Final Report of the Thirty-eighth Antarctic Treaty Consultative Meeting

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Acronyms and Abbreviations

ACAP	Agreement on the Conservation of Albatrosses and Petrels
ASMA	Antarctic Specially Managed Area
ASOC	Antarctic and Southern Ocean Coalition
ASPA	Antarctic Specially Protected Area
ATS	Antarctic Treaty System or Antarctic Treaty Secretariat
ATCM	Antarctic Treaty Consultative Meeting
ATME	Antarctic Treaty Meeting of Experts
BP	Background Paper
CCAMLR	Convention on the Conservation of Antarctic Marine Living Resources and/or Commission for the Conservation of Antarctic Living Resources
CCAS	Convention for the Conservation of Antarctic Seals
CCRWP	Climate Change Response Work Programme
CEE	Comprehensive Environmental Evaluation
CEP	Committee for Environmental Protection
COMNAP	Council of Managers of National Antarctic Programs
EIA	Environmental Impact Assessment
EIES	Electronic Information Exchange System
HSM	Historic Site and Monument
IAATO	International Association of Antarctica Tour Operators
ICAO	International Civil Aviation Organization
ICG	Intersessional Contact Group
IEE	Initial Environmental Evaluation
IHO	International Hydrographic Organization
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission
IOPC Funds	International Oil Pollution Compensation Funds
IP	Information Paper
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
MPA	Marine Protected Area
NCA	National Competent Authority
RCC	Rescue Coordination Centre
SAR	Search and Rescue

SCAR	Scientific Committee on Antarctic Research
SC-CAMLR	Scientific Committee of CCAMLR
SGMP	Subsidiary Group on Management Plans
SOLAS	International Convention for the Safety of Life at Sea
SOOS	Southern Ocean Observing System
SP	Secretariat Paper
UAV	Unmanned Aerial Vehicle
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organization
WP	Working Paper
WTO	World Tourism Organization

PART II

Measures, Decisions and Resolutions (Cont.)

4. Management Plans

Management Plan for Antarctic Specially Protected Area No. 101

TAYLOR ROOKERY, MAC.ROBERTSON LAND

Introduction

Taylor Rookery is an emperor penguin (*Aptenodytes forsteri*) colony located on the east side of Taylor Glacier, Mac.Robertson Land (67°27'S; 60°51'E, Map A). The site was originally designated as Specially Protected Area No. 1, through Recommendation IV-I (1966), after a proposal by Australia. A management plan for the Area was adopted under Recommendation XVII-2 (1992). In accordance with Decision 1 (2002) the site was redesignated and renumbered as Antarctic Specially Protected Area (ASPA) No. 101. Revised ASPA management plans were adopted under Measure 2 (2005) and Measure 1 (2010). Taylor Rookery is designated as an ASPA to protect the largest known colony of emperor penguins located entirely on land.

1. Description of values to be protected

Of the 48 currently known emperor penguin colonies around Antarctica, the first land-based colony was only discovered at Emperor Island, Dion Islands, Antarctic Peninsula (67°52'S, 68°43'W) in 1948. About 150 breeding pairs occupied the island, but since the 1970s the population decreased and comprised only 22 pairs in 1999. No emperor penguins have been sighted at the Dion Islands since 2009 and the colony is likely to have become extinct. The colony at Taylor Glacier was the second land-based colony to be discovered, in October 1954. This colony is entirely land-based throughout the breeding season. Because of this uncommon characteristic this colony was designated as a Specially Protected Area in 1966, as was Emperor Island. A third land-based colony with about 250 pairs was discovered in Amundsen Bay, East Antarctica, in 1999.

The emperor penguin colony at Taylor Glacier is the largest known land-based colony (Map B) and as such is of outstanding scientific importance. The Australian Antarctic program has monitored the population at the Taylor Glacier colony, intermittently from 1957 to 1987, and annually since 1988. Photographic censuses have resulted in counts with high levels of accuracy. The number of adults at the colony averaged about 3680 breeding pairs in the early years. In the 1988-2010 period, the population averaged 2930 pairs or 20.5% less than earlier years. From 2011-2014, a further drop of 12% occurred (unpublished data). The reasons for this decrease are unknown. Similar long term records are available only for two other emperor penguin colonies, near Dumont d'Urville (Pointe Géologie Archipelago, ASPA 120, 66º40'S, 140º01'E), and at Haswell Island (ASPA 127, 66º31'S, 93º00'E), where both colonies decreased by about 50% in the 1970s. Population data are also available for a number of colonies in the Ross Sea region. However, the records of the latter are not continuous and do not include counts of the colonies in winter.

Each year the Australian Antarctic program makes no more than three visits, at different times of year, to Taylor Glacier. The colony is ideal for census work as it is surrounded by small rocky hills which make it possible to observe the penguins without entering the breeding area. Thus, human disturbance to the colony, especially since 1988, has been very low and direct human interference can be excluded as a potential factor influencing the health of this population.

2. Aims and Objectives

Management of Taylor Rookery aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance;

- allow research on the ecosystem and physical environment, particularly on the avifauna, provided it is for compelling reasons which cannot be served elsewhere;
- minimise the possibility of introduction of pathogens which may cause disease in bird populations within the Area;
- minimise the possibility of introduction of alien plants, animals and microbes to the Area;
- allow for the gathering of data on the population status of the emperor penguin colony on a regular basis and in a sustainable manner; and
- allow visits for management purposes in support of the aims of the management plan.

3. Management Activities

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

- visits shall be made to the Area as necessary (preferably not less than once every five years) to assess whether the Area continues to serve the purposes for which it was designated and to ensure that management activities are adequate: and
- the Management Plan shall be reviewed at least every five years and updated as required.

4. Period of Designation

Designated for an indefinite period.

5. Maps

Map A: Antarctic Specially Protected Area No. 101, Taylor Rookery, Mawson Coast, Mac.Robertson Land, East Antarctica. The inset map indicates the location in relation to the Antarctic continent.

Map B: Antarctic Specially Protected Area No. 101, Taylor Rookery: Topography and Emperor Penguin Colony.

Map C: Antarctic Specially Protected Area No. 101, Taylor Rookery: Vehicle and Helicopter Approach and Landing Site.

Map D: Antarctic Specially Protected Area No. 101, Taylor Rookery: ASPA Boundary Points

All map specifications: Horizontal Datum: WGS84; Vertical Datum: Mean Sea Level

6. Description of the Area

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

The Taylor Rookery ASPA consists of the whole of the northernmost rock exposure on the east side of Taylor Glacier, Mac.Robertson Land (67°27' 14"S, 60°53' 0"E, Map B). Boundary coordinates for the Area are provided at Appendix 1 and are shown on Map D. The Area boundary follows the coastline (at the low tide mark) from a point at the north-western corner of the Area at 67°27'4.9"S, 60°52'58.2"E (boundary point 1), in a roughly south-easterly direction to boundary point 6 (67°27'27.8"S, 60°53'7.7"E). The boundary then continues in a westerly and then northerly direction (roughly following the limit of the ice free area) to boundary point 22 (67°27'18"S, 60°52'50.2"E) then follows the ice cliff north to boundary point 23 (67°27'5.3"S, 60°52'57.1"E) and then joins back to boundary point 1. There are no boundary markers delimiting the site.

The emperor penguin colony is located on a low lying rock outcrop in the south-west corner of a bay formed by Taylor Glacier to the west, the polar ice cap to the south and the islands of the Colbeck Archipelago to the east. The Area is surrounded by fast ice to the north and east. The Area is some 90 kilometres west of

Mawson station. There is ice-free terrain adjacent to the glacier on the western boundary and to the south the rock rises steeply to meet the ice of the plateau. The rock itself forms a horseshoe around a central flat area of exposed rock and moraine. This area is covered with snow in winter and is occupied by the emperor penguins. A couple of small melt lakes form in late spring and a small stream exits to the north-east. The sides of the horseshoe are rounded ridges of rock which are bare and smoothed by ice. Otherwise the terrain is rough and dissected with cracks and fissures. The average height of the ridges is about 30 metres.

The Area also has a raised beach which is typical of several found along the coast of Mac.Robertson Land. The beach is composed of locally derived pebbles, cobbles and boulders between 1 cm and 1 m across. It slopes upwards from the shoreline to a well defined platform several metres broad and 3 to 6 m above sea level. The Area is readily defined by its natural features.

Climate

Limited data exist for the meteorology of the Area. Conditions are probably similar to those of the Mawson station area, approximately 90 km to the east, where the mean monthly temperatures range from +0.1°C in January to -18.8°C in August, with extreme temperatures ranging from +10.6°C to -36.0°C. The mean annual wind speed is 10.9 m per second with frequent prolonged periods of strong south-easterly katabatic winds from the ice cap with mean wind speeds over 25 m per second and gusts often exceeding 50 m per second. Local sections of the coast vary in their exposure to strong winds and it is possible that slightly lower mean wind speed may exist at Taylor Rookery. Other characteristics of the weather are high cloudiness throughout the year, very low humidity, low precipitation and frequent periods of strong winds, drifting snow and low visibility associated with the passage of major low pressure systems.

Environmental Domains and Antarctic Conservation Biogeographic Regions

Based on the Environmental Domains Analysis for Antarctica (Resolution 3(2008)) Taylor Rookery is located within Environment D *East Antarctic coastal geologic*. Based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)) Taylor Rookery is not assigned to a Biogeographic Region.

Geology and Soils

The rocks at Taylor Rookery are metamorphic and probably formed from ancient metamorphic sedimentary rocks. They are mapped as garnet-biotite-quartz-felspar gneiss, granite and migmatite. The metamorphic rocks are intruded by charnockite which has yielded an isotopic age of 100 million years, thus defining a minimum age for the metamorphic rocks. Numerous shear zones intersect the banded metamorphic rocks and there are recognised traces of an old erosion surface at about 60 m altitude.

Vegetation

The flora of Taylor Rookery consists of at least ten species of lichen (Table 1) and an unknown number of terrestrial and freshwater algae. No mosses have been recorded from the Area. Twenty six species of lichen and three species of moss can be found in the region, 20 of which are found on nearby Chapman Ridge and 16 from Cape Bruce on the western side of Taylor Glacier. The rock types are not conducive to colonization by lichens. Most of the lichens occurring at Taylor Rookery grow on the higher outcrops at the southern end where weathering is least.

LICHENS

Pseudephebe minuscula	*Lecidea phillipsiana*
Buellia frigida	*Physcia caesia*
Caloplaca citrina	*Xanthoria elegans*

Candelariella flava	*Xanthoria mawsonii*
Rhizoplaca melanophthalma	*Lecanora expectans*

Table 1. Plants recorded from Taylor Rookery.

Birds

Emperor penguins

The breeding site of the emperor penguins is a north-facing amphitheatre formed by the tongue of the Taylor Glacier to the west and rocky hills to the east. The penguins occupy the areas that are level, and are covered with snow for most of the breeding season.

First hatchlings were observed in mid July which suggests mid May as the onset of laying. Fledglings depart the colony from mid December to mid January, usually leaving during the day when the weather is the warmest and the katabatic wind has subsided. Adult birds and fledglings generally head in N–NE towards a polynya 60-70 km from the colony. The fast ice extent reduces to approximately 25 km by mid January. The polynya appears to be a permanent feature of the Mawson Coast.

Following the commencement of the ongoing monitoring program in 1988, up to about 2010 the penguins occupied the southern part of the Area. In recent years, they have moved to the northern part where they now spend the winter. In 2014 they were observed for the first time occupying the fast ice outside the Area (as early as October). The ongoing monitoring program will help determine whether this is a recurring behaviour; if so, changes to the Area management arrangements may be required.

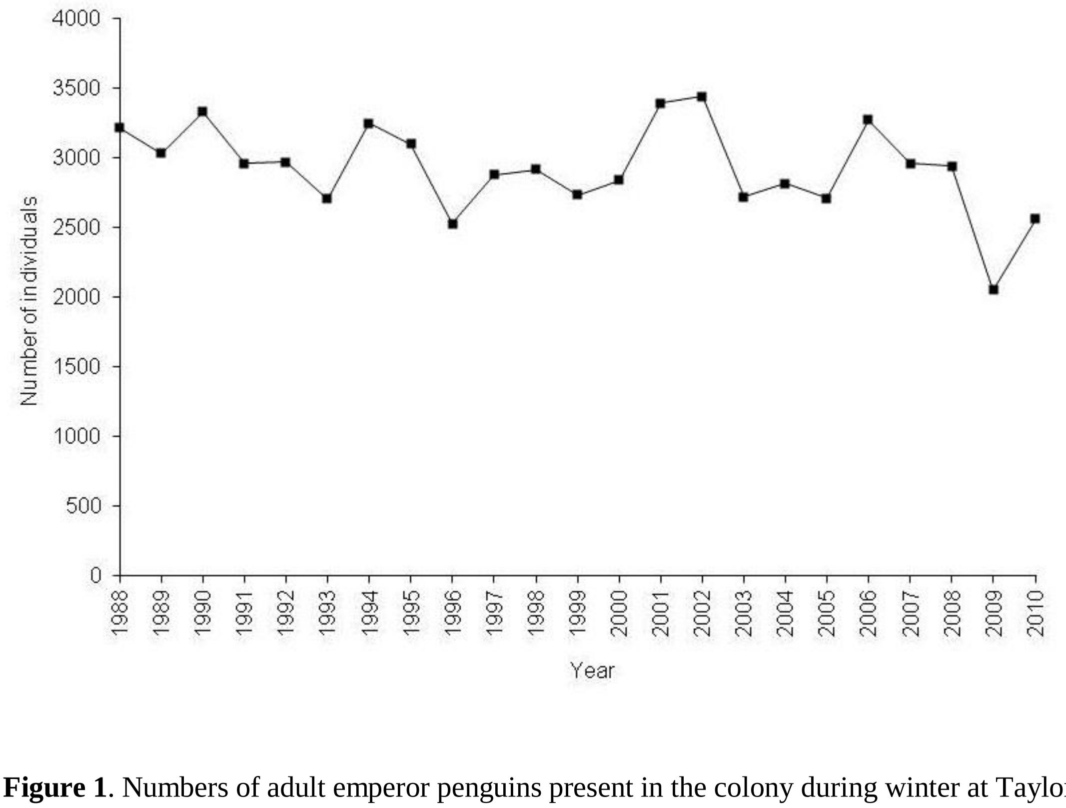

Figure 1. Numbers of adult emperor penguins present in the colony during winter at Taylor Glacier, 1988–2010. Source: Robertson et al. (2014)

Skuas

Skuas are often observed near the penguin colony. It is not known whether these birds breed in this location.

6(ii) Access to the Area

Travel to the Area may be by vehicle over sea ice, which is generally only possible during the period 1 May to 25 December, or by aircraft, in accordance with section 7(ii) of this plan.

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

Two automated cameras were set up within the Area in 2013 on the rocky ridges surrounding the breeding area of the penguins (see Map B for camera locations – 67°27’10.8”S, 60°53’6”E and 67°27’18.0”S, 60°52’55.2”E . A four-berth refuge is located in the Colbeck Archipelago, approximately five kilometres to the north-east of the Area (see Map A – 67°26’17.9”S, 60°59’23.6”E). Mawson station (67°36’S, 62°53’E) is approximately 90 kilometres to the east.

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

ASPA No. 102 Rookery Islands, Mac.Robertson Land (67°36'36" S and 62°32'01" E) is located approximately 80 kilometres east of Taylor Rookery (see Map A).

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 compelling scientific reasons that cannot be served elsewhere, in particular for scientific study of the avifauna and ecosystem of the Area, or for essential management purposes consistent with plan objectives, such as inspection, management or review;
- the actions permitted will not jeopardise the values of the Area;
- the actions permitted are in accordance with the management plan;
- the permit, or an authorised copy, shall be carried within the Area;
- a visit report shall be supplied to the authority named in the permit;
- the permit shall be issued for a finite period; and
- the appropriate national authority shall be notified of any activities or measures undertaken that were not included in the authorised permit.

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

Whenever possible, vehicle access to the Area should be from sea ice to the east of Colbeck Archipelago, to avoid crossing the penguin’s pathways from the rookery to the sea (see Map B). Vehicle entry to the Area is prohibited. Vehicles used for transport to the Area are to be left outside the Area, to the east, and entry to the Area must be by foot. The approach route for vehicles is marked on Map C.

The following conditions apply to the use of aircraft:

- disturbance of the colony by aircraft shall be avoided at all times;
- overflights of the colony are prohibited, except where essential for scientific or management purposes. Such overflights are to be at an altitude of no less than 930 m (3050 ft) for single-engine helicopters and fixed-wing aircraft, and no less than 1500 m (5000 ft) for twin-engine helicopters;
- fixed wing aircraft are not permitted to land inside the Area;

- fixed wing aircraft used to approach the Area shall not land or take off within 930 m (3050 ft) or fly within 750 m (2500 ft) of the colony;
- helicopters shall approach the Area from the east over the sea ice and preferably, where sea ice conditions permit, land outside the Area at the point marked "H" on Map C (60°53'32.5"E, 67°27'6.1"S), with access to the Area being by foot;
- when landing outside the Area, single-engine helicopters should not land or take off within 930 m (3050 ft) or fly within 750 m of the colony, and twin-engine helicopters should not land, take off or fly within 1500 m (5000 ft) of the colony;
- if landing inside the Area is essential due to unsuitable sea ice conditions, only singled-engine helicopters may land in the north-east of the Area at the point marked "H" on Map C (60°53'17.8"E, 67°27'6.8"S), where a headland to the south obscures the colony from view and noise;
- single-engine helicopters approaching to land in the Area should fly at the lowest safe height over the sea ice to avoid disturbing the colony; and
- refuelling of aircrafts is not permitted within the Area.

There are no marked pedestrian routes within the Area. Unless disturbance is authorised by permit, pedestrians should keep well away from the colony area (at least 50 m) and give way to departing and arriving penguins. Pedestrians moving in and around the Area should avoid crossing the access routes of the birds if possible, or cross quickly without obstructing penguin traffic.

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

Penguins may be in the Area in most months, and are particularly sensitive to disturbance during the following periods:

- from mid-May to mid-July, when they are incubating eggs; and
- from mid-July to mid-September, when adults are brooding chicks.

The Area may be accessed to conduct censuses of the emperor penguin colony. The colony is ideal for census work because it can be done without any disturbance to the birds. The best vantage point for viewing and photographing the penguins in winter are the rocky headlands that run adjacent to Taylor Glacier, on the western side of the colony, and on the eastern side of the Area. The ideal time for a census of adults is from 22 June to 5 July, since during this time most birds present are incubating males, each representing one breeding pair.

Other activities which 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.

7(iv) Installation, modification or removal of structures

No new structures are to be erected within the Area, or scientific equipment installed, except for compelling scientific or management reasons and for a pre-established period, as specified in a permit. Scientific markers and equipment must be secured and maintained in good condition, clearly identifying the permitting country, name of principal investigator and year of installation. All such items should be made of materials that pose minimum risk of harm to fauna and flora or of contamination of the Area.

A condition of the permit shall be that equipment associated with the approved activity shall be removed on or before completion of the activity. Details of markers and equipment temporarily left in situ (GPS locations, description, tags, etc. and expected removal date) shall be reported to the permitting authority.

Temporary field huts, if permitted, should be placed well away from the penguin colony at the point to the north-east of the Area, where a headland to the south obscures the colony from view.

7(v) Location of field camps

A four-berth refuge is located in the Colbeck Archipelago, approximately 5 kilometres to the north-east of the Area (60°59’23.6”E, 67°26’17.9”S).

Camping is permitted within the Area and should be well away from the penguin colony, preferably at the point to the north-east of the Area where a headland to the south obscures the colony from view (as indicated on Map B).

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

- 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 season for which they are required.
- Deliberate introduction of animals, plant material, micro-organisms and non-sterile soil into the Area is prohibited. The highest level precautions shall be taken to prevent the accidental introduction of animals, plant material, micro-organisms and non-sterile soil from other biologically distinct regions (within or beyond the Antarctic Treaty area) into the Area.
- To the maximum extent practicable, clothing, footwear and other equipment used or brought into the Area (including backpacks, carry-bags and other equipment) shall be thoroughly cleaned before entering and after leaving the Area.
- Boots and sampling/research equipment and markers that come into contact with the ground shall be disinfected or cleaned with hot water and bleach before entering and after visiting the Area to help prevent accidental introductions of animals, plant material, micro-organisms and non-sterile soil into the Area. Cleaning should be undertaken either at the refuge hut or on station.
- Visitors should also consult and follow as appropriate recommendations contained in the Committee for Environmental Protection Non-native Species Manual (CEP 2011), and in the Environmental Code of Conduct for terrestrial scientific field research in Antarctica (SCAR 2009).
- No herbicides or pesticides shall be brought into the Area. Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes specified in a permit, shall be removed from the Area at or before the conclusion of the activity for which the permit was granted.
- Fuel is not to be stored in the Area unless required for essential purposes connected with the activity for which the permit has been granted. All such fuel shall be removed at the conclusion of the permitted activity. Permanent fuel depots are not permitted.
- All material introduced shall be for a stated period only, shall be removed at or before the conclusion of that stated period, and shall be stored and handled so as to minimise the risk of 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 and removal of anything not brought into the Area by the permit holder

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

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 such material is found the permit issuing authority shall be notified, if possible while the field party is still within the Area.

7(ix) Disposal of waste

All wastes, including all human wastes, shall be removed from the Area. Wastes from field parties shall be stored in such a manner to prevent scavenging by wildlife (e.g. skuas) until such time as the wastes can be disposed or removed. Wastes are to be removed no later than the departure of the field party. Human wastes and grey water may be disposed into the sea well outside 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 biological monitoring and Area inspection activities, which may involve the collection of samples for analysis or review;
- erect or maintain scientific equipment and structures, and signposts; or
- carry out other protective measures.

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

Visitors shall take special precautions against the introduction of alien organisms to the Area. Of particular concern are pathogenic, microbial or vegetation introductions sourced from soils, flora or fauna at other Antarctic sites, including research stations, or from regions outside Antarctica. To minimise the risk of introductions, before entering the Area visitors shall thoroughly clean footwear and any equipment to be used in the Area, particularly sampling equipment and markers.

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, and no later than six months after the visit has been completed. Such visit reports should include, as applicable, 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.

A copy of the report should be forwarded to the Party responsible for development of the Management Plan (Australia) to assist in management of the Area, and the monitoring of bird populations.

8. Supporting Documentation

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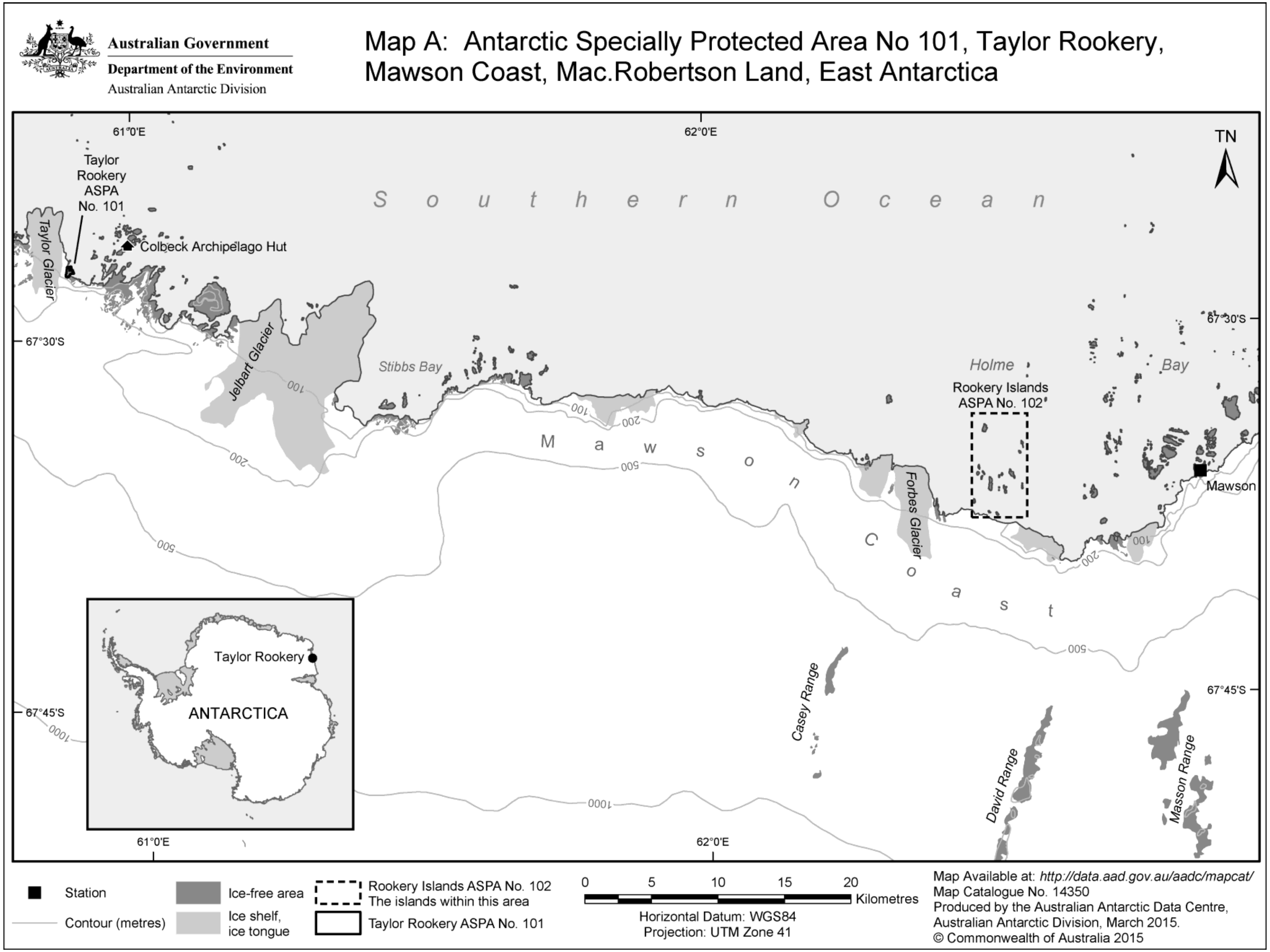
Appendix 1: Taylor Rookery, Antarctic Specially Protected Area No 101, boundary coordinates

Boundary Point	Latitude (S)	Longitude (E)	Boundary Point	Latitude (S)	Longitude (E)
1	67°27'4.9"	60°52’58.2"	14	67°27’27.9"	60°52’49.3"
2	67°27’17.1"	60°53’29.5"	15	67°27’28.7"	60°52’48.8"
3	67°27’17.7"	60°53’31.0"	16	67°27’28.9"	60°52’47.7"
4	67°27’21.6"	60°53’27.5"	17	67°27’28.9"	60°52’46.5"
5	67°27’22.4"	60°53’19.3"	18	67°27’28.3"	60°52’46.0"
6	67°27’27.8"	60°53’7.7"	19	67°27’24.9"	60°52’45.4"
7	67°27’29.1"	60°53’4.9"	20	67°27’20.7"	60°52’50.1"
8	67°27’29.8"	60°53’2.6"	21	67°27’19.3"	60°52’49.9"
9	67°27’30.1"	60°53’0.5"	22	67°27’18.0"	60°52’50.2"
10	67°27’29.8"	60°52’57.1"	Follows ice cliff north		
11	67°27’29.3"	60°52’55.5"	23	67°27’5.3"	60°52’57.1"
12	67°27’28.0"	60°52’54.6"			
13	67°27’27.4"	60°52’51.5"			


Australian Government
Department of the Environment
Australian Antarctic Division
Map A: Antarctic Specially Protected Area No 101, Taylor Rookery, Mawson Coast, Mac.Robertson Land, East Antarctica
61°0'E
62°0'E
TN
Taylor Rookery ASPA No. 101
Colbeck Archipelago Hut
Taylor Glacier
Jelbart Glacier
Southern Ocean
Stibbs Bay
Holme Bay
Rookery Islands ASPA No. 102
Mawson
Forbes Glacier
Mawson Coast
67°30'S
67°45'S
Casey Range
David Range
Masson Range
Taylor Rookery
ANTARCTICA
100
200
500
1000
Station
Contour (metres)
Ice-free area
Ice shelf, ice tongue
Rookery Islands ASPA No. 102 The islands within this area
Taylor Rookery ASPA No. 101
0 5 10 15 20 Kilometres
Horizontal Datum: WGS84
Projection: UTM Zone 41
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14350
Produced by the Australian Antarctic Data Centre, Australian Antarctic Division, March 2015.
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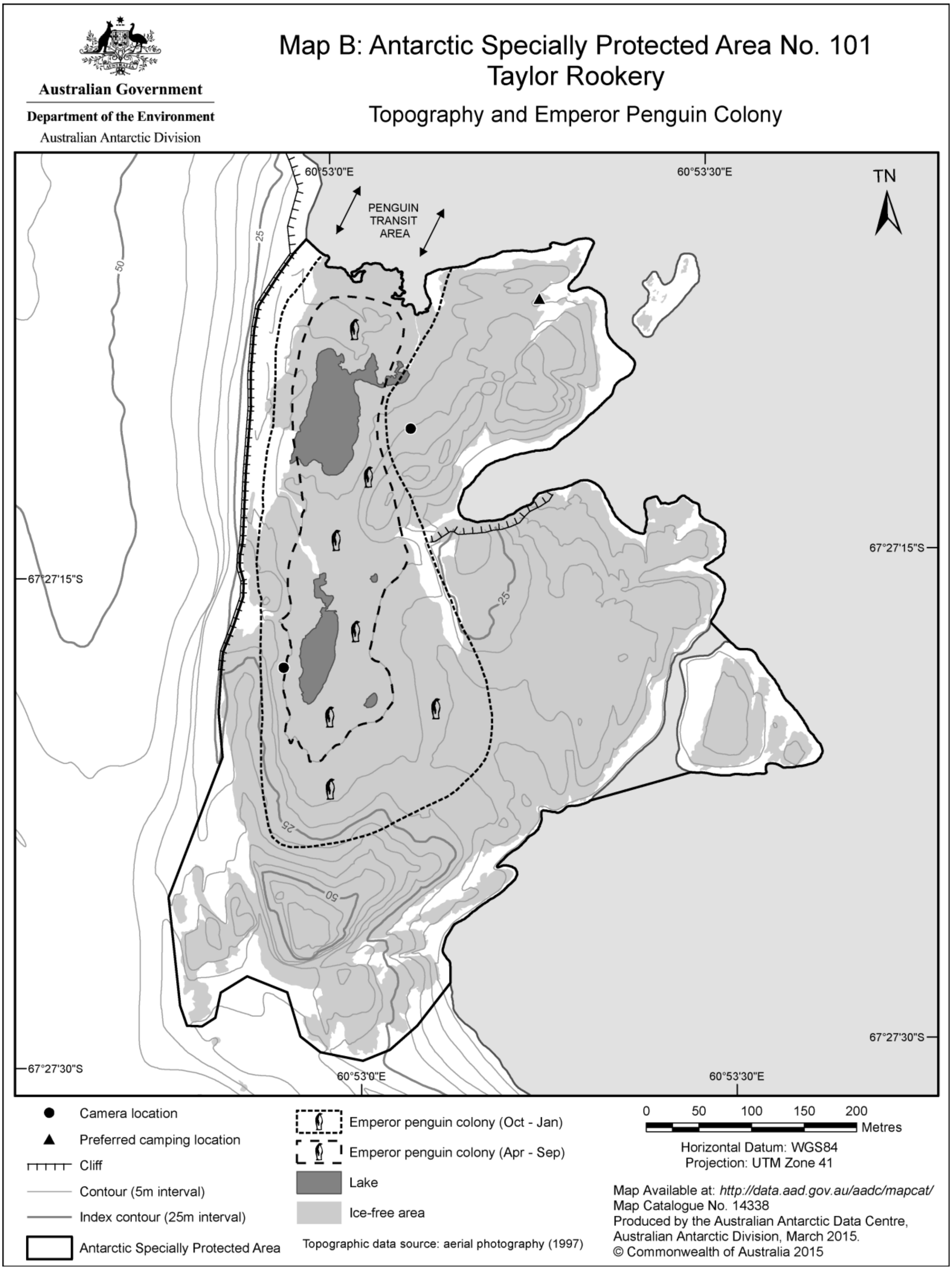
Australian Government
Department of the Environment
Australian Antarctic Division
Map B: Antarctic Specially Protected Area No. 101
Taylor Rookery
Topography and Emperor Penguin Colony
60°53'0"E
60°53'30"E
TN
PENGUIN
TRANSIT
AREA
67°27'15"S
67°27'30"S
25
50
Camera location
Preferred camping location
Cliff
Contour (5m interval)
Index contour (25m interval)
Antarctic Specially Protected Area
Emperor penguin colony (Oct - Jan)
Emperor penguin colony (Apr - Sep)
Lake
Ice-free area
Topographic data source: aerial photography (1997)
0 50 100 150 200
Metres
Horizontal Datum: WGS84
Projection: UTM Zone 41
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14338
Produced by the Australian Antarctic Data Centre,
Australian Antarctic Division, March 2015.
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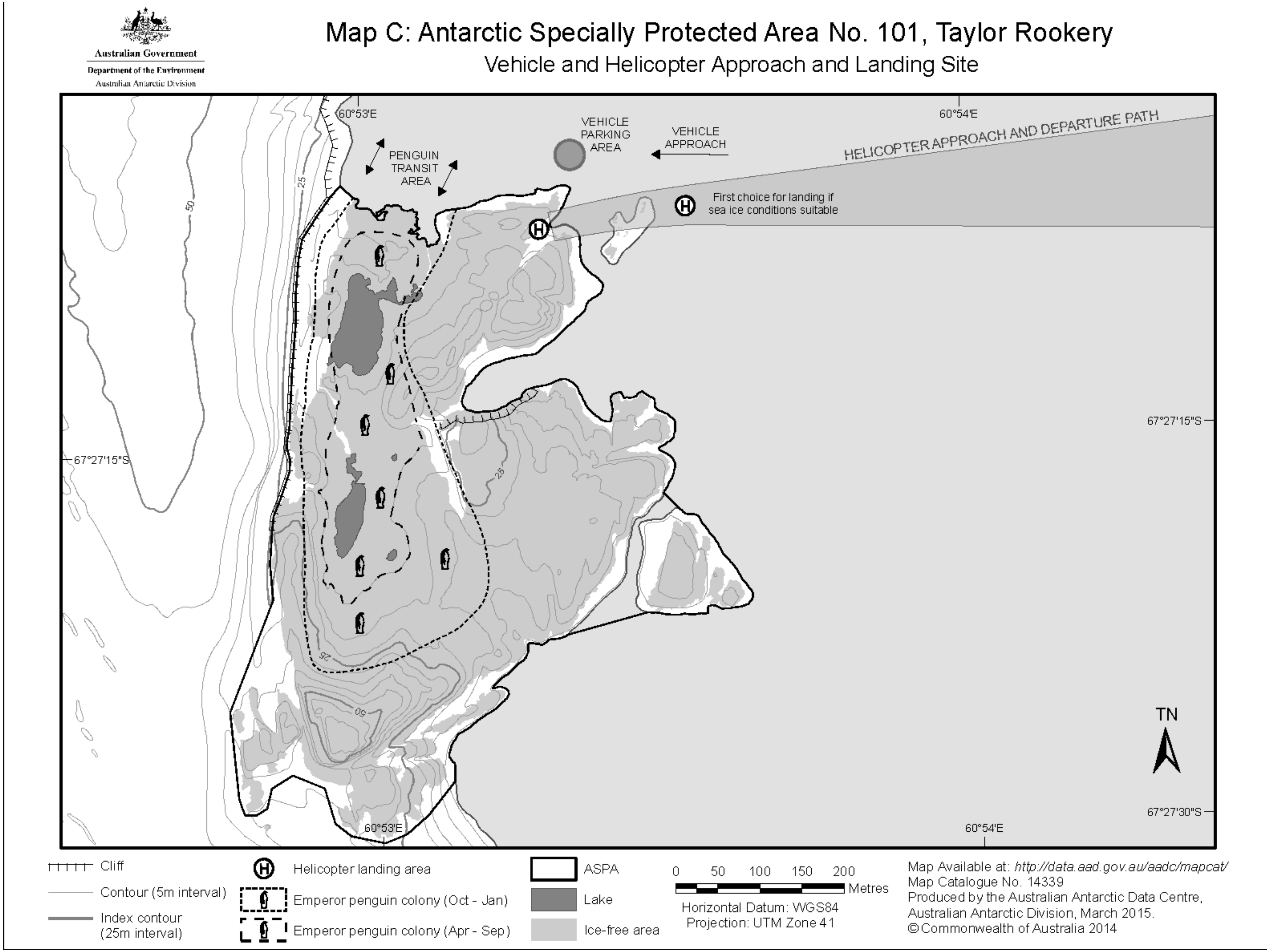
Australian Government
Department of the Environment
Australian Antarctic Division
Map C: Antarctic Specially Protected Area No. 101, Taylor Rookery
Vehicle and Helicopter Approach and Landing Site
60°53'E
60°54'E
VEHICLE PARKING AREA
VEHICLE APPROACH
HELICOPTER APPROACH AND DEPARTURE PATH
PENGUIN TRANSIT AREA
First choice for landing if sea ice conditions suitable
67°27'15"S
67°27'30"S
TN
Cliff
Contour (5m interval)
Index contour (25m interval)
Helicopter landing area
Emperor penguin colony (Oct - Jan)
Emperor penguin colony (Apr - Sep)
ASPA
Lake
Ice-free area
0 50 100 150 200 Metres
Horizontal Datum: WGS84
Projection: UTM Zone 41
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14339
Produced by the Australian Antarctic Data Centre, Australian Antarctic Division, March 2015.
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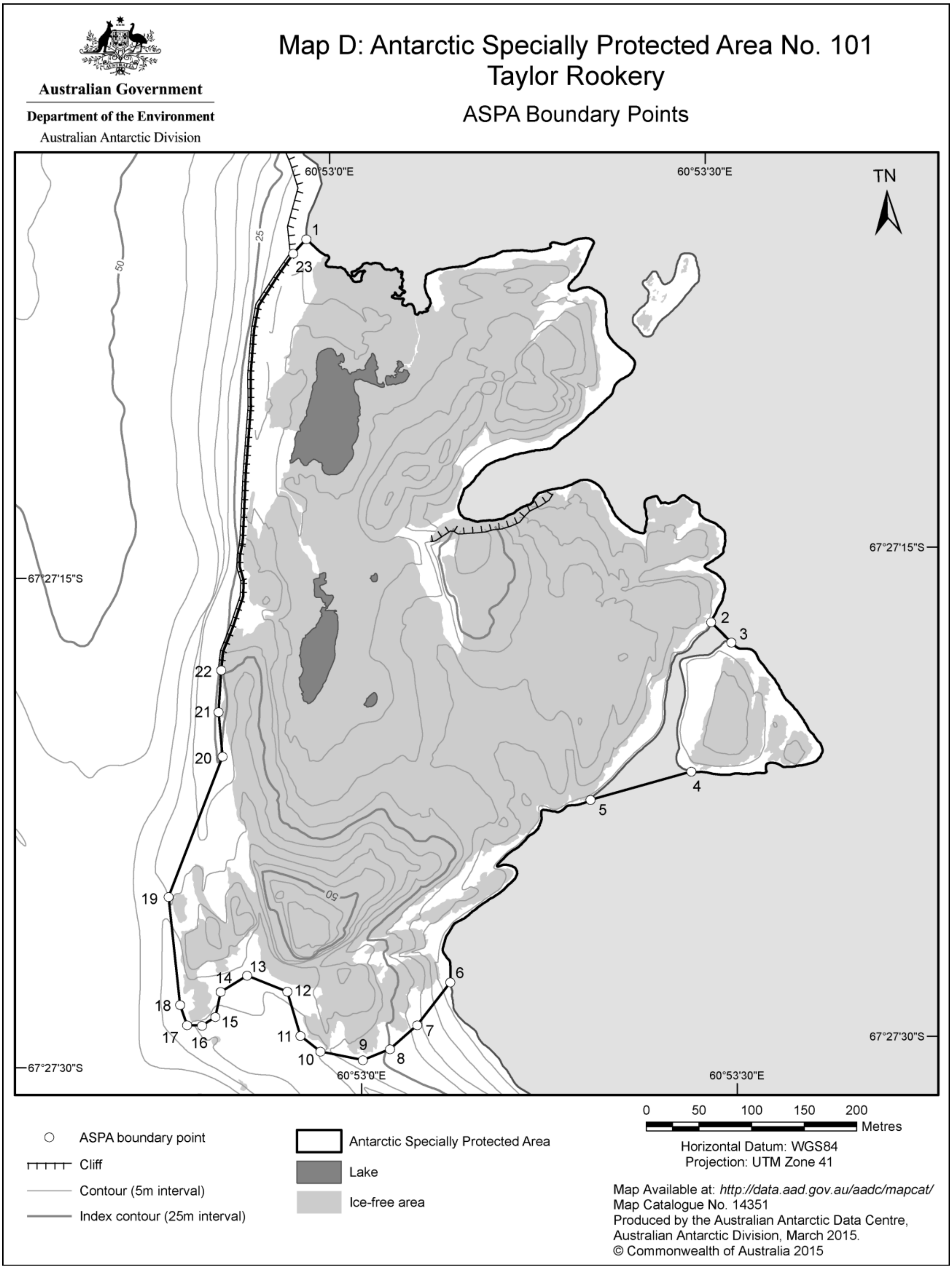
Australian Government
Department of the Environment
Australian Antarctic Division
Map D: Antarctic Specially Protected Area No. 101
Taylor Rookery
ASPA Boundary Points
60°53'0"E
60°53'30"E
TN
67°27'15"S
67°27'30"S
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
25
50
0 50 100 150 200
Metres
Horizontal Datum: WGS84
Projection: UTM Zone 41
ASPA boundary point
Cliff
Contour (5m interval)
Index contour (25m interval)
Antarctic Specially Protected Area
Lake
Ice-free area
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14351
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Management Plan for Antarctic Specially Protected Area No. 102

ROOKERY ISLANDS, HOLME BAY, MAC.ROBERTSON LAND

Introduction

The Rookery Islands are a group of small islands and rocks in the western part of Holme Bay, lying to the north of the Masson and David Ranges in Mac.Robertson Land, East Antarctica (67°36'36" S, 62°32'01" E, Map A and Map B). The Rookery Islands were originally designated as Specially Protected Area No. 2 through Recommendation IV-II (1966), after a proposal by Australia. A management plan for the Area was adopted under Recommendation XVII-2 (1992). In accordance with Decision 1 (2002), the site was redesignated and renumbered as Antarctic Specially Protected Area (ASPA) No. 102. Revised ASPA management plans were adopted under Measure 2 (2005) and Measure 2 (2010). The Area is designated to protect breeding colonies of the five bird species known to breed in the region, including the southern giant petrel (*Macronectes giganteus*) and the Cape petrel (*Daption capensis*) which are not known to occur elsewhere in the region. The Area is one of only four known southern giant petrel breeding colonies in East Antarctica.

1. Description of values to be protected

The Rookery Islands contain breeding colonies of five bird species: Adélie penguin (*Pygoscelis adeliae*), Cape petrel, snow petrel (*Pagodroma nivea*), southern giant petrel, and Antarctic skua (*Catharacta maccormicki*). It is also highly likely that Wilson's storm petrels breed on the islands. The Area is primarily designated to safeguard this unusual assemblage of bird species. The Rookery Islands also provide a representative sample of the near-shore island habitats occurring along the coast of Mac.Robertson Land.

A small colony of about 4 pairs of southern giant petrels is located on Giganteus Island, the third largest island in the Rookery Islands group. However, up to 80 southern giant petrels have been occasionally observed feeding on seal carcasses in the Holme Bay region. The species is not known to breed elsewhere in the Holme Bay region. This colony is one of only four known breeding sites in East Antarctica. The other three East Antarctic colonies are located near the Australian stations of Casey (Frazier Islands, ASPA 160, 66°14’S 110°10’E, approximately 250 pairs), and Davis (Hawker Island, ASPA 167, 68º35’S, 77º50’E, approximately 35 pairs), and near the French station Dumont d’Urville (Pointe-Géologie Archipelago, ASPA 120, 66º40’S, 140º01’E, 12-15 pairs).These four breeding colonies represent less than one per cent of the global breeding population that comprises approximately 50,000 breeding pairs, approximately 11,000 of which are found south of 60ºS, mostly in the Antarctic Peninsula region.

Currently there are relatively few published data available that allow robust analyses of southern giant petrel population trends. Some locations have experienced a decrease that appears to be stabilising or to have reversed in recent years. Small increases have occurred at other locations.

The seabird assemblage occupying the Area comprises breeding populations of probably five of the eight flying seabird species breeding in East Antarctica, and one penguin species. This offers a unique opportunity to study population dynamics of different species. In addition, it is important to protect southern giant petrels at the southern limit of their breeding range. The Antarctic Treaty parties have committed to minimise human disturbance to southern giant petrels, and to encourage regular population counts at all breeding sites in the Antarctic Treaty area.

2. Aims and Objectives

Management of the Rookery Islands 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 on the ecosystem, particularly on the avifauna, and physical environment, provided it is for compelling reasons which cannot be served elsewhere;
- minimise the possibility of introduction of pathogens which may cause disease in bird populations within the Area;
- minimise the possibility of introduction of alien plants, animals and microbes to the Area;
- minimise human disturbance to southern giant petrels on Giganteus Island;
- allow Giganteus Island to be used as a reference area for future comparative studies with other breeding populations of southern giant petrels;
- preserve Giganteus Island, henceforth, as a highly restricted area by limiting human visitation to the island during the southern giant petrel breeding season;
- allow for the gathering of data on the population status and related demography of the bird species on a regular basis; and
- allow visits for management purposes in support of the aims of the management plan.

3. Management Activities

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

- information on the location of the Area (stating special restrictions that apply), and a copy of this Management Plan shall be kept available at adjacent operational research/field stations and will be made available to ships visiting the vicinity;
- where practicable the Area shall be visited as necessary (preferably 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;
- where practicable, at least one research visit should be conducted to census the southern giant petrels at Giganteus Island and other seabird populations in each five year period, to enable assessment of breeding populations.
- the Management Plan shall be reviewed at least every five years.

4. Period of Designation

Designation is for an indefinite period.

5. Maps

Map A:Antarctic Specially Protected Area No 102, Rookery Islands, Mawson Coast, Mac.Robertson Land, East Antarctica. The inset map indicates the location in relation to the Antarctic continent.

Map B: Antarctic Specially Protected Area No 102, Rookery Islands. Bird distribution

Map C: Antarctic Specially Protected Area No 102, Giganteus Island (Restricted Zone). Topography and bird distribution .

Specifications for all Maps:

Horizontal Datum: WGS84 Projection: UTM Zone 49.

6. Description of the Area

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

The Rookery Islands comprise a small group of approximately 75 small islands and rocks in the south-west part of Holme Bay, Mac.Robertson Land, about 10 km to the west of the Australian station Mawson. The Area comprises those rocks and islands lying within a rectangle enclosed by following coordinates: 62°28'01"E, 67°33'45"S; 62°34'37"E, 67°33'47"S; 62°28'02"E, 67°38'10"S; 62°34'39"E, 67°38'11"S (Map B).

There are no boundary markers delimiting the site.

The Rookery Islands range in size from small rocks which barely remain above water at high tide to the larger islands which include Giganteus Island (approximately 400 m long, 400 m wide and 30 m high) and Rookery Island, the highest of the group, with an altitude of 62 m, and of similar area, but slightly more elongate. Raised beaches are evident on Giganteus Island.

Climate

Limited data exist for the meteorology of the Area. Conditions are probably similar to those of the Mawson station area where the mean monthly temperature ranges from +0.1°C in January to -18.8°C in August, with extreme temperatures ranging from +10.6°C to -36.0°C. The mean annual wind speed is 10.9 m per second with frequent prolonged periods of strong south-easterly katabatic winds from the ice cap at mean speeds over 25 m per second and gusts often exceeding 50 m per second. Mean wind speed decreases seaward with distance from the icecap, but is unlikely to be much lower at the Rookery Islands which lie quite close to the coast. Other general characteristics of the coastal Antarctic climate to which these islands are likely to be subjected are high cloudiness throughout the year, very low absolute humidity, low precipitation and frequent periods of intensified winds, drifting snow and low visibility associated with the passage of major low pressure systems.

Environmental Domains and Antarctic Conservation Biogeographic Regions

Based on the Environmental Domains Analysis for Antarctica (Resolution 3 (2008)) the Rookery Islands are located within Environment D *East Antarctic coastal geologic*. Based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)) the Rookery Islands are not assigned to a Biogeographic Region.

Geology and soils

The Rookery Islands are outcrops of the Mawson charnockite, a rock type which occurs over an area of at least 2000 square kilometres along the coast of Mac.Robertson Land. The charnockites of the Rookery Islands are the fine grained variant and are comparatively poor in the mineral hypersthene but rich in garnet and biotite. The charnockites enclose abundant bands and lenses of hornfels, garnetiferous quartz and felspar-rich gneisses. There are also a number of pegmatic dykes which cut across the charnockite rocks.

Vegetation

No mosses or lichens have been recorded from any of the Rookery Islands. There are some terrestrial algae but no taxonomic identifications have been made. Most of the smaller islands and rocks are covered with sea spray in summer and are sometimes scoured by rafted sea ice in winter and spring. It is considered unlikely that species of moss or lichen could become established.

Inland waters

There are no freshwater bodies on the Rookery Islands.

Birds

Five species of birds are known to breed on the Rookery Islands: Adélie penguin (*Pygoscelis adeliae*), Cape petrel (*Daption capensis*), snow petrel (*Pagodroma nivea*), southern giant petrel (*Macronectes giganteus*), and the south polar skua (*Catharacta maccormicki*). Wilson’s storm petrels (*Oceanites oceanicus*) are likely to breed there as well but nest sites have not yet been found.

The southern giant petrels nest on Giganteus Island (Map C). The colony is currently very small but has been stable at 2-4 breeding pairs since the mid-1960s. A total of 16 incubating birds were recorded in 1958, and in 1967, 13 nests were occupied but only four contained eggs. Only two nests were present in 1972, four in 1973, two in 1977, one in 1981, two in 1982, and three in 2001. During the most recent count in 2007, four nests were counted on two separate occasions, with two pairs and two lone birds at first count (27th November) and three pairs and one lone bird on an egg (therefore assumed to have an absent partner) at second count (10th December). The nests are shallow mounds of stones and are built on broad gravel patches on the raised beaches. The area has many old nest sites and several may be rebuilt each year but there is no evidence that they are used.

Cape petrels breed on Rookery Island and a small island known as Pintado Island, located 300 m north-west of Rookery Island. In the most recent survey of Cape petrel populations in the Area on 24 December 2007, 123 occupied nests were observed on Pintado Island and 10 occupied nests on Rookery Island. The nearest known breeding colonies of Cape petrels to the Area occur at four rock outcrops near Forbes Glacier 8 km to the west, and on Scullin and Murray Monoliths (ASPA 164) approximately 200 km to the east. A remotely operating camera on the un-named island 250 m east of Rookery Island (Map B) is monitoring annual breeding success of approximately 30 Cape petrel nests.

Adélie penguins breed on 14 of the islands. The most recent population survey across the Area in December 2007 estimated the breeding population at all 14 islands was approximately 91,000 occupied nests. The largest populations occur on Rookery Island (31,000 occupied nests) and Giganteus Island (11,000 occupied nests). Although the Area-wide survey has not been repeated since 2007, surveys of individual islands are being undertaken each year and an up-dated Area-wide estimate will be possible during the life of this plan. A remotely operating camera on Rookery Island (Map B) is also monitoring the annual breeding success at approximately 30 Adelie penguin nests.

Snow petrels nest throughout the Rookery Islands and in greatest concentration on Rookery Island. Wilson’s storm petrels are frequently seen flying around the islands and probably breed on a number of the larger islands in the group, although no nests have been recorded.

6(ii) Access to the Area

The Area can be accessed by oversnow vehicles or boats (depending on sea ice conditions) and aircraft. There are no designated landing sites (also see Section 7(ii)).

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

Two remotely operating time lapse cameras are located at 67º37’55.5”S, 62º30’47.9”E and 67º36’12.6”S, 62º 29’ 17.0”E. Deployed in 2010/11, the cameras support long term monitoring of Adélie penguin and Cape petrel breeding success and phenology, with minimal disturbance. While not permanent the cameras are expected to remain in place beyond the term of this plan.

There are no other structures within or adjacent to the Area.

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

ASPA 101 Taylor Rookery, Mac.Robertson Land (67°27'14"S; 60°53'0"E) is located approximately 80 kilometres to the west.

6(v) Special zones within the Area

Giganteus Island is designated as a Restricted Zone to afford a high level of protection to southern giant petrels (Map B, Map C). Entry is restricted and may only be permitted in accordance with the purposes and conditions detailed elsewhere in this management plan.

7. Terms and conditions for entry permits

7(i) General conditions

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

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

Entry to the Giganteus Island Restricted Zone is only permitted in accordance with conditions outlined below.

- Permits to enter the Giganteus Island Restricted Zone during the southern giant petrel breeding period (1 October to 30 April) may only be issued for the purpose of conducting censuses. Other research may be conducted outside the breeding period in accordance with a permit.
- Wherever practicable, censuses should be conducted from outside the southern giant petrel colony using vantage points from which the nesting birds may be counted.
- Access to the Restricted Zone should be limited to the minimum amount of time reasonably required to undertake the census.
- Visits to conduct censuses should be made by a team including someone from a national Antarctic program with relevant scientific skills and experience. Other personnel should remain at the shoreline.
- For permitted activities associated with obtaining census data or biological data, persons shall not approach closer than is necessary to any nesting southern giant petrels, and in no case closer than 20 m so long as no birds are disturbed (showing no change in behaviour).
- Overflights of Giganteus Island are prohibited.

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

Travel to the Area may be by boat, by vehicle over sea ice, or by aircraft.

Vehicles are prohibited on the islands, and vehicles and boats must be left at the shoreline. Movement on the islands is by foot only. Vehicles used to access the islands over sea ice must be taken no closer than 250 m from concentrations of birds.

Access to Giganteus Island is prohibited except in accordance with the provisions elsewhere in this Plan.

If access to the islands is not possible by boat or by vehicle over sea ice, then fixed wing aircraft or helicopters may be used subject to the following conditions:

- disturbance of the colonies by aircraft shall be avoided at all times
- sea ice landings shall be encouraged (where practicable);
- aircraft landings on Giganteus Island during the breeding season are prohibited;
- as aircraft may provide the only viable access to the other islands when sea and sea ice access is not possible, single-engine helicopters may land on the islands during the breeding season where it is possible to maintain a distance of at least 500 m from bird colonies. Permission to land an aircraft may be granted for essential scientific or management purposes only if it can be demonstrated that disturbance will be minimal. Only personnel who are required to carry out work in the Area should leave the helicopter;
- when accessing Giganteus Island by aircraft outside the breeding season sea ice landings are preferred, following separation distances mentioned below;
- at all other times, single-engine helicopters and fixed wing aircraft must not land or take off within 930 m (3050 ft) or fly within 750 m of bird colonies, and twin-engine helicopters must not land, take off or fly within 1500 m of bird colonies;
- overflights of the islands during the breeding season is prohibited, except where essential for scientific or management purposes. Such overflights are to be at an altitude of no less than 930 m (3050 ft) for single-engine helicopters and fixed-wing aircraft, and no less than 1500 m (5000 ft) for twin-engine helicopters;
- refuelling of aircraft is prohibited within the Area.

There are no marked pedestrian routes within the Area. Unless disturbance is authorised by permit, pedestrians should keep at least 100 m from concentrations of birds, and give way to departing and arriving penguins. Pedestrians moving in or around the Area should avoid crossing the access routes of birds if possible, or cross quickly without disturbing penguin traffic.

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

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

- scientific research consistent with the Management Plan for the Area which cannot be undertaken elsewhere and which will not jeopardise the values for which the Area has been designated or the ecosystems of the Area;
- essential management activities, including monitoring; and
- sampling, which should be the minimum required for approved research programs.

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

- Permanent structures or installations are prohibited.
- Other structures or installations shall not be erected within the Area except as specified in a permit.
- Small temporary refuges, hides, blinds or screens may be constructed for the purpose of scientific study of the avifauna.
- Installation (including site selection), removal, modification or maintenance of structures shall be undertaken in a manner that minimises disturbance to breeding birds.
- All scientific equipment or markers installed within the Area must be clearly identified by country, name of the principal investigator, year of installation and date of expected removal.
- Markers, signs or other structures erected within the Area for scientific or management purposes shall be secured and maintained in good condition and removed when no longer required. All such items should be made of materials that pose minimal risk of harm to bird populations or of contamination of the Area.

Permits will require the removal of specific structures, equipment or markers before the permit expiry date.

7(v) Location of field camps

- Camping is prohibited within the Area except in an emergency.

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

- 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 season for which they are required.
- Deliberate introduction of animals, plant material, micro-organisms and non-sterile soil into the Area is prohibited. The highest level precautions shall be taken to prevent the accidental introduction of animals, plant material, micro-organisms and non-sterile soil from other biologically distinct regions (within or beyond the Antarctic Treaty area) into the Area;
- To the maximum extent practicable, clothing, footwear and other equipment used or brought into the Area (including backpacks, carry-bags and other equipment) shall be thoroughly cleaned before entering and after leaving the Area.
- Boots and sampling/research equipment and markers that comes into contact with the ground shall be disinfected or cleaned with hot water and bleach before entering and after visiting the Area to help prevent accidental introductions of animals, plant material, micro-organisms and non-sterile soil into the Area. Cleaning should be undertaken at station.
- Visitors should also consult and follow as appropriate recommendations contained in the Committee for Environmental Protection Non-native Species Manual (CEP 2011), and in the Environmental Code of Conduct for terrestrial scientific field research in Antarctica (SCAR 2009);
- No herbicides or pesticides shall be brought into the Area. Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes specified in a permit, shall be removed from the Area as far as possible at or before the conclusion of the activity for which the permit was granted.
- Fuel is not to be stored in the Area unless required for essential purposes connected with the activity for which the permit has been granted. Permanent fuel depots are not permitted.
- All material introduced shall be for a stated period only, shall be removed at or before the conclusion of that stated period, and shall be stored and handled so as to minimise the risk of environmental impact.

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

- Taking of, or harmful interference with, native flora and fauna is prohibited, 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 shall be limited to activities that are non-invasive and non-disruptive to the breeding seabirds present within the Area. Surveys, including aerial photographs for the purposes of population census, shall have a high priority.
- Disturbance of southern giant petrels shall be avoided at all times.

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

- Material may only be collected or removed from the Area as authorised in a permit and shall be limited to the minimum necessary to meet scientific or management needs.

- Material of human origin likely to compromise the values of the Area, which was not brought into the Area by the permit holder or otherwise authorised, may be removed unless the impact of the removal is likely to be greater than leaving the material *in situ*. If such material is found the permit issuing authority shall be notified if possible while the field party is present within the Area.

7(ix) Disposal of waste

- All wastes, including human wastes, shall be removed from the Area. Wastes from field parties shall be stored in such a manner to prevent scavenging by wildlife (e.g. skuas) until such time as the wastes can be disposed or removed. Wastes are to be removed no later than the departure of the field party. Human wastes and grey water may be disposed into the sea outside 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 biological monitoring and Area inspection activities, which may involve the collection of samples for analysis or review;
- erect or maintain scientific equipment and structures, and signposts; or
- carry out other protective measures.

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

To help maintain the ecological and scientific values of the Area, visitors shall take special precautions against introductions of non-indigenous organisms. Of particular concern are pathogenic, microbial or vegetation introductions sourced from soils, flora and fauna at other Antarctic sites, including research stations, or from regions outside Antarctica. To minimise the risk of introductions, before entering the Area visitors shall thoroughly clean footwear and any equipment, particularly sampling equipment and markers to be used in the Area.

Where practical, a census of southern giant petrels on Giganteus Island shall be conducted at least once in every five year period. Censuses of other species may be undertaken during this visit provided no additional disturbance is caused to the southern giant petrels.

To reduce disturbance to wildlife, noise levels including verbal communication is to be kept to a minimum. The use of motor-driven tools and any other activity likely to generate noise and thereby cause disturbance to nesting birds is prohibited within the Area during the breeding period (1 October to 30 April).

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, and no later than six months after the visit has been completed. Such visit reports should include, as applicable, 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.

A copy of the report should be forwarded to the Party responsible for development of the Management Plan (Australia) to assist in management of the Area, and the monitoring of bird populations. 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 of the Area.

