The Antarctic Treaty

Measures adopted at
the Forty-seventh Consultative Meeting

Milan, 23 June – 3 July 2025

Presented to Parliament
by the Secretary of State for Foreign, Commonwealth and Development Affairs
by Command of His Majesty
February 2026

CP 1524

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THE ANTARCTIC TREATY

MEASURES ADOPTED AT THE FORTY-SEVENTH ANTARCTIC TREATY CONSULTATIVE MEETING

Milan, Italy 23 June - 3 July 2025

The Measures[1] adopted at the Forty-seventh Antarctic Treaty Consultative Meeting are reproduced below from the Final Report of the Meeting.

In accordance with Article IX, paragraph 4, of the Antarctic Treaty, the Measures adopted at Consultative Meetings become effective upon approval by all Contracting Parties whose representatives were entitled to participate in the meeting at which they were adopted (i.e. all the Consultative Parties). The full text of the Final Report of the Meeting, including the Decisions and Resolutions adopted at that Meeting and colour copies of the maps found in this command paper, is available on the website of the Antarctic Treaty Secretariat at www.ats.aq.

The approval procedures set out in Article 6 (1) of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty[2] apply to Measures 1 to 3 (2025).

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1 As defined in Decision 1 (1995), published in Miscellaneous No. 28 (1996) Cm 3483

2 Treaty Series No. 15 (2006) Cm 6855

The texts of the Antarctic Treaty together with the texts of the Recommendations of the first three Consultative Meetings (Canberra 1961, Buenos Aires 1962 and Brussels 1964) have been published in Treaty Series No. 97 (1961) Cmnd. 1535 and Miscellaneous No. 23 (1965) Cmnd. 2822. The text of the Environmental Protocol to the Antarctic Treaty has been published in Treaty Series No. 6 (1999) Cm 4256. The text of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty has been published in Treaty Series No. 15 (2006) Cm 6855.

The Recommendations of the Fourth to Eighteenth Consultative Meetings, the Reports of the First to Sixth Special Consultative Meetings and the Measures adopted at the Nineteenth and the Measures adopted at the Twenty-sixth, Twenty-seventh, Twenty-eighth, Twenty-ninth, Thirtieth, Thirty-first, Thirty-second, Thirty-third, Thirty-fourth, Thirty-fifth, Thirty-sixth, Thirty-seventh, Thirty-eighth, Thirty-ninth, Fortieth, Forty-first, Forty-second, Forty-third, Forty-fourth, Forty-fifth and Forty-sixth Consultative Meetings were also published as Command Papers. No Command Papers were published for the Twentieth to Twenty-fifth Consultative Meetings.

Measures Adopted at the XLVII Consultative Meeting held at Milan, Italy 23 June - 3 July 2025

Measure 1 (2025) Antarctic Specially Protected Area No 162 (Mawson's Huts, Cape Denison, Commonwealth Bay, George V Land, East Antarctica): Revised Management Plan

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Measure 2 (2025) Antarctic Specially Protected Area No 169 (Amanda Bay, Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica): Revised Management Plan

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Measure 3 (2025) Antarctic Specially Protected Area No 143 (Marine Plain, Mule Peninsula, Vestfold Hills, Princess Elizabeth Land): Revised Management Plan

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Measure 1 (2025)

Antarctic Specially Protected Area No 162 (Mawson's Huts, Cape Denison, Commonwealth Bay, George V Land, East Antarctica): Revised Management Plan

The Representatives,

Recalling Articles 3, 5 and 6 of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty providing for the designation of Antarctic Specially Protected Areas ("ASPA") and approval of Management Plans for those Areas;

Recalling

- Measure 2 (2004), which designated Mawson's Huts, Commonwealth Bay, George V Land, East Antarctica as ASPA 162 and adopted a Management Plan for the Area;
- Measure 1 (2004), which designated Cape Denison, Commonwealth Bay, George V Land, East Antarctica as Antarctic Specially Managed Area ("ASMA") No 3, within which ASPA 162 is located;
- Measure 3 (2004), which added Historic Site and Monument ("HSM") No 77 (Cape Denison), located partially within ASPA 162, to the List of HSM;
- Measure 1 (2009), which adopted a revised Management Plan for ASMA 3;
- Measure 9 (2014), which stated that ASMA 3 shall not be used as a future designation and revoked its Management Plan;
- Measures 12 (2009) and 9 (2014), which adopted revised Management Plans for ASPA 162;

Recalling that the Committee for Environmental Protection ("CEP") XXII (2019) reviewed and continued without changes the Management Plan for ASPA 162, which is annexed to Measure 9 (2014);

Noting that the CEP has endorsed a revised Management Plan for ASPA 162;

Desiring to replace the existing Management Plan for ASPA 162 with the revised Management Plan;

Recommend to their Governments the following Measure for approval in accordance with paragraph 1 of Article 6 of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty:

That:

1. the revised Management Plan for Antarctic Specially Protected Area No 162 (Mawson's Huts, Cape Denison, Commonwealth Bay, George V Land, East Antarctica), which is annexed to this Measure, be approved; and
2. the Management Plan for Antarctic Specially Protected Area No 162 annexed to Measure 9 (2014) be revoked.

Management Plan for Antarctic Specially Protected Area No. 162

MAWSON'S HUTS, CAPE DENISON, COMMONWEALTH BAY, GEORGE V LAND, EAST ANTARCTICA

Introduction

Cape Denison, Commonwealth Bay (67°00'31"S 142°40'43"E) is a key site of early human activity in Antarctica and a powerful symbol of the Heroic Era of Antarctic exploration of the late nineteenth and early twentieth century. It is the location of four timber huts, known as 'Mawson's Huts', which served as the base of the Australasian Antarctic Expedition (AAE) of 1911-14, led by Dr (later Sir) Douglas Mawson. As one of only six hut sites remaining from this period, Cape Denison hosted some of the earliest comprehensive studies of Antarctic geology, geography, terrestrial magnetism, astronomy, meteorology, glaciology, oceanography, biology, zoology and botany. It also served as the starting point of numerous explorations and artefacts from these journeys, including food caches and equipment remain in situ.

Cape Denison is characterised by four valleys aligned northwest/southeast, with most AAE artefacts and historic structures concentrated in the westernmost valley and its surrounding ridges (Map A).

In recognition of the site's outstanding historic and scientific value, the Mawson's Huts site (comprising the four huts and a 5 metre buffer around each hut) was designated under Measure 2 (2004) as Antarctic Specially Protected Area (ASPA) No. 162, primarily to protect the significance of the site. The ASPA also contains the site designated under Measure 3 (2004) as Historic Site and Monument No. 77 Cape Denison, Commonwealth Bay, George V Land, and was originally embedded within Antarctic Specially Managed Area (ASMA) No. 3 Cape Denison, Commonwealth Bay, George V Land, designated under Measure 1 (2004). Under Measure 9 (2014), ASMA No. 3 was de-designated and the boundary of ASPA No. 162 was expanded to coincide with the previous ASMA boundary. This provides additional protection for the historic landscape and artefact scatters at Cape Denison, and simplifies the management arrangements for the site.

Cape Denison has a relatively low level of human activity, though it receives occasional summer visits from small conservation works teams and commercial tour groups. Visitor Site Guidelines adopted under Resolution 4 (2011) are in place to guide access consistent with the Management Plan. The Area contributes to the Antarctic Protected Area system by protecting a site of significant historical value. Potential impacts of a changing climate on the site are not yet understood.

1. Description of values to be protected

The Area is primarily designated to protect Mawson's Huts, remaining artefacts and the associated landscape which hold considerable historic and scientific, as well as environmental and aesthetic, value. The site also exhibits archaeological, technical,

social and architectural significance. The design of the huts reflects functional and efficient planning that enabled the structures to withstand the harsh conditions of the site, also endured by the expedition members. The weathered appearance and decay of the huts evoke a feeling of time passed and demonstrate their exposure to the elements.

- *Historic values*

Cape Denison provides the setting for the buildings, structures and artefacts of the Main Base of the Australasian Antarctic Expedition. Mawson's Huts is one of a group of only six sites of Heroic Era huts where pragmatic consideration of the need to provide permanent shelter in the Antarctic environment resulted in an expedition hut structure suitable for polar regions.

Cape Denison is designated as HSM 77, and demonstrates the following criteria identified in Resolution 3 (2009):

- a particular event of importance in the history of science or exploration of Antarctica occurred at the place; and
- a particular association with a person who played an important role in the history of science or exploration in Antarctica.

Mawson's primary focus was scientific research but the expedition also had an exploratory agenda: to chart the entire Antarctic coastline immediately south of Australia. For this purpose, at least five sledging expeditions were launched from Cape Denison from spring 1912, including the infamous Far-Eastern Sledging Party during which expeditioners Belgrave Ninnis and Xavier Mertz perished, and Mawson himself barely survived. Overall, the expedition's sledging parties explored over 6,500 km of coastline and hinterland.

Cape Denison contains numerous artefacts relating to the work of Mawson's expedition, including Mawson's Huts and other significant and relatively untouched artefacts such as food caches from the Heroic Era. The site contains a rich resource of material available for research and interpretation, potentially yielding information about aspects of expeditioner life not included in official written accounts. While the majority of the artefacts and other signs of occupation are concentrated in the westernmost valley and its immediate surrounds, the historical boundaries of the Main Base extend beyond this area across the entire Cape.

Mawson's Huts were built in January, February and March 1912, and May 1913. In their surviving form and setting, the huts illustrate the isolation and harsh environment of Cape Denison. They also demonstrate the cramped internal conditions endured by expedition members. The living quarters in the Main Hut, for example, a single space measuring 7.3 m x 7.3 m, provided sleeping and kitchen facilities for 18 men.

The external form and internal structure of the largest hut, known as the Main Hut (67º00'31"S, 142º39'39"E), are a simple but strong architectural concept: a square

base topped by a pyramid roof (to prevent damage by blizzards), with skylights to provide natural lighting. Following the decision to combine two expedition bases into one, a hip-roofed accommodation hut measuring 5.5 m x 4.9 m was adjoined to the living quarters and equipped as a workshop. A 1.5 m wide verandah surrounded the structure on three sides, under the same roof. The verandah was used as a storage space that also assisted in insulating the hut from the weather.

The two huts that form the Main Hut were built of Oregon timber frames clad with Baltic pine tongue-and-groove boards. They were prefabricated in Australia, and on-site construction was assisted by a branded letter code on framing members and coded colours painted on board ends (none of the expedition party had any previous construction experience). The survival of the Main Hut at one of the windiest sites on Earth is a testament to the strength of its design and care of its construction.

The three other AAE huts are:

- The Absolute Magnetic Hut (67°00'23"S, 142°39'48"E) was constructed in February 1912. It measured 1.8 m x 1.8 m in plan with a skillion roof and had an Oregon timber frame to which boards of remnant timber were fixed. The hut was used in association with, and as a reference point for, observations made in the Magnetograph House. Today it is a standing ruin.
- The Magnetograph House (67°00'21"S, 142°39'47"E) was erected in March 1912 to house equipment used to measure variations in the South Magnetic Pole. It measures 5.5 m x 2 m with a shallow pitched skillion roof and no windows. After the first building attempt was demolished by high winds, large rocks were heaped against the new hut to provide a wind barrier. Sheepskin and hessian attached to the roof also assisted in keeping the internal temperature constant and in minimising the ingress of drift snow. These innovations may have contributed to the relatively intact condition of the hut today.
- Construction of the Transit Hut (67°00'30"S, 142°39'42"E) commenced in May 1913, with packing case timbers being affixed to an Oregon frame. The structure was also clad in sheepskin and canvas. Originally known as the Astronomical Observatory, the hut housed the theodolite used to take star sights to determine the exact longitude of Cape Denison. It is now considered to be a standing ruin.

- *Scientific values*

Mawson, a geologist, planned his expedition in order to examine the theories about continental connection and the processes of glaciation and climate. He also sought to study the South Magnetic Pole and magnetic charting for navigational purposes; to conduct biological studies, including the identification of new species; and to establish a weather station.

Cape Denison provides opportunities to repeat Mawson's experiments and conduct further research into magnetism, meteorology, biology, and other sciences. For example, although Antarctic lakes are generally recognised as valuable due to their

relatively simple natural ecosystems, the lakes at Cape Denison have neither been sampled nor their biota studied. There are also numerous non-marine algae present, however, no surveys have been undertaken. The records from Mawson's expedition provide a dataset against which the results of modern research may be compared, and the site's isolation lends it considerable value for future use as a reference site for other areas that experience a greater level of human activities.

- *Environmental values*

The paucity of relatively ice-free areas in the immediate region means that Cape Denison represents important habitat for many species, including a significant breeding colony of Adélie penguins, as recognised in Important Bird Area No. 157. The closest ice-free areas of similar or greater size are approximately 20 km to the east and approximately 60 km to the west. Cape Denison is a haul-out site for Weddell, leopard and elephant seals, and an important breeding area for Wilson's storm- petrels, snow petrels and south polar skuas.

13 lichen species, distributed on boulders and other moraines throughout the peninsula, have been recorded at Cape Denison. The lichens' distribution on rocks, which are subject to different patterns of snow ablation, makes them vulnerable to trampling and other interference by visitors, however infrequent visitation may be. The Area includes the type localities for Bacidia johnstonii (Lichen) and Lecanora mawsonii (Lichen). No bryophytes are evident.

Cape Denison has 13 small lakes. These are associated with glacial action, are a permanent feature, and are frozen over for most of the year. Since such lakes are also susceptible to physical, chemical and biological modification within their catchment boundaries, a catchment-based approach to the management of human activities is required.

- *Aesthetic values*

The Area is designated to protect not only the artefacts remaining in situ but also the cultural landscape of Cape Denison in which Mawson and his men lived and worked. Cape Denison is characterised by its almost incessant blizzard conditions, which severely limit access to the region and activities at the site. Katabatic winds pour down the plateau and funnel through the Cape's valleys; blasting the huts with gusts that in May 1912 reached 322 km/h (the average wind speed for the month was 98 km/h). Cape Denison is not only the windiest place in Antarctica, but also the windiest place on Earth at sea level. The site thus demonstrates the physical and symbolic context of the extreme isolation and harsh conditions endured by the expedition members and, by association, all other Heroic Era researchers and explorers. Set against the mountains, snow, and rocks, with the sea beyond, the huts repose in the landscape, evoking a profound sense of isolation. In designating the entire area as an ASPA, Cape Denison's unique 'sense of place' is protected, with Mawson's Huts and Boat Harbour as the focus of the visual catchment.

2. Aims and objectives

The aim of the Management Plan is to provide protection for the Area so that the identified values can be protected. Management of the Area aims to:

- maintain the historic values of the Area through planned conservation and archaeological work programmes;
- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance to the Area, its features and artefacts by means of managed access to the four Australasian Antarctic Expedition huts and surrounding artefact scatters;
- allow scientific research in the Area provided it is for compelling reasons which cannot be served elsewhere and will not jeopardise the values or the natural ecosystem in the Area;
- allow activities in the Area for educational and outreach purposes (including tourism), provided that such activities are for compelling reasons which cannot be served elsewhere, and which will not jeopardise the values or the natural ecological system in the Area; and
- allow visits for management purposes in support of the aims of the Management Plan.

3. Management activities

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

- copies of this Management Plan shall be made available to the principal permit holder of all groups visiting the Area;
- research and other activities essential or desirable for understanding, protecting and maintaining the values of the Area;
- a programme of conservation and archaeological work shall be undertaken on the historic structures and artefacts at the site to understand and protect the designated values in the Area;
- monitoring of the impacts of visitation to inform future management of the site;
- the removal of objects not related to the AAE of 1911–14 and/or the British Australian New Zealand Antarctic Research Expeditions (BANZARE) of 1929–31 and that compromise the historic and aesthetic values of the Area, provided that removal does not adversely impact on the values of the Area, and that the objects are appropriately documented prior to removal. Priority should be given to the removal of field infrastructure from the Visual Protection Zone (Map B), giving consideration to the needs and safety of conservation workers and the conservation program;
- essential maintenance of other objects and infrastructure, including the

Automatic Weather Station;

- the Management Plan shall be reviewed no less than once every five years and updated as required; and
- National Antarctic Programs operating in the region, or those with an interest or experience in Antarctic historic site management, shall consult together with a view to ensuring the above management actions are implemented.

4. Period of designation

Designated for an indefinite period.

