7. Permit conditions

Entry into the Area is prohibited except in accordance with a Permit issued by an appropriate national authority. Conditions for issuing a Permit to enter the Area are that:

- it is issued only for compelling scientific reasons that cannot be served elsewhere, in particular for scientific study of the avifauna and ecosystem of the Area, or for essential management purposes consistent with plan objectives such as inspection, maintenance or review;
- the actions permitted will not jeopardise the values of the Area;
- any management activities are in support of the objectives of the management plan;
- the actions permitted are in accordance with the management plan;
- the Permit, or an authorised copy, shall be carried within the Area;
- a visit report shall be supplied to the authority named in the Permit;
- permits shall be issued for a stated period;

- the appropriate authority should be notified of any activities/measures undertaken that were not included in the authorised Permit.

7(i) Access to and movement within the Area

- Vehicles are prohibited on land within the Area. All movement on land within the Area shall be on foot. Movement within the Area on foot shall be by routes that minimise any disturbance to breeding birds, and to achieve this it may be necessary to take a longer route to the destination than would otherwise be the case. A preferred walking route, which avoids the most sensitive bird breeding sites, should be used when traversing across the central part of the island where movement in this area is necessary (Map 2). The designated route extends from the central eastern coast up the eastern slopes of the hill (Map 2). Visitors should bear in mind that specific nest sites may vary from year to year, and some variations on the recommended route may be preferable: the route is intended as a guide, and visitors are expected to exercise good judgement to minimise the effects of their presence. In other areas, and where practical and safe, it is usually preferable to adopt a route that follows the coastline of the Area.
- Access into areas where southern giant petrels are nesting (Map 3) shall only be undertaken for purposes specified in the Permit. When access to the beacon is necessary (e.g. for maintenance), visitors shall follow the designated access route as closely as possible, trying to avoid nesting birds. Much of the area leading up to and surrounding the beacon is occupied by breeding petrels, so great care must be exercised.
- Movements should be slow, noise kept to a minimum, and the maximum distance practicable should be maintained from nesting birds.
- Visitors shall watch carefully for signs of agitation and preferably retreat from approach if significant disturbance is observed.
- Small boat landings should be made at the designated locations on the central northwestern coast or on the central eastern coast of the island (Map 2). If sea or ice conditions render this impractical, small boat landings may be made elsewhere along the coast as conditions allow.
- Access by vehicle to the coast when sea ice is present should also use these access points, and vehicles shall be parked at the shore.
- Travel by small boat or vehicle within the marine part of the Area is not confined to specific routes, but shall be by the shortest route consistent with the objectives and requirements of the permitted activities. Vehicle or boat crew, or other people on vehicles or boats, are prohibited from moving on foot beyond the immediate vicinity of the landing site unless specifically authorised by Permit.
- Aircraft should avoid landing within the Area throughout the year. Restrictions on overflight also apply (see Table 1below). A Permit may be granted for helicopter use when this is considered necessary for essential purposes and where there is no practical alternative, such as for the installation, maintenance or removal of structures. In such instances the need for helicopter access, including alternatives, and the potential disturbance to breeding birds shall be adequately assessed before a Permit may be granted. Such a Permit shall clearly define the conditions for helicopter access based on the findings of the assessment.

Table 1: Aircraft overflight restrictions applying year-round at Avian Island.

		Minimum approach distance (m)			
		Vertical (above ground)		**Horizontal**	
Aircraft type	**Number of engines**	***Feet***	**Metres**	***Feet***	**Metres**
Helicopter	1	*2460*	750	*2460*	750

Helicopter	2	*3300*	1000	*3300*	1000
Fixed-wing	1 or 2	*1480*	450	*1480*	450
Fixed-wing	4	*3300*	1000	*3300*	1000

7(ii) Activities that are or may be conducted in the Area, including restrictions on time or place

- Scientific research that will not jeopardise the avifauna or ecosystem of the Area, and which is for compelling reasons that cannot be served elsewhere;
- Essential management activities, including monitoring;

Restrictions on times at which activities may be conducted apply within the Area, and are specified in the relevant sections of this management plan.