8. Supporting Documentation

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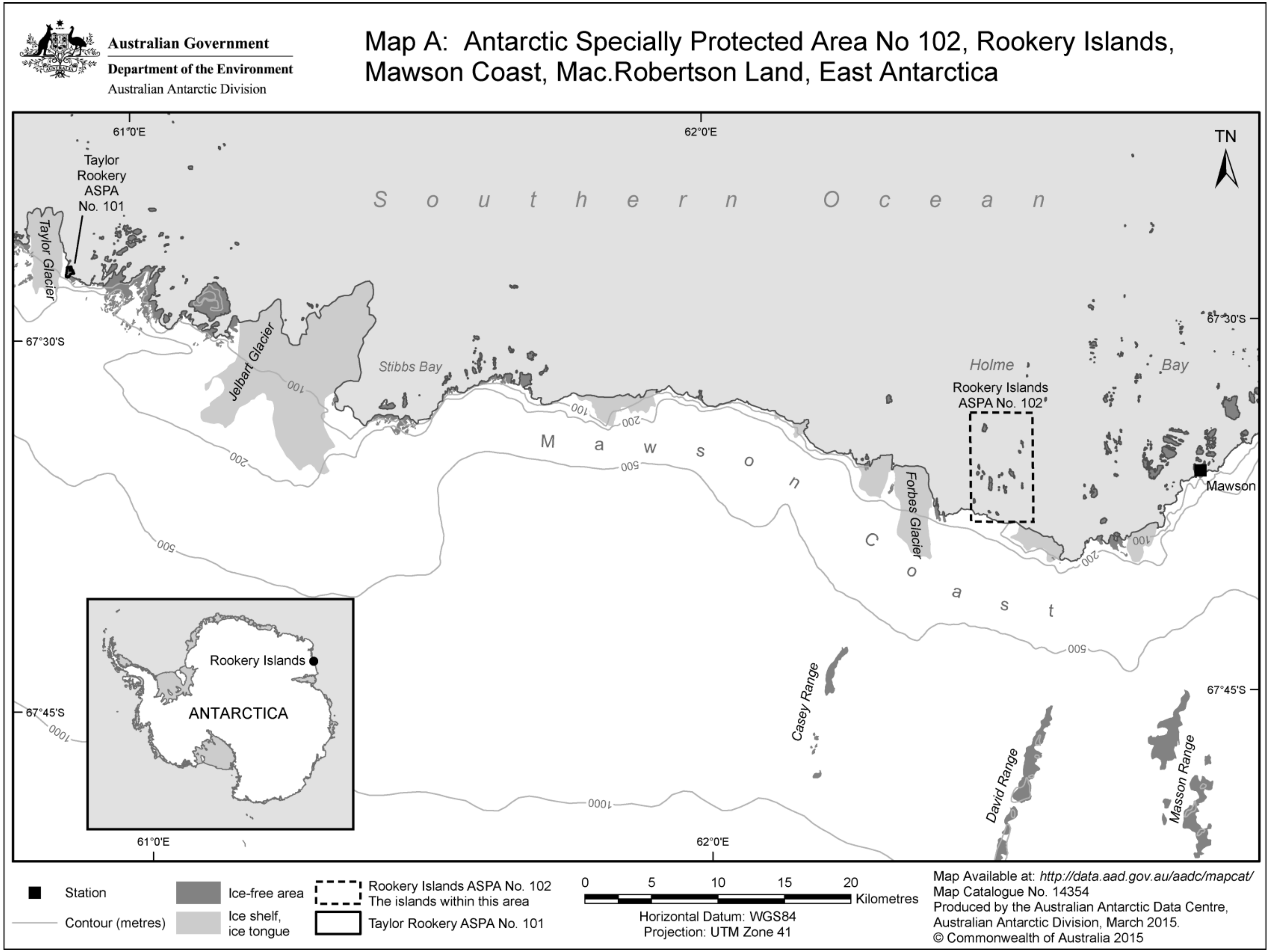
Australian Government
Department of the Environment
Australian Antarctic Division
Map A: Antarctic Specially Protected Area No 102, Rookery Islands, Mawson Coast, Mac.Robertson Land, East Antarctica
61°0'E
62°0'E
TN
Taylor Rookery ASPA No. 101
Taylor Glacier
Southern Ocean
67°30'S
Jelbart Glacier
Stibbs Bay
Holme Bay
Rookery Islands ASPA No. 102
Mawson
Mawson Coast
Forbes Glacier
Casey Range
David Range
Masson Range
67°45'S
Rookery Islands
ANTARCTICA
100
200
500
1000
Station
Contour (metres)
Ice-free area
Ice shelf, ice tongue
Rookery Islands ASPA No. 102 The islands within this area
Taylor Rookery ASPA No. 101
0 5 10 15 20 Kilometres
Horizontal Datum: WGS84
Projection: UTM Zone 41
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14354
Produced by the Australian Antarctic Data Centre, Australian Antarctic Division, March 2015.
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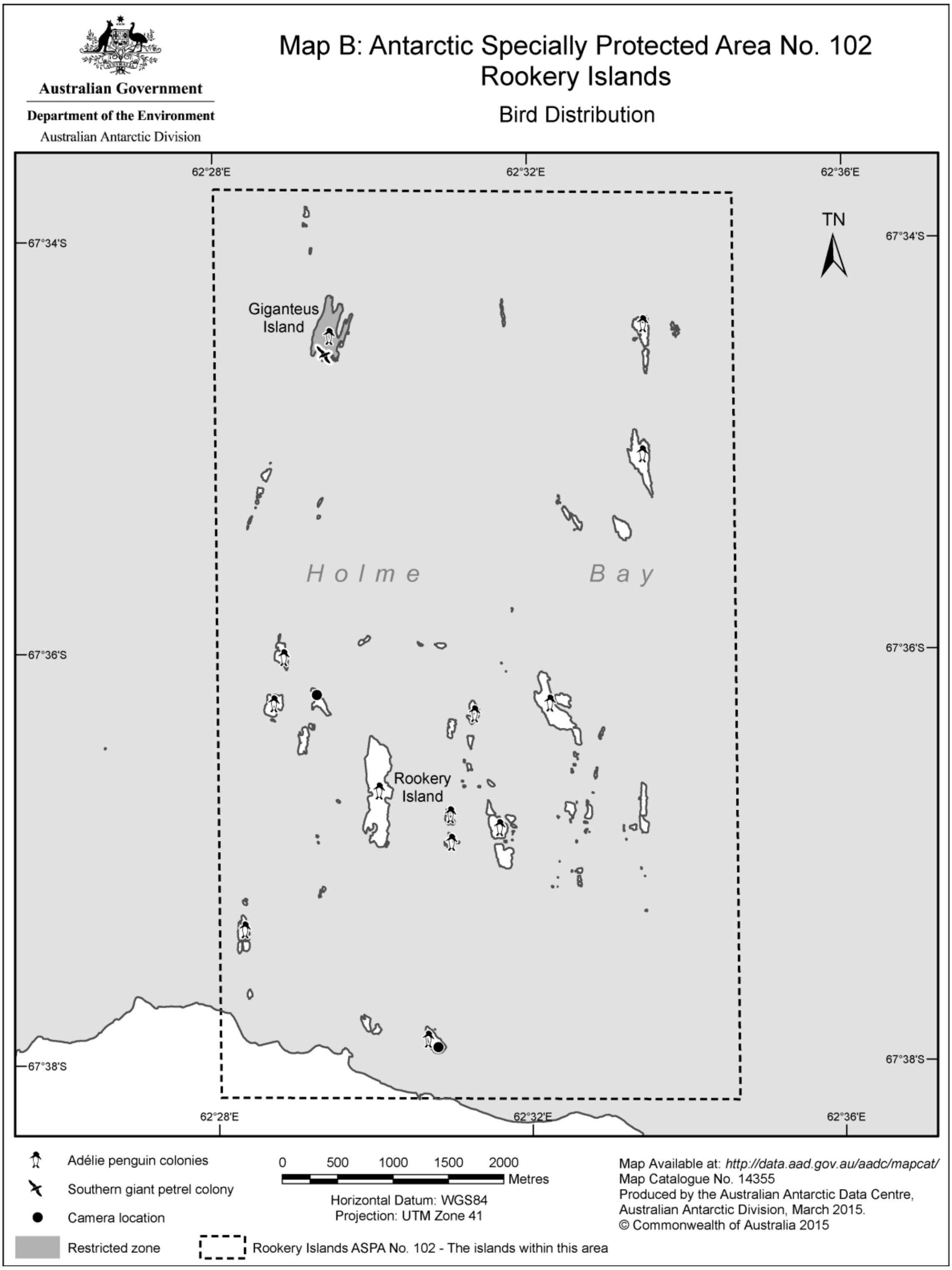
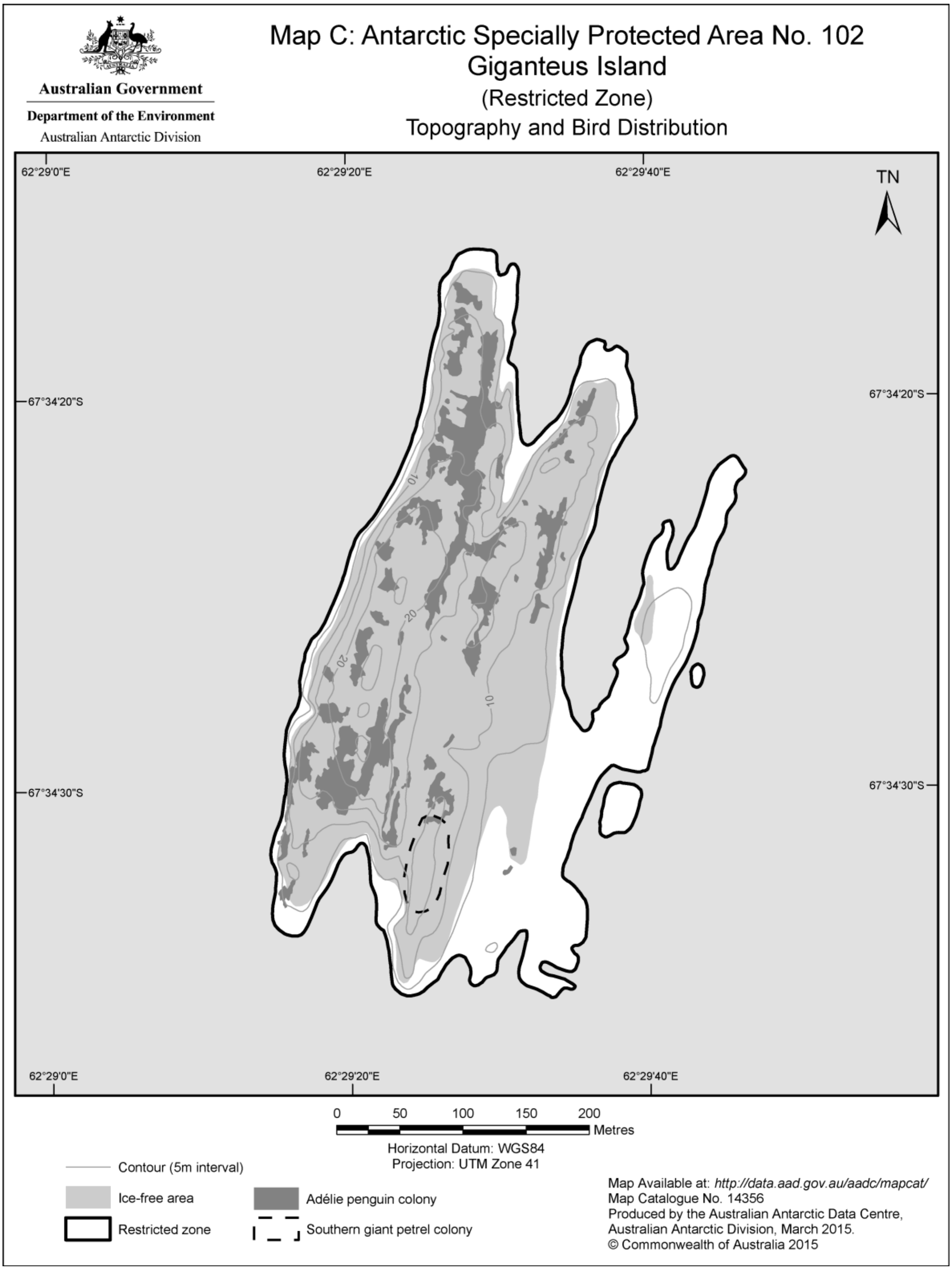

Australian Government
Department of the Environment
Australian Antarctic Division
Map B: Antarctic Specially Protected Area No. 102
Rookery Islands
Bird Distribution
62°28'E
62°32'E
62°36'E
67°34'S
67°36'S
67°38'S
TN
Giganteus Island
Holme Bay
Rookery Island
Adélie penguin colonies
Southern giant petrel colony
Camera location
Restricted zone
Rookery Islands ASPA No. 102 - The islands within this area
0 500 1000 1500 2000 Metres
Horizontal Datum: WGS84
Projection: UTM Zone 41
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14355
Produced by the Australian Antarctic Data Centre, Australian Antarctic Division, March 2015.
© Commonwealth of Australia 2015


Australian Government
Department of the Environment
Australian Antarctic Division
Map C: Antarctic Specially Protected Area No. 102
Giganteus Island
(Restricted Zone)
Topography and Bird Distribution
62°29'0"E
62°29'20"E
62°29'40"E
TN
67°34'20"S
67°34'30"S
10
20
20
10
0
50
100
150
200
Metres
Horizontal Datum: WGS84
Projection: UTM Zone 41
Contour (5m interval)
Ice-free area
Adélie penguin colony
Restricted zone
Southern giant petrel colony
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14356
Produced by the Australian Antarctic Data Centre,
Australian Antarctic Division, March 2015.
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Management Plan for Antarctic Specially Protected Area No. 103

ARDERY ISLAND AND ODBERT ISLAND, BUDD COAST, WILKES LAND, EAST ANTARCTICA

Introduction

Ardery Island and Odbert Island (66°22’20”S; 110°29’10”E, Map A) were originally designated as Specially Protected Area No. 3, through Recommendation IV-III (1966), after a proposal by Australia. A management plan for the Area was adopted under Recommendation XVII-2 (1992). In accordance with Decision 1 (2002), the site was redesignated and renumbered as Antarctic Specially Protected Area (ASPA) No. 103. Revised management plans for the ASPA were adopted under Measure 2 (2005) and Measure 3 (2010). The Area is primarily designated to protect the unusual assemblage of breeding colonies of several species of petrel. The Antarctic petrel (*Thalassoica antarctic*a) and the southern fulmar (*Fulmarus glacialoides*) are of particular scientific interest.

1. Description of values to be protected

The Area is designated primarily to protect the assemblage of four fulmarine petrels at Ardery Island and Odbert Island (Map B and C). The four species of fulmarine petrels, all belonging to different genera, are Antarctic petrels, southern fulmars, Cape petrels (*Daption capense*), and snow petrels (*Pagodroma nivea*). All breed in the Area in sufficient numbers to allow comparative study. Study of these four genera at one location is of high ecological importance in understanding their responses to changes in the Southern Ocean ecosystem.

The Antarctic petrel is the only species in the genus *Thalassoica*; they occur most commonly in the Ross and Weddell seas and are much less abundant in East Antarctica. Similarly, the southern fulmar inhabits islands mainly near the Antarctic Peninsula and the islands of the Scotia Arc where about a quarter of its global population resides. Since southern fulmars require steeper slopes as breeding habitat (to allow falling away from the colony when becoming airborne) than Antarctic petrels, this species is more prone to suffer reductions in breeding success in poor weather conditions.

Both islands are also occupied by breeding populations of Wilson's storm petrels (*Oceanites oceanicus*) and Antarctic skuas (*Catharacta maccormicki*). Odbert Island also supports a breeding population of Adélie penguins (*Pygoscelis adeliae*).

2. Aims and Objectives

Management of Ardery Island and Odbert Island aims to:

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

3. Management activities

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

- a copy of this Management Plan shall be made available at Casey station and to ships visiting the vicinity;
- the Area shall be visited as necessary, preferably 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
- the Management Plan shall be reviewed at least every five years.

4. Period of designation

Designation is for an indefinite period.

5. Maps

- **Map A**: Antarctic Specially Protected Area No 103, Ardery Island and Odbert Island, Budd Coast, Wilkes Land, East Antarctica. The inset map indicates the location in relation to the Antarctic continent.
- **Map B**: Antarctic Specially Protected Area No 103, Ardery Island: Topography and Bird Distribution.
- **Map C**: Antarctic Specially Protected Area No 103, Odbert Island: Topography and Bird Distribution.
- **Map D**: Antarctic Specially Protected Area No 103: Ardery Island and Odbert Island: Helicopter approach and landing sites.

Specifications for all maps: Horizontal Datum: WGS84; Vertical Datum: Mean Sea Level

6. Description of the Area

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

Ardery Island (66°22’15”S, 110°27’0”E) and Odbert Island (66°22’24”S, 110°32’28”E) are among the southernmost of the Windmill Islands in the south of Vincennes Bay, off the Budd Coast of Wilkes Land, Eastern Antarctica. The Area comprises both islands down to low water mark.

Topography

Ardery Island and Odbert Island are located 5 km and 0.6 km, respectively, to the west of Robinson Ridge, south of Casey station.

Odbert Island is approximately 2.7 km long and 0.8 km wide. It has a rocky coast which rises steeply from the sea to a plateau. The highest point is 90 m altitude. The plateau is dissected by a series of valleys which run to the south from the high flat rim on the northern side. These valleys are snow covered in winter. The hill tops remain essentially ice and snow free. In some years, the island remains joined to Robinson Ridge on the mainland by sea ice.

Ardery Island is a steep, ice free island approximately 1.2 km long and 0.8 km wide, with an east-west orientation. The highest point is 117 m above sea level.

The terrain on both islands is rugged and dissected by fissures. The cliffs are fractured and have narrow exposed ledges which in summer are occupied by nesting sea birds. On the hillsides and plateau region, the exposed rock is ice-smoothed and the valley floors are covered with moraine. The islands have undergone isostatic rebound. Moraine and solifluction debris is abundant at heights in excess of 30 metres above mean sea level but considerably less at lower altitudes.

Geology

The Windmill Islands region represents one of the eastern most outcrops of a Mesoproterozoic low-pressure granulite facies terrain that extends west to the Bunger Hills and further to the Archaean complexes in Princess Elizabeth Land, to minor exposures in the east in the Dumont d'Urville area and in Commonwealth Bay. The total outcrop areas do not exceed more than a few square kilometres. The Mesoproterozoic outcrop of the Windmill Islands and the Archaean complexes of Princess Elizabeth Land are two of the few major areas in East Antarctica that can be directly correlated with an Australian equivalent in a Gondwana reconstruction. The Mesoproterozoic facies terrain comprise a series of migmatitic metapelites and metapsammites interlayered with mafic to ultramafic and felsic sequences with rare calc-silicates, large partial melt bodies (Windmill Island supacrustals), undeformed granite, charnockite, gabbro, pegmatite, aplites and cut by easterly-trending late dolerite dykes.

Ardery Island and Odbert Island are part of the southern gradation of a metamorphic grade transition which separates the northern part of the Windmill Islands region from the southern part. The metamorphic grade ranges from amphibolite facies, sillimanite-biotite orthoclase in the north at Clark Peninsula, through biotite-cordierite-almandine granulite, to hornblende-orthopyroxene granulite at Browning Peninsula in the south.

Ardery Island and Odbert Island together with Robinson Ridge, Holl Island, Peterson Island and the Browning Peninsula are similar geologically and are composed of Ardery charnockite. Charnockites are of granitic composition but were formed under anhydrous conditions. The Ardery Charnockite of Ardery Island and Odbert Island intrudes the Windmill metamorphics and consists of a modal assemblage of quartz + plagioclase + microcline + orthopyroxene + biotite + clinopyroxene hornblende with opaques and minor zircon and apatite. An isotopic age of about 1,200 million years for the Ardery charnockite has been established. The charnockite is prone to deep weathering and crumbles readily because of its mineral assemblage, whereas the metamorphic sequences of the northerly parts of the region have a much more stable mineral assemblage and crystalline structure. This difference has a significant influence on the distribution of vegetation in the Windmill Islands region with the northern rock types providing a more suitable substrate for slow growing lichens.

Soils on the islands are poorly developed and consist of little more than rock flour, moraine and eroded material. Some soils contain small amounts of organic matter derived from excreta and feathers from the seabirds.

Glaciation

The Windmill Islands region was glaciated during the Late Pleistocene. The southern region of the Windmill Islands was deglaciated by 8,000 corr. yr B.P., and the northern region, including the Bailey Peninsula deglaciated by 5,500 corr. yr B.P. Isostatic uplift has occurred at a rate of 0.5 to 0.6 m/100 yr, with the upper mean marine limit, featured as ice-pushed ridges, being observed at nearby Robinson Ridge at approximately 28.5 metres.

Climate

The climate of the Windmill Islands region is frigid-Antarctic. Conditions at Ardery Island and Odbert Island are probably similar to those of the Casey station area approximately 12 km to the north. Meteorological data for the period 1957 to 1983 from Casey station (altitude 32 m) on the Bailey Peninsula show mean temperatures for the warmest and coldest months of 0.3 and -14.9°C, respectively, with extreme temperatures ranging from 9.2 to -41°C. Mean annual temperature for the period was –9.3°C.

The climate is dry with a mean annual snowfall of 195 mm year^{-1} (rainfall equivalent) precipitation as rain has been recorded in summer. However, within the last 10 to 15 years the mean annual temperature has decreased to –9.1°C and the mean annual snowfall has increased to 230 mm year^{-1} (rainfall equivalent).

On average the area experiences 96 days with gale-force winds, which are predominantly easterly in direction, off the polar ice cap. Blizzards are frequent, especially during winter. Snowfall is common during the winter, but the extremely strong winds scour the exposed areas. On most hill crests in the area snow gathers in the lee of rock outcrops and in depressions in the substratum. Further down the slopes snow forms deeper drifts.

Environmental Domains and Antarctic Conservation Biogeographic Regions

Based on the Environmental Domains Analysis for Antarctica (Resolution 3(2008)) Ardery Island and Odbert Island are located within Environment L *Continental coastal-zone ice sheet*. Based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)) the Area is located within Biogeographic Region 7 *East Antarctica*.

Biological Features

Terrestrial

The flora of Odbert Island consists of three moss species, eleven lichen species (Table 1), and an unknown number of terrestrial and freshwater algae. The most extensive development of lichens is towards the highest elevations of the southern parts of the island in an area of ice-fractured bedrock. The algae occur in tarns, soil seepage areas and soil. Stands of *Prasiola* spp and other green algae and cyanobacteria occur below snow drifts down slope from penguin colonies towards the western part of the island.

The flora of Ardery Island comprises several species of lichen similar to those found on Odbert Island.

The only recorded invertebrates are ectoparasites of birds. Ardery Island is the type locality for the Antarctic flea *Glaciopsyllus antarcticus,* associated with southern fulmars.

MOSSES
Bryum pseudotriquetrum Hedw.) Gaertn., Meyer & Scherb.
Ceratodon purpureus (Hedw.) Brid.
Schistidium antarcticum (= Grimmia antarctici) (Card.) L.I.Savicz & Smirnova
LICHENS
Buellia frigida (Darb.)
Buellia soredians Filson
Buellia sp.
Caloplaca athallina Darb.
Caloplaca citrina (Hoffm.) Th. Fr.
Candelariella flava (C.W.Dodge & Baker) Castello & Nimis
Rhizoplaca melanophthalma (Ram.) Leuck. et Poelt
Rinodina olivaceobrunnea Dodge & Baker
Umbilicaria decussata (Vill.) Zahlbr.
Xanthoria mawsonii Dodge.
Usnea antarctica Du Rietz
ALGAE
Prasiola crispa (Lightfoot) Kützing
Prasiococcus sp.

Table 1. List of mosses, lichens and algae recorded from Odbert Island.

Lakes

Cold monomictic lakes and ponds occur throughout the Windmill Islands region in bedrock depressions, and are usually ice-free during January and February. Nutrient rich lakes are found near the coast in close proximity to extant or abandoned penguin colonies. Sterile lakes are located further inland and are fed by melt water and local precipitation. On Ardery Island and Odbert Island, there are a number of small tarns which are frozen in winter and filled with melt water in summer. Many of the tarns are ephemeral, drying out towards the end of summer. Other tarns located below snow banks are fed continuously by melt water.

Birds and seals

Odbert Island has breeding populations of Adélie penguins, Cape petrels, snow petrels, southern fulmars, Wilson’s storm petrels, and south polar skuas. Ardery Island supports a similar species composition as well as Antarctic petrels, but does not have any breeding Adélie penguins. The southern giant petrel (*Macronectes giganteus*), which breeds on the Frazier Islands approximately 23 km to the north-west, is the only species breeding in the Windmill Islands that breeds neither at Ardery Island nor at Odbert Island.

No seals inhabit Ardery Island and Odbert Island although Weddell seals (*Leptonychotes weddellii*) are frequently observed on the sea ice around them. The main pupping area is about 3 km to the south-east between Herring Island and the Antarctic mainland. In this area, disturbance of the sea ice caused by movement of the Peterson Glacier ensures open water and easy access to food. About 100 pups are born annually in the region. Elephant seals (*Mirounga leonina*) haul out a little farther to the south on Petersen Island and on the Browning Peninsula. Up to 100 of these seals are seen annually; most are mature males and only a few females have also been observed.

Adélie penguin ***(****Pygoscelis adeliae****)***

Adélie penguins breed on Odbert Island, and although they regularly come ashore on Ardery Island, none breed there. The most recent published estimate of the breeding population on Odbert Island is 11,000 pairs in 1989/90. Observations during a visit to the Area in 2012/13 indicated that the population had increased further, but no new estimate is yet available.

Egg laying usually commences before the middle of November, the first chicks hatch around mid-December, and juveniles start leaving the colony in early February. Southern fulmar (Fulmarus glacialoides)

The total population of southern fulmars in the Area is about 5,000 breeding pairs. There are approximately 3,000 occupied southern fulmar sites on Ardery Island; the largest colonies are located on the northern cliffs and around the eastern tip of the island. At Odbert Island, most of the 2,000 sites are concentrated in two large colonies on Haun Bluff and in the central north.

Southern fulmars breed colonially on or near the cliffs and ravines. Nests are situated on small cliff ledges but also on large nearly flat terraces, some birds nest in the open, others in deep crevices or between loose rocks. First eggs appear in early December and most are laid within 10 days. Hatching commences in the third week of January and chicks fledge by mid-March.

Antarctic petrel (Thalassoica antarctica)

The total population of Antarctic petrels in the Area has been estimated at just over 300 breeding pairs. The largest colony, on the Northern Plateau at Ardery Island, contains at least 150 sites in the main area and some 25 sites in smaller groups nearby. At Odbert Island, some 30 nests are located in a small area off the central northern cliffs

Most nests of Antarctic petrels are situated on plateau-like areas or gently sloping sections of steep cliffs on the Northern Plateau, and smaller colonies around Soucek Ravine. Nests are very close together; isolated nesting on small ledges appears to be avoided. In late November, the first Antarctic petrels return from their pre-laying exodus and a week later most birds have returned to lay their eggs. First hatchlings appear in the second week of January, fledging commences in late February to early March, and all chicks have left before the middle of March.

Cape petrel (Daption capense)

Approximately 750 breeding pairs of Cape petrel utilise the Area, with most breeding at Ardery Island in small colonies on the northern cliffs. Scattered nests are present on both sides of Snowie Mountain. There are approximately 100 to 200 nesting sites on Odbert Island, mostly located around the fulmar colonies.

Cape petrels prefer nesting sites sheltered by slightly overhanging rocks and substantial cover from the back and if possible the sides. Most nests are in less steep parts of cliffs or along the top edges of cliffs both in colonies and small scattered groups. After returning from the pre-laying exodus, eggs are laid in late November, and hatching commences in the second week of January. Most chicks have fledged by the first week of March.

Snow petrel (Pagodroma nivea)

The number of snow petrels in the Area is estimated at over 1,100 breeding pairs. Approximately 1,000 snow petrel nesting sites were located on Ardery Island in 1990, mostly on the slopes of Snowie Mountain. Snow petrels appear to be less abundant on Odbert Island than on Ardery with 100 – 1000 nesting sites. In 2003, 752 active nests were found on Ardery Island and 824 on Odbert Island.

The snow petrels breed in crevices or in holes between loose rocks in loose, low density aggregations. Isolated nests are common, as are nests within colonies of other species. Suitable snow petrel habitat also harbours Wilson's storm petrels. The onset of egg laying varies between concentrations of nests, with laying occurring within the first three weeks of December, and chicks hatching from the middle of January onwards. All are fledged in the first two weeks of March.

Wilson's storm petrel (Oceanites oceanicus)

Wilson's storm petrels are widely distributed, and nest in all suitable rocky areas within the Area. Approximately 1,000 nesting sites have been documented for Ardery Island. Odbert Island has 1,000 – 2,000 nesting sites, at a lower density than that of Ardery Island because of the general spread of suitable rock areas. Wilson's storm petrels breed in deep, narrow holes. As the nests can be extremely difficult to detect the population estimates are likely to be considerable under-estimates.

South polar skua (Catharacta maccormicki)

In 1984/85, ten pairs of south polar skua bred on Ardery Island, and another three more pairs may have held territories. A similar number was present in 1986/87, although only seven pairs produced eggs. Odbert Island had 10 - 20 pairs. The distribution of south polar skua nests on Ardery Island reflects their dependence on petrels. Most pairs have observation points close to petrel nests, from which they can observe their food territory on the bird cliffs. At Odbert Island, most nests were near the penguin colonies.

Nests are shallow hollows in gravel, either fully in the open on flat ground or slightly protected by surrounding rocks. Territories and nest locations appear to be stable from year to year; near a nest there are usually several depressions of previous nests. Egg laying dates vary considerably, though most are concentrated around late November to early December. The first chicks are observed in the last days of December, and juveniles begin to fly by mid February.

Non-breeding bird species

Emperor penguins (*Aptenodytes forsteri*) do not breed in the immediate Casey area but individual birds have been observed near Casey station and even far inland. A chinstrap penguin (*Pygoscelis antarctica*) was observed in January 1987 in the Adélie penguin colony on Whitney Point, north of Casey. Southern giant petrels, both adults and immatures, are regular visitors to Ardery Island. In favourable winds they fly along the bird cliffs in search of food. An emaciated juvenile blue petrel (*Halobaena caerulea)* arrived at Casey in March 1987. In November 1984, an adult Dominican gull (*Larus dominicanus*) was sighted in the Casey area. Groups of terns, possibly Arctic tern (*Sterna paradisea)*, were observed in the Casey area in 1984/ 85 and in 1986/87, when a few groups of up to 100 birds were seen and heard high in the air in March.

6(ii) Access to the Area

Travel to the Area may be by vehicle over sea ice, by boat or by aircraft, in accordance with section 7(ii) of this plan.

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

Four remotely operating time lapse cameras are located on Ardery Island and one on Odbert Island (locations 66°22'6.3"S, 110°26'42.9"E; 66°22'13.4"S, 110°27'46.2"E; 66°22'6.2"S, 110°26'56.3"E; 66°22'7.7"S, 110°26'57.7"E (Map B) and 66°22'37.8"S, 110°33'55.3"E (Map C)). Deployed in 2010/11, the cameras have been located for long term monitoring of **s**outhern Fulmar, Cape petrel and Adélie penguin breeding success and phenology with minimal disturbance**.** While the cameras are not permanent, they are expected to remain in place beyond the term of this plan.

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

The following Protected Areas are located in the vicinity of Ardery Island and Odbert Island (see Map A):

- North-east Bailey Peninsula (66°17'S, 110°32'E) (ASPA No 135) approximately 12 km north of Ardery Island and Odbert Island;
- Clark Peninsula (66°15'S, 110°36'E) (ASPA No 136), approximately 16 km north of Ardery Island and Odbert Island;
- Frazier Islands (66°13'S 110°11'E) (ASPA No 160), approximately 23 km north-east of Ardery Island and Odbert Island.

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

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

Vehicles and boats used to visit the islands must be left at the shoreline. Movement within the Area is by foot only.

Defined landing sites for access by sea and helicopter to Ardery Island and Odbert Island are shown on Map D. At Ardery Island, the preferred boat landing site is at Robertson Landing where there are three rock anchors to tie down a boat or other equipment. The boat landing site marked for Ardery Island on Map D is within 200 metres of seabird colonies. However, it represents the preferred safe landing site on the island. All landings must be undertaken carefully to avoid disturbance to the birds. There are no defined pedestrian routes within the Area, however, pedestrians should keep their distance from and avoid disturbance of the birds at all times.

If access to the islands is not possible by boat or by vehicle over sea ice, then fixed wing aircraft or helicopters may be used subject to the following conditions:

- disturbance of the colonies by aircraft shall be avoided at all times;
- sea ice landings shall be encouraged (where practicable);
- overflight of the islands should be avoided at all times, except where it is considered essential for scientific or management purposes as authorised in a permit. In these instances, overflight must be at a vertical or horizontal distance of no less than 930 metres (3050 feet) for single-engine aircraft and 1500 metres (5000 feet) for twin-engine aircraft;
- during the breeding season of penguins and petrels, defined here as the period from 1 November to 1 April, helicopter movement to the islands should be kept to the minimum;

- the use of twin-engine helicopters to land on Ardery Island or Odbert Island is prohibited;
- the single-engine helicopter approach to Ardery Island should be at a high altitude and from a southern direction as the lowest densities of birds are on the southern cliffs (see Maps B and D);
- the single-engine helicopter approach to Odbert Island should preferably be from the south, avoiding cliff areas because of the nesting petrels (see Maps C and D);
- single-engine helicopter landing sites marked on Map D are approximate and pilots shall ensure that disturbance of breeding colonies is avoided.
- only personnel who are required to carry out work in the Area should leave the helicopter;
- refuelling of aircraft is prohibited within the Area.

7(iii) **Activities which are, or may be conducted within the Area**

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

- compelling scientific research consistent with the Management Plan for the Area which cannot be undertaken elsewhere and will not jeopardise the values for which the Area has been designated or the ecosystems of the Area;
- essential management activities, including monitoring; and
- sampling, which should be the minimum required for approved research programs.

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

- No permanent structures are to be erected in the Area.
- Any structures erected or installed within the Area are to be specified in a permit.
- Scientific markers and equipment must be secured and maintained in good condition, clearly identifying the permitting country, name of principal investigator and year of installation. All such items should be made of materials that pose minimum risk of contamination of the Area.
- A condition of the permit shall be the removal of equipment associated with scientific research before the permit for that research expires. Details of markers and equipment temporarily left in situ (GPS locations, description, tags, etc. and expected removal date) shall be reported to the permitting Authority.
- When permitted, the installation of a field hut on Ardery Island must take place before 1 November when the breeding season commences, and removal after 1 April when fledglings have departed. Installation and removal should be supported by vehicle over sea ice unless sea ice conditions prevent this.

7(v) Location of field camps

- Camping is prohibited on Odbert Island except in emergency.
- If required for field work, a hut may be erected on Ardery Island at the point specified on Map D. There are eight solid rock anchors available at this location. There is a refuge hut “Robinson Ridge Hut”, on the mainland, located on Robinson Ridge (66°22.4’S 110°35.2’E), approximately 800 m west of Odbert Island (see Map A).

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

- 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 season for which they are required.
- Deliberate introduction of animals, plant material, micro-organisms and non-sterile soil into the Area is prohibited. The highest level precautions shall be taken to prevent the accidental introduction of animals, plant material, micro-organisms and non-sterile soil from other biologically distinct regions (within or beyond the Antarctic Treaty area) into the Area;

- To the maximum extent practicable, clothing, footwear and other equipment used or brought into the Area (including backpacks, carry-bags and other equipment) shall be thoroughly cleaned before entering and after leaving the Area.
- Boots and sampling/research equipment and markers that comes into contact with the ground shall be disinfected or cleaned with hot water and bleach before entering and after visiting the Area to help prevent accidental introductions of animals, plant material, micro-organisms and non-sterile soil into the Area. Cleaning should be undertaken either at the refuge hut or at station.
- Visitors should also consult and follow as appropriate recommendations contained in the Committee for Environmental Protection Non-native Species Manual (CEP 2011), and in the Environmental Code of Conduct for terrestrial scientific field research in Antarctica (SCAR 2009);
- No herbicides or pesticides shall be brought into the Area. Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes specified in a permit, shall be removed from the Area at or before the conclusion of the activity for which the permit was granted.
- Fuel is not to be stored in the Area unless required for essential purposes connected with the activity for which the permit has been granted. Permanent fuel depots are not permitted.
- All material introduced shall be for a stated period only, shall be removed at or before the conclusion of that stated period, and shall be stored and handled so as to minimise the risk of environmental impact.

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

- Taking of or harmful interference with native flora and fauna is prohibited, 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. Surveys shall have a high priority. If the capture of individuals is required, capture should occur at nests on the periphery of the Area if at all possible to reduce disturbance.

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

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

7(ix) Disposal of waste

- All wastes, including human wastes, shall be removed from the Area. Wastes from field parties shall be stored in such a manner to prevent scavenging by wildlife (e.g. skuas) until such time as the wastes can be disposed or removed. Wastes are to be removed no later than the departure of the field party. Human wastes and grey water may be disposed into the sea outside 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 biological monitoring and Area inspection activities, which may involve the collection of samples for analysis or review;
- erect or maintain scientific equipment, structures, and signposts; or
- carry out other protective measures.

Any specific sites of long-term monitoring shall be appropriately marked and a GPS position obtained for lodgement with the Antarctic Data Directory System through the appropriate National Authority.

To help maintain the ecological and scientific values of the Area, visitors shall take special precautions against introductions. Of particular concern are pathogenic, microbial or vegetation introductions sourced from soils, flora and fauna at other Antarctic sites, including research stations, or from regions outside Antarctica. To minimise the risk of introductions, before entering the Area, visitors shall thoroughly clean footwear and any equipment, particularly sampling equipment and markers to be used in the Area.

7(xi) Requirement for reports

The principal permit holder for each visit to the Area shall submit a report to the appropriate national authority as soon as practicable, and no later than six months after the visit has been completed. Such visit reports should include, as applicable, 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.

A copy of the report should be forwarded to the Party responsible for development of the Management Plan (Australia) to assist in management of the Area, and monitoring of bird populations. Additionally visit reports should 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 of the Area.

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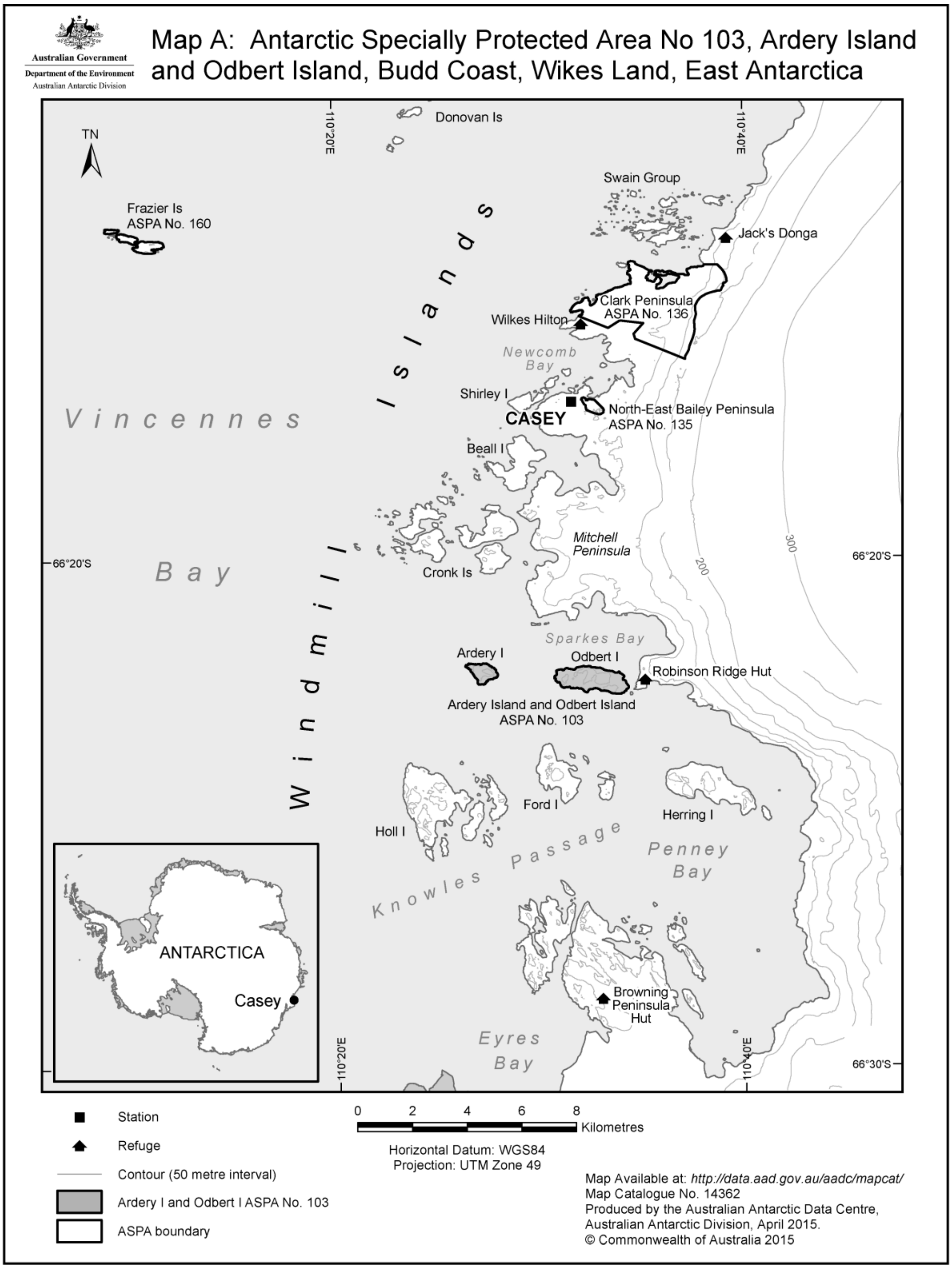
Australian Government
Department of the Environment
Australian Antarctic Division
Map A: Antarctic Specially Protected Area No 103, Ardery Island and Odbert Island, Budd Coast, Wikes Land, East Antarctica
TN
110°20'E
110°40'E
66°20'S
66°30'S
Donovan Is
Swain Group
Jack's Donga
Frazier Is
ASPA No. 160
Clark Peninsula
ASPA No. 136
Wilkes Hilton
Newcomb Bay
Shirley I
CASEY
North-East Bailey Peninsula
ASPA No. 135
Beall I
Vincennes Bay
Windmill Islands
Mitchell Peninsula
Cronk Is
200
300
Sparkes Bay
Ardery I
Odbert I
Robinson Ridge Hut
Ardery Island and Odbert Island
ASPA No. 103
Ford I
Herring I
Holl I
Knowles Passage
Penney Bay
ANTARCTICA
Casey
Browning Peninsula Hut
Eyres Bay
Station
Refuge
Contour (50 metre interval)
Ardery I and Odbert I ASPA No. 103
ASPA boundary
0 2 4 6 8
Kilometres
Horizontal Datum: WGS84
Projection: UTM Zone 49
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14362
Produced by the Australian Antarctic Data Centre,
Australian Antarctic Division, April 2015.
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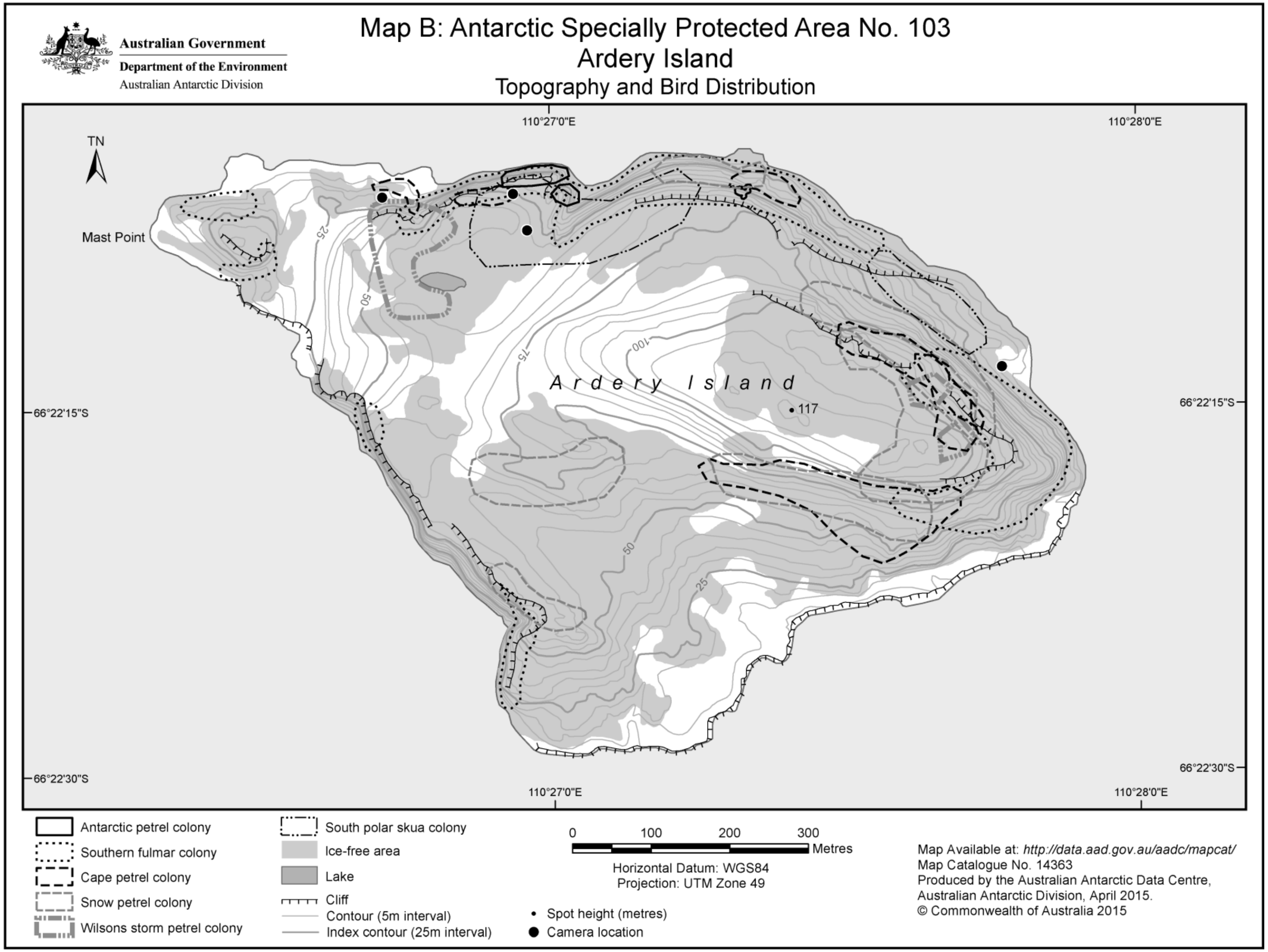
Australian Government
Department of the Environment
Australian Antarctic Division
Map B: Antarctic Specially Protected Area No. 103
Ardery Island
Topography and Bird Distribution
110°27'0"E
110°28'0"E
TN
Mast Point
Ardery Island
117
25
50
75
100
66°22'15"S
66°22'30"S
Antarctic petrel colony
Southern fulmar colony
Cape petrel colony
Snow petrel colony
Wilsons storm petrel colony
South polar skua colony
Ice-free area
Lake
Cliff
Contour (5m interval)
Index contour (25m interval)
0 100 200 300 Metres
Horizontal Datum: WGS84
Projection: UTM Zone 49
Spot height (metres)
Camera location
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14363
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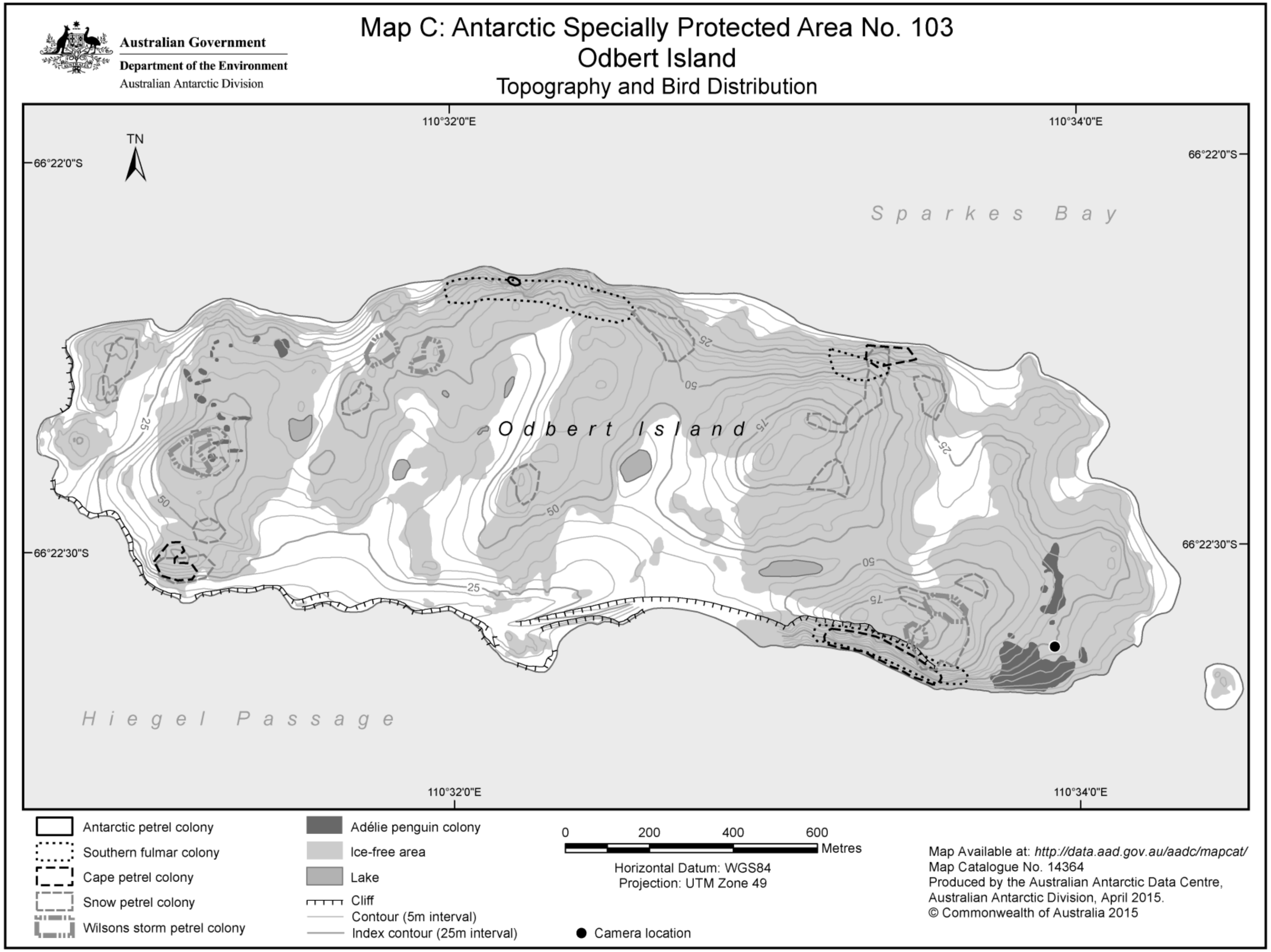

Australian Government
Department of the Environment
Australian Antarctic Division
Map C: Antarctic Specially Protected Area No. 103
Odbert Island
Topography and Bird Distribution
TN
110°32'0"E
110°34'0"E
66°22'0"S
66°22'30"S
Sparkes Bay
Odbert Island
Hiegel Passage
25
50
75
Antarctic petrel colony
Southern fulmar colony
Cape petrel colony
Snow petrel colony
Wilsons storm petrel colony
Adélie penguin colony
Ice-free area
Lake
Cliff
Contour (5m interval)
Index contour (25m interval)
0
200
400
600
Metres
Horizontal Datum: WGS84
Projection: UTM Zone 49
Camera location
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14364
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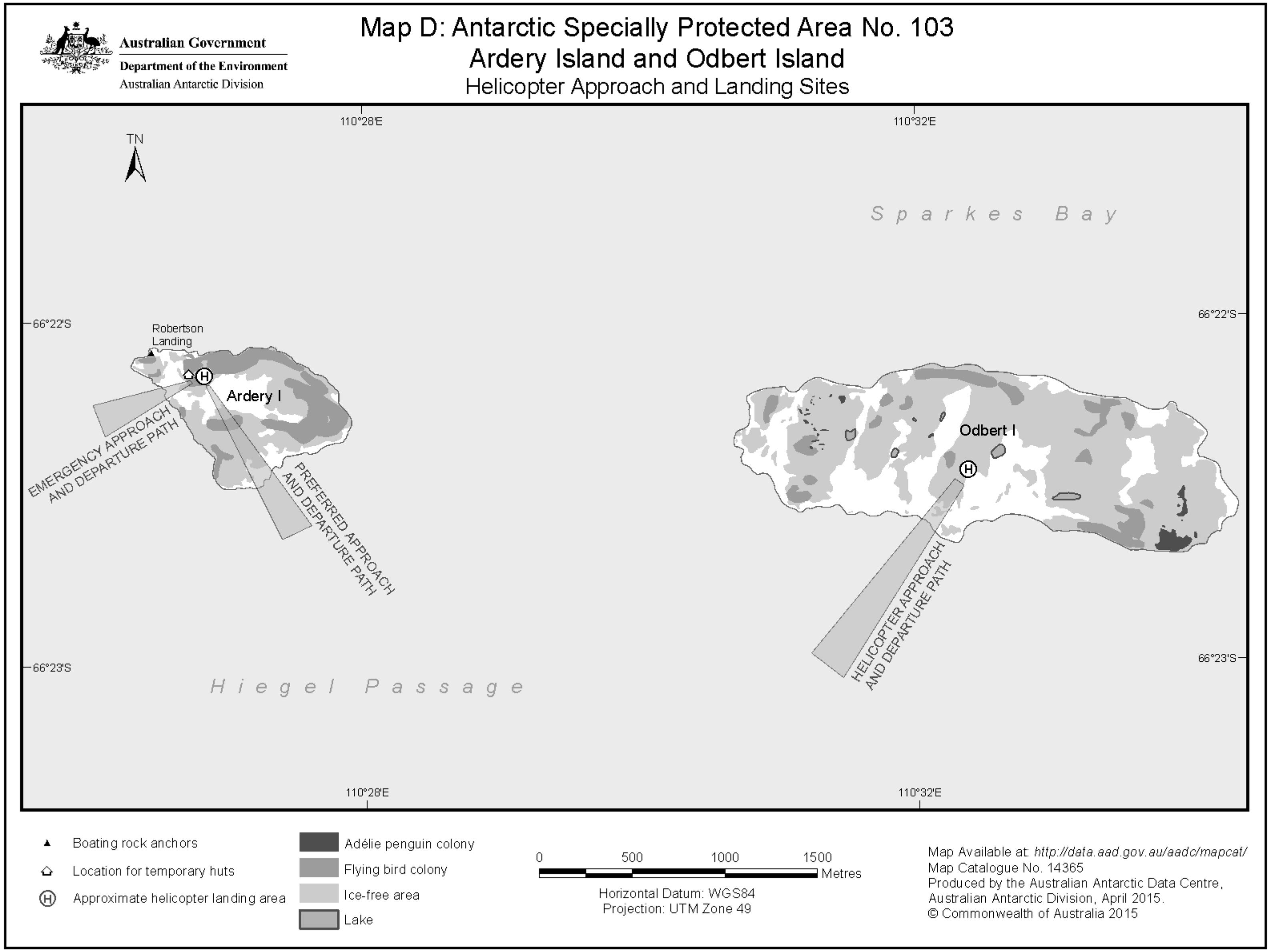
Australian Government
Department of the Environment
Australian Antarctic Division
Map D: Antarctic Specially Protected Area No. 103
Ardery Island and Odbert Island
Helicopter Approach and Landing Sites
110°28'E
110°32'E
TN
Sparkes Bay
66°22'S
Robertson Landing
Ardery I
EMERGENCY APPROACH AND DEPARTURE PATH
PREFERRED APPROACH AND DEPARTURE PATH
Odbert I
HELICOPTER APPROACH AND DEPARTURE PATH
66°23'S
Hiegel Passage
Boating rock anchors
Location for temporary huts
Approximate helicopter landing area
Adélie penguin colony
Flying bird colony
Ice-free area
Lake
0 500 1000 1500 Metres
Horizontal Datum: WGS84
Projection: UTM Zone 49
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14365
Produced by the Australian Antarctic Data Centre, Australian Antarctic Division, April 2015.
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Management Plan For
Antarctic Specially Protected Area No. 104
SABRINA ISLAND, BALLENY ISLANDS, ANTARCTICA

1. Description of values to be protected

Sabrina Island, in the Balleny Island archipelago, was originally designated as Specially Protected Area (SPA) No. 4 in Recommendation IV-4 (1966) on the grounds that “the Balleny Islands, as the most northerly Antarctic land in the Ross Sea region, supports a fauna and flora which reflects many circumpolar distributions at this latitude and that Sabrina Island in particular provides a representative sample of this fauna and flora.” The site was re-designated Antarctic Specially Protected Area (ASPA) No. 104 in Decision 1 (2002). A Management Plan was prepared and adopted in Measure 3 (2009) which included Sabrina Island, 'Chinstrap Islet' and The Monolith.

The primary reason for the designation of Sabrina Island as an Antarctic Specially Protected Area is to protect the outstanding ecological values, specifically the biological diversity which is unique for the Ross Sea region.

The Balleny Islands, discovered in February 1839 by John Balleny who was a British sealer, are located approximately 325 km north of the Pennell and Oates Coasts. They are composed of three main islands, Young, Buckle and Sturge Islands, and several smaller islets that form a northwest-southeast island archipelago about 160 kilometres between 66° 15'S to 67° 10'S and 162° 15'E and 164° 45'E (Map 1). The Balleny Islands are the only truly oceanic islands (rather than continental islands) on the Ross Sea side of Antarctica with the exception of Scott Island, which is approximately 505 kilometres northeast of Cape Adare. The archipelago is located within the main Antarctic Circumpolar Current. As such, they provide an important resting and breeding habitat for seabird and seal species and are significant in circumpolar distribution for a variety of species (see Tables 1 and 2, Appendix 1).

Sabrina Island, 'Chinstrap Islet' and The Monolith are located approximately 3 kilometres south south-east of Buckle Island. These islands are the only known breeding site for Chinstrap penguins (*Pygoscelis antarctica*) between Bouvetoya and Peter I Islands (a span of 264° longitude), with the majority of breeding pairs found on Sabrina Island. In addition, this population co-exists with a much larger Adelie penguin (*P. adeliae*) colony where normally the two species breeding ranges are completely separate – except where some colonies overlap near the tip of the Antarctic Peninsula on the South Shetland Islands, and further north on the South Orkney Islands.

Sabrina Island’s Adélie colony is of particular importance because it is the largest in the archipelago (and has the majority of the Chinstrap breeding pairs), and because the population is thought to be increasing. Being isolated and prone to difficult weather and ice conditions, the Balleny Islands have been subjected to very little human disturbance, with the exception of the Southern Ocean fisheries.

2. Aims and Objectives

Management of Sabrina Island aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance to the Area;

- prevent or minimise the introduction to the Area of alien plants, animals and microbes;
- preserve the natural ecosystem as a reference area largely undisturbed by direct human activities;
- avoid disturbance to the Chinstrap penguin colony, which is anomalous in terms of species distribution, by preventing unnecessary sampling;
- allow scientific research in the Area provided it is for compelling reasons which cannot be served elsewhere and which will not jeopardize the natural ecological system in the Area;
- allow visits for management purposes in support of the aims of the Management Plan.

3. Management activities

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

- Copies of this Management Plan shall be made available to vessels operating in the vicinity of the Area.
- National programs shall ensure the boundaries of the Area and the restrictions that apply within are marked on relevant maps and marine charts for which they are responsible.
- The Area shall be visited as necessary to assess whether it continues to serve the purposes for which it was designated and to ensure that management activities are adequate.

4. Period of Designation

Designated for an indefinite period.

5. Maps and photographs

Map 1- ASPA 104: Sabrina Island, Balleny Islands, Antarctica. Regional Map.
Datum: WGS84; Projection: Antarctica Polar Stereographic; Data Source Main Map and Inset: SCAR Antarctic Digital Database, Version 6, 2012.

Map 2 – ASPA 104: Sabrina Island, Balleny Islands, Antarctica. Boundary, Access and Features.
Datum: WGS84; Projection: UTM Zone 58 South; Data Source: Imagery from Digital Globe, WorldView – 1 Satellite, Acquired on 14 January, 2011, 50 cm resolution. Features captured by Land Information New Zealand.
Inset oblique photography obtained December 2014 by the Royal New Zealand Air Force (RNZAF).

6. Description of the Area

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

Location and general description:

The Balleny Islands are located around 325 km north of the Pennell and Oates Coasts (Map 1). The Islands are the exposed portion of a volcanic seamount chain. There are three main islands and a number of smaller islets and exposed rocks. Sabrina Island is located at 66°55 S, 163°19 E, three kilometres off the southern end of Buckle Island (the central of the main islands). It is less than 2 km across and reaches an estimated height of 180 m above sea level. A volcanic plug approximately 80 m high, named The Monolith, is attached to the southern end of Sabrina Island by a boulder spit. A small islet lies to the north east of Sabrina Island, commonly known as 'Chinstrap Islet'.

Boundaries:
The ASPA comprises all of Sabrina Island, The Monolith, and 'Chinstrap Islet' above sea level, at low tide (Map 2). The marine area is not included with the ASPA.

Natural Features:
Approximately a quarter of Sabrina Island is covered in permanent snow and ice, and an ice foot meets the sea at the northern end. A steep ridge runs across the island, with scoria slopes to the east and south. Sheer cliffs form the majority of the island’s coast except for a cobble beach in the south west.

The scoria slopes to the east of the central ridge on Sabrina Island are occupied by Adélie and Chinstrap penguin nests. The birds access their nesting sites via the beach to the south west of the island. Sabrina Island has the largest penguin colony of the Balleny Island penguin colonies with approximately 3,770 Adélie breeding pairs recorded in 2000; and 202 Chinstrap adults and 109 chicks in 2006. 'Chinstrap Islet' had 2,298 penguin breeding pairs in 2000, with approximately 10 Chinstrap pairs recorded on the Islet in 1965 and 1984.