5. Maps

- Map A: Antarctic Specially Protected Area No. 162 Mawson's Huts, Cape Denison. Map Specifications: Horizontal Datum: WGS84; Mean Sea Level.
- Map B: Antarctic Specially Protected Area No. 162 Mawson's Huts, Cape Denison. Visual Protection Zone. Map Specifications: Horizontal Datum: WGS84; Mean Sea Level.
- Map C: Mawson's Huts, Cape Denison. Flight Paths and Bird Colonies. Horizontal Datum: WGS84. Mean Sea Level.

6. Description of the Area

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

- *General Description*

Cape Denison (67°00'31"S 142°40'00"E) is located on the coast of Commonwealth Bay, a 60 km- wide stretch of coast in George V Land some 3,000 km south of Hobart, Australia. The Cape itself is a rugged, 1.5 km-wide tongue of ice, snow, rock and moraine projecting into Commonwealth Bay from the steeply rising wall of the ice cap of continental Antarctica. On the western side of the Cape is Boat Harbour, a 330 m-long coastal indentation.

The designated Area (Map A) extends from Land's End (67°00'47"S, 142°39'28"E) in the west, along the coastline to the northern tip of the western shore of Boat Harbour (67°00'20" S, 142°39'27"E), across the mouth of Boat Harbour (in a straight north-easterly diagonal) to the eastern shore of Boat Harbour (67°00'21"S, 142°39'18"E), south-west of Penguin Knob, and then along the coastline in a south-easterly direction down to John O'Groats (67°00'47"S, 142°41'27"E). The southern boundary extends in a straight line from Land's End to John O'Groats along latitude 67°00'47"S. With the exception of the boundary across the mouth of Boat Harbour, the northern coastal boundary extends to that land above the lowest tide.

The shoreline and the ice cliffs at both ends of the Cape (Land's End and John O'Groats) form a clearly defined boundary; as such, no boundary markers have been installed.

- *Climate*

Meteorological data for the Area is received from the automatic weather station (AWS) approximately 150 m southeast of the Main Hut. This Area is known for its cold southerly winds and blizzards. Not accounting for wind chill, surface temperatures generally range from -21°C and lower in winter, to -3°C in summer, with occasional days approaching zero or above.

- *Environmental Domains Analysis*

Mawson's Huts, Cape Denison is located within Environment L Continental coastal-zone ice sheet (Resolution 3 (2008)).

- *Antarctic Conservation Biogeographic Regions*

Mawson's Huts, Cape Denison is not classified in accordance with the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)).

- *Important Bird Areas*

Mawson's Huts, Cape Denison includes Important Bird Area No. 157 (Resolution 5 (2015)).

- *Topography and geomorphology*

The topography of Cape Denison is characterised by a series of four rocky ridges, running south- southeast to north-northwest, and three valleys. The largest and westernmost of these valleys contains the AAE buildings. The basement rock of the Cape Denison area consists of partially migmatised, massive felsic orthogneiss intruded about 2350 million years ago (Ma) into an older metamorphosed sequence. Above the basement, the area features a lower zone of relatively polished rock and a higher zone of relatively unpolished rock; the former being especially prominent below 12 m above sea level and is indicative of more recent uplift and exposure than the upper zone. Upper and lower moraines are apparent, with the upper moraine, closer to the edge of plateau, containing a diversity of angular boulders. The lower moraine is dominated by local rocks sorted into bands, perhaps the result of an 'ice push' from the sea rather than being genuine glacial moraine.

- *Water bodies*

Cape Denison contains 13 small glacial lakes, which are generally oriented parallel to the foliation of the basement rocks. At the height of summer, Cape Denison also features numerous melt streams which flow into Commonwealth Bay. It is not known

whether the streams flow down established courses, or whether the streams are a feature of the regular freeze/thaw cycle.

- *Biological features*

Cape Denison is breeding habitat for Adélie penguins, Wilson's storm-petrels, snow petrels and the south polar skua in summer (Map C). Other species sighted in the area include the Cape petrel, Antarctic petrel, southern giant petrel and emperor penguin. A list of breeding seabird species and their approximate populations (where available) is at Appendix A(i). Weddell seals, southern elephant seals and leopard seals have been recorded as hauling out and, in the case of elephant seals, moulting at Cape Denison. However, the sporadic nature of visits to the Area means that monitoring has been inconsistent and the exact extent of the seal population uncertain. Some data is presented in Appendix A(ii).

The only flora evident at Cape Denison are lichens and non-marine algae.

6(ii) Access to the Area

Sea, land and air access to Mawson's Huts is difficult due to the rugged topography and climate of the area. Sea ice extent and uncharted bathymetry may constrain ship access up to 10 nm or more from the coastline. Access can be gained either by small watercraft or by helicopter, although attempts to land are frequently hampered by heavy seas and prevailing north-westerly or katabatic winds. Boat landings can be made at Boat Harbour and due north of Sørensen Hut. The helicopter landing site (67°00'36"S, 142°39'48"E) and approach and departure flight paths are indicated on Map C.

Travel within the Area is to be on foot, except where vehicle use is authorised for work parties, in accordance with the terms and conditions of entry described in Section 7(ii). Pedestrian access within the Area is unrestricted except in places where AAE structures, artefacts, or bird or lichen colonies are present, and should be conducted in accordance with the terms and condition of entry. With the exception of a short boardwalk close to the Main Hut, there are no roads or other transportation infrastructure on shore. The boardwalk is frequently covered by snow and therefore unusable for all but a few weeks of the year.

Helicopter operations have the potential to disturb breeding and moulting wildlife. To minimise disturbance to seals and nesting birds at Cape Denison during the summer months, helicopters should only land at the site indicated on Map C and approach and depart in accordance with the flight paths indicated on the map. Departure paths have been selected to avoid wildlife concentrations as much as possible. Use of a single-engine helicopter is preferable, however twin-engine helicopters may be used with due regard for the potentially greater disturbance to wildlife. The presence of seals and the breeding cycle of birds nesting in the Area are charted at Appendix A. To reduce disturbance, helicopter operations should be avoided during weeks that birds are hatching eggs or raising chicks (late October to early March).

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

Cape Denison is notable for being the location of four historic structures, artefacts, features and memorials constructed or left by the AAE of 1911-1914. The AAE installed a Memorial Cross (67°0'30"S, 142°39'19"E) and on top of Azimuth Hill, and survey markers and masts across the site, including on top of Anemometer Hill, about 150 m east of the Main Hut. On 5 January 1931 members of the BANZARE party (including Douglas Mawson) visited Cape Denison to claim formal possession of George V Land on behalf of Great Britain, and used the mast to support the proclamation flag and canister containing the proclamation itself. A small timber replica plaque and proclamation, still attached to the mast, are the only 'formal' artefacts of that visit remaining in situ today. A time capsule was installed on 16 January 2012 at the base of the proclamation pole (142°39'52"E 67°0'33"S) to commemorate the centenary of the AAE. A plaque to commemorate this event was laid at the base of the proclamation pole next to the time capsule.

Cape Denison additionally features seven other structures: an automatic weather station (AWS); a remotely operating camera to monitor Adelie penguin populations; a field shelter and conservation laboratory known as Sørensen Hut; a red fibreglass 'Apple' hut; a wooden platform on which tents may be pitched; a field shelter known as Granholm Hut, and a plaque near the Main Hut indicating that the hut is a Historic Site and Monument (HSM No. 77).

The AWS (67°00'33"S, 142°39'51"E) is located on a rise near Round Lake and approximately 150 m southeast of the Main Hut. It has been operating since 1990 as part of the Antarctic Automatic Weather Project of the University of Wisconsin, Madison, and is the property of that institution.

A remotely operating camera was established in 2012 by Australia at a location near an Adelie penguin colony in the vicinity of Low Lake (67°0'39"S, 142°40'52" E).

Sørensen Hut (67°00'29"S, 142°40'12"E) is located about 400 m east of the Main Hut. It was constructed by the Australian Antarctic Program in 1986 to provide temporary shelter for parties conducting conservation works on Mawson's Huts and contains some provisions and field equipment. Numerous items are also stored underneath and immediately adjacent to Sørensen Hut, and in the adjacent Apple hut. Access to Sørensen Hut is limited to those who are part of authorised work parties.

Granholm Hut (67°00'29"S, 142°39'26"E) is situated some 160 m northwest of the Main Hut. Constructed in 1978, it provides temporary shelter and a workshop for parties working on Mawson's Huts. It contains numerous building materials, some field equipment and limited provisions. The hut has been painted to blend into the rocky landscape to lessen its visual impact on the site.

Objects left by the AAE are scattered throughout the Area, and are exposed to varying degree depending on snow cover. These artefacts include cairns, cached seal and penguin carcasses, timbers, and a large collection of disassembled penguin skeletons. It is believed that a significant number of artefacts exist under the snow

and have yet to be uncovered. It is additionally possible that artefacts from the ice cave known as 'Aladdin's Cave', the sledging depot excavated by Mawson's expedition in 1912, may also be present in the vicinity of the Area, if not within the Area itself. The cave was originally located on the plateau at 67°05'S, 142°38'E, some 8 km south of the Main Hut, but it may have been relocated (via the movement of ice) up to 4.5 km down-slope from the original 1912 location. Its exact location has yet to be determined.

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

There are no other ASPAs or ASMAs within 50 km of Cape Denison. The ASPA incorporates:

- Historic Site and Monument No. 77, Mawson's Huts (including the Main Hut and associated buildings from the Australasian Antarctic Expedition, 1911–14).

6(v) Special zones within the Area

The visual catchment of Mawson's Huts and the Memorial Cross is of particular importance within the Cape Denison cultural landscape. In order to protect the landscape setting and 'sense of place' of Mawson's Huts, a Visual Protection Zone is defined within the Area. To protect these values, no new structures should be built within the Visual Protection Zone. The boundaries of the Visual Protection Zone are shown on Maps A and B, and are generally defined by the western and eastern ridgelines of the valley containing the historic structures. The boundary extends from the coastline (67°00'25"S, 142°39'14"E) and runs southeast along the western side of the westernmost ridge to the ice plateau (67°00'47"S, 142°39'37"E); northeast along the edge of the ice plateau to 67°00'44"S, 142°40'06"E; north- northwest between Round Lake and Long Lake to 67°00'33"S, 142°39'60" E; as far as the Magnetograph House (67°00'21"S, 142°39'47"E); and then northwest along the eastern side of the eastern ridge line to the sea (67°00'16"S, 142°39'28"E).

7. Terms and conditions for entry permits

Annex V of the Protocol on Environmental Protection to the Antarctic Treaty prohibits entry into an ASPA except in accordance with a permit. Permits shall only be issued by appropriate national authorities and may contain general and specific conditions. A permit may be issued by a national authority to cover a number of visits in a season by the same operator. Parties operating in the Commonwealth Bay area shall consult together and with non-government operators interested in visiting the Area to ensure that visitors are managed appropriately.

7(i) General permit conditions

Conditions for issuing a permit to enter the Area are that:

- it is issued for compelling scientific, educational (such as tourism) or outreach reasons which cannot be served elsewhere, or for reasons essential to the management of the Area;
- activities related to conservation, inspection, maintenance, research and/or monitoring purposes, consistent with the aims and objectives of this Management Plan;
- the actions permitted are in accordance with this Management Plan;
- the activities permitted will give due consideration via the environmental impact assessment process to the continued protection of the historic values of the Area;
- the permit shall be issued for a finite period; and
- the permit shall be carried when in the Area.

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

All land vehicles are prohibited within the Area, with the exception of small all-terrain vehicles by authorised work parties which, due to the colonisation of rocky areas by lichens and seabirds, should be used on snow and ice surfaces only and with due consideration of the location of historic artefacts. Pedestrian access within the Area is unrestricted but artefact-rich areas (such as the scatter immediately to the north of the Main Hut), bird or lichen colonies, and penguin 'highways' (the established route of birds moving between their nest and the sea) should be avoided.

Authorised work parties, when undertaking conservation work on the huts, may use small all-terrain vehicles within the Area to assist with the transport of materials and equipment to and from the buildings.

Access to Sørensen Hut is limited to those who are part of authorised work parties.

Visitors may enter the Main Hut and Magnetograph House provided that:

- the visit is strictly controlled and conducted by an experienced guide who possesses heritage expertise and knowledge of the site and its structures (to the satisfaction of the permitting Party);
- appropriate entry/exit protocols for the Main Hut are followed;
- visitation of the interior of the huts is limited to up to four (4) persons (including the guide) at any one time inside the Main Hut, and up to three (3) persons (including the guide) in the Magnetograph House;
- artefacts, scientific and related conservation management equipment, and interior building fabrics are not touched;
- briefings on this Management Plan and the values of the Area are conducted prior to visits and adequate site interpretation materials are made available to each visitor;
- visitors accessing the Area avoid sensitive historic artefacts, such as the artefacts scatter to the immediate north of the Main Hut, and other sensitive

areas, such as lichen communities;

- visitors do not touch the exterior fabric of the buildings or any artefacts; and
- smoking in or near the huts is not permitted.

Authorised work parties undertaking approved conservation and/or archaeological work programmes are exempt from the provisions of this sub-section.

The following conditions apply to the use of aircraft:

- The operation of aircraft over the Area should be carried out, as a minimum requirement, in compliance with the Guidelines for the Operation of Aircraft near Concentrations of Birds contained in Resolution 2 (2004).

The following conditions apply to the use of Remotely Piloted Aircraft Systems (RPAS):

- The operation of RPAS over the Area should be carried out, as a minimum requirement, in compliance with the 'Environmental Guidelines for Operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica' (v 1.1) contained in Resolution 4 (2018).

7(iii) Activities which may be conducted within the Area

Activities which may be conducted within the Area include:

- compelling scientific research which cannot be undertaken elsewhere;
- sampling, which should be the minimum required for approved research programs;
- conservation, inspection and maintenance;
- essential management activities, including monitoring;
- operational activities in support of scientific research or management within or beyond the Area, including visits to assess the effectiveness of the Management Plan and management activities; and
- educational and/or recreational visits, including tourism.

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

To protect the historic, aesthetic and environmental values of the Area, no new structures or equipment should be constructed, nor additional scientific equipment installed in the Area, except for the conservation, research or maintenance activities specified in Section 3 above.

All equipment and infrastructure left in the Area should be periodically reviewed for maintenance and potential removal.

7(v) Location of field camps

- Only tents associated with authorised works parties should be pitched on the wooden platform adjacent to Sørensen Hut.
- Camping by other personnel is permitted within the Visual Protection Zone.
- Use of Mawson's Huts for accommodation is not permitted.
- If Sørensen Hut is used in an emergency, use of any supplies should be reported to the Australian Antarctic Division as soon as practicable to ensure the safety of other people who may be reliant upon known stores.
- Existing non-historic infrastructure should be used by parties undertaking activities in accordance with this Management Plan, in preference to establishing new infrastructure.

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

- No living animals, plant material, micro-organisms or soils shall be deliberately introduced into the Area, and all reasonable precautions shall be taken to prevent accidental introductions.
- No poultry products, with the exception of sterilised egg powder, may be brought into the Area.
- No polystyrene packaging materials may be brought into the Area.
- No pesticides or herbicides may be brought into the Area, except those used for the purposes of conservation or preservation of historic structures or artefacts, which shall be allowed into the Area in accordance with a permit, and then removed from the Area at or before the conclusion of the activity for which the permit was granted.
- Fuel, food and other materials are not to be deposited in the Area, unless required for essential purposes connected with the activity for which the permit has been granted.
- Use of combustion-type lanterns is not permitted inside the Area under any circumstances.

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

Taking or harmful interference with native flora and fauna is prohibited, except in accordance with a 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 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.

Approach distances to wildlife should be consistent with those agreed within the Committee for Environmental Protection. Until guidelines are adopted by the Committee, Table 1 below provides guidance.

Visitors are prohibited from washing, swimming or diving into the lakes. These activities could contaminate the water body and disturb the water column, microbial communities, and sediments.

Table 1: Minimum distances to maintain when approaching wildlife on foot

Species	Phase of life	On foot (m)
Snow petrels	Nesting	15
Wilson's storm-petrels	Nesting	15
South polar skuas	Nesting	15
Adélie penguins	Summer: on ice or away from colony	5
	Summer: breeding birds in colonies	15
Seals with pups	Breeding	15
Individual seals (all species)	All times	5

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

Visitors to the Area are prohibited from interfering with or from handling, taking or damaging any designated Historic Site or Monument, or any anthropogenic material meeting the criteria in Resolution 5 (2001).