7(iii) Installation, modification or removal of structures

Structures shall not be erected within the Area except as specified in a Permit. Any new or additional permanent structures are prohibited. Existing abandoned or dilapidated structures should be removed or renovated. Small temporary hides, blinds or screens may be constructed for the purpose of scientific study of the avifauna. Before a Permit may be granted for the installation, modification or removal of structures, an adequate environmental impact assessment shall be undertaken. Installation, modification, maintenance or removal of structures shall be undertaken in a manner that minimises disturbance to breeding birds. Such activities shall be undertaken between 1 February and 30 September inclusive to avoid the main breeding season. All structures, scientific equipment, hides or markers installed within the Area must be approved by Permit for a specified period, clearly identified by country, name of the principal investigator and year of installation. All such items should be made of materials that pose minimal risk of harm to bird populations or of contamination of the Area. Removal of specific equipment, hides or markers for which the period specified in the Permit has expired shall be a condition of the Permit.

7(iv) Location of field camps

Camping should be avoided within the Area. However, when necessary for purposes specified in the Permit, temporary camping is allowed at two designated campsites: one on the central eastern coast of the island, the other on the central northwestern coast of the Area (Map 2).

7(v) Restrictions on materials and organisms that can be brought into the Area

No living animals, plant material or microorganisms shall be deliberately introduced into the Area and the precautions listed in 7(ix) below shall be taken to prevent accidental introductions. In view of the presence of significant breeding bird colonies on the island, poultry products, including products containing uncooked dried eggs, are prohibited within the Area. No herbicides or pesticides shall be brought into the Area. Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes specified in the Permit, shall be removed from the Area at or before the conclusion of the activity for which the Permit was granted. Fuel is not to be stored in the Area, unless specifically authorised by Permit for specific scientific or management purposes. Refuelling of aircraft or vehicles is prohibited on land within the Area. Anything introduced shall be for a stated period only, shall be removed at or before the conclusion of that stated period, and shall be stored and handled so that risk of any introduction into the environment is minimised. If release occurs

which is likely to compromise the values of the Area, removal is encouraged only where the impact of removal is not likely to be greater than that of leaving the material *in situ*. The appropriate authority should be notified of anything released and not removed that was not included in the authorised Permit.

7(vi) Taking or harmful interference with native flora or fauna

Taking or harmful interference with native flora or fauna is prohibited, except by Permit issued in accordance with Annex II to the Protocol on Environmental Protection to the Antarctic Treaty. Where taking or harmful interference with animals is involved, the *SCAR Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica* should be used as a minimum standard.

7(vii) Collection or removal of anything not brought into the Area by the Permit holder

Material may be collected or removed from the Area only in accordance with a Permit and should be limited to the minimum necessary to meet scientific or management needs. Permits shall not be granted if there is a reasonable concern that the sampling proposed would take, remove or damage such quantities of soil, native flora or fauna that their distribution or abundance on Avian Island would be significantly affected. Samples of flora or fauna found dead within the Area may be removed for analysis or audit without prior authorisation by Permit. Material of recent human origin likely to compromise the values of the Area, which was not brought into the Area by the Permit Holder, or is not otherwise authorised, shall be removed unless the impact of removal is likely to be greater than leaving the material *in situ*: if this is the case the appropriate authority should be notified.

7(viii) Disposal of waste

All wastes, except human wastes, shall be removed from the Area. Human wastes shall be removed from the Area or disposed of into the sea.

7(ix) Measures that are necessary to ensure that the aims and objectives of the Management Plan can continue to be met

1. Permits may be granted to enter the Area to carry out monitoring and site inspection activities, which may involve the small-scale collection of samples for analysis or review, or for protective measures.
2. Any specific long-term monitoring sites shall be appropriately marked.
3. To help maintain the ecological and scientific values found at Avian Island visitors shall take special precautions against introductions. Of concern are pathogenic, microbial or plant introductions sourced from other Antarctic sites, including stations, or from regions outside Antarctica. Visitors shall ensure that sampling equipment or markers brought into the Area are cleaned or sterilised. To the maximum extent practicable, footwear and other equipment used or brought into the Area (including backpacks, carry-bags and tents) shall be thoroughly cleaned before entering the Area.
4. Poultry products and other introduced avian products, which may be a vector of avian diseases, are prohibited within the Area.