Cape petrels (*Daption capense*) were seen nesting on Sabrina Island in 2006 and also on the southern side of The Monolith in 1965 (although this has not been confirmed by more recent expeditions). Individual Macaroni penguins (*Eudyptes chrysolophus*) have been sighted on Sabrina Island (1964, possible sighting 1973).

Various species of algae (including Myxopycophyta, Xanthophyceae (*Tribonema spp.)* and Chlorophycophyta (*Prasiola spp.)*) have been recorded on Sabrina Island. Chromogenic (bright yellow) bacteria, yeasts, 14 species of filamentous fungi, two species of thermophilous fungi (*Aspergillus fumigatus* and *Chaetomium gracile*), mites (*Stereotydeus mollis, Nanorchestes antarcticus, Coccorhgidia* spp.) and nematodes have also been reported. Rock encrusting lichens, mainly *Caloplaca* or *Xanthoria* species occur on top of the main ridge.

6(ii) Access to the Area

- The Area is difficult to access due to the steep cliffs and terrain of each island and ice conditions at different times of the year. There is no identified access route to 'Chinstrap Islet' but Sabrina Island and The Monolith are accessible by helicopter or small boat from the cobble beach on the south west side of Sabrina Island (Map 2).
- Access restrictions apply within the Area, the specific conditions for which are set out in Section 7(ii) below.

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

- There are no known existing structures on or adjacent to the Area.

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

- The nearest protected area to Sabrina Islands is ASPA 159: Cape Adare, Borchgrevink Coast located approximately 560 kilometres south east.

6(v) Special zones within the Area

- There are no special zones within the Area.

7. Terms and conditions for entry permits

7(i) General 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 for compelling scientific reasons which cannot be served elsewhere, or for reasons essential to the management of the Area;
- the actions permitted are in accordance with this Management Plan;
- the actions permitted will not jeopardize the natural ecological system or the environmental or scientific values of the Area;
- the Permit is issued for a finite period; and
- the Permit, or a copy, shall be carried within the Area.

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

- Access to Sabrina Island and The Monolith is by small boat or helicopter on the gravel beach below the scoria slopes of the south west side of Sabrina Island, 66° 55.166'S, 163° 18.599'E (Map 2).
- There is no identified preferred access route to 'Chinstrap Islet'.
- Helicopter overflight of the Area should be avoided, except for essential scientific or management purposes.
- 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).
- All movement within the Area should be on foot. Pedestrian traffic should be kept to the minimum necessary to undertake permitted activities and every reasonable effort should be made to minimise trampling effects.

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 and will not jeopardise the natural ecological system or the environmental or scientific values of the Area; and
- essential management activities, including monitoring and inspections.

7(iv) Installation, modification or removal of structures

- No new structures (i.e. signs or boundary markers) are to be erected within the Area, or scientific equipment installed, except for compelling scientific or management reasons and for pre-established periods, as specified in a Permit.
- All markers, structures or scientific equipment installed in the Area must be clearly identified by country, name of the principal investigator or agency, year of installation and date of expected removal.
- All such items should be free of organisms, propagules (e.g. seeds, eggs) and non-sterile soil, and be made of materials that can withstand the environmental conditions and pose minimal risk of contamination of the Area.

- Removal of specific structures or equipment for which the Permit has expired shall be the responsibility of the authority which granted the original Permit and shall be a condition of the Permit.

7(v) Location of field camps

Field camps may be established if necessary to support permitted scientific or management activity. The camp location should be selected to minimise disturbance to wildlife as much as possible and care should be taken to secure all equipment.

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

- The deliberate introduction of animals, plant material, 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, microorganisms and non-sterile soil from other biologically distinct region (within or beyond the Antarctic Treaty area).
- All sampling equipment, footwear, outer clothing, backpacks and other equipment used or brought into the Area shall be thoroughly cleaned before entering the Area. Scrubbing footwear in a disinfectant footbath before each landing is recommended.
- No poultry products, including food products containing uncooked dried eggs, shall be taken into the Area.
- No pesticides shall be brought into the Area. Any other chemicals, which may be introduced for compelling scientific, management or safety purposes specified in the Permit, shall be removed from the Area at or before the conclusion of the activity for which the Permit was granted.
- Fuel, 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. All such materials introduced are to be removed when no longer required. Permanent depots are not permitted.
- Spill response materials appropriate to the volume of fuels or other hazardous liquids taken into the Area should be carried. Any spills should be immediately cleaned up, provided the response has less environmental impact than the spill itself.

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 Annex II of 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 may be collected or removed from the Area only in accordance with a Permit and should be limited to the minimum necessary to meet scientific or management needs. Permits shall not be granted if there is reasonable concern that the sampling proposed would take, remove or damage such quantities of soil, sediment, microbiota, flora or fauna, that their distribution or abundance within the Area would be significantly affected.
- Material of human origin likely to compromise the values of the Areas, which was not brought into the Area by the Permit Holder or otherwise authorised, may be removed from the Area, unless the impact of removal is likely to be greater than leaving the material *in situ*; if this is the case the appropriate authority should be notified.

7(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 and Area inspection activities, which may involve the collection of a small number of samples or data for analysis or review;
- erect or maintain signposts, structures or scientific equipment;
- or for other management measures.

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, and no later than six months after the visit has been completed. Such visit reports should include, as applicable, the information identified in the recommended visit report form, contained in Appendix 2 of the Revised Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas appended to Resolution 2 (2011) available from the website of the Secretariat of the Antarctic Treaty (www.ats.aq).

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.

Data currently available for the Area is very limited. New Zealand, as the Party responsible for review of this Management Plan, would therefore appreciate copies of data and images which could assist future management of the Area.

8. Supporting documentation

Bradford-Grieve, Janet and Frenwick, Graham. November 2001. *A Review of the current knowledge describing the biodiversity of the Balleny Islands: Final Research Report for Ministry of Fisheries Research Projects ZBD2000/01 Objective 1 (in part).* NIWA, New Zealand.

de Lange W., Bell R. 1998. Tsunami risk from the southern flank: Balleny Islands earthquake. *Water and atmosphere*. 6(3), pp 13-15.

Macdonald, J.A., Barton, Kerry J., Metcalf, Peter. 2002. Chinstrap penguins (*Pygoscelis antarctica*) nesting on Sabrina Islet, Balleny Islands, Antarctica. *Polar Biology* 25:443-447

Robertson,CJR, Gilbert, JR, Erickson, AW. 1980. Birds and Seals of the Balleny Islands, Antarctica. *National Museum of New Zealand Reconds* 1(16).pp271-279

Sharp, Ben R. 2006. *Preliminary report from New Zealand research voyages to the Balleny Islands in the Ross Sea region, Antarctica, during January-March 2006.* Ministry of Fisheries, Wellington, New Zealand.

Smith, Franz. 2006. *Form 3: Format and Content of Voyage Reports: Balleny Islands Ecology Research Voyage.*

Varian, SJ. 2005. *A summary of the values of the Balleny Islands, Antarctica.* Ministry of Fisheries, Wellington, New Zealand.

Appendix 1

Table 1: Bird species recorded from the Balleny Islands

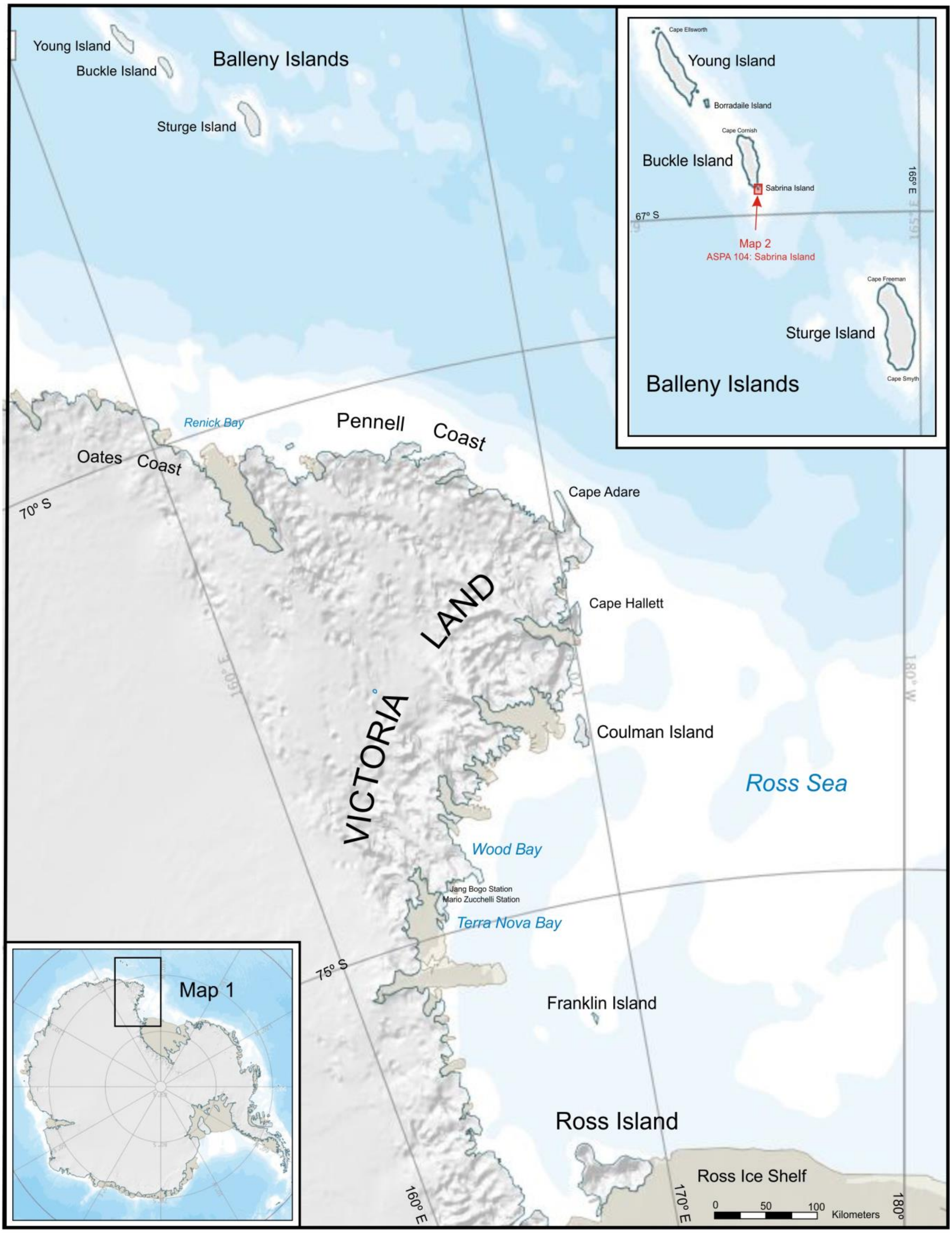
The table lists sightings recorded in expedition reports and scientific publications. Species indicated as breeding have been confirmed in recent expeditions (i.e. since 2000), those marked with S breed on Sabrina Island itself.

Common Name	Species	Breeding
Adélie penguin	*Pygoscelis adeliae*	✓ S
Antarctic fulmar	*Fulmarus glacialoides*	✓
Antarctic petrel	*Thalassoica antarctica*	✓
Antarctic prion	*Pachyptila desolata*	
Arctic tern	*Sterna paradisea*	
Black browed mollymawk	*Diomedea melanophrys*	
Cape pigeon	*Daption capense*	✓ S
Chinstrap penguin	*Pygoscelis antarctica*	✓ S
Grey-headed mollymawk	*Diomedea chrysostoma*	
Light-mantled sooty albatross	*Phoebetria palpebrata*	
Macaroni penguin	*Eudyptes chrysolphus*	
Snow petrel	*Pagodroma nivea*	✓
Sooty shearwater	*Puffinus griseus*	
Southern giant petrel	*Macronectes giganteus*	
South polar skua	*Catharacta maccormicki*	
Brown skua	*Catharacta antarctica subsp lonnbergi*	
Wandering albatross	*Diomedea exulans*	
White chinned petrel	*Procellaria aequinoctialis*	
Wilson's storm petrel	*Oceanites oceanicus*	

Table 2: Seal species recorded from the Balleny Islands

The table lists sightings recorded in expedition reports and scientific publications. Breeding has not been confirmed for any species.

Common Name	Species
Crabeater seal	*Lobodon carcinophagus*
Elephant seal	*Mirounga leonina*
Leopard seal	*Hydrurga leptonyx*
Weddell seal	*Leptyonychotes weddellii*



Map Information

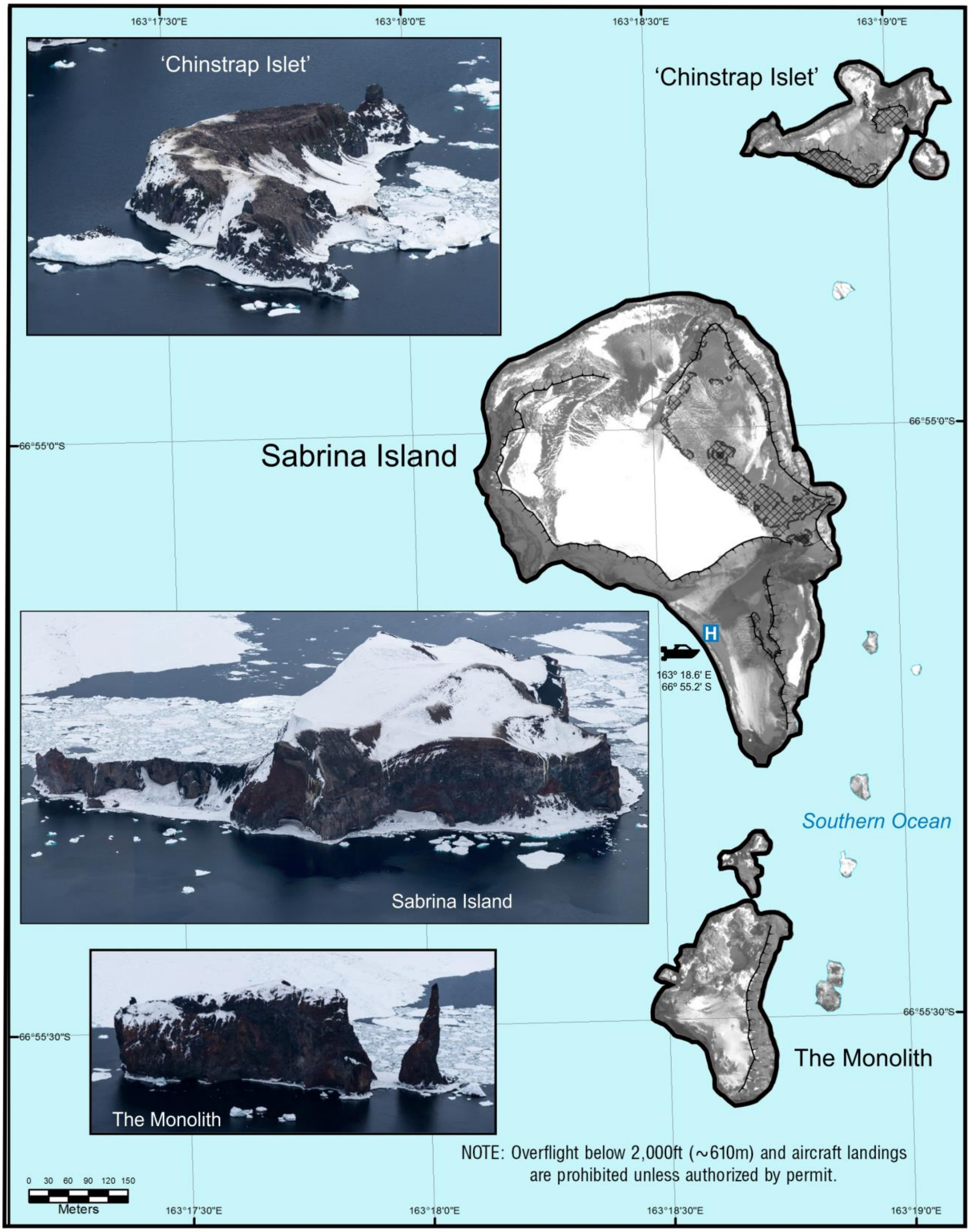
Source: SCAR Antarctic Digital Database
Version 6.0 Year 2012
Projection: Antarctic Polar Stereographic
Datum: WGS84

True north is coincident with the lines of longitude

Map 1 - ASPA 104: Sabrina Island

Balleny Islands, Antarctica.

Regional Map



Map Information
Projection: UTM Zone 58 Sth
Datum: WGS 84
True north is coincident with the lines of longitude

Data Source
Imagery: Digital Globe, WorldView-1 Satellite
Acquired on 14 January 2011, 50cm res
Features: Captured by Land Information New Zealand
Oblique Photography: Taken in Dec 2014 by RNZAF

Map 2 - ASPA 104: Sabrina Island
Balleny Islands, Antarctica.

Boundary, Access and Features

Legend
- Cliffs
- Adelie penguin colonies (extents approximate as at Dec 2000)
- Chinstrap penguin colonies (extents approximate as at Dec 2000)
- ASPA Boundary
- H Preferred Landing Site (helicopter & small boat)

Management Plan For
Antarctic Specially Protected Area No. 105
BEAUFORT ISLAND, McMURDO SOUND, ROSS SEA

1. Description of Values to be Protected

Beaufort Island was originally designated as Specially Protected Area No. 5 in Recommendation IV-5 (1966) on the grounds that it “contains substantial and varied avifauna, that it is one of the most important breeding grounds in the region, and that it should be protected to preserve the natural ecological system as a reference area.” The Area was re-designated by Decision 1 (2002) as Antarctic Specially Protected Area (ASPA) No. 105 and a revised Management Plan was adopted through Measure 2 (2003) and Measure 4 (2010). The Area is an island relatively untouched by human activity, set aside primarily to protect the ecological values of the site from human interference.

Beaufort Island is the northern most feature of the Ross Archipelago, lying approximately 30 kilometres north of Cape Bird, Ross Island. It is a portion of the rim of a volcanic cone, the remainder of which was eroded away and is now submerged to the east of the island. The island, and the remains of the submerged caldera, block the predominantly westward drift of pack ice and ice bergs calving from the nearby Ross Ice Shelf. Icebergs ground on these peaks which in turn facilitate fast ice growth. Beaufort Island is predominantly rock but portions are ice and snow covered. On the south west side of the island there is a broad ice-free shelf with raised beaches behind which summer ponds form, fed by small meltwater streams draining to the coast. Sloping ice fields (about 12° to 15°) cover much of the west and north side of the island but the ice has been receding in recent years. An extensive flat area of less than 50 m elevation is at the north end of the island, where the ice cap of the island drains to a boulder beach, fringing that portion of the shore. Near vertical cliffs compose the eastern side of the island facing the centre of the caldera.

The avifauna is the most varied in the southern Ross Sea. There exists a large Adélie penguin (*Pygoscelis adeliae*) colony on the broad shelf of the southwest side of the island, and a smaller newly formed subcolony, established in 1995, on the beach along the northwest coast. The dating of Adélie penguin remains goes back 45,000 years. A breeding colony of Emperor penguins (*Aptenodytes forsteri*) exists in variable locations on the fast ice to the north and east of the island where grounded icebergs facilitate fast ice establishment. There is acolony of South polar skua (*Catharacta maccormicki*) on both the north and south coasts and Snow petrels (*Pagodroma nivea*) have been seen nesting in cavities on the cliffs at the south of the island. The boundaries of the Area, which previously excluded the Emperor colony, have been extended to include the fast-ice that could potentially be occupied by breeding birds. Weddell seals (*Leptonychotes weddellii*) haul out and pup on the fast ice adjacent to the various grounded icebergs and Leopard seals (*Hydruga leptonyx*) and Ross sea killer whales (Type C) but also the form known as Type B, occur in the vicinity. The Ross sea killer whales are attracted by fish, and the Leopard seals and Type B killer whales are attracted by the penguins and seals. Crabeater seals (*Lobodon carcinophagus)*, Minke whales (*Balaenoptera acutorostrata*) and Arnoux’s beaked whales (*Berardius arnuxii*) have also been seen in the surrounding waters.

Beaufort Island is situated in Environment S – McMurdo South Victoria Land geologic based on the Environmental Domains Analysis for Antarctica (Resolution 3 (2008)) and in Region 9 – South Victoria Land based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)).

Other protected areas within Environment S includes ASPA 116, 121, 122, 123, 124, 131, 137, 138, 154, 155, 156, 157, 158, 161, 172 and 175 and ASMA 2.

Open water and pack ice around the island early in the summer season makes access difficult somost of the Area is known to have been visited only infrequently. Other than the penguins, Beaufort Island has not been comprehensively studied and is largely undisturbed by direct human activity. However, recent observations indicate that the snow and ice fields are receding. The ecological, scientific and aesthetic values derived from the isolation and relatively low levels of human impact are important reasons for special protection at Beaufort Island.

2. Aims and Objectives

The aim of the Management Plan is to provide protection for the Area and its features so that its values can be preserved. The objectives of the Management Plan are to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance to the Area;
- preserve the natural ecosystem as a reference area largely undisturbed by direct human activities;
- allow scientific research on the natural ecosystems, plant communities, avifauna, invertebrate communities and soils in the Area provided it is for compelling reasons which cannot be served elsewhere;
- minimise human disturbance to these communities by preventing unnecessary sampling;
- minimise the possibility of introduction of alien plants, animals and microbes to the Area;
- allow visits for management purposes in support of the aims of the Management Plan.

3. Management Activities

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

- Copies of this Management Plan (stating the special restrictions that apply), including maps of the Area, shall be made available at adjacent operational research/field stations.
- 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 necessary.
- Visits shall be made as necessary to assess whether the Area continues to serve the purposes for which it was designated and to ensure management and maintenance measures are adequate.
- National Antarctic Programmes operating in the region shall consult together with a view to ensuring these steps are carried out.

4. Period of Designation

Designated for an indefinite period.

5. Maps and Photographs

Map A: Beaufort Island topographic map. This map is derived from the orthophotograph used in Map B and C, using Map B and C specification. Inset: McMurdo Sound, showing Ross Island and the location of McMurdo Station (USA) and Scott Base (NZ).

Map B: Northern Beaufort Island orthophotograph. Orthophotograph specifications; Projection: Lambert Conformal Conic; Standard Parallel 1: 76.6°S; Standard Parallel 2: 79.3°S; Datum: WGS84; Includes material (c) METI and NASA 2006.

Map C: Southern Beaufort Island orthophotograph. Orthophotograph specifications as for Map B.

6. Description of the Area

6(i) Geographical coordinates, boundary markers and natural features
The designated Area encompasses the whole of Beaufort Island (76° 56'S, 166° 56'E) above the mean high water mark, and includes adjacent fast-ice occupied by breeding Emperor penguins (Map A). The coordinates include:

- From the northern coast of Beaufort Island at 76 ° 55' 44" S, 166° 52' 42" E north to 76° 55' 30" S, 166° 52' 49" E;
- From 76° 55' 30" S, 166° 52' 49" E east to 76° 55' 30" S, 167° 00' E;
- From 76° 55' 30" S, 167° 00' E south along the 167° longitude parallel to where it intersects with the coastline of Beaufort Island at 76° 55' 30"S, 167° E (Map A).

The island is part of the late Tertiary volcanic vents that developed in a series along a line of weakness in the Ross Sea floor. The island is the remains of a basaltic cone of about the Last Interglacial age, and is one portion of the caldera. More than three quarters of the cone now comprises a circular series of submerged peaks to the east of Beaufort Island. These submerged peaks, along with the island, block the predominant westward drift of pack ice and cause icebergs to ground here which in turn allows fast ice to establish in this area. It is upon this fast ice that the Emperor penguins breed. The location of the breeding colony varies with the fast ice distribution and therefore the protected area boundary has been extended to account for the location of the colony in any given season.

The geology of the island is typical of an eroded, sub-aerially produced basaltic complex, with lava flows and explosion breccias and tuffs evident. Many of the volcanic rocks have been intruded by a series of late stage basaltic dikes, and there is evidence of layered ash-fall tuffs and welded spatter flows from local subsidiary cinder and spatter cones. The island is roughly 7 km long and 3.2 km wide rising to a highest point of 771 m at Paton Peak. The west and northwest side of the island is predominantly an ice field with ice cliffs along the northwest edge of about 20 m on the coast, while the east and south sides of the island are largely ice-free, with almost vertical, inaccessible cliffs rising straight from the sea. On the south west shore is Cadwalader Beach which comprises a beach foreland and cuspate spit, backed by steep basaltic cliffs and several talus cones. A series of beach ridges, which are generally occupied by the breeding Adélie penguins, have trapped meltwater ponds and mark the growth of the beach face away from the cliffs with time and isostatic uplift. A series of raised beaches is evident at the northern side of the island, some with evidence (quills and guano) of former and apparently substantial penguin occupation (to 45,000 years). Sub-tidal (abrasion) platforms and massive boulders are found below the highly weathered southern cliffs. The eastern cliffs descend directly into the sea. Beaufort Island is relatively inaccessible by sea, except on the south and north shores, due to the steep cliff nature of the island and owing to the submerged peaks and grounded icebergs. Shipping, therefore, gives the island a wide berth. In view of the isolation of Beaufort Island and the current low levels of shipping activity in the region, boundary markers and signs have not been installed to mark the Area. The need for marking should be re-evaluated at each Management Plan review.

There is one main Adélie penguin colony and one newly formed subcolony on Beaufort Island. The main colony of 70,468 breeding pairs (2013/14) occupies the flat area at Cadwalader Beach (Map A and C). Between 1981 and 2000 there was a general decreasing trend in the number of breeding pairs at the main colony, then an increasing trend from 2001-2012. The 2013/14 count is the highest number of breeding pairs recorded at this site since counts began in 1981 and is nearly twice the 30 years average (39,391 breeding pairs) for this site (Lyver et al., 2014). In 1995 a sub-colony established at the west end of the ice-free beach on the northern coast (76° 55' S, 166° 52'E) comprising 2 pairs with 3 chicks and approximately 10-15 non breeders. The sub-colony has continued to grow with 525 breeding pairs in the 2005-06 breeding season,677 breeding pairs in the 2008-09 season and 989 breeding pairs in the 2013/14 season. Since 1996, scientists from the USA and NZ programmes have been banding a sample of 400 near-to-fledging Adélie penguin chicks at the Cadwalader Beach area. A few hundred banded adults, survivors of their juvenile years, now reside in the colony. Penguins banded at Cape Royds, Cape Bird and Cape Crozier have been sighted especially at the sub-colony on the north beach. Beaufort Island not long ago provided many emigrants to Ross Island colonies, but with recession of the ice fields and increased availability of nesting space, this is no longer the case. Above the beach, a raised ice-cored moraine terrace (5–20 m elevation, ranging from 2-3 metres wide over most of its length but broadening to 50 metres at its eastern end) extends for 550 m before rising more steeply toward the unstable basaltic cliffs which persist around the entire eastern side of the island. At least three sub-fossil penguin colony deposits have been identified within the moraine terrace, each layer vertically separated by around 50–100 cm of gravels and sand, suggesting this part of the island had been occupied by a sizable breeding penguin colony.

South polar skuas nest (roughly 150 pairs, but not specifically known) on the steep talus accumulating below the cliffs that rise behind the Adélie penguin colony at Cadwalader beach. Another population of approximately 50 pairs of skuas (1995 count) breed on the terrace and ice-free slopes on the northern shore. The proportion of breeders to non-breeders in this population is not known, but approximately 25 and 50 chicks were counted in January 1995 and 1997 respectively. Several snow petrels have also been seen in the cliffs above the Adélie colony at Cadwalader Beach.

On the fast-ice extending out from the northern and eastern coasts of Beaufort Island, a small colony of Emperor penguins (live chick counts from 1962 to 2012 range from 131 to 2,038 individuals; aerial photo of adult abundance was 812 in 2012) is present annually between the months of approximately April to January. Chick counts minimally represent the number of breeding pairs. Chick counts at Beaufort Island declined between 2000 and 2004 when the giant iceberg B15A collided with the north-west tongue of the Ross Ice Shelf at Cape Crozier, Ross Island (Kooyman et al., 2007).

Between 2000 and 2012 chick and adult counts have been variable. The size of the colony is limited by the areal extent and condition of the fast-ice, which affects the availability of breeding sites in the lee of the northern slopes of Beaufort Island. The precise location of the colony varies from year to year and the colony moves within a breeding season, but the general area of occupation is on the fast ice at the foot of the cliffs off the north-eastern corner of the island, indicated on Map A and B. A higher coefficient of variation in chick abundance found at this small colony suggests that it occupies a marginal habitat and may be susceptible to environmental change.

The ice-cored moraine terrace above the beach on the north end of the island (Map A and B) supports the growth of vegetation. Little can grow in the thick guano covering the Cadwalader beach area and all other areas of the island are either cliffs or ice covered. An area of vegetation, 50 meters wide and 5-7 meters above the beach on the north of the island, was described from site visits in January 1995 and 1997, consisting of an extensive (approximately 2.5 ha), continuous area of a single moss species *Bryum argenteum*. A second species of moss, *Hennediella heimii,* is also found among the *B.argenteum*. The moss community is known to support significant populations of mites (Acari) and springtails (Collembola). Although a detailed survey of invertebrates has not been conducted, *Gomphiocephalus hodgsoni* (Collembola) and *Stereotydeus mollis* (Acari) were found to be very abundant in moss samples taken from Beaufort Island. Recent genetic analysis of these populations has found unique genetic mitochondrial DNA haplotypes at Beaufort Island not found in other invertebrate populations in the Ross Sea region.

A diverse community of algae, also prolific on the south-shore shelf, is found at this site and while a detailed algal survey has not yet been undertaken, several species of algae have been found including the red snow algae *Chlamydomonas sp*., *Chloromonas sp*., and *Chlamydomonas nivalis*, representing one of the most southerly locations where red snow algae have been observed and *Prasiola crispa* is particularly abundant at the north beach site. A number of unicellular chlorophytes and xanthophytes (including *Botrydiopsis* and *Pseudococcomyxa* species) and cyanobacteria (particularly scillatorians) were found mixed with *P. crispa*. Green snow algae, noticeable as a green band at the lower levels of snow banks above the beach and below the ice cliffs, contained a mixture of *Chloromonas* and *Klebsormidium* species.

6(ii) Restricted zones within the Area
None.

6(iii) Structures within and near the Area
The only structure known to exist on the island is a signpost on a prominent rock in the Adélie penguin colony at Cadwalader Beach (Map A and C). The sign, erected in 1959–60, bears the names and home towns of the seamen and the Captain of the HMNZS *Endeavour.* The sign is set in concrete and was in good condition in November 2008. The sign is of potential historic value and should remain *in situ* unless there are compelling reasons for its removal, which should be kept under review.

An astronomical survey station is recorded on a map of the island compiled in 1960, but it is unknown whether any associated permanent marker exists. The station is recorded as located at the south end of the main island ridge-line divide at an altitude of 549 m (Map C).

6(iv) Location of other protected areas within close proximity of the Area
The nearest protected area to Beaufort Island is New College Valley, Caughley Beach, Cape Bird (ASPA 116) located approximately 30 km to the south at Cape Bird, Ross Island. Cape Royds and Backdoor Bay (ASPAs 121 and 157) are a further 35 km to the south on Ross Island. Cape Crozier (ASPA 124) is about 40 km to the east. (Refer to the inset: Map A).

7. Terms and Conditions for Entry Permits

Entry into the Area is prohibited except in accordance with a Permit issued by appropriate national authorities. Conditions for issuing a Permit to enter the Area include:

- it is issued only for essential management purposes or compelling scientific reasons that cannot be served elsewhere;
- the actions permitted will not jeopardise the ecological or scientific values of the Area;
- any management activities are in support of the aims of the Management Plan;
- the actions permitted are in accordance with the Management Plan;
- the Permit, or an authorized copy, shall be carried within the Area;
- a visit report shall be supplied to the authority named in the Permit;
- Permits shall be issued for a stated period.

7(i) Access to and movement within the Area
Land vehicles are prohibited within the Area and access shall be by small boat or by aircraft. Aircraft should land on the island only at the designated site (166° 52' 31" E, 76° 55' 49" S: Maps A and B) on the large flat toe of ice on the north end of the island. Should snow conditions at the designated landing site at the time of visit militate against a safe aircraft landing, a suitable mid- to late-season alternative to the designated landing site may be found at the nominated northern camp site at the western end of the northern beach on Beaufort Island. It is preferred that aircraft approach and depart from the designated landing site from the south or west (Map A). When it is found necessary to use the alternative site at the northern beach campsite, practical considerations may dictate a northern approach. When this is the case, aircraft shall avoid over flight of the area east of this site indicated on Maps Aand B. Use of smoke grenades when landing within the Area is prohibited unless absolutely necessary for safety and all grenades should be retrieved. There are no special restrictions on where access can be gained to the island by small boat. Pilots, air or boat crew, or other people on aircraft or boats, are prohibited from moving on foot beyond the immediate vicinity of the landing site unless specifically authorised by a Permit.

Over flight of bird breeding areas lower than 750 m (or 2500 ft) is normally prohibited. The areas where these special restrictions apply are shown on Maps A and B. When required for essential scientific or management purposes (e.g. aerial photography to assess colony size), transient over flights down to a minimum altitude of 300 m (1000 ft) may be allowed over these areas. Conduct of such over flights must be specifically authorised by a Permit.

Visitors should avoid unnecessary disturbance to birds, or walking on visible vegetation. Pedestrian traffic should be kept to the minimum consistent with the objectives of any permitted activities and every reasonable effort should be made to minimise effects.

7(ii) Activities that are or may be conducted in the Area, including restrictions on time or place
- Scientific research that will not jeopardise the ecosystem of the Area and which cannot be served elsewhere;
- Essential management activities, including monitoring.

7(iii) Installation, modification or removal of structures
No scientific equipment or structures are to be erected within the Area except as specified in a Permit. All markers, structures or scientific equipment installed in the Area must be approved by Permit and clearly identified by country, name of the principal investigator and year of installation. All such items should be made of materials that pose minimal risk of contamination of the Area. Removal of specific equipment for which the Permit has expired shall be a condition of the Permit.

7(iv) Location of field camps
Camping is permitted only at two designated sites (Maps A–C). The north camping site is located on the flat area north of the designated landing site, on a more sheltered location at the NW end of the

beach, 200 m from where several pair of Adélie penguins and skuas nest (if present). The second site is located 100 m from the northern edge of the large Adélie penguin colony at Cadwalader Beach.

7(v) Restrictions on materials and organisms which can be brought into the Area
No living animals, plant material or microorganisms shall be deliberately introduced into the Area and the precautions listed in 7(ix) below shall be taken against accidental introductions. No herbicides or pesticides shall be brought into the Area. Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes specified in the Permit, shall be removed from the Area at or before the conclusion of the activity for which the Permit was granted. Fuel is not to be stored in the Area, unless required for essential purposes connected with the activity for which the Permit has been granted. All materials introduced shall be for a stated period only, shall be removed at or before the conclusion of that stated period, and shall be stored and handled so that risk of their introduction into the environment is minimised.

7(vi) Taking or harmful interference with native flora or fauna
Taking or interfering with native flora or fauna is prohibited, except in accordance with a separate Permit issued under Article 3 of Annex II by the appropriate national authority specifically for that purpose. Where animal taking or harmful interference 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(vii) Collection or removal of anything not brought into the Area by the Permit holder
Material may be collected or removed from the Area only in accordance with a Permit and should be limited to the minimum necessary to meet scientific or management needs. 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 removal is likely to be greater than leaving the material *in situ*. If this is the case the appropriate authority should be notified.

7(viii) Disposal of waste
All wastes, including all human wastes, shall be removed from the Area.

7(ix) Measures that are necessary to ensure that the aims and objectives of the Management Plan can continue to be met
Permits may be granted to enter the Area to carry out biological monitoring and site inspection activities, which may involve the collection of small samples for analysis or review, or for protective measures.

Any specific sites of long-term monitoring shall be appropriately marked.

To help maintain the ecological and scientific values of the isolation and historically low level of human impact at Beaufort Island visitors shall take special precautions against introductions. Of particular concern are microbial or vegetation introductions sourced from soils at other Antarctic sites, including stations, or from regions outside Antarctica. Visitors shall take the following measures to minimise the risk of introductions:

a) Any sampling equipment or markers brought into the Area shall be sterilised and, to the maximum extent practicable, maintained in a sterile condition before being used within the Area. To the maximum extent practicable, footwear and other equipment used or brought into the Area (including backpacks, carry-bags, tent pegs, tarps and any other camping equipment) shall be thoroughly cleaned or sterilised and maintained in this condition before entering the Area;

b) Sterilisation should be by an acceptable method, such as by UV light, autoclave or by washing exposed surfaces in 70% ethanol solution in water.

7(x) Requirements for reports

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

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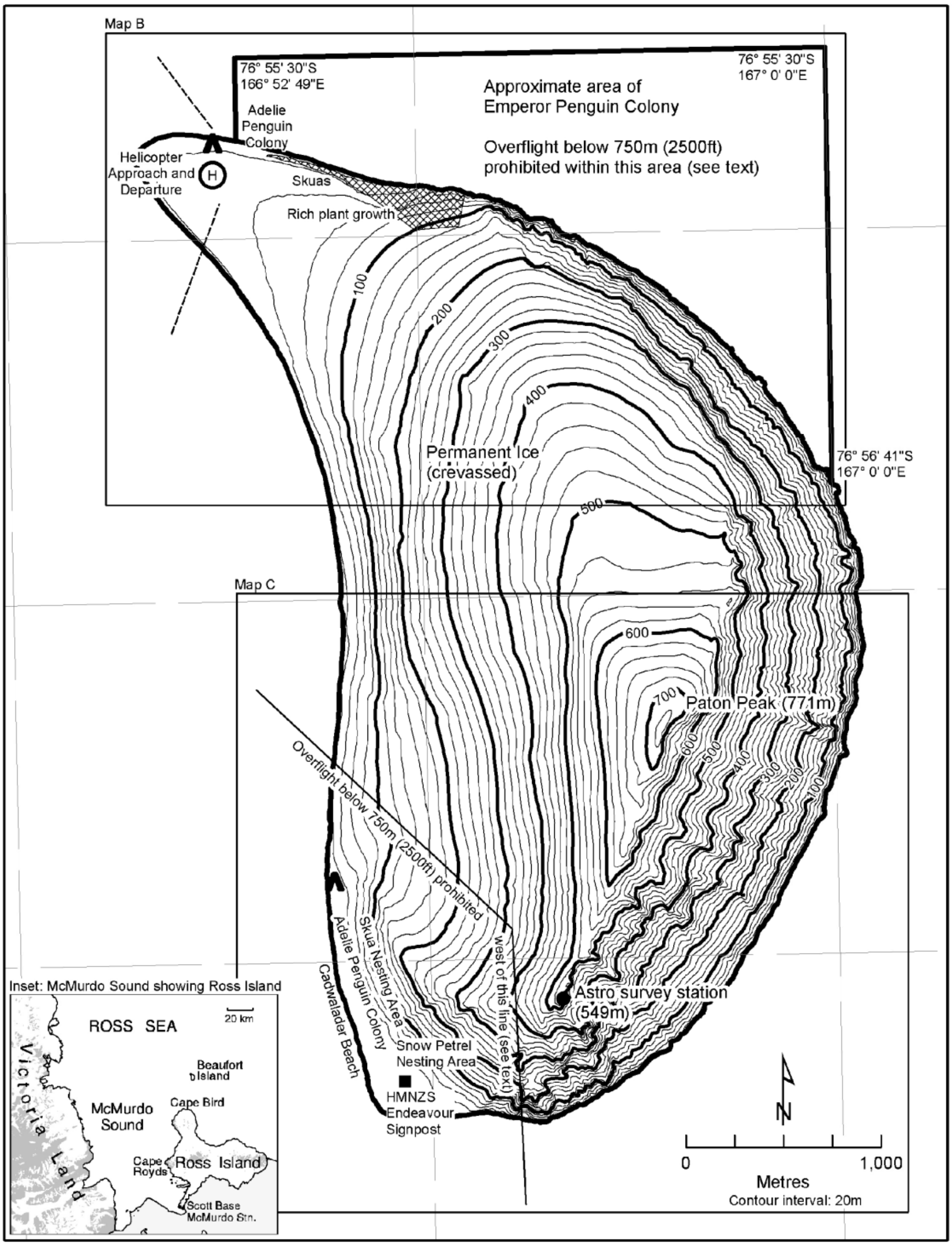
Map A - Beaufort Island, Antarctic Specially Protected Area 105: Topographic map



Rich plant growth

Protected area boundary (includes fast ice occupied by breeding Emperor penguins)

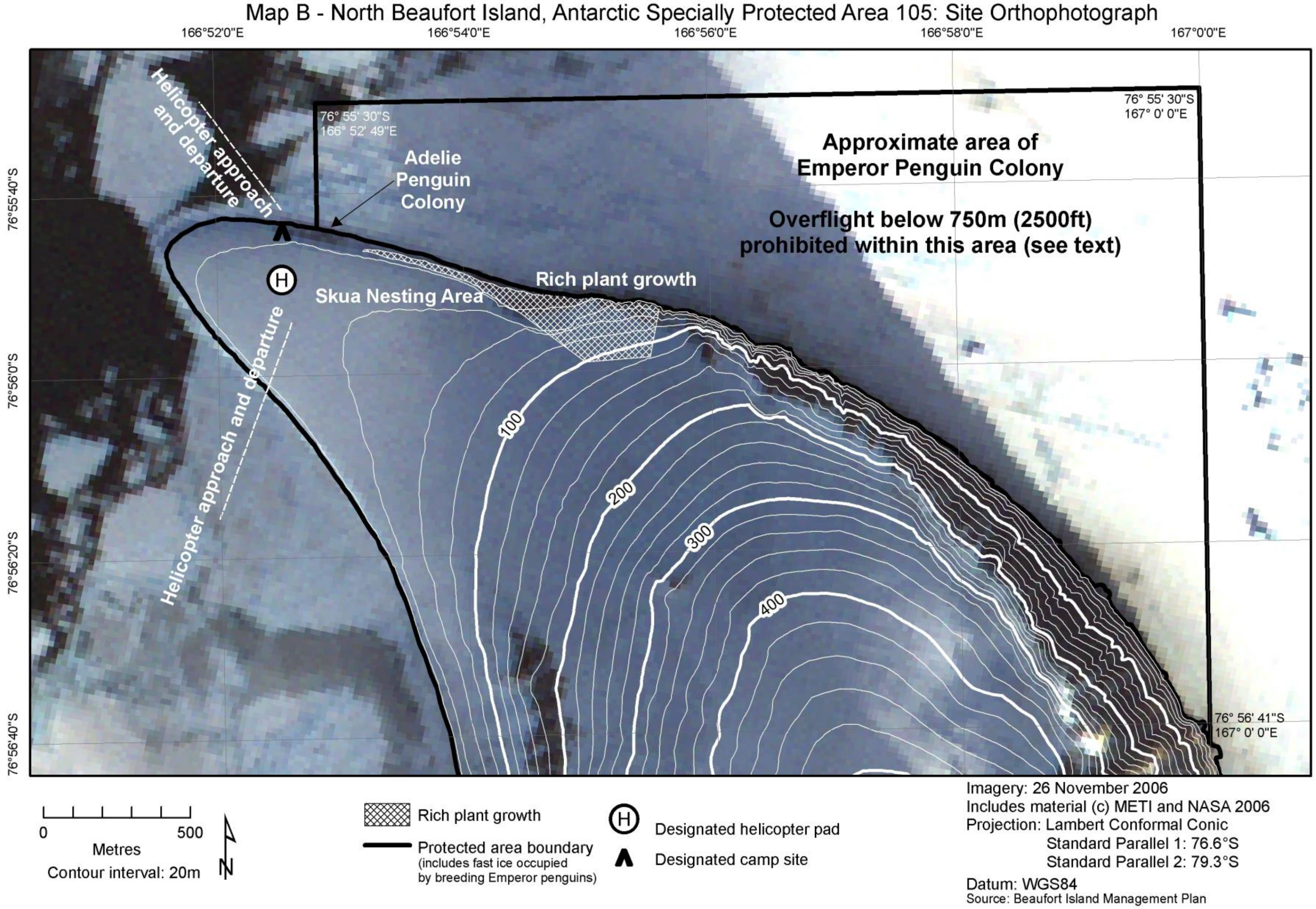
Designated helicopter pad

Designated camp site

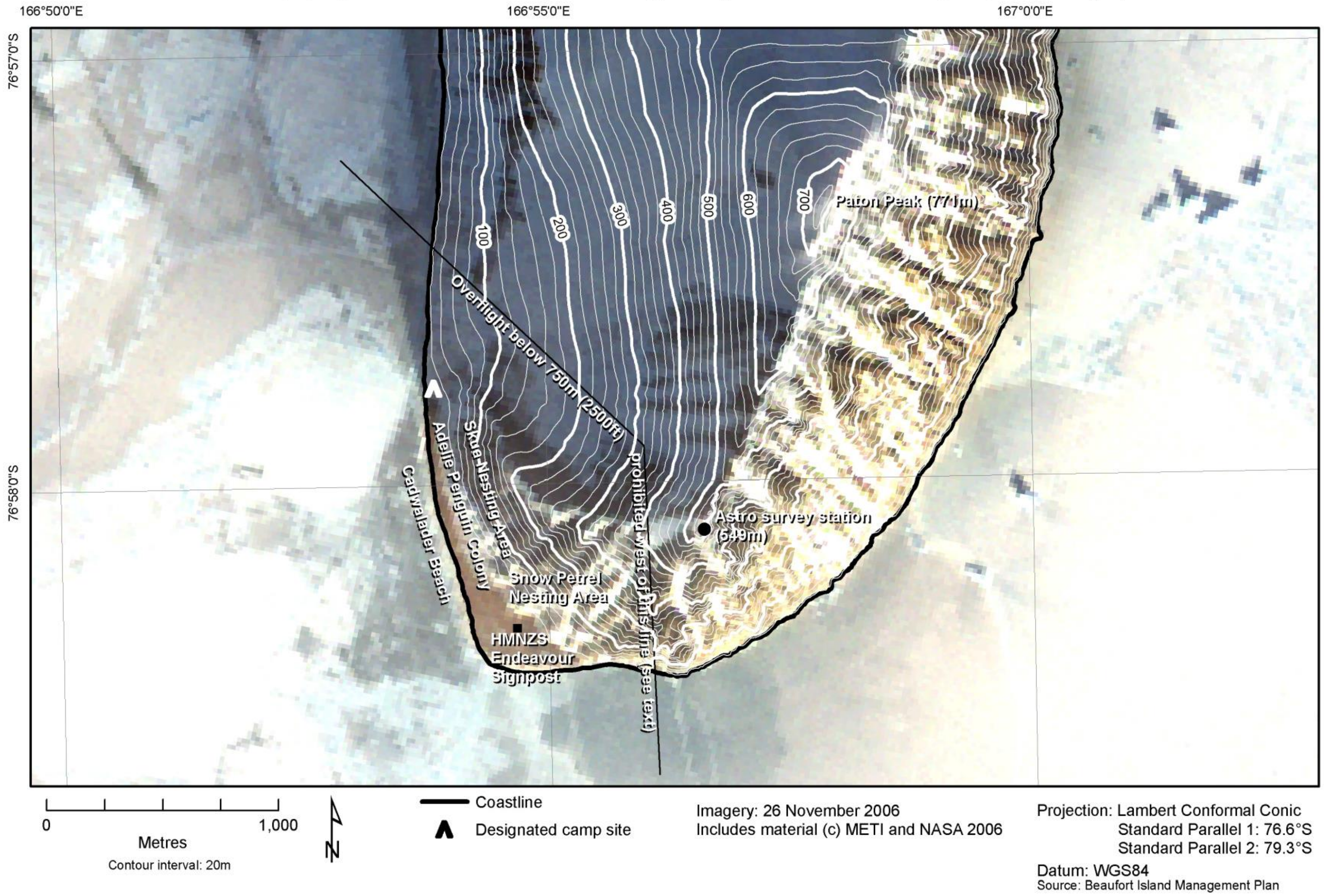
Projection: Lambert Conformal Conic
Standard Parallel 1: 76.6°S
Standard Parallel 2: 79.3°S

Datum: WGS84

Source: Beaufort Island Management Plan


Map B - North Beaufort Island, Antarctic Specially Protected Area 105: Site Orthophotograph
166°52'0"E
166°54'0"E
166°56'0"E
166°58'0"E
167°0'0"E
76°55'40"S
76°56'0"S
76°56'20"S
76°56'40"S
76° 55' 30"S
166° 52' 49"E
76° 55' 30"S
167° 0' 0"E
76° 56' 41"S
167° 0' 0"E
Helicopter approach and departure
Helicopter approach and departure
Adelie Penguin Colony
Approximate area of Emperor Penguin Colony
Overflight below 750m (2500ft) prohibited within this area (see text)
Skua Nesting Area
Rich plant growth
100
200
300
400
0
500
Metres
Contour interval: 20m
N
Rich plant growth
Protected area boundary
(includes fast ice occupied by breeding Emperor penguins)
Designated helicopter pad
Designated camp site
Imagery: 26 November 2006
Includes material (c) METI and NASA 2006
Projection: Lambert Conformal Conic
Standard Parallel 1: 76.6°S
Standard Parallel 2: 79.3°S
Datum: WGS84
Source: Beaufort Island Management Plan

Map C - South Beaufort Island, Antarctic Specially Protected Area 105: Site Orthophotograph



Management Plan for Antarctic Specially Protected Area (ASPA) No. 106 CAPE HALLETT, NORTHERN VICTORIA LAND, ROSS SEA (170° 14' E, 72° 19' S)

Introduction

The Cape Hallett Antarctic Specially Protected Area is situated at the northern extremity of the Hallett Peninsula, northern Victoria Land at 170°13'25" E, 72°19'11" S. Approximate area: 0.53 km^2. The primary reason for designation of the Area is that it provides an outstanding example of biological diversity, in particular a rich and diverse terrestrial ecosystem. It includes a small area of particularly rich vegetation that represents a valuable scientific resource for monitoring of vegetation change in Antarctica. The Area contains the most diverse arthropod community known in the Ross Sea region, which is of scientific interest. Furthermore, the Area contains a substantial Adélie penguin (*Pygoscelis adeliae*) breeding colony comprising around 64 000 pairs in 2009-10, which is recolonizing the site of the former Hallett Station (NZ / US) and is therefore of particular scientific interest. Cape Hallett is the only protected area in northern Victoria Land designated on the grounds of its terrestrial ecosystem or which includes a substantial bird colony, providing an important representation of the ecosystem in this region of Antarctica. The Area was proposed by the United States of America and adopted through Recommendation IV-7 [1966, Specially Protected Area (SPA) No. 7]; boundaries were extended by Recommendation XIII-13 (1985); the Area was renamed and renumbered through Decision 1 (2002), and the boundaries were further extended through Measure 1 (2002) to include the Adélie penguin colony, increasing the size of the Area to 75 ha. A further adjustment of the boundary was made through Measure 5 (2010) to delete the Managed Zone and replace this with two sites outside of the protected area, to be managed by Antarctic Treaty Site Guidelines for Visitors. One of the sites identified for visitor access is on the northern / NW coast of Seabee Hook and the second is on the SE coast. An additional revision was made to the eastern boundary, making the size of the Area 53 ha. The boundaries of the Area have not been changed in the current management plan.

ASPA No.106 was not classified under the Environmental Domains Analysis for Antarctica (EDA v.2.0) (Resolution 3 (2008)), although subsequent analysis has confirmed that the Area lies within 'Environment U – North Victoria Land Geologic'. Under the Antarctic Conservation Biogeographic Regions classification (Resolution 6 (2012)) the Area lies within ACBR8 – North Victoria Land.

1. Description of values to be protected

An area of approximately 12 ha at Cape Hallett was originally designated in Recommendation IV-7 (1966, SPA No. 7) after a proposal by the United States of America on the grounds that the Area provided an outstanding example of biological diversity, containing "a small patch of particularly rich and diverse vegetation which supports a variety of terrestrial fauna". The proposal gave special mention to the rich avifauna in the Area, which was noted as being of "outstanding scientific interest". The boundaries of the Area were enlarged in Recommendation XIII-13 (1985) to include extensive stands of vegetation to the south and north of the Area, increasing the Area to approximately 32 ha. The boundaries were further extended in Measure 1 (2002) to include scientific values related to the Adélie penguin (*Pygoscelis adeliae*) colony on Seabee Hook, increasing the size of the Area to 75 ha. Boundary and zoning revisions through Measure 5 (2010) reduced the size of the Area to 53 ha.

The eastern part of the Area contains a variety of habitats with plant communities that are considered important as they include most extensive, representative, and outstanding examples known near the northern extremity of the latitudinal gradient of Victoria Land and the Ross Sea. Vegetation surveys have recorded five species of moss in the Area, dominated by *Bryum subrotundifolium*, and 27 species of lichen. Although few algal species have been identified numerous species are expected to be present. The terrestrial habitats have been extensively studied, most recently as part of the international Latitudinal Gradient Project (LGP) (Italy, New Zealand, and United States). A vegetation plot in the eastern part of the Area is particularly valuable as a scientific resource for monitoring vegetation change in Antarctica, and this is designated a Restricted Zone. This site was first surveyed in detail in 1961-62 and provides a valuable baseline against which vegetation changes can be measured at a fine scale.

Detailed information on the distribution and abundance of arthropod species in the Area is available, which also represents a valuable scientific resource. In terms of species richness, Cape Hallett represents the most diverse arthropod community known in the Ross Sea region, with eight species of mites (Acari) and three of springtails (Collembola) identified within the Area. Of these, two (*Coccorhagidia gressitti* and *Eupodes wisei*) have their type localities at Cape Hallett.

A large number of markers were placed during early scientific studies conducted within the Area to mark sites of plant and bird studies. Many of these markers remain *in situ* and now represent a highly valuable resource for scientific studies that may wish to make repeat measurements.

Hallett Station was established by New Zealand and the United States on Seabee Hook in 1956 as part of the International Geophysical Year (IGY), and operated continuously until it closed in 1973. Although all structures have been removed, the site continues to possess enduring historic and heritage values relating to its former human use. In recognition of these values, many of the structures and artefacts from the former station are now held at the Canterbury Museum, Christchurch. In 2015, the only known remaining item of potential historical value and /or scientific value is the well-preserved body of a husky that died in 1964, which is contained in an enclosed wooden box located in the eastern part of the Area.

Adélie penguins have started to recolonize the site where the station was previously located. The history of human impact on the Adélie penguin colony and the subsequent station closure, together with the availability of reliable and repetitive historical data on Adélie population changes, make this site unique and ideal for scientific study of impacts on, and recovery of, the colony following substantial ecosystem disturbance. As such, the site has high scientific value, and in order to maintain this value it is desirable that any further human presence be carefully controlled and monitored.

In addition to the ecological and scientific values described, the Area possesses outstanding aesthetic values, with its combination of prolific biological resources and the impressive surrounding scenery of Edisto Inlet and Mt. Herschel (3335 m). Seabee Hook is one of only a few such sites that are relatively accessible in the northern Ross Sea. The site also has high educational value as an example of a station that was decommissioned and removed, with the site now showing evidence of recovery.

2. Aims and objectives

Management at Cape Hallett 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, in particular on terrestrial and seabird ecology and on environmental recovery, while preventing unnecessary sampling and human disturbance in the Area;
- allow other scientific research provided it will not jeopardize the values of the Area;
- prevent the removal of, or disturbance to, markers used in previous scientific research that could be valuable for future comparative studies;
- allow environmental clean-up and remediation activities associated with the decommissioning and removal of the former Hallett Station as required and appropriate, provided the impacts of these activities are not greater than those arising from leaving material *in situ*;
- take into account the potential historic and heritage values of any artifacts before their removal and/or disposal, while allowing for appropriate clean-up and remediation;
- minimize the possibility of introduction of alien plants, animals and microbes into the Area; and
- allow visits for management purposes in support of the aims of the Management Plan.

3. Management activities

- Markers should be installed to identify areas requiring specific management activities, such as scientific monitoring sites;
- 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 necessary;
- National Antarctic programs operating in the Area should maintain a record of all new markers, signs and structures erected within the Area;
- National programs shall ensure the boundaries of the Area and the restrictions that apply within are marked on relevant maps and charts for which they are responsible;
- To the extent practicable, efforts shall be made to remove any small waste debris still present within the Area following the removal of Hallett Station, although this shall be undertaken in consultation with an appropriate authority to ensure that potentially important historic or heritage values of any artifacts are not lost;
- Visits shall be made as necessary (preferably at least once every five years) to assess whether the Area continues to serve the purposes for which it was designated and to ensure that management and maintenance measures are adequate;
- National Antarctic programs operating in the region shall consult together for the purpose of ensuring that the above provisions are implemented.

4. Period of designation

Designated for an indefinite period.

5. Maps

Map 1: Cape Hallett Antarctic Specially Protected Area No. 106: Regional map.

Map specifications: Projection: Lambert Conformal Conic; Standard parallels: 1st 72° 20' S; 2nd 72° 30' S; Central Meridian: 170° 00'E; Latitude of Origin: 72° 00'S; Spheroid and horizontal datum: WGS84; Contour interval 200 m.

Map 2: Cape Hallett Antarctic Specially Protected Area No. 106: Air access guidance.

Map specifications: Projection: Lambert Conformal Conic; Standard parallels: 1st 72° 19' S; 2nd 72° 19' 30" S; Central Meridian: 170° 13' 30" E; Latitude of Origin: 72° 00' S; Spheroid: WGS84; Datum: USGS 'Fisher' geodetic station 1989-90: ITRF93 Coordinates 170° 12' 39.916" E, 72° 19' 06.7521" S;

Map 3: Cape Hallett Antarctic Specially Protected Area No. 106: Topographic map.

Specifications for Map 3 are the same as for Map 2. Contour interval 5 m: contours derived from a digital elevation model used to generate an orthophotograph at 1:2500 with a positional accuracy of ±1 m (horizontal) and ±2 m (vertical) with an on-ground pixel resolution of 0.25 m.

Map 4: Cape Hallett Antarctic Specially Protected Area No. 106: Former Hallett Station area.

Specifications for Map 4 are the same as for Map 2.

6. Description of the Area

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

Boundaries and coordinates

Cape Hallett is located at the southern end of Moubray Bay, Northern Victoria Land, in the western Ross Sea (Map 1). The protected area occupies most of the ice-free ground of a cuspate spit of low elevation known as Seabee Hook and includes the adjacent western slopes of the northern extremity of Hallett Peninsula, extending east of Willett Cove to the margin of the permanent glaciers (Maps 1 – 3).

The northern boundary of the Area extends along the northern coast of Seabee Hook from 170° 14' 25.5"E, 72° 19' 05.0"S to the eastern limit of the Adélie colony at 170° 14' 19.3" E, 72° 19' 04.9" S (Map 3). The boundary then follows the edge of the nesting area of the Adélie colony (as defined in 2009), maintaining a distance of at least 5 m from the colony, extending to the coordinate 170° 12' 25.3" E, 72° 19' 07.9" S (Map 4).

From 170° 12' 25.3" E, 72° 19' 07.9" S the boundary extends 33 m due west to the coast at 170° 12' 21.8" E, 72° 19' 07.9" S (Map 4). From this coastal position, the boundary of the Area continues southward to follow the western and southern coastline of Seabee Hook to the position 170° 12' 54.3" E, 72° 19' 19.1" S, which is near the southeastern extremity of the spit (Map 3). From this location the boundary extends northward, following around the edge of the nesting area, maintaining a distance of at least 5 m from the colony, in the southeastern part of Seabee Hook to the position 170° 12' 58.7" E, 72° 19' 15.3" S (Map 3). From this coastal position, the boundary of the Area continues northward to follow the low water shoreline along the eastern coast of Seabee Hook, and then follows the low water coastline around Willett Cove to the southern boundary at 170° 13' 24.9" E, 72° 19' 28.0" S (Map 3).

From 170° 13' 24.9" E, 72° 19' 28.0" S the boundary extends eastward to the Bornmann Glacier, following a seasonal stream which descends from the glacier. The eastern boundary of the Area then follows the glacier and permanent ice margin northward at elevations approximately between 120 – 150 m, crossing the steep western slopes of Hallett Peninsula and following the upper outcrops of a series of rocky ridges dissecting the slope. The boundary then descends to join the northern coastline of Seabee Hook at the base of a rock buttress at 170° 14' 25.5" E, 72° 19' 05.0" S (Map 3).

Climate

Seabee Hook is surrounded by sea ice for approximately eight months of the year. Sea ice usually breaks out annually, beginning in late December to early January, and re-forms in early March. Summer temperatures range from 4°C to -8°C, with a mean annual temperature of -15.3°C, and winds are predominantly from the south. Precipitation in the form of snow is common during the summer, with annual precipitation approximately 18.3 cm of water equivalent.

Geology, geomorphology, soils and freshwater environment

The topography of the Area comprises the large flat area of the spit and adjoining steep scree forming part of the western slopes of northern Hallett Peninsula. Seabee Hook is composed of coarse volcanic material deposited in a series of beach ridges, with gently undulating terrain of hummocks and depressions and a number of level areas. Many of the depressions contain melt water in the summer, and are colonized by dense mats of algae. In the northeastern part of the Area a small meltwater stream flows from the western slopes of the Hallett Peninsula down to Willett Cove. There is higher moisture availability in soils at Cape Hallett compared to sites in Southern Victoria Land. Sub-surface soils are typically saturated after snowfall, with groundwater at between 8 and 80 cm below the soil surface during summer. Permafrost underlies soils on Seabee Hook at a depth of ~1 m (Hofstee *et al*. 2006). Soils in areas occupied by, or affected by water runoff from, penguin colonies are ornithogenic in character and were classified as Typic Haplorthels over mounds and Typic Aquorthels between mounds by Hofstee *et al*. (2006). Beyond areas influenced by the presence of penguins, these authors classified soils as Typic Haplothels, with one example of Typic Haploturbels in an area of patterned ground.