Other material of human origin likely to compromise the values of the Area, and which was not brought into the Area by the permit holder or otherwise authorised, may be removed from the Area unless the environmental impact of the removal is likely to be greater than leaving the material in situ: if this is the case the appropriate national authority must be notified and approval obtained.

7(ix) Disposal of waste

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

Refuelling of vehicles, generators and other essential equipment should be conducted with due care for the surrounding environment. Refuelling activities should not be conducted in the catchment areas of lakes or melt streams, at the ice edge, or in other sensitive areas.

7(x) Measures that may be necessary to continue to meet the aims of the Management Plan

- The provision of information for tourists and other visitors to the Area, including a briefing video and interpretative literature;
- a post-visit survey to assist in the formal monitoring of visitor impact (with primary regard to conservation requirements, rather than visitor access);
- off-site interpretation of the Area that maximises the use of available media,

including the internet; and

- the development of skills and resources, particularly those related to the excavation of artefacts from ice and materials conservation to assist in the protection of the Area's values.

7(xi) Requirements of reports

The principal permit holder for each visit to the Area shall submit a report to the appropriate national authority as soon as practicable.

Such visit reports should include, as applicable, the information identified in the recommended visit report form contained in the Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas.

If appropriate, the national authority should also forward a copy of the visit report to the Party that proposed the Management Plan, to assist in managing the Area and reviewing the Management Plan.

Parties should, wherever possible, deposit originals or copies of such original visit reports in a publicly accessible archive to maintain a record of usage, for the purpose of any review of the Management Plan and in organising further visitation and/or use of the Area.

8. Supporting documentation

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McGregor, A. (1998). Mawson's Huts: an Antarctic Expedition Journal. Sydney: Hale and Iremonger, pp. 7–15.
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Patterson, D. 2003. Mawson's Huts Conservation Expedition 2002: Field Leader's Report.
Secretariat of the Antarctic Treaty, Environmental Protection, Protected Areas http://www.ats.aq/e/ep_protected.htm (Accessed 5 July 2013).
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Appendix A(i)

Breeding populations and cycles of nesting seabirds at Cape Denison, Commonwealth Bay

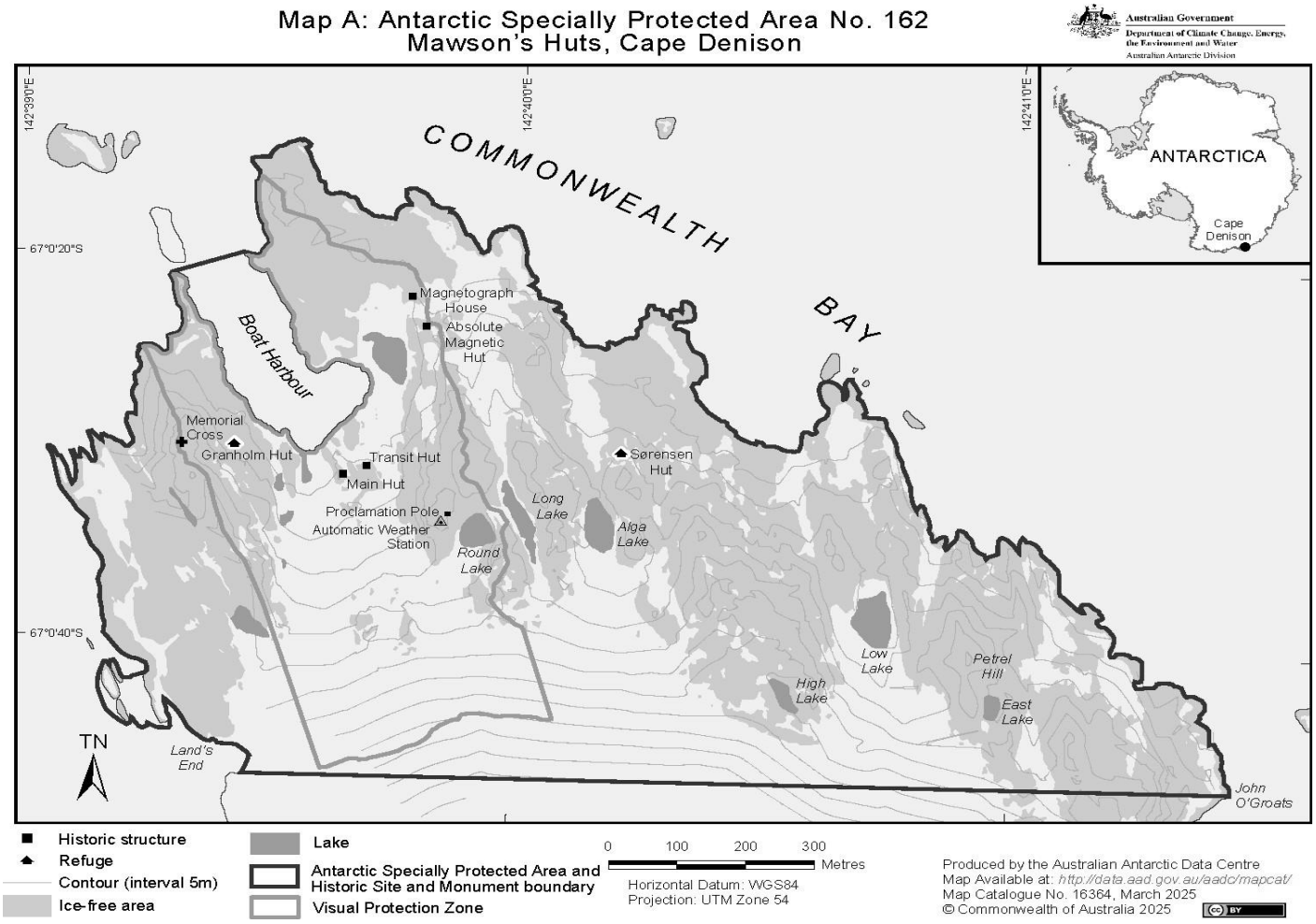
Seabird species breeding at Cape Denison	**Breeding populations**	**Summer breeding cycle**
Wilson's storm-petrel (*Oceanites oceanicus*)	Approximately 40 breeding pairs; nests in rock crevices and cracks dispersed across the area but concentrated in three aggregations	Before mid-December: adults; after mid-December: adults, eggs and chicks
Snow petrel (*Pagodroma nivea*)	Approximately 30 breeding pairs; nests in rock crevices dispersed across the area but concentrated in one aggregation	Before late November: adults; after late November: adults, eggs and chicks
Adélie penguin (*Pygoscelis adeliae*)	Approximately 20,000 breeding pairs; numerous densely populated colonies	Before November: adults; after November: adults, eggs and chicks
South polar skua (*Catharacta maccormicki*)	Approximately 10 pairs; scattered nests on fringes of penguin colonies	Before mid-December: adults; after mid--December adults and chicks

Appendix A(ii)

Timing of presences of seals at Cape Denison, Commonwealth Bay

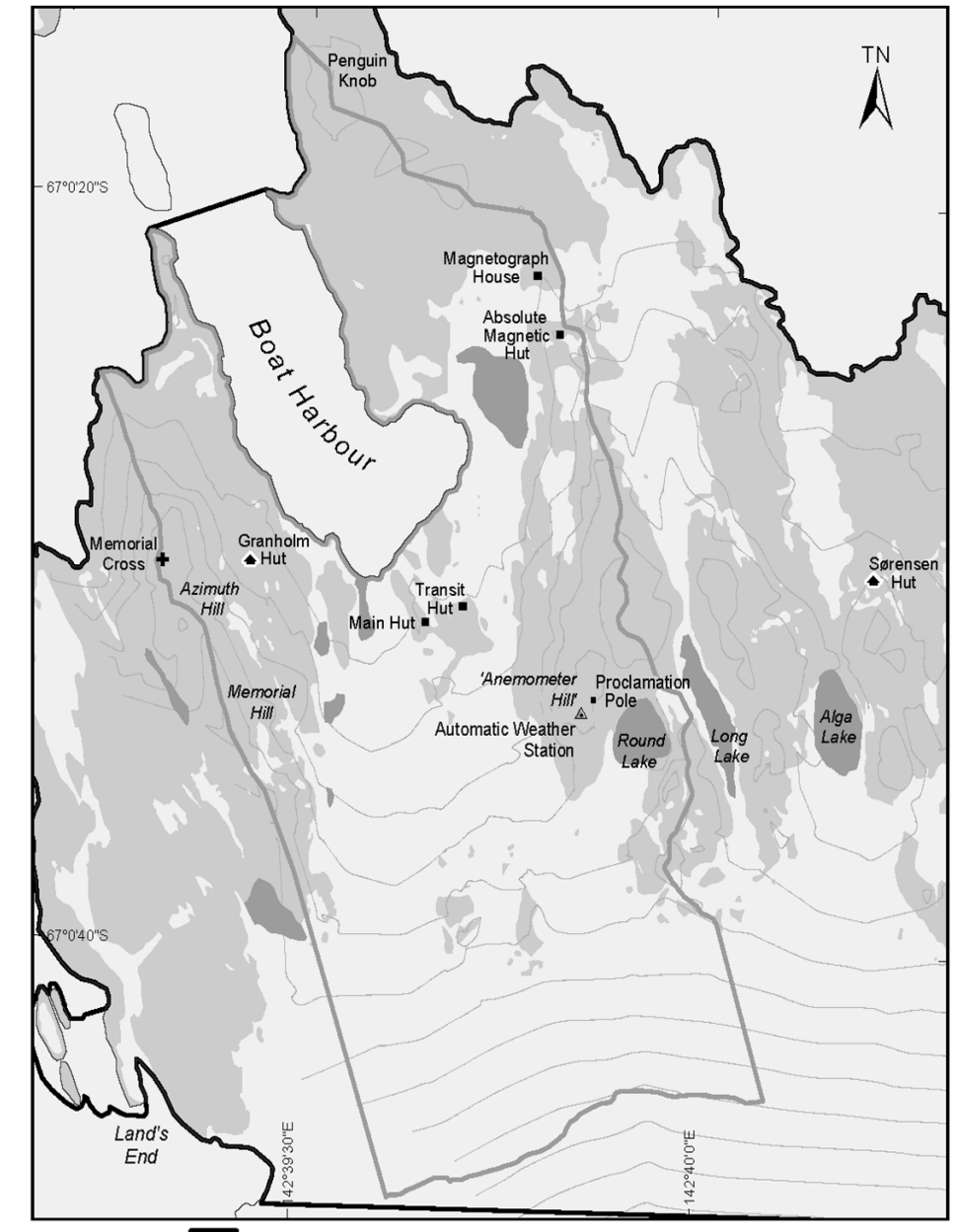
Species	**Number**	**Presence**
Weddell seal (*Leptonychotes weddellii*)	Exact number not known, no established breeding colonies	Between mid-November to end December, approx. 24 adults per day
Southern elephant seal (*Mirounga leonina*)	Exact number not known, no established colonies	Approx. 2 or more adults per day between December and April

Map A: Antarctic Specially Protected Area No. 162
Mawson's Huts, Cape Denison



Map B: Antarctic Specially Protected Area No. 162
Mawson's Huts, Cape Denison
Visual Protection Zone

Australian Government
Department of Climate Change, Energy, the Environment and Water
Australian Antarctic Division



Historic structure
Refuge
Lake
Ice-free area
ASPA and HSM
Visual Protection Zone
Contour (interval 5m)

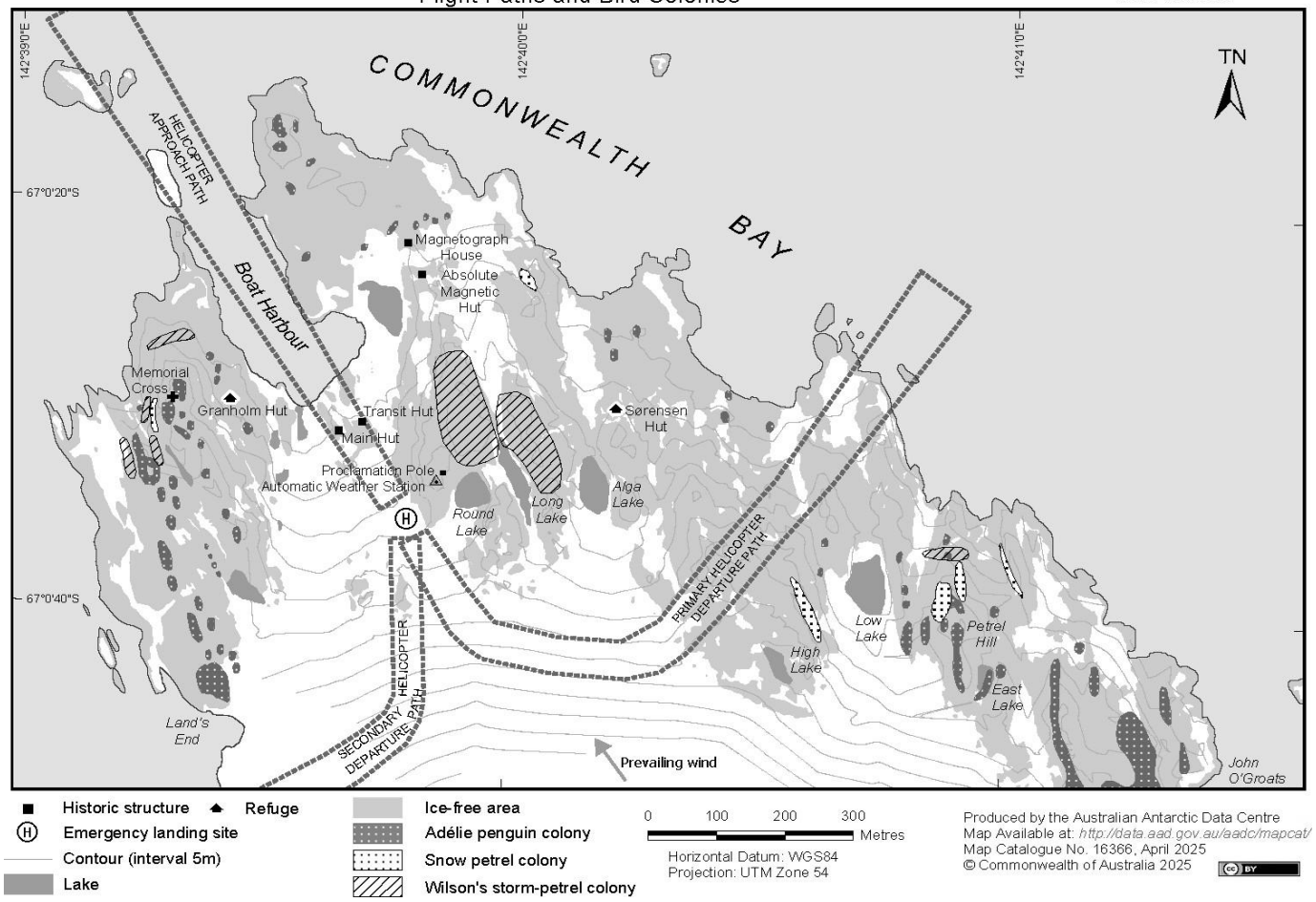
0 50 100 150 Metres

Horizontal Datum: WGS84
Projection: UTM Zone 54

Produced by the Australian Antarctic Data Centre
Map Available at: *http://data.aad.gov.au/aadc/mapcat/*
Map Catalogue No. 16365, April 2025

Map C: Antarctic Specially Protected Area No. 162, Mawson's Huts, Cape Denison

Flight Paths and Bird Colonies



Measure 2 (2025)

Antarctic Specially Protected Area No 169 (Amanda Bay, Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica): Revised Management Plan

The Representatives,

Recalling Articles 3, 5 and 6 of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty providing for the designation of Antarctic Specially Protected Areas ("ASPA") and approval of Management Plans for those Areas;

Recalling

- Measure 3 (2008), which designated Amanda Bay, Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica as ASPA 169 and adopted a Management Plan for the Area;
- Measure 10 (2014), which adopted a revised Management Plan for ASPA 169;

Noting that the Committee for Environmental Protection ("CEP") has endorsed a revised Management Plan for ASPA 169;

Desiring to replace the existing Management Plan for ASPA 169 with the revised Management Plan;

Recommend to their Governments the following Measure for approval in accordance with paragraph 1 of Article 6 of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty:
That:

1. the revised Management Plan for Antarctic Specially Protected Area No 169 (Amanda Bay, Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica), which is annexed to this Measure, be approved; and
2. the Management Plan for Antarctic Specially Protected Area No 169 annexed to Measure 10 (2014) be revoked.