7(x) Requirements for reports

Parties should ensure that the principal holder for each Permit issued submits to the appropriate authority a report describing the activities undertaken. Such reports should include, as appropriate, the information identified in the Visit Report form suggested by SCAR. Parties should maintain a record of such activities and, in the Annual Exchange of Information, should provide summary descriptions of activities conducted by persons subject to their jurisdiction, which should be in sufficient detail to allow evaluation of the effectiveness of the management plan. Parties should, wherever possible, deposit originals or copies of such original reports in a publicly accessible archive to maintain a record of usage, to be used both in any review of the management plan and in organising the scientific use of the Area.

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6(i) Additional information on the natural features of the Area.

CLIMATE AND SEA ICE

No extended meteorological records are available for Avian Island, but records from 1962-74 for Adelaide Base (formerly UK; now Teniente Luis Carvajal, Chile), 1.2 km distant, show a mean daily maximum temperature of 3ºC in February (extreme maximum 9ºC) and a mean daily minimum of -8ºC in August (extreme minimum -44ºC). The same general pattern was observed in year-round observations made on the island in 1978-79 (Poncet and Poncet 1979). Precipitation on the island in this year was usually as snow, most of which fell between August and October, but with occasional snowfalls and some rain in the summer.

Marguerite Bay usually freezes in winter, although the extent and character of sea ice shows considerable inter-seasonal variation. Occasionally Marguerite Bay may not clear of ice completely until February or March, at which time the sea may again begin to freeze. Despite the extent and frequent persistence of regional sea ice, a recurrent polynya has been observed near Avian Island, which can provide locally ice-free conditions from October onward. In addition, strong tidal currents around Avian Island help to keep surrounding waters ice-free for much of the year, which facilitates easy access to feeding grounds for several species. The island is not particularly windy, with an annual average of 10 knots in 1978-79. However, the strong katabatic winds that descend from Adelaide Island, perhaps for 1-3 days a few times every month, reduce snow accumulation on the island and push sea ice away from the coast, helping to form the polynya. The relatively snow-free conditions are important for bird colonisation.

GEOLOGY, GEOMORPHOLOGY AND SOILS

The bedrock of Avian Island forms the eastern limb of a NNE – SSW trending synclinal structure at the southwestern end of Adelaide Island and is composed of interbedded lithic-rich and feldspar-rich volcaniclastic sandstones. Bedded tuffaceaous sandstones, pebbly sandstones rich in volcanic lithics, and a volcanic granule breccia also occur. The latter is probably a primary volcanic deposit, while the rest of the sequence is largely composed of reworked volcanic material. The sequence forms part of the Antarctic Peninsula Volcanic Group and is of Jurassic to early Tertiary age (Griffiths 1992, Moyes *et al* 1994). Apart from rock outcrop, the surface consists mainly of frost-shattered rock with permafrost. Ornithogenic soils are widespread, particularly in the north; organic peat soil is virtually absent, but where present is not well developed and is associated with moss growth. Several raised beaches have been noted on Avian Island, but the geomorphology has not otherwise been described.

STREAMS AND LAKES

Avian Island has several ephemeral freshwater ponds of up to 10,000 m^2 and of about 40 cm in depth, the largest being on the eastern coast, at about 5 m altitude, and on the north-western coast near sea level. Numerous small pools and meltwater channels develop from seasonal snow melt, and small streams drain valleys in the vicinity of the ponds. Both the ponds and melt-pools freeze solid in winter. Freshwater bodies on the island are organically enriched by guano, a source

of nutrients, and in summer a number of the ponds show a rich benthic flora and fauna of algae, phyllopods, copepods, Nematoda, Protozoa, Rotifera, and Tardigrada. Large numbers of the crustacean *Branchinecta* sp. have also been observed (Poncet and Poncet 1979). The freshwater ecology of the island has not been studied in detail.

BREEDING BIRDS

Seven species of birds breed on Avian Island, which is a relatively high number compared to other sites on the Antarctic Peninsula. Several species have unusually high populations, being some of the largest for their species in the Antarctic Peninsula region (Map 3). Detailed year-round data for all species were collected in 1978-79 (Poncet and Poncet 1979), while data are otherwise sporadic. Descriptions below are thus often based on a single season's observations and it should be emphasised that these data are therefore not necessarily representative of longer-term population trends. However, this is the best information that is presently available.