Vegetation

In wetter parts of the Area, the algal component is comprised mainly of the sheet-like green alga *Prasiola crispa* and *Protococcus* sp., with associated filamentous and blue-green forms (*Ulothrix* sp.) and cyanobacteria (e.g. *Nostoc*). It is expected that a number of other algal species may be present, but few have been identified.

The vegetation within the Area, with the exception of algae such as *Prasiola*, is largely confined to the ice-free ground not occupied by breeding Adélie penguins, which is to the east of Willett Cove and south of 72° 19' 10" S. This area includes a 100-200 m strip of relatively level ground adjacent to Willett Cove and steeper slopes up to the crest of the Hallett Peninsula ridge. The strip of flat ground comprises a number of dry, gravel hummocks up to 1.5 m high, many of which are occupied by nesting skuas, and in the northern part old guano deposits indicate former occupation by Adélie penguins. Small patches of moss and algae may be found at the base of these hummocks but the upper parts are devoid of vegetation. Substantial beds of moss colonize stable gravel flats in the north part of the flat ground where there is a high water table, while scattered patches of moss, algae and lichen occur on coarser, more angular, loose rocks in the south. The moss becomes more sparse as the ground slopes upwards, with the notable exception of a particularly dense and extensive patch covering approximately 3900 m^2 with almost complete coverage of the substratum occupying a shallow valley on a scree slope in the south of the Area (Map 3). Only the most prolific areas are illustrated on Map 3.

Five moss species have been identified within the Area (Table 1). *Bryum subrotundifolium* is the dominant moss within the Area. The presence of *Bryum subrotundifolium* in such a bird enriched area makes the Area an excellent example of a bird affected vegetation site. Also, the presence of almost mono-specific stands of *Bryum pseudotriquetrum* at the site is unusual for the region.

The steep scree slope adjoining the largely flat area is dissected by shallow gullies and small ridges, with a number of prominent rock outcrops. These rock outcrops, particularly in the north of the Area, support large stands of lichens and scattered moss, with cover of 70 – 100% in many places. Twenty-seven lichen species have been recorded in the Area (Table 1). Nitrogen-tolerant lichen species such as *Xanthomendoza borealis* and species of *Caloplaca*, *Candelariella*, *Physcia* and *Xanthoria* may be observed in the immediate vicinity of the penguin breeding area (Crittenden *et al*. 2015).

Eight species of mites and three species of springtails have been recorded from within the Area (Table 1) (Sinclair *et al*. 2006). *F. grisea* occurs mainly on the scree slopes and adjacent level areas, *C. cisantarcticus* was reported to be associated with moss, occurring plentifully on level ground, while *D. klovstadi* was abundant under stones on the slopes. Four species of nematodes have been found in the Cape Hallett area (Table 1), the most abundant, and in general the most dominant, species of which is *Panagrolaimus davidi* Timm (Raymond *et al*. 2013).

Table 1: Moss, lichen and invertebrate species recorded within ASPA No. 106, Cape Hallett

Mosses a	**Lichens** a, b, c, d	**Invertebrates**
		Mites e
Bryum subrotundifolium	*Acarospora gwynnii*	*Coccorhagidia gressittii*
Bryum pseudotriquetrum	*Amandinea petermannii*	*Eupodes wisei*
Ceratodon purpureus	*Amandinea coniops*	*Maudheimia petronia*
Grimmia sp	*Buellia frigida*	*Nanorchestes* sp.,
Sarconeurum glaciale	*Caloplaca athallina*	*Stereotydeus belli*
	Caloplaca citrina	*S. puncatus*
	Caloplaca saxixola	*Tydeus setsukoae*
	Candelaria murrayi	*T. wadei*
	Candelariella flava	
	Lecanora chrysoleuca	**Springtails** e
	Lecanora expectans	*Cryptopygus cisantarcticus*
	Lecanora mons-nivis	*Friesea grisea*
	Lecanora physciella	*Desoria klovstadi*
	Lecidea cancriformis	
	Lecidella greenii	**Nematodes** f
	L. siplei	*Eudorylaimus antarcticus* (Steiner) Yeates
	Physcia caesia	*Panagrolaimus davidi* Timm
	Pleopsidium chlorophanum	*Plectus* sp.
	Rhizocarpon geographicum	*Scottnema lindsayae* Timm
	Rhizoplaca chrysoleuca	
	Rhizoplaca macleanii	
	Rhizoplaca melanophthalma	
	Umbilicaria decussata	
	Usnea sphacelata	
	Xanthomendoza borealis	
	Xanthoria elegans	
	Xanthoria mawsonii	

Sources:
a T.G.A. Green, University of Waikato, New Zealand and R. Seppelt, Australian Antarctic Division, 2002;b Smykla *et al*. 2011; c Ruprecht *et al*. 2012; d Crittenden *et al*. 2015; e Sinclair *et al*. 2006; f Raymond *et al*. 2013.

Birds

Seabee Hook is the site of one of the largest Adélie penguin colonies in the Ross Sea region, with a mean of 42 628 breeding pairs of Adélie penguins (*Pygoscelis adeliae*) reported over 14 seasons sampled between 1981 and 2012 (Lyver *et al*. 2014). Approximately 63 971 breeding pairs were present in 2009-10 (combined total of direct nest, oblique aerial and ground photo counts made 26 November – 3 December 2009; unpublished data ERA 2010). Seabee Hook is also the site of the former Hallett Station, a joint United States and New Zealand station that was open from 1956-73. During operation the station and associated infrastructure occupied an area of 4.6 ha on land that had formerly been occupied by breeding Adélie penguins. Establishment of Hallett Station in 1956 required eviction of 7580 penguins, including 3318 chicks, in order to clear the 0.83 ha required for bulldozing and erection of buildings. The colony was subjected to substantial impacts from the establishment and operation of Hallett Station, and declined from 62 900 pairs in 1959 to a low of 37 000 pairs in 1968, although increased again to 50 156 by 1972. Fluctuations in populations may have been exacerbated by changes in sea ice cover documented for the entire region. By 1987, after the closure of the station in 1973, the colony had increased to near its 1959 population; however, few areas modified by humans had by that time been fully recolonized. The area formerly occupied by the station has now been partly recolonized, although numbers were estimated at 39 014 breeding pairs in 1998-99, and an aerial census in 2006-07 (conducted as part of a long-term program) recorded only 19 744 breeding pairs (Lyver and Barton 2008, unpublished data). The count of 63 971 breeding pairs of Adélie penguins made in late 2009 (unpublished data ERA 2010) is comparable to numbers recorded on Seabee Hook around the time Hallett Station was built.

South Polar skuas (*Catharacta maccormicki*) breed within the Area. The population declined from 181 breeding pairs in 1960-61 to 98 breeding birds recorded in both 1968-69 and 1971-72. In January 1983 there was a population of 247 birds (84 breeding pairs and 79 non-breeding birds). A survey conducted between 27 November – 02 December 2009 recorded 14 breeding pairs and 66 individuals on Seabee Hook. An additional 23 breeding pairs and 92 individuals were counted in the area east of Willett Cove, giving a total of 37 breeding pairs and 158 individuals, and a grand total of 232 birds in 2009-10. Approximately 250 skua nest sites are marked and numbered within the Area; markers should not be disturbed or removed.

Emperor penguins (*Aptenodytes forsteri*) have been recorded in the vicinity in late December, and solitary Chinstrap penguins (*Pygoscelis antarctica*) have been recorded in late January and February. Wilson's Storm petrels (*Oceanites oceanicus*) and Snow petrels (*Pagodroma nivea*) breed close to Cape Hallett across Edisto Inlet; numerous Snow petrels were observed around the cliffs of Cape Hallett in December 2009, suggesting they may breed in this area. Southern Giant petrels (*Macronectes giganteus*) have been sighted frequently in the vicinity of the Area, although numbers have dropped in recent years, possibly due to declining populations further to the north. Weddell seals (*Leptonychotes weddellii*) are commonly seen; these seals breed in Edisto Inlet, and have been recorded ashore on Seabee Hook. Other mammals commonly seen offshore include Leopard seals (*Leptonyx hydrurga*) and Minke whales (*Balaenoptera acutorostrata*).

Human activities and impact

Hallett Station was established by New Zealand and the United States on Seabee Hook in December 1956 as part of the IGY. The base operated continuously until its closure in February 1973 and supported a range of activities including the 1967-68 Mt. Herschel expedition led by Sir Edmund Hilary. Station construction had significant impacts on the environment, with almost 8000 Adélie penguins removed from the site. Beginning in 1984, the station was progressively cleaned up, and a joint NZ / US multi-year remediation plan for the station and surrounding area was formulated in 2001. Remediation continued in 2003-04 and 2004-05, when most remaining structures were demolished and removed, and the last remaining substantial items were removed at the end of January 2010. Many of the buildings and artefacts from the former Hallett Station are now held at the Canterbury Museum, Christchurch.

Some material associated with the former station still remains dispersed throughout the Area, including small pieces of wood and metal, wire, and metal drums, much of which is firmly embedded in the ground. In addition, the well-preserved body of a husky that died in 1964 remains contained within an enclosed wooden box covered by rocks in the east of the Area (Map 3).

As part of the clean up operation, mounds were constructed within the old station footprint to encourage Adélie penguin recolonization, and substantial parts of these areas have now been occupied (Map 4). The history of human impact on the Adélie colony and its subsequent recovery make the site of high scientific value for research into the impacts on and recovery of the colony following significant ecosystem disturbance.

6(ii) Access to the Area

Access to the Area may be made by air, from the sea or by pedestrians over sea ice. Break out of sea ice at Cape Hallett usually begins between late December and early January and sea ice generally reforms in early March. Areas of sea ice that are potentially more stable and better suited to aircraft landing may be found at sites southwest of Seabee Hook in the enclosure of Edisto Inlet. However, sea ice within Edisto Inlet can break out rapidly, even early in the season, so care is needed.

The breeding season for Adélie penguins and skuas within the Area is between October and March. During this period and when suitable sea ice is present, fixed wing aircraft may land at any site outside of the 1/2 nautical mile (~930 m) guideline distance described in Section 7(i) and shown on Map 2. When landings beyond 1/2 nautical mile are unsafe or impractical, fixed wing landings may be made at any site beyond 1/4 nautical mile (~460m) of the Adélie colony on Seabee Hook. Access to the Area from fixed wing landing locations may be by helicopter or on foot over sea ice.

Helicopters may land at any site outside of the 1/2 nautical mile (~930m) guideline distance, except when such landings are unsafe or impractical, in which case the designated helicopter landing site within the Area in Willett Cove at 170° 13.579' E, 72° 19.228' S may be used. Helicopter access to the designated landing site should be from the south and follow the eastern coastline of Willett Cove (Map 2). Occasionally the designated helicopter landing site at Willett Cove may be susceptible to inundation by high tides.

When access to the Area is made from the sea, small boats may land anywhere within the Area, although small boat landings with the purpose of camping should be made to Willett Cove. Strong currents and eddies have been reported on the seaward margins of Seabee Hook, which may prove difficult for small boat landings. Ocean conditions are generally calmer in Willett Cove and in the lee of Seabee Hook.

Access to the Area on foot may be made over sea ice.

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

Hallett Station was established on Seabee Hook in December 1956 and closed in February 1973. By 1960 the buildings of Hallett Station occupied 1.8 ha and the associated roads, refuse dumps, fuel caches and radio aerials a further 2.8 ha. The station was occupied year-round until 1964, from when summer-only operation continued until closure. The station was progressively dismantled after 1984 and in 1996 only six structures, including a large 378,500 liter (100,000 gallon) fuel tank remained. Liquid fuel remaining in the large fuel tank was removed in February 1996. Further clean-up work was undertaken in 2003-04 and 2004-05, to remove all remaining structures including the fuel tank, and to remove contaminated soil from the area. All remaining substantial items were removed from the Area on 30-31 January 2010.

Two Automatic Weather Stations (AWS) operated by the United States (McMurdo Dry Valleys Long Term Ecological Research) and New Zealand (National Institute of Water and Atmospheric Research) are located 10 m apart approximately 50 m north of the designated campsite (Map 3). New Zealand maintains a bunded fuel cache of several drums approximately 50 m south of the designated campsite. An enclosed box containing the remains of a husky dog that died in 1964 is located near a large rock in the eastern part of the Area, covered by loose rocks (Map 3).

The USGS geodetic station ‘FISHER’ (Maps 3 & 4) consists of a standard USGS Antarctic brass tablet stamped with “FISHER 1989-90” and is set flush on the top of a large concrete block (2x1x1 m) at an elevation of 2.15 m. The benchmark is located approximately 80 m south of the emergency cache and 140 m inland from the NW coast of Seabee Hook. Following recolonization of the old station area, the benchmark now lies within a small Adélie subcolony, and is therefore likely to be surrounded by breeding birds during the summer. An emergency cache, comprising a large box (~1.5 m square and 1 m in height) painted bright red on top with smaller box alongside, is located on the site of the former station (Map 4).

Markers from a number of scientific studies are present within the Area, including those delineating the vegetation monitoring plot within the Restricted Zone. It should be noted that not all historical markers have been documented.

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

The nearest protected areas to Cape Hallett are Cape Adare (ASPA No.159) 115 km to the north, Mount Rittman (ASPA No.175) ~200 km to the south, and Mount Melbourne (ASPA No.175) and Edmonson Point (ASPA No.165) which are both approximately 290 km to the south.

6(v) Special zones within the Area

Restricted Zone

A small zone directly below the scree slopes in the northeast of the Area is designated a Restricted Zone in order to preserve part of the Area as a reference site for future comparative vegetation studies. Access to the Restricted Zone is allowed only for compelling reasons that cannot be served elsewhere in the Area. The remainder of the Area is more generally available for research programs and sample collection.

A vegetation study plot of approximately 28 m by 120 m was mapped in detail by Rudolph (1963), which was relocated and re-mapped by Brabyn *et al*. (2006) to provide a quantification of vegetation change at the site over a 42-year period. This site established by Rudolph represents an extremely valuable resource for monitoring vegetation change. Markers used in both studies remain *in situ* and define the extent of the vegetation monitoring plot. The NE corner of the monitoring plot is indicated by a large boulder with a cairn built on top, located at 170°14'2.55" E 72°19'11.37" S. Detailed descriptions of the plot are given in Rudolph (1963) and Brabyn *et al*. (2006). Rudolph also photographed stones colonized by lichens, which Brabyn *et al.* (2006) re-photographed to measure lichen growth rates. One of these sites (shown on Map 3) is within the Restricted Zone and should not be disturbed.

The Restricted Zone provides a buffer around the monitoring plot of 20 m on the NW side and 10 m on the other three sides, making a rectangle of 58 m in width and 140 m in length. The corner coordinates of the Restricted Zone are defined in Table 2. A series of cairns has been constructed (on existing rocks where possible) to indicate the extent of the Restricted Zone (Map 3).

Table 2. Restricted Zone corner coordinates

Corner	**Longitude (E)**	**Latitude (S)**
Northeast	170°14'4.012"	72°19'11.219"
Northwest	170°13'58.341"	72°19'10.43"
Southwest	170°13'51.901"	72°19'14.479"
Southeast	170°13'57.338"	72°19'15.299"

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 purposes, or for educational purposes that cannot be served elsewhere, or for reasons essential to the management of the Area;
- the actions permitted are in accordance with the Management Plan;
- The activities permitted will give due consideration via the environmental impact assessment process to the continued protection of the environmental, scientific, educational, historic, and aesthetic values of the Area;
- The Permit shall be issued for a finite period;
- the Permit, or a copy, shall be carried when in the Area.

7(ii) Access to and movement within the Area

- Access into the Area shall be by small boat, helicopter, or on foot.
- Vehicles are prohibited within the Area.

- Restrictions on aircraft operations apply during the period between 01 October and 31 March, when aircraft shall operate and land within the Area according to strict observance of the following conditions:
  - Overflight of the Area below 2000 feet (~610 m) is prohibited, unless authorized by permit for purposes allowed for by the Management Plan;
  - Overflight and landings within ½ nautical mile (~930 m) of the Adélie colony on Seabee Hook for tourism is strongly discouraged;
  - Landings within ½ nautical mile (~930 m) of the Adélie colony on Seabee Hook should be avoided wherever possible;
  - Landings beyond ½ nautical mile (~930 m) of the Adélie colony may select landing sites according to visit needs and local conditions;
  - The Primary Landing Site (170° 11.460' E, 72° 19.686' S) shown on Map 2 represents the location where access to the designated camping site is shortest by traverse over sea ice. Landings at this site may be made as local conditions allow; and
  - When landings beyond ½ nautical mile (~930 m) of the Adélie colony are considered unsafe or impractical (e.g. because sea ice is absent or poor, if weather conditions are unfavorable, or because there is an important logistic need such as to move heavy equipment), the following conditions apply:

    FIXED WING

    - Fixed wing aircraft may land beyond ¼ nautical mile (~460 m) of the Adélie colony;
    - Fixed wing aircraft landings should not be made in Willett Cove.

    HELICOPTERS

    - Helicopters shall land at the designated site at Willett Cove (170° 13.579' E, 72° 19.228' S) (Map 2), either on land or on sea ice adjacent to the campsite;
    - On occasions the landing site is susceptible to inundation by high tides: if this occurs landings may made on nearby dry ground, avoiding vegetated sites and preferably remaining on beach gravels south of the designated landing site, keeping as close to the shore as possible. Landings closer to the Adélie penguin colony shall be avoided;
    - Helicopters should follow the designated approach route to the maximum extent practicable. The preferred helicopter approach route is from the south and extends from the primary landing site to the designated landing site following a route along the southern and eastern coastline of Willett Cove (Map 2).

- There are no special restrictions on where access can be gained to the Area by small boat, although small boat landings with the purpose of camping should be made to Willett Cove in order to avoid the need to haul camp equipment through the Adélie colony.
- Access to the Restricted Zone is allowed only for compelling reasons that cannot be served elsewhere in the Area.
- It is important that all visitors are careful to restrict their movements around the campsite, keeping to the area along the shoreline to avoid trampling inland areas that are seasonally moist and richly colonized by a variety of plants and invertebrates, which are the subject of on-going research.
- Within the Adélie colony, visitors should not enter sub-groups of nesting penguins unless required for research or management purposes: visitors should walk around the coastal strip of Seabee Hook when possible, and/or around or between sub-groups. Traces of the old station road extend from the NW corner of Willett Cove through to the former station site, and remains a comparatively wide corridor where pedestrians can maintain a reasonable distance from nesting birds.
- Visitors should avoid walking on the scree slopes in the eastern part of the Area unless necessary for essential scientific or management purposes; screes are a sensitive and easily damaged habitat for a diverse community of flora and fauna.

- All pedestrian traffic should be kept to the minimum necessary consistent with the objectives of any permitted activities and every reasonable effort should be made to minimize effects. Visitors should avoid walking on visible vegetation. Care should be exercised when walking in areas of moist ground and on screes, where foot traffic can easily damage sensitive soils and plant communities.

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

- Scientific research that will not jeopardize the values of the Area;
- Essential management activities, including assessment or remediation of impacts, and monitoring;
- Activities with educational aims (such as documentary reporting (photographic, audio or written), the production of educational resources or services, or educating program personnel about clean-up methods) that cannot be served elsewhere. Educational aims do not include tourism; and
- Activities with the aim of preserving or protecting historic resources within the Area.

7(iv) Installation, modification or removal of structures

- No structures are to be erected within the Area except as specified in a permit;
- All structures and scientific equipment installed in the Area must be authorized by permit and clearly identified by country, name of the principal investigator and year of installation. All such items should be made of materials that pose minimal risk of contamination of the Area;
- Installation (including site selection), maintenance, modification or removal of structures shall be undertaken in a manner that minimizes disturbance to flora and fauna;
- The emergency cache should only be used in genuine emergency, and any such use should be reported to an appropriate authority so the cache can be restocked; and
- Removal of specific equipment for which the permit has expired shall be the responsibility of the authority which granted the original Permit, and shall be a condition of the permit.

7(v) Location of field camps

Permanent field camps are prohibited within the Area. When conditions allow, temporary camping should preferably be located on sea ice in Willett Cove, which is outside of the Area. When this is not practical, temporary camping is permitted at a designated site on the eastern shore and 100 m south of the head of Willett Cove (72º 19' 13" S, 170º 13' 34" E). This site comprises unconsolidated beach gravels, is not colonized by birds or significant plant communities (although these are present nearby) and lies on the site of a former station road (Map 3). Stakes have been driven into the hard, stony ground at the campsite for tent guys; these should be used wherever possible.

The campsite is located immediately adjacent to areas rich in terrestrial fauna and flora and visitors should restrict their movements around the campsite to the area along the shoreline unless required for research purposes. On occasions the site is susceptible to inundation by high tides: if this occurs the camp may be moved to dry ground, avoiding vegetated sites to the maximum extent practicable and preferably remaining on beach gravels south of the designated campsite, keeping as close to the shore as possible.

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

In addition to the requirements of the Protocol on Environmental Protection to the Antarctic Treaty, restrictions on materials and organisms which may be brought into the Area are:

- Deliberate introduction of animals, plant material, micro-organisms and non-sterile soil into the Area is prohibited. Precautions shall be taken to prevent the accidental introduction of animals, plant material, micro-organisms and non-sterile soil from other biologically distinct regions (within or beyond the Antarctic Treaty area);
- Visitors shall ensure that sampling equipment and markers brought into the Area are clean. To the maximum extent practicable, footwear and other equipment used or brought into the area (including

backpacks, carry-bags and tents) shall be thoroughly cleaned before entering the Area. Visitors should also consult and follow as appropriate recommendations contained in the Committee for Environmental Protection Non-native Species Manual (CEP 2011), and in the Environmental Code of Conduct for Terrestrial Scientific Field Research in Antarctica (SCAR 2009);

- In view of the presence of breeding bird colonies at Cape Hallett, no poultry products, including products containing uncooked dried eggs, and wastes from such products, shall be released into the Area;
- No pesticides shall be brought into the Area;
- Fuel, food, chemicals and other materials shall not be stored in the Area, unless specifically authorized by permit, or are contained within an emergency cache authorized by an appropriate authority, and shall be stored and handled in a way that minimizes the risk of their accidental introduction into the environment;
- All materials introduced shall be for a stated period only, and shall be removed at or before the conclusion of that stated period; and
- If release occurs which is likely to compromise the values of the Area, removal is encouraged only where the impact of removal is not likely to be greater than that of leaving the material *in situ*.

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

Taking of, or harmful interference with, native flora and fauna is prohibited, except in accordance with a permit issued under Article 3 of Annex II to the Protocol on Environmental Protection to the Antarctic Treaty. Where animal taking or harmful interference 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) Collection or removal of materials not brought into the Area by the Permit holder.

- Material may be collected or removed from the Area only in accordance with a permit and should be limited to the minimum necessary to meet scientific or management needs. Permits shall not be granted if there is a reasonable concern that the sampling proposed would take, remove or damage such quantities of soil, native flora or fauna that their distribution or abundance within the Area would be significantly affected.
- Removal of, or disturbance to, markers left by previous scientific work within the Area is prohibited unless specifically authorized by permit.
- Other than scientific markers as noted above, material of human origin likely to compromise the values of the Area, which was not brought into the Area by the Permit holder, and is clearly of no historic value or otherwise authorized, 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 authority must be notified and approval obtained.
- Material found that is likely to possess important historic or heritage values should not be disturbed, damaged, removed or destroyed. Any such artifacts should be recorded and referred to the appropriate authority for a decision on conservation or removal. Relocation or removal of artifacts for the purposes of preservation, protection, or to re-establish historical accuracy is allowable by permit.
- The well-preserved body of a husky is contained in an enclosed wooden box located in the eastern part of the Area and should not be disturbed while options for its future management remain under consideration.

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 meet the aims of the Management Plan

Permits may be granted to enter the Area to:

- carry out monitoring and Area inspection activities, which may involve the collection of a small number of samples or data for analysis or review;

- erect or maintain signposts, structures or scientific equipment (specific sites of long-term monitoring should be appropriately marked);
- carry out protective measures.

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, and where possible should do so within six months after the visit has been completed.
- Such reports should include, as appropriate, the information identified in the Visit Report form contained in Appendix 2 of the Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas (Resolution 2 (2011)). 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 reports in a publicly accessible archive to maintain a record of usage, to be used both in any review of the Management Plan and in organizing the scientific use of the Area.
- The appropriate authority should be notified of any activities / measures undertaken, anything removed, and / or of any materials released and not removed, that were not included in the authorized permit.

8. Supporting documentation

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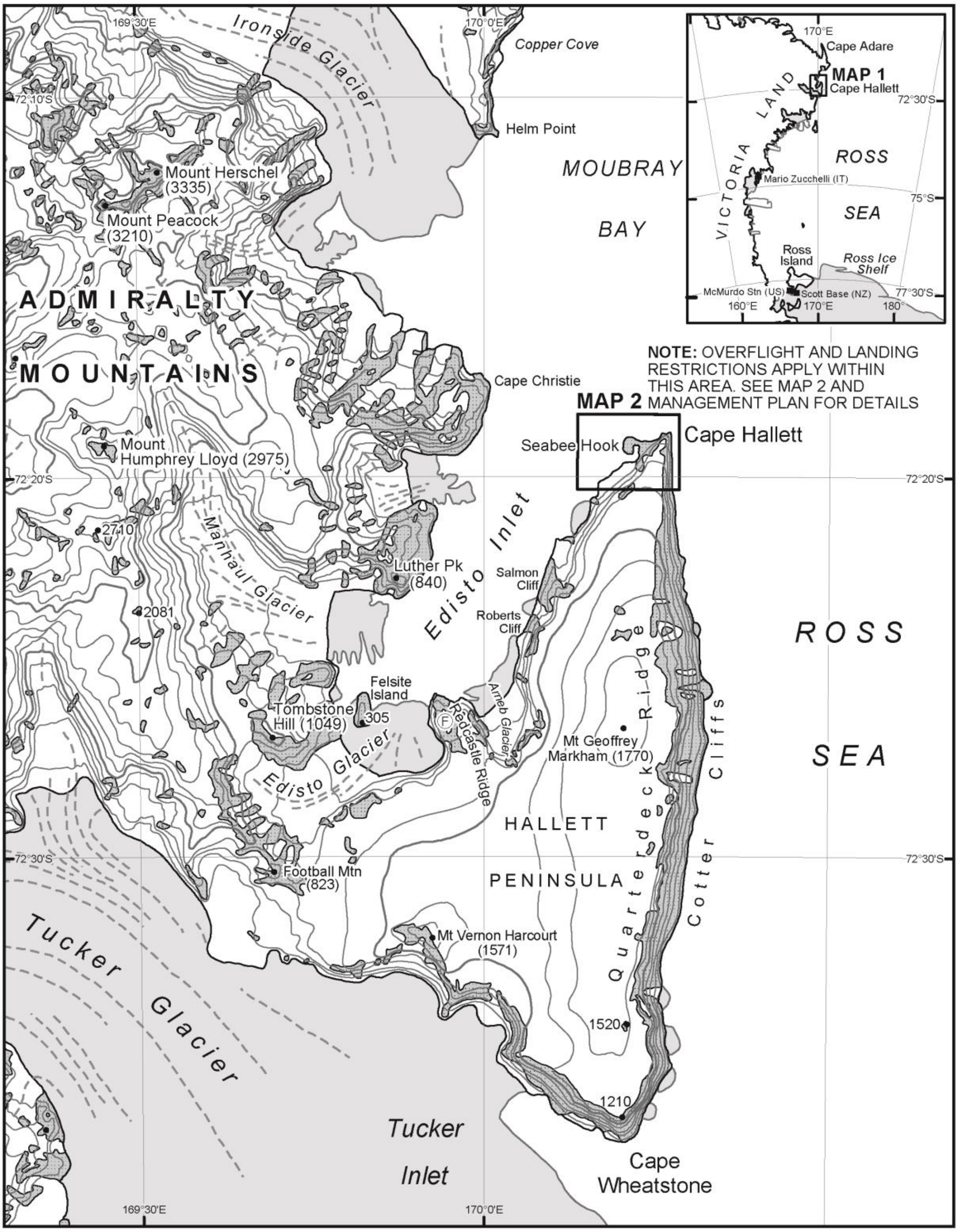


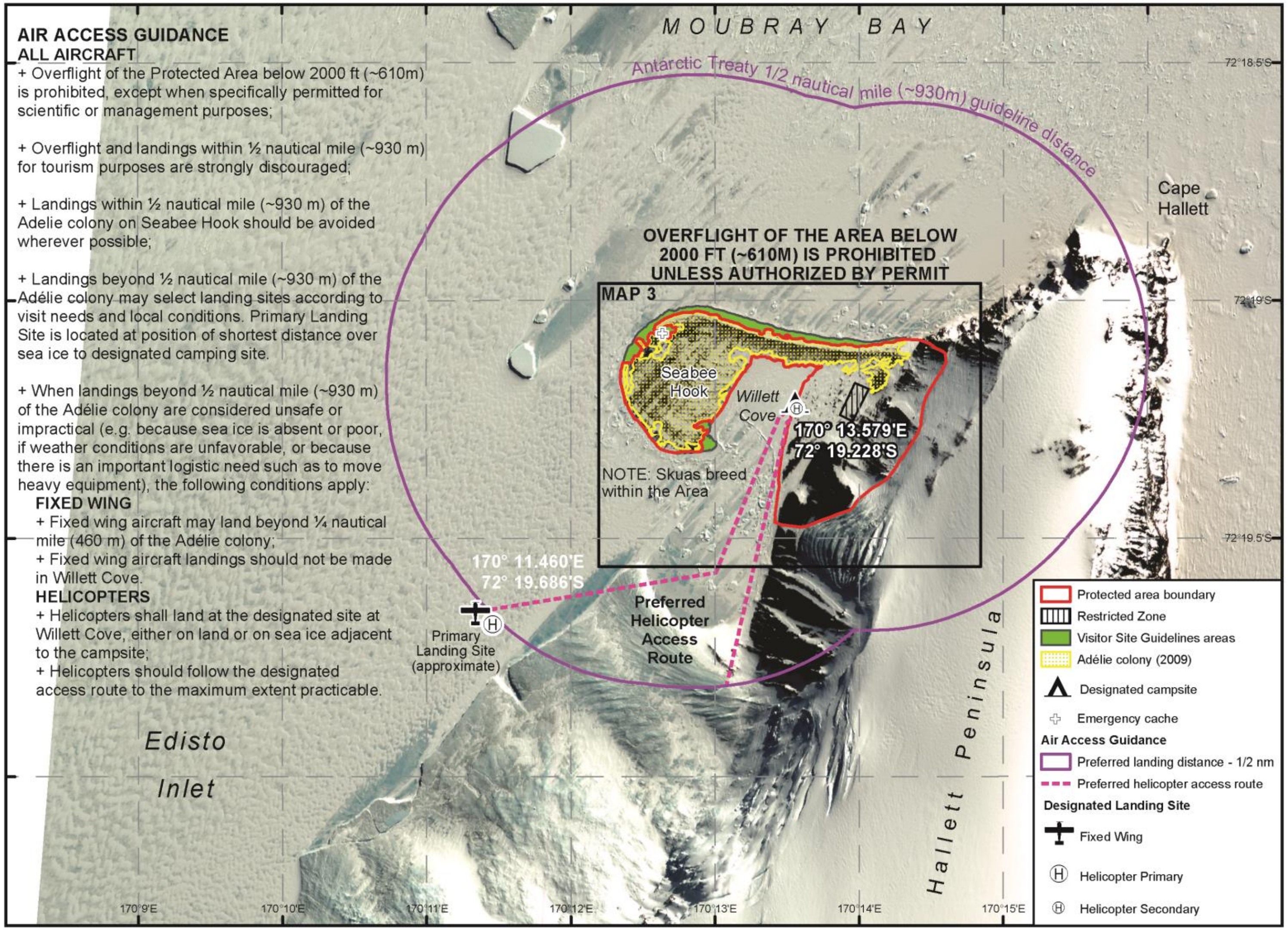
Map 1: ASPA No. 106 - Cape Hallett - Regional Map

02 Mar 2015 (Map ID: 10068.0007.01)
United States Antarctic Program
Environmental Research & Assessment

Permanent ice
Ice shelf
Ice free ground
Coastline
Index contour (1000m)
Contour (200m)
Glacier flow line
Spot height (m)
Fuel cache & geology camp (IT)

0 5 10
Kilometers
N

Projection: Lambert Conformal Conic
Spheroid and horizontal datum: WGS84;
Data: SCAR Antarctic Digital Database v5 (2007)
Contour interval: 200 m; Heights in meters.



Map 2: ASPA No.106 - Cape Hallett - Air access guidance

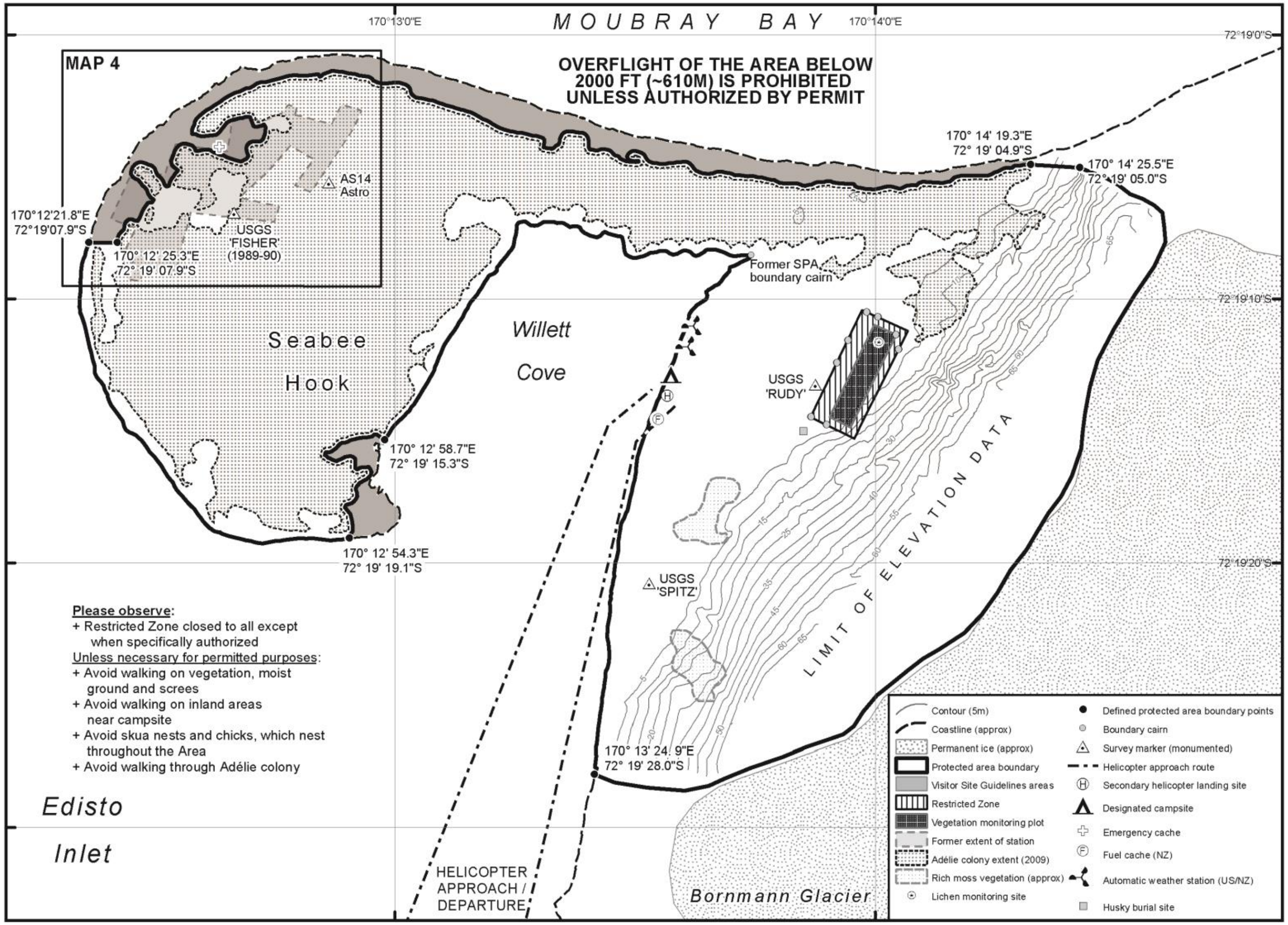
18 Mar 2015 (Map ID: 10068.0008.01)
United States Antarctic Program
Environmental Research & Assessment

Nautical Miles 0 0.5 1

Kilometers 0 0.5 1

N

Projection: Lambert Conformal Conic;
Spheroid: WGS84; Horizontal datum: USGS 'Fisher';
Data sources: ERA field survey (27 Nov - 03 Dec 09);
Base imagery: Quickbird 12 Oct 2009;
(Imagery © 2009 Digital Globe; NGA Commercial Imagery Program).



Map 3: ASPA No.106 - Cape Hallett - Topography, boundaries & features

0 100 200
Meters
N

18 Mar 2015 (Map ID: 10068.0009.01)
United States Antarctic Program
Environmental Research & Assessment

Projection: Lambert Conformal Conic;
Spheroid: WGS84; Horizontal datum: USGS 'Fisher'; Contour interval: 5 m;
Data sources: Coastline, Adélie colony, vegetation plot, husky burial site, survey markers,
AWS, fuel cache & emergency cache: ERA field survey (27 Nov - 03 Dec 09);
Contours: derived from aerial orthophotos; contour interval 5m.

Map 4: ASPA No.106 - Cape Hallett - Former Hallett Station area

0 10 20 30 40 50
Meters
N

18 Mar 2015 (Map ID: 10068.0010.01)
United States Antarctic Program
Environmental Research & Assessment

Coastline (approx)
Protected area boundary
Visitor Site Guidelines areas
Former extent of station
Adelie colony extent (2009)
Defined protected area boundary points
Survey marker (monumented)
Emergency cache

Projection: Lambert Conformal Conic;
Spheroid: WGS84; Horizontal datum: USGS 'Fisher'; Contour interval: 5 m;
Data sources: Coastline, penguin colony, AS14 Astro
& emergency cache: ERA field survey (27 Nov - 03 Dec 09).

Management Plan for Antarctic Specially Protected Area (ASPA) No. 119 DAVIS VALLEY AND FORLIDAS POND, DUFEK MASSIF, PENSACOLA MOUNTAINS (51° 05' W, 82° 29' S)

Introduction

Davis Valley and Forlidas Pond Antarctic Specially Protected Area (ASPA) is situated within the Dufek Massif, Pensacola Mountains at 51°4'53"W, 82°29'21"S. Approximate area: 55.8 km^2. The primary reason for the designation of the Area is that it contains some of the most southerly freshwater ponds with autotrophic microbial life known to exist in Antarctica, which represent unique examples of near-pristine freshwater ecosystems and their catchments. The geomorphology of the Area represents a unique scientific resource for the reconstruction of previous glacial and climatic events. As a consequence of its extreme remoteness and inaccessibility, the Area has experienced very little human activity and with the total number of visitors estimated to be less than 50 people. As a result, the Area has outstanding potential as a scientific reference site. Furthermore, the Area possesses outstanding wilderness and aesthetic values. The Area is one of the most southerly 'dry valley' systems in Antarctica and, as of April 2015, is the most southerly Antarctic Specially Protected Area (ASPA) in Antarctica. The Area was originally proposed by the United States of America and adopted through Recommendation XVI-9 (1991, SPA No. 23). It included Forlidas Pond (51°16'48"W, 82°27'28"S) and several ponds along the northern ice margin of the Davis Valley. The boundaries of the Area were extended to include the entire ice-free region centered on the Davis Valley through Measure 2 (2005). Newly available imagery in 2013 allowed the boundaries of the Area to be adjusted in the current management plan to follow the margins of ice-free ground.

The Area lies within 'Environment O – West Antarctic Ice Sheet' and 'Environment R – Transantarctic Mountains', as defined in the Environmental Domains Analysis for Antarctica (Resolution 3(2008)), and is the only protected area designated within Environment R. Under the Antarctic Conservation Biogeographic Regions classification (Resolution 6(2012)) the Area lies within ACBR10 – Transantarctic Mountains, and is also the only protected area designated within this bioregion.

1. Description of values to be protected

Forlidas Pond (51°16'48" W, 82°27'28" S) and several ponds along the northern ice margin of the Davis Valley (51°05' W, 82°27'30" S), in the Dufek Massif, Pensacola Mountains, were originally designated as a Specially Protected Area through Recommendation XVI-9 (1991, SPA No. 23) after a proposal by the United States of America. The Area was designated on the grounds that it "contains some of the most southerly freshwater ponds known in Antarctica containing plant life" which "should be protected as examples of unique near-pristine freshwater ecosystems and their catchments". The original Area comprised two sections approximately 500 metres apart with a combined total area of around 6 km^2. It included Forlidas Pond and the meltwater ponds along the ice margin at the northern limit of the Davis Valley. The site has been rarely visited and until recently there has been little information available on the ecosystems within the Area.

This Management Plan reaffirms the original reason for designation of the Area, recognizing the ponds and their associated plant life as pristine examples of a southerly freshwater habitat. The values identified for special protection and the boundaries of the Area were expanded as described below following a field visit made in December 2003 (Hodgson and Convey 2004).

The Davis Valley and the adjacent ice-free valleys is one of the most southerly 'dry valley' systems in Antarctica and, as of March 2015, is the most southerly Antarctic Specially Protected Area in Antarctica. While occupying an area of only 53 km^2, which is less than 1% of the area of the McMurdo Dry Valleys, the Area nevertheless contains the largest ice-free valley system found south of 80°S in the 90ºW-0º-90ºE half of Antarctica. Moreover, it is the only area known in this part of Antarctica where the geomorphology preserves such a detailed record of past glacial history. Some ice-free areas around the Weddell Sea region have scattered erratics and sometimes moraines, but the assemblage of drift limits, moraines, and abundant quartz-bearing erratics in the Davis Valley and associated valleys is very unusual. The location of the Dufek Massif close to the junction between the western and the eastern Antarctic ice sheets also makes this site particularly valuable for the collection of data that can be used to constrain parameters such as the past thickness and dynamics of this sector of the Antarctic ice sheet. Such data are potentially extremely valuable for understanding the response of the Antarctic ice sheet to climate change. The Area therefore has exceptional and unique scientific value for the interpretation of past glacial events and climate in this part of Antarctica and it is important that this value is maintained.

The terrestrial ecology of the Area is impoverished but is also highly unusual, with lake and meltwater stream environments and their associated biota being rare this far south in Antarctica. As such, they provide unique opportunities for the scientific study of biological communities near the extreme limit of the occurrence of these environments. Vegetation appears to be limited to cyanobacterial mats and a very sparse occurrence of small crustose lichens. The cyanobacterial mat growth in the terrestrial locations is surprisingly extensive, and represents the best examples of this community type known this far south. The cyanobacterial community appears to survive in at least three distinct environments:

- in the permanent water bodies;
- in exposed terrestrial locations, particularly at the boundaries of sorted polygons; and
- in a series of former or seasonally dry pond beds on ice-free ground in the Davis Valley.

No arthropods or nematodes have thus far been detected in samples taken from within the Area, and the invertebrate fauna in the Area is unusually sparse. This characteristic distinguishes the Area from more northerly ice-free valley systems such as those at the Ablation Valley – Ganymede Heights (ASPA No. 147), Alexander Island, or at the McMurdo Dry Valleys (ASMA No. 2), where such communities are present. Rotifers and tardigrades have been extracted from samples taken within the Area, with the greatest numbers occurring within the former pond beds in the Davis Valley, although their diversity and abundance is also extremely limited compared with more northerly Antarctic sites (Hodgson and Convey 2004). Further analyses of the samples obtained and identification of all taxa present are published (Hodgson *et al*. 2010; Fernandez-Carazo *et al.* 2011; Peeters *et al*. 2011, 2012)) and are an important contribution to the understanding of biogeographical relationships between the different regions of Antarctica.

The Area is extremely isolated and difficult to access, and as a result has been visited by only a small number of people. Reports indicate that small field parties visited the Area in December 1957, in the 1965-66 and 1973-74 austral summer seasons, in December 1978 and in December 2003. The total number of people having visited probably numbers less than 50, with visits generally limited to a period of a few weeks or days. No structures or installations have been built within the Area, and as far as is known all equipment brought into the Area has subsequently been removed. While Hodgson and Convey (2004) reported evidence of a very limited number of human footprints and several old soil pit excavations, the Area has been exposed to few opportunities for direct human impact. The Area is believed to be one of the most pristine ice-free valley systems in Antarctica, and is therefore considered to possess outstanding potential as a reference area for microbiological studies, and it is important that these values receive long-term protection.

The site possesses outstanding wilderness and aesthetic values. The dry and weathered brown valleys of the Area are surrounded by extensive ice-fields, the margins of which fringe the valleys with dry based glacial ice of a deep blue hue. This abrupt and dramatic blue-ice margin stands in stark contrast to the stony and barren ice-free landscape of the valleys, and aesthetically is extremely striking in appearance. One of the original explorers of this area in 1957 recalled "the excitement we felt at being the first people to view and enter this magnificently scenic, pristine area." (Behrendt 1998: 354). Further examples of descriptions of the Area by visitors are: "[the blue ice] was towering over us ~ 150 feet – a large wave of blue. It was like being in a tidal wave that was held in suspension as we walked under it…" (Reynolds, field notes, 1978), and "I still cannot find adequate superlatives to describe the features, whether large or small, biologic or physical… [Of the] many settings that stretch the imagination…in my experience none match the northern side of the Dufek Massif, with Davis Valley as its crown jewel." (Reynolds, pers. comm. 2000); "the most unusual [landscape] I have ever seen on any of the seven continents.” (Boyer, pers. comm. 2000); “Probably the single most remarkable environment I've been, either in Antarctica or elsewhere” (Convey, pers. comm. 2004). Burt (2004) described the region simply as “inspiringly awesome”.

The boundaries of the Area include the entire ice-free region centered on the Davis Valley, including the adjacent valleys and Forlidas Pond. In general, the margins of the surrounding ice sheets form the new boundary of the Area, providing special protection of the region as an integrated ice-free unit that closely approximates the valley catchments. The full catchments of the surrounding glaciers that flow into these valleys extend considerable distances from the ice-free area and do not possess many of the values related to the purpose of special protection, and are therefore excluded from the Area.

2. Aims and Objectives

Management at Davis Valley and Forlidas Pond aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance and sampling in the Area;
- preserve the ecosystem as an area largely undisturbed by human activities;
- preserve the almost pristine ecosystem for its potential as a biological reference area;
- allow scientific research on the natural ecosystem and physical environment within the Area provided it is for compelling reasons which cannot be served elsewhere;
- minimize the possibility of introduction of alien plants, animals and microbes to the Area; and
- allow visits for management purposes in support of the aims of the Management Plan.

3. Management Activities

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

- Markers, signs or other structures erected within the Area for scientific or management purposes shall be secured and maintained in good condition and removed when no longer necessary.
- National programs shall ensure the boundaries of the Area and the restrictions that apply within are marked on relevant maps and aeronautical charts;
- Visits shall be made as necessary to assess whether the Area continues to serve the purposes for which it was designated and to ensure management and maintenance measures are adequate.

4. Period of Designation

Designated for an indefinite period.

5. Maps

Map 1: Davis Valley and Forlidas Pond, ASPA No. 119, Dufek Massif, Pensacola Mountains: Location Map.

Map Specifications: Projection: Lambert Conformal Conic; Standard parallels: 1st 82°S; 2nd 83°S; Central Meridian: 51°W; Latitude of Origin: 81°S; Spheroid: WGS84.

Inset: the location of the Pensacola Mountains and Map 1 in Antarctica.

Map 2: Davis Valley and Forlidas Pond, ASPA No. 119: Topographic map and protected area boundary.

Map Specifications: Projection: Lambert Conformal Conic; Standard parallels: 1st 82°S; 2nd 83°S; Central Meridian: 51°W; Latitude of Origin: 81°S; Spheroid: WGS84; Vertical datum: WGS84. EGM96 MSL height differential –21 m. Contour interval 25 m. Topographic data generated by digital orthophoto and photogrammetric techniques from USGS aerial photography (TMA400, TMA908, TMA909 (1958) and TMA1498 (1964)) by the Mapping and Geographic Information Centre, British Antarctic Survey (Cziferszky *et al*. 2004). Accuracy estimates: horizontal: ±1 m; vertical: ±2 m, declining towards the south away from available ground control points. The surrounding ice fields and ice-free area beyond orthophoto coverage are mapped from WorldView 1 satellite imagery (05 Nov 2013) (© Digital Globe, courtesy NGA Commercial Imagery Program) with elevation data generated from a DEM produced by the Polar Geospatial Center (PGC) in 2014..

6. Description of the Area

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

General description

Davis Valley (51°05'W, 82°28'30"S) and Forlidas Pond (51°16'48"W, 82°27'28"S) are situated in the north-eastern Dufek Massif, Pensacola Mountains, part of the Transantarctic Mountain range (Map 1). The Dufek Massif is situated approximately mid-way between the Support Force Glacier and the Foundation Ice Stream, two of the major glaciers draining northwards from the Polar Plateau into the Ronne and Filchner Ice Shelves. Approximately 60 km to the southeast is the Forrestal Range (also part of the Pensacola Mountains), which is separated from the Dufek Massif by the Sallee Snowfield. The Ford Ice Piedmont separates the Dufek Massif from the Ronne and Filchner Ice Shelves, about 50 km to the northwest and 70 km to the northeast respectively.

The Davis Valley is approximately five kilometers wide and seven kilometers long, with its northern extent defined by the blue ice lobes that form part of the southern margin of the Ford Ice Piedmont (Map 2). It is bounded in the northeast by Wujek Ridge and Mount Pavlovskogo (1074 m) and southeast by Mount Beljakova (1240 m), flanked on the outer side by a glacier draining north from the Sallee Snowfield to the Ford Ice Piedmont. The western extent of the Davis Valley is defined by Clemons Spur, Angels Peak (964 m) and Forlidas Ridge. The Edge Glacier extends approximately 4 km into the Davis Valley from the Sallee Snowfield. The southern Davis Valley is dominated by Mount Beljakova (1240 m), on the northwestern margin of the Sallee Snowfield. Several smaller valleys exist in the west of the Area, adjacent to the prominent Preslik Spur and Forlidas Ridge. Almost 75% of the region enclosed by the large surrounding ice fields is ice-free, comprising 39 km^2 of ice-free ground in total, with the remainder of the area covered by the Edge Glacier, other permanent bodies of snow / ice and several small ponds.

Forlidas Pond is landlocked and occupies a small unnamed dry valley separated from the Davis Valley by a tributary ridge extending north from Forlidas Ridge. Other pro-glacial lakes and ponds occur within the Area at various locations along the blue ice margin of the Ford Ice Piedmont, at the terminus of the Edge Glacier, and along the ice margin west of Forlidas Ridge and Clemons Spur.

Boundary

The Area comprises all of the Davis Valley and the immediately adjacent ice-free valleys, including several of the valley glaciers within these catchments (Map 2). The boundary predominantly follows the margins of the surrounding ice fields of the Ford Ice Piedmont and Sallee Snowfield, which enclose the ice-free area that is considered to be of outstanding value. The northern boundary extends parallel to and 500 metres north from the southern margin of the Ford Ice Piedmont in the Davis Valley and in the adjacent valley containing Forlidas Pond, extending from 51°24'02"W, 82°26'23.4"S in the northwest to 50°52'10"W, 82°26'45.5"S in the northeast. This provides a buffer of protection around the freshwater bodies of value along the northern glacier margin. The eastern boundary follows the ice margin along Wujek Ridge from the Ford Ice Piedmont to Mount Pavlovskogo. The southeastern boundary extends from Mount Pavlovskogo across the Sallee Snowfield and the upper slopes of the Edge Glacier, following areas of outcrop where they exist to Mount Beljakova. The southern and western boundaries of the Area follow the margins of the permanent ice, with the southernmost extent being at 51°17'00"W, 82°33'20"S. The boundary encompasses a total area of 55.8 km^2.

Boundary markers have not been installed in the Area because of its remoteness, the limited opportunities for visits and the practical difficulties of maintenance. Moreover, the margins of the permanent ice fields are generally sharply defined and form a visually obvious boundary around most of the Area.

Meteorology

Several estimates of mean annual surface air temperature have been made in the Dufek Massif region from measurements taken in ice bores or crevasses at around 10 metres depth. A measurement of –24.96°C was obtained 32 km due north of Forlidas Pond on the Ford Ice Piedmont in December 1957 (Pit 12, Map 1) (Aughenbaugh *et al*. 1958). Another estimate of -9°C was made in December 1978 in the Enchanted Valley 26 km to the south (Map 1), measured in a crevasse at 8 metres depth (Boyer pers. comm. 2000).

Detailed meteorological data for the Area itself are limited to records collected over two weeks in 2003. Hodgson and Convey (2004) measured temperature and relative humidity over snow and rock surfaces at their sampling sites within the Area from 3-15 December 2003, with data recorded at 30-minute intervals, though sensors were not shielded with a Stevenson screen. Temperatures over snow ranged from a maximum of +12.8ºC to a minimum of –14.5ºC, with an average over the period of –0.56ºC. Temperatures over rock ranged from a maximum of +16.0ºC to a minimum of –8.6ºC, with an average over the period of +0.93ºC (data over rock were only recorded from 3-11 December 2003). Relative humidity recorded over snow ranged from a maximum of 80.4% to a minimum of 10.8%, with an average over the period of 42.6%. Over rock surfaces (from 3-11 December 2003), relative humidity ranged from a maximum of 80.9% to a minimum of 5.6%, with an average over the period of 38.7%.

Directly measured data on windspeeds and directions within the Area are not available, but models suggest near surface winds are predominantly from the west-north-west with mean winter velocities of c. 10 ms^{-1} (van Lipzig *et al.* 2004). While the older exposed ice-free areas above the glacial drift limit possess many features related to long-term wind erosion, there is some evidence to suggest that windspeeds within the locality are currently not especially high. For example, ice and snow surfaces were observed as largely free of wind-blown debris, and terrestrial cyanobacterial mats exist in-tact in exposed locations in the bottom of dry valleys (Hodgson and Convey 2004). No precipitation data are available, although the bare ice and rock surfaces and low average relative humidity recorded by Hodgson and Convey (2004) attest to a dry environment of low precipitation. This is consistent with a Type 2 dominated ablation area where sublimation-driven ablation occurs at the foot of the steep topographic barriers, with individual glacier valleys serving as gates for air drainage from the plateau to the Ronne-Filchner Ice Shelf. Strongest sublimation rates occur on these localized glaciers in the Transantarctic Mountains, where widespread blue ice areas are present (van den Broeke *et al.* 2006).

Geology, geomorphology and soils

The Dufek Massif is characterized by layered bands of cumulate rock belonging to the Dufek intrusion, thought to be one of the largest layered gabbro intrusions in the world (Behrendt *et al*. 1974; 1980; Ferris *et al.* 1998). This is exposed in the Davis Valley as the light- to medium-gray, medium-grained Aughenbaugh gabbro, which is the lowest exposed part of the Middle Jurassic Dufek intrusion (Ford *et al.* 1978).

The Davis Valley primarily consists of minimally weathered talus and glacial till of both local and exotic origin. In particular there appears to be an abundance of erratics of Dover Sandstone, one of several metasedimentary layers disrupted by the Dufek intrusion. An extensive glacial geomorphological record is evident. Features include overlapping valley-glacier moraines, ice sheet moraines, lake shoreline, lateral glacial channels, ice eroded surfaces, well-developed patterned ground and erratics. Boyer (1979) identified at least three major glacial and two major interglacial events, while Hodgson *et al.* (2012) maps geomorphological features derived from up to seven glacial stages. From oldest to youngest, these stages were: alpine glaciation of the escarpment edge; over-riding warm-based glaciation; glacier advance to an upper limit (760 m); two ice-sheet advances to closely parallel limits in the valleys; advance of the plateau outlet glacier (Edge Glacier) to merge with the ice sheet; and finally an advance and retreat of the main ice sheet margin. Attempts to provide age constraints for some of these glacial events have been carried out using paired cosmogenic ^{10}Be-^{26}Al exposure ages on erratic boulders, composed of Dover Sandstone. These suggest that some parts of the valley have been exposed for >1.0-1.8 Ma and experienced only a minor ice sheet advance at the Last Glacial Maximum, consistent with an emerging dataset from around the Weddell Sea rim that implies only rather modest ice thickening at this time.

Soils are not well-developed in the Area and generally lack a significant organic component. Parker *et al*. (1982) collected a soil that was light brown in color, resulting from gravel weathering predominantly to muscovite. The soil comprised sand (81%) with silt (14%) and clay (5%), a composition different from other sites in the Pensacola Mountains where the clay proportions of six samples ranges from 0.4% to 1.6%. The soil sample from the Davis Valley had a pH of 6.4 (Parker *et al*. 1982).

Lakes, ponds and streams

Forlidas Pond is a perennially frozen, shallow, round landlocked pond that was ~100 metres in diameter in 1957 (Behrendt 1998). In December 2003 the lake was measured by Hodgson and Convey (2004) as 90.3 metres in diameter from shoreline to shoreline on a transect azimuth of 306º (magnetic). At this time it was frozen almost completely to its base, with a thin layer of hypersaline slush at the lake bottom, and a freshwater meltwater moat that was partly ice free and partly covered by 10-15 cm of ice (Hodgson and Convey 2004). Depth was measured at 1.83 m and the thickness of the ice between 1.63 and 1.83 metres. The conductivity and temperature in the brine layer was 142.02 mS cm^{-1} and -7.67ºC respectively, compared with 2.22 mS cm^{-1} and 0.7ºC in the freshwater moat (Hodgson *et al.* 2010). The salinity of the bottom-water in Forlidas Pond is thus around four times greater than seawater. This concentration of salts is the result of the pond being the remnant of a much larger lake, which evaporated from about 2200 years ago and can be identified by a series of lake terraces and a high shoreline 17.7 m above the present water level (Hodgson *et al*. 2012).

Hodgson and Convey (2004) also report a small remnant pro-glacial pond near the margin of the Ford Ice Piedmont, 900 metres north of Forlidas Pond. Two pro-glacial meltwater ponds also occur to the west of Forlidas Ridge and a series of similar pro-glacial meltwater ponds also occur along the blue-ice margin of the northern Davis Valley, located at 51º 05.5' W, 82º 27.5' S and 51º 07' W, 82º 27.55' S. The pro-glacial lake at the terminus of the Edge Glacier is the largest within the Area. This is permanently frozen to the bottom apart from at the eastern margins where seasonal meltwater has been observed.

Dry stream channels and water erosion features are evident within the ice-free area, although only the small glacial melt streams on the eastern margin of the Edge Glacier have thus far been reported as flowing in December (Hodgson and Convey 2004). The apparent lack of melt streams may be because all visits to date have been made in the month of December, possibly before streams become more active. The presence of lake moats, the positive temperatures recorded by Hodgson and Convey (2004), as well as the biological and the geomorphological evidence, as well observations of footprints into formerly moist ground (Convey pers. comm. 2015) suggest that it is probable that at least some streams become active later in the season from melting snow, although perhaps not on an annual basis.

Biology

Visible biota is dominated by cyanobacterial mats, found both in lakes and in patches on the surface of ice-free ground, and a very sparse occurrence of small crustose lichens. Neuburg *et al.* (1959) observed yellow and black lichens growing sparsely in sheltered places in the Davis Valley, while Hodgson and Convey (2004) observed several lichen forms growing deep within the crevices of boulders. These have been identified as *Lecidea cancrioformis* Dodge & Baker (Hodgson *et al.* 2010, and see Appendix 1: Table A1 for a list of taxa identified in the Area). The British Antarctic Survey Plant Database also reports *Blastenia succinea* Dodge & Baker and *Xanthoria elegans* (Link.) Th. Fr. in samples from elsewhere in the Dufek Massif, although these have not been independently verified. Previous anecdotal reports of the possible occurrence of mosses within the Area could not be substantiated by Hodgson and Convey (2004), and it is probable that the rich cyanobacterial mat growth was earlier mistaken for bryophytes by non-specialists. The cyanobacterial community is the most abundant biota and is present in at least three distinct environments:

(1) In the permanent water bodies; particularly in the moat of Forlidas Pond, at the bottom and littoral zones of the Davis Valley Ponds, and in the seasonally wetted perimeter of Edge Lake. These habitats are extensively covered by red-brown cyanobacterial mats. These are actively photosynthesizing, as evidenced by gas bubbles trapped against the lower ice surfaces, and bubbles incorporated into the ice. Because perennially ice covered lakes have elevated concentrations of dissolved O_2 gas, the microbial mats growing on the bottom can become buoyant and start to float off the bottom as 'lift-off' mats, or become incorporated into the base of the lake ice when it makes contact with the bed. In Forlidas Pond and the Davis Valley Ponds lift off mats frozen into the base of the lake ice eventually migrate up through the ice profile. In the Davis Valley, this appears to take place over several years with each summer marked by the development of a 2-3 cm melt-cavity formed by the upward progression of the clump thorough the lake ice due to preferential heating of its upper surface. These clumps eventually break out at the surface and are dispersed by wind onto the shoreline, or further afield. Cyanobacteria were also present in the hypersaline brine of Forlidas Pond as single cells and as small flakes. A strain corresponding to the morphology of *Leptolyngbya antarctica* was isolated from the saline slush of TM1 (Fernandez-Carazo *et al*. 2011).