Management Plan for Antarctic Specially Protected Area No. 169

AMANDA BAY, INGRID CHRISTENSEN COAST, PRINCESS ELIZABETH LAND, EAST ANTARCTICA

Introduction

The Amanda Bay Antarctic Specially Protected Area (ASPA) in southern Prydz Bay, on the Ingrid Christensen Coast of Princess Elizabeth Land, East Antarctica at 69°15'00"S, 76°49'00"E (Map A). The ASPA was designated under Measure 3 (2008) following a proposal by China and Australia, primarily to protect the breeding colony of several thousand pairs of emperor penguins (Aptenodytes forsteri). A revised Management Plan for the Area was adopted under Measure 10 (2014).

The Area contributes to the series of Antarctic protected areas as one of only four ASPAs in East Antarctica designated to protect emperor penguin colonies, along with: ASPA 101 Taylor Glacier, approximately 680 km west of Amanda Bay; ASPA 127 Haswell Island, approximately 740 km east of Amanda Bay; and ASPA 120 Point Géologie Archipelago, approximately 2530 km east of Amanda Bay. Long-term location data indicate that the position of the Amanda Bay colony has remained constant since it was first sighted in the mid-1950s. Systematic intermittent estimates of the population are available since 1983.

Being proximate to research stations in the Larsemann Hills and Vestfold Hills, Amanda Bay is among the most accessible emperor penguin colonies in East Antarctica. Its location facilitates the collection of valuable long-term population monitoring data and comparative studies with other East Antarctic emperor penguin colonies. Although advantageous for research purposes, Amanda Bay's proximity to research stations increases the potential for human disturbance of the emperor penguin colony.

Amanda Bay and its resident emperor penguin colony were discovered on 30 November 1956 during an aerial survey by expeditioners from the former Soviet Union. On 26 August 1957, an Australian surveying party observed an astro fix at the Larsemann Hills. During the return flight to Davis, the area was photographed and named Amanda Bay after the newly born daughter of the pilot, RAAF Squadron Leader Peter Clemence. Since 1957, the colony has been visited by researchers from Australia, China, Russia and the former Soviet Union. A small number of visits were made by tourist operators prior to the area's designation as an ASPA.

1. Description of values to be protected

The Area is primarily designated to protect the breeding colony of emperor penguins and their habitat (fast ice), and possesses environmental and scientific values. The collection of long-term population monitoring data in the Area helps determine the status of the colony and is valuable for comparative studies with other emperor penguin colonies in East Antarctica, and elsewhere in Antarctica.

During winter the colony is located on the fast ice in the south-west corner of Amanda Bay. As the breeding season progresses, the colony separates into several smaller groups that move away from the wintering ground and cover most of the southern section of the ASPA. The colony comprises up to 11,000 pairs, and on average 8500 chicks. However, the number of penguins attending the colony varies annually (Wienecke and Pedersen 2009, Wienecke et al. 2024).

Emperor penguins have a circumpolar breeding distribution and live all year in Antarctic waters. There are currently more than 60 known breeding colonies (Fretwell and Trathan 2020, Fretwell 2024), but the populations of many of these colonies have not been subject to regular on-ground or satellite monitoring.

The first estimate of the global population of emperor penguins drew upon satellite imagery and indicated that there may be some 238 000 breeding pairs (Fretwell et al. 2012). Since then, several new colonies were found, increasing the estimate by approximately 5-10 per cent (Fretwell and Trathan 2020). Throughout the breeding season, the number of adults attending a colony varies and decreases towards summer. Thus, chick numbers provide a more reliable representation of colony size than adult counts.

Emperor penguins are long-lived, but are susceptible to changes in their breeding habitat. Colonies are typically located on winter fast ice in areas where this ice forms early in the year and remains relatively stable throughout summer. Only two colonies are located entirely on land – Taylor Glacier, Mac.Robertson Land (ASPA 101, 67°26’57”S, 60°51’01”E) and the Amundsen Bay colony in Enderby Land (66°45’00”S, 50°38’00”E).

The Amanda Bay area also supports breeding colonies of other seabird species and is a haul-out area for Weddell seals and a moult site for Adélie penguins.

2. Aims and objectives

Management at Amanda Bay aims to:

- avoid degradation of, or substantial risk to, the emperor penguin colony by preventing/minimising unnecessary human disturbance;
- provide for ongoing research and monitoring of the emperor penguin colony, and other compelling scientific activities which cannot be undertaken elsewhere;
- gather survey data on the population status of the emperor penguin colony on a regular basis; and
- minimise the possibility of the introduction of pathogens which may cause disease in fauna populations within the Area.

3. Management activities

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

- information about the Area including its boundaries and the special restrictions that apply within it, plus copies of this management plan, shall be made available at research and field stations in the Vestfold Hills and Larsemann Hills, and to ships that visit the vicinity;
- pilots operating in the region shall be informed of the location, boundaries and restrictions applying to entry and over-flight in the Area;
- national program personnel undertaking activities in the vicinity of, accessing or flying over the Area, shall be specifically instructed by their national program as to the provisions and contents of the management plan;
- visits shall be made to the Area as necessary (where practicable, 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;
- the management plan shall be reviewed at least every five years and updated as required; and
- national Antarctic programs operating in the Area shall consult with a view to ensuring the above management activities are implemented.

4. Period of designation

Designated for an indefinite period.

5. Maps

- Map A: Amanda Bay Antarctic Specially Protected Area, Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica. Location Amanda Bay on Ingrid Christensen Coast. Map Specifications: Projection: Lambert Conical Conformal; Horizontal Datum: WGS84; Vertical Datum: Mean Sea Level.
- Map B: Amanda Bay Antarctic Specially Protected Area, Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica. Location of Emperor Penguin Colony and Physical Features. Map Specifications: Horizontal Datum: WGS84; Vertical Datum: Mean Sea Level.
- Map C: Amanda Bay Antarctic Specially Protected Area. Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica. Location of monitoring devices. Horizontal Datum: WGS84; Vertical Datum: Mean Sea Level.
- Figure 1: Photographs of Australian automated monitoring devices at Amanda Bay.
- Figure 2: Photographs of Chinese automated monitoring devices at Amanda

Bay.

- Figure 3: Photographs of penguin colony at Amanda Bay.

6. Description of the Area

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

- *General description*

Amanda Bay (69°15'00"S, 76°49'00"E) lies south-west of the Brattstrand Bluffs, between the Vestfold Hills to the north-east and the Larsemann Hills to the south-west, on the Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica (see Map A). Amanda Bay is approximately 3.5 km wide and 5 km long and opens north-west into Prydz Bay. It is flanked by the Flatnes Ice Tongue and the Hovde Glacier on its south- west and south-east side, respectively. Its southern side is bounded by continental ice cliffs and rock outcrops. There are small islets in the south-western section, the largest of which is Reel Island. There are also several small, un-named islands a few kilometres offshore outside the Area.

The ASPA comprises the rocks, islands and water (including fast ice) commencing at a point to the north-east of Hovde Island at the terminus of the Hovde Glacier, 69°13'26"S, 76°53'41"E; then south along the coastline at the base of the Hovde Glacier ice cliffs, to a point at 69°16'23"S, 76°53'44"E; then west along the coastline at the base of a series of ice-free bluffs to a point 69°16'59"S, 76°49'37"E; then north along the base of the Flatnes Ice Tongue ice cliffs, to a point at the terminus of the Flatnes Ice Tongue, 69°16'59"S, 76°49'37"E; then a straight line in a north-easterly direction connecting with the originating point at 69°13'26"S, 76°53'41"E (Map B).

- *Environmental Domains Analysis*

Amanda Bay is located within Environment C Continental coastal-zone ice sheet (Resolution 3 (2008)).

- *Antarctic Conservation Biogeographic Regions*

Amanda Bay is located within Biogeographic Region 7 East Antarctica (Resolution 6 (2012)).

- *Important Bird Areas in Antarctica*

Amanda Bay represents Important Bird Area No. 128 (Resolution 5 (2015)).

- *Emperor penguins*

During winter, the emperor penguin colony occupies the fast ice in the south-west part of Amanda Bay. Throughout the breeding season, and especially once the chicks

are mobile, various small groups form that spread to the north, south and west of the wintering area. The largest of the small islands in the south-west part of the bay, Reel Island (69°16'22"S, 76°50'24"E), is usually occupied by large numbers of chicks during spring and summer. Strong circular currents in Prydz Bay render the sea ice north of the Area unstable for most of the year, providing the emperor penguins with good access to open water some 30-40 km from the colony. Between 2009 and 2022 the number of chicks alive in late November/early December ranged from approximately 6,500 in 2009 to approximately 10,500 in 2022.

- *Other biota*

South polar skuas (Catharacta maccormicki) and Wilson's storm petrels (Oceanites oceanicus) breed on the islands of Amanda Bay. However, the size of their breeding populations is currently unknown. More than 20 non-breeding south polar skuas also occupy these islands in summer. Adélie penguins (Pygoscelis adeliae) frequently visit the Area and use these islands during their annual moult. Weddell seals (Leptonychotes weddelli) regularly haul out at tide cracks in the Area, particularly in the southern part where the fast ice remains for most of the summer.

- *Climate*

Amanda Bay is almost entirely covered by fast ice (usually even during summer) making it an important habitat for both emperor penguins and Weddell seals.

Limited meteorological data exist for the immediate region. The nearest areas with a substantial record of meteorological data are the Vestfold Hills (Davis station), 75 km to the north-east, and the Larsemann Hills (Zhongshan, Progress and Bharati stations), 22-30 km to the south-west.

The prevailing wind within Amanda Bay appears to be highly variable but comes mainly from the east- southeast. The prevailing winds at Davis station are northeast to east and of moderate strength. The mean annual wind speed is 18 km/hr. On average the windiest month is November, and the least windy month is April. In the Larsemann Hills, violent southerly winds are often encountered. Persistent and strong katabatic winds also blow off the plateau from the northeast on most summer days.

From December to February daytime air temperatures in the Larsemann Hills frequently exceed 4°C and can exceed 10°C, and the mean monthly temperature is a little above 0°C. Mean monthly winter temperatures are between 15°C and -18°C. Precipitation occurs as snow and is unlikely to exceed 250 mm water equivalent annually. Davis experiences a mean monthly temperature range from +1°C in January to -18°C in July. Snowfall is very light and most snow accumulation is the result of drift snow blown from the plateau between March and October.

- *Geology*

Rocky areas in southern Prydz Bay include the Svenner Islands, the Brattstrand Bluffs, islands and islets in Amanda Bay, the Larsemann Hills, Bølingen Islands, Søstrene Island, the Munro Kerr Mountains, and Landing Bluff, and consist of interleaved paragneiss and orthogneiss with high-temperature mineral assemblages and structures about 500 Ma in age (Pan African). The paragneiss preserves no conclusive evidence of earlier metamorphism. However, the orthogneiss has local relics of high-grade metamorphism at 1000 Ma. The Pan-African orogenic event involved crustal thickening and burial of the paragneiss followed by exhumation. There are also several igneous intrusions that post-date peak metamorphism, including granitoid plutons and widespread pegmatite dykes which crosscut the gneiss and plutons. One such granitoid pluton is found at Amanda Bay. This is K-feldspar rich and post-dates early foliations in the country gneiss. The pluton exhibits a biotite foliation, contains garnet, spinel and apatite and is thought to be syntectonic, intruded during the later stages of metamorphism.

6(ii) Access to the Area

The Area may be accessed via helicopter or ground vehicle in accordance with the conditions presented in section 7(ii) of this plan.

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

Two temporary automated cameras were placed on Reel Island in the south-eastern part of Amanda Bay, and one on the southern rock outcrop for monitoring the emperor penguin colony and local fast ice conditions, by the Australian Antarctic Program in 2011; and four temporary automatic monitoring devices were placed in the south-east part of Amanda Bay during the 38th Chinese Antarctic Expedition in 2022 (Appendix 2).

6(iv) Location of other Protected Areas in the vicinity

The Larsemann Hills, Antarctic Specially Managed Area No 6 (69°23’42”S 76°10’24"E) and Stornes, ASPA No 174 (69°25’40”E, 76°05’07”) are located approximately 16 km and 30km to the south-west of Amanda Bay, respectively. Hawker Island, ASPA No 167 (68°37’60”S, 77°51’00”E) and Marine Plain, ASPA No 143 (68°37’50”S, 78°07’55”E), are located in the Vestfold Hills approximately 75 km and 80 km to the north-east of Amanda Bay, respectively.

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 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:

- the permit is issued only for compelling scientific reasons that cannot be served elsewhere, in particular for the scientific study of the avifauna and ecosystem of the Area, or for essential management purposes consistent with the objectives of this management plan, such as inspection, management or review;
- the actions permitted will not jeopardise the values of the Area or other permitted activities;
- the actions permitted are in accordance with this Management Plan;
- the permit, or an authorised copy, shall be carried within the Area;
- a visit report will be supplied to the authority that approved the permit, as soon as practicable after the visit to the ASPA has been completed, but no later than six months after the visit has occurred;
- permits shall be issued for a finite period;
- permit holders shall notify the appropriate authority of any activities or measures undertaken that were not authorised by the permit; and
- all census and GPS data shall be made available to the permitting authority and to the Parties responsible for the development of the management plan.

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

Noting that environmental conditions and the location of the emperor penguin colony vary between and during seasons, disturbance of the colony should be minimised at all times, particularly during incubation and early chick rearing.

The coastline partially comprises a very large ice wall which prevents direct access from the continent from the west, south and east.

There are no marked pedestrian routes within the Area. Unless disturbance is authorised by a permit, pedestrians should keep at least 50 m from any penguin or concentrations of penguins.

Vehicle access should be overland from the south or from sea ice to the north, avoiding crossing between the colony and the sea. Vehicles should be kept at least 500 m from any penguin or concentrations of penguins.

As the emperor penguin colony does not remain in a fixed location, it is not possible to designate helicopter landing sites and flight paths that will always prevent disturbance. Appropriate flight paths and a viable landing site (VLS) need to be assessed on a visit-by-visit basis, and caution must be exercised in accordance with the provisions of this management plan. When approaching and departing a VLS,

natural features, such as islands and icebergs, should be used to shield concentrations of penguins from direct noise.

The following conditions apply to the use of aircraft:

- aircraft shall operate in accordance with Resolution 2 (2004), Guidelines for the Operation of Aircraft near Concentrations of Birds in Antarctica;
- aircraft shall not be operated over or in the Area from 1 May to 1 October each year;
- fixed wing aircraft shall not be landed in the Area;
- aircraft shall not be refuelled within the Area;
- helicopters may only land at a VLS, identified on each visit by making an initial assessment flight around the outer perimeter of the Area to determine penguin distribution and concentrations in relation to the topography; for twin-engine helicopters, the VLS must be located at least 1000 m from the nearest concentration of penguins; and
- for single-engine helicopters, the VLS must be at least 1000 m from concentrations of penguins, or where the topography (icebergs, islands etc) will shield concentrations of penguins from direct noise. (Note: A VLS may be present on the inner side of the eastern coastal edge of Reel Island in the southeast corner of Amanda Bay at 69°16'22"S, 76°50'24"E).

The following conditions apply to the use of Remotely Piloted Aircraft Systems (RPAS):

- The operation of RPAS over the Area should be carried out, as a minimum requirement, in compliance with the 'Environmental Guidelines for Operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica' (v 1.1) contained in Resolution 4 (2018).
- RPAS shall not be operated over or in the Area from 1 May to 1 October each year.

7(iii) Activities which may be conducted in the Area

The following activities may be conducted in the Area:

- compelling scientific research, which cannot be undertaken elsewhere and which will not jeopardise the avifauna or the ecosystem of the Area;
- essential management activities, including monitoring; and
- sampling, which should be the minimum required for the approved research programs.

As the emperor penguins are particularly sensitive to disturbance during the following periods:

- from mid-May to late July when they are incubating eggs;
- from late July to late September when adults are brooding chicks;
- from late November to late December when the chicks moult and fledge; and
- in late summer during the adults' moult.

Visitors should exercise particular care not to unduly disturb or interfere with the emperor penguins during these periods.

