

Management Plan for Antarctic Specially Protected Area No. 167

HAWKER ISLAND, PRINCESS ELIZABETH LAND

Introduction

Hawker Island (68°38'S, 77°51'E, Map A) is located 7 km south-west from Davis station off the Vestfold Hills on the Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica. The island was designated as Antarctic Specially Protected Area (ASP) No. 167 under Measure 1 (2006), following a proposal by Australia, primarily to protect the southernmost breeding colony of southern giant petrels (*Macronectes giganteus*) (Map B). A revised management plan for the Area was adopted under Measure 9 (2011). The Area is one of only four known breeding locations for southern giant petrels on the coast of East Antarctica, all of which have been designated as ASPAs: ASPA 102, Rookery Islands, Holme Bay, Mac.Robertson Land (67°36'S, 62°53'E) – near Mawson Station; ASPA 160, Frazier Islands, Wilkes Land (66°13'S, 110°11'E) – near Casey station; and ASPA 120, Pointe Géologie, Terre Adélie (66°40'S, 140°01'E) – near Dumont d'Urville. Hawker Island also supports breeding colonies of Adélie penguins (*Pygoscelis adeliae*), south polar skuas (*Catharacta maccormicki*), Cape petrels (*Daption capense*) and occasionally southern elephant seals (*Mirounga leonina*) haul out there.

1. Description of values to be protected

The total population of southern giant petrels in East Antarctica represents less than one per cent of the global breeding population. Estimates of breeding populations are problematic, as birds may be occupying a nest site when monitoring occurs, but not breeding that season. There are currently about 280 occupied nests in East Antarctica, comprising about 40 occupied nests on Hawker Island (2014), 2 occupied nests on Giganteus Island (Rookery Islands group) (2015), about 230 occupied nests on the Frazier Islands (2013) and about 8 occupied nests at Pointe Géologie (2005). Southern giant petrels also breed on islands in the southern Indian and Atlantic oceans and at the Antarctic Peninsula.

The southern giant petrel colony at Hawker Island was discovered in December 1963; at that time there were 40-50 nests present, “some with eggs” but it is unclear how many nests were occupied. From 1963 to 2007, intermittent counts of adults, eggs or chicks were undertaken at various stages of the breeding cycle. Because of the variability in the timing of counts and the inconsistency of count units it is not possible to establish a long term trend for this population. Low numbers were previously reported for this colony because only the numbers of chicks banded in a given year were recorded rather than total chick numbers.

Southern giant petrels are sensitive to disturbance at the nest. Restrictions in activities permitted at breeding sites near Australian stations, including a prohibition of banding, were introduced in the mid-1980s.

At the South Shetland Islands and South Orkney Islands, the incidental bycatch of southern giant petrels in longline fisheries operating in the Southern Ocean is likely to have contributed to observed population decreases. Similar observations have not been made in East Antarctica.

Southern giant petrels are listed as Least Concern by the International Union for Conservation of Nature (IUCN, 2016). However, census data from a number of locations are decades old and the size and trend of the global population is not entirely certain. Hawker Island also supports breeding colonies of Adélie penguins, south polar skuas and Cape petrels. Occasionally southern elephant seals haul out on the southern beaches.

2. Aims and objectives

Management of the Hawker Island ASPA aims to:

- protect the breeding colony of southern giant petrels and other wildlife;

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance;
- allow scientific research on the ecosystem, particularly on the avifauna, and physical environment, provided it is for compelling reasons which cannot be served elsewhere;
- minimise the possibility of introduction of pathogens which may cause disease in bird populations within the Area;
- minimise human disturbance to southern giant petrels in the Area;
- allow the Area to be used as a reference area for future comparative studies with other breeding populations of southern giant petrels;
- protect the values of Hawker Island as a reference area for future comparative studies with other breeding populations of southern giant petrels;
- minimise the possibility of the introduction of alien plants, animals and microbes to Hawker Island;
- allow for the gathering of data on the population status and related demography of the bird species on a regular basis; and
- allow visits for management purposes in support of the aims of the management plan.

3. Management activities

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

- research visits to assess population status and trends of the southern giant petrel colony and/or other wildlife shall be permitted. Wherever feasible, preference shall be given to activities and methodologies which minimise disturbance to the breeding colony (e.g. use of automated cameras);
- visits shall be made to the Area as necessary (preferably not less than once every five years) to assess whether the Area continues to serve the purposes for which it was designated and to ensure that management activities are adequate;
- if practicable the Area shall be visited outside the breeding season of southern giant petrels (i.e. during the period mid-April to mid-September), to assess whether it continues to serve the purposes for which it was designated and to ensure that management activities are adequate;
- information on the location of Hawker Island ASPA (stating the restrictions that apply) shall be produced and copies of this management plan shall be available at nearby stations. Informative material and the management plan should be provided to ships visiting the vicinity; and
- the management plan shall be reviewed at least every five years.