(2) In exposed terrestrial locations, particularly at the edge of larger rocks and within the boundary crevices of frost sorted polygons. These are generally very foliose in form, mid brown in colour, and best developed at the edge of larger rocks with depths of at least 10-15 cm. Nearly all clumps were completely dry on discovery, although those near to melting snow were damp and some had lower thalli that were often deep green in colour. Particularly good examples of this growth form were found in the mid valley floor of Forlidas Valley and in Davis Valley (near a large snow gully where it meets the second major terrace above Edge Lake).

(3) In a series of dry pond beds in the Davis Valley, two of up to 50 m diameter, which have extensive areas of almost continuous cyanobacterial mat on the former pond floors. These pond beds and gullies occupy depressions and therefore may accumulate snow in winter, permitting the cyanobacteria to take advantage of the wet and protected environment within the snow patches.

The growth form also occurs in many of the adjacent small gullies between polygons or other cryoturbation features, which often have the appearance of temporary drainage features.

Analyses of the cyanobacterial molecular diversity from four samples collected in and around Forlidas Pond show a depleted diversity, with only 2 - 5 Operational Taxonomic Units (OTUs) per sample (Hodgson *et al*. 2010). This is likely a product of geographical isolation combined with multiple environmental stressors such as salinity and seasonal desiccation, and UV radiation. Some of the cyanobacteria, for example from the brine of Forlidas Pond, are related to sequences from other hypersaline Antarctic lakes, whilst others are found almost exclusively in glacial regions. The six cyanobacterial OTUs described from the Dufek Massif are all distributed in more than one location within the continent and are found outside Antarctica.

The invertebrate fauna within the area is equally impoverished, with both the diversity and abundance of organisms being extremely limited compared with lower latitude and coastal Antarctic sites. No nematodes or arthropods have been found, but there are three species of tardigrade present from two Classes: *Echiniscus* (cf) *pseudowendti* Dastych, 1984 (Heterotardigrada), *Acutuncus antarcticus* (Richters 1904) and *Diphascon sanae* Dastych, Ryan and Watkins, 1990 (Eutardigrada), and a few unidentified bdelloid rotifers (Hodgson *et al.* 2010). *Acutuncus antarcticus* is an Antarctic species that occurs in semi-permanent damp / wet habitats throughout the Antarctic continent and sub-Antarctic islands, but has not been reported from any of the close neighbour continents. *Echiniscus* (cf) *pseudowendti* and *Diphascon sanae* found in samples from Forlidas Pond are also endemic to the Antarctic, with restricted distributions.

The most productive sites for these organisms were not the aquatic environments of the permanent lakes, but the former pond beds in the Davis Valley, showing these areas to be biologically productive, which necessitates a source of liquid water. In December 2003 very little snow was evident on the valley floor, prompting Hodgson and Convey (2004) to reason that the source of moisture may be from a considerable increase in melt later in the season flowing off the local ice sheet in the upper valley, or from local ice-cored moraines. Although this process was not occurring during their visit, footprints and shallow soil survey pits remaining from one of the previous parties (i.e. 25-46 years old) indicated that some ground was moist or waterlogged at the time of the earlier visit. Seasonal inundation by liquid water would explain the extensiveness and integrity of this cyanobacterial community, and its apparent resilience to the potential ravages of polar winds, as well as the relative abundance of invertebrates extracted from samples taken from within these areas.

Viable yeast species have been recorded in the soil, along with the algae *Oscillatoria* sp., *Trebouxia* sp. and *Heterococcus* sp. (Parker *et al.* 1982). Chasmoendolithic microorganisms have been recorded in rocks in the Dufek Massif (Friedmann 1977), although Hodgson and Convey (2004) found no evidence of their presence within the Area and noted that rock types most favorable for the occurrence of endolithic organisms are not widespread.

Avifauna is sparse: in December 2003 a single snow petrel (*Pagadroma nivea*) was noted flying around one of the peaks above Davis Valley.

Human activities and impact

There have been few visits to the Area and human impacts are believed to be minimal (Table A2 Appendix 1). Because of its remoteness and the infrequency of visits, it is one of the few ice-free areas of Antarctica where the compiled record of past human activity at the site is almost complete. The almost pristine condition of the environment contributes to the extremely high value of the Area and is an important reason for its special protection.

The key characteristics of visits recorded to the Area are summarized in Table A2 (Appendix 1), which should be updated as required (see Section 7(x)). Past camps have generally been on the ice sheet outside of the Area. Previous parties removed all wastes from the Area, with the possible exception of small quantities of human wastes. In 2003 all wastes including all human wastes were removed, both from within the Area and from the party's adjacent campsite on the Ford Ice Piedmont (Map 2). Hodgson and Convey (2004) noted that in December 2003 the evidence of previous visits was limited to a number of footprints and several shallow soil excavations in the Davis Valley.

6(ii) Access to the Area

Access to the Area may be made only on foot. Access to the icefields surrounding the Area may be made by aircraft or via overland routes. Access to the Area should be made as close as practicable to the intended study site, in order to minimize the amount of the Area that needs to be crossed. Due to the surrounding terrain and crevasse patterns, the most practical access routes into the Area are from the Ford Ice Piedmont to the north of the Area.

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

No structures, installations or caches are known to exist within the Area.

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

There are no other protected areas nearby, with the nearest being Ablation Valley – Ganymede Heights (ASPA No. 147), Alexander Island, which is approximately 1300 km to the north-west.

6(v) Special zones within the Area

None.

7. Permit conditions

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 compelling scientific or educational reasons that cannot be served elsewhere, or for reasons essential to the management of the Area ;
- 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 environmental, scientific and aesthetic and wilderness values of the Area, in particular its pristine value and its potential as a largely undisturbed biological reference site;
- The Permit shall be issued for a finite period.
- the Permit, or a copy, shall be carried when in the Area;

7(ii) Access to and movement within the Area

- Landing of aircraft is prohibited within the Area and overflight of the Area at less than 100 metres above ground level is prohibited.
- Vehicles are prohibited within the Area.
- Access into and movement within the Area shall be on foot.
- No special restrictions apply to the means of access, or air or land routes used, to move to and from the icefields surrounding the boundaries of the Area.
- Access into the Area should be at a practicable point close to sites of study in order to minimize the amount of the Area that needs to be traversed. The terrain and crevassing generally makes such access most practical from the Ford Ice Piedmont to the north of the Area.
- Pedestrian routes should avoid lakes, ponds, former pond beds, stream beds, areas of damp ground and areas of soft sediments or sedimentary features. Care should be exercised to avoid damage to any areas of cyanobacterial mat growth, in particular to the extensive areas found in relict pond beds in Davis Valley (see Map 2).
- Pedestrian traffic should be kept to the minimum necessary consistent with the objectives of any permitted activities and every reasonable effort should be made to minimize effects.

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

- Scientific research that will not jeopardize the scientific, ecological or aesthetic and wilderness values of the Area, or its pristine value and potential as a reference site, and which cannot be served elsewhere;
- Essential management activities, including monitoring;
- Activities with educational aims that are undertaken for compelling reasons which cannot be served elsewhere. Activities may include documentary reporting (photographic, audio or written) or the production of educational resources or services. Educational activities shall not compromise the values for which the Area is protected, in particular its value as a near-pristine reference site. Educational aims do not include tourism.
- The appropriate authority should be notified of any activities / measures undertaken that were not included in the authorized Permit.

7(iv) Installation, modification or removal of structures

- No structures are to be erected within the Area except as specified in a Permit.
- Permanent structures are prohibited.
- All scientific equipment installed in the Area must be approved by Permit.
- Should equipment be intended to remain within the Area for a duration of more than one season it shall clearly be identified by country, name of the principal investigator and year of installation. All such items should be made of materials that pose minimal risk of contamination of the Area.

- Installation (including site selection), maintenance, modification or removal of structures shall be undertaken in a manner that minimizes disturbance to the physical, ecological, scientific or aesthetic and wilderness values of the Area;
- Removal of structures, equipment or markers for which the Permit has expired shall be a condition of the Permit. It shall be the responsibility of the authority which granted the Permit to ensure that this condition is included in the Permit, and, in the event that the Permit holder does not meet this obligation, it shall be that authority's responsibility to ensure removal.

7(v) Location of field camps

- Camping within the Area is prohibited.
- Suitable camp sites have been proven to the north and west of the Area on the Ford Ice Piedmont (Map 2), and also in the Enchanted Valley (Map 1).

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

In addition to the requirements of the Protocol on Environmental Protection to the Antarctic Treaty, restrictions on materials and organisms which may be brought into the area are:

- Deliberate introduction of animals, plant material, micro-organisms and non-sterile soil into the Area is prohibited. Precautions shall be taken to prevent the accidental introduction of animals, plant material, micro-organisms and non-sterile soil from other biologically distinct regions (within or beyond the Antarctic Treaty area)
- Visitors shall ensure that sampling equipment and markers brought into the Area are clean. To the maximum extent practicable, footwear and other equipment used or brought into the area (including backpacks, carry-bags and tents) shall be thoroughly cleaned before entering the Area. Visitors should also consult and follow as appropriate recommendations contained in the Committee for Environmental Protection Non-native Species Manual (CEP 2011), and in the Environmental Code of Conduct for Terrestrial Scientific Field Research in Antarctica (SCAR 2009);
- To reduce the risk of microbial contamination, the exposed surfaces of footwear, sampling equipment and markers should be sterilized before use within the Area. Sterilization should be by an acceptable method, such as by washing in 70% ethanol solution in water.
- No pesticides shall be brought into the Area;
- Fuel, food, chemicals, and other materials shall not be stored in the Area, unless specifically authorized by permit and shall be stored and handled in a way that minimizes the risk of their accidental introduction into the environment;
- All materials introduced shall be present only for a finite period stated in the Permit and shall be removed at or before the conclusion of that stated period; and
- If release occurs which is likely to compromise the values of the Area, removal is encouraged only where the impact of removal is not likely to be greater than that of leaving the material *in situ*.

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

- Taking or harmful interference with native flora or fauna is prohibited, except in accordance with a permit issued under Article 3 of Annex II to the Protocol on Environmental Protection to the Antarctic Treaty. Where animal taking or harmful interference 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) Collection or removal of materials not brought into the Area by the Permit holder

- Material may be collected or removed from the Area only in accordance with a Permit and should be limited to the minimum necessary to meet scientific or management needs. Permits shall not be granted if there is a reasonable concern that the sampling proposed would take, remove or damage such quantities of soil, native flora or fauna that their distribution or abundance within the Area would be significantly affected.

- 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 authorized, 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 authority must be notified and approval obtained.

7(ix) Disposal of waste

All wastes, including water used for any human purpose and including all human wastes, shall be removed from the Area. Individuals or groups shall carry appropriate containers for human waste and gray water so that they may be safely transported and removed from the Area.

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

Permits may be granted to enter the Area to:

- carry out monitoring and Area inspection activities , which may involve the collection of a small number of samples or data for analysis or review;
- carry out protective measures;

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, and no later than six months after the visit has been completed.
- Such reports should include, as appropriate, the information identified in the Visit Report form contained in Appendix 2 of the Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas (Resolution 2 (2011)). 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 reports in a publicly accessible archive to maintain a record of usage, to be used both in any review of the Management Plan and in organizing the scientific use of the Area.
- The appropriate authority should be notified of any activities / measures undertaken, anything removed, and / or of any materials released and not removed, that were not included in the authorized permit.

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Appendix 1: Table A1. Biological sampling program in the Davis and Forlidas Valleys: groups of taxa identified and the methods used (Hodgson *et al.*, 2010).

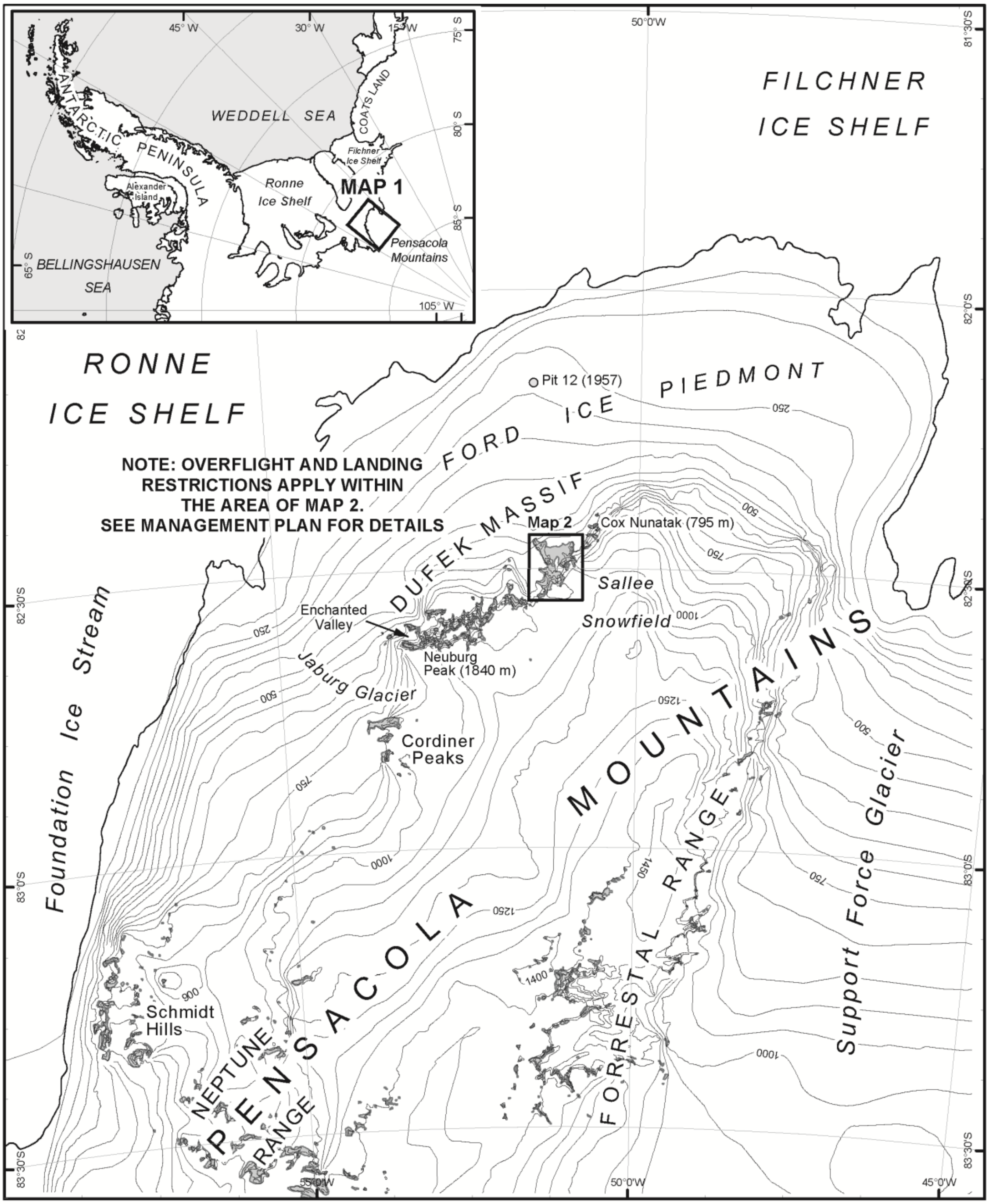
Description	Method	No. samples	No. taxa	Taxa
Bryophyta	Observational survey	0	0	n/a
Lichens	Observational survey	1	1	*Lecidea cancriformis* Dodge & Baker
Bacillariophyceae / Diatoms	Survey under light microscope	2	1	*Pinnularia microstauron* (Ehr.) Cl.††
Cyanobacteria	Clone library, DGGE + band sequencing, isolation of strains+ sequencing (microscopy)	3	6	Sample TM1: 16ST63, 16ST14 Sample TM2: 16ST63, 16ST14, 16ST44, 16ST49, 16ST80 Sample TM3: 16ST44, 16ST49, 16ST80, 16ST07
Chlorophyta /Green algae	DGGE + band sequencing	2	1	*Urospora* sp.
Rhizaria/ Cercozoa	DGGE + band sequencing	2	2	Heteromitidae, *Paulinella* sp.
Bacteria	DGGE + band sequencing	2	32	Cyanobacteria: Nostocales, Oscillatoriales, Chroococcales, Gloeobacteriales** Bacteroidetes: Sphingobacteriales, Flavobacteriales Firmicutes: Clostridiales Gammaproteobacteria: Pseudomonadales, Psychrobacter
Bacteria	Isolation of strains + sequencing	1	330 isolates	*Firmicutes* 33%, *Bacteroidetes* 23%, *Alphaproteobacteria* 25%, *Actinobacteria* 9%, *Betaproteobacteria*. 8%, *Gammaproteobacteria* 1.5%, Deinococci 0.3%
Arthropods	Tullenberg	50	0	n/a
Invertebrates	Baermann extractions	130	3	See Tardigrades (below)
Tardigrades	Light microscope (Molecular†)	14 20	3 1	*Echiniscus* (cf) *pseudowendti* Dastych, 1984 (Heterotardigrada), *Acutuncus antarcticus* (Richters, 1904) *Diphascon sanae* Dastych, Ryan and Watkins, 1990 (Eutardigrada)
Rotifers	Tullenberg and light microscope	130	present	Bdelloid rotifers
Soil bacteria and algae	Cultured (Parker *et al.*, 1982)*	1	3	Cyanobacteria: *Oscillatoria* sp. Algae: *Trebouxia* sp., *Heterocous* sp. (viable yeasts present)
Avifauna	Observation	n/a	1	Snow petrel (*Pagadroma nivea*)

*previously published, ** tentative identification based on about 100 bases, †analyses carried out on morphologically congruent samples from the Shackleton Range, †† not considered as evidence of an extant community

Appendix 1: Table A2. Known visits to the Davis Valley and adjacent ice-free valleys within and near the Area.

Party	No. pers	Org	Purpose	Dates	Duration (days)	Locations visited	Camp	Transport
Aughenbaugh, Behrendt, Neuburg, Thiel, Walker	5	IGY (US)	Geology Geophysics	Dec 1957	?	FIP,DV,FP, FR	FIP west of FR	Sno-Cat traverse to FIP, then on foot
Ford, Schmidt, Nelson, Boyd, Rambo (?)	5	USGS	Geology	Dec 1965 – Jan 1966	?	?	Base camp in Neptune Range	Numerous helicopter landings in Dufek Massif
Ford & team	?	USGS	Geology	Summer 1973-74	?	?	?	?
Ford, Carlson, Czamanske, Nutt, England, Nelson	6	USGS	Geology	30 Nov – 30 Dec 1976 (expedition dates)	?	?	Base camp close to Walker Peak (southwest Dufek Massif)	Numerous helicopter landings in Dufek Massif. Motor toboggans and ski traverses used on ground.
Russian team led by Shuljatin, O. G. Accompanied by Ford (and Grue?) from the USA and Paech from Germany.	11	Soviet Antarctic Expedition (22)	Geology Geophysics	Summer 1976-77	49 (total expedition)	Dufek Massif and other locations in the Pensacola Mountains	Field camps on Provender Mountain, Read Mountain and Skidmor Mountain. Druznaja Station used as base camp.	Helicopter landings, snowmobile 'Buran', thence on foot
Russian team led by Kamenev, E. N.	6	Soviet Antarctic Expedition (23)	Geology Geophysics	06 Feb – 17 Feb 1978	11	Dufek Massif	Field camp in Schmidt Hills. Druznaja Station used as base camp.	Airplane, snowmobile 'Buran', thence on foot
Boyer, Reynolds	2	USGS	Geology	12 Dec 1978	2	FIP, DV	EV	Toboggan from EV to ice margin, thence on foot
Ford, Boyer, Reynolds Carl?	4	USGS	Geology	14 Dec 1978	4	FIP, DV, FR, AP	EV	Toboggan from EV to ice margin, thence on foot
Hodgson, Convey, Burt	3	BAS (UK)	Biology, Limnology, Glacial geo-morphology	3-15 Dec 2003	13	FIP, DV, FP, FR, AP	FIP 1.9km north of FP	Twin Otter to FIP, thence on foot.
TOTALS	~30				~40??	(numbers approximate owing to incomplete data)		

Key: FIP – Ford Ice Piedmont; DV – Davis Valley; FP – Forlidas Pond; FR– Forlidas Ridge; AP – Angels Peak; CS – Clemons Spur; PS – Preslik Spur; MB– Mt Beljakova; MP–Mt Pavlovskogo; EV–Enchanted Valley.



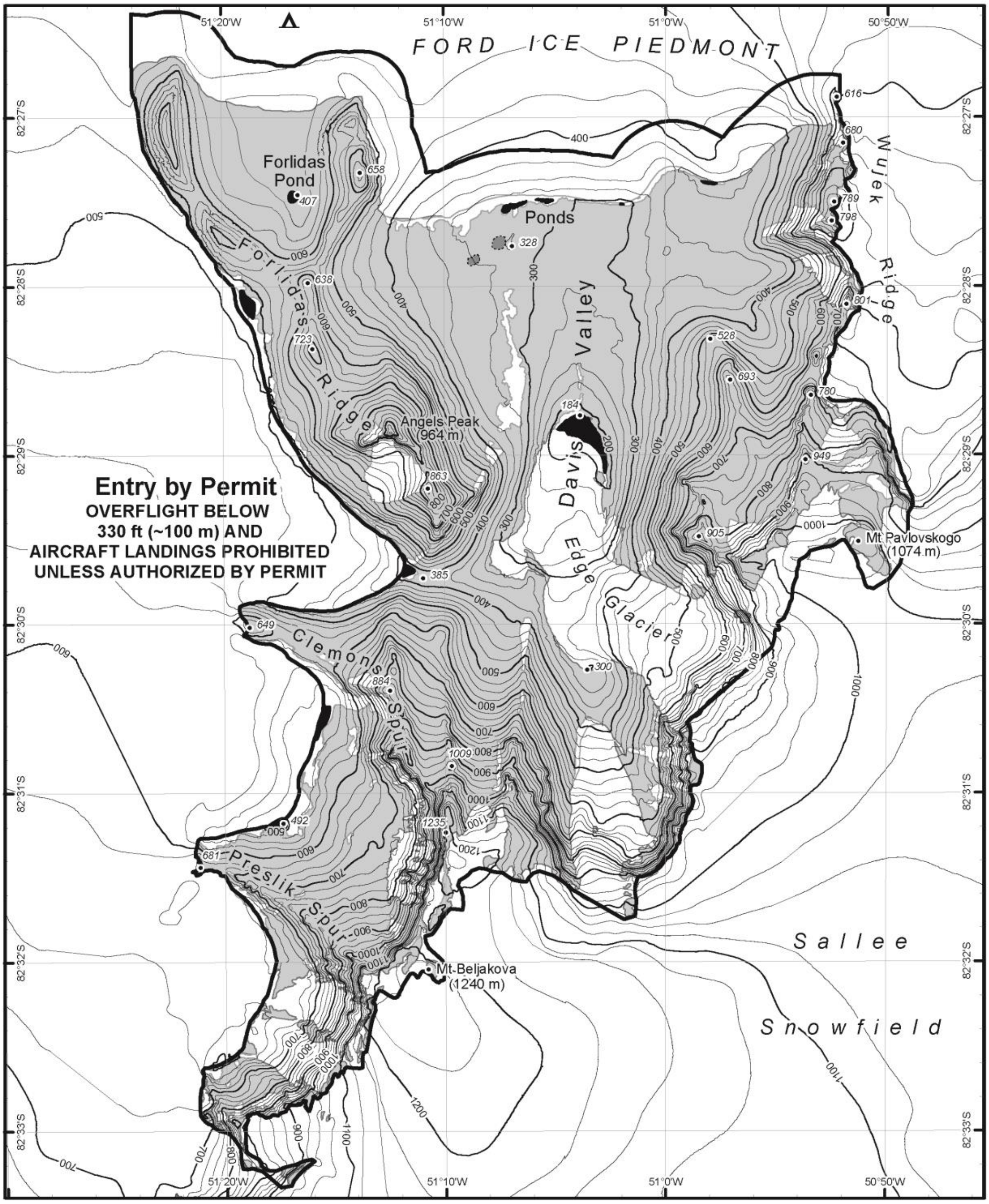
Map 1: ASPA No. 119 - Davis Valley and Forlidas Pond - Location Map

10 Feb 2015 (Map ID: 10068.0005.01)
United States Antarctic Program
Environmental Research & Assessment

0 10 20 Kilometers

Coastline — Contour (50 m) — Ice free ground — Permanent ice — Ice bore

Projection: Lambert Conformal Conic
Spheroid and horizontal datum: WGS84
Data sources: Coast & topography: SCAR ADD (v6, 2012).



Map 2: ASPA No. 119 - Davis Valley and Forlidas Pond - Topographic Map

13 Mar 2015 (Map ID: 10068.0006.01)
United States Antarctic Program
Environmental Research & Assessment

Spot elevation · Index contour (100 m) · Contour (25 m) · Ice free ground · Permanent ice · ASPA boundary · Lake · Relict pond bed · Proven campsite

Kilometers 0 1 2

Projection: Lambert Conformal Conic
Spheroid and horizontal datum: WGS84
Data sources: Topographic data supplied by the MAGIC, BAS.
Derived from USGS aerial photography (1956, 1964), satellite imagery (2002) and field observations (Hodgson and Convey).
Updated by ERA using WorldView imagery and DEM provided by PGC.

Management Plan for Antarctic Specially Protected Area No. 148

MOUNT FLORA, HOPE BAY, ANTARCTIC PENINSULA

Introduction

The primary reason for the designation of Mount Flora, Hope Bay, Antarctic Peninsula (Latitude 63°25’ S, Longitude 57°01’ W, 0.3 km^2) as an Antarctic Specially Protected Area (ASPA) is to protect scientific values associated with the rich fossil flora present within the Area.

Mount Flora was originally designated as a Site of Special Scientific Interest through Recommendation XV-6 (1989, SSSI No. 31) after a proposal by the United Kingdom. It was designated on the grounds that ‘the site is of exceptional scientific importance for its rich fossil flora’. It was one of the first fossil floras discovered in Antarctica and has played a significant role in deducing the geological history of the Antarctic Peninsula. Its long history as an easily accessible site and the large amount of fossiliferous debris occurring in scree has made it vulnerable to souvenir collectors, and the amount of material available for serious research has been considerably depleted.” The Management Plan underwent a major revision in 2002 (Measure 1) including changes to the boundary.

Geologist Johann Gunnar Andersson discovered Mount Flora during the Swedish South Polar Expedition (1901-04), whose original stone hut (Historic Site and Monument No. 39) remains nearby at Seal Point, Hope Bay. Otto Nordenskjöld, the leader of the expedition, named Mount Flora (as ‘Flora-Berg’) following the geological observations of Andersson, recognising it as the first significant fossil locality discovered in Antarctica. The Area subsequently became of great scientific importance for interpreting key geological relationships in the region.

The Area is approximately three kilometres southeast of Esperanza Station (Argentina) and Teniente de Navio Ruperto Elichiribehety Station (Uruguay).

The Area fits into the wider context of the Antarctic Protected Area system as one of the few ASPAs protecting primarily geological values. Resolution 3 (2008) recommended that the Environmental Domains Analysis for the Antarctic Continent, be used as a dynamic model for the identification of Antarctic Specially Protected Areas within the systematic environmental-geographical framework referred to in Article 3(2) of Annex V of the Protocol (see also Morgan et al., 2007). Using this model, ASPA 148 is contained within Environment Domain A: Antarctic Peninsula northern geologic (Morgan et al., 2007). ASPA 148 sits within Antarctic Conservation Biogeographic Region (ACBR) 1 Northeast Antarctic Peninsula.

1. Description of values to be protected

Following a visit to the ASPA by environmental managers from Argentina in January 2011 and January 2013 the values specified in the earlier designation were reviewed and re-confirmed. Values within the Area are set out as follows:

- Mount Flora has important scientific and historical values associated with this significant heritage of geological discovery in Antarctica.
- Mount Flora is characterised by three distinct geological formations: the Hope Bay Formation (Trinity Peninsula Group), which is separated by an unconformity from the overlying gently tilted plant beds of the Mount Flora Formation (Botany Bay Group), which in turn are overlaid by ignimbrites and

welded tuffs of the Kenney Glacier Formation (Antarctic Peninsula Volcanic Group). The relationships between these formations have been fundamental for determining the age of the plant beds, which has been vital to the interpretation of the geology of the Antarctic Peninsula.
- Historically, the site has played an important role in comparisons with other Southern Hemisphere floras.
- The fossil flora has been important for providing Mesozoic palaeoclimate data from a region where such information is otherwise sparse.
- Mount Flora holds one of the few Jurassic floras known from Antarctica and it is the only site that has been relatively well studied and documented. The Mesozoic plant assemblages from Mount Flora include members of the sphenophytes, ferns, cycadophytes (cycads and bennetites), pteridosperms and conifers. Samples of the fossils have served as a major reference source for many studies of Jurassic and Cretaceous palaeobotany.

2. Aims and objectives

Management at Mount Flora aims to:
- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance and sampling in the Area through uncontrolled access and inappropriate collections of geological material;
- allow scientific geological and palaeontological research, while ensuring protection from over-sampling;
- allow other scientific research within the Area provided it will not compromise the values for which the Area is protected;
- allow scientific research in the Area provided it is for compelling reasons which cannot be served elsewhere;
- allow visits for management purposes in support of the aims of the Management Plan.

3. Management activities

The following management activities shall be undertaken to protect the values of the Area:
- A map showing the location of the Area (stating the special restrictions that apply) shall be displayed prominently at Esperanza Station (Argentina) and Teniente de Navio Ruperto Elichiribehety Station (Uruguay), where copies of this Management Plan shall be made available.
- Persons wishing to make the ascent of Mount Flora shall be instructed not to enter the Area without a Permit issued by the appropriate authority.
- Markers, signs or other structures erected within the Area for scientific or management purposes shall be secured and maintained in good condition.
- Abandoned equipment or materials shall be removed to the maximum extent possible provided that doing so does not adversely impact on the values of the Area
- The area shall be visited by experts as necessary to assess whether it continues to serve the purposes for which it was designated and to ensure that management and maintenance activities are adequate. A desk assessment shall also be undertaken to consider the ASPA post-visits reports and available information on fossil collection within the Area.
- Increasing exposure of fossiliferous rocks on Mount Flora is expected if glacial ice in the vicinity continues to retreat, as has occurred in recent years. Periodic updating of the boundaries should be undertaken to ensure any newly-exposed fossiliferous rocks are included within the Area, which should be considered at the time of review of the Management Plan.
- A record of fossils collections from Mount Flora will be maintained based on post visit reports, in order to better assess the issuance of permits and to minimize over-sampling. (see sections *7(iii),(x)* and *(xi)*).

4. Period of designation

Designated for an indefinite period.

5. Maps

Map 1: Mount Flora ASPA No. 148 in relation to Hope Bay, Trinity Peninsula, and the South Shetland Islands, showing the location of the nearest protected areas. The location of Esperanza Station (Argentina) and Teniente de Navio Ruperto Elichiribehety Station (Uruguay) are also shown. Inset: the location of Mount Flora on the Antarctic Peninsula.

Map 2: Mount Flora ASPA No. 148, Hope Bay, topographic map. Map specifications: Projection: Lambert Conformal Conic: Standard parallels: 1st 76° 40' S; 2nd 63° 20' S Central Meridian: 57° 02' W; Latitude of Origin: 70° 00' S; Spheroid: WGS84. Vertical datum: mean sea level. Vertical contour interval 25 m. Horizontal and vertical accuracy unknown. Note: topography and positions are based on original 1950s survey data, and true positions are known to be in error by up to 500 m. Ice margins are provided based upon 1999 aerial photography.

Map 3: Mount Flora ASPA No. 148 geological map, adapted from the 'Mapa Geológico de Bahía Esperanza Antártida' published by the Intituto Geológico y Minero de España and Instituto Antártico Argentino (Scale 1:10,000).

6. Description of the Area

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

GENERAL DESCRIPTION
Mount Flora (latitude 63°25' S, longitude 57°01' W, 0.3 km^2) is situated on the southeastern flank of Hope Bay, at the northern end of Trinity Peninsula, Antarctic Peninsula (Map 1). The summit of Mount Flora (520 m) is approximately 1 km from the southern shore of Hope Bay. Four glaciers surround Mount Flora. The Flora Glacier extends from the cirque below the summit of Mount Flora in a northeasterly direction for one kilometre before it flows into a larger glacier that flanks the eastern and southern slopes of Mount Flora, extending northeast from The Pyramid (565 m) (Map 2). The western slopes of Mount Flora are bounded by the Kenney Glacier, which joins Depot Glacier before flowing into the head of Hope Bay. The Pyramid is a distinctive peak 1.5 km to the SSE of Mount Flora. To the north of the Area is the ice-free Five Lakes Valley and Scar Hills, and to the northeast is Lake Boeckella.

BOUNDARIES
The boundaries designated in the original Management Plan were amended during the 2002 Management Plan revision to include all of the known exposed fossiliferous strata on the northern slopes of Mount Flora. The summit ridge and highest peak of Mount Flora (520 m), which were formerly within the boundary, are comprised of non-fossiliferous volcanic rocks and have been excluded from the Area. The boundary runs from the north summit of Mount Flora (516 m) – the highest point of the boundary – westward down the ridge to the Kenney Glacier, the eastern margin of Kenney Glacier northward to the 150 m contour, eastward along the 150 m contour to the northwestern margin of the Flora Glacier, the northwestern margin of the Flora Glacier southwestward to the ridge leading westward to the north summit of Mount Flora. Where present, the glacier margins, lower outcrops, western ridge and northern summit of Mount Flora form visually obvious features that indicate the boundaries: the Area remains otherwise unmarked.

The boundary co-ordinates of the Area, starting with the north summit of Mt Flora and moving clockwise, are shown in Table 1.

Table 1. Boundary co-ordinates of ASPA No. 148 Mt Flora, Hope Bay, Antarctic Peninsula

Number	Latitude	Longitude
1	63º25’01.6’’ S	057º01’44.6’’ W
2	63º24’52.7’’ S	057º01’58.4’’ W
3	63º24’49.2’’ S	057º01’47.5’’ W
4	63º24’42.5’’ S	057º00’51.8’’ W
5	63º24’47.9’’ S	057º01’12.0’’ W
6	63º24’54.4’’ S	057º01’19.4’’ W
7	63º24’54.8’’ S	057º01’31.0’’ W

CLIMATE

No climate data are available for Mount Flora but local conditions are indicated by those at Esperanza Station. In summer (December, January and February), the average maximum temperature ranges between 2.6 ºC and 3.2 ºC, while the average minimum temperature ranges between -2.9 ºC and -1.8 ºC. During this season the temperature can reach as high as 14.8 ºC, as in 1978, or as low as -12.0 ºC, as in 1985. In winter, average maximum temperatures are around -6.0 ºC, while the minimum averages are about -15.0 ºC. Exceptionally, the temperature may rise to 13.0 ºC, or fall to -32.3 ºC, as in 1975. Temperatures at Mount Flora are likely to be lower owing to its greater elevation. The least windy months are December and January (mean wind speed 20-22 km h^{-1}), compared to May, July, August and September when winds are stronger (mean wind speed >30 km h^{-1}). During April and May gusts of more than 380 km h^{-1} have been recorded, resulting from katabatic winds from the local glacier. Strong winds (at or above 43 km h^{-1}) have been observed throughout the year, with an average frequency of c. 15 days per month. The average annual frequency of days with snow is 181 days per year. Throughout the year, snow fall occurs, on average, on 13-16 days each month, with a minimum average of 13 days in June. The average frequency of days with overcast skies is high in summer (23 days in January) but lower during the winter months (c. 13 days per month). The frequency of days with clear skies it is low throughout the year, ranging between 1 and 5 days per month. (Servicio Meteorológico Nacional, Argentina).

GEOLOGY, SOILS AND PALAEONTOLOGY

The geology of the Area comprises three main formations: the Hope Bay Formation, the Mount Flora Formation and the Kenney Glacier Formation. At the base, the Hope Bay Formation (Trinity Peninsula Group) is more than 1200 m thick and is characterised by marine siliciclastic turbidite and sandstone. It has an inferred Permo-Carboniferous age based on supposed Carboniferous spores (Grikurov and Dibner 1968) and Rb-Sr isotopic dating of ‘grits’ and mudstones (281 ±16 Ma; Pankhurst 1983) but the age evidence is sparse and open to ambiguous interpretation (Smellie and Millar 1995). The Hope Bay Formation is separated by an angular unconformity and a long stratigraphic gap from the overlying Mount Flora Formation. The Mount Flora Formation (Botany Bay Group) is composed mainly of sandstones, conglomerates and shale, and contains the most significant fossil strata. The overlying Kenney Glacier Formation (Antarctic Peninsula Volcanic Group), which is also separated from the Mount Flora Formation by an angular unconformity, is composed of ignimbrites and welded tuffs. There has been debate over the age of the Mount Flora Formation (Andersson 1906, Halle 1913, Bibby 1966, Thomson 1977, Farquharson 1984, Francis 1986, Gee 1989, Rees 1990); the most recent palaeobotanical and radiometric data available support an age of Early to Middle Jurassic (Rees 1993a, b, Rees and Cleal 1993, Riley and Leat 1999). Faults have been observed in the northern face of Mount Flora (Birkenmajer 1993a) and mapped separating the Trinity Peninsula Group and Mount Flora Formation (Smellie pers. comm. 2000).

The Mount Flora Formation is about 230-270 m thick and may be subdivided into an older Five Lakes Member and an upper Flora Glacier Member, which contains the most important fossil deposits. The Five Lakes Member is about 170 m thick and consists of plant-bearing coarse sedimentary breccias, conglomerates and sandstones. The dominant lithology, particularly in the lower part of the succession, is clast-supported cobble to boulder conglomerate (Farquharson 1984). It is well-exposed on the northern and northeastern slopes of Mount Flora between the Flora Glacier and Five Lakes Valley. The lower boundary of this member is an angular unconformity against the Hope Bay Formation. The contact between the Mount Flora Formation and the Hope Bay Formation is covered by scree. Some 50 m of basal beds of the Five Lakes Member are presumed unexposed. A higher section of the Five Lakes Member is well-exposed at a buttress which separates Flora Glacier from Five Lakes Valley (Martín Serrano et al. 2005, Montes et al. 2004).

The Flora Glacier Member comprises a sandstone-conglomerate complex 60-100 m thick, locally overlain by a shale complex up to 10 m thick, which is the main fossiliferous zone. It is best exposed at a buttress that divides the Flora Glacier cirque from Five Lakes Valley at approximately 350 m. A one metre-thick sill occurs in the upper section of the shale, close to the contact with the Kenney Glacier Formation. The sandstone association is dominated by fining upward cycles (characterised by decreasing grain size) that range in thickness from 2.5 to 11.5 m (Farquharson 1984). Although mostly inaccessible, good exposures of the Flora Glacier Member continue in the steep slopes of Mount Flora above Five Lakes Valley, extending westward to the margin of the Kenney Glacier. The thickness of the unit increases from 50-60 m at the buttress to about 100 m at the glacier margin. Volcanogenic deposits form a small but significant part of the Mount Flora Formation. A single ignimbrite 26 m thick forms a pale band across the north face of Mount Flora, approximately halfway up the sedimentary sequence (Farquharson 1984). The Kenney Glacier Formation volcanic rocks overlie the Mount Flora Formation, exposed in the highest part of Mount Flora. It also unconformably overlies the Hope Bay Formation on the eastern spur of the Pyramid (Smellie, pers. comm. 2000). The incomplete formation is a complex of predominantly evolved, rhyolite-dacite lavas, ignimbrites, agglomerates and tuffs (Birkenmajer 1993a & b). Farquharson (1984) identified the presence of tuffs, fine-grained agglomerates and welded tuffs. The most significant fossil exposures are found on the northern and northwestern faces of Mount Flora.

Most research has been conducted on samples from the relatively accessible northern face. The fossil flora was first comprehensively described by Halle (1913) and since then has been considered a standard for Mesozoic gondwanan floristic and biostratigraphic studies (Rees and Cleal 1993). Halle (1913) originally described 61 species from the fossils; this was revised to 43 species (Gee 1989), then to 38 species (Rees 1990) and, later still, to 32 species (Baldoni, 1986, Morel et al. 1994; Rees and Cleal 2004). More recently, 41 taxa have been described (Ociepa 2007; Birkenmajer and Ociepa 2008; Ociepa and Barbacka 2011). Fossil wood from the ASPA has also been studied (Torres et al. 2000).

The flora is represented typically by small scale-like leaves of Hepatophyta, stems and cone fragments of sphenophytes (Equisetaceae, *Equisetum*), as well as foliage of several ferns families (Dipteridaceae, Matoniaceae, Dicksoniaceae, Osmundaceae) and leaves and wood of gymnosperms (Caytoniales, Cycadales, Bennettitales, pteridosperms and conifers). Cycadophyte and conifer cone scales, seeds and other unidentifiable stems, leaves and foliage branches are also preserved (Taylor, no date; Rees pers. comm. 1999). Other floral fragments have been interpreted as fertile fern fronds or pollen organs of conifers but it remains uncertain how this species is related to other taxa because no spores or pollen have been obtained from the material to date (Ociepa and Barbacka, 2011). More generally, identifiable palynomorphs from the plant beds of Mount Flora Formation could not be recovered (Rees and Cleal 2004; Ociepa and Barbacka 2011). Four beetle (Order: Coleoptera) elytra (exoskeletons) have been identified from a small sample of shale, also containing plant fossils, from Mount Flora (Zeuner 1959). These were identified as *Grahamelytron crofti* and *Ademosynoides antarctica*. *G. crofti* is possibly a Carabidae, although it resembles a Chrysomelidae, while *A. antarctica* has been referred to as a Carabidae, Tenebrionidae, Elateridae or the fossil family Permosinidae (Zeuner, 1959). No other examples of fossil fauna have been recorded. There are no known marine fossil floral or faunal deposits in the Area.

TERRESTRIAL AND FRESHWATER BIOLOGY

The living flora within the Area is sparse and patchily distributed. Although a full floristic survey has not been made, a number of moss and lichen species have been identified as present. Moss species identified are: *Andreaea gainii, Bryum argenteum, Ceratodon purpureus, Hennediella heimii, Pohlia nutans, Sanionia uncinata, Schistidium antarctici* and *Syntrichia princeps*. Lichen species identified are: *Acarospora macrocyclos, Buellia anisomera, Buellia* spp., *Caloplaca* spp., *Candelariella vitellina, Cladonia pocillum, Haematomma erythromma, Physcia caesia, Pleopsidium chlorophanum, Pseudephebe minuscula, Rhizocarpon geographicum, Rhizoplaca aspidophora, Stereocaulon antarcticum, Tremolecia atrata, Umbilicaria antarctica, Umbilicaria decussata, Umbilicaria kappeni, Usnea antarctica, Xanthoria candelaria* and *Xanthoria elegans*. There are no permanent streams or lakes within the Area. No information is available on the invertebrate fauna or microbial communities present at Mount Flora.

BREEDING BIRDS

Little information is available on bird communities present at Mount Flora, although a report on the exact nesting sites of some species suggested that birds are unlikely to breed within the Area (Marshall 1945). However, the breeding birds of Hope Bay generally have been well-studied, for instance, Argentina has been monitoring the penguins colonies since the earlier 1990s. Part of one of the largest colonies of Adélie penguin (*Pygoscelis adeliae*) on the Antarctic Peninsula, numbering c. 102,000 pairs, is situated about 500 m northeast of the Area (Santos et al. 2013) (Map 2). Other birds breeding at Hope Bay include around 500 pairs of gentoo penguins (*Pygoscelis papua*) (Argentina Monitoring Program), brown skua (*Catharacta loennbergi*), south polar skua (*Catharacta maccormicki),* Antarctic tern (*Sterna vittata*), Wilson's storm petrel (*Oceanites oceanicus*), kelp gull (*Larus dominicanus*), and sheathbill (*Chionis alba*). Further information on the number of breeding birds in the vicinity of Mount Flora can be found in Argentina (1997), Santos et al. (2013) and Coria and Montalti (1993).

HUMAN ACTIVITIES AND IMPACTS

Mount Flora was discovered in 1903 by Johann Gunnar Andersson, a member of the Swedish South Polar Expedition of 1901-04, which explored and mapped much of the northern Antarctic Peninsula. Andersson collected fossil and mineralogical specimens from Mount Flora while stranded and awaiting rescue at Hope Bay over the winter of 1903. Andersson and his companions over-wintered in a stone hut (Historic Site and Monument No. 39). The leader of the expedition was Otto Nordenskjöld, who named Mount Flora because of the geological findings of Andersson. The United Kingdom established Base 'D' at Hope Bay in 1945 as part of 'Operation Tabarin'. The station was operational until February 1964 with a winter complement of 7-19 personnel. Base 'D' was transferred from the United Kingdom to Uruguay in 1997 and renamed as Teniente de Navio Ruperto Elichiribehety Station. Argentina established Esperanza Station on 31 December 1951 and has operated the station continuously since, with approximately 50 winter and up to 70 summer personnel, devoted to the study of different scientific disciplines such as seismology, geology, geomorphology, and the monitoring of different parameters of the ecosystem and contamination.

Mount Flora was designated as a Site of Special Scientific Interest in 1989 as a result of concern that the best examples of fossils were being collected by casual visitors and might therefore be lost to science.

6(ii) Access to the Area

All access to the areas shall be on foot. The lower slopes of Mount Flora are easily accessible by foot from both the local research stations and from Hope Bay. However, reaching the boundary of the ASPA, and moving within it, requires a demanding hike, due to the steep nature of the local terrain. To access the area, follow the relatively flat ground south of Esperanza Station to Boeckella Lake. From there, follow a trail that heads southward towards the eastern end of the ASPA, which allows access via the least steep ground (see Map 2). Helicopter landings within the Area are prohibited, except under emergency conditions when the use of helicopters may be considered under the conditions set out in section *7 (ii) Access to and movement within or over the Area*.

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

There are no structures present within the Area. The nearest scientific research stations are Esperanza Station (Argentina) (latitude 63°24'S, longitude 56°59'W) and Teniente de Navio Ruperto Elichiribehety Station (Uruguay) (latitude 63°24'S, longitude 56°59'W), both approximately 1.5 kilometres northeast of the Area. The remains of a British Base, which burnt down in 1948, are situated 300 m to the northeast of the Uruguayan base. The graves of two British men who died in the above fire are located on a small promontory some 300 m to the north of the Uruguayan base. Two shelters, run by Argentina, are situated east of Mount Flora (latitude 63º25'10" S, longitude 56º59'50"W and latitude 63º27'36" S, longitude 57º11'14"W).

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

The nearest protected areas to Mount Flora are Potter Peninsula (ASPA No. 132), Western Shore of Admiralty Bay (ASPA No. 128), Lions Rump (ASPA No. 151), and Narębski Point, Barton Peninsula (ASPA No. 171), all of which are located on King George Island, South Shetland Islands, lying approximately 150 km to the west (Map 1). A stone hut (Historic Site and Monument No. 39) built by members of the Swedish South Polar Expedition and a bust of General San Martin, grotto with a statue of the Virgin of Lujan, and a flag mast erected by Argentina in 1955, together with a graveyard with stele in memory of members of Argentine expeditions who died in the area (Historic Site and Monument No. 40) are present within the vicinity of Esperanza Station (Map 2).

6(v) Special zones within the Area
None.

7. Terms and condition 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 as designated under Article 7 of Annex V of the Protocol on Environmental Protection to the Antarctic Treaty.

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

- it is issued for compelling scientific reasons which cannot be served elsewhere, or for reasons essential to the management of the Area;
- any management activities are in support of the objectives of the 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 scientific and historic values of the Area;
- should the applicant for a Permit propose to make rock collections, the applicant shall demonstrate to an appropriate national authority that the research proposed cannot be adequately served by samples already collected and held in the various collections worldwide, before a Permit is granted;
- the Permit, or an authorised copy, shall be carried when in the Area;
- a visit report shall be supplied to the authority named in the Permit;
- the Permits shall be issued for a finite period;
- the appropriate authority should be notified of any activities/measures undertaken that were not included in the authorised Permit.

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

- Access to and movement within the Area shall be on foot.
- Due to the steepness of the ground, which makes it technically difficult to land a helicopter within the Area, access to the Area by helicopter is not permitted, except in the event of an emergency. In an emergency, and if wind conditions allow, a helicopter can enter the ASPA, preferably without landing, to perform a rescue. If necessary or useful for the type of emergency in question, the helicopter may land on Flora Glacier. Should an emergency arise which necessitates the use of a helicopter, the helicopter flight paths shown in Map 2 are recommended. Furthermore, helicopter lands in the surrounding area are not recommended due to the high concentration of birds nesting in the vicinity of Mount Flora. The recommended helicopter landing site is the Esperanza Station helicopter pad (see Map 2). The ‘Guidelines for the Operation of Aircraft near Concentrations of Birds’ contained in Resolution 2 (2004) should also be consulted.
- Land vehicles are prohibited within the Area.
- Pedestrian traffic should be kept to the minimum necessary to undertake permitted activities and every reasonable effort should be made to minimise trampling effects, such as breakage of rocks, especially of rocks *in situ*.

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

- Compelling scientific research which cannot be undertaken elsewhere;
- Scientific research that will not jeopardise the scientific values of the Area.
- Essential management activities, including monitoring.

Where geological sampling is involved this should, as a minimum standard, be in accordance with the following principles:

1. Sampling should be done with the minimum disturbance practical.
2. Sampling should be kept to the minimum necessary to achieve the research objectives.
3. Enough material/specimens should be left to allow future workers to understand the context of the material.
4. Sample sites should be left free of markings (paint, labels, etc.).
5. Specimens should be retained in a recognised repository after the project finishes.
6. Details of the GPS location of collection sites, volume/weight, sample orientation, type of material collected, and where the removed material will be housed, should be detailed in visit reports submitted to the appropriate national authority.
7. A copy of these details should also be provided to the Proponent Parties to facilitate the review of the Management Plan and to facilitate the provision of advice to other Parties regarding the existence of materials in geological repositories, with a view to minimising unnecessary new or additional sampling.

7(iv) Installation, modification, or removal of structures
No structures are to be erected within the Area, or scientific equipment installed, except for compelling scientific or management reasons and for a pre-established period, as specified in a permit. Permanent structures or installations are prohibited. All markers, structures or scientific equipment installed in the Area must be clearly identified by country, name of the principal investigator or agency, year of installation and date of expected removal. All such items should be free of organisms, propagules (e.g. seeds, eggs) and non-sterile soil, and be made of materials that can withstand the environmental conditions and pose minimal risk of contamination of the Area. Removal of specific equipment for which the Permit has expired shall be a condition of the Permit.

7(v) Location of field camps
Camping is prohibited within the Area.

7(vi) Restrictions on materials and organisms that may be brought into the Area
In addition to the requirements of the Protocol on Environmental Protection to the Antarctic Treaty, restrictions on materials and organisms which may be brought into the area are:

- The deliberate introduction of animals, plant material, 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, microorganisms and non-sterile soil from other biologically distinct regions (within or beyond the Antarctic Treaty area). Furthermore, all tools (drills, picks, shovels, geological hammers, etc.) should be thoroughly cleaned before being taken to Antarctica, particularly those tools which have been used previously in high altitude and high latitude areas outside the Antarctic Treaty area.
- No herbicides or other pesticides shall be brought into the Area.
- Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes specified in the Permit, shall be removed from the Area at or before the conclusion of the activity for which the Permit was granted.
- Fuel or other chemicals shall not be stored in the Area unless specifically authorised by Permit condition. They shall be stored and handled in a way that minimises the risk of their accidental introduction into the environment.

- Materials introduced into the Area shall be for a stated period only and shall be removed by the end of that stated period. If release occurs which is likely to compromise the values of the Area, removal is encouraged only where the impact of removal is not likely to be greater than that of leaving the material *in situ*.
- The appropriate authority shall be notified of any materials released and not removed that were not included in the authorised Permit.

7(vii) Taking of, or harmful interference with, native flora or fauna
Taking of, or harmful interference with, native flora and fauna is prohibited, except in accordance with a permit issued in accordance with Annex II of 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) Collection or removal of anything not brought into the Area by the Permit holder
Material may be collected or removed from the Area only in accordance with a Permit and should be limited to the minimum necessary to meet scientific or management needs (see sections *7(iii) Activities which may be conducted in the Area* and *7(x) Measures that may be necessary to continue to meet the aims of the management plan*). Permits shall not be granted if there is a reasonable concern that the sampling proposed would take, remove or damage such quantities of fossiliferous rocks that their abundance on Mount Flora would be significantly affected. 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 all human wastes, shall be removed from the Area in accordance with Annex III (Waste disposal and waste management) to the Protocol on Environmental Protection to the Antarctic Treaty (1998).

7(x) Measures that may be necessary to continue to meet the aims of the Management Plan
In view of the fact that geological sampling is both permanent and results in cumulative impact the following measures shall be taken to safeguard the scientific values of the Area:

- Visitors removing geological samples from the Area shall complete a record describing the geological type, quantity and location of samples taken, which should, at a minimum, be deposited with their National Antarctic Data Centre and/or with the Antarctic Master Directory.
- Visitors planning to sample within the Area shall demonstrate that they have familiarised themselves with earlier collections to minimise duplication. Sample collections exist in repositories around the world including:

Repositories	***Information/repository website***
Museum of Natural Sciences, B. Rivadavia, Buenos Aires, Argentina	http://wander-argentina.com/natural-sciences-museum-buenos-aires/
Museum of Natural Sciences, La Plata, Argentina	http://www.welcomeargentina.com/laplata/museum-natural-sciences.html
Natural History Museum, London, UK	http://www.nhm.ac.uk/visit-us/galleries/green-zone/minerals/index.html
British Antarctic Survey, Cambridge, UK	http://www.antarctica.ac.uk/bas_research/data/collections/terrestrial_geology.php
Swedish Natural History Museum, Stockholm	http://www.nrm.se/english.16_en.html
Byrd Polar Research Center Polar Rock Repository, Ohio, USA	http://bprc.osu.edu/rr/
Institute of Geological Sciences, Polish Academy of Sciences, Krakow, Poland	http://www.ing.pan.pl/index_E.htm
Department of Geology, Institute of	http://www.geologia.ufrj.br/index.php?modul

Geosciences, Federal University of Rio de Janeiro, Brazil	e=pagemaster&PAGE_user_op=view_page&PAGE_id=50

7(xi) Requirements for reports

The principal permit holder for each visit to the Area shall submit a visit report to the appropriate national authority as soon as practicable and no later than six months after the visit has been completed.
Such reports should include, as appropriate, the information identified in the *Antarctic Specially Protected Area visit report form* contained in the *Revised Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas* (Appendix 2). Amongst other details, the visit report should include the information requested in bullet point 6 of section *7(iii) Activities which may be conducted in the Area* of this Management Plan. Wherever possible, the national authority should also forward a copy of the visit report to the Proponent Parties, 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, to be used both in any review of the Management Plan and in organising the scientific use of the Area.

8. Supporting documentation

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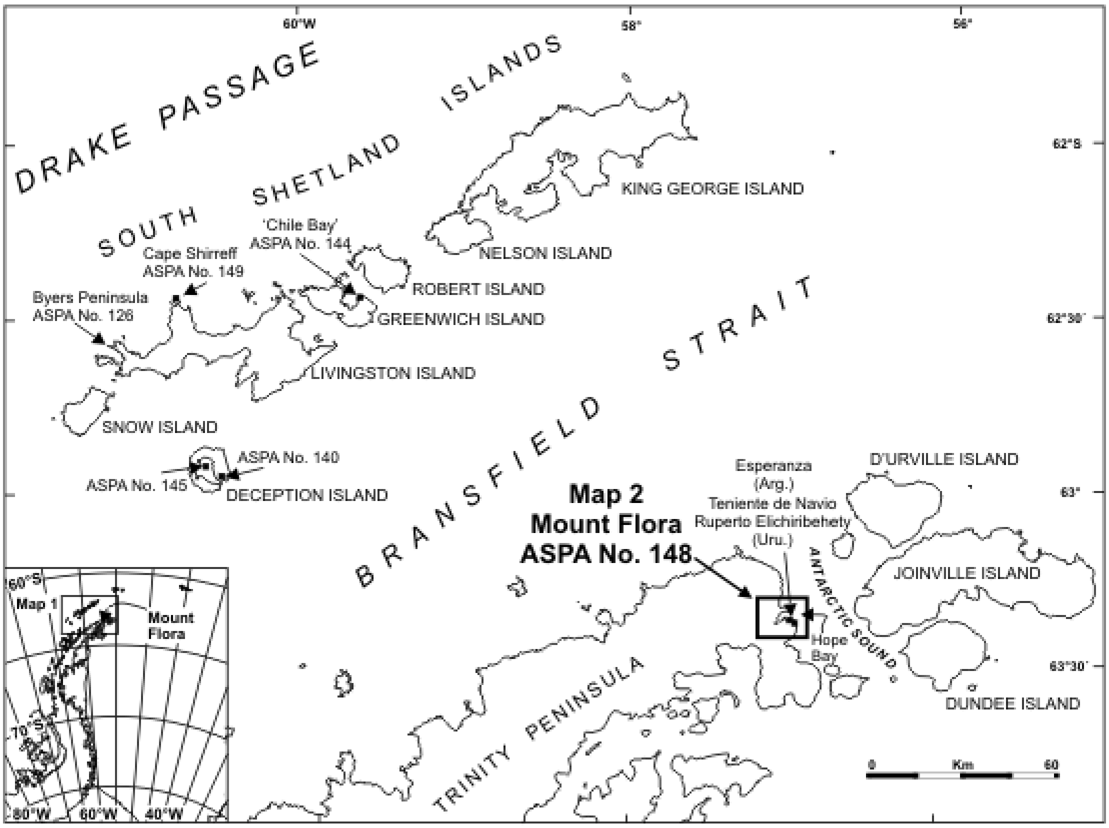
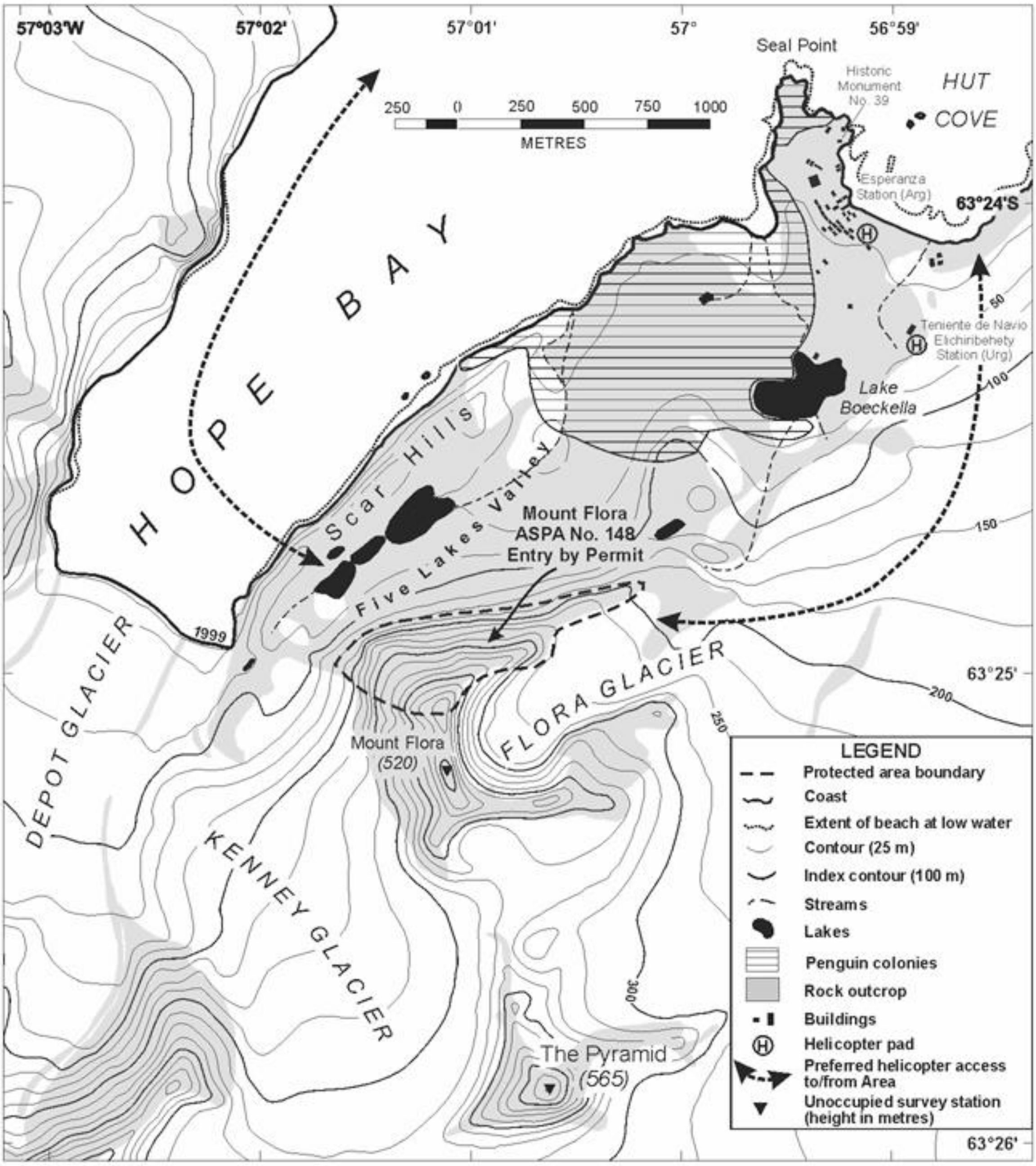
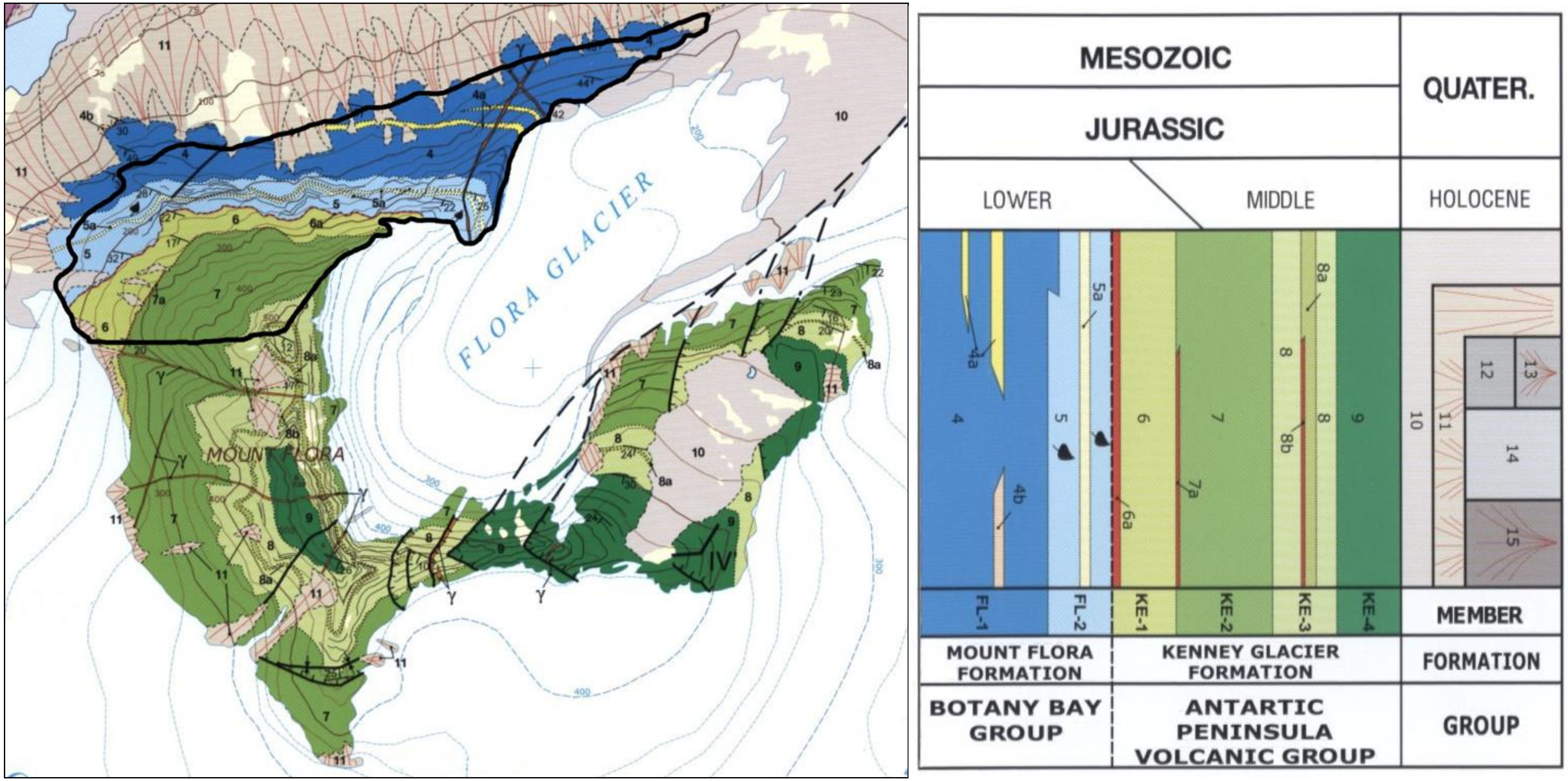


Map 1. Mount Flora (ASPA No. 148), Hope Bay, Antarctic Peninsula, location map.
Inset: location of Mount Flora on the Antarctic Peninsula.