The most recent data available for Adélie penguins (*Pygoscelis adeliae*) on Avian Island indicated a population of 35,600 breeding pairs (11/11/78) (Poncet and Poncet 1979, Woehler 1993). The colony occupies the northern half and central eastern coast of the island (Map 3). The former management plan referred to the Avian Island colony as "the largest on the Antarctic Peninsula [containing] a third of the total population breeding in the region". While this is not substantiated by recent data (e.g. one Antarctic Peninsula colony has over 120,000 pairs and several others have over 30,000 (Woehler 1993)), the Avian Island colony represents one of the largest breeding populations in this region. It contains perhaps as much as 9% of the total Adélie breeding population along the Antarctic Peninsula, excluding the South Shetland Islands.

In 1978-79 Adélie penguins were recorded on the island from October until the end of April, with egg laying occurring through October and November, and the first chicks hatching around mid-December. Chick créches were observed around mid-January, with the first chicks becoming independent near the end of January. Most of the moulting adults and independent chicks had departed the island by the third week of February, although groups returned periodically throughout March and April.

A large colony of blue-eyed cormorants (*Phalacrocorax atriceps*) has been recorded in three groups located on the southwestern coastal extremity of the island (Map 3). Stonehouse (1949) reported about 300 birds present in October 1948; a similar number were recorded in mid-November 1968, most of which were breeding (Willey 1969). Poncet and Poncet (1979) observed 320 pairs in 1978, and approximately 670 pairs on 17 January 1989 (Poncet 1990). A count on 23 February 2001 recorded 185 chicks, although it is probable some had departed by the time of the count; approximately 250 nest sites were counted. In 1968 blue-eyed cormorants were observed present on the island from 12 August, with egg laying occurring from November, and chicks hatching in December (Willey 1969). In 1978-79 they were observed from September until June, with egg laying occurring from November through to January, when the first chicks hatched, and chicks started to become independent in the third week of February (Poncet and Poncet 1979).

Of the thirteen southern giant petrel (*Macronectes giganteus*) colonies known south of the South Shetland Islands, Avian Island is one of the two largest, and comprises about one fifth of the breeding population in the southern Antarctic Peninsula region (Patterson *et al* in press). In 1979 the southern giant petrels occupied principally the elevated rocky outcrops of the central and

southern half of the island in four main groups (Map 3). Data on the numbers of birds present on the island are shown in Table 2.

Table 2: Southern giant petrel (*Macronectes giganteus)* numbers at Avian Island.

Year	Number of birds	Number of pairs	Number of chicks	Source
1948	~100	n/a	n/a	Stonehouse 1949
1965	n/a	160	n/a	Patterson *et al* 2000 (?)
1968	400	163	n/a	Willey 1969
1979	n/a	197	n/a	Poncet and Poncet 1979
1989	n/a	250	n/a	Poncet 1990
2001	n/a	n/a	237	Harris 2001

n/a - not available.

In 1978-79 the birds were present on Avian Island from mid-September through to as late as June. In this season, egg laying occurred from late October through to the end of November, with hatching occurring throughout January and chicks generally achieving independence by April. In the 1978-79 austral summer up to 100 non-breeders were observed on the island during the courtship period in October, with these numbers decreasing to a few non-breeders as the season progressed.

Approximately 200 adult Kelp gulls (*Larus dominicanus*), of which over 60 pairs were breeding, were recorded on Avian Island in 1978-79. These birds were distributed widely, but principally in the elevated central and southern parts of the island (Poncet and Poncet 1979) (Map 3). In the 1978-79 austral summer the majority of breeders arrived in early October, followed by egg laying around mid-November and hatching a month later. Detailed data are not available because of concern that human disturbance by data collection would seriously impair the breeding performance of this species. However, no more than 12 chicks were observed on the island near the end of January 1979, which would suggest breeding performance in this season was low: the exact cause – whether human disturbance or natural factors – could not be determined. In 1967, 19 pairs and 80-120 birds were recorded (Barlow 1968).