4. Period of designation

Designation is for an indefinite period.

5. Maps

Map A: Antarctic Specially Protected Area No 167, Hawker Island Vestfold Hills, Ingrid Christensen Coast, East Antarctica.

Map B: Antarctic Specially Protected Area No 167, Hawker Island Vestfold Hills, Ingrid Christensen Coast, East Antarctica, Topography and Fauna Distribution.

Specifications for maps:

Projection: UTM Zone 49
Horizontal Datum: WGS84

6. Description of the Area

6(i) Geographical co-ordinates, boundary markers and natural features

Hawker Island is located at 68°38'S, 77°51'E, approximately 300 m offshore from the Vestfold Hills. The Vestfold Hills are a roughly triangular ice-free area of approximately 512 km² of bedrock, glacial debris, lakes and ponds. The Vestfold Hills are bound by the ice plateau to the east, the Sørsdal Glacier to the south, and Prydz Bay to the west. They contain low hills (maximum height 158 m at Boulder Hill) and valleys, and are penetrated deeply by fjords and lakes. Numerous islands fringe the coast of the Vestfold Hills, and Hawker Island lies in the south-west, between Mule Island and Mule Peninsula.

Hawker Island is an irregularly shaped island of low elevation (maximum elevation of nearly 40 m), with two parallel ranges running in a north south direction terminating in two small southern peninsulas. A third peninsula lies directly west and terminates with a 40 m hill with steep cliffs to the sea on the western and southerly aspects. A number of small freshwater lakes lie between the ranges of hills on the northern part of the island, with a number of small lakes lying on the flatter terrain on the eastern sector of the island. At its maximum extent the island is 2 km north to south and 1.7 km east to west.

The Hawker Island ASPA comprises the entire terrestrial area of Hawker Island, with the seaward boundary at the low water mark (Map B). The total area of the Hawker Island ASPA is approximately 1.9 km². There are no boundary markers.

Environmental Domains and Antarctic Conservation Biogeographic Regions

Based on the Environmental Domains Analysis for Antarctica (Resolution 3 (2008)) Hawker Island is located within Environment T *Inland continental geologic*.

Based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)), Hawker Island is located within Biogeographic Region 7 *East Antarctica*.

Human History

The first recorded sighting of the Vestfold Hills was on 9 February 1931 by Douglas Mawson on the BANZARE voyage of the '*Discovery*'. Four years later, on 20 February 1935, Captain Klarius Mikkelsen of the tanker *Thorshavn* (Lars Christensen Company), sighted the hills and landed in the area. He named many features in the area and in the Vestfold Hills after his home province in Norway. The Vestfold Hills were again visited by Mikkelsen in early 1937, while undertaking an aerial survey of the coast.

In January 1939, the American explorer, Lincoln Ellsworth, and his Australian adviser, Sir Hubert Wilkins were the next recorded visitors to the area in the motor ship *Wyatt Earp*. Ellsworth flew some 400 km inland. In early 1947, the *USS Currituck* visited the Ingrid Christensen Coast as part of Operation Highjump. Photographic flights were conducted to survey the coastline.

The first Australian National Antarctic Research Expedition (ANARE) to the area was led by Dr Phillip Law on *Kista Dan* and reached the Vestfold Hills on 1 March 1954. During January 1956, members of the Soviet Antarctic Expedition landed on the Ingrid Christensen Coast in preparation for the International Geophysical Year and established Mirny Station 595 km to the east. Australia established Davis station in the Vestfold Hills in 1957. Hawker Island was named for A.C. Hawker, radio supervisor at Davis station in 1957.

Climate

Meteorological data for the Area are confined almost entirely to observations at Davis station, 7 km northwest of Hawker Island. The Vestfold Hills area has a polar maritime climate that is cold, dry and windy. In summer, average temperatures range from -1°C to +3°C and from -14°C to -21°C in winter. From 1957 to 2015, the maximum temperature recorded at Davis station was +13°C, while the lowest temperature was -41.8°C recorded on 27 April 1998. Long periods of relatively calm, fine conditions occur throughout the year. Winds are generally light. The yearly average is around 20 km/h. Violent winds and blizzards can commence with little warning at any time of the year, and gusts of over 200 km/h were recorded in 1972. Snowfall averages 78 mm/yr, with the greater proportion of annual accumulation resulting from windblown drift. Apart from several permanent ice banks, the Vestfold Hills are virtually snow free in summer and lightly covered in winter. The highest rainfall recorded at Davis was 55.6 mm in 2013. The record illustrates the seasonal

climate expected for high latitudes, but on average Davis station is warmer than other Antarctic stations at similar latitudes. This has been attributed to the “rocky oasis” which results from the lower albedo of rock surfaces compared to ice, hence more solar energy is absorbed and re-radiated.