Map 2. Mount Flora (ASPA No. 148), Hope Bay, topographic map.

Map 3: Mount Flora ASPA No. 148 geological map, adapted from the 'Mapa Geológico de Bahía Esperanza Antártida' published by the Instituto Geológico y Minero de España and Instituto Antártico Argentino (Scale 1:10,000). The sketch map is orientated with north to the top of the map. The area depicted is approximately 1.5 km across. Legend: 4. Massive conglomerates of different thicknesses. 5. Sandstones, conglomerates and black shales with plant remains. 5a. Fragmented volcanic rocks. 6. Welded tuffs with interbedded sandstones, volcanic breccias and welded ignimbrite beds. 6a. Reddish thermal contact. 7. Breccias, sandstones and siltstones with interbedded volcanic ignimbrites. 8. Welded tuffs, interbedded with welded ignimbrites and beds of breccia and sandstone. 8a. volcanic laminated siltstones, sandstones and volcanic basaltic lava layers. 8b. Reddish thermal contact. 9. Breccias and sandstones with interbedded volcanic ignimbrites. 10. Angular boulders with a sandy-silty matrix. Background till and moraines. 11. Angular boulders. Slopes and debris cones. γ: dyke: palaeobotanical remains.



Management Plan for
Antarctic Specially Protected Area No. 152
WESTERN BRANSFIELD STRAIT

Introduction

The Area is located off the western and southern coasts of Low Island, South Shetland Islands, lying between 63°15'S and 63°30'S; 62°00'W and 62°45'W, and is fully marine. Approximate area: 916 km^2. Designation is on the grounds that the shallow shelf in this region near Low Island is one of only two known sites in the vicinity of Palmer Station (USA) that are suitable for bottom trawling for fish and other benthic organisms (see also ASPA No. 153 Eastern Dallmann Bay). The site offers unique opportunities to study the composition, structure and dynamics of several accessible marine communities. Proposed by the United States of America: adopted by Recommendation XVI-3 (Bonn, 1991: SSSI No. 35); date of expiry extended by Measure 3 (2001); renamed and renumbered by Decision 1 (2002); revised management plans adopted by Measure 2 (2003) and by Measure 10 (2009). The Area is approved under the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) in accordance with Decision 9 (2005).

The Environmental Domains Analysis for Antarctica (Resolution 3 (2008)) and Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)) classifications are based on terrestrial criteria, and therefore have limited applicability in marine environments.

1. Description of values to be protected

Western Bransfield Strait (between latitudes 63°20'S and 63°35'S and longitudes 61°45'W and 62°30'W, approximately 916 km^2) was originally designated as a Site of Special Scientific Interest through Recommendation XVI-3 (1991, SSSI No. 35) after a proposal by the United States of America. It was designated on the grounds that “the shallow shelf south of Low Island is one of only two known sites in the vicinity of Palmer Station that are suitable for bottom trawling for fish and other benthic organisms. From an ecological standpoint, the Low Island site offers unique opportunities to study the composition, structure, and dynamics of several accessible marine communities. The Site, and in particular, its benthic fauna, is of exceptional scientific interest and requires long-term protection from potential harmful interference”. Together with Eastern Dallmann Bay (ASPA No. 153), the Area is used in over 90 percent of specimen collections carried out by US researchers who are actively studying such fish communities within the region (Detrich pers. comms. 2009 and 2015).

The boundaries of the Area were revised by Measure 2 (2003) to include all of the shallow shelf down to 200 m depth to the west and south of Low Island, while the deeper water of Bransfield Strait to the east was excluded. The boundaries of the Area at Western Bransfield Strait are between latitudes 63°15'S and 63°30'S and longitudes 62°00'W and 62°45'W and are defined in the north-east by the shoreline of Low Island, encompassing an area of approximately 916 km^2 (Map 1).

The Area continues to be considered important for studies of the composition, structure and dynamics of the marine communities, and the original reasons for designation are reaffirmed in the current Management Plan. In addition, the Area is recognized as an important spawning ground for several fish species, including the rockcod *Notothenia coriiceps* and the icefish *Chaenocephalus aceratus*. Fish have been collected from the Area by scientists from Palmer Station since the early 1970s. The Area is within the research area of the Palmer Long Term Ecological Research (LTER) Program; fish collected from the Area are used in the study of biochemical and physiological adaptations to low temperatures. Some of the fish collected have been used for comparative studies with the more heavily impacted Arthur Harbor area. Scientific research is also being undertaken on the benthic faunal communities.

2. Aims and objectives

Management at Western Bransfield Strait 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 on the marine environment while ensuring protection from over-sampling;
- allow other scientific research within the Area provided it will not compromise the values for which the Area is protected;
- allow visits for management purposes in support of the aims of the management plan.

3. Management activities

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

- A map showing the location of the Area (stating the special restrictions that apply) shall be displayed prominently and copies of this Management Plan shall be made available at Palmer Station (USA).
- National programs shall ensure the boundaries of the Area and the restrictions that apply within are marked on relevant maps and marine charts for which they are responsible.
- Copies of this Management Plan shall be made available to vessels travelling in the vicinity of the Area.
- Buoys, or other markers or structures installed within the Area for scientific or management purposes shall be secured and maintained in good condition and removed when no longer needed.
- Visits shall be made as necessary to assess whether the Area continues to serve the purposes for which it was designated and to ensure management and maintenance measures are adequate.

4. Period of designation

Designated for an indefinite period.

5. Maps and photographs

Map 1: ASPA No. 152 Western Bransfield Strait bathymetric map. Coastline data are derived from the SCAR Antarctic Digital Database (ADD) Version 6.0 (2012). Bathymetry is derived from the International Bathymetric Chart of the Southern Ocean (IBCSO) v1.0 (2013). Bird data: ERA (2015). Important Bird Areas: BirdLife International / ERA (Harris *et al*. 2011).

Map specifications: Projection: Lambert Conformal Conic; Standard parallels: 1st 63° 15' S; 2nd 63° 30' S; Central Meridian: 62° 00' W; Latitude of Origin: 64° 00' S; Spheroid and horizontal datum: WGS84; Horizontal accuracy: maximum error of ±300 m. Isobath 200 m.

<u>Inset:</u> the location of Map 1, ASPA No. 152 Western Bransfield Strait, Antarctic Peninsula, showing the nearest protected area, ASPA No. 153, Eastern Dallmann Bay.

6. Description of the Area

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

General description

Bransfield Strait is a deep water passage approximately 220 km long and 120 km wide between the Antarctic Peninsula and the numerous islands that comprise the South Shetland Islands. The Drake Passage is to the north and to the west is the Bellingshausen Sea. The Area lies approximately 80 km west of the Antarctic Peninsula, mostly within the 200 m isobath directly south and west of Low Island (Map 1). Low Island is the southern-most of the South Shetland Islands, lying 60 km south-west of Deception Island and 25 km south-east of Smith Island. To the west and south of Low Island, and for approximately 20 km from the shore, the sea floor slopes gently from the intertidal zone to depths of approximately 200 m. The sea floor slopes steeply to the east of Low Island, reaching depths of up to 1200 m in this part of Bransfield Strait. Cores collected as part of the BENTART research programme during the austral summers of 2003 and 2006 indicate that the sea floor within the Area is generally composed of muddy sediments containing gravel or small stones, and of sessile epifaunal communities (Troncoso *et al.* 2008), which either remain firmly attached to substrates or move very slowly (Robinson *et al.* 1996).

Boundaries

The boundaries of the Area at Western Bransfield Strait are defined in the north as the line of latitude at 63°15'S and in the south at 63°30'S; in the east the boundary is defined as the line of longitude at 62°00'W and in the west 62°45'W (Map 1). The northeastern boundary is defined as the shoreline of Low Island, extending from 62°00'W, 63°20'S in the southeast (approximately two kilometers from Cape Hooker) to 62°13'30"W, 63°15'S in the northwest (Cape Wallace). The coastline boundary on the western and southern shores of Low Island is defined as the high tide level, and the intertidal zone is included within the Area. The Area extends a maximum of 27.6 km north-south and a maximum of 37.15 km east-west, encompassing an area of approximately 916 km^2. Boundary markers have not been installed because in the marine area this is impractical, while at Low Island the coast itself is a clearly defined and visually obvious boundary feature.

Oceanography, climate and marine geology

There is considerable year-to-year variation in sea ice within the Bransfield Strait region, although coverage appears to be less than 100 days per year (Parkinson 1998). Rates of sea ice advance and retreat along the northwestern Antarctic Peninsula are also variable. Sea ice advance is for approximately five months followed by approximately seven months of retreat. Ice growth is fastest in June and July and the fastest decay is in December and January (Stammerjohn and Smith 1996). Measurements made within the Bransfield Strait between 20th January and 9th February 2001 indicate that ocean temperatures in the Area averaged between 1.7 and 1.8 ºC at 5 m depth and 0.2 to 0.3ºC at the 150 m contour (Catalan *et al.* 2008). Water salinity within the Area ranged between 34.04 and 34.06 psu at 5 m, whilst at 150 m depth salinity reached 34.40 psu.

Wind is predominantly from the NNW direction, resulting in a southward flowing coastal current along the western Antarctic Peninsula (Hofman *et al.* 1996). Coupled with the northward flow of the Antarctic Circumpolar Current, this results in a predominantly clockwise circulation in Bransfield Strait (Dinniman and Klinck 2004; Ducklow *et al.* 2007), dominated by the Gerlache Strait Current and the Bransfield Strait Current (Zhou *et al.* 2002 and 2006). Drifters deployed as part of RACER (Research on Antarctic Coastal Ecosystems and Rates) between 1988 and 1990 indicate that eddie formation within the Area is minimal and that a strong north-easterly flow originates to the south of Low Island (Zhou *et al.* 2002). The current bifurcates to the west of Low Island, with water flowing to the north-east to merge with the Bransfield Strait Current and to the north-west, towards Smith Island. Local circulation is also influenced by tides, with tide records obtained at Low Island during a six-week period in December 1992 to January 1993 recording a maximum level variation of 1.70 m (López *et al.* 1994).

Seismic measurements from the Seismic Experiment in Patagonia and Antarctica (SEPA) monitoring station, located on the north-eastern coast of Low Island, have detected significant earthquake activity within the

Area, which is thought to result from the intersection of the Hero Fracture Zone with the South Shetland Platform at Smith Island (Maurice *et al.* 2003). During the Spanish Antarctic campaign of 2006/07, an additional seismic monitoring station was installed on the southern coast of Low Island, in order to extend geodetic monitoring within the Bransfield Strait area (Berrocoso *et al*. 2007).

Marine biology

The predominantly soft sand / mud / cobbled-rock substrate of the Area supports a rich benthos with numerous fish species, invertebrates (sponges, anemones, annelids, molluscs, crustaceans, asteroids, ophiuroids, echinoids, holothurioids, brachiopods, tunicates), and marine plants, in several distinct communities.

Fish species commonly collected near Low Island at depths of 80 to 200m include *Chaenocephalus aceratus, Harpagifer bispinis, Notothenia coriiceps, Gobionotothen gibberifrons (formerly N. gibberifrons), Parachaenichthys charcoti* and *Trematomus newnesi* (Grove and Sidell 2004; Lau *et al.* 2001). Species rarely found at Low Island include *Champsocephalus gunnari, Chionodraco rastrospinosus* and *Pseudochaenichthys georgianus*. In addition, the Low Island shelf appears to be a spawning ground for several fish species, for example the ice fish *Chaenocephalus aceratus* and *N. coriiceps*, with the family Nototheniidae, representing the bulk of fish larvae and juveniles captured in the area (Catalan *et al.* 2008). Other juvenile fish species collected close to Low Island include *Trematomus lepidorhynus and Notothenia kempi*. The Area is a mating ground for yellowbelly rockcod (*Notothenia coriiceps*) (indicated by eggs) (Kellermann 1996). The fish spawn in May / June. The large eggs, around 4.5 mm in diameter, are pelagic after fertilization and ascend to the surface waters where they incubate during the winter. Larval species recorded in the Area include *Bathylagus antarcticus*, *Electrona antarctica*, *Gymnodraco acuticeps*, *Nototheniops larseni*, *Notothenia kempi* and *Pleuragramma antarcticum* (Sinque *et al.* 1986; Loeb *et al.* 1993; Morales-Nin *et al.* 1995).

Specimens collected during April-June 2008 and 2010 were used to investigate protein folding in *Gobionotothen gibberifrons* in relation to warming oceans (Cuellar *et al*. 2014).

The following benthic amphipod species have been recorded within the Area: *Ampelisca barnardi, A. bouvieri, Byblis subantarctica, Epimeria inermis, E. oxicarinata, E. walkeri, Eusirus antarcticus, E. perdentatus, Gitanopsis squamosa, Gnathiphimedia sexdentata, Jassa* spp., *Leucothoe spinicarpa, Liljeborgia georgiana, Melphidippa antarctica, Oediceroides calmani, O. lahillei, Orchomenella zschaui, Parharpinia obliqua, Parepimeria bidentata, Podocerus septemcarinatus, Prostebbingia longicornis, Shackeltonia robusta, Torometopa perlata, Uristes georgianus* and *Waldeckia obesa* (Wakabara *et al.* 1995).

Molluscan assemblages have been analysed at four sample sites within the Area as part of an integrated study of the benthic ecosystem of Bransfield Strait, which was carried out between 24 January and 3 March 2003 (BENTART 03) and from 2 January to 17 February 2006 (BENTART 06) (Troncoso *et al*. 2008). The most abundant species in the Area was the bivalve *Lissarca notorcadensis*, distantly followed by *Pseudamauropsis aureolutea*, which was the most widely distributed. Other species collected included *Marseniopsis conica*, *Onoba gelida*, *Yoldiella profundorum*, *Anatoma euglypta*, *Chlanidota signeyana* and *Thyasira debilis*.

No information is available on the zooplankton or marine flora within the Area.

Marine mammals

Satellite tracking studies carried out between January 2004 and 2006 suggest that humpback whales (*Megaptera novaeangliae*) pass close to the Area and may enter it during foraging (Dalla Rosa *et al.* 2008). Southern elephant seals (*Mirounga leonina*) were tracked within the Area using satellite transmitters between December 1996 and February 1997 (Bornemann *et al.* 2000).

Birds

Approximately 325 000 pairs of chinstrap penguins (*Pygoscelis antarctica*) were breeding at ~13 locations on and near to the shore of Low Island in 1987 (Shuford & Spear 1988), most of which are in colonies located along or near the northeastern boundary of the Area. The largest colonies are immediately to the north of the

Area at and near Cape Wallace (129 000 – 229 000 pairs) and at and near Cape Garry (approximately 104 375 pairs) and Jameson Point (20 000 – 35 000) (Map 1). These breeding sites, as well as nearby Cape Hooker, have been identified by BirdLife International as Important Bird Areas because of their large chinstrap penguin colonies (Harris *et al*. 2011). It is expected that the large colonies of chinstrap penguin influence the Area. Small colonies of Antarctic shags (*Phalacrocorax* [atriceps] *bransfieldensis*) have been observed at Cape Garry, on an island within the Area between Cape Garry and Jameson Point, and on an island several kilometers NE of Cape Wallace (Poncet and Poncet, unpublished data Feb 1987, in Harris 2006) (Map 1).

Human activities / impacts

Fish collected within the Area have been used for a variety of biochemical, genetic and physiological research, including: studies of the adaptations in fish that enable proteins to function at low temperatures (Detrich *et al.* 2000; Cheng and Detrich 2007); the adaptations of muscle and energy metabolism, including the processing of fatty acids to low temperatures (Hazel and Sidell 2003; Grove and Sidell 2004); efficient genome transcription in cold water (Lau *et al.* 2001; Magnoni *et al.* 1998); the influence of hydrostatic pressure on enzyme function within fish livers (Ciardiello *et al.* 1999); and the cardiovascular adaptations of icefishes, in compensation for their complete lack of haemoglobin (Sidell and O'Brien 2006).

Specimens collected during trawls in March and April 1991, 1992, and 1993 were used in comparative studies of Polynuclear Aromatic Hydrocarbon (PAH) contamination in fish with those collected from Arthur Harbor and the effects of Diesel Fuel Arctic (DFA) on *Notothenia gibberifrons* (now *Gobionotothen gibberifrons*) (McDonald *et al.* 1995; Yu *et al.* 1995). The former study found levels of contamination in fish sampled from the Area were considerably lower than those sampled from the vicinity of the 1989 *Bahia Paraiso* wreck in Arthur Harbor and that fish captured near US scientific stations are exposed to PAH, albeit low levels (McDonald *et al.* 1992 and 1995). However, concentrations of PAH were higher than had been expected in fish collected from within the Area, with levels found to be similar to those in fish sampled from near Old Palmer Station.

6(ii) Access to the Area

Access into the Area is generally by ship from Bransfield Strait, or from the direction of Drake Passage, or Boyd Strait which lies to the north between Smith and Snow islands. Vessels may transit through the Area, although anchoring shall be avoided except in compelling circumstances. Access into the Area may be made by air or over sea ice when conditions allow. Access routes into or within the Area have not been defined.

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

There are no structures known to be within or near the Area. The nearest scientific stations are Decepción (Argentina) and Gabriel de Castilla (Spain), both approximately 70 km to the northeast on Deception Island.

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

The nearest protected areas to Western Bransfield Strait are Eastern Dallmann Bay (ASPA No. 153), which lies about 45 km to the SSE, and Port Foster and other parts of Deception Island (ASPAs No. 140 and No. 145 respectively), which are approximately 70 km to the northeast (Map 1, Inset).

6(v) Special zones within the Area

None.

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 purposes, or for educational purposes that cannot be served elsewhere, or for reasons essential to the management of the Area;
- the actions permitted are in accordance with the Management Plan;
- the activities permitted will give due consideration via the environmental impact assessment process to the continued protection of the environmental and scientific values of the Area;
- the Permit shall be issued for a finite period;
- the Permit, or a copy, shall be carried when in the Area.

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

Access into the Area shall be by sea, over sea ice or by air. There are no specific restrictions on routes of access to, or movement within, the Area, although movements should be kept to the minimum necessary consistent with the objectives of any permitted activity. Every reasonable effort should be made to minimize disturbance. Vessels may transit through the Area, although anchoring shall be avoided except in compelling circumstances. There are no special overflight restrictions within the Area, and aircraft may land by Permit when sea ice conditions allow, although pilots should take into account the large penguin colonies present near the northeastern boundary of the Area on the Low Island coast (Map 1).

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

- Scientific research that will not jeopardize the values of the Area;
- Essential operational activities of vessels that will not jeopardize the values of the Area, such as transit through, or stationing within, the Area in order to facilitate science or other activities, including tourism, or for access to sites outside of the Area;
- Essential management activities, including monitoring.

7(iv) Installation, modification or removal of structures

- No structures are to be erected within the Area except as specified in a permit and permanent structures or installations are prohibited;
- All structures, scientific equipment or markers installed in the Area must be authorized by permit and clearly identified by country, name of the principal investigator and year of installation. All such items should be made of materials that pose minimal risk of contamination of the Area;
- Installation (including site selection), maintenance, modification or removal of structures shall be undertaken in a manner that minimizes disturbance to flora and fauna.
- Removal of specific equipment for which the permit has expired shall be the responsibility of the authority which granted the original Permit, and shall be a condition of the permit.

7(v) Location of field camps

None.

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

In addition to the requirements of the Protocol on Environmental Protection to the Antarctic Treaty, restrictions on materials and organisms which may be brought into the area are:

- Deliberate introduction of animals, plant material, micro-organisms and non-sterile soil into the Area is prohibited. Precautions shall be taken to prevent the accidental introduction of animals, plant material, micro-organisms and non-sterile soil from other biologically distinct regions (within or beyond the Antarctic Treaty area);

- Visitors shall ensure that sampling equipment and markers brought into the Area are clean. To the maximum extent practicable, equipment to be used within the area shall be thoroughly cleaned before entering the Area. Visitors should also consult and follow as appropriate recommendations contained in the Committee for Environmental Protection Non-native Species Manual (CEP 2011);
- No pesticides shall be brought into the Area;
- Fuel, food, chemicals and other materials shall not be stored in the Area, unless specifically authorized by permit, and shall be stored and handled in a way that minimizes the risk of their accidental introduction into the environment;
- All materials introduced shall be for a stated period only, shall be removed at or before the conclusion of that stated period; and
- If release occurs which is likely to compromise the values of the Area, removal is encouraged only where the impact of removal is not likely to be greater than that of leaving the material *in situ*.

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

- Taking of, or harmful interference with, native flora or fauna is prohibited, except in accordance with a permit issued under Article 3 of Annex II to the Protocol on Environmental Protection to the Antarctic Treaty. Where animal taking or harmful interference 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) Collection or removal of materials not brought into the Area by the Permit holder

- Material may be collected or removed from the Area only in accordance with a permit and should be limited to the minimum necessary to meet scientific or management needs.
- 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 authorized, may be removed from any part of the Area, unless the impact of removal is likely to be greater than leaving the material *in situ*: if this is the case the appropriate 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 continue to meet the aims of the Management Plan

Permits may be granted to enter the Area to:

- carry out monitoring and Area inspection activities, which may involve the collection of a small number of samples or data for analysis or review;
- Erect, install or maintain structures or scientific equipment;
- Carry out protective measures.

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, and where possible within six months after the visit has been completed.
- Such reports should include, as appropriate, the information identified in the Visit Report form contained in Appendix 2 of the Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas (Resolution 2 (2011)). 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 reports in a publicly accessible archive to maintain a record of usage, to be used both in any review of the Management Plan and in organizing the scientific use of the Area.
- The appropriate authority should be notified of any activities/measures undertaken, anything removed and/or of any materials released and not removed, that were not included in the authorized permit.

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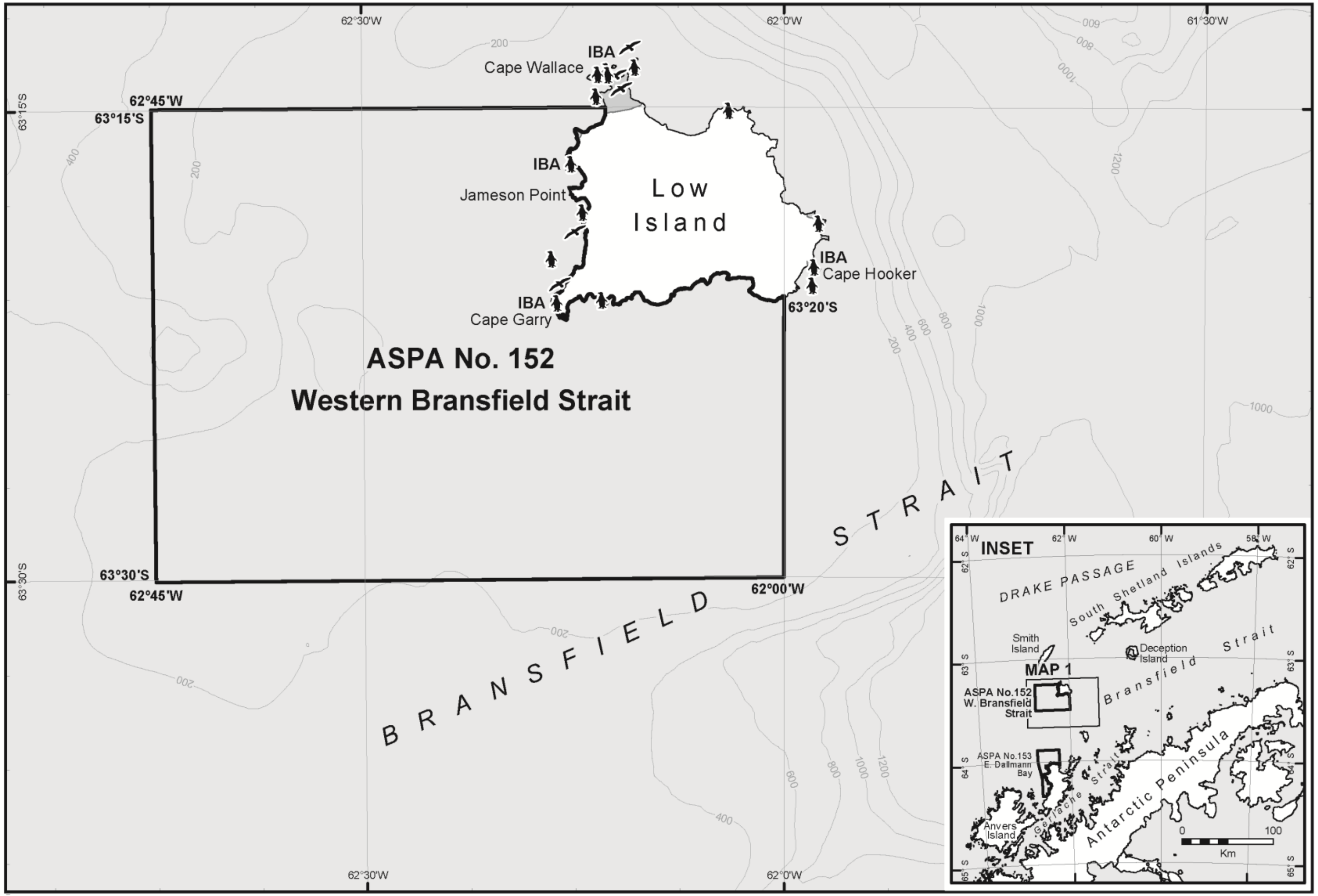

Map 1: ASPA No. 152 - Western Bransfield Strait

31 Mar 2015 (Map ID: 10068.0003.02)
United States Antarctic Program
Environmental Research & Assessment

Coastline
Isobath (200 m)
Ice free ground
Permanent ice
Ocean
Antarctic Specially Protected Area (ASPA) boundary
IBA Important Bird Area
Flying bird colony
Penguin colony

0 5 10
Kilometers

Projection: Lambert Conic Conformal
Spheroid and horizontal datum: WGS84
Data sources: Coast & topography: SCAR ADD (v6, 2012), updated by ERA (Mar 2015); Bathymetry: IBCSO (v1, 2013); Bird data: ERA (Mar 2015); IBA: BirdLife Int./ERA (2011); Protected areas: ERA Antarctic Protected Areas v3.0 (Jun 2014).

Management Plan for
Antarctic Specially Protected Area No. 153
EASTERN DALLMANN BAY

Introduction

This Area is located off the western and northern coasts of Brabant Island, Palmer Archipelago, between 64°00'S and 64°20'S; 62°50'W and the western coast of Brabant Island, and is fully marine. Approximate area: 610 km^2. Designation on the grounds that the shallow shelf in this region near Brabant Island is one of only two known sites in the vicinity of Palmer Station (US) that are suitable for bottom trawling for fish and other benthic organisms (see also ASPA No. 152 Western Bransfield Strait). The benthic fauna of the site is of exceptional scientific interest and the area provides an important habitat for juvenile fish. Proposed by the United States of America: adopted by Recommendation XVI-3 (Bonn, 1991: SSSI No. 36); date of expiry extended by Measure 3 (2001); renamed and renumbered by Decision 1 (2002); revised management plan adopted by Measure 2 (2003) and Measure 11 (2009). The Area is approved under the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) in accordance with Decision 9 (2005).

The Environmental Domains Analysis for Antarctica (Resolution 3 (2008)) and Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)) classifications are based on terrestrial criteria, and therefore have limited applicability in marine environments.

1. Description of values to be protected

Eastern Dallmann Bay (between latitudes 64°00'S and 64°20'S and from longitude 62°50'W eastward to the western shore of Brabant Island, approximately 610 km^2) was originally designated as a Site of Special Scientific Interest through Recommendation XVI-3 (1991, SSSI No. 36) after a proposal by the United States of America. It was designated on the grounds that "the shallow shelf west of East Dallmann Bay is one of only two known sites near Palmer Station that are suitable for bottom trawling for fish and other benthic organisms. The Site and, in particular, its benthic fauna, are of exceptional scientific interest and require long-term protection from harmful interference". Together with Western Bransfield Strait (ASPA No. 152), the Area is used in over 90 percent of specimen collections carried out by US researchers who are actively studying such fish communities within the region (Detrich pers. comm. 2009 and 2015).

The boundaries of the Area were revised by Measure 2 (2003) to focus more specifically on the shallow shelf down to 200 m depth to the west and north of Brabant Island, while the deeper water of Dallmann Bay to the west has been excluded. The boundaries of the Area at Dallmann Bay are between latitudes 63°53'S and 64°20'S and longitudes 62°16'W and 62°45'W and are defined in the east by the shoreline of Brabant Island, encompassing an area of approximately 610 km^2 (Map 1).

The Area continues to be considered important for obtaining scientific samples of fish and other benthic organisms, and the original reasons for designation are reaffirmed in the current Management Plan. In addition, the Area is an important habitat for juvenile fish species, including the rockcod *Notothenia coriiceps* and the icefish *Chaenocephalus aceratus*. Fish have been collected from the Area by scientists from Palmer Station since the early 1970s. The Area is within the research area of the Palmer Long Term Ecological Research (LTER) Program. Fish collected from the Area are used in the study of biochemical and physiological adaptations to low temperatures. Some of the fish collected have been used for comparative studies with the more heavily impacted Arthur Harbour area scientific research is also being undertaken on the benthic faunal communities.

2. Aims and objectives

Management at Eastern Dallmann Bay aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance;
- allow scientific research on the marine environment while ensuring protection from over-sampling;
- allow other scientific research within the Area provided it will not compromise the values for which the Area is protected;
- allow visits for management purposes in support of the aims of the management plan.

3. Management activities

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

- A map showing the location of the Area (stating the special restrictions that apply) shall be displayed prominently and copies of this Management Plan shall be made available at Palmer Station (US);
- National programs shall ensure the boundaries of the Area and the restrictions that apply within are marked on relevant maps and marine charts for which they are responsible;
- Copies of this Management Plan shall be made available to vessels traveling in the vicinity of the Area;
- Buoys, or other markers or structures installed within the Area for scientific or management purposes shall be secured and maintained in good condition and removed when no longer needed;
- Visits shall be made as necessary to assess whether the Area continues to serve the purposes for which it was designated and to ensure management and maintenance measures are adequate.

4. Period of designation

Designated for an indefinite period.

5. Maps and photographs

Map 1: ASPA No. 153 Eastern Dallmann Bay bathymetric map. Coastline and terrestrial contour data are derived from the SCAR Antarctic Digital Database Version 6.0 (2012). Bathymetry is derived from the International Bathymetric Chart of the Southern Ocean (IBCSO) v1.0 (2013). Bird data: ERA (2015). Important Bird Areas: BirdLife International/ERA (Harris *et al.* 2011). Historic Sites and Monuments: ATS, updated by ERA (2014).

Map specifications: Projection: Lambert Conformal Conic; Standard parallels: 1st 64° 00' S; 2nd 64° 30' S; Central Meridian: 62° 30' W; Latitude of Origin: 65° 00' S; Spheroid and horizontal datum: WGS84; Horizontal accuracy: maximum error of ±300 m. Vertical contour interval 100 m, vertical accuracy to within ±50 m. Isobath 200 m.

Inset: the location of Map 1, ASPA No. 153 Eastern Dallmann Bay, Antarctic Peninsula, showing the nearest protected area, ASPA No. 152 Western Bransfield Strait.

6. Description of the Area

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

General description

Dallmann Bay (between latitudes 64°00'S and 64°20'S and from longitude 63°15'W eastward to the western shore of Brabant Island) is situated approximately 65 km west of the Antarctic Peninsula, between Brabant Island and Anvers Island, with Bransfield Strait to the north and Gerlache Strait to the south (Map 1). Brabant Island is predominantly ice-covered, with a high north-south mountain chain, which rises to 2520 m at Mount Parry and falls steeply to the sea on the western coast (Smellie *et al.* 2006). The western coastline is characterized by rock and ice cliffs and ice-free headlands, interspersed by steep boulder and narrow pebble beaches. Rock platforms are exposed at low tide in various locations north of Driencourt Point (Map 1), which field surveys carried out in January 2002 suggest are part of a much larger outcrop of volcanic rock, which extends approximately 10 km from Brabant Island and was formed by two phases of phreatomagmatic volcanism during the Late Quaternary (Smellie *et al.* 2006). Numerous rocky islets extend several kilometers offshore, including Astrolabe Needle (104 m) which stands one kilometer offshore, two kilometers south of Claude Point. West of Brabant Island the sea floor slopes moderately from the intertidal zone to depths of approximately 200 m before the slope eases to depths of 400-500 m beyond the western boundary of the Area. The gradient from the shore down to 200 m slopes more gently in the north of the Area. The Area lies mostly within the 200 m depth contour west and north of Brabant Island (Map 1). The sea floor in the Area is generally composed of a matrix of soft sand, mud and cobbled-rock.

Boundaries

The designated Area is defined in the south by latitude 64°20'S, extending from Fleming Point westward for two kilometers to 62°40'W. From this location, the western boundary extends due north on longitude 62°40'W for 18.5 km to 64°10'S, SSW of Astrolabe Needle. The western boundary then extends NNW almost 19 km to 62°45'W, 64°00'S. The western boundary then extends approximately 13 km due north on longitude 62°45'W to latitude 63°53'S, the northern boundary of the Area. The northern boundary extends along latitude 63°53'S from 62°45'W to 62°16'W, being a distance of approximately 23.4 km. The eastern boundary extends due south approximately 16 km from 62°16'W, 63°53'S to the eastern extremity of Pasteur Peninsula, Brabant Island, at 62°16'W, 64°02'S. From there, the eastern boundary is defined as the mean high water mark of the northern and western coastline of Brabant Island, which includes the intertidal zone within the Area. The Area is 50 km from north to south and extends up to a maximum of 23.4 km east-west. West of Brabant Island the width of the Area ranges between 10 km (at Guyou Bay) and 1.5 km (near Claude Point). The total area is approximately 610 km^2.

Oceanography, marine geology and climate

Regional winds are predominantly from the NNW, resulting in a southward flowing coastal current along the western Antarctic Peninsula (Hofmann *et al.* 1996). Coupled with the northward flow of the Antarctic Circumpolar Current, this results in a generally clockwise oceanic circulation along the western Antarctic Peninsula (Dinniman and Klinck 2004; Ducklow *et al.* 2007). Within Bransfield Strait, a cyclonic circulation predominates, with the two main currents (the Gerlache Strait Current and the Bransfield Strait Current) originating from the south of Brabant Island (Zhou *et al.* 2002, 2006). Drifters deployed as part of RACER (Research on Antarctic Coastal Ecosystems and Rates) between 1988 and 1990 suggest an east – west flow within the northern part of the Area and the formation of eddies between Metchnikoff Point and Astrolabe Needle (Zhou *et al*. 2002). Tidal variation on Brabant Island is almost two meters and observations made while fishing indicate strong near-shore currents (Furse 1986).

Measurements made between 20th January and 9th February 2001 indicated that ocean temperatures in the Area were 1.8 to 1.9 º C at a depth of 5 m and at 150 m depth, temperatures reached 0.3 to 0.45 ºC (Catalan *et al.* 2008). Measurements carried out between 11^{th} June and 16^{th} July 2001 suggested that water temperatures in the Area ranged between –0.8 to –1.1°C at depths of 100–200 m (Eastman and Lannoo 2004). Water salinity within the Area ranged between 33.84 and 34.04 psu at 5 m, whilst at 150 m depth salinity values were 34.42 -34.45 psu (Catalan *et al.* 2008). Sea ice coverage averages approximately 140 days per year within Eastern Dallmann Bay and persists for approximately 82% of the winter period (Stammerjohn *et al.* 2008). Sea ice concentrations show considerable interannual variability, which has been linked to phase changes in ENSO and the Southern Annular Mode (SAM) (Stammerjohn *et al.* 2008).

Seismic measurements from the Seismic Experiment in Patagonia and Antarctica (SEPA) geodetic monitoring network indicate a significant earthquake activity within the Area, particularly to the north of Brabant Island, which is thought to result from the intersection of the Hero Fracture Zone with the South Shetland Platform at Smith Island (Maurice *et al.* 2003).

Marine biology

The Area supports a rich benthic community including numerous fish species, invertebrates, and marine plants and the Area is an important habitat for juvenile fish species. Fish commonly collected within a depth range of

80 to 200m at Eastern Dallmann Bay include *Gobionotothen gibberifrons (formely Notothenia gibberifrons), Chaenocephalus aceratus, Champsocephalus gunnari, Pseudochaenichthys georgianus* and *Chionodraco rastrospinosus* (Eastman and Lannoo 2004; Dunlap *et al.* 2002). In addition to more common species, trawls carried out between 15th June and 4th July 2001 collected numerous specimens of *Lepidonotothen larseni, Lepidonotothen nudifrons Notothenia rossii* and *Notothenia coriiceps* and examples of *Parachaenichthys charcoti, Chaenodraco wilsoni, Dissostichus mawsoni, Trematomus eulepidotus* and *Lepidonotothen squamifrons* (Eastman and Sidell 2002; Grove and Sidell 2004). Specimens of *Trematomus newnesi* and *Gymnodraco acuticeps* have been collected occasionally within the Area (Hazel and Sidell 2003; Wujcik *et al*. 2007). Larval species recorded in the Area include *Artedidraco skottsberg, Gobionotothen gibberifrons, Lepidonotothen. nudifrons* and *Pleuragramma antarcticum* (Sinque *et al.* 1986; Loeb *et al.* 1993).

Invertebrates collected within the Area have included varieties of sponge, anemone, annelid, mollusc, crustacean, asteroid, ophiuroid, echinoid, holothurioid and tunicate. Acoustic echo-sounding was used to measure aggregations of Antarctic krill (*Euphausia superba*) within the Area during cruises between 1985 and 1988 (Ross *et al.* 1996). Aggregations were generally recorded in the upper 120 m of the water column. The lowest numbers of aggregations were observed in early spring, increasing to a maximum in late summer and early winter and spawning occurs from November to March (Zhou *et al*. 2002). The Area provides a food-rich nursery for krill, which may become entrained within the Area by eddy currents.

Birds

Two colonies of chinstrap penguins (*Pygoscelis antarctica*) have been recorded on the northwestern coast of Brabant Island immediately adjacent to the Area. Approximately 5000 breeding pairs were counted at Metchnikoff Point and approximately 250 pairs at Claude Point in 1985 (Woehler 1993). Colonies of Antarctic fulmars (*Fulmarus glacialoides*) have been observed at three locations along the coast of Brabant Island (Poncet and Poncet, unpublished data: in Harris 2006) and 1000 breeding pairs were estimated to be nesting along Cape Cockburn cliffs in 1987, at the northeastern boundary of the Area (Creuwels *et al*. 2007). Antarctic shags (*Phalacrocorax* [atriceps] *bransfieldensis)* have been observed to nest at four locations along the western coast of Brabant Island (Poncet and Poncet, unpublished data from Jan-Feb 1987, in Harris 2006). Other birds observed breeding on the western coast of Brabant Island and frequenting the Area are: Antarctic terns (*Sterna vittata*), black-bellied storm petrels (*Fregetta tropica*), brown skuas (*Catharacta antarctica*), cape petrels (*Daption capense*), greater sheathbills (*Chionis alba*), kelp gulls (*Larus dominicanus*), snow petrels (*Pagodroma nivea*), south polar skuas (*Catharacta maccormicki*) and Wilson's storm petrels (*Oceanites oceanicus*) (Parmelee and Rimmer 1985; Furse 1986). Antarctic petrel (*Thalassoica antarctica*), black-browed albatross (*Diomedea melanophris*), southern giant petrel (*Macronectes giganteus*) commonly forage in the Area (Furse 1986).

Marine mammals

Numerous marine mammals were observed in Dallmann Bay between January 1984 and March 1985 (Furse 1986). Humpback whales (*Megaptera novaeangliae*) were the most frequently sighted whale species, with possible sightings of killer whales (*Orcinus orca*) off Metchnikoff Point in May and June 1985. Satellite tracking of humpback whales between January 2004 and January 2006 indicated that numerous animals passed through the Area and foraged within it, with the broader Gerlache Strait region being identified as an important feeding ground for humpback whales (Dalla Rosa *et al.* 2008). Minke whales have been sighted within the Area, to the north of Brabant Island, during the austral summer (Dec – Feb) (Scheidat *et al.* 2008).

Crabeater seals (*Lobodon carcinophagus*), southern elephant seals (*Mirounga leonina*), numerous Antarctic fur seals (*Arctocephalus gazella*), leopard seals (*Hydrurga leptonyx*) and Weddell seals (*Leptonychotes weddellii*), were observed in the Area from Metchnikoff Point (Furse 1986).

Human activities / impacts

Numerous research cruises along the western Antarctic Peninsula have included sampling stations within the Area for oceanographic and/or biological research. Fish collected within the Area have been used for a variety of biochemical, genetic and physiological research. Studies of icefish biochemical processes have included: studies of the adaptations in fish that enable proteins to function at low temperatures (Dunlap *et al.* 2002;

Cheng and Detrich 2007); the adaptations of muscle structure and energy metabolism, including the processing of fatty acids to low temperatures (Hazel and Sidell 2003; Grove and Sidell 2004; O'Brien *et al.* 2003); the influence of hydrostatic pressure on enzyme function within fish livers (Ciardiello *et al*. 1999) and efficient genome transcription at low water temperatures (Lau *et al*. 2001; Magnoni *et al*. 2002). Numerous studies have investigated icefish morphology, including; research into the cardiovascular adaptations of icefish, in compensation for their complete lack of haemoglobin (Wukcik *et al*. 2007; Sidell and O'Brien 2006); the histology and anatomy of the sense organs and brains of icefish (Eastman and Lannoo 2004); and neutral buoyancy of icefish in relation to their life histories and skeletal structure (Eastman and Sidell 2002).

Specimens collected during trawls in March and April 1991, 1992, and 1993 were used in comparative studies of polynuclear aromatic hydrocarbon (PAH) contamination in fish with those collected from Arthur Harbor and the effects of Diesel Fuel Arctic (DFA) on *Notothenia gibberifrons* (now *Gobionotothen gibberifrons*) (McDonald *et al.* 1995; Yu *et al*. 1995). The former study found levels of contamination in fish sampled from the Area were considerably lower than those sampled from the vicinity of the 1989 *Bahia Paraiso* wreck in Arthur Harbor and that fish captured near US scientific stations are exposed to PAH, albeit low levels (McDonald *et al*. 1992 and 1995). However concentrations of PAH were higher than had been expected in fish collected from within the Area, with levels found to be similar to those in fish sampled from near Old Palmer Station.

Specimens have been regularly collected in recent years (2008, 2009, 2010, 2011) for further research related to biochemical processes in icefish (Cuellar *et al*. 2014, Devor 2013, Mueller *et al*. 2011, Mueller *et al*. 2012, Teigen 2014).

A British Joint Services Expedition involving 35 team members spent one year on Brabant Island from January 1984 to March 1985 (Furse 1986). Several camps and numerous caches were established along the western coastline, including a main base camp at Metchnikoff Point. Some of the camp structures, equipment and supplies were abandoned following the expedition, although their status in 2015 is unknown. The level of impact of the expedition on the adjacent marine environment is also unknown.

The Brabant Island – Anvers Island region is a popular destination for tourism. Data on tourist visits compiled by the US National Science Foundation show that since the Area was first designated in 1991 a number of tour vessels have visited Dallmann Bay, and more specifically Metchnikoff Point. Tourist activity in the vicinity since original designation is summarised in Table 1. It is not clear where in Dallmann Bay the reported tourist visits took place, although it is thought that ship activity occurs predominantly within western Dallmann Bay, specifically along the coast of Anvers Island and close to the Melchior Islands (Crosbie pers. comm. 2008). In February 2010 a vessel collided with and injured a humpback whale during approach to Dallmann Bay (Liggett *et al*. 2010). It remains necessary, however, to move through the Area to gain access to Metchnikoff Point by sea.

Table 1. Tourism activity in the vicinity of ASPA No. 153, Eastern Dallmann Bay, 1991–92 to 2007–08. Numbers given in brackets indicate activity at Metchnikoff Point.

Year	No. of vessels	Total No. of Visitors	Small-boat cruise (pax)	Small-boat landing (pax)	Helicopter flight	Kayaking	Scuba diving
1991-92	(1)		(12)				
1992-93							
1993-94	1		84				
1994-95							
1995-96	2		104				
1996-97	1		70				
1997-98	(1)			(55)			
1998-99	(1)			(2)			
1999-00	2		102				
2000-01	0		0				
2001-02	(1)		0 (96)				
2002-03	0		0				
2003-04	0	0	0	0	0	0	0

2004-05	1	56	0	0	0	0	0
2005-06	7	1399	467	0	0	107	0
2006-07	8	1232	318	0	0	101	0
2007-08	8	10,068	61	0	0	0	0
2008-09	9	6545	170	0	0	0	0
2009-10	9	13,759	107	0	0	0	0
2010-11	9	2402	103	0	26	0	14
2011-12	4	2131	78	0	0	0	0
2012-13	8	3715	0	4	0	0	0
2013-14	9	3558	29	0	0	0	0

6(ii) Access to the Area

Access into the Area is generally by ship from Bransfield Strait, or from the direction of Gerlache Strait to the south, or from the Drake Passage in the west and through Dallmann Bay. Vessels may transit through the Area, although anchoring shall be avoided except in compelling circumstances. Access into the Area may be made by air or over sea ice when conditions allow. Access routes into or within the Area have not been defined.

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

There are no structures known to be within the Area. Structures and other material from the UK Joint Services Expedition to Brabant Island (January 1984 to March 1985) may remain on the western shores of Brabant Island, particularly at Metchnikoff Point. The nearest stations are President González Videla (Chile), approximately 55 km south in Paradise Harbour; Port Lockroy (UK), approximately 75 km south-west on Goudier Island, Yelcho (Chile), approximately 80 km south-west on Doumar Island; and Palmer (US), approximately 90 km SW on Anvers Island.

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

The nearest protected area to Eastern Dallmann Bay is Western Bransfield Strait (ASPA No. 152), which lies about 45 km to the north. Antarctic Specially Managed Area No. 7 Southwest Anvers Island and Palmer Basin lies approximately 80 km to the southwest on the southern coast of Anvers Island (Map 1).

6(v) Special zones within the Area

None.

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 purposes, or for educational purposes that cannot be served elsewhere, or for reasons essential to the management of the Area;
- the actions permitted are in accordance with the Management Plan;
- the activities permitted will give due consideration via the environmental impact assessment process to the continued protection of the environmental and scientific values of the Area;
- the Permit shall be issued for a finite period;
- the Permit, or a copy, shall be carried when in the Area.

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

Access into the Area shall be by sea, over sea ice or by air. There are no specific restrictions on routes of access to or movement within the Area, although movements should be kept to the minimum necessary consistent with the objectives of any permitted activity. Every reasonable effort should be made to minimize disturbance. Vessels may transit through the Area, although anchoring shall be avoided except in compelling circumstances. There are no special overflight restrictions and aircraft may land by Permit when sea ice conditions allow, although pilots should take into account the bird breeding colonies present along the eastern boundary of the Area on the Brabant Island coast (Map 1).

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

- Scientific research that will not jeopardize the values of the Area;
- Essential operational activities of vessels that will not jeopardize the values of the Area, such as transit through, or stationing within, the Area in order to facilitate science or other activities, including tourism, or for access to sites outside of the Area;
- Essential management activities, including monitoring.

7(iv) Installation, modification or removal of structures

- No structures are to be erected within the Area except as specified in a permit and permanent structures or installations are prohibited.
- All structures, scientific equipment or markers installed in the Area must be authorized by permit and clearly identified by country, name of the principal investigator and year of installation. All such items should be made of materials that pose minimal risk of contamination of the Area.
- Installation (including site selection), maintenance, modification or removal of structures shall be undertaken in a manner that minimizes disturbance to flora and fauna.
- Removal of specific equipment for which the permit has expired shall be the responsibility of the authority which granted the original Permit, and shall be a condition of the permit.

7(v) Location of field camps

None.

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

In addition to the requirements of the Protocol on Environmental Protection to the Antarctic Treaty, restrictions on materials and organisms which may be brought into the area are:

- Deliberate introduction of animals, plant material, micro-organisms and non-sterile soil into the Area is prohibited. Precautions shall be taken to prevent the accidental introduction of animals, plant material, micro-organisms and non-sterile soil from other biologically distinct regions (within or beyond the Antarctic Treaty area);
- Visitors shall ensure that sampling equipment and markers brought into the Area are clean. To the maximum extent practicable, equipment to be used within the area shall be thoroughly cleaned before entering the Area. Visitors should also consult and follow as appropriate recommendations contained in the Committee for Environmental Protection Non-native Species Manual (CEP 2011);
- No pesticides shall be brought into the Area;
- Fuel, food, chemicals and other materials shall not be stored in the Area, unless specifically authorized by permit, and shall be stored and handled in a way that minimizes the risk of their accidental introduction into the environment;
- All materials introduced shall be for a stated period only, shall be removed at or before the conclusion of that stated period; and
- If release occurs which is likely to compromise the values of the Area, removal is encouraged only where the impact of removal is not likely to be greater than that of leaving the material *in situ*.

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

- Taking of, or harmful interference with, native flora or fauna is prohibited, except in accordance with a permit issued under Article 3 of Annex II to the Protocol on Environmental Protection to the Antarctic Treaty. Where animal taking or harmful interference 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 may be collected or removed from the Area only in accordance with a permit and should be limited to the minimum necessary to meet scientific or management needs.
- 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 authorized, may be removed from any part of the Area, unless the impact of removal is likely to be greater than leaving the material *in situ.* If this is the case the appropriate 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 continue to meet the aims of the Management Plan

Permits may be granted to enter the Area to:

1. Carry out monitoring and Area inspection activities, which may involve the collection of a small number of samples or data for analysis or review;
2. Erect, install or maintain structures or scientific equipment;
3. Carry out protective measures.

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, and where possible within six months after the visit has been completed.
- Such reports should include, as appropriate, the information identified in the Visit Report form contained in Appendix 2 of the Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas (Resolution 2 (2011)). 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 reports in a publicly accessible archive to maintain a record of usage, to be used both in any review of the Management Plan and in organizing the scientific use of the Area.
- The appropriate authority should be notified of any activities/measures undertaken, anything removed and / or of any materials released and not removed, that were not included in the authorized permit.

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Map 1: ASPA No. 153 - Eastern Dallmann Bay

31 Mar 2015 (Map ID:10068.0002.02)
United States Antarctic Program
Environmental Research & Assessment

Coastline | Contour (250 m) | Isobath (200 m) | Ice free ground | Permanent ice | Ocean | Protected area boundary | Historic Site & Monument | IBA Important Bird Area | Flying bird colony | Penguin colony

Kilometers
Projection: Lambert Conformal Conic
Spheroid and horizontal datum: WGS84
Data sources: Coast & topography: SCAR ADD (v4.1 2005, v6, 2012); Bathymetry: IBCSO (v1, 2013); Bird data: ERA (Mar 2015); IBA: BirdLife Int./ERA (2011); Protected areas: ERA Antarctic Protected Areas v3.0 (Jun 2014); HSM: ATS, revised by ERA (Jun 2014).

Management Plan For
Antarctic Specially Protected Area No. 155
CAPE EVANS, ROSS ISLAND
(including Historic Site and Monument Nos. 16 and 17, the historic *Terra Nova* hut of Captain Robert Falcon Scott and its precincts and the Cross on Wind Vane Hill)

1. Description of Values to be protected

The significant historic value of this Area was formally recognised when it was listed as Historic Site and Monument Nos. 16 and 17 in Recommendation 9 (1972). An area containing both sites was designated as Specially Protected Area No. 25 in Measure 2 (1997) and redesignated as Antarctic Specially Protected Area 155 in Decision 1 (2002).

The *Terra Nova* hut (Historic Site and Monument No. 16) is the largest of the historic huts in the Ross Sea region. It was built in January 1911 by the British Antarctic *Terra Nova* Expedition of 1910-1913, led by Captain Robert Falcon Scott, RN. It was subsequently used as a base by the Ross Sea party of Sir Ernest Shackleton's Imperial Trans-Antarctic Expedition of 1914-1917.

Historic Site and Monument No. 17 consists of the Cross on Wind Vane Hill, erected in the memory of three members of Shackleton's Ross Sea party who died in 1916. In addition to this, two anchors from the ship *Aurora* of the Imperial Trans-Antarctic Expedition, two instrument shelters (one on Wind Vane Hill and the other near the *Terra Nova* hut), several supply dumps and numerous artefacts are distributed around the site.

Cape Evans is one of the principal sites of early human activity in Antarctica. It is an important symbol of the Heroic Age of Antarctic exploration and, as such, has considerable historical significance. Some of the earliest advances in the study of earth sciences, meteorology, flora and fauna in Antarctica are associated with the *Terra Nova* Expedition based at this site. The data collected can provide a bench mark against which to compare current measurements. The history of these activities and the contribution they have made to the understanding and awareness of Antarctica therefore contribute to both the historic and scientific value of the site.

A revised version of the Management Plan was adopted by means of Measure 2 (2005) and changes to the access and movement provisions were adopted by means of Measure 12 (2008) and Measure 8 (2010).

Cape Evans is situated in Environment S – McMurdo South Victoria Land geologic based on the Environmental Domains Analysis for Antarctica (Resolution 3 (2008)) and in Region 9 – South Victoria Land based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)). Other protected areas within Environment S includes ASPA 105, 116, 121, 122, 123, 124, 131, 137, 138, 154, 156, 157, 158, 161, 172 and 175 and ASMA 2.

2. Aims and Objectives

The aim of the Management Plan is to provide protection for the Area and its features so that its values can be preserved. The objectives of the Management Plan are to:

- avoid degradation of, or substantial risk to, the values of the Area;

- maintain the historic values of the area through planned conservation work which may include:
  a. an annual ‘on-site’ maintenance programme,
  b. a programme of monitoring the condition of artefacts and structures, and the factors which affect them, and
  c. a programme of conservation of artefacts to be conducted on and off site;
- allow management activities which support the protection of the values and features of the Area including:
  a. mapping and otherwise recording the disposition of historic items in the hut environs, and
  b. recording other relevant historic data; and
- prevent unnecessary human disturbance to the Area, its features and artefacts through managed access to the *Terra Nova* hut.

3. Management Activities

The following management activities will be undertaken to protect the values of the Area:
- A regular programme of conservation work shall be undertaken on the *Terra Nova* hut and associated artefacts in the Area.
- Visits shall be made as necessary for management purposes.
- Systematic monitoring shall be put in place to assess the impacts of present visitor limits, and the results and any related management recommendations included in reviews of this Management Plan.
- National Antarctic Programmes operating in, or those with an interest in, the Area shall consult together with a view to ensuring the above management activities are implemented.
- Copies of this Management Plan, including maps of the Area, shall be made available at adjacent operational research/field stations.

4. Period of Designation

Designated for an indefinite period.

5. Maps

Map A: Cape Evans regional map. This map shows the boundaries of the Area with significant topographical features, field camp sites and helicopter landing sites. It also shows the approximate location of significant historical items within the area. Inset: Ross Island showing sites of nearby protected areas and stations.

Map B: Cape Evans site map. This map shows the approximate location of specific historic artefacts and sites within the Area.

6. Description of the Area

6(i) Geographical co-ordinates, boundary markers and natural features
Cape Evans is a small, triangular shaped, ice-free area at the south west of Ross Island, 10 kilometres to the south of Cape Royds and 22 kilometres to the north of Hut Point Peninsula on Ross Island.

The ice-free area is composed of till-covered basalt bedrock. The designated Area is located on the north western coast of Cape Evans adjacent to Home Beach and centered on Scott's *Terra Nova* hut. The boundaries of the ASPA are:

- South: a line extending east from a point at 77º 38' 15.47" S, 166º 25' 9.48" E – 20 metres south of the cross on Wind Vane Hill;
- South-west: a line from the reference point above extended to follow the crest of the small ridge descending in a north westerly direction to the shoreline at 77º 38' 11.50" S, 166º 24' 49.47" E;
- North-west: by the shoreline of Home Beach;
- North-east: by the line of the outlet stream from Skua Lake to Home Beach at 77º 38' 4.89" S, 166º 25' 13.46" E;
- East: by the line extending south from the western edge of Skua Lake at 77º 38' 5.96" S, 166º 25' 35.74" E – to intersect with the southern boundary at 77º 38' 15.48" S, 166º 25' 35.68" E.

Skua (*Catharacta maccormicki*) nest at Cape Evans and Adelie penguins (*Pygoscelis adeliae*) from the colony at Cape Royds may occasionally transit the Area. Weddell seals (*Leptonychotes weddellii*) have also been seen hauled out on Home Beach.

6(ii) Access to the Area

When safe conditions exist, vehicle approach to the Area can be made across the sea ice. Vehicles are prohibited from entering the Area, unless approved to do so for management activities in accordance with 7(i) below. During open water, landings by boat may be made directly in front of the hut at Home Beach. Helicopter landings may be made at either of the existing designated landing sites marked on Maps A and B. One site is approximately 100 metres to the north of the hut, just outside the Area. The other is located adjacent to the New Zealand refuge hut approximately 250 metres beyond the south western boundary of the Area.

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

All structures located within the Area are of historic origin, although a temporary, modern protective enclosure around the magnetic hut remains in place. A major feature of the Area is Scott's *Terra Nova* hut located on the north western coast of Cape Evans at Home Beach. The hut is surrounded by many historic relics including the two anchors from the *Aurora*, dog skeletons, an instrument shelter, two dog lines, meteorological screen, fuel dump, magnetic hut, coal stores, a flag pole and the experimental rock hut/rubbish dump which is an historic rock structure linked with the 'Worst Journey in the World' to Cape Crozier (1911) containing a small collection of artefacts. A memorial cross to three members of Shackleton's Ross Sea party of 1914-1917 stands on Wind Vane Hill. All these features are included within the boundaries of the Area.