An estimate of at least several hundred pairs of breeding Wilson's storm petrels (*Oceanites oceanicus*) on the island was made in 1978-79 (Poncet and Poncet 1979). Wilson's storm petrels were observed on the island from the second week of November, with laying and incubation probably occurring through to mid-December. Departure of adults and independent chicks was largely complete by the end of March. Most of the rocky outcrops on the northern half of the island and all of the stable rocky slopes in the south are ideal habitat for this species.

In 1978-79 about 25-30 pairs of south polar skuas (*Catharacta maccormicki*) were breeding on Avian Island. The skua nests were distributed widely over the island, although the majority were on the central and eastern part of the island, especially on slopes overlooking the Adélie penguin colony (Map 3). Large groups of non-breeders (around 150 birds; Poncet and Poncet 1979) were observed to congregate around the shallow lake on the eastern side of the island. Barlow (1968) reported approximately 200 non-breeding birds in 1968. In the 1978-79 austral summer the south polar skuas took up residence around the end of October, with egg laying in early December and hatching complete by the end of January. Independent chicks and adults generally departed by the end of March, with some late-breeders remaining until mid-April. A breeding success of one chick per nest was reported in the 1978-79 austral summer. Barlow

(1968) reported 12 breeding pairs of brown (=subantarctic) skuas (*Catharacta loennbergi*), although this number could include south polar skuas. One breeding pair of brown skuas was recorded on the southwest of the island in the 1978-79 austral summer. This is the southernmost record of this species breeding along the Antarctic Peninsula. Several non-breeding brown skuas were also recorded in the same season.

Several other bird species, known to breed elsewhere in Marguerite Bay, are frequent visitors to Avian Island, notably Antarctic terns (*Sterna vittata*), snow petrels (*Pagodroma nivea*), and southern fulmars (*Fulmarus glacialoides*). These species have not been observed to nest on Avian Island. Small numbers of Antarctic petrels (*Thalassoica antarctica*) have been seen on a few occasions. The cape petrel (*Daption capense*) was observed on Avian Island in October 1948 (Stonehouse 1949). Solitary individuals of king (*Aptenodytes patagonicus*) and chinstrap (*Pygoscelis antarctica*) penguins were observed in 1975 and 1989, respectively.

TERRESTRIAL BIOLOGY

Vegetation on Avian Island is generally sparse, and the flora has not been described in detail. Phanerogams are absent from the island and there is a limited range of cryptogams, although there is a rich lichen flora. To date, nine moss and 11 lichen species have been identified within the Area.

Mosses described are *Andreaea depressinervis*, *Brachythecium austro-salebrosum*, *Bryum argenteum*, *B. pseudotriquetrum*, *Pohlia cruda, P. nutans, Sanionia uncinata* (=*Drepanocladus uncinatus*), *Syntrichia princeps* (=*Tortula princeps*) and *Warnstorfia laculosa* (=*Calliergidium austro-stramineum*). The latter species is at the southern limit of its known range on Avian Island (Smith 1996). Moss development is confined to those parts of the island that are unoccupied by breeding Adélie penguins or blue-eyed cormorants, and occurs in moist depressions or by melt pools. Patches of moss of up to 100 m^2 surround the shore of a small pond on the hill in the south of the Area, at ca. 30 m elevation. The green foliose alga *Prasiola crispa* is widespread in wet areas of the island.

Lichens identified on Avian Island are *Acarospora macrocyclos*, *Cladonia fimbriata*, *C. gracilis*, *Dermatocarpon antarcticum*, *Lecanora dancoensis*, *Lecidea brabantica*, *Physcia caesia*, *Rinodina egentissima*, *Siphulina orphnina*, *Thamnolecania brialmontii*, and *Usnea antarctica*. The most extensive communities are on the rocky outcrops in the south of the island.

The micro-invertebrate fauna, fungi and bacteria on Avian Island have yet to be investigated in detail. Thus far only one mesostigmatid mite (*Gamasellus racovitzai*) (BAS Invertebrate Database 1999) has been described, although a Collembollan (springtail) and several species of Acari (mites) have been observed but not identified (Poncet 1990). A number of nematode species (dominated by *Plectus* sp.) (Spaull 1973) and one fungus (*Thyronectria hyperantarctica*) (BAS Invertebrate Database 1999) have been recorded on the island.