Geology

The Vestfold Hills consist of Archaean gneiss, upon which thin and often fossiliferous Pliocene and Quaternary sediments occupy depressions. The oldest known Cenozoic strata in the Vestfold Hills are the mid-Pliocene Sørskal Formation, which contains a diverse marine fossil flora and fauna. Other younger Cenozoic strata attest to repeated glaciation, and several marine transgressions and regressions. The three major lithologies forming the Vestfold Hills are (in order of age) Chelnock Paragneiss, Mossel Gneiss and Crooked Lake Gneiss. This is repeated in units from east-north-east to west-south-west. Intruded into these, are groups of mafic dykes in a rough north-south orientation. The dykes are a major feature of the Vestfold Hills. Hawker Island comprises an extension of the Crooked Lake Gneiss of the northern portion of Mule Peninsula above Laternula Inlet. In common with the Archaean gneisses in the Vestfold Hills, the Hawker Island Crooked Lake Gneiss is cut by very distinctive, middle to early Proterozoic dolerite dykes.

Southern Giant Petrels

At Hawker Island, the colony of southern giant petrels is situated on slightly sloping ground about 20 m above sea-level at the northern end of the island (Map B). The same area has been used for breeding since its discovery in 1963/64.

The breeding season for southern giant petrels on Hawker Island commences in late September/early October and eggs are laid during the second half of October. Following an incubation period of about 60 days, hatching starts in the second half of December. Hatching continues over a period of three to four weeks until mid-January. About 14 – 16 weeks after hatching, the fledglings leave the colony from late March to early May. Images taken year round by automated cameras show that a small number of birds are present outside the breeding season; hence the requirement that visits to the Area at any time of the year be conducted in a manner that ensures minimal disturbance.

In the mid 1980s, a management strategy was implemented for all three southern giant petrels breeding localities in the vicinity of the Australian stations, to minimise human disturbance. Previously the Australian Antarctic Division restricted visits to one in every three to five year period and implemented tight administrative controls over all other visits. At this time, this level of visitation was considered an appropriate compromise between the risk of disturbing the birds and the need to obtain meaningful population data. However, this management regime impacted on the level of visitation needed to assess population status and trends and did not appear to significantly benefit the breeding success of the southern giant petrels. With the development of new technology (automated cameras), some detailed information can now be obtained with little or no human presence during the breeding period.

During the 2013/14 breeding season, 43 nests were occupied at some stage but not all adults attending them attempted to breed. In February 2014, at least 23 well advanced chicks were present. Some nests are not in the field of view of the automated cameras so the number of chicks may have been slightly higher.

Other Birds

Adélie penguins breed along the Vestfold Hills coastline and on 27 offshore islands, including Hawker Island. The total number of Adélie penguins in the Vestfold Hills coast and offshore islands was most recently estimated to be 330 000 pairs in 2009/10. The Hawker Island Adélie penguin colony is currently located in the vicinity of a small hill midway on the western side of the island and was estimated to be 5000 pairs in 2009/10. There has been an historical shift in the occupation of sub-colony areas. Some areas which were previously occupied are no longer occupied. This is common at Adélie penguin populations in the Davis region. As with other breeding sites in the Davis region, the first Adélie penguins usually appear in the area by the middle of October and eggs are laid about four weeks later. The laying interval between the first and

second egg is 2 to 4 days, and the incubation period ranges from 32 to 35 days. The last moulted adults usually depart Hawker Island by the end of March.

A small colony of Cape petrels has been recorded on Hawker Island on the southern tip of the south western peninsula. Cape petrels are absent from the Area in winter; they return to their nesting sites during October, lay eggs from late November to early December and chicks fledge in late February and early March.

Seals

Weddell seals breed in the fjords of the Vestfold Hills and occasionally near the south-east part of Hawker Island. The seals start to appear in late September and early October, and pupping occurs from mid-October until late November. Throughout summer, moulting Weddell seals continue to frequent firm sea-ice and occasionally haul out onto land. Most of the local population remains in the sea ice region close to the Vestfold Hills throughout the summer. Non-breeding groups of southern elephant seals (*Mirounga leonina*) haul out during the summer months in the vicinity of the south-western peninsula on Hawker Island. Their moulting areas contain deposits of hair and excrement that have accumulated over several thousand years, and could be considered as sensitive areas.

Vegetation

The flora of the Vestfold Hills comprises at least 82 species of terrestrial algae, six moss species and at least 23 lichen species. The lichens and mosses are distributed chiefly in the eastern or inland sector and their distribution patterns reflect the availability of drift snow, time since exposure of the substrate from the ice plateau, time since the last glaciation, elevation and proximity to saline waters. Very few occurrences of lichens or mosses have been noted towards the salt-affected coastal margin including Hawker Island where the low terrain is densely covered with extensive sand and moraine deposits.