A New Zealand refuge hut, camp site and helicopter landing site are situated approximately 250m to the south west of the Area.

The former Greenpeace year-round World Park Base was sited to the north east of Scott's *Terra Nova* hut from 1987 to 1992. No visible sign of the base remains.

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

- ASPA 121 (previously SSSI No. 1), Cape Royds, and
- ASPA 157 (SPA No. 27), Backdoor Bay, Cape Royds are 10 kilometres north of Cape Evans.
- ASPA 122 (SSSI No. 2), Arrival Heights and
- ASPA 158 (SPA No. 28), Hut Point are approximately 22 kilometres south of Cape Evans at Hut Point Peninsula.

- ASPA 130 (SSSI No. 11), Tramway Ridge is approximately 20 kilometres east of Cape Evans.

All sites are located on Ross Island.

6(v) Special Zones within the Area
There are no special zones within the Area.

7. Terms and Conditions for Entry Permits

Entry to the Area is prohibited except in accordance with a Permit. Permits shall be issued only by appropriate national authorities and may contain both general and specific conditions. A Permit may be issued by a national authority to cover a number of visits in a season. Parties operating in the Area shall consult together and with groups and organisations interested in visiting the Area to ensure that visitor numbers are not exceeded. Permits to enter the site may be issued for a stated period for:

- activities related to conservation, research and/or monitoring purposes;
- management activities in support of the objectives of this Plan;
- activities related to educational or recreational activities including tourism, providing they do not conflict with the objectives of this Plan; and
- any other activity specifically provided for in this Plan.

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

- Control of movement within the Area is necessary to prevent damage caused by crowding around the many vulnerable features within the Area. The maximum number in the Area at any time (including guides and those within the hut) shall be: **40 people**.
- Control of numbers within the hut is necessary to prevent damage caused by crowding around the many vulnerable features within the hut. The maximum number within the hut at any time (including guides) shall be: **8 people**.
- Avoidance of cumulative impacts on the interior of the hut requires an annual limit on visitor numbers. The effects of the current visitor levels (average 1042 per year between 1998/99 and 2013/14) suggest that a significant increase could cause significant adverse impacts. The maximum annual number of visitors shall be: **2,000 people**.
- These limits have been set based on current visitor levels and on the best advice available from conservation advisory agencies (which include conservators, archaeologists, historians, museologists and other heritage protection professionals). The limits are based on the proposition that any significant increase in the current level of visitor numbers would be detrimental to the values to be protected. An ongoing monitoring programme to assess the effects of visitors is required to provide the basis for future reviews of the Management Plan, in particular whether the current limits on numbers of visitors are appropriate.
- Adequate supervision of visits to the Area is necessary to prevent damage caused by crowding and by actions inconsistent with the Code of Conduct set out in section 7(ii). All tourism, educational and recreational visits must be supervised by an experienced guide nominated by the operator (refer section 7(ix)).
- Helicopter landings are prohibited within the Area as they have the potential to damage the site by blowing scoria and ice particles and to accelerate the abrasion of the hut and surrounding artefacts. Refer to section 6(ii) for recommended approaches and landing sites.
- Vehicles are prohibited from entering the Area except where it is necessary to use vehicles for management activities. This may include, but is not limited to activities such as clearing

snow and ice that is judged to be a threat to the historic hut or other artefacts. In all such cases consideration shall be given to:

i. using the minimum sized vehicle required for the job;
ii. ensuring the vehicle operator is fully trained and aware of the provisions of this Plan, and of the sensitivities at the site of operation of the vehicle;
iii. careful planning and monitoring of all vehicle movements within the site so as to avoid damage to either the hut or artefacts buried beneath accumulated snow and ice.

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

Activities which may be conducted within the Area include:

- visits for conservation purposes;
- educational and/or recreational visits including tourism; and
- scientific activity which does not detract from the values of the Area.

Visitors should adhere to the following Code of Conduct, except where conservation, research, monitoring or management activities specified in the Permit require otherwise:

- Thoroughly clean grit and scoria, ice and snow from boots using the brushes provided before entering the hut to reduce floor abrasion and only use tripods or monopods with flat bottomed rubber bases as opposed to those with metal spikes which can damage the floor;
- Remove any clothing made wet by sea water, and any sea ice crystals from boots, as salt particles accelerate corrosion of metal objects;
- Do not touch, move or sit on any items or furniture in the huts - handling artefacts causes damage;
- As many areas are cramped and artefacts can be accidentally bumped, do not wear packs inside and when the maximum number of visitors (8) are in the hut at one time the use of tripods or monopods is prohibited;
- When moving around the sites, take great care not to tread on any items which may be obscured by snow and remain on established walking tracks;
- Use of combustion style lanterns, naked flames or smoking in or around the hut is strictly forbidden as fire is a major risk; and
- Visits should be recorded in the book provided. This allows times and levels of visitation to be correlated with temperature and humidity data automatically logged inside the hut.

7(iii) Installation, modification or removal of structures

- No new structures are to be erected in the Area, or scientific equipment installed, except for conservation activities as specified in section 1.
- No historic structure shall be removed from the Area, unless specified in a Permit issued in accordance with the provisions of section 7(vii).

7(iv) Location of field camps

- Use of the historic hut for living purposes is not permitted. Camping is prohibited in the Area under any circumstances.
- An existing field camp site is associated with the two New Zealand field shelters located 250m south west of the Area and should be used by all parties intending to camp in this area. A second alternative field camp site is located to the north of the Area near the helicopter pad on Home Beach (Map A and B).

7(v) Restrictions on materials and organisms which may be brought to the Area

- No living animals, plant material, micro-organisms or soil shall be introduced to the Area. No food products shall be taken into the Area.
- Chemicals may only be introduced for permitted scientific or conservation purposes. Chemicals (including fuel) or other materials are not to be left in the Area, unless required for essential purposes connected with the conservation of the historic structures or associated relics.
- All introduced materials are to be removed when no longer required and before a date to be specified in the relevant Permit.

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

- This activity is prohibited except in accordance with a Permit issued by the appropriate national authority specifically for that purpose under Article 3, Annex II to the Protocol on Environmental Protection.
- Where animal taking or harmful interference 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(vii) Collection or removal of anything not imported by the Permit holder

- Material may be collected and removed from the Area for conservation reasons consistent with the objectives of this Management Plan only when specified in a Permit issued by the appropriate national authority.
- Materials which pose a threat to the environment or human health may be removed from the Area for disposal, in accordance with a Permit, where they meet one or more of the following criteria:

i. the artefact presents a threat to the environment, wildlife or human health and safety;
ii. it is in such poor condition that it is not reasonably possible to conserve it;
iii. it does not contribute in any significant way to our understanding of the hut, its occupants or the history of Antarctica;
iv. it does not contribute to, or it detracts from, the visual qualities of the site or the hut, and/or;
v. it is not a unique or rare item;

and where such action is:

i. undertaken by parties with appropriate heritage conservation expertise; and
ii. part of an overall plan for conservation work at the site.

- National authorities should ensure that any removal of artefacts and assessment against the above criteria is carried out by personnel with appropriate heritage conservation expertise.
- Artefacts judged to be of high historic value, which cannot be conserved on site with currently available techniques, may be removed in accordance with a Permit for storage in a controlled environment until such time as they can safely be returned to the Area.
- Except with respect to any part of, or the contents of, an historic site or monument, samples of soil and other natural materials may be removed for scientific purposes. Such removal must be in accordance with an appropriate Permit.

7(viii) Disposal of waste

All human waste, grey water and other waste generated by work parties or visitors shall be removed from the Area.

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

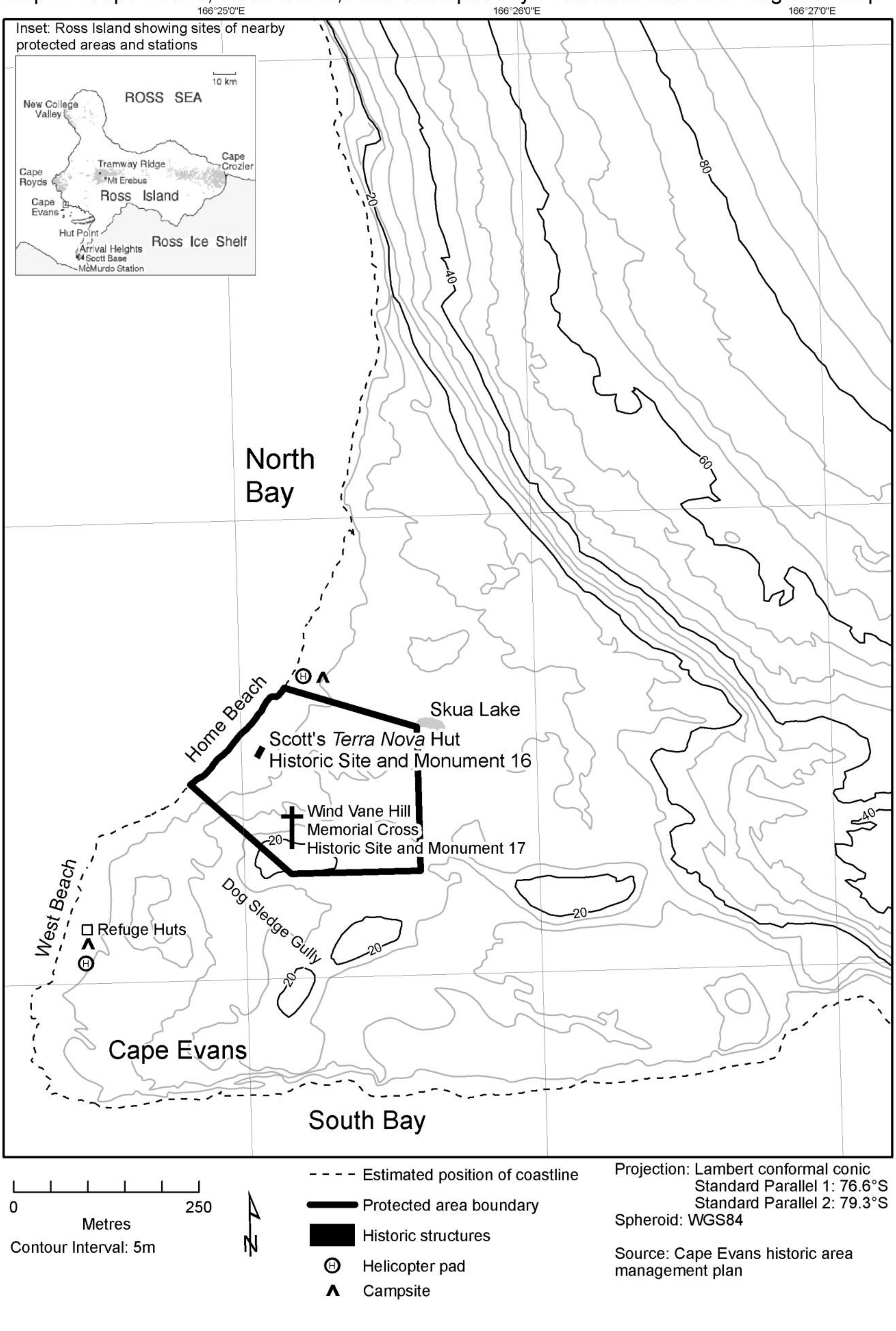
- The Permit, or an authorised copy, shall be carried within the Area.
- Information on the requirements of this Plan shall be provided to all visitors.
- The Code of Conduct set out in section 7(ii) shall be followed by all visitors, except where conservation, research, monitoring or management purposes require otherwise.
- Operators facilitating educational and recreational visits (including tourism) to the Area shall, prior to commencement of the summer season, nominate people with a working knowledge of both the site and this Management Plan to act as guides during visits.
- All educational and recreational visits (including tourism) shall be supervised by a nominated guide, who is responsible for briefing visitors on the Code of Conduct and the requirements of this Management Plan and ensuring they are complied with.
- Parties shall consult and coordinate to develop skills and resources, particularly those related to conservation techniques, to assist with the protection of the Area's values.

7(x) Requirements for reports

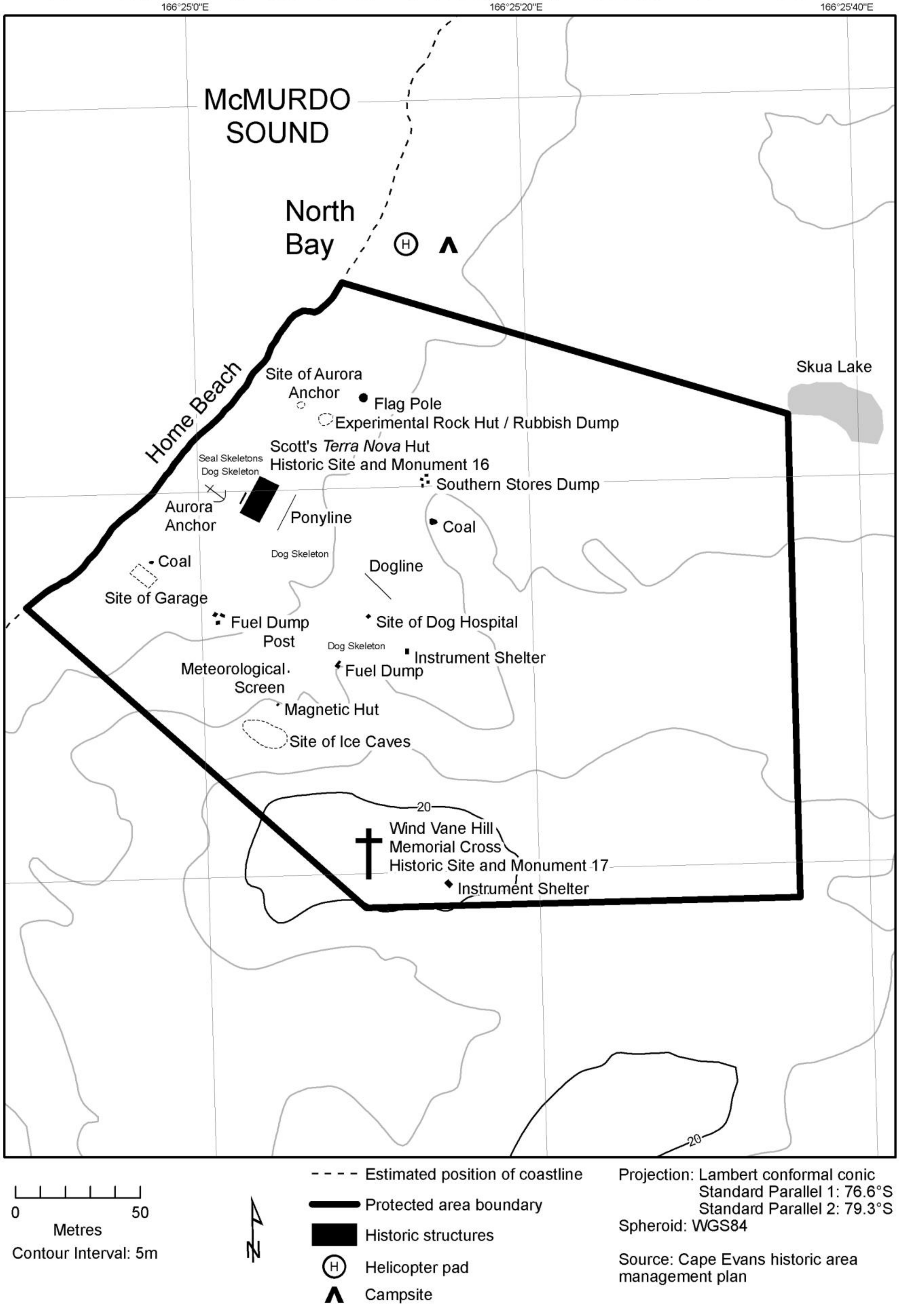
Parties shall ensure that the principal holder for each Permit issued submits to the appropriate authority a report describing the activities undertaken. Such reports shall include, as appropriate, the information identified in the Visit Report provided in Appendix 4 of Resolution 2 (1998). In addition, any removal of materials in accordance with section 7(vii) shall be detailed, including the reason for removal and the current location of the items or the date of disposal. Any return of such items to the site shall also be reported.

Parties shall maintain a record of activities within the Area and, in the Annual Exchange of Information, 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 should wherever possible deposit originals or copies of such reports in a publicly accessible archive to maintain a record of visitation, to be used both for review of the Management Plan and in managing further visitation to the site.

Map A - Cape Evans, Ross Island, Antarctic Specially Protected Area 155: Regional Map



Map B - Cape Evans, Ross Island, Antarctic Specially Protected Area 155: Site Map



Management Plan For
Antarctic Specially Protected Area No. 157
BACKDOOR BAY, CAPE ROYDS, ROSS ISLAND
(including Historic Site and Monument No. 15, the historic hut of Sir Ernest Shackleton and its precincts)

1. Description of Values to be Protected

The significant historic value of this Area was formally recognised when it was listed as Historic Site and Monument No. 15 in Recommendation 9 (1972). It was designated as Specially Protected Area No. 27 in Measure 1 (1998) and redesignated as Antarctic Specially Protected Area 157 in Decision 1 (2002). The Management Plan was reviewed and a revised version with additional visitor management provisions was adopted by means of Measure 2 (2005) and Measure 9 (2010).

The hut (Historic Site and Monument No. 15) on which this Area is centered was built in February 1908 by the British Antarctic *Nimrod* Expedition of 1907-1909 which was led by Sir Ernest Shackleton. It was also periodically used by the Ross Sea party of Shackleton's Imperial Trans-Antarctic Expedition of 1914-1917.

Structures associated with the hut include stables, kennels, a latrine and a garage created for the first motor vehicle in Antarctica. Other significant relics in the Area include an instrument shelter, supply depots, and a rubbish site. Numerous additional artefacts are distributed around the Area.

Cape Royds is one of the principal areas of early human activity in Antarctica. It is an important symbol of the Heroic Age of Antarctic exploration and, as such, has considerable historical significance. Some of the earliest advances in the study of earth sciences, meteorology, flora and fauna in Antarctica are associated with the *Nimrod* Expedition which was based at this site. The history of these activities and the contribution they have made to the understanding and awareness of Antarctica give this Area significant scientific, aesthetic and historic value.

Cape Royds is situated in Environment S – McMurdo South Victoria Land geologic based on the Environmental Domains Analysis for Antarctica (Resolution 3 (2008)) and in Region 9 – South Victoria Land based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)). Other protected areas within Environment S includes ASPA 105, 116, 121, 122, 123, 124, 131, 137, 138, 154, 155, 156, 158, 161, 172 and 175 and ASMA 2.

2. Aims and Objectives

The aim of the Management Plan is to provide protection for the Area and its features so that its values can be preserved. The objectives of the Management Plan are to:

- avoid degradation of, or substantial risk to, the values of the Area;
- maintain the historic values of the Area through planned conservation work which may include:
  a. an annual 'on-site' maintenance programme,
  b. a programme of monitoring the condition of artefacts and structures, and the factors which affect them, and
  c. a programme of conservation of artefacts conducted on and off site;

- allow management activities which support the protection of the values and features of the Area including:
  a. mapping and otherwise recording the disposition of historic items in the hut environs, and
  b. recording other relevant historic data;
- prevent unnecessary human disturbance to the Area, its features and artefacts through managed access to the *Nimrod* hut.

3. Management Activities

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

- A regular programme of conservation work shall be undertaken on the *Nimrod* hut and associated artefacts in the Area.
- Visits shall be made as necessary for management purposes.
- Systematic monitoring shall be put in place to assess the impacts of present visitor limits, and the results and any related management recommendations included in reviews of this Management Plan.
- National Antarctic Programmes operating in or those with an interest in, the Area shall consult together with a view to ensuring the above management activities are implemented.
- Copies of this Management Plan, including maps of the Area, shall be made available at adjacent operational research/field stations and will be provided to ships visiting the Area and vicinity.

4. Period of Designation

Designated for an indefinite period.

5. Maps

Map 1: ASPA No. 157 Backdoor Bay, Regional topographic map.
Projection: Lambert Conformal Conic; Standard parallels: 1st 77° 33' 30"S, 2nd 77° 33' 30"S: Central Meridian: 166° 10' 00"E; Latitude of origin: 78° 00' 00"S: Speheroid: WGS84.
Data sources:
The base map and contours are derived from an orthophotograph using aerial imagery acquired by USGS/DoSLI (SN7847) 16 November 1993 prepared at 1:2500 with a positional accuracy of ±1.25 m (horizontal) and ±2.5 m (vertical) and an on-ground pixel resolution of 0.4 m. Signposts: UNAVCO (Jan 2014). ASPA boundary: ERA (Jan 2014). Survey markers: LINZ (2011). Viewing areas and AWS (approx.): ERA (Jan 2014). Approximate penguin nesting area digitized from georeferenced aerial image acquired 19 Jan 2005 and supplied by P. Lyver, Landcare Research, Mar 2014. Contours (interval 10 m) and other infrastructure supplied by Gateway Antarctica (2009).
Inset 1: Ross Sea region, showing location of Inset 2.
Inset 2 Ross Island region, showing location of Map 1 and McMurdo Station (US) and Scott Base (NZ).

Map 2: ASPA No. 157 Backdoor Bay, Site topographic map. Map specifications as per Map 1, except the contour interval is 2 m.

6. Description of the Area

6(i) Geographical coordinates, boundary markers and natural features
Cape Royds is an ice free area at the western extremity of Ross Island, approximately 40 kilometers to the south of Cape Bird and 35 kilometers to the north of Hut Point Peninsula on Ross Island. The ice free area is composed of till covered basalt bedrock. The designated Area is located to the north east of Cape Royds adjacent to Backdoor Bay. It is immediately to the east of ASPA 121, an Adélie penguin colony. The Area is centered on Shackleton's *Nimrod* Expedition hut.

The eastern and southern boundary consists of the shoreline of the eastern coast of Cape Royds from an unmarked point in Backdoor Bay (77° 33' 07.5"S, 166° 10' 32.6"E) to an unmarked point in Arrival Bay (77° 33' 15.8"S, 166° 10' 06.6"E).

The western boundary follows the boundary of ASPA 121 from the coastline at Arrival Bay (77° 33' 15.8"S, 166° 10' 06.6"E) 18 metres north-west to a signpost at the southern end of the penguin viewing area (77°33´ 15.2" S, 166° 10´ 05.7" E), a further 74 metres to a signpost (77° 33' 12.9"S, 166° 10' 01.9"E) on the northern end of the penguin viewing area and a further 42 metres to a signpost (77° 33' 11.8"S, 166° 09' 59.0"E) east of Pony Lake.

The boundary then extends northwest from the signpost east of Pony Lake (77° 33' 11.8"S, 166° 09' 59.0"E) along a gully leading to an unmarked point (77° 33' 07.5" S, 166° 10' 12.9" E) adjacent to the New Zealand refuge hut.

The northern boundary extends due east from the New Zealand shelter (from the unmarked point at 77° 33' 07.5" S, 166° 10' 12.9" E) to the coastline of Backdoor Bay (77° 33' 07.5"S, 166° 10' 32.6"E).

Skua (*Catharacta maccormicki)* nest in the vicinity of the Area and Adelie penguins (*Pygoscelis adeliae)* from the adjacent colony at Cape Royds often transit the Area.

6(ii) Access to the Area
Access to the Area should be made on foot from Backdoor Bay or the helicopter landing sites using the routes shown in Map 2. Landings by boat (when there is open water), or vehicle (when safe sea ice conditions exist), may be made in Backdoor Bay. Care should be taken to avoid the marine extent of ASPA 121 (see Map 1 and 2).

Helicopters should land throughout the year at the Primary landing site (166°10.38'E, 77°33.06'S) north of the New Zealand refuge hut (Map 2). A Secondary landing site is located at 166°10.24'E, 77°33.11'S, ~100 m SW of the Primary landing site, which should be avoided when the penguin colony is occupied (01 November through 01 March).

6(iii) Location of structures within and adjacent to the Area
Apart from a Treaty plaque, all structures within the Area are of historic origin. A major feature of the Area is Shackleton's *Nimrod* Expedition hut located in a sheltered basin. The hut is surrounded by many other historic relics including an instrument shelter, supply depots, and a dump site. Numerous additional artefacts are distributed around the site.

A New Zealand refuge hut and camp site are located at the northwest corner of the ASPA.

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

- ASPA 121 (previously SSSI No. 1), Cape Royds is immediately adjacent to this Area.
- ASPA 122 (SSSI No. 2), Arrival Heights and
- ASPA 158 (SPA No. 28), Hut Point are approximately 35 kilometres south of Cape Royds at Hut Point Peninsula.
- ASPA 130 (SSSI No. 11), Tramway Ridge is 20 kilometres east of Cape Royds.
- ASPA 116 (SSSI No. 10, SPA No. 20), New College Valley is located 35 kilometres north in the vicinity of Cape Bird.
- ASPA 155 (SPA No. 25), Cape Evans is 12 kilometres south.
- ASPA 156 (SPA No. 26), Lewis Bay is 36 kilometres to the north east.

All sites are located on Ross Island.

6 (v) Special Zones within the Area

There are no special zones within the Area.

7. Terms and Conditions for Entry Permits

Entry to the Area is prohibited except in accordance with a Permit. Permits shall be issued only by appropriate national authorities and may contain both general and specific conditions. A Permit may be issued by a national authority to cover a number of visits in a season. Parties operating in the Area shall consult together and with groups and organisations interested in visiting the Area to ensure that visitor numbers are not exceeded.

Permits to enter the site may be issued for a stated period for:

- activities related to conservation, research and/or monitoring purposes;
- management activities in support of the objectives of this Management Plan; and
- activities related to educational or recreational activities including tourism, providing they do not conflict with the objectives of this Management Plan.

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

- Control of movement within the Area is necessary to prevent damage caused by crowding around the many vulnerable features within the Area. The maximum number in the Area at any time (including guides and those within the hut) shall be: **40 people.**
- Control of numbers within the hut is necessary to prevent damage caused by crowding around the many vulnerable features within the hut. The maximum number within the hut at any time (including guides) shall be: **8 people.**
- Avoidance of cumulative impacts on the interior of the hut requires an annual limit on visitor numbers. The effects of current visitor levels (average 767 per year between 1998/99 and 2013/14) suggest that a significant increase could cause significant adverse impacts. The annual maximum number of visitors shall be: **2,000 people.**
- These limits have been set based on current visitor levels and on the best advice available from conservation advisory agencies (which include conservators, archaeologists, historians, museologists and other heritage protection professionals). The limits are based on the proposition that any significant increase in the current level of visitors would be detrimental to the values to be protected. An ongoing monitoring programme to assess the effect of visitors is required to provide the basis for future reviews of the Management Plan, in particular whether the current limits on numbers of visitors are appropriate.

- Adequate supervision of visits to the Area is necessary to prevent damage caused by crowding and by actions inconsistent with the Code of Conduct set out in section 7(ii). All tourism, educational and recreational visits must be supervised by an experienced guide nominated by the operator (refer section 7(ix)).
- Helicopter landings are prohibited within the Area as they have the potential to damage the site by blowing scoria and ice particles and to accelerate the abrasion of the hut and surrounding artefacts. Vehicles are prohibited within the Area. Refer to 6(ii) for recommended approaches and landing sites near the Area.

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

Activities which may be conducted within the Area include:

- visits for conservation purposes;
- educational and/or recreational visits including tourism;
- scientific activity which does not detract from the values of the Area.

Visitors should adhere to the following Code of Conduct, except where conservation, research, monitoring or management activities specified in the Permit require otherwise:

- Thoroughly clean grit and scoria, ice and snow from boots using the brushes provided before entering the hut to reduce floor abrasion and only use tripods or monopods with flat bottomed rubber bases as opposed to those with metal spikes which can damage the floor;
- Remove any clothing made wet by sea water, and any sea ice crystals from boots, as salt particles accelerate corrosion of metal objects;
- Do not touch, move or sit on any items or furniture in the huts - handling artefacts causes damage;
- As many areas are cramped and artefacts can be accidentally bumped, do not wear packs inside and avoid the use of tripods or monopods when the maximum number of visitors (8) are in the hut at one time;
- When moving around the sites, take great care not to tread on any items which may be obscured by snow and remain on established walking tracks;
- Use of combustion style lanterns, naked flames or smoking in or around the hut is prohibited, as fire is a major risk; and
- Visits should be recorded in the book provided. This allows times and levels of visitation to be correlated with temperature and humidity data automatically logged inside the hut.

7(iii) Installation, modification or removal of structures

- No new structures are to be erected in the Area, or scientific equipment installed, except for conservation or scientific activities that do not detract from the values of the Area as specified in section 1.
- No historic item shall be removed from the Area, unless specified in a Permit issued in accordance with the provisions of section 7(vii).

7(iv) Location of field camps

- Use of the historic hut for living purposes is not permitted. Camping is prohibited within the Area under any circumstances.
- An existing field camp site and a New Zealand shelter are located at the north western boundary of the Area (see Map 2).

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

- No living animals, plant material, soil or micro-organisms shall be introduced to the Area. No food products shall be taken into the Area.

- Chemicals may only be introduced for permitted scientific or conservation purposes. Chemicals (including fuel) or other materials are not to be left in the Area, unless required for essential purposes connected with the conservation of the historic structures or the associated relics.
- All introduced materials are to be removed when no longer required and before a date to be specified in the relevant Permit.

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

- This activity is prohibited except in accordance with a Permit issued by the appropriate national authority specifically for that purpose under Article 3, Annex II to the Protocol on Environmental Protection.
- Where animal taking or harmful interference 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(vii) Collection of anything not imported by the Permit Holder

- Material may be collected and removed from the Area for conservation or scientific reasons consistent with the objectives of this Management Plan only when specified in a Permit issued by the appropriate national authority.
- Materials which pose a threat to the environment or human health may be removed from the Area for disposal, in accordance with a Permit, where they meet one or more of the following criteria:
  i. the artefact presents a threat to the environment, wildlife or human health and safety;
  ii. it is in such poor condition that it is not reasonably possible to conserve it;
  iii. it does not contribute in any significant way to our understanding of the hut, its occupants or the history of Antarctica;
  iv. it does not contribute to, or it detracts from, the visual qualities of the site or the hut; and/or
  v. it is not a unique or rare item;

and where such action is:

  i. undertaken by parties with appropriate heritage conservation expertise; and
  ii. part of an overall plan for conservation work at the site.

- National authorities should ensure that any removal of artefacts and assessment against the above criteria is carried out by personnel with appropriate heritage conservation expertise.
- Artefacts judged to be of high historic value, which cannot be conserved on site with currently available techniques, may be removed in accordance with a Permit for storage in a controlled environment until such time as they can safely be returned to the Area.
- Samples of soil and other natural materials may be removed for scientific purposes only in accordance with an appropriate Permit.

7(viii) Disposal of waste

All human waste, grey water and other waste generated by work parties or visitors shall be removed from the Area.

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

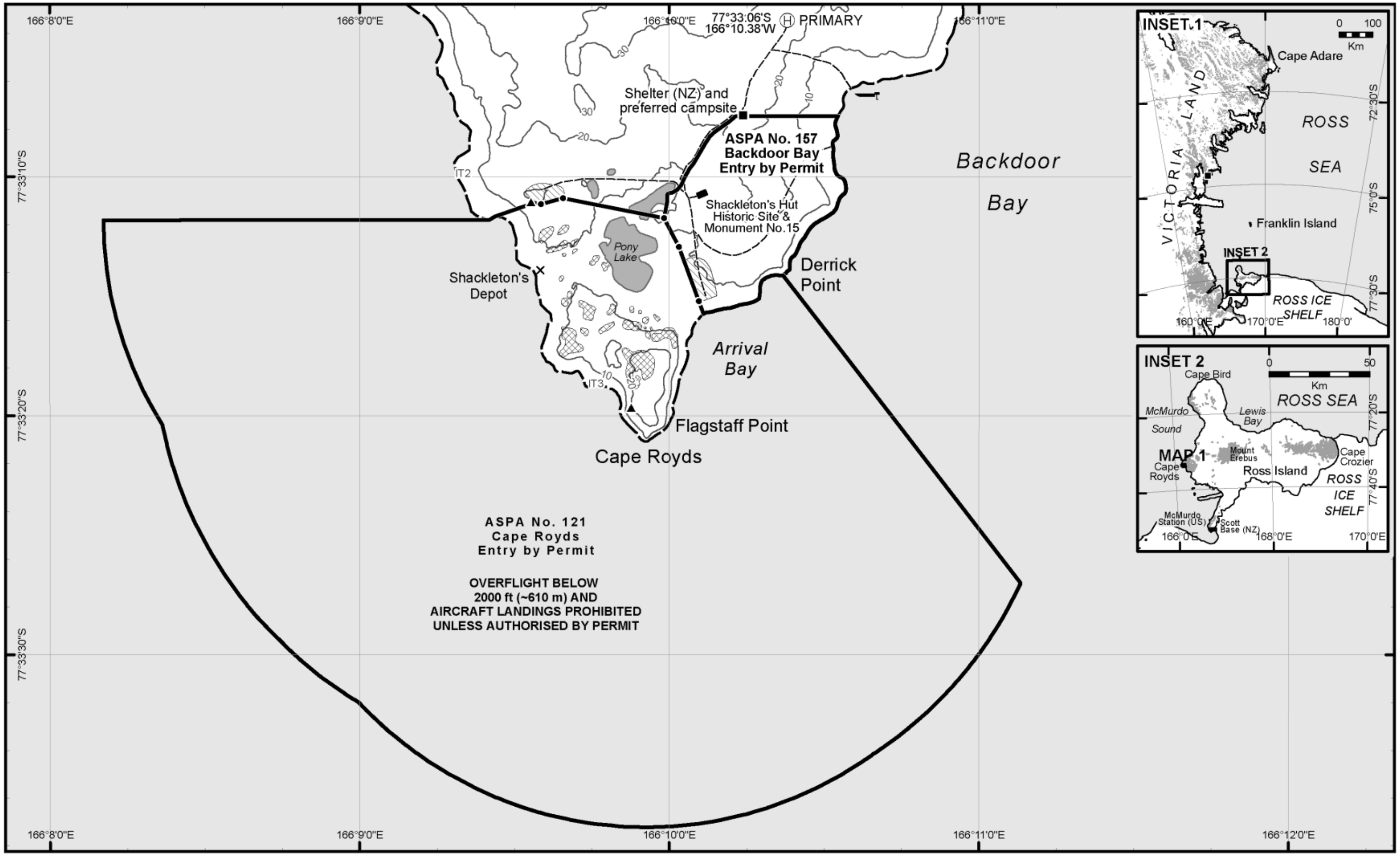
- The Permit, or an authorised copy, shall be carried within the Area.

- Information on the requirements of this Management Plan shall be provided to all visitors.
- The Code of Conduct set out in section 7(ii) shall be followed by all visitors, except where conservation, research, monitoring or management purposes require otherwise.
- Operators facilitating educational and recreational visits (including tourism) to the Area should, prior to commencement of the summer season, nominate people with a working knowledge of both the site and this Management Plan to act as guides during visits.
- All educational and recreational visits (including tourism) shall be supervised by a nominated guide, who is responsible for briefing visitors on the Code of Conduct and the requirements of this Management Plan and ensuring they are complied with.
- Parties should consult and coordinate to develop skills and resources, particularly those related to conservation techniques, to assist with the protection of the Area's values.

7(x) Requirements for reports

Parties shall ensure that the principal holder for each Permit issued submits to the appropriate authority a report describing the activities undertaken. Such reports shall include, as appropriate, the information identified in the Visit Report Form provided in Appendix 4 of Resolution 2 (1998). In addition, any removal of materials in accordance with section 7(vii) shall be detailed, including the reason for removal and the current location of the items or the date of disposal. Any return of such items to the site shall also be reported.

Parties shall maintain a record of activities within the Area and, in the Annual Exchange of Information, shall provide summary descriptions of activities conducted by persons subject to their jurisdiction, in sufficient detail to allow evaluation of the effectiveness of the Management Plan. Parties should wherever possible deposit originals or copies of such reports in a publicly accessible archive to maintain a record of visitation, to be used both for review of the Management Plan and in managing further visitation to the site.



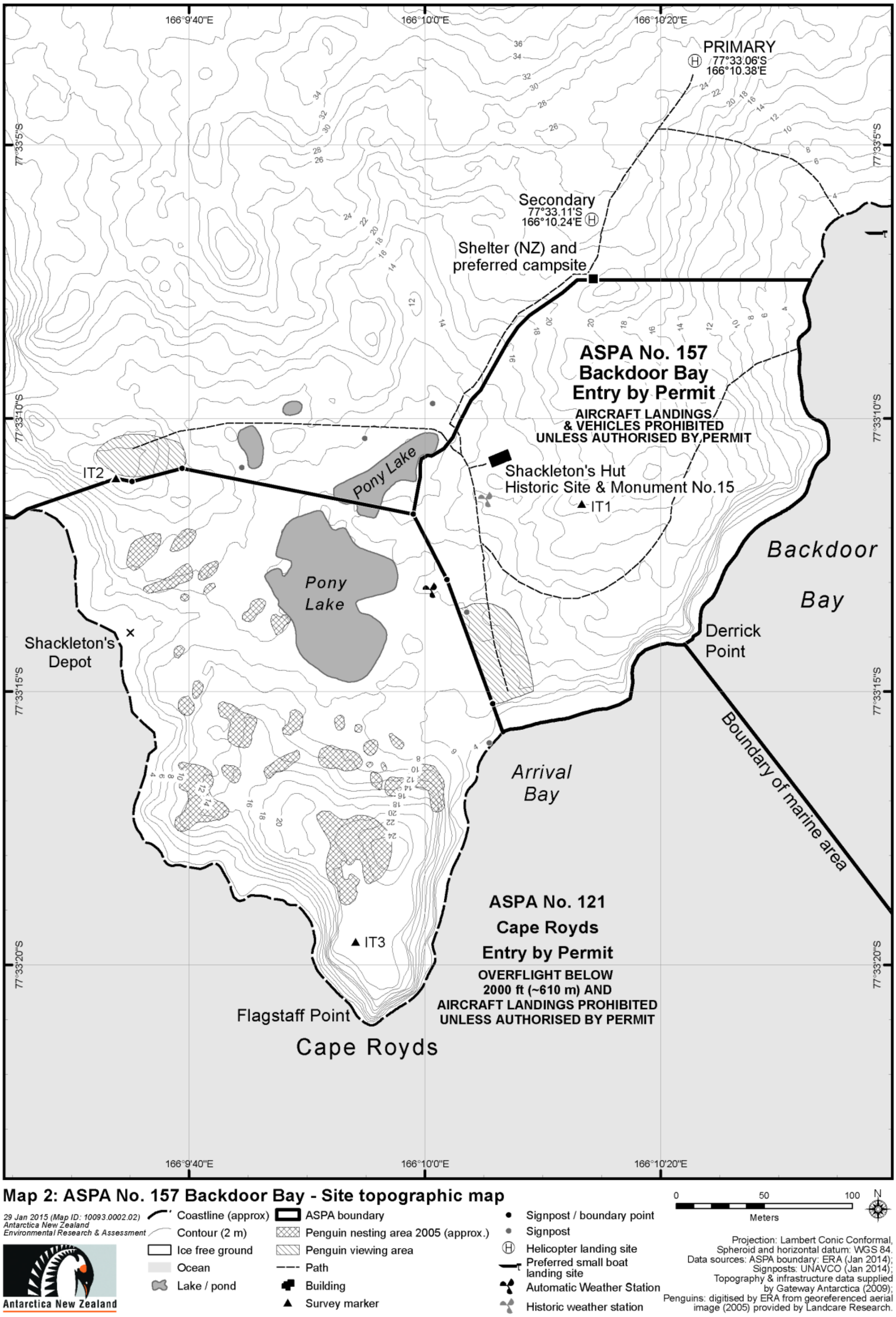
Map 1: ASPA No. 157 Backdoor Bay - Regional topographic map

13 Apr 2015 (Map ID: 10093.001.03)
Antarctica New Zealand
Environmental Research & Assessment

Coastline (approx) | Contour (10 m) | Ice free ground | Ocean | Lake / pond | Antarctic Specially Protected Area (ASPA) boundary | Penguin nesting area 2005 (approx.) | Penguin viewing area | Path | Building | Survey marker | Signpost / boundary point | Helicopter landing site | Preferred small boat landing site

Meters

Projection: Lambert Conic Conformal, Spheroid and horizontal datum: WGS 84. Data sources: ASPA boundary: ERA (Jan 2014); Signposts: UNAVCO (Jan 2014); Topography & infrastructure data supplied by Gateway Antarctica (2009); Penguins: digitised by ERA from georeferenced aerial image (2005) provided by Landcare Research.


PRIMARY
77°33.06'S
166°10.38'E
Secondary
77°33.11'S
166°10.24'E
Shelter (NZ) and
preferred campsite
ASPA No. 157
Backdoor Bay
Entry by Permit
AIRCRAFT LANDINGS
& VEHICLES PROHIBITED
UNLESS AUTHORISED BY PERMIT
Pony Lake
Shackleton's Hut
Historic Site & Monument No.15
IT1
IT2
Pony
Lake
Backdoor
Bay
Derrick
Point
Shackleton's
Depot
Arrival
Bay
Boundary of marine area
ASPA No. 121
Cape Royds
Entry by Permit
OVERFLIGHT BELOW
2000 ft (~610 m) AND
AIRCRAFT LANDINGS PROHIBITED
UNLESS AUTHORISED BY PERMIT
IT3
Flagstaff Point
Cape Royds
166°9'40"E
166°10'0"E
166°10'20"E
77°33'5"S
77°33'10"S
77°33'15"S
77°33'20"S
Map 2: ASPA No. 157 Backdoor Bay - Site topographic map
29 Jan 2015 (Map ID: 10093.0002.02)
Antarctica New Zealand
Environmental Research & Assessment
Coastline (approx)
Contour (2 m)
Ice free ground
Ocean
Lake / pond
ASPA boundary
Penguin nesting area 2005 (approx.)
Penguin viewing area
Path
Building
Survey marker
Signpost / boundary point
Signpost
Helicopter landing site
Preferred small boat landing site
Automatic Weather Station
Historic weather station
0
50
100
Meters
N
Projection: Lambert Conic Conformal,
Spheroid and horizontal datum: WGS 84.
Data sources: ASPA boundary: ERA (Jan 2014);
Signposts: UNAVCO (Jan 2014);
Topography & infrastructure data supplied
by Gateway Antarctica (2009);
Penguins: digitised by ERA from georeferenced aerial
image (2005) provided by Landcare Research.
Antarctica New Zealand

Management Plan For Antarctic Specially Protected Area No. 158 HUT POINT, ROSS ISLAND

(including Historic Site and Monument No. 18, the historic *Discovery* hut of Captain Robert Falcon Scott)

1. Description of Values to be Protected

The significant historic value of this Area was formally recognised when it was designated as Historic Site and Monument No. 18 in Recommendation 9 (1972). It was designated as Specially Protected Area No. 28 in Measure 1 (1998) and redesignated as Antarctic Specially Protected Area 158 in Decision 1 (2002). The Management Plan was reviewed and a revised version with additional visitor management provisions was adopted by means of Measure 2 (2005) and Measure 10 (2010).

The hut was built in February 1902 during the National Antarctic *Discovery* Expedition of 1901-1904, led by Captain Robert Falcon Scott who later found it a valuable advance staging point for journeys on the "Barrier" during his 1910-1913 expedition. It was also used by Sir Ernest Shackleton during the 1907-1909 British Antarctic *Nimrod* Expedition and later by his stranded Ross Sea party during the Imperial Trans-Antarctic Expedition of 1914-1917. This building was prefabricated in Australia to an 'outback' design with verandas on three sides.

The Hut Point site is one of the principal sites of early human activity in Antarctica. It is an important symbol of the Heroic Age of Antarctic exploration and, as such, has considerable historical significance. Some of the earliest advances in the study of earth sciences, meteorology, flora and fauna in Antarctica are associated with the *Discovery* Expedition based at this site. The history of these activities and the contribution they have made to the understanding and awareness of Antarctica give this Area significant scientific, aesthetic and historic value.

Hut Point is situated in Environment S – McMurdo South Victoria Land geologic based on the Environmental Domains Analysis for Antarctica (Resolution 3 (2008)) and in Region 9 – South Victoria Land based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)). Other protected areas within Environment S includes ASPA 105, 116, 121, 122, 123, 124, 131, 137, 138, 154, 155, 156, 157, 161, 172 and 175 and ASMA 2.

2. Aims and Objectives

The aim of the Management Plan is to provide protection for the Area and its features so that its values can be preserved. The objectives of the Management Plan are to:

- avoid degradation of, or substantial risk to, the values of the Area;
- maintain the historic values of the Area through planned conservation work which may include:
  a. an annual 'on-site' maintenance programme,
  b. a programme of monitoring the condition of artefacts and structures, and the factors which affect them, and
  c. a programme of conservation of artefacts conducted on and off site;

- allow management activities which support the protection of the values and features of the Area including recording of any relevant historic data; and
- prevent unnecessary human disturbance to the Area, its features and artefacts through managed access to the *Discovery* hut.

3. Management Activities

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

- A regular programme of conservation work shall be undertaken on the *Discovery* hut and associated artefacts in the Area;
- Visits shall be made as necessary for management purposes;
- Systematic monitoring shall be put in place to assess the impacts of present visitor limits, and the results and any related management recommendations included in reviews of this Management Plan;
- National Antarctic Programmes operating in, or those with an interest in, the Area shall consult together with a view to ensuring the above management activities are implemented.
- Copies of this Management Plan, including maps of the Area, shall be made available at adjacent operational research/field stations and will be provided to ships visiting the Area and vicinity.

4. Period of Designation

Designated for an indefinite period.

5. Maps

Map A: Hut Point regional topographic map. This map shows the wider environs of the Area with significant topographic features and the adjacent US McMurdo Station. Inset: shows the position of the site in relation to other protected sites on Ross Island.

Map B: Hut Point site topographic map. This map shows the location of the historic hut, Vince's cross and other detail of the immediate environs.

6. Description of the Area

6(i) Geographical coordinates, boundary markers and natural features
Hut Point is a small ice free area protruding south west from Hut Point Peninsula and situated to the west of the United States McMurdo Station. The designated Area consists solely of the structure of the hut (77° 50’S, 166° 37’E) which is situated near the south western extremity of Hut Point.

6(ii) Access to the Area
There are no designated helicopter landings sites in the vicinity of the hut as helicopters have the potential to damage the hut by blowing scoria and ice particles and to accelerate the abrasion of the hut and surrounding artefacts. Vehicles may approach the hut along the road leading from the United

States McMurdo Station, or from the sea ice when safe conditions exist. During open water, landings by boat may be made to the north of the hut.

6(iii) Location of structures within and adjacent to the Area
The designated Area consists solely of the structure of the historic *Discovery* hut (Historic Site and Monument No. 18). Historic Site and Monument No. 19, a cross to the memory of George T. Vince (a member of the *Discovery* Expedition who died in the vicinity), is situated approximately 75 metres west of the hut.

6(iv) Location of other Protected Areas in the vicinity
- ASPA 121 (previously SSSI No. 1) Cape Royds and
- ASPA 157 (SPA No. 28), Backdoor Bay, Cape Royds, are 32 kilometres north of Hut Point.
- ASPA 122 (SSSI No. 2), Arrival Heights, is 2 kilometres north of Hut Point on Hut Point Peninsula.
- ASPA 155 (SPA No. 25), Cape Evans, is 22 kilometres to the north of Hut Point.

All sites are located on Ross Island.

6(v) Special Zones within the Area
There are no special zones within the Area.

7. Terms and Conditions for Entry Permits

Entry to the Area is prohibited except in accordance with a Permit. Permits shall be issued only by appropriate national authorities and may contain both general and specific conditions. A Permit may be issued by a national authority to cover a number of visits in a season. Parties operating in the Area shall consult together and with groups and organisations interested in visiting the Area to ensure that visitor numbers are not exceeded.

Permits to enter the site may be issued for a stated period for:
- activities related to conservation, research and/or monitoring purposes;
- management activities in support of the objectives of this Management Plan; and
- activities related to educational or recreational activities including tourism, providing they do not conflict with the objectives of this Management Plan.

7(i) Access to and movement within or over the Area
- Control of numbers within the hut is necessary to prevent damage caused by crowding around the many vulnerable features within the hut. The maximum number within the hut at any time (including guides) shall be: **8 people**
- Avoidance of cumulative impacts on the interior of the hut requires an annual limit on visitor numbers. The effects of current visitor levels (average 1015 per year between 1998/99 and 2013/14) suggest that a significant increase could cause significant adverse impacts. The annual maximum number of visitors shall be: **2,000 people**
- These limits have been based on current visitor levels and on the best advice available from conservation advisory agencies (which include conservators, archaeologists, historians, museologists and other heritage protection professionals). The limits are based on the proposition that any significant increase in the current level of visitors would be detrimental to the values to be protected. An ongoing monitoring programme to assess the effect of

visitors is required to provide the basis for future reviews of the Management Plan, in particular whether the current limits on numbers of visitors to the Area are appropriate.

- Adequate supervision of visits to the Area is necessary to prevent damage caused by crowding and by actions inconsistent with the Code of Conduct set out in section 7(ii). All tourism, educational and recreational visits must be supervised by an experienced guide nominated by the operator (refer section 7(ix)).
- Vehicles should avoid approaching the Area to within 50 meters from the building structure unless for management purposes.

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

Activities which may be conducted within the Area include:

- visits for conservation purposes;
- educational and/or recreational visits including tourism;
- scientific activity which does not detract from the values of the Area.

Visitors should adhere to the following Code of Conduct, except where conservation, research, monitoring or management activities specified in the Permit require otherwise:

- Thoroughly clean grit and scoria, ice and snow from boots using the brushes provided before entering the hut to reduce floor abrasion and only use tripods or monopods with flat bottomed rubber bases as opposed to those with metal spikes which can damage the floor;
- Remove any clothing made wet by sea water, and any sea ice crystals from boots, as salt particles accelerate corrosion of metal objects;
- Do not touch, move or sit on any items or furniture in the huts - handling artefacts causes damage;
- As many areas are cramped and artefacts can be accidentally bumped, do not wear packs inside and avoid the use of tripods or monopods when the maximum number of visitors (8) are in the hut at one time;
- When moving around the sites, take great care not to tread on any items which may be obscured by snow;
- Use of combustion style lanterns, naked flames or smoking in or around the hut is prohibited, as fire is a major risk; and
- Visits should be recorded in the book provided. This allows times and levels of visitation to be correlated with temperature and humidity data automatically logged inside the hut.

7(iii) Installation, modification or removal of structures

- No alteration to the structure shall be made, except for conservation purposes or scientific activities that do not detract from the values of the Area as specified in section 1.
- No historic item shall be removed from the Area, unless specified in a Permit issues in accordance with the provisions of section 7(vii).

7(iv) Location of field camps

Use of the historic hut for living purposes is not permitted.

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

- No living animals, plant material, micro-organisms or soil shall be introduced to the Area. No food products shall be taken into the Area.
- Chemicals may only be introduced for permitted scientific or conservation purposes. Chemicals (including fuel) or other materials are not to be left in the Area, unless required for essential purposes connected with the conservation of the historic structure or the associated relics.

- All introduced materials are to be removed when no longer required and before a date to be specified in the relevant Permit.

7(vi) Taking or harmful interference with native flora and fauna
There are no native flora or fauna within the designated Area.

7(vii) Collection of anything not imported by the Permit Holder

- Material may be collected and removed from the Area for conservation or scientific reasons consistent with the objectives of this Management Plan only when specified in a Permit issued by the appropriate national authority.
- Materials which pose a threat to the environment or human health may be removed from the Area for disposal, in accordance with a Permit, where they meet one or more of the following criteria:
  i. the artefact presents a threat to the environment, wildlife or human health and safety;
  ii. it is in such poor condition that it is not reasonably possible to conserve it;
  iii. it does not contribute in any significant way to our understanding of the hut, its occupants or the history of Antarctica;
  iv. it does not contribute to, or it detracts from, the visual qualities of the site or the hut, and/or;
  v. it is not a unique or rare item;

and where such action is:

  i. undertaken by parties with appropriate heritage conservation expertise; and
  ii. part of an overall plan for conservation work at the site.

- National authorities should ensure that any removal of artefacts and assessment against the above criteria is carried out by personnel with appropriate heritage conservation expertise.
- Artefacts judged to be of high historic value, which cannot be conserved on site with currently available techniques, may be removed in accordance with a Permit for storage in a controlled environment until such time as they can safely be returned to the Area.

7(viii) Disposal of waste
All human waste, grey water and other waste generated by work parties or visitors shall be removed from the Area.

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

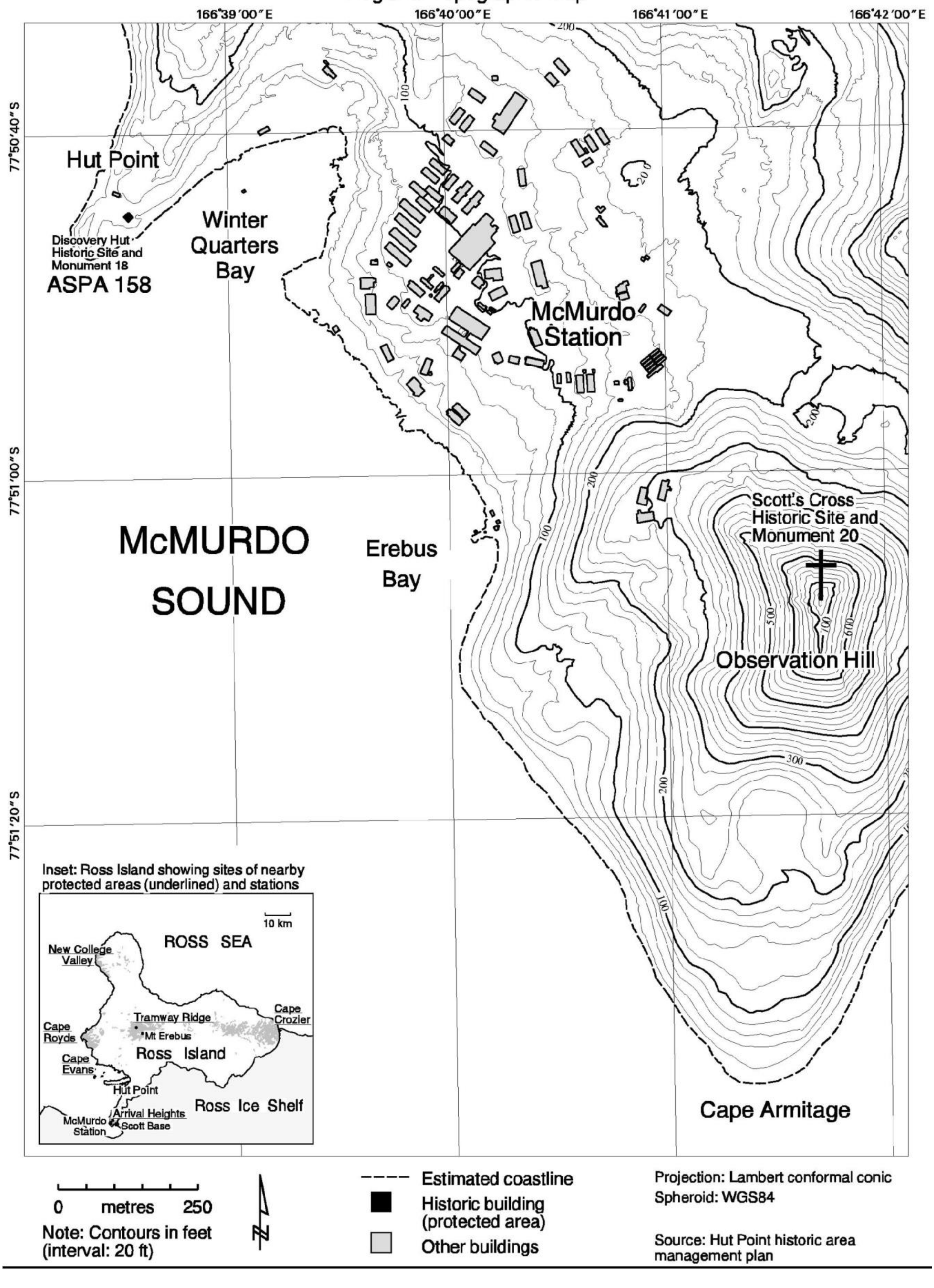
- The Permit, or an authorised copy, shall be carried within the Area.
- Information on the requirements of this Management Plan shall be provided to all visitors.
- The Code of Conduct set out in section 7(ii) shall be followed by all visitors, except where conservation, research, monitoring or management purposes require otherwise.
- Operators facilitating educational and recreational visits (including tourism) to the Area shall, prior to commencement of the summer season, nominate people with a working knowledge of both the site and this Management Plan to act as guides during visits.
- All educational and recreational visits (including tourism) shall be supervised by a nominated guide, who is responsible for briefing visitors on the Code of Conduct and the requirements of this Management Plan and ensuring it is complied with.
- Parties shall consult and coordinate to develop skills and resources, particularly those related to conservation techniques, to assist with the protection of the Area’s values.

7(x) Requirements for reports

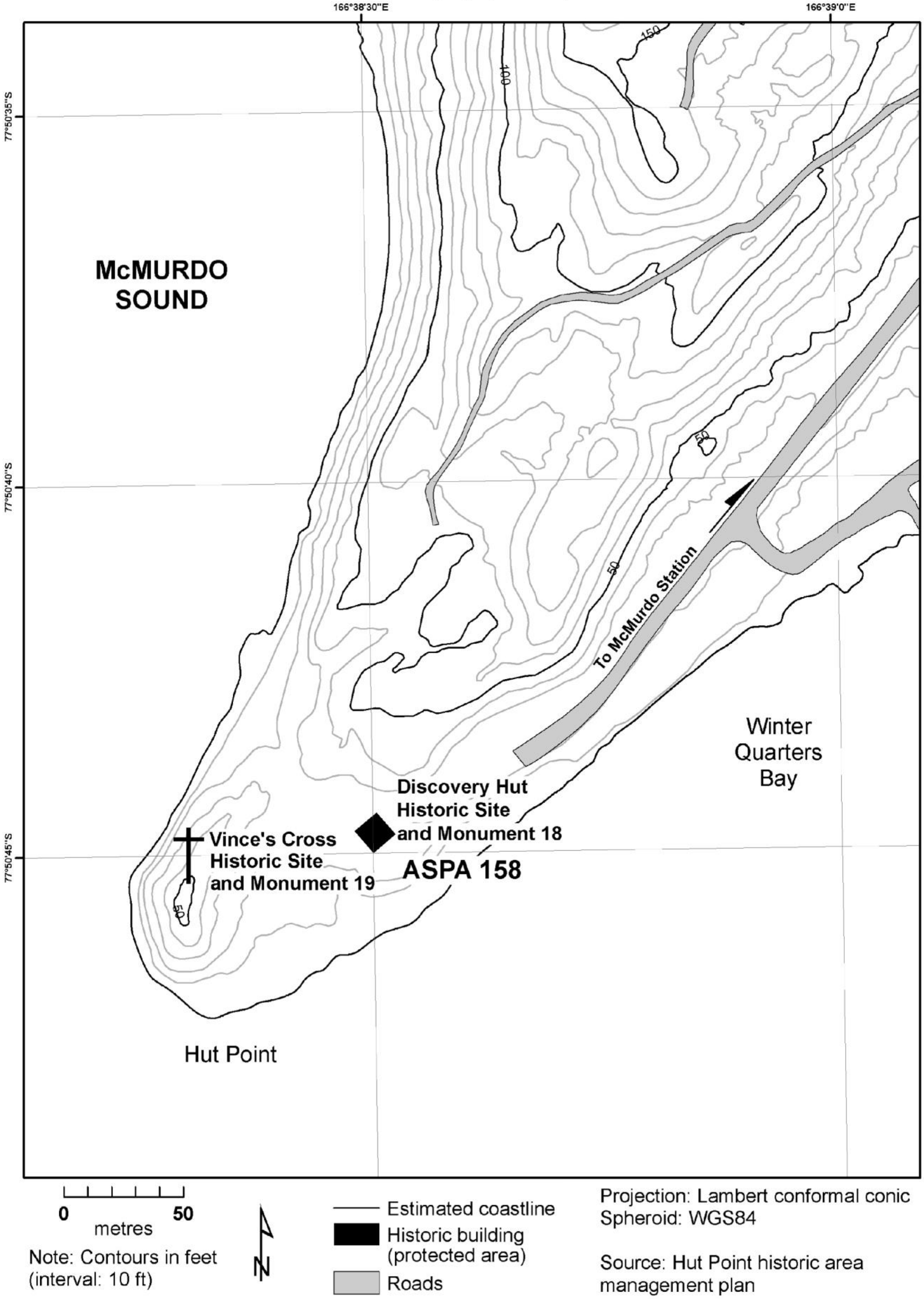
Parties shall ensure that the principal holder for each Permit issued submits to the appropriate authority a report describing the activities undertaken. Such reports shall include, as appropriate, the information identified in the Visit Report Form provided in Appendix 4 of Resolution 2 (1998). In addition, any removal of materials in accordance with section 7 (vii) shall be detailed, including the reason for removal and the current location of the items or the date of disposal. Any return of such items to the site shall also be reported.

Parties shall maintain a record of activities within the Area and, in the Annual Exchange of Information, shall provide summary descriptions of activities conducted by persons subject to their jurisdiction, in sufficient detail to allow evaluation of the effectiveness of the Management Plan. Parties should wherever possible deposit originals or copies of such reports in a publicly accessible archive to maintain a record of visitation, to be used both for review of the Management Plan and in managing further visitation to the site.