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

Permanent structures and installations are prohibited in the Area. Temporary structures and installations may only be established in the Area for compelling scientific or management reasons as specified in a permit.

Any temporary structure established in the Area must be:

- clearly identified by country, name of the principal agency, date of installation and date of expected removal;
- first cleaned of organisms, propagules (e.g. seeds, eggs) and non-sterile soil;
- made of materials that can withstand Antarctic conditions and pose minimal contamination risk to the Area; and
- removed when they are no longer required, or before the expiry of the permit, whichever is earlier.

7(v) Location of field camps

Camping may only be undertaken within the Area if:

- it facilitates compelling scientific research or management operations;
- it is temporary only; and
- every effort is made to locate and keep the camp at least 500 m from penguin concentrations.

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

The following restrictions apply:

- no poultry products, including dried food containing egg powder, are to be taken into the Area;
- no depots of food or other supplies are to be left within the Area beyond the time period for which they are required;
- no living animals, plant materials, microorganisms or non-sterile soils are to be deliberately introduced into the Area. Precautions must be taken to prevent the accidental introduction of living animals, plant materials, microorganisms or non-sterile soils into the Area;

- no herbicides or pesticides are to be taken into the Area. Any other chemicals (including radionuclides or stable isotopes which may be introduced for scientific or management purposes specified in a permit) will be removed from the Area at or before the conclusion of the activity for which the permit was granted;
- fuel must not to be stored in the Area unless it is required for essential purposes connected with the activity for which the permit has been granted. All such fuel must be removed from the Area at or before the conclusion of the permitted activity. Permanent or semi-permanent fuel depots are not permitted; and
- all material introduced to the Area shall be for a stated time period only and if left unattended, labelled with a country identifier. All material introduced to the Area will be removed at or before the conclusion of that stated time period, and will be stored and handled in a manner that will minimise the risk of environment impacts.

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

Taking of or harmful interference with native flora and fauna is prohibited except in accordance with a permit. 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 on the breeding birds present within the Area shall be limited to activities that are non-invasive and non-disruptive. If the capture of individuals is required, capture should occur outside the Area if at all possible to reduce disturbance to the colony.

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

Material may only be collected or removed from the Area in accordance with a permit and should be limited to the minimum quantity necessary to meet scientific or management needs.

Material of human origin likely to compromise the values of the Area, and 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 this is the case, the appropriate national authority must be notified and approval obtained.

7(ix) Disposal of waste

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

7(x) Measures that may be necessary to ensure that the aims and objectives of the management plan can continue to be met

Permits may be granted to allow biological monitoring and Area management and inspection activities which may involve:

- the collection of samples for analysis or review;
- the establishment or maintenance of scientific equipment, structures and signposts; and
- other protective measures.

Any specific sites of long-term monitoring shall be appropriately marked and GPS coordinates obtained for lodgement with the Antarctic Data Directory System through the appropriate national authority.

Ornithological research shall be limited to activities that, where practicable, are non-invasive and non- disruptive to the breeding birds present within the Area. Invasive and/or disruptive research activities shall only be authorised if they will have no effect or only a temporary and transient effect on the population.

Visitors shall take special precautions against the introduction of alien organisms into the Area. Of particular concern are pathogenic, microbial or vegetation introductions sourced from soils, flora or fauna at other Antarctic sites (including research stations). To minimise the risk of introductions, before entering the Area all visitors shall thoroughly clean their footwear, sampling equipment, markers etc.

7(xi) Requirements for reports

Parties shall ensure that the principal permit holder for each permit issued submits, to the appropriate national authority, a report on activities undertaken.

Such reports shall include, as appropriate, the information identified in the visit report form contained in Appendix 4 of the Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas appended to Resolution 2 (1998).

Parties shall maintain a record of such activities.

In the Annual Exchange of Information, Parties shall provide summary descriptions of activities conducted by persons subject to their jurisdiction, in sufficient detail to allow an evaluation of the effectiveness of the management plan.

Parties shall, wherever possible, deposit original reports or copies of such in a publicly accessible archive to maintain a record of usage for the benefit of a review of the management plan and the organisation of science in the Area.

A copy of the report shall be forwarded to the Party responsible for the development of the management plan.

Additionally, visit reports shall provide detailed information on census data, locations of any new colonies or nests not previously recorded, a brief summary of research findings, and copies of photographs taken in the Area.

8. Supporting documentation

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

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Appendix 1. Systematic counts of emperor penguin chicks at Amanda Bay (2009-2022)

Date	Estimated number of chicks (alive)	Comments	Reference
29 November 2009	9738	Ground photography	Wienecke *et al*. 2024
13 December 2014	8852	Aerial photography	Wienecke *et al*. 2024
8 December 2018	6517	Aerial photography	Wienecke *et al*. 2024
23 November 2022	10485	Aerial photography	Wienecke *et al*. 2024

Appendix 2. Location of temporary automatic monitoring devices within and adjacent to the Area

Three automatic cameras were installed around Reel Island by Australia in January 2011. Four automated monitoring devices were installed on the south-east corner of Amanda Bay by China in 2022. The location of these seven devices are listed in Table 1:

Table 1: Location of automated monitoring devices at Amanda Bay

No.	Device	Latitude S	Longitude E	Setup Date
1	Automatic camera (Australia)	69°27'11"	76°83'42"	January 2011
2	Automatic camera (Australia)	69°27'10"	76°83'41"	January 2011
3	Automatic camera (Australia)	69°27'10"	76°83'41"	January 2011
4	Infrared camera (China)	69°16'22"	76°49'55"	March 2022
5	Solar-powered automatic meteorological station + Infrared camera (China)	69°16'16"	76°50'01"	March 2022
6	Infrared camera (China)	69°16'09"	76°50'04"	August 2022
7	Solar-powered automatic meteorological station + Infrared camera (China)	69°16'25"	76°49'54"	August 2022

Figure 1: Photographs of Australian automated monitoring devices at Amanda Bay

Figure 2: Photographs of Chinese automated monitoring devices at Amanda Bay

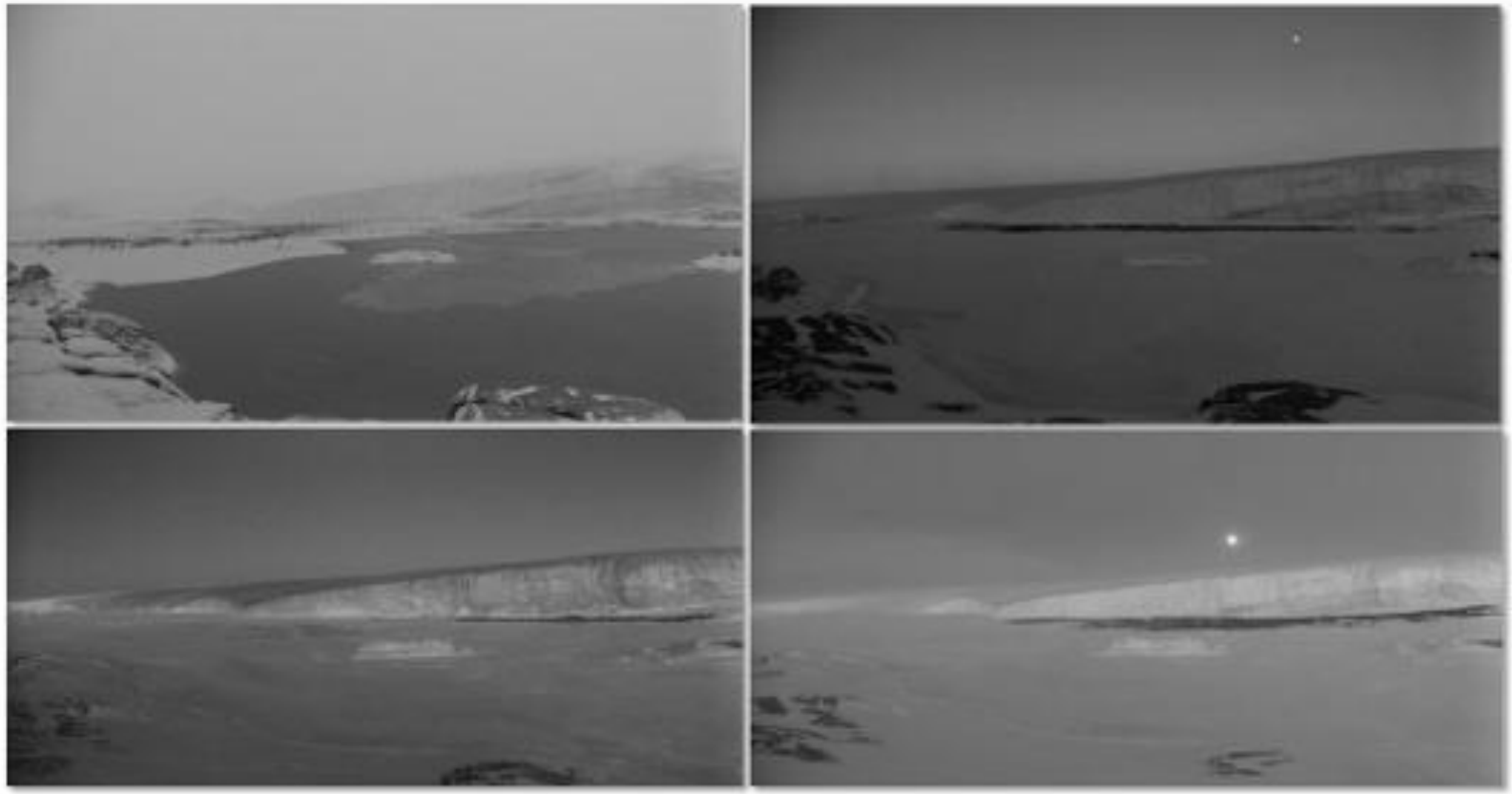
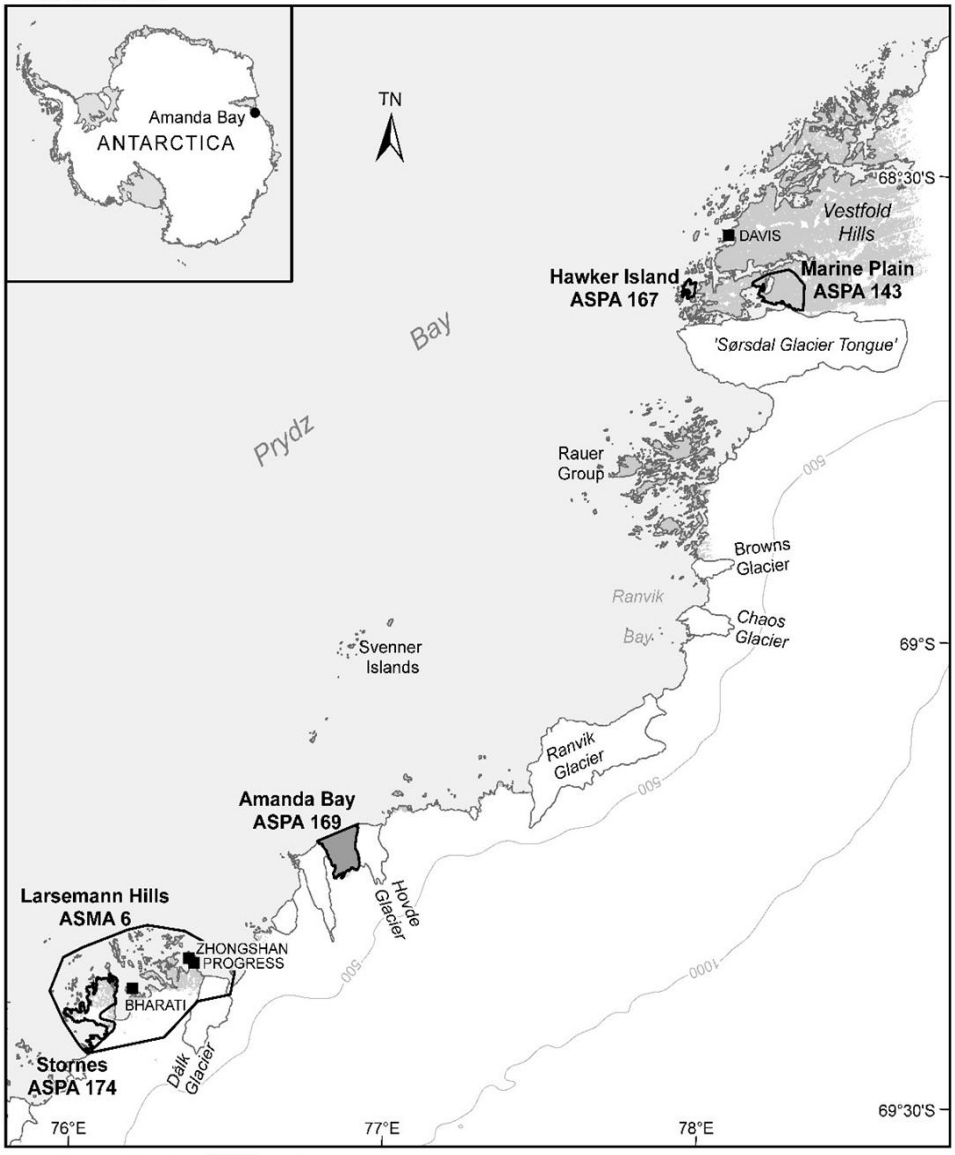


Figure 3: Photographs of penguin colony at Amanda Bay

Australian Government
Department of Climate Change, Energy, the Environment and Water
Australian Antarctic Division

Map A: Antarctic Specially Protected Areas and Antarctic Specially Managed Area, Ingrid Christensen Coast, East Antarctica



Year-round station
Ice-free area
Contour (500 metre interval)
ASPA/ASMA boundary
Amanda Bay ASPA No. 169
Glacier, glacier tongue, ice shelf

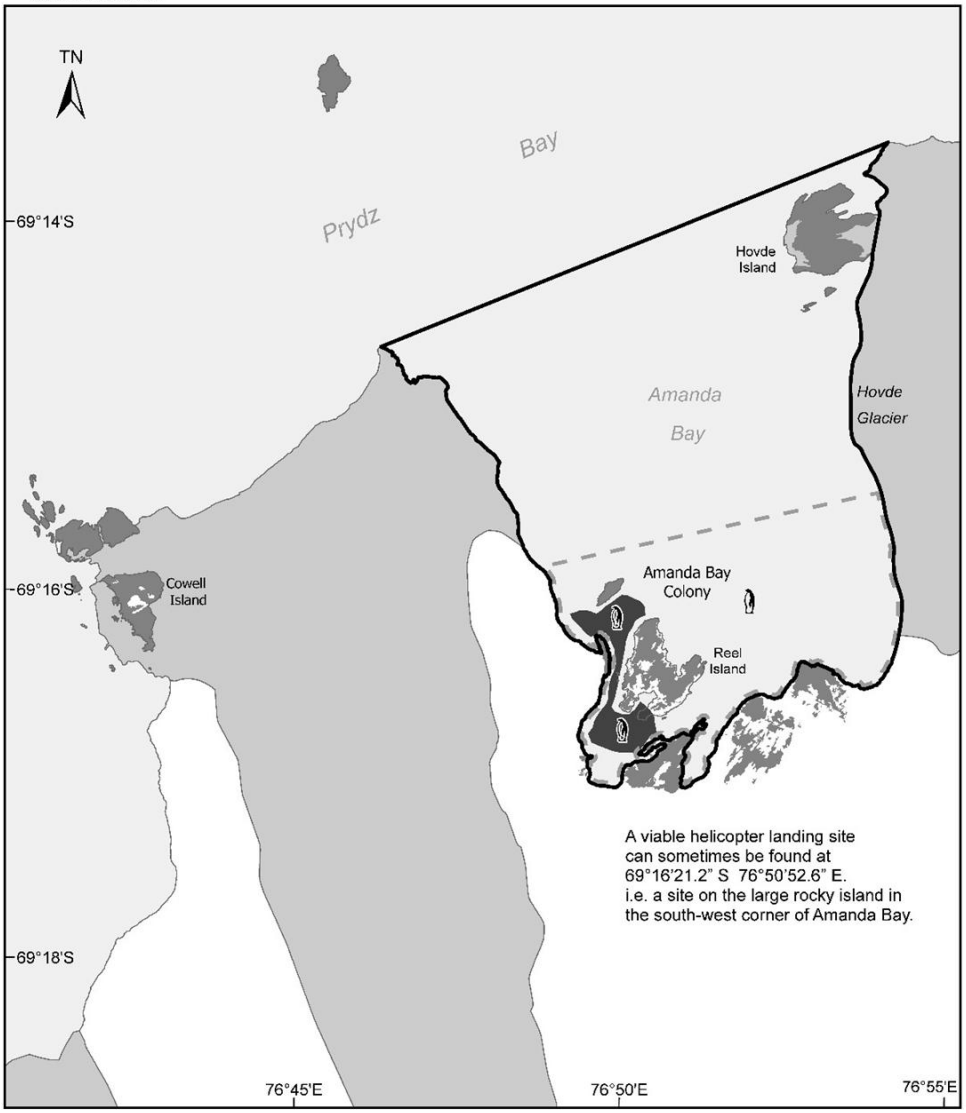
0 10 20 Km
Horizontal Datum: WGS84
Projection: UTM Zone 43