Terrestrial algae are widespread and are major primary producers in the Vestfold Hills. Sublithic (or hypolithic) algae have been reported from Hawker Island, developing on the undersurfaces of translucent quartz stones that are partially buried in soil. The dominant algae, Cyanobacteria, particularly oscillatoriacean species, *Chroococidiopsis* sp., and *Aphanothece* sp. occur with the greatest frequency together with the Chlorophyta species, cf. *Desmococcus* sp. A and *Prasiococcus calcarius*. The endaphic alga *Prasiola crispa* occurs as green crumpled sheet-like strands at melt flushes, usually associated with the diatom *Navicula muticopsis* and oscillatoriacean algae. The ornithophilous lichen *Candelariella flava* has been reported from Hawker Island, associated with seabird nesting sites.

Invertebrates

An extensive survey of terrestrial tardigrades (water dwelling, eight legged, segmented invertebrates) was undertaken in the Vestfold Hills in 1981 from which four genera and four species of tardigrade were recovered. Although no tardigrades were recovered from the Hawker Island sample site it has been suggested that, as two species of tardigrade, *Hypsibius allisonii* and *Macrobiotus fuciger* (?) were recovered from Walkabout Rocks, they may be found in other coastal areas of similar ecology, associated with *Prasiola crispa*. The mite, *Tydeus erebus* is associated with breeding sites of Adélie penguins on the island.

6(ii) Access to the Area

Depending on sea ice conditions, the Area can be approached by vehicle, small boat or aircraft, all of which must remain outside the Area. There are no designated landing sites within the Area.

Access by small boat should be via a site that exceeds minimum wildlife separation distance and that, as far as possible, is separated by a geographic feature such as a low ridge line to minimise disturbance on approach.

6(iii) Location of structures within and adjacent to the Area

There are no permanent structures within or adjacent to the Area. Three automated cameras are temporarily located in close proximity to the southern giant petrel colony, for the purposes of ongoing population monitoring.

6(iv) Location of other protected areas in the vicinity

Antarctic Specially Protected Area No. 143 Marine Plain (68°36'S, 78°07'E) is located approximately 8 km to the east.

6(v) Special zones within the Area

There are no special zones within the Area.

7. Terms and conditions for entry permits

7(i) General 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, management or review;
- the actions permitted will not jeopardise the values of the Area;
- 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 finite period; and
- the appropriate national authority shall be notified of any activities or measures undertaken that were not included in the authorised permit.

7(ii) Access to, and movement within or over the Area

- Vehicles are prohibited within the Area. Movement within the Area is by foot only.
- Access to the Hawker Island ASPA boundary may be by watercraft or vehicle depending upon seasonal conditions. Boats used to visit the islands must be left at the shoreline. Only personnel who are required to carry out scientific/management work in the Area are to leave the landing/parking site. Quad-bikes or other land vehicles used to reach the Area shall not be taken into the Area. Vehicles shall remain on the sea-ice at least 200 m from the edge of the southern giant petrel colony (see Table 1);
- The minimum (closest) approach distances to wildlife are set out in Table 1. If disturbance of wildlife is observed, separation distance should be increased or the activity modified until there is no visible disturbance. Exceptions to this are only allowed when a closer approach distance is authorised in a permit.
- Persons authorised in a permit to approach southern giant petrels to obtain census data or biological data, should maintain the greatest practical separation distance. Persons shall not approach closer than is necessary to obtain census data or biological data from any nesting southern giant petrels, and in no case closer than 20m;
- Disturbance can be minimised by leaving vehicles as far from the site as possible, approaching slowly and quietly, and using topography to screen your approach.
- To reduce disturbance to wildlife, noise levels, including verbal communication are to be kept to a minimum. The use of motor-driven tools and any other activity likely to generate significant noise

(thereby risking disturbance to nesting southern giant petrels and other nesting birds) is prohibited within the Area during the breeding period for southern giant petrels (mid-September to mid-April);

- Overflights of the island during the southern giant petrel breeding season are prohibited, except where essential for scientific or management purposes and authorised in a permit. Such overflights are to be at an altitude of no less than 930 m (3050 ft) for single-engine helicopters and fixed-wing aircraft, and no less than 1500 m (5000 ft) for twin-engine helicopters;
- Landing of aircraft within 930 m of a wildlife concentration for single-engine helicopters and fixed-wing aircraft, and within 1500 m (5000 ft) of a wildlife concentration for twin-engine helicopters is prohibited;
- Overflight of the Area, including by unmanned aerial vehicles, is prohibited (except where essential for scientific or management purposes as authorised in a Permit).
- Clothing (particularly all footwear and outer clothing) and field equipment shall be thoroughly cleaned before entering the Area.