Map A - Historic Hut, Hut Point, Ross Island, Antarctic Specially Protected Area 158: Regional Topographic Map



Map B - Historic Hut, Hut Point, Ross Island, Antarctic Specially Protected Area 158: Site Topographic Map



Management Plan For Antarctic Specially Protected Area No. 159 CAPE ADARE, BORCHGREVINK COAST

(including Historic Site and Monument No. 22, the historic huts of Carsten Borchgrevink and Scott's Northern Party and their precincts)

1. Description of Values to be Protected

The historic value of this Area was formally recognized when it was listed as Historic Site and Monument No. 22 in Recommendation VII-9 (1972). It was designated as Specially Protected Area No. 29 in Measure 1 (1998) and redesignated as Antarctic Specially Protected Area 159 in Decision 1 (2002). The Management Plan was reviewed and a revised version was adopted by means of Measure 2 (2005) and Measure 11 (2011).

There are three main structures in the Area. Two huts were built in February 1899 during the British Antarctic *Southern Cross* Expedition led by Carston E. Borchgrevink (1898-1900). One hut served as a living hut and the other as a store. They were used for the first winter spent on the Antarctic continent. The collapsing remains of a third hut built in February 1911 for the Northern party led by Victor L.A. Campbell of Robert Falcon Scotts British Antarctic *Terra Nova* Expeditions (1910-1913), is situated 30 meters to the north of Borchgrevink's hut. The Northern party wintered in this hut in 1911.

In addition to these features there are numerous other historic relics located in the Area. These include stores depots, a latrine structure, two anchors from the ship *Southern Cross*, an ice anchor from the ship *Terra Nova*, and supplies of coal briquettes. Other historic items within the Area are buried in guano. Collectively, the three huts and associated historic relics are listed as Historic Site and Monument No. 22.

Cape Adare is one of the principal sites of early human activity in Antarctica as it includes the first building erected on the continent. It is an important symbol of the Heroic Age of Antarctic exploration and, as such, has considerable historical significance. Some of the earliest advances in the study of earth sciences, meteorology, flora and fauna in Antarctica are associated with the two earliest expeditions based at this site. The history of these activities and the contribution they have made to the understanding and awareness of Antarctica give this Area significant scientific, aesthetic and historic value.

Cape Adare is situated in Environment U – North Victoria Land geologic based on the Environmental Domains Analysis for Antarctica (Resolution 3 (2008)) and in Region 8 – North Victoria Land based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)). Other protected areas within Environment U include 106, 165, 173, and 175.

2. Aims and Objectives

The aim of the Management Plan is to provide protection for the Area and its features so that its values can be preserved. The objectives of the Plan are to:

- avoid degradation of, or substantial risk to, the values of the Area;

- maintain the historic values of the Area through planned conservation work which may include:
  a. 'on-site' maintenance,
  b. monitoring the condition of artefacts and structures, and the factors which affect them, and
  c. conservation of artefacts to be conducted on and off site;
- allow management activities which support the protection of the values and features of the Area including:
  a. mapping and otherwise recording the disposition of historic items in the hut environs, and
  b. recording other relevant historic data;
- prevent unnecessary human disturbance to the Area, its features and artefacts through managed access to Borchgrevink's hut.

3. Management Activities

- A programme of conservation work shall be undertaken on the historic huts and associated structures and artefacts in the Area.
- Visits shall be made as necessary for management purposes.
- Systematic monitoring shall be put in place to assess the impacts of present visitor limits, and the results and any related management recommendations included in reviews of this Management Plan.
- National Antarctic Programmes operating in, or those with an interest in, the Area shall consult together with a view to ensuring the above management activities are implemented.
- Copies of this Management Plan, including maps of the Area, shall be made available at the nearest operational research/field stations and will be provided to ships visiting the Area and vicinity.

4. Period of Designation

Designated for an indefinite period.

5. Maps

Map A: Cape Adare regional map. This map shows the Cape Adare region along with the boundaries of the Area with significant topographic features. It also shows the approximate location of significant historical items within the Area.

Map B: Cape Adare site map. This map shows the approximate location of specific historic relics and structures within the Area.

6. Description of the Area

6(i) Geographical coordinates, boundary markers and natural features
Cape Adare is a generally ice free, prominent volcanic headland, at the northern extremity of Victoria Land, which marks the western approaches to the Ross Sea. The Area is located to the south

west of the Cape on the southern shore of Ridley Beach, which encloses a large, flat, triangular area of shingle.

The whole of the flat area and the lower western slopes of the Adare Peninsula are occupied by one of the largest Adélie penguin (*Pygoscelis adeliae*) colonies in Antarctica. The penguins have almost completely occupied the Area and the need to avoid disturbance often restricts access to the huts.

The boundaries of the ASPA are:

- North, an east-west line drawn 50 metres north of the Northern Party Hut;
- East, a north-south line drawn 50 metres to the east of Borchgrevink's stores hut. The north east corner of the boundary is 71° 18.502'S, 170° 11.735'E and the south east corner of the boundary is 71° 18.633'S 170°11.735'E;
- West, a north-south line drawn 50 metres to the west of Borchgrevink's living hut. The north west corner of the boundary is 71° 18.502'S, 170° 11.547'E and the south west corner of the boundary is 71° 18.591'S, 170° 11.547'E; and
- South, the high tide mark of Ridley Beach.

Skuas (*Catharacta maccormicki*) nest in the vicinity and Weddell seals (*Leptonychotes weddellii*) also haul up along the beach.

6(ii) Access to the Area

There are no designated helicopter pads in the vicinity of the Area. Helicopter landings should be avoided as for most of the summer season it is difficult to operate helicopters without causing disturbance to penguins and skuas. Landings from the sea by boat, or vehicles travelling on the sea ice, may be made directly onto the beach as ice and surf conditions allow. From the beach, access to the Area is by foot. Care must be taken to avoid damage to artefacts in the Area and disturbance to birds nesting on and around the structures.

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

Apart from a Treaty plaque all structures within the Area are of historic origin. Major features of the Area include Borchgrevink's *Southern Cross* Expedition living hut and the unroofed stores hut. Scott's Northern Party hut is situated 30 meters to the north of Borchgrevink's living hut and is in a state of collapse.

In addition to these structures there are many other historic relics distributed around the Area. These include stores depots, a latrine structure, two anchors from the ship *Southern Cross*, an ice anchor from the ship *Terra Nova*, and supplies of coal. Many of these items are either partly or completely covered in the guano of the Adélie penguins which also occupy the Area.

The grave (Historic Site and Monument No. 23) of Nicolai Hanson (biologist with the *Southern Cross* Expedition) is located approximately 1.5 km north east of historic huts. It is marked by a large boulder with an iron cross, a brass plaque and a white cross marked out in quartz pebbles.

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

The nearest protected area is ASPA 106 (previously SPA No. 7), approximately 115 km to the south, on the western side of Cape Hallett.

6(v) Special Zones within the Area

There are no special zones within the Area.

7. Terms and Conditions for Entry Permits

Entry to the Area is prohibited except in accordance with a Permit. Permits shall be issued only by appropriate national authorities and may contain both general and specific conditions. A Permit may be issued by a national authority to cover a number of visits in a season. Parties operating in the Area shall consult together and with groups and organisations interested in visiting the Area to ensure that visitor numbers are not exceeded.

Permits to enter the site may be issued for a stated period for:

- activities related to conservation, research and/or monitoring purposes;
- management activities in support of the objectives of this Management Plan; and
- activities related to educational or recreational activities including tourism, providing they do not conflict with the objectives of this Management Plan.

7(i) Access to and movement within the Area

- Control of movement within the Area is necessary to prevent disturbance to wildlife and damage caused by crowding around the many vulnerable historic features within the Area. The maximum number in the Area at any time (including guides and those within the hut) shall be: **40 people.**
- Control of numbers within Borchgrevink's hut is necessary to prevent damage caused by crowding around the many vulnerable features within the hut. The maximum number within the hut at any time (including guides) shall be: **4 people.**
- Avoidance of cumulative impacts on the interior of Borchgrevink's hut requires an annual limit on visitor numbers. The number of visitors to the hut varies considerably from year to year (average 181 per year between 1998/99 and 2013/14) but the effect of visitors to other historic huts in the Ross Sea region suggests that similar limits should apply. The annual maximum number of visitors shall be: **2,000 people.**
- These limits have been based on current visitor levels and on the best advice available from conservation advisory agencies (which include conservators, archaeologists, historians, museologists and other heritage protection professionals). The limits are based on the proposition that any significant increase in the current level of visitors would be detrimental to the values to be protected. An ongoing monitoring programme to assess the effect of visitors is required to provide the basis for future reviews of the Management Plan, in particular whether the limits on number of visitors are appropriate.
- Adequate supervision of visits to the Area is necessary to prevent damage caused by crowding and by actions inconsistent with the Code of Conduct set out in section 7(ii). All tourism, educational and recreational visits must be supervised by an experienced guide nominated by the operator (refer section 7(ix)).
- Helicopter landings are prohibited within the Area.
- The operation of aircraft over the Area or in the vicinity of 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).
- Vehicles are prohibited within the Area.

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

Activities which may be conducted within the Area include:

- visits for conservation purposes;
- educational and/or recreational visits including tourism; and
- scientific activity which does not detract from the values of the Area.

Visitors should adhere to the following Code of Conduct, except where conservation, research, monitoring or management activities specified in the Permit require otherwise:

- Thoroughly clean grit and scoria, ice and snow from boots using the brushes provided before entering the hut to reduce floor abrasion and only use tripods or monopods with flat bottomed rubber bases as opposed to those with metal spikes which can damage the floor;
- Remove any clothing made wet by sea water, and any sea ice crystals from boots, as salt particles accelerate corrosion of metal objects;
- Do not touch, move or sit on any items or furniture in the huts - handling artefacts causes damage;
- As many areas are cramped and artefacts can be accidentally bumped, do not wear packs inside and avoid the use of tripods or monopods when the maximum number of visitors (4) are in the hut at one time;
- When moving around the sites, take great care not to tread on any items which may be obscured by snow and remain on established walking tracks;
- Use of combustion style lanterns, naked flames or smoking in or around the huts is prohibited, as fire is a major risk; and
- Visits should be recorded in the book provided. This allows times and levels of visitation to be correlated with temperature and humidity data automatically logged inside the hut.

7(iii) Installation, modification or removal of structures

- No new structures are to be erected in the Area, or scientific equipment installed, except for conservation or scientific activities that do not detract from the values of the Area as specified in section 1.
- No historic item shall be removed from the Area, unless specified in a Permit issued in accordance with the provisions of section 7(vii).

7(iv) Location of field camps

- Use of the historic hut, or other structures in the Area, for living purposes is not permitted.
- Camping is prohibited within the Area under any circumstances.

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

- No living animals, plant material, soil or micro-organisms shall be introduced to the Area.
- No food products shall be taken into the Area.
- Chemicals may only be introduced for permitted scientific or conservation purposes. Chemicals (including fuel) or other materials are not to be left in the Area, unless required for essential purposes connected with the conservation of the historic structures or the associated relics.
- All introduced materials are to be removed when no longer required and before a date to be specified in the Permit.

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

- This activity is prohibited except in accordance with a Permit issued by the appropriate national authority specifically for that purpose under Article 3, Annex II to the Protocol on Environmental Protection.
- Where animal taking or harmful interference 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(vii) Collection of anything not imported by the Permit Holder

- Material may be collected and removed from the Area for conservation or scientific reasons consistent with the objectives of this Management Plan only when specified in a Permit issued by the appropriate national authority.
- Materials which pose a threat to the environment or human health may be removed from the Area for disposal, in accordance with a Permit, where they meet one or more of the following criteria:
    i. the artefact presents a threat to the environment, wildlife or human health and safety;
    ii. it is in such poor condition that it is not reasonably possible to conserve it;
    iii. it does not contribute in any significant way to our understanding of the hut, its occupants or the history of Antarctica;
    iv. it does not contribute to, or it detracts from, the visual qualities of the site or the hut, and/or;
    v. it is not a unique or rare item;

and where such action is:

i. undertaken by parties with appropriate heritage conservation expertise; and
ii. part of an overall plan for conservation work at the site.

- National authorities should ensure that any removal of artefacts and assessment against the above criteria is carried out by personnel with appropriate heritage conservation expertise.
- Artefacts judged to be of high historic value, which cannot be conserved on site with currently available techniques, may be removed in accordance with a Permit for storage in a controlled environment until such time as they can safely be returned to the Area.

7(viii) Disposal of waste
All human waste, grey water and other waste generated by work parties or visitors shall be removed from the Area.

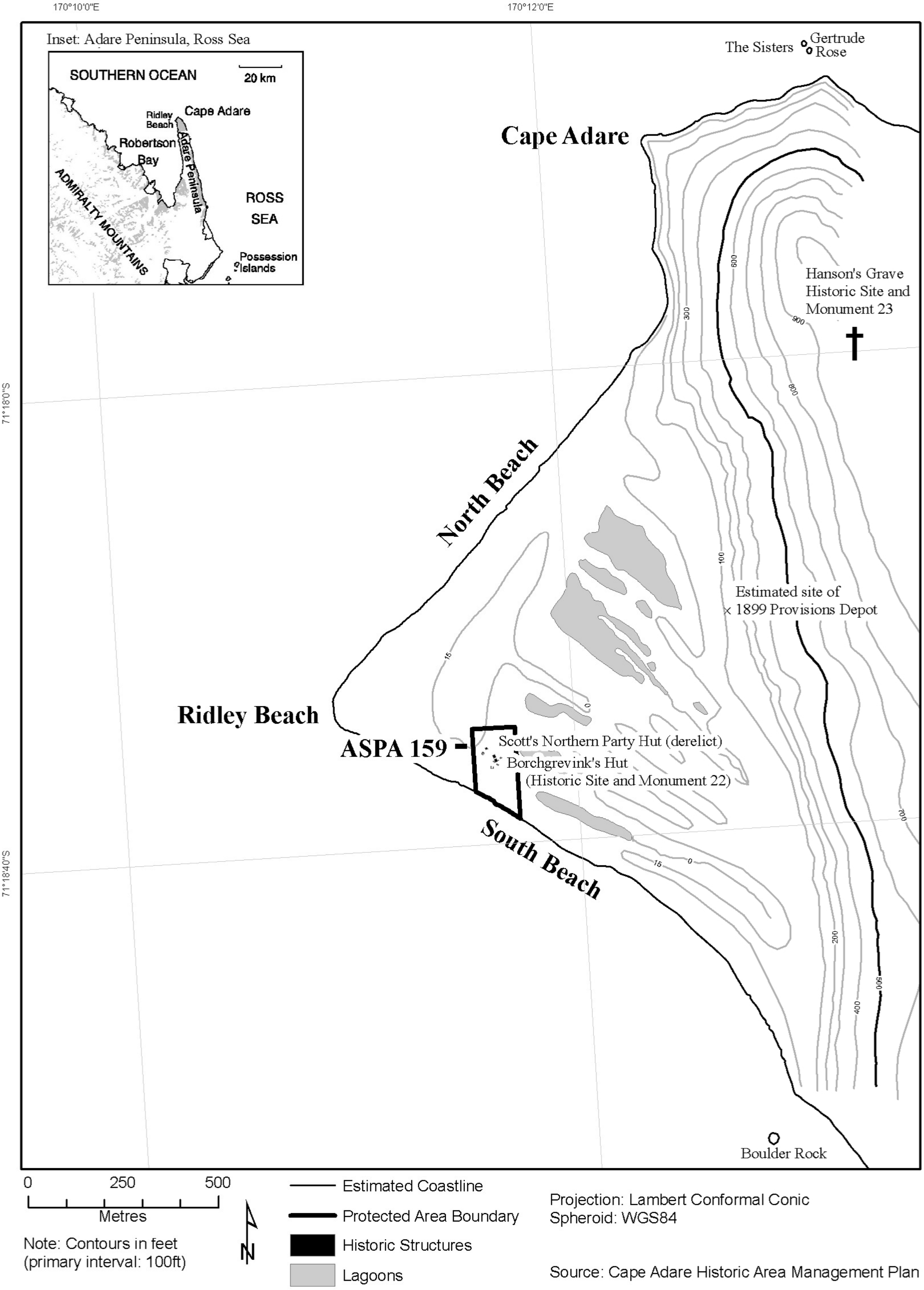
7(ix) Measures that may be necessary to ensure that the aims and objectives of the plan continue to be met
- The Permit, or an authorised copy, shall be carried within the Area.
- Information on the requirements of this Management Plan shall be provided to all visitors.
- The Code of Conduct set out in section 7(ii) shall be followed by all visitors, except where conservation, research, monitoring or management purposes require otherwise.
- Operators facilitating educational and recreational visits (including tourism) to the Area shall, prior to commencement of the summer season, nominate people with a working knowledge of both the site and this Management Plan to act as guides during visits.
- All educational and recreational visits (including tourism) shall be supervised by a nominated guide, who is responsible for briefing visitors on the Code of Conduct and ensuring it is complied with.
- Parties shall consult and coordinate to develop skills and resources, particularly those related to conservation techniques, to assist with the protection of the Area's values.

7(x) Requirements for reports
Parties shall ensure that the principal holder for each Permit issued submits to the appropriate authority a report describing the activities undertaken. Such reports shall include, as appropriate, the information identified in the Visit Report Form provided in Appendix 4 of Resolution 2 (1998). In addition, any removal of materials in accordance with section 7 (vii) shall be detailed, including the

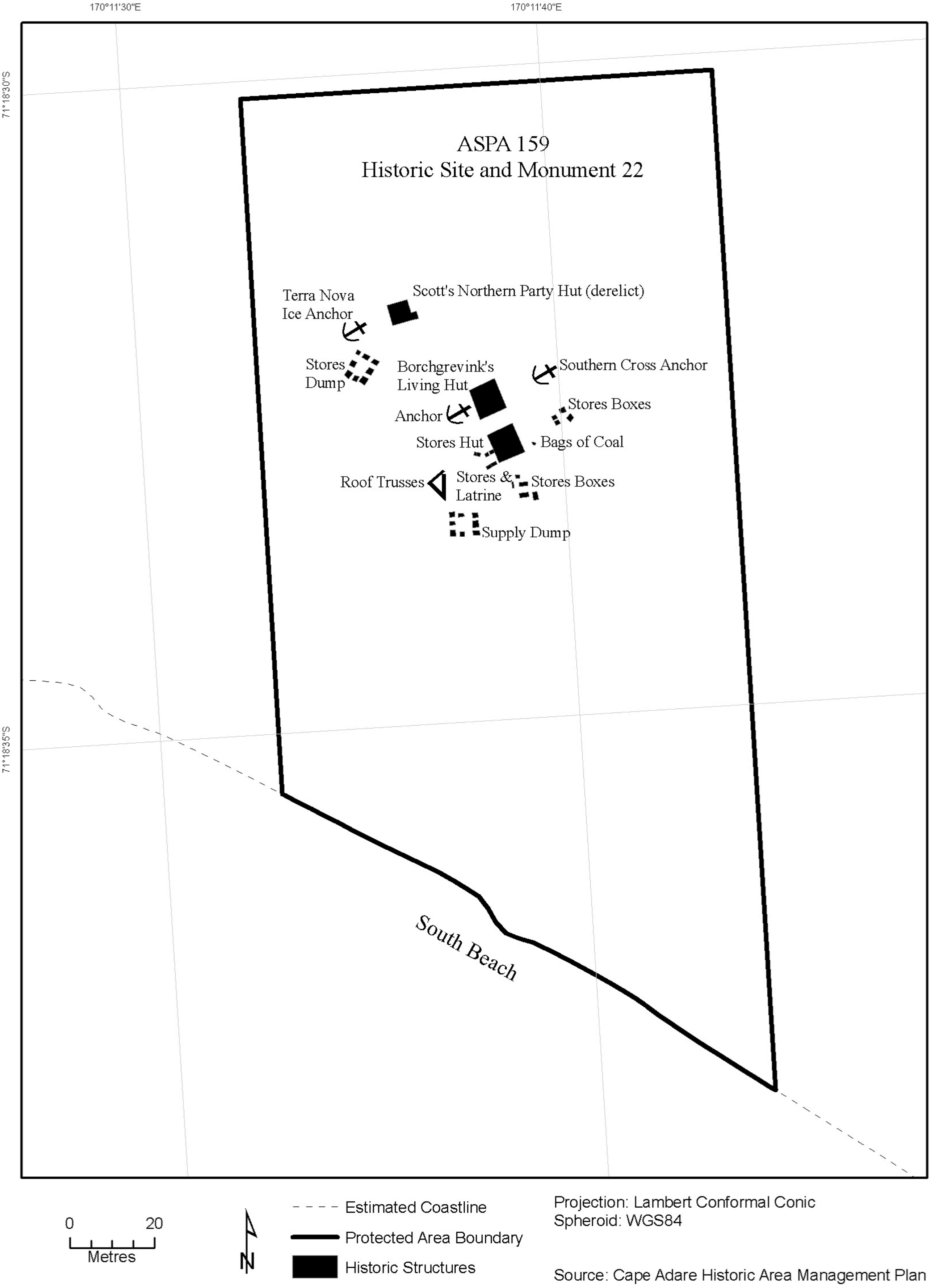
reason for removal and the current location of the items or the date of disposal. Any return of such items to the site shall also be reported.

Parties shall maintain a record of such activities and, in the Annual Exchange of Information, shall provide summary descriptions of activities conducted by persons subject to their jurisdiction, in sufficient detail to allow evaluation of the effectiveness of the Management Plan. Parties should wherever possible deposit originals or copies of such reports in a publicly accessible archive to maintain a record of visitation, to be used both for review of the Management Plan and in managing further visitation to the site.

Map A - Historic Hut, Cape Adare, Antarctic Specially Protected Area 159: Regional Map



Map B - Historic Hut, Cape Adare, Antarctic Specially Protected Area 159: Site Map



Management Plan for Antarctic Specially Protected Area (ASPA) No 163 Dakshin Gangotri Glacier, Dronning Maud Land

Introduction

India introduced a Working Paper at XXV ATCM (WP47) on a draft management plan for a proposed site of Special Scientific Interest for Dakshin Gangotri Glacier Snout, Schirmacher Hills, Dronning Maud Land. The Committee noted that this should be termed an ASPA rather than SSSI. Accordingly, during XXVI ATCM India submitted a draft management plan for Antarctica Specially Protected Area (XXVI ATCM/WP-38) and thereafter submitted revised management plan during XXVII-ATCM (WP 33). The management plan was adopted by Measure 2 (2005) and designated ASPA 163 during XXVIII ATCM (WP 25). This Management Plan was further reviewed after five years with minor changes, while submitted to XXXIII-ATCM (WP055 rev1.) and adopted under Measure 12 (2010).

Dakshin Gangotri glacier has significant value in terms of glacier retreat monitoring. A snout is being monitored since 1983 to understand the effect of climate change on glacier. This area is also important for study of algae, moss, cynobacteria and lichen which are wide spread in Schirmacher Hills and especially within the ASPA site. Cynobacteria contribute significantly to the nitrogen fixation, and many species have been identified so far from this area. Many species of lichens are also indentified in this area according to study conducted since 2003.

1. Description of values to be protected

Historic Value

Dakshin Gangotri Glacier is a small tongue of polar continental ice sheet, overriding the Schirmacher Hills in central Dronning Maud Land (CDML). It was identified by the second Indian Antarctic Expedition in 1982-83 and since then its snout is being monitored regularly for fluctuation w.r.t. retreat/advance.

Scientific Value

With the availability of the vast amount of data for the past two decades, it has become a valuable site for observing the changes in the movement of the Antarctic ice sheet under the impact of global warming. The area has primary scientific importance for glaciologists and environmental scientists. Due to The scientific values of the Area and the nature of the research, the area is protected as an Antarctic Specially Protected Area consistent with Articles 2, 3, 5 and 6 of Annex V of the Protocol on Environmental Protection to the Antarctic Treaty; to prevent interference with ongoing planned scientific investigations.

Global positioning system (GPS) campaigns were conducted during the 2003 and 2004 austral summer seasons to obtain insight into the velocity and strain-rate distribution on the margin of the continental ice sheet overriding southern part of Schirmacher Hills in CDML. GPS data were collected for two years at 21 sites and analyzed to estimate the site coordinates baselines and velocities. Horizontal velocities of the glacier sites lie between 1.89±0.01 and 10.88±0.01 m a-1 to the north-northeast, with an average velocity of 6.21±0.01 m a-1. The principal strain rates provide a quantitative measurement of extension rates, which range from (0.11±0.01) &times 10-3 to (1.48±0.85) × 10-3 a-1, and shortening rates, which range from (0.04±0.02) × 10-3 to (0.96±0.16) × 10-3 a-1 (Sunil et al., 2007).

Environmental Value

At the designated area, exploration showed abundant faunal diversity of the moss-inhabiting terrestrial invertebrate fauna. Schirmacher Hills is also an important area for the algae and cyanobacterial diversity. Terrestrial mosses are quite widespread in the Schirmacher Hills colonizing on a wide range of habitats. The mosses, because of their poikilohydric nature and alternative strategy of adaptation, are one of the plant groups which grow in Antarctica. Mosses play role in habitat modification, nutrient cycling and providing shelter and security to associated invertebrate animals. Studies on mosses in Schirmacher Hills revealed that distribution of mosses is significant at central part and at designated area as compare to eastern and western part.

Distribution of algae and cyanobacteria and flora of fresh water streams of the Hills at the designated area have been studied. The species reported are *G.magma, Chaemosiphon subglobosus, Oscillatoria limosa, O.limnetica,P. frigidum, P. autumnale, Nostoc commune, N.punctiforme, Calothrix gracilis, C.brevissima*, *Uronema sp.,and Cosmarium leave*. Among the cyanobacteria encountered in the stream of Schirmacher Hills, N_2 –fixing species might play a significant role in nitrogen economy of the ecosystem through N_2 –fixation. Studies on polar Skuas were also conducted at Schirmacher Hills and their nesting and breeding success have been reported around the designated place.

Further study on the Lichens carried out since 2003-04 within the protected area site, revealed occurance of species such as; *Acarospora geynnii* , C.W.Dodge & E.D.Rudolph, *Acarospora williamsii*, Filson, *Amandinea punctata*,(Hoffm.) Coppins & Scheid, *Buellia frigida*, Darb., *Buellia grimmiae*, Filson, *Candelaria murrayi*, Poelt, *Candelariella flava* , (C.W.Dodge & G.E. Baker), Castello & Nimis, *Carbonea vorticsa*, (Florke) Hertel, *Lecanora expectans* , Darb., *Lecanora fuscobrunnea* , C.W. Dodge & G.E. Baker, *Lecanora geophila* (Th. Fr.) Poelt, *Lecidea andersonii*, Filson, *Lecidea cancriformis* , C.W.Dodge & G.E. Baker, *Lecidella siplei* , (C.W. Dodge & G.E. baker) May., *Lepraria cacuminum* , (A. Massal.) Lohtander, *Physcia caesia* , (Hoffm.) Furnr., *Pseudephebe minuscule* , (Nyl. Ex Arnold) Brodo & D. Hawksw., and *Rhizoplaca melanophtalma*, (Ram.) Luckert & Poelt (Olech et al. 2010).

2. Aims and Objectives

Management of Dakshin Gangotri Glacier is aimed to:

- avoid degradation of values of the Area by preventing undue human interference
- allow glaciological and environmental scientific research, while ensuring protection of observational accuracy from any sort of man-made inputs
- ensure that peripheral points along the snout are not adversely affected by human activity in the Area
- maintain the Area as a reference marker for studying the movement patterns of this part of the Antarctic ice-sheet under the influence of global warming
- allow visits for management purposes in support of the aims of the Management Plan for the Area
- minimize the possibility of introduction of alien plants, animals and microbes into the Area

3. Management Activities

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

- A detailed map showing the location and boundaries of the Area and stating the special restrictions that apply would be displayed prominently at Maitri (India) and Novolazarevskaya

(Russia) research stations; copies of this management plan will also be made available at both the stations.

- Two signs displaying the location and boundaries of the Area with clear statements of entry restrictions will be placed on prominent rocks near both the entrance points to the valley, the eastern end and the south-eastern end; to help avoid inadvertent entry.
- Copies of this management plan along with location and boundary maps of the Area will be provided to all the visiting ships/aircraft.
- Markers, signs, cairns and other structures erected within the Area for scientific and management purposes will be secured and maintained in good condition, and will be removed when no longer necessary.
- Visits shall be made as necessary (at least once every year) to assess whether the Area continues to serve the purposes for which it was designated and to ensure that maintenance and management are adequate.
- The management plan shall be reviewed no less than once every five years and updated as required.

4. Period of Designation

The ASPA is designated for an indefinite period.

5. Maps and Photographs

The following maps and photographs are enclosed for illustrating the Area and the proposed plan:

Map 1: Location of Schirmacher Hills in central Dronning Maud Land, East Antarctica.

Map2: Map of Schirmacher Hills, showing locations of Maitri Research Station (India) and Novolazarevskaya Research Station (Russia).

Map 3: Classification and Numbering of Lakes of Schirmacher Hills. (after Ravindra et al, 2001)

Map 4: Topographic map of the Area. (contour interval 10 m)

Map 5: Paths of Fossil Glaciers in Schirmacher Hills. (after Beg et al, 2000)

Map 6: Aerial view of the Dakshin Gangotri Glacier Snout.

Figure 1: Image showing the markers showing boundary location of ASPA

6. Description of the Area

i. Geographical coordinates, Boundary markers and Natural features

Schirmacher Hills is a rocky hill range, about 17 km long in E-W trend (bounded by Eastern longitudes 11° 22' 40" and 11° 54' 20") and about 0.7 km to 3.3 km wide (bounded by Southern latitudes 70° 43' 50" and 70° 46' 40"). Its elevation varies from 0 to 228 m above the msl. It is a part of central Dronning Maud Land in Eastern Antarctica. The proposed area is a fragment of the western part of Schirmacher Hills.

The Area proposed under ASPA is bounded by Eastern longitudes 11° 33' 30" and 11° 36' 30" and by the Southern latitudes 70° 44' 10" and 70° 45' 30". The Area is 4.53 sq. km in aerial extent. The northeastern and northwestern corners of the Area are on shelf-ice, while the southwestern extremity is on polar ice-sheet. The southeastern end lies on a rocky outcrop.

Topographically, the Area can be divided into four distinct units- the southern continental ice-sheet, rocky hill slopes, a vast central proglacial lake (Lake-B7, Sbrosovoye Lake) and northern undulatory shelf ice.

The southernmost ice-sheet is bare 'blue ice', descending from 180 m contour to 10 m contour at the snout of the Glacier. It is crevassed and crisscrossed by NE-SW to NNE-SSW trending fractures. Two small and ephemeral supraglacial streams flow over the snout in a NNE direction.

The rocky terrain is uneven and has the minimum width of the Schirmacher Hills at the snout point; less than 50 m only. The eastern and western sides of the hills slope towards the snout, making a wide valley. The contours descend from 150 m to msl at the northern margin of the rock outcrops.

The central part of the Area is occupied by Lake B7. It is a lake of glacial origin. The dimensions of the lake are about 500 m x 300 m.

The northernmost part of the Area comprises shelf ice with pressure ridges, fractures and crevasses. The contact between shelf ice and eastern rocky slopes is marked by a prominent 3-km long, NNE-SSW trending lineament. The fractures in the ice are also aligned parallel to this lineament.

Schirmacher Hills exposes a granulite to amphibolite facies metamorphic terrain. The rock types are represented by charnockites, enderbites, garnet-sillimanite, gneisses, garnet-biotite gneisses, quartzofeldspathic augen gneisses with some foliated lamprophyres, amphibolites, dolerite, metagabbro and metabasalt. The rock suites dominantly fall under Grenvillean (1000 Ma) and Pan-African (550 Ma) events. Three phases of deformation are distinct.

The Area comprises mostly charnockite-Khondalite type of rocks (quartz-garnet-sillimanite-perthite±graphite gneisses) with some interlayering of garnet-sillimanite quartzites, calc silicate gneisses and mafic granulites. Two sets of faults (N30E and N50E) are quite prominent. One such major fault runs from the north-eastern corner of the Area; cutting all the three geomorphological units- shelf ice, rocks and continental ice-sheet.

Meteorological data from the nearby Indian Research Station Maitri shows that the Area has a dry polar climate. The extreme temperatures for the warmest and the coldest months range between 7.4 to -34.8°C. The mean annual temperature is -10.2°C. December is the warmest month of the year and August is the coldest. The blizzards touch a gale speed of 90 to 95 knots; the mean annual wind speed is 18 knots. The dominant wind direction is E-SE. Snowfall is quite frequent during the winter months, but gale force winds scrub the rocky surfaces clean and snow deposition is widespread on the leeward side of the hillocks.

Glaciological observations from 1983 to 1996 were carried out by surveys from two fixed points (‘G’ and ‘H’) using EDM or theodolite. The results showed that the Glacier is steadily receding every year at an average recession rate of 70 cm per annum.

In 1996, to enhance the accuracy of the observations, 19 peripheral points were marked encircling the snout of the Glacier. The average annual recession in the years 1997 to 2002 was 48.7 cm, 74.9 cm, 69.5 cm, 65.8 cm and 62.7 cm, respectively. This translates into an overall average recession of 65.3 cm per annum for the period 1996-2002; which is in conformity with the observations for the previous period (1983 – 1996) of a recession rate of 7 meters per decade.

Further monitoring were carried out and data revealed that average yearly recession for 2003, 2004, 2005 and 2006, gradually increased to 68.0, 69.4, 71.3, 72.8 centimeter per annum. However during the year 2006-2007, the average retreat of the Dakshin Gangotri polar ice front was only 0.6 m, but the data collected from the western margin of Schirmacher Hills showed an average annual retreat of around 1.4 m during the year 2006-07. The average annual retreat of the Dakshin Gangotri Snout was recorded to be about 1m in 2008, whereas the average annual retreat for the western extension of polar ice front was recorded to be about 2m. The maximum recession was observed at observation-point-14, which recorded a cumulative recession of 17.21 meters in ten years (1996-2006).

Observations carried out after 2008-09 every year till date. Results shows that the annual recession of the snout is computed to be 1.1m, 0.26m, 0.59m, 0.33m, 0.92m, 0.29m and 1.31m, respectively.

The recessional values computed from 1996-97 till date shows that the lowest recession has occurred in the year 2009-10 i.e 0.26 meter, whereas highest recession occurred during 2014-15 i.e 1.31 meter.

ii. Restricted and Managed Zones within the Area

Along the periphery of the Dakshin Gangotri Glacier, 19 observation points have been marked in February 1996. With reference to these points it was possible to record the movement of the Glacier with an accuracy of 1 cm. Precise monitoring on cm-scale is also available for the years 1996-2002. Access to this zone should be restricted. To protect the accuracy of scientific observations,it is proposed that a 100 m radius all along the periphery of the Glacier should have limited admittance.

iii. Structures within and near the Area

There are no structures present in the Area, apart from two cairns (‘G’ and ‘H’) marking the sites used for glaciological and topographical surveys.

In future, some signs and cairns will be erected notifying the protected status of the Area.

iv. Location of other Protected Areas within close proximity of the Area

In the entire Schirmacher Hills, there are no other protected areas.

7. Permit Conditions

i. Access to and movement within the Area

Entry into the Area would be prohibited except in accordance with a permit issued by an appropriate National Authority as designated under Annex V, Article 7 of the Protocol on Environmental Protection to the Antarctic Treaty.

A permit to enter the Area may only be issued for scientific research, or for essential management purposes consistent with the Management Plan’s objectives and provisions; with the condition that the actions permitted will not jeopardize the scientific and environmental values of the Area and will not interfere with ongoing scientific studies. Access to the area is permitted only by foot, access to site using land vehicle or helicopter landing is prohibited within the area.

ii. Activities that are or may be conducted within the Area, including restrictions on time or place

The following activities may be conducted within the Area:

- Scientific research programmes consistent with the management Plan for the Area, including the values for which the Area has been designated; which can not be carried out elsewhere and which will not jeopardize the ecosystem of the Area.
- Essential management activities, including monitoring.

iii. Installation, modification or removal of structures

No structures are to be erected within the Area except as specified in a permit. Any equipment should not be installed if it is not essential for scientific research or for management activities, and it must be authorized in a permit. All scientific equipment installed in the Area must be clearly identified by country with name of principal investigator, year of installation and expected date of completion of the study. Details are to be included in the visit report. All such equipment should be made of materials that pose minimum risk of contamination and must be removed immediately after completion of the study. Removal of specific equipment for which the permit has expired shall be a condition of the permit.

iv. Location of field camps

Camping is not allowed in the Area. The field parties can camp either east of "Lake Kalika" at "VK-Ground" or beyond the western limit of the Area.

v. Restriction on materials and organisms, which can be brought into the Area

- No living animals, plant material or microorganism shall be deliberately introduced into the Area and precautions shall be taken against accidental introductions.
- No pesticides, herbicides, chemicals, radio-isotopes shall be brought into the Area, other than those permitted for scientific or management purposes. These authorized agents shall be removed from the Area at the conclusion of the activity.
- Visitors should also consult and follow as appropriate recommendations contained in the Committee for Environmental Protection Non-native Species Manual (CEP 2011), and in the Environmental Code of Conduct for terrestrial scientific field research in Antarctica (SCAR 2009).
- Fuel is not to be stored in the Area unless connected with authorized activity. Permanent depots are not to be built in the Area.
- All material taken into the Area shall be for a stated period only and shall be removed at or before the conclusion of that stated period.

vi. Taking or harmful interference with native flora and fauna

Any interference with the native flora and fauna of the Area shall be in accordance with the requirements of the Protocol on Environmental Protection to the Antarctic Treaty, 1991, annex II, Article 3. Where taking or harmful interference with animals is involved, SCAR Code of Conduct for Use of Animals for Scientific Purposes in Antarctica shall be used as a minimum standard.

vii. Collection or removal of anything not brought into the Area by the Permit holder

Material may only be collected or removed from the Area as specified in the permit and shall be limited to the minimum necessary to meet scientific or management requirements.

Material of human origin, not brought into the Area by the permit holder, but which is likely to compromise the values of the Area may be removed from the Area unless the impact of removal is likely to be greater than leaving the material in situ. If this is the case the appropriate authority should be notified.

viii. Disposal of Waste

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

ix. Measures that are necessary to ensure that the aims and objectives of the management plan can continue to be met

- Permits may be granted to enter the Area to carry out biological monitoring and area inspection activities.
- Specific sites of long-term monitoring shall be appropriately marked and GPS positions will be obtained for records with the Antarctic Data Directory System through the appropriate National Authority.

x. Requirements for Reports

The principal permit holder would submit to the appropriate National Authority a visit report describing the activities undertaken by those issued permit. Reports are due and shall be submitted as soon as possible after the expiration of the permit, and include the types of information contained in SCAR visit report form or as required by national laws. The Authority will maintain a record of such activities and make this accessible to interested Parties.

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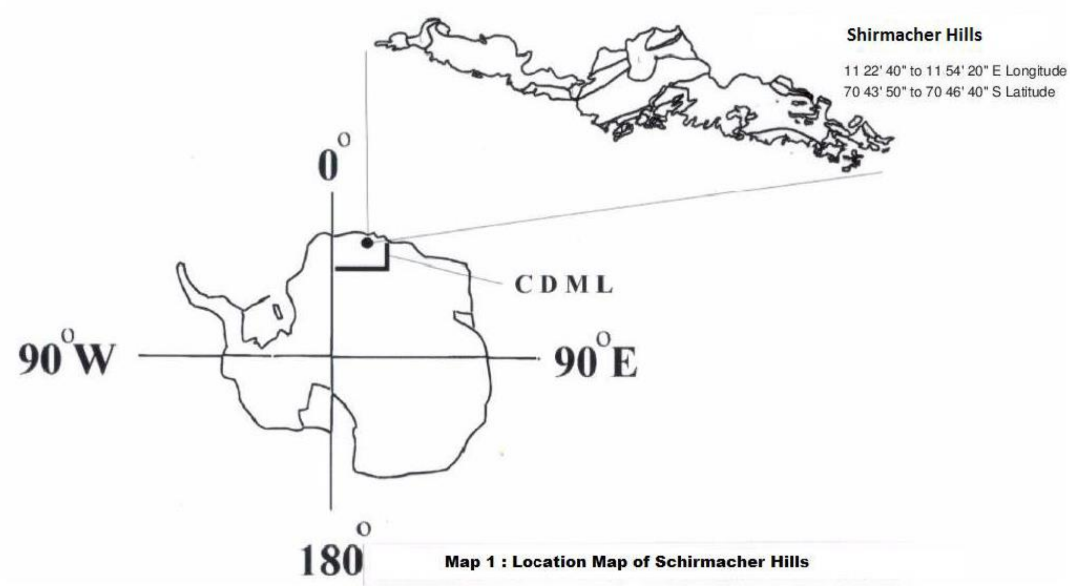
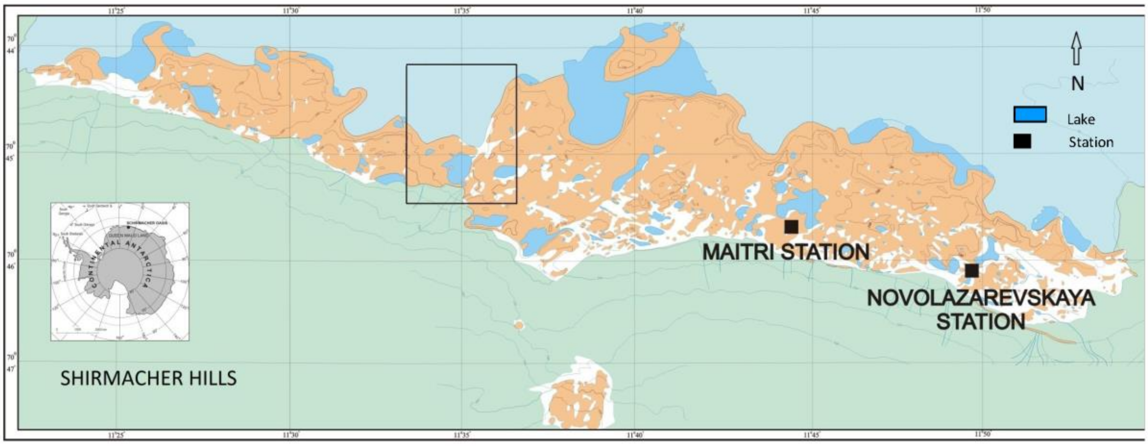
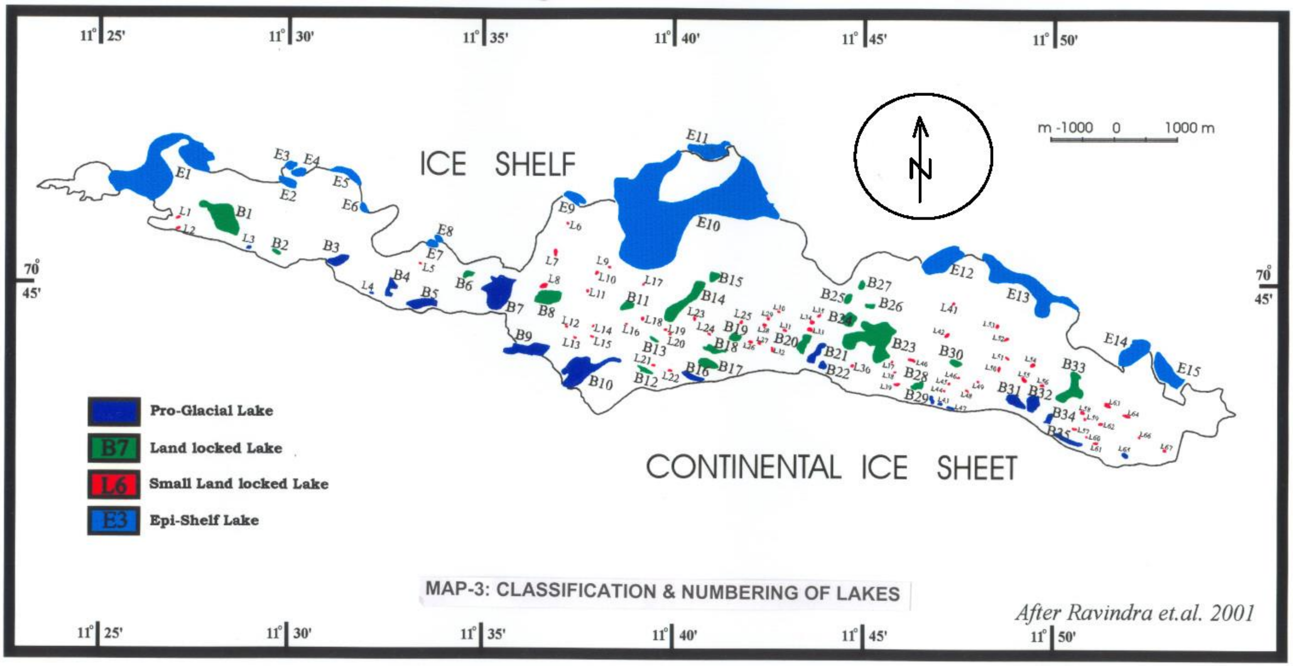
Figure 1: Images of Secured Markers at two Locations at the Boundary of ASPA-163



Map 1 : Location Map of Schirmacher Hills

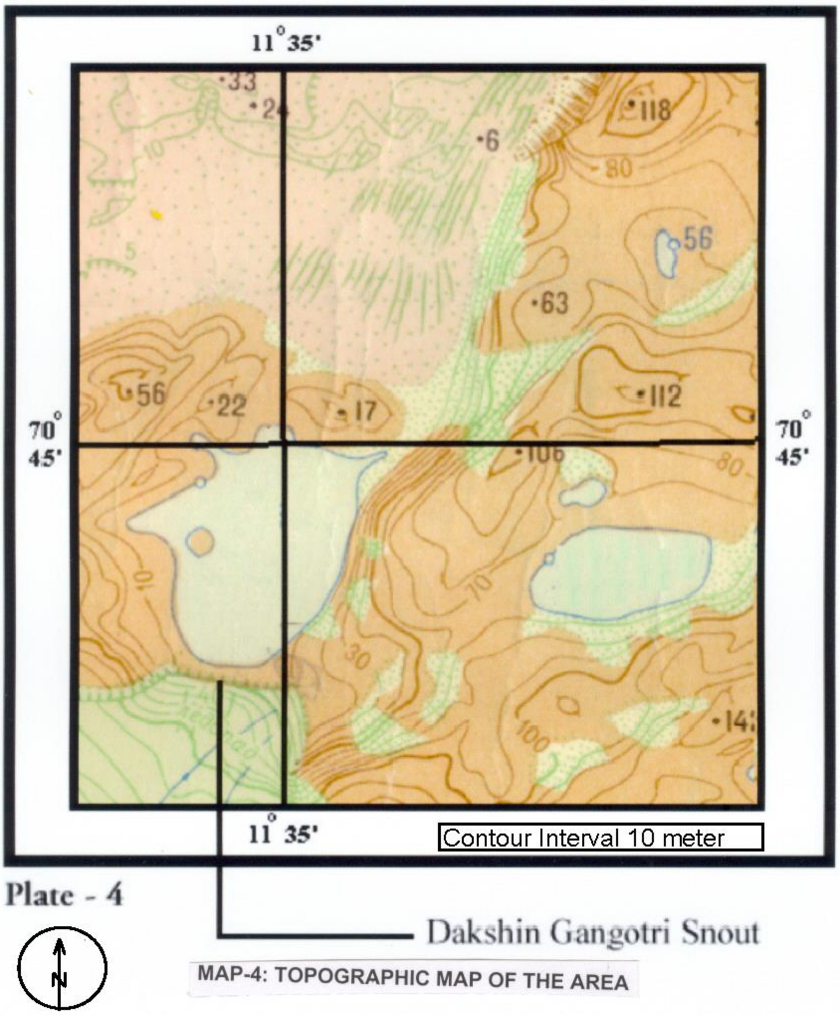


MAP 2: MAP SHOWING LOCATION OF MAITRI AND NOVOLAZAREVSKAYA STATION

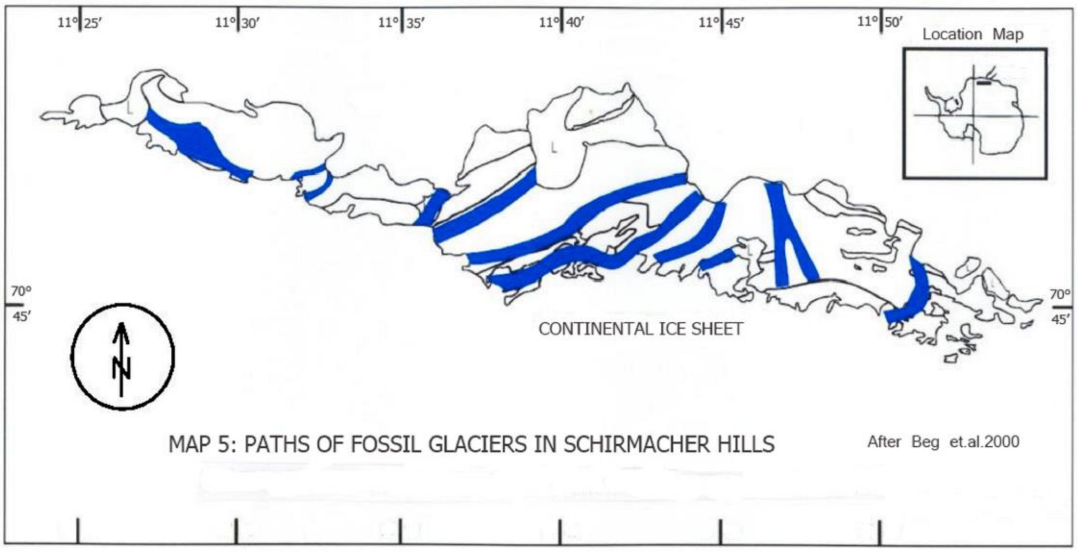


MAP-3: CLASSIFICATION & NUMBERING OF LAKES

After Ravindra et.al. 2001



MAP-4: TOPOGRAPHIC MAP OF THE AREA



MAP 5: PATHS OF FOSSIL GLACIERS IN SCHIRMACHER HILLS


MAP-6: DAKSHIN GANGOTRI SNOUT (MARCH 2013)

Management Plan for Antarctic Specially Protected Area No. 164

SCULLIN AND MURRAY MONOLITHS, MAC.ROBERTSON LAND

Introduction

Scullin Monolith (67°47'37"S, 66°43'8"E) and Murray Monolith (67°47'3"S, 66°53'17"E) (Map A) were designated as Antarctic Specially Protected Area (ASPA) No 164 under Measure 2 (2005), following a proposal by Australia. A revised management plan for the Area was adopted under Measure 13 (2010). The Area is designated to protect the greatest concentration of breeding colonies of seabirds in East Antarctica. Seven species occupy territories in the Area: five species of petrel (Antarctic petrels *Thalassoica antarctica*, Cape petrels *Daption capense*, southern fulmars *Fulmarus glacialoides*, snow petrels *Pagodroma nivea*, Wilson's storm petrel *Oceanites oceanicus*), one penguin (Adélie penguin *Pygoscelis adeliae*) and one larid (south polar skua *Catharacta maccormicki*).

Compared to some other sites in East Antarctica, Scullin and Murray Monoliths are visited infrequently, and with the one known exception, all visits have been brief (less than a day). Scullin and Murray Monoliths were first visited during the second British, Australian and New Zealand Antarctic Research Expedition (BANZARE) voyage in 1930-31, on 13 February 1931. Sir Douglas Mawson named both monoliths during this visit. Murray Monolith was named after Sir George Murray, Chief Justice of South Australia, Chancellor of the University of Adelaide and a patron of the Expedition, while Scullin Monolith was named after James H. Scullin, Prime Minister of Australia from 1929-31.

A brief landing was made at Scullin Monolith on 26 February 1936 from the R.R.S. William Scoresby, when an ascent was made to a height of several hundred metres. The Norwegian Lars Christensen landed on 30 January 1937 and visited Scullin Monolith. Australian Antarctic program personnel occasionally make visits to the Area from Mawson station, approximately 160 km to the west. The only recorded stay within the Area was a six-day visit (1 to 6 February 1987), when comprehensive ornithological surveys were conducted. The first visit by a commercial tourist vessel to the area was made on 10 December 1992, and a small number of brief visits have been made in subsequent years.

1. Description of values to be protected

The Area is primarily designated to protect the outstanding ecological and scientific values associated with the important assemblage of seabirds found at Scullin Monolith and Murray Monolith.

With at least 160,000 pairs, the Antarctic petrel colony on Scullin Monolith is second in population size only to the colony at Svarthameren in the Mühlig Hofmannfjella, in Dronning Maud Land (ASPA 142). Thus, about a third of the estimated global population of approximately half a million pairs breeds at Scullin Monolith.

Adélie penguin colonies occupy the lower slopes of both monoliths, extending almost to the foreshore. The most recent survey in December 2010 found approximately 43,000 birds on Scullin Monolith and a further 80,000 pairs on Murray Monolith. (At this stage of the breeding season (mid incubation) the number of birds present will approximate the number of breeding pairs.) This represents approximately 5% of the Adélie penguin breeding population for East Antarctica and approximately 2% of the global population.

Many of the ocean-facing slopes of both monoliths are occupied by the other petrel species. Extensive breeding colonies occur on many of the steeper, higher-altitude slopes of both monoliths. South polar skuas nest throughout the Area, making use of the high density of breeding seabirds as prey during their breeding season.

Some large colonies of seabirds are known from elsewhere in East Antarctica (e.g. the Rauer Group). However, the combined breeding population conservatively estimated at 230,000 pairs and the rich species diversity within the two very small ice-free areas of Scullin and Murray Monoliths (about 1.9 and 0.9 km^2, respectively) mean that the monoliths support the greatest concentration of breeding seabirds, and one of the most diverse seabird breeding localities in East Antarctica (Appendix 1).

In addition to the outstanding ecological and scientific values, the Area possesses outstanding aesthetic values arising from the geomorphology of the two monoliths and the spectacular backdrop of glaciers that descend from the continental plateau and flow around the monoliths to end in calving glaciers.

The very large and diverse breeding assemblage of seabirds in a setting of high aesthetic and wilderness values warrants the highest level of protection.

2. Aims and Objectives

Management of Scullin and Murray Monoliths aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance to the Area;
- maintain the undisturbed nature of the Area to permit its future use as a reference area;
- allow scientific research on the ecosystem and values of the Area, providing it is for compelling reasons which cannot be served elsewhere and will not impact on the values of the Area, particularly ornithological values;
- grant high priority to the collection of seabird census data from representative sample areas, reference breeding groups (RBGs) or of whole breeding populations. These census data will be major determinants in, and contributions to, future revisions of the management strategy for the Area;
- accord high priority to the collection of other biological survey data, in particular flora and invertebrate surveys. These survey data will be incorporated into future revisions of the management strategy for the Area;
- allow visits for management purposes in support of the aims of the management plan; and
- minimise the potential for introduction of non-native plants, animals and micro-organisms, particularly avian pathogens.

3. Management Activities

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

- where practical, the Area shall be visited as necessary, and preferably no less than once every five years, to conduct censuses of seabird breeding populations, including mapping of colonies and nest sites;
- information on the Scullin and Murray Monoliths ASPA, including copies of this management plan, will be made available at both Davis and Mawson stations and to all visitors;
- national Antarctic programs operating in the vicinity or intending to visit the Area shall consult with other national programs to ensure that research projects do not overlap or conflict; and
- where practical, management visits will be made to remove unnecessary materials currently located within the Area.

4. Period of Designation

The Area is designated for an indefinite period.

5. Maps and Photographs

- **Map A**: Antarctic Specially Protected Area No 164, Scullin and Murray Monoliths, Mac.Robertson Land, East Antarctica. The inset map indicates the location in relation to the Antarctic continent.
- **Map B**: Antarctic Specially Protected Area No. 164, Scullin Monolith: Topography and Bird Distribution.
- **Map C**: Antarctic Specially Protected Area No. 164, Murray Monolith: Topography and Bird Distribution.
- **Map D**: Antarctic Specially Protected Area No. 164: Scullin Monolith: Helicopter approach and landing site.

Specifications for all maps: Horizontal Datum: WGS84; Vertical Datum: Mean Sea Level.

6. Description of the Area

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

Scullin Monolith (67°47’37”S, 66°43’8”E) and Murray Monolith (67°47’3”S, 66°53’17”E) are situated on the coast of Mac.Robertson Land some 160 km east of Mawson station (Map A). The monoliths are approximately seven kilometres apart and abut the sea at the edge of the continental ice sheet. The coastline to the west and east, and between the monoliths, consists of ice cliffs 30 – 40 m high; the Antarctic plateau rises steeply from there to the south. Scullin Monolith is a crescent-shaped massif whose highest point is 443 m above sea level. It encloses a broad north-facing cove with an entrance approximately one kilometre wide. All upper slopes of the monolith are precipitous, but in the lower 100 m the slope eases in many parts and these areas are strewn with boulders and large stones. Elsewhere in the lower parts the rock face falls sheer to the sea, and there are some scree slopes.

The walls of Murray Monolith rise from the sea to a dome-shaped summit at 340 m above sea level. On the western side of Murray Monolith, the lower slopes drop to a coastal platform. The Area extends over all ice-free areas associated with the two monoliths, and includes a portion of the adjacent continental ice and Torlyn Mountain to the south-west of Murray Monolith (which rises to about 400 m above sea level). There are no boundary markers delimiting the site.

The Scullin and Murray Monoliths ASPA comprises two sectors (see Map B and Map C):

- Scullin Monolith: the boundary commences at a coordinate on the coastline at 67°46’59”S, 66°40’30”E, then in a southerly direction to a coordinate at 67°48’03”S, 66°40’26”E, east to a coordinate at 67°48’06”S, 66° 44’33”E then north to a coordinate on the coast at 67°46’41”S, 66°44’37”E, then west following the coast line at the low tide mark to the coordinate 67°46’59”S,66° 40’30”E.
- Murray Monolith: the boundary commences on the coastline at 67°46’36”S, 66°51’01”E, then continuous in a southerly direction to 67°48’03”S, 66° 50’55”E, extends east to 67°48’05”S, 66°53’51”E, and north to 67°46’38”S, 66°54’00”E, then west following the coast line at the low tide mark to the coordinate 67°46’36”S, 66°51’01”E.

Birds

Seven species occupy territories in the Area: five species of petrel (Antarctic petrels *Thalassoica antarctica*, Cape petrels *Daption capense*, southern fulmars *Fulmarus glacialoides*, snow petrels *Pagodroma nivea*, Wilson’s storm petrel *Oceanites oceanicus*), one penguin (Adélie penguin *Pygoscelis adeliae*) and one larid (south polar skua *Catharacta maccormicki*). Scullin Monolith hosts the second largest colony of Antarctic petrels with a population of at least 160,000 pairs and significant Adélie penguin colonies. Less is known about the species diversity of Murray Monolith; however approximately 8,000 Adélie penguins were observed in 2010/11(Appendix 1).

There has been only one attempt (in 1986/87) to estimate the population of all species in the Area. A subsequent aerial survey in 2010/11 focussed on Adélie penguins only. Consequently, the Adélie penguin is the only species for which any data on population change is available. The Adélie population estimates for Scullin Monolith are similar at these two times (approximately 50,000 and 43,000 pairs) and the difference is likely to be within measurement error. The estimates for Murray Monolith differ substantially (approximately 20,000 and 8,000 pairs), but the basis for the early estimate is not clearly described and the value may not be reliable. It is likely that the 1986/87 census of petrels under-estimated the breeding population given the census occurred late in the breeding season.

Geology

The geology of the two monoliths is poorly understood, as they have been neither the subject of dedicated study nor specific geological mapping. The geology of the monoliths appears to be similar in general terms to that of the region around Mawson station. The rocks consist dominantly of high grade granulite facies gneisses of metasedimentary origin, including some sapphirine bearing rocks. The metamorphism occurred in anhydrous conditions probably at about 1000Ma. An age range of between 1254Ma and as young as 625Ma have been documented for the gneisses from Scullin Monolith. Metamorphism involved sedimentary rocks initially of Proterozoic age. These metamorphic basement rocks were intruded at about 920-985Ma by the Mawson Charnockite a form of granite characterised by presence of orthopyroxene, and common in this region. It forms the faces of the monoliths. The recorded an age of 433 and 450Ma which may reflect a later influence of the '500 Ma or Pan-African event' recorded widely throughout Gondwana. The margins of the monoliths contain some sediment carried by the icesheet and deposited by melting ice. The source cannot be specified but it may contain recycled material from farther inland and could perhaps provide evidence of some of the geology beneath the ice.

Environmental Domains and Antarctic Conservation Biogeographic Regions

Based on the Environmental Domains Analysis for Antarctica (Resolution 3(2008)) Scullin and Murray Monoliths are located within Environments D *East Antarctic coastal geologic* and L *Continental coastal-zone ice sheet*. Based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)) the Area is not assigned to a Biogeographic Region.

Vegetation

The flora reported from Scullin Monolith is given in Appendix 3, based on visits in 1972 and 1987. All species of lichens and moss found on Scullin Monolith occur elsewhere in Mac.Robertson Land (Appendix 2). Vegetation on Scullin Monolith is restricted mainly to the western plateau and associated nunataks. The coastal slopes are generally void of vegetation due to high levels of seabird guano. The distribution of vegetation on the western plateau is influenced by microtopography that controls the extent of exposure and moisture availability. Although not recorded, it is likely that vegetation at Murray Monolith is similar to that found at Scullin Monolith.

Other biota

There have been no comprehensive invertebrate studies at Scullin or Murray Monoliths. A leopard