Produced by the Australian Antarctic Data Centre
Map Available at: *http://data.aad.gov.au/aadc/mapcat/*
Map Catalogue No. 16361, February 2025

Australian Government
Department of Climate Change, Energy, the Environment and Water
Australian Antarctic Division

Map B: Antarctic Specially Protected Area No. 169, Amanda Bay

Location of Emperor Penguin Colony and Physical Features



Emperor penguin colony (Apr - Sep)
Emperor penguin colony (Oct - Jan) - approximate location
Antarctic Specially Protected Area
Ice-free area
Glacier

0 500 1000 1500 Metres

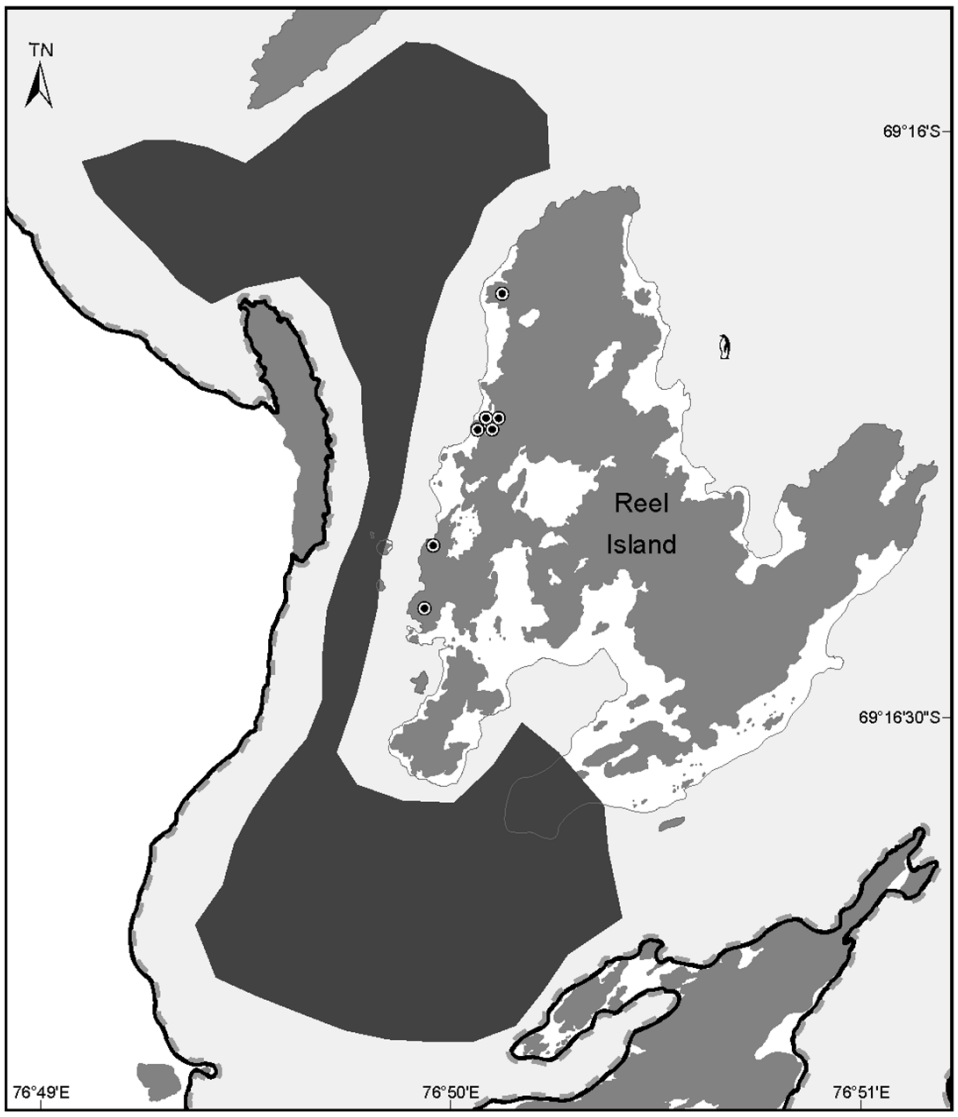
Horizontal Datum: WGS84
Projection: UTM Zone 43

Produced by the Australian Antarctic Data Centre
Map Available at: *http://data.aad.gov.au/aadc/mapcat/*
Map Catalogue No. 16362, February 2025

Australian Government
Department of Climate Change, Energy, the Environment and Water
Australian Antarctic Division

Map C: Antarctic Specially Protected Area No. 169, Amanda Bay

Location of automated monitoring devices



Emperor penguin colony (Apr - Sep)
Emperor penguin colony (Oct - Jan) - approximate location
Antarctic Specially Protected Area
Ice-free area
Device location

0 100 200 300 Metres

Horizontal Datum: WGS84
Projection: UTM Zone 43

Produced by the Australian Antarctic Data Centre
Map Available at: *http://data.aad.gov.au/aadc/mapcat/*
Map Catalogue No. 16377, February 2025

Measure 3 (2025)

Antarctic Specially Protected Area No 143 (Marine Plain, Mule Peninsula, Vestfold Hills, Princess Elizabeth Land): Revised Management Plan

The Representatives,

Recalling Articles 3, 5 and 6 of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty providing for the designation of Antarctic Specially Protected Areas ("ASPA") and approval of Management Plans for those Areas;

Recalling

- Recommendation XIV-5 (1987), which designated Marine Plain, Mule Peninsula, Vestfold Hills, Princess Elizabeth Land as Site of Special Scientific Interest ("SSSI") No 25 and annexed a Management Plan for the site;
- Resolution 3 (1996), which extended the expiry date for SSSI 25;
- Measure 2 (2000), which extended the expiry date of the Management Plan for SSSI 25;
- Decision 1 (2002), which renamed and renumbered SSSI 25 as ASPA 143;
- Measures 2 (2003) and 9 (2013), which adopted revised Management Plans for ASPA 143;

Recalling that Resolution 3 (1996) was designated as no longer current by Decision 1 (2011);

Recalling that Measure 2 (2000) did not become effective and was withdrawn by Measure 5 (2009);

Noting that the Committee for Environmental Protection ("CEP") has endorsed a revised Management Plan for ASPA 143;

Desiring to replace the existing Management Plan for ASPA 143 with the revised Management Plan;

Recommend to their Governments the following Measure for approval in accordance with paragraph 1 of Article 6 of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty:
That:

1. the revised Management Plan for Antarctic Specially Protected Area No 143 (Marine Plain, Mule Peninsula, Vestfold Hills, Princess Elizabeth Land), which is annexed to this Measure, be approved; and
2. the Management Plan for Antarctic Specially Protected Area No 143 annexed to Measure 9 (2013) be revoked.

Management Plan for Antarctic Specially Protected Area No. 143

MARINE PLAIN, MULE PENINSULA, VESTFOLD HILLS, PRINCESS ELIZABETH LAND

Introduction

Marine Plain (68°37′50″S, 78°7′55″E) is located approximately 10 km south-east of Davis station in the Vestfold Hills (Map A). The Marine Plain Antarctic Specially Protected Area covers an area of 20.44 km² and opens into an arm of Crooked Fjord on the southern side of Mule Peninsula, the southernmost of the three major peninsulas that comprise the Vestfold Hills.

The Area was originally designated as Site of Special Scientific Interest (SSSI) No. 25 under Recommendation XIV-5 (1987), following a proposal by Australia. The site was re-designated as ASPA 143 in Decision 1 (2002). Revised Management Plans were adopted under Measure 2 (2003) and Measure 9 (2013).

The Area is representative of a major Antarctic terrestrial ice-free ecosystem and is primarily designated to protect outstanding fossil fauna and rare geological features, which are of exceptional scientific interest. It protects a formation containing fossils of a diverse range of marine vertebrate and invertebrate fauna, including the first marine fossils found in Antarctica. This discovery provided crucial evidence of a Pliocene-aged marine transgression in the area, indicating that approximately three million years ago, higher sea levels allowed the sea to encroach upon regions now above sea level (Pickard et al. 1988). This relevance to the palaeoecological and palaeoclimatic record of Antarctica demonstrates the Area's exceptional scientific value.

Burton Lake lies within the Area and is the only meromictic lake included in an ASPA within East Antarctica. By preserving distinct features not represented elsewhere, the Area contributes to a representative Antarctic protected areas system, offers palaeoecological and palaeoclimatic insights into the ecology from 5 million years ago and enhances understanding of past climatic history.

1. Description of values to be protected

Marine plain is protected for its outstanding environmental, scientific and historic values, such as the exceptional fossil record, Pliocene marine sediments, and the largest periglacial thermokarst in East Antarctica.

The Area has yielded outstanding vertebrate fossil fauna including Australodelphis mirus, the first higher vertebrate named from the Oligocene-Pleistocene interval on land in Antarctica, and the first cetacean fossil from the polar margin of circum-Antarctic Southern Ocean that postdates the break-up of Gondwana. It has also revealed four other species of cetaceans; a species of fish; and a diverse invertebrate

fauna comprising molluscs, gastropods, marine diatoms and the first Pliocene decapod crustacean from Antarctica.

The Area contains a roughly horizontal section of ca 8 m thick Pliocene marine sediments known as the Sørsdal Formation (Map C), which is in some areas exposed, but elsewhere underlies Holocene sediments up to 1 m thick. A diatom biostratigraphy placed the Sørsdal Formation in the Fragilariopsis barronii Zone, Early Pliocene (ca 4.5-4.1 Ma). The early Pliocene deposits are crucial as a source of information on the environment at this stage of Antarctic history.

The fossil fauna provides insight into the early Pliocene Antarctic environments, including high- latitude climate and oceanography. By examining the diatom microfossils, it is possible to reconstruct the probable palaeoenvironmental conditions relating to the Sørsdal Formation and test hypothetical models of ice sheet behaviour against the geological record. This will also provide insight into the Antarctic ice sheet's response to climate change.

The Vestfold Hills covers an area of approximately 512 km². The hills are typically less than 180 m in elevation. They have been subject to intermittent glaciations and exposed rocks are characterised by polishing, striation and fracturing. The glacial striae show the direction of past ice movements. These features, together with other periglacial and glacial features, have been extensively studied to investigate the region's geomorphological and glacial history.

In addition, the Area possesses the largest periglacial thermokarst in East Antarctica. Sediments are normally cemented by permafrost (in addition to any cement formed during diagenesis), however thawing can lead to undercutting and collapse. The thermokarst landforms have been produced by thermal back wearing of low scarps and include thaw pits, thaw lakes, ground ice sumps, linear depressions and very small scale beaded drainage features. Human impact may accelerate the permafrost thawing which may disturb important geomorphological values and threaten fossils contained in the diatomite.

The Area is intrinsically linked to Burton Lake, a hypersaline lagoon with a seasonal connection with the marine environment. This lagoon represents a stage in the biological and physio-chemical evolution of a terrestrial water body (i.e. the geological creation of a lake). Burton Lake, together with several smaller lakes and ponds around the Area, provide important examples in the spectrum of hypersaline to fresh water lake types in the Vestfold Hills and present opportunities for important geochemical and limnological research. The interrelationships between environment and biological communities in such lakes provide considerable insight into the evolution of lake environments and more broadly Antarctic environmental development. Burton Lake is currently the only meromictic lagoon that has been protected within East Antarctica.

The Area is also the type locality for Drepanopus bispinosus and Spiraloecion didymocostatum.

Given its proximity to Australia's Davis station, there is a risk that the values of the Area may be compromised or damaged by accidental interference. There are no designated walking tracks or waypoint routes. The Area is easily accessible (by vehicle or foot) and is therefore vulnerable to inadvertent entry, especially en route to the Mule Peninsula lakes (Clear, Laternula, and McCallum) from Ellis Rapids.

The Area merits protection given there is a demonstrable risk of interference, which may jeopardise scientific investigation. Accordingly, it is critical that the Area's fossil fauna is protected from unrecorded sampling, collection or interference.

2. Aims and objectives

Management for the Marine Plain ASPA aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance to the Area;
- allow scientific research for geological, palaeoclimatic, palaeontological, geomorphological and limnological purposes, while ensuring protection from over-sampling;
- allow other scientific research provided it is for compelling reasons that cannot be served elsewhere and which will not jeopardise the values of the Area;
- prevent or minimise the introduction to the Area of alien plants, animals and microbes;
- minimise damage to landforms, particularly Marine Plain; the plain south of Poseidon Lake and east of Pickard Ridge (68°37'23"S, 78°07 10"E); glacial and periglacial features; and potential fossil sites; and
- allow visits for management purposes in support of the aims of this Management Plan.

3. Management activities

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

- copies of this Management Plan (and informative materials) shall be made available to personnel, including the operators of vehicles, small boats and aircraft in the vicinity of the Area;
- signs illustrating the location of the Area (including entry restrictions) and a copy of this management plan will be made available at Davis station, Marine Plain refuge and Watts Hut;
- markers, signs or structures, erected within the Area for scientific or management purposes shall be secured and maintained in good condition and removed when no longer required;

- abandoned equipment or materials shall be removed to the maximum extent possible provided doing so does not adversely impact on the values of the Area;
- visit the Area as necessary (no less than once every five years) to assess whether it continues to serve the purposes for which it was designated and to ensure that management activities are adequate; and
- review the Management Plan at least every five years and update as required.

4. Period of designation

Designated for an indefinite period.

5. Maps

- Map A: Vestfold Hills, East Antarctica, showing the locations of Marine Plain ASPA; Davis station and surrounding refuges. Inset: The location of the Vestfold Hills in Antarctica. Map Specifications: Projection: UTM Zone 44 Horizontal Datum: WGS84.
- Map B: The region immediately surrounding Marine Plain ASPA including topography and fauna distribution. Map Specifications: Projection: UTM Zone 44 Horizontal Datum: WGS84 Contour Interval: 20 m.
- Map C: Geological map of Marine Plain ASPA including the Sørsdal Formation. Map Specifications: Projection: UTM Zone 44 Horizontal Datum: WGS84.
- Map D: Areas where helicopter landings may be permitted within and adjacent to Marine Plain, ASPA 143. Map Specifications: Projection: UTM Zone 44 Horizontal Datum: WGS84.

6. Description of the Area

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

- *General description*

The Area is located 10 km southeast of Davis Station in the Vestfold Hills and opens into an arm of Crooked Fjord on the southern side of Mule Peninsula. The Vestfold Hills are a largely ice-free area of approximately 512 km² on the eastern side of Prydz Bay, Princess Elizabeth Land characterised by exposed bedrock, fjords, lakes, glacial debris, and ponds.

The Area includes Marine Plain (approximately 3 km²) which occupies the centre of the Area in a north-south orientation. Pickard Ridge (maximum elevation of 70 m) separates this site from Poseidon Basin in the northeast.

Both Marine Plain and Poseidon Basin are low-lying areas with elevations less than 20 m. Sections elsewhere above 20 m are mostly low rugged hills of Precambrian rock which are characterised by a marked change in slope at their base which may represent a Holocene shoreline. The surface of the lower areas below 20 m are marked by a series of concave-to-the-south recessional moraine ridges. A series of south westerly facing sand slopes occupy Marine Plain east of Burton Lake.