Table 1: Minimum distances to maintain when approaching wildlife at Hawker Island

Species	Distances (m)		
	People on foot / ski (unless a closer approach distance is authorised in a permit)	All vehicles Quad/ Skidoo Hagglunds, etc.	Small watercraft
Giant petrels	100 m	Not permitted inside the Area. Parking shall be on the sea-ice and no closer than 200 m from wildlife colonies.	Watercraft should maintain 200 m from wildlife during transit and should not be landed within 50 m of wildlife; in particular, the Adélie penguin colony on the eastern shore. Care shall be taken when in close proximity to the island.
Breeding/moulting emperor penguin	50 m		
All other breeding animals and birds	15 m		
Non-breeding seal or bird	5 m		

7(iii) Activities which are or may be conducted within the Area, including restrictions on time and place

Activities undertaken within the breeding period of the southern giant petrel (16 September to 14 April) shall only be permitted if the activity is non-invasive and cannot reasonably be undertaken during the non-breeding period. Where practical, activities not relating to southern giant petrels shall be restricted to areas outside the visual catchment of the southern giant petrel breeding site.

The following activities may be conducted within the Area as authorised in a permit:

- scientific research consistent with the provisions of this management plan which cannot be undertaken elsewhere;
- essential management activities, including monitoring; and

- sampling which should be the minimum required for approved research programs.

7(iv) Installation, modification, or removal of structures

- Permanent structures or installations are prohibited.
- Temporary structures or equipment, including cameras, shall only be erected within the Area in accordance with in a permit.
- Small temporary refuges, hides, blinds or screens may be constructed for the purpose of scientific study.
- Installation (including site selection), removal, modification or maintenance of structures or equipment shall be undertaken in a manner that minimises disturbance to breeding birds and the surrounding environment.
- All scientific equipment or markers installed within the Area must be clearly identified by country, name of the principal investigator or national agency, year of installation and date of expected removal.
- Markers, signs or other structures erected within the Area for scientific or management purposes shall be secured and maintained in good condition and removed under permit when no longer required. All such items should be made of materials that pose minimal risk of harm to wildlife or of contamination of the Area.

7(v) Location of field camps

- Camping is prohibited within the Area except in an emergency. Any emergency camp should avoid areas of wildlife concentrations, if feasible.

7(vi) Restrictions on materials and organisms that may be brought into the Area

- Fuel is not to be stored in the Area. Boat refuelling is permitted at landing sites. A small amount of fuel may be taken into the Area for an emergency stove and must be handled in a way that minimises the risk of accidental introduction into the environment.
- No depots of food or other supplies are to be left within the Area beyond the season for which they are required.
- No poultry products, including dried food containing egg powder, are to be taken into the Area.
- No herbicides or pesticides are to be brought into the Area.
- Any chemical which may be introduced for compelling scientific purposes as authorised in a permit shall be removed from the Area, at or before the conclusion of the activity for which the permit was granted. The use of radio-nuclides or stable isotopes is prohibited.
- No animals, plant material or microorganisms shall be deliberately introduced into the Area and precautions shall be taken against accidental introductions; all equipment and clothing (particularly footwear) should be thoroughly cleaned before entering the Area.
- All material 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 as to minimise the risk of environmental impact.

7(vii) Taking of or harmful interference with native flora and fauna

- Taking of, or harmful interference with, native flora and fauna is prohibited unless specifically authorised by permit. Any such permit shall clearly state the limits and conditions for such activities which, except in an emergency, shall only occur following approval by an appropriate animal ethics committee. Where taking or harmful interference with animals is involved this should, as a minimum standard, be in accordance with the SCAR Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica.

- Ornithological research shall be limited to activities that are non-invasive and non-disruptive to the breeding seabirds present within the Area. Surveys, including aerial photographs for the purposes of population census, shall have a high priority.
- Disturbance of southern giant petrels or other wildlife shall be avoided at all times. Visitors should be alert to changes in wildlife behaviour, especially changes in posture or vocalisation. If birds are showing signs of wanting to leave the nest, all persons shall retreat immediately. .

7(viii) Collection or removal of anything not brought into the Area by the permit holder

- Material may only be collected or removed from the Area as authorised in a permit and should be limited to the minimum necessary to meet scientific or management needs.
- Material of human origin likely to compromise the values of the Area, which was not brought into the Area by the permit holder or otherwise authorised, may be removed unless the impact of the removal is likely to be greater than leaving the material *in situ*. If such material is found, the appropriate national authority must be notified and approval obtained prior to removal.

7(ix) Disposal of Waste

All wastes, including human wastes, shall be removed from the Area.