BREEDING MAMMALS AND MARINE ENVIRONMENT

Weddell seals (*Leptonychotes weddellii*) were common on and around Avian Island in 1978-79. During the winter more than a dozen remained, hauled out on coastal ice (Poncet 1990).

Several pups were born on the shores of the island in the last week of September 1978. An elephant seal (*Mirounga leonina*) was reported pupping on the northeastern coast of Avian Island on 10 October 1969 (Bramwell 1969). Aerial photography taken on 15 December 1998 revealed 182 elephant seals hauled out in groups, mostly close to the ponds. Leopard seals (*Hydrurga leptonyx*) have been observed around the shoreline, and one was observed ashore in winter 1978. A number of non-breeding Antarctic fur seals (*Arctocephalus gazella*) were reported on the island in March 1997 (Gray and Fox 1997), and again at the end of January 1999 (Fox pers comm 1999). At least several hundred were present on 23 February 2001 (Harris 2001), particularly on beaches and low-lying ground in the central and northern parts of the island. Crabeater seals (*Lobodon carcinophagus*) are regularly seen in Marguerite Bay, but have not been reported on Avian Island. The marine environment surrounding Avian Island has not been investigated.

HUMAN ACTIVITIES / IMPACTS

Human activity at Avian Island has been sporadic. The first record of a visit was made in October 1948, when members of the UK Stonington Island expedition discovered the large Adélie penguin colony on Avian Island (then referred to as one of the Henkes Islands). Subsequent visits have comprised a mixture of science, base personnel recreation, tourism and logistic activity (survey etc.). Refuges were constructed on the island in 1957 and 1962 by Argentina and Chile respectively (see Section 6(iii)).

A geological field party of two camped for about 10 days on the southeast of the island in November 1968 (Elliott 1969). In the same year, a UK Naval hydrographic survey team camped on the eastern coast of Avian Island over the summer. Permanent chains and rings for mooring lines to the survey vessel were installed in a small bay on the northwestern coast, and were still present in 1989 (Poncet 1990).

In 1969, a field party camped on the island for a month conducting research on the common cold virus: accompanying dogs were inoculated with a virus and then returned to base (Bramwell 1969). Dogs often accompanied personnel on the regular visits to Avian Island during the period of operation of the UK base on Adelaide Island, but impacts are unknown.

A two-person party spent a year on the island in 1978-79, based on the yacht *Damien II*, making detailed observations of the avifauna and other aspects of the biology and natural environment of the island (Poncet and Poncet 1979, Poncet 1982, Poncet 1990). The yacht was moored in a small cove on the NW coast. This yacht party regularly visited the island over the next decade before SPA designation.

Map survey work and aerial photography was conducted on and over the island in 1996-98 (Fox and Gray 1997, Gray and Fox 1997), and 1998-99 (Fox pers. comm.1999).

The impacts of these activities have not been described and are not known, but are believed to have been relatively minor and limited to transient disturbance to breeding birds, campsites, footprints, occasional litter, human wastes, scientific sampling and markers. Despite the likely transient nature of most disturbances, it has been reported that human visits have caused loss of eggs and chicks, either through nest abandonment or by opportunistic predation. Several species, such as southern giant petrels and kelp gulls are particularly vulnerable to disturbance, and have been observed to abandon nests at particular periods of the nesting cycle, perhaps at the sight of people as much as 100 m distant (Poncet 1990). Approximately 140 people, including a tour

vessel of 100, were reported to have visited Avian Island in the 1989-90 summer. Growing concern over the number and unregulated nature of visits prompted SPA designation.

The most lasting and visually obvious impacts are associated with the two refuges and beacon structures described in Section 6(iii), which are situated close to breeding birds. Both refuges were in poor repair in February 2001, with rubbish such as rusting cans, glass, wood, roofing iron and empty fuel drums nearby. Birds and seals were observed among this rubbish in February 2001. The older of the two beacon structures is disused and its iron structure, while standing, is rusting and deteriorating. The new beacon, erected in February 1998, was in good repair in February 2001.