Starting at the most northerly point of the Area, the boundary description is as follows:

Commencing at 68°36'34"S, 78°09'28"E, then south-easterly to 68°36'45"S, 78°10'30"E; then south- easterly to 68°37'30"S, 78°12'30"E, then south along meridian of longitude 78°12'30"E to its intersection with the northern shore of Pineapple Lake; then west along that shore to the edge of the Sørsdal Glacier; then westerly along the northern edge of the Sørsdal Glacier to its intersection with the low water mark of the north eastern shore of Crooked Fjord; then westerly along the low water mark of the northern shore of Crooked Fjord (cutting across the outlet of Burton Lake into Crooked Fjord) to its intersection with the meridian of longitude 78°03'0"E; then north along meridian of longitude 78°03'0"E to its intersection with the parallel of latitude 68°37'30"S, then north-easterly to 68°36'56"S, 78°05'39"E, then north-easterly to the point of commencement.

- *Environmental domains analysis*

Marine Plain is located within Environment D East Antarctic coastal geologic (Resolution 3 (2008)).

- *Antarctic Conservation Biogeographic Regions*

Marine Plain is located within Biogeographic Region 7 East Antarctica (Resolution 6 (2012)).

- *Important Bird Areas in Antarctica*

Marine Plain does not include any Important Bird Area (Resolution 5 (2015)).

- *Geology and palaeontology*

The three major lithologies forming the Vestfold Hills (Map C) are (in order of age) Chelnock Paragneiss, Mossel Gneiss and Crooked Lake Gneiss. This is repeated in units from east-northeast to west-southwest. Intruded into these are groups of mafic dykes in a rough north-south orientation (Map C). These dykes are a major feature of the Vestfold Hills.

The Precambrian rock is overlain in low-lying areas (approximately 10–17 m above sea level) by ca 8 m of early Pliocene (ca 4.5-3.5 Ma) diatomite with limestone lenses in the upper half. The limestone contains molluscs, especially bivalves including

Chlamys tuftsensis. Holocene (ca 6.49 ka) glacial debris disconformably covers the marine deposit (0.5-1 m), extending over an area of 8-10 km². A layer of lenticular sandstone separates the Pliocene and Holocene units.

Low scarps in the Pliocene marine sediments have yielded a diverse array of fossil marine vertebrates and invertebrates. The cetacean specimens occur as large assemblages of vertebral columns, skulls and complete specimens approximately 2 m or more in length in the upper 2 m of the Marine Plain section. The main occurrences are along the margins of the "Big Ditch" near Burton Lake and in the scarp on the eastern side of Marine Plain. One notable cetacean fossil is Australodelphis mirus which illustrates a remarkable convergence between living dolphins (Family Delphinidae) and the living beaked whale genus Mesoplodon.

Marine Plain has also yielded the first Pliocene decapod crustacean from Antarctica. The specimen is incomplete, making it difficult to identify precisely, although it probably belongs with the Palinuridae. Other species include a beaked whale and baleen whale (and others not yet studied), possibly penguins, fish, bivalves, gastropods, serpulid worms, bryozoans, asteroids, ophiuroids, echinoids and abundant leiospheres that are probably planktonic in origin.

Marine Plain has been subject to significant fluvial activity since the mid-Holocene resulting in small patches of lake sediment on its eastern side. Stream valleys and source lakes (now virtually empty) have been identified.

The Pliocene diatomite at Marine Plain appears to be the only such deposit in the Vestfold Hills. In some areas the Holocene till and glacials are very thin and consequently are easily disturbed. A thin crust over the loose powdery surface is easily crushed by footfall, releasing a plume of diatom and sand rich dust which leaves a sharply defined colour-contrasting footprint.

Permafrost occurs below ca 1 m depth and the local landforms have evolved due to very slow progressive melting of ground ice. Terrain produced by this process is known as periglacial thermokarst because the resulting depressions give the topography an appearance similar to that of conventional limestone karst.

The Sørsdal Glacier (near the edge of the Antarctic ice sheet) is the southern boundary for the ice-free Vestfold Hills. A 1 km length of the northern edge of Sørsdal Glacier has retreated c. 800 m away from the southern edge of Marine Plain in the 40 years from 1947. This retreat is due to movement through the deep channel that the glacier fills and the formation of ice ridges in the glacier which subsequently collapse into Crooked Fjord.

- *Lakes*

Burton Lake is a major feature of the western side of the Area. There are several unnamed ponds and small lakes within the Area. Burton Lake is a seasonally isolated marine lagoon with a maximum depth of 18 m. It is meromictic and hypersaline. Burton Lake is ice-covered for 10-11 months of the year and is seasonally connected

to Crooked Fjord by a tidal channel approximately 20 m wide and up to 2 m deep. The lake is isolated from Crooked Fjord by ice for approximately 6-7 months of the year.

The lake contains a range of photosynthetic bacteria. The dominant species are Chlorobium vibriofome and C. limiola while minor species are Thiocapsa roseopersicina and Rhodopseudomonas palustris. The lake also harbours psychrophilic bacteria which are relatively uncommon in Antarctic coastal ice zones. These thrive on the increased availability of nutrients from continental inputs, pelagic algal blooms and the breakout of pelagic algae into the water column from melting ice. One novel species of bacterium is Psychroserpens burtonensis which has not been cultured from or recorded in any other environment.

Marine algae are abundant in Burton Lake. A diatom floristic study of the lagoon revealed 41 diatom species.

The ultrastructure of Postgaardi mariagerensis was reported for the first time from research in Burton Lake. This very unusual organism is not a euglenid but rather a member of the clade Euglenozoa – Euglenozoa incertae sedis. Aside from the Vestfold Hills, the only other known occurrences of Postgaardi are in a Danish Fjord and the Santa Barbara Basin between the California mainland and the northern Channel Islands.

Additionally, Burton Lake is one of two Antarctic lakes from which the first account of choanoflagellate (including Diaphanoeca grandis, Diaphanoeca sphaerica and Saepicula leadbeateri) were reported. The Area is the type locality for Spiraloecion didymocostatum and for Drepanopus bispinosus.

Four metazoan species have been regularly recorded in the zooplankton of Burton Lake: Drepanopus bispinosus and Paralabidocera antarctica (Copepoda), Rathkea lizzioides (Anthomedusae) and an un- named cydippid ctenophore. Many holotrichia, at least two species of nematode and a large marine amphipod have been recorded in the benthic community. Tardigrades are also present.

One species of fish, Pagothenia borchgrevinki, has been observed in the lake on one occasion. This species is common in coastal areas and fjords of the Vestfold Hills, however, it does not appear to inhabit the lake continuously. Weddell seals are also known to enter Burton Lake when it is connected to the sea. Due to the seasonal marine connection it remains probable that additional algae, zooplankton and fish enter the lake but do not survive the winter.

- *Vegetation*

Mosses and lichens occur in the vicinity of small ephemeral watercourses that drain radially down the ‘talus skirt’ fringing the Precambrian hills. Numerous small crevices and cracks in the knoll jutting into the northern end of Burton Lake provide a rich lichen site, while the northern end of Poseidon Lake is rich in mosses. The

moss and lichen flora of the Area has not been documented, however the Vestfold Hills supports at least six moss species and at least 23 lichens.

- *Fauna*

Three seabird species breed within the Area between November and March. Wilson's storm petrels (Oceanites oceanicus) and Snow petrels (Pagodroma nivea) nest in the higher Precambrian rocks. South polar skuas (Catharacta maccormicki) nest on Marine Plain and occasionally around the water's edge. Weddell seals (Leptonychotes weddellii), Southern Elephant seals (Mirounga leonina), Adélie penguins (Pygoscelis adeliae) and Emperor penguins (Aptenodytes forsteri) also transit through the area and may occur in small groups at moulting locations in the Area but are not known to breed here.

- *Climate*

Meteorological data for the Area are confined almost entirely to observations at Davis station, 10 km northwest of Marine Plain. The Vestfold Hills area has a polar maritime climate that is cold, dry and windy. Summer days are typically sunny with a mean minimum temperature of -2.6°C and a mean maximum temperature of +1.8°C. For most of the year temperatures are below 0°C. During winter the temperature may fall as low as -41.8°C (April 1998). The maximum temperature recorded at Davis station from 1957 to 2025 was +13°C (Jan 1974). 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 (whereby solar energy is absorbed and re-radiated as heat).

6(ii) Access to the Area

The vicinity of the Area can be accessed on foot, by helicopter or by over-snow vehicle or boat in accordance with requirements outlined in Section 7(ii) of this plan.

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

There are no refuges within the Area, however, two refuges are located nearby. Marine Plain Refuge (68°36'48"S, 78°06'29"E) is approximately 100 m north of the northern boundary of the Area. A helicopter landing site is immediately adjacent to this refuge. Watts Hut (68°36'00"S, 78°23'44"E) is located at the eastern end of Ellis Fjord, approximately 5 km east-northeast of the Marine Plain Refuge and 2.9 km east-northeast of the northern-most point of the Area.

Evidence of past research activity, fossil site protection measures and access provisions are evident at Marine Plain. Two parallel lines of small boulders mark out an former helicopter landing site (68°37'37"S, 78°08'11"E). Geotextile fabric covers were installed in 2008 and supplemented in 2017 to ensure the protection of the two key fossil sites within the Sørsdal Formation (Map C). At the north western side of the embayment there are approximately 10 wooden stakes 1 m high in a rough line,

north to south. In the next embayment to the north, three red painted rock cairns form a triangle area (approximately 50 m in side length).

Within the Area there also remains evidence of previous fossil excavations including five shallow unfilled pits; a large unfilled pit (near Burton Lake); a major unfilled excavation occurring on one high flank of a natural trough (the trough locally known as "Big Ditch") and some old filled trench sites. On the north western side of Burton Lake lies a pipe and rope (possibly for lake monitoring).

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

Other protected areas in the vicinity include:

- Antarctic Specially Protected Area No. 167, Hawker Island (68°38'S, 77°51'E) is located approximately 8 km east of Marine Plain.
- Historic Site and Monument No. 72, Mikkelsen's Cairn (68°22′0″S, 78°24′0″E) is located 29 km north-east of Davis station, and comprises a cairn and wooden mast erected in 1935 by Captain Klarius Mikkelsen marking the first landing in the Vestfold Hills area.
- Historic Site and Monument No. 6, Walkabout Rocks HSM No. 6 (68°22'14"S, 78°32'19"E) is located 40 km north-east of Davis station, and comprises a rock cairn erected in 1939 by Sir Hubert Wilkins – the cairn contains a canister containing a record of his visit.

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 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 scientific reasons which cannot be served elsewhere (such as, palaeontological, palaeoclimatic, geological, geomorphological, glaciological, biological and limnological research), or for reasons essential to the management of the Area;
- the actions permitted are in accordance with this Management Plan;
- the permit shall be issued for a finite period; and
- the permit shall be carried when in the Area.

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

Movement within the Area should be kept to a minimum with every reasonable effort made to minimise impact. The brittle surface crust is easily crushed under foot, risking damage to fossil material and long-term evidence of human impact. Footprints in the fragile Sørsdal Formation are very slow to recover (McLennan 2017). Where possible, movement on Precambrian (bedrock) areas is preferred, while movement on the scarps is to be avoided. All movement should be undertaken carefully so as to minimise disturbance to the soil, vegetation, diatomite, thermokarst, sediment outcrops and other geofeatures that provide historic, scientific and environmental value to the site. The landing of aircraft and camping is prohibited on the Sørsdal Formation. Vehicle use within the Area is prohibited.

- Normally the helicopter landing site immediately adjacent to the Marine Plain refuge should be used. However where necessary, in order to minimise foot traffic within Marine Plain, helicopter landing within the Area may be authorised for a particular visit.
- Landing sites shall be: positioned on rocky outcrops (Map D) where practicable to minimise the distance that people walk over the fragile Sørsdal Formation; located where minimal disturbance would be caused by the aircraft to water bodies, vegetation, fragile or sediment deposits and wildlife.
- Motorised vessels are not to be used on Burton Lake.
- Over-flights of lakes should be kept to the minimum necessary to achieve specific research or management requirements.
- The operation of aircraft over the Area should be carried out, as a minimum requirement, in compliance with the 'Guidelines for the Operation of Aircraft near Concentrations of Birds' contained in Resolution 2 (2004).
- Remotely Piloted Aircraft or other automated monitoring systems, must be authorised by a permit and may only be used in accordance with the 'Environmental Guidelines for Operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica' (v 1.1) contained in Resolution 4 (2018).
- Drone surveys should be flown within Visual Line of Sight, and if launched from within the Area, launched from a bedrock outcrop.

7(iii) Activities which may be conducted in the Area

The following activities may be conducted within the Area:

- compelling scientific research which cannot be undertaken elsewhere and that will not jeopardise the values of the Area;
- sampling, which should be the minimum required for the approved research programs, and be in accordance with the SCAR Environmental Code of Conduct for Geosciences Field Research Activities in Antarctica (Resolution 1 (2021);
- hydrological sampling, ensuring equipment is cleaned prior to entry into the Area to prevent contamination from other lakes; and

- essential management activities, including monitoring and actions to protect the values of the Area.

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

Permanent structures and installations are prohibited in the Area.

Temporary structures, installations, markers and equipment may only be established in the Area for compelling scientific or management purposes as specified in a permit. They should be:

- clearly identified by country, name of the principal agency, date of installation and date of expected removal;
- free of organisms, propagules (e.g. seeds, eggs) and non-sterile soil;
- made of materials that can withstand Antarctic conditions;
- made of materials that pose a minimal risk of contamination to the Area; and
- removed when they are no longer required, or upon the expiry of the permit, whichever is earlier.

7(v) Location of field camps

Camping is prohibited within the Area, except when all other options for accessing research sites would cause a greater risk to the Area's values.

Camping is prohibited on the Sørsdal Formation.

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

Restrictions on materials and organisms which may be brought into the Area are:

- the deliberate introduction of living animals, plant material or microorganisms, and non-sterile soil into the Area shall not be permitted. Precautions shall be taken to prevent the accidental introduction of animals, plant material, micro-organisms and non-sterile soil;
- no herbicides or pesticides shall be brought into the Area;
- scientific markers and research materials should prioritise inorganic options (such as stainless steel or polythene) over organic materials (like wood, cotton, hessian); and
- hazardous materials, including small amounts of fuel, may be introduced for compelling scientific, safety or management purposes as authorised in a permit provided they do not threaten the values of the Area. They shall be stored and handled in a way that minimises the risk of their accidental introduction into the environment and shall be removed from the Area, at or before the conclusion of the permit or authorisation.

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

Taking of, or harmful interference with, native flora and fauna is prohibited except in accordance with a permit issued in accordance with Article 3 of Annex II to the Protocol on Environmental Protection to the Antarctic Treaty.

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.

7(viii) The collection or removal of materials not brought into the Area by the permit holder

Material naturally occurring in the area may only be collected or removed from the Area 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 collection would take, displace, remove or damage such quantities that the values of the Area would be significantly affected. Excavation of fossils is exempted from this requirement.

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. In this event, the appropriate national authority should be notified.

7(ix) Disposal of waste

All wastes, including all 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

- Permits may be granted to enter the Area to carry out monitoring, site inspections (which may involve the collection of a small number of samples for analysis or review).
- Sites of long-term monitoring shall be appropriately marked and a GPS position recorded.
- Personnel permitted to enter the Area shall be informed via briefings and permit conditions on ways to help maintain the values of the Area.
- Special care will be taken when walking over slopes, moraines, rock exposures and diatomite soil. To minimise the risk of damage to the values of the Area, foot traffic to and from Marine Plain and the plain south of Poseidon Basin and east of Pickard Ridge shall be restricted wherever possible.
- Special precautions will be undertaken against introductions. To minimise the risk of introductions of non-native species, footwear and any equipment to be used in the Area shall be thoroughly cleaned prior to entry into the Area.

- Abandoned scientific equipment shall be removed and excavations rehabilitated to the maximum extent possible.
- The stratigraphic integrity and endolithic communities of the Area shall be preserved through the closure and securing of excavation sites. Recommended measures include:

- the placement of excavated soil onto a polythene sheet of adequate thickness;
- the replacement of soil and sediment in layers in the order in which they were removed;
- the replacement of larger clasts by correct orientation;
- the removal of unnatural surface irregularities; and
- the reorientation of rock and till during closure.

7(xi) Requirements for reports

The principal permit holder for each visit to the Area shall submit a report to the appropriate national authority as soon as practicable.

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. If appropriate, the national authority should also forward a copy of the visit report to the Party that proposed the Management Plan, to assist in managing the Area and reviewing the Management Plan.

Parties should, wherever possible, deposit originals or copies of such original visit reports in a publicly accessible archive to maintain a record of usage, for the purpose of any review of the Management Plan and in organising the scientific use of the Area.