7(x) Measures that may be necessary to continue to meet the aims of the management plan

- GPS data shall be obtained for specific sites of long-term monitoring for lodgement with the Australian Antarctic Data Centre or the Antarctic Data Directory System through the appropriate national authority.
- Permits may be granted to enter the Area to carry out biological monitoring, Area inspection and management activities, which may involve the collection of samples for analysis or review; the erection or maintenance of temporary scientific equipment and structures, and signposts; or for other protective measures.
- Where practical, a census of southern giant petrels in the Area shall be conducted at least once in every five year period. Censuses of other species may be undertaken provided no additional disturbance is caused to the southern giant petrels.
- Where practical, activities not relating to southern giant petrels shall be restricted to areas outside the visual catchment of the southern giant petrel breeding site.
- Visitors shall take special precautions against introductions of non-indigenous organisms. Of particular concern are pathogenic, microbial or vegetation introductions sourced from soils, flora and fauna at other Antarctic sites, including research stations, or from regions outside Antarctica. To minimise the risk of introductions, before entering the Area visitors shall thoroughly clean footwear and any equipment, particularly sampling equipment and markers to be used in the Area.

7(xi) Requirement for reports

Visit reports shall provide detailed information on all census data; locations of any new colonies or nests not previously recorded, as texts and maps, a brief summary of research findings; copies of relevant photographs taken of the Area; and comments indicating measures taken to ensure compliance with permit conditions.

The report may make recommendations relevant to the management of the Area, in particular as to whether the values for which the Area was designated are being adequately protected and whether management measures are effective.

The report shall be submitted as soon as practicable after the visit to the ASPA has been completed to the appropriate national permitting authority who issue the permit, but no later than six months after the visit has occurred. A copy of the report shall be made available to the permit issuing authority and the Party responsible for development of the Management Plan (Australia - Australian Antarctic Division) (if different) for the purposes of reviewing the management plan. Such reports should include, as appropriate, the information identified in the Visit Report form contained in the Guide to the Preparation of Management

Plans for Antarctic Specially Protected Areas. 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.

8. Supporting documentation

Some or all of the data used within this paper were obtained from the **Australian Antarctic Data Centre (IDN Node AMD/AU)**, a part of the Australian Antarctic Division (Commonwealth of Australia).

Adamson, D.A. and Pickard, J. (1986): Cainozoic history of the Vestfold Hills, In Pickard, J., ed. *Antarctic Oasis, Terrestrial environments and history of the Vestfold Hills*. Sydney, Academic Press, 63–97.

Adamson, D.A. and Pickard, J. (1986): Physiology and geomorphology of the Vestfold Hills, In Pickard, J., ed. *Antarctic oasis: terrestrial environments and history of the Vestfold Hills*. Sydney, Academic Press, 99–139.

ACAP (Agreement on the Conservation of Albatrosses and Petrels) (2012) *Species assessments: southern giant petrel *Macronectes giganteus**. <www.acap.aq/en/acap-species/288-southern-giant-petrel/file>, downloaded 19 September 2012.

ANARE (1968): Unpublished data.

Australian Antarctic Division (2010): Environmental Code of Conduct for Australian Field Activities, Territories, Environment and Treaties Section, Australian Antarctic Division.

Birdlife International (2000): *Threatened birds of the world*. Barcelona and Cambridge U. K, Lynx Edicions and Birdlife International.

BirdLife International (2011): *Macronectes giganteus*, In: IUCN 2011, 2011 IUCN Red List of Threatened Species, <<http://www.iucnredlist.org/>>, Downloaded on 17 January 2011.

BirdLife International (2011): Species fact sheet: *Macronectes giganteus*, <<http://www.birdlife.org/>> Downloaded on 17 January 2011.

Cooper, J., Woehler, E., Belbin, L. (2000): Guest editorial, Selecting Antarctic Specially Protected Areas: Important Bird Areas can help, *Antarctic Science* 12: 129.

DSEWPC (Department of Sustainability, Environment, Water, Population and Communities) (2011a): *Background Paper: Population status and threats to albatrosses and giant petrels listed as threatened under Environment Protection and Biodiversity Conservation Act 1999* <<http://www.environment.gov.au/resource/national-recovery-plan-threatened-albatrosses-and-giant-petrels-2011%E2%80%942016>> Downloaded on 10 February 2016.

DSEWPC (Department of Sustainability, Environment, Water, Population and Communities) (2011b): *National recovery plan for threatened albatrosses and giant petrels: 2011-2016*, <<http://www.environment.gov.au/biodiversity/threatened/publications/recovery/albatrosses-and-giant-petrels.html>>, Downloaded on 10 February 2016.

Fabel, D., Stone, J., Fifield, L.K. and Cresswell, R.G. (1997): Deglaciation of the Vestfold Hills, East Antarctica; preliminary evidence from exposure dating of three subglacial erratics. In RICCI, C.A., ed. *The Antarctic region: geological evolution and processes*, Siena: Museo Nazionale dell'Antartide, 829–834.

Garnett ST, Szabo JK and Dutson G (2011). *The action plan for Australian birds 2010*. CSIRO Publishing.

Gore, D.B. (1997): Last glaciation of Vestfold Hills; extension of the East Antarctic ice sheet or lateral expansion of Sørdsdal Glacier. *Polar Record*, 33: 5–12.

Hirvas, H., Nenonen, K. and Quilty, P. (1993): Till stratigraphy and glacial history of the Vestfold Hills area, East Antarctica, *Quaternary International*, 18: 81–95.

IUCN (International Union for Conservation of Nature) (2001): *IUCN Red List Categories: Version 3.1*, IUCN Species Survival Commission, <www.iucnredlist.org>. Downloaded on 25 January 2016.

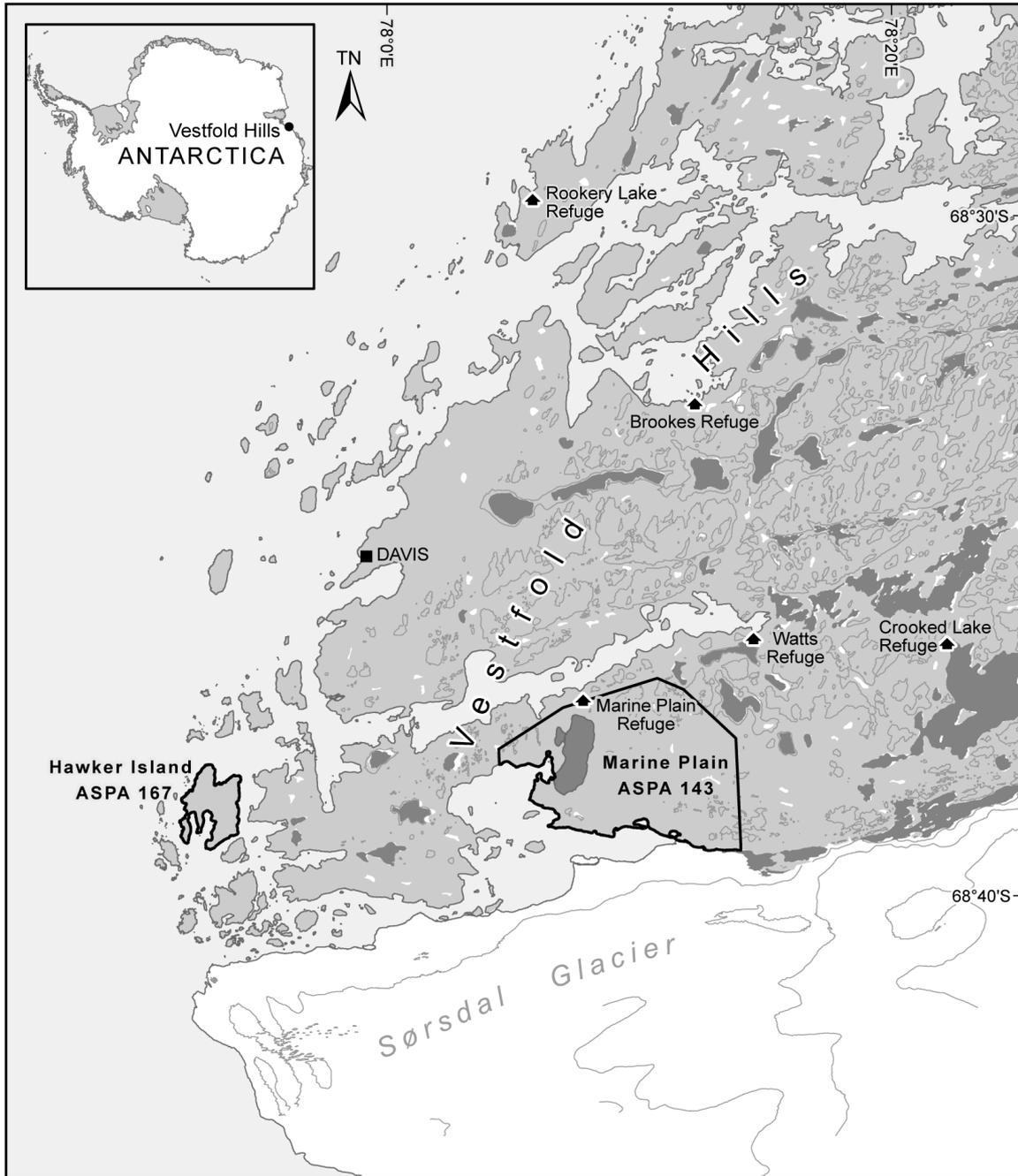
IUCN (International Union for Conservation of Nature) (2015): *IUCN Red List of Threatened Species*. Version 2015.4 <www.iucnredlist.org>. Downloaded on 25 January 2016.