8. Supporting Documentation

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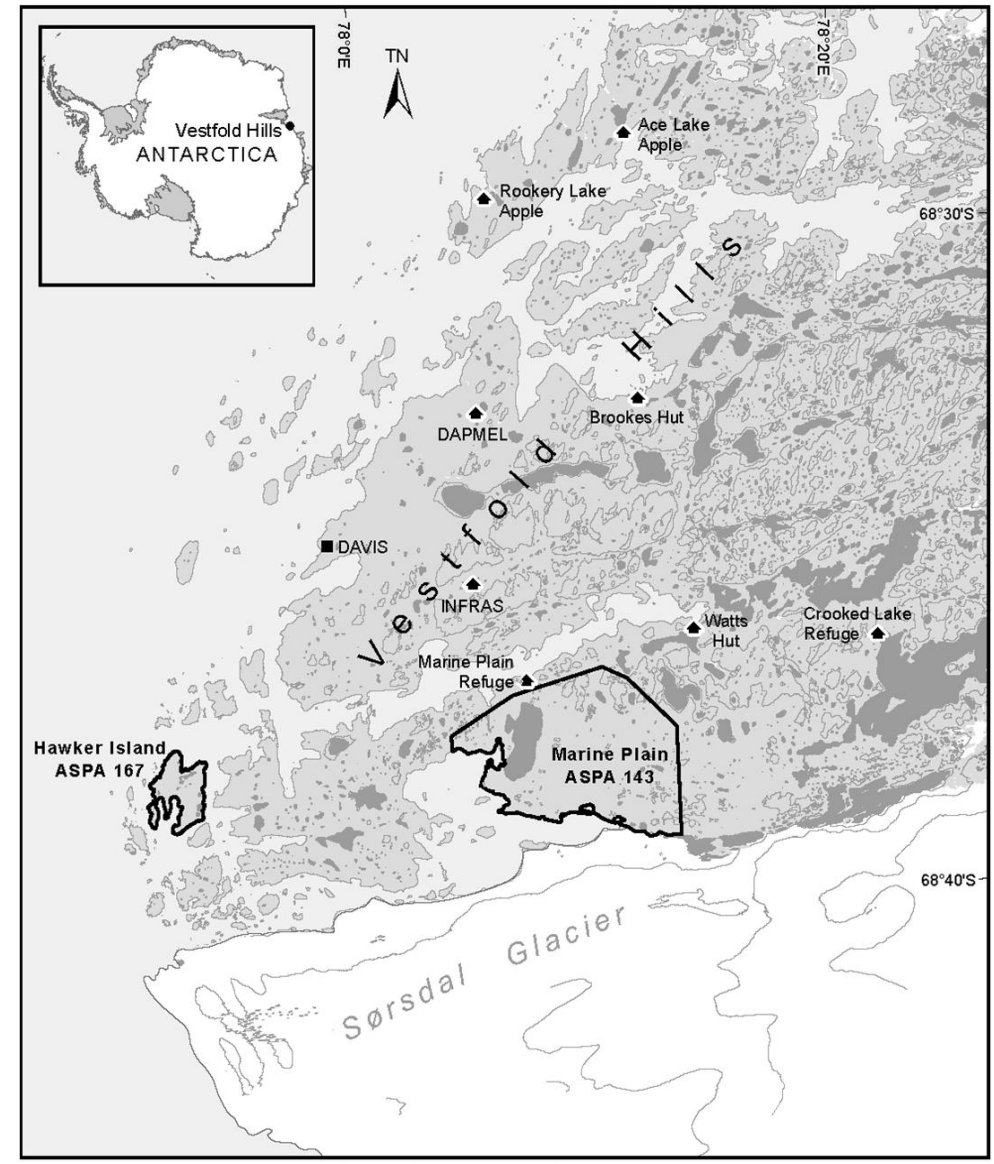
Map A: Antarctic Specially Protected Area No 143, Marine Plain Vestfold Hills, Ingrid Christensen Coast, East Antarctica



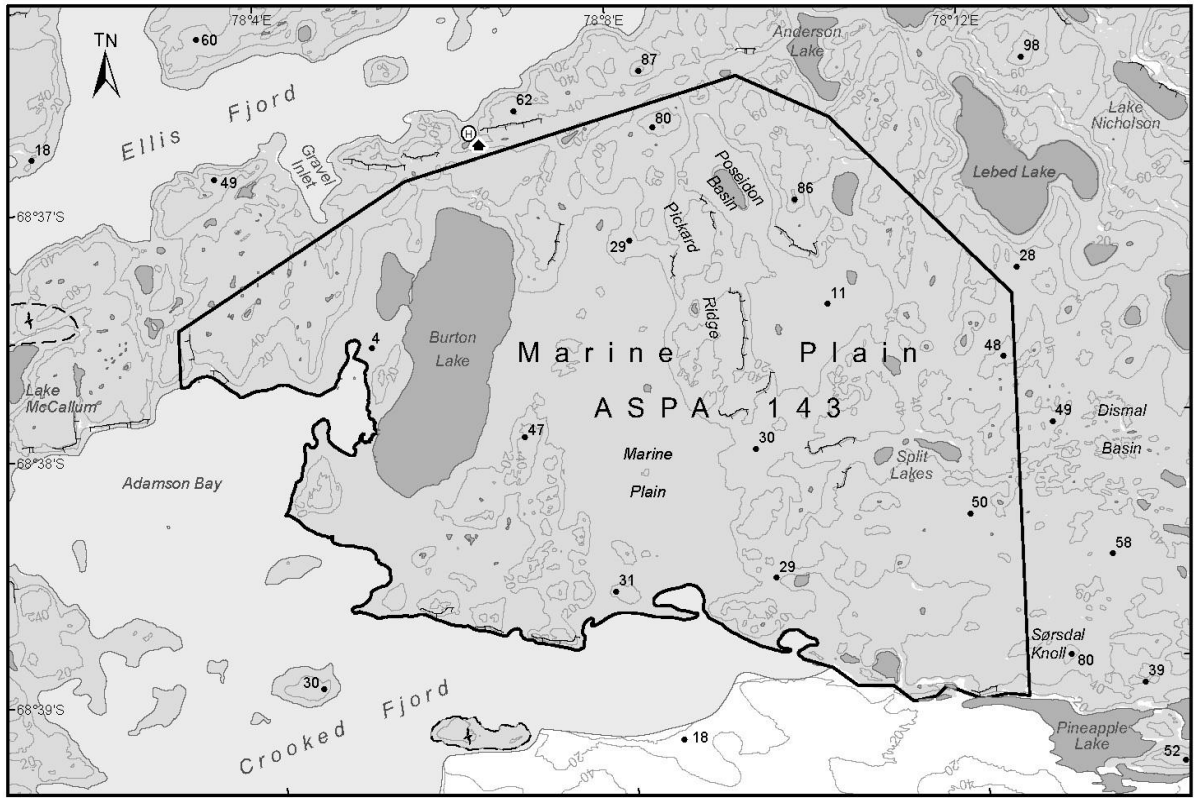
■ Station ♠ Refuge
Contour (50 metre interval)
Ice-free area
Lake
Antarctic Specially Protected Area

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

Produced by the Australian Antarctic Data Centre
Map Available at: *http://data.aad.gov.au/aadc/mapcat/*
Map Catalogue No. 16367, April 2025

Australian Government
Department of Climate Change, Energy, the Environment and Water
Australian Antarctic Division

Map B: Antarctic Specially Protected Area No 143, Marine Plain
Vestfold Hills, Ingrid Christensen Coast, East Antarctica
Topography and Fauna Distribution

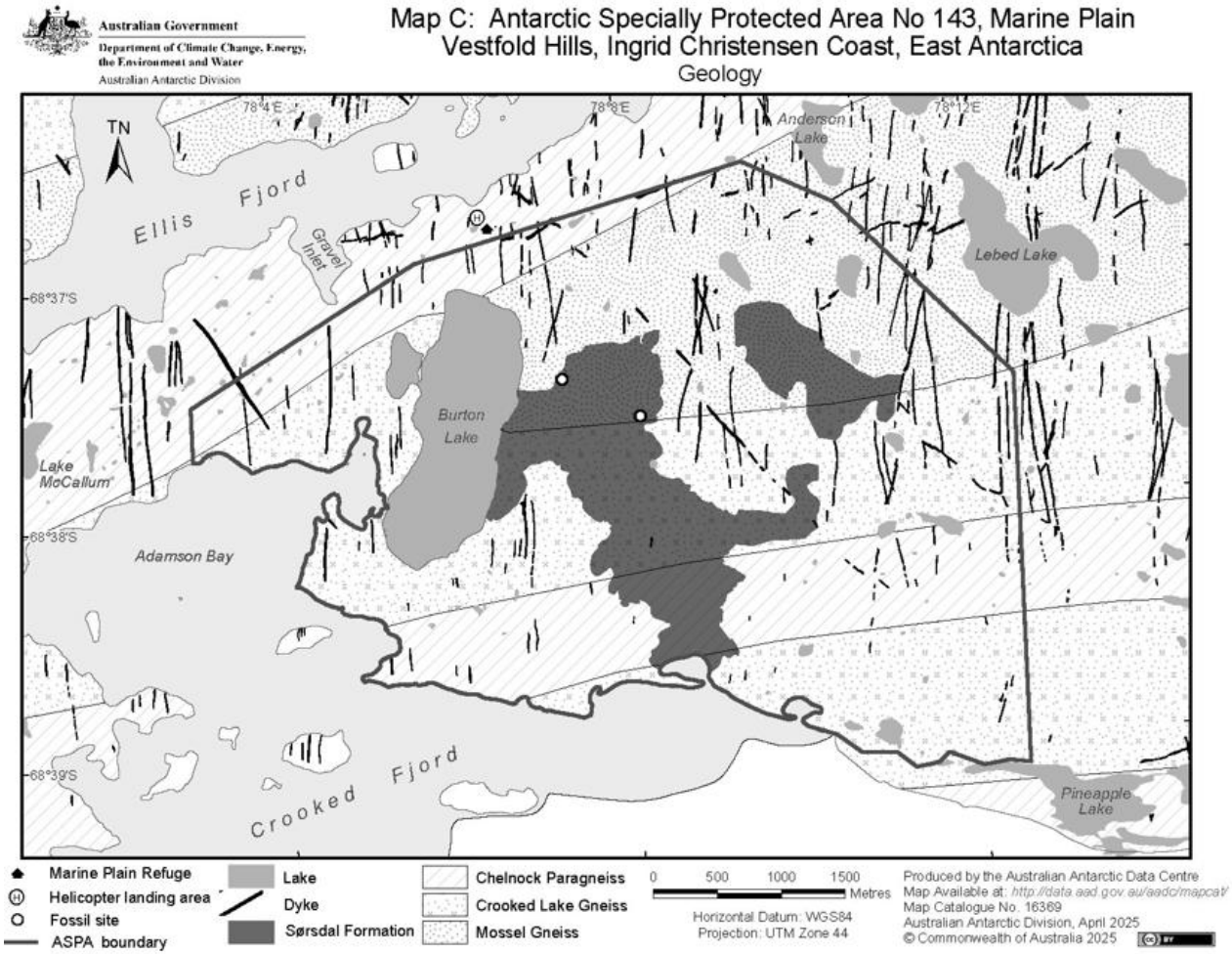


- Spot elevation (metres)
- Marine Plain Refuge
- Helicopter landing area
- Contour (20 metre interval)
- Cliff
- ASPA boundary
- Snow petrel nesting area
- Ice-free area
- Lake

0 500 1000 1500 Metres

Horizontal Datum: WGS84
Projection: UTM Zone 44

Produced by the Australian Antarctic Data Centre
Map Available at: *http://data.aad.gov.au/aadc/mapcat/*
Map Catalogue No. 16368
Australian Antarctic Division, April 2025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Map C: Antarctic Specially Protected Area No 143, Marine Plain
Vestfold Hills, Ingrid Christensen Coast, East Antarctica
Geology
TN
78°4'E
78°8'E
78°12'E
Anderson Lake
Ellis Fjord
Gravel Inlet
Lebed Lake
68°37'S
Burton Lake
Lake McCallum
68°38'S
Adamson Bay
68°39'S
Crooked Fjord
Pineapple Lake
Marine Plain Refuge
Helicopter landing area
Fossil site
ASPA boundary
Lake
Dyke
Sørsdal Formation
Chelnock Paragneiss
Crooked Lake Gneiss
Mossel Gneiss
0 500 1000 1500
Metres
Horizontal Datum: WGS84
Projection: UTM Zone 44
Produced by the Australian Antarctic Data Centre
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 16369
Australian Antarctic Division, April 2025
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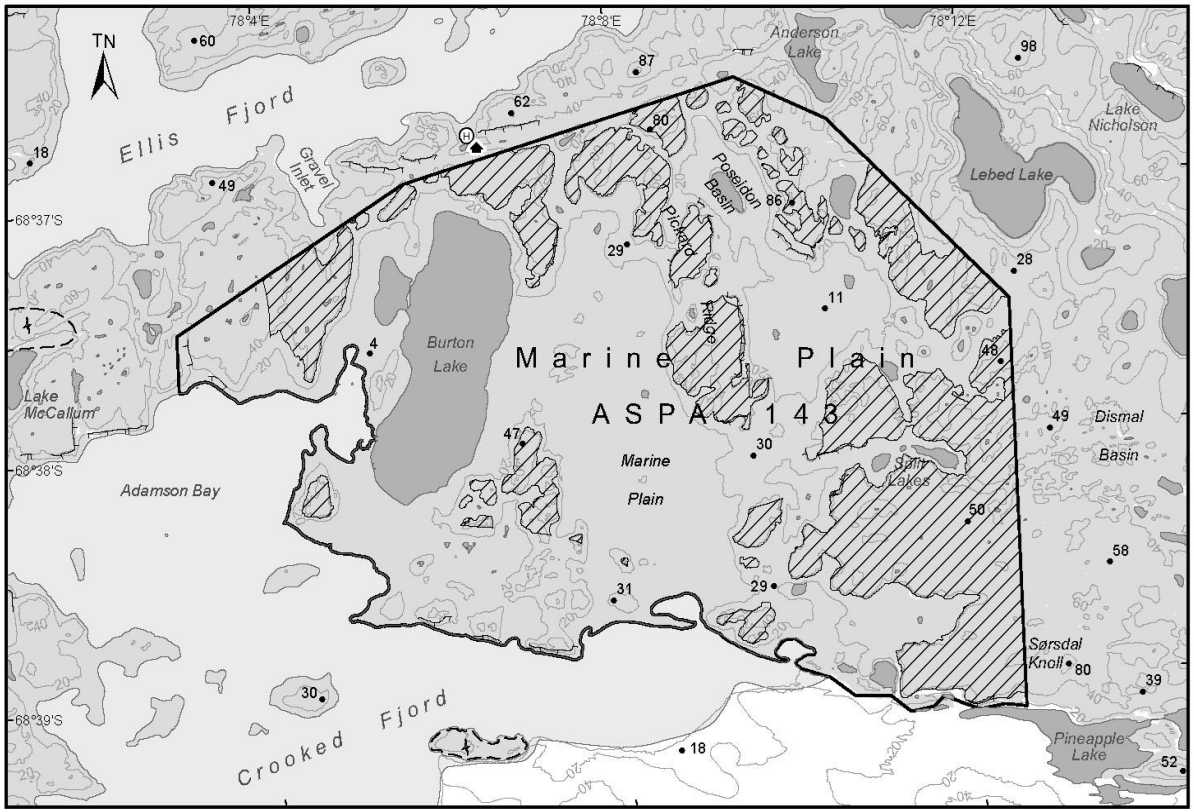
Australian Government
Department of Climate Change, Energy, the Environment and Water
Australian Antarctic Division

Map D: Antarctic Specially Protected Area No 143, Marine Plain
Vestfold Hills, Ingrid Christensen Coast, East Antarctica

Areas where helicopter landings may be permitted within and adjacent to Marine Plain, ASPA 143



- Spot elevation (metres)
- Marine Plain Refuge
- Helicopter landing area
- Contour (20 metre interval)
- Cliff
- ASPA boundary
- Snow petrel nesting area
- Ice-free area
- Lake

0 500 1000 1500 Metres

Horizontal Datum: WGS84
Projection: UTM Zone 44

Produced by the Australian Antarctic Data Centre
Map Available at: *http://data.aad.gov.au/aadc/mapcat/*
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