- Jouventin, P., Weimerskirch, H. (1991):** Changes in the population size and demography of southern seabirds: management implications, in: Perrins, C.M., Lebreton, J.D. and Hiron, G.J.M. *Bird population studies: Relevance to conservation and management*. Oxford University Press: 297-314.
- Johnstone, Gavin W.; Lugg, Desmond J., and Brown, D.A. (1973):** The biology of the Vestfold Hills, Antarctica. Melbourne, Department of Science, Antarctic Division, *ANARE Scientific Reports*, Series B(1) Zoology, Publication No. 123.
- Law P. (1958):** Australian Coastal Exploration in Antarctica, *The Geographical Journal CXXIV*, 151-162.
- Leishman, M.R. and Wild, C. (2001):** Vegetation abundance and diversity in relation to soil nutrients and soil water content in Vestfold Hills, East, *Antarctic Science*, 13(2): 126-134
- Micol, T., Jouventin, P. (2001):** Long-term population trends in seven Antarctic seabirds at Point Géologie (Terre Adélie), Human impact compared with environmental change, *Polar Biology* 24: 175-185.
- Miller, J.D. et al. (1984):** A survey of the terrestrial Tardigrada of the Vestfold Hills, Antarctica, In Pickard, J., ed. *Antarctic Oasis, Terrestrial environments and history of the Vestfold Hills*. Sydney, Academic Press, 197-208.
- Orton, M.N. (1963):** Movements of young Giant Petrels bred in Antarctica, *Emu* 63: 260.
- Patterson D.L., Woehler, E.J., Croxall, J.P., Cooper, J., Poncet, S., Fraser, W.R. (2008):** Breeding distribution and population status of the Northern Giant Petrel *Macronectes halli* and the southern giant petrel *M. Giganteus*, *Marine Ornithology* 36: 115-124.
- Pickard, J. ed., (1986):** *Antarctic oasis: terrestrial environments and history of the Vestfold Hills*. Sydney, Academic Press.
- Puddicombe, R.A.; and Johnstone, G.W. (1988):** Breeding season diet of Adélie penguins at Vestfold Hills, East Antarctica, In *Biology of the Vestfold Hills*, Antarctica, edited by J.M. Ferris, H.R. Burton, G.W. Johnstone, and I.A.E. Bayly.
- Rounsevell, D.E., and Horne, P.A. (1986):** Terrestrial, parasitic and introduced invertebrates of the Vestfold Hills. *Antarctic oasis; terrestrial environments and history of the Vestfold Hills*, Sydney: Academic Press, 309-331.
- Southwell C., Emmerson L., McKinlay J., Newberry K., Takahashi A., Kato A., Barbraud C., DeLord K., Weimerskirch H. (2015)** Spatially extensive standardized surveys reveal widespread, multi-decadal increase in East Antarctic Adélie penguin populations. *PLoS ONE* 10(10): e0139877.
doi:10.1371/journal.pone.0139877
- Stattersfield, A.J., Capper, D.R. (eds.) (2000):** *Threatened Birds of the World*. Lynx Editions, Barcelona.
- Terauds, A., Chown, S.L., Morgan, F., Peat, H.J., Watts, D.J., Keys, H., Convey, P., and Bergstrom, D.M. (2012):** Conservation biogeography of the Antarctic, *Diversity and Distributions* Vol. 18. 726-741.
- Wienecke, B., Leaper, R., Hay, I., van den Hoff, J. (2009):** Retrofitting historical data in population studies: southern giant petrels in the Australian Antarctic Territory, *Endangered Species Research* Vol. 8: 157-164.
- Woehler, E.J., Cooper, J., Croxall, J.P., Fraser, W.R., Kooyman, G.L., Miller, G.D., Nel, D.C., Patterson, D.L., Peter, H-U, Ribic, C.A., Salwicka, K., Trivelpiece, W.Z., Wiemerskirch, H. (2001):** *A Statistical Assessment of the Status and Trends of Antarctic and Subantarctic Seabirds*, SCAR/CCAMLR/NSF, 43 pp.



Australian Government
 Department of the Environment
 Australian Antarctic Division

Map A: Antarctic Specially Protected Area No 167, Hawker Island Vestfold Hills, Ingrid Christensen Coast, East Antarctica



- Station ▲ Refuge
- Contour (50 metre interval)
- Ice-free area
- Lake
- Antarctic Specially Protected Area

0 2 4 6 Km
 Horizontal Datum: WGS84
 Projection: UTM Zone 44

Map Available at: <http://data.aad.gov.au/aadc/mapcat/>
 Map Catalogue No. 14499
 Produced by the Australian Antarctic Data Centre,
 Australian Antarctic Division, February 2016.
 © Commonwealth of Australia 2016
 This work is licensed under a Creative Commons
 Attribution 3.0 Unported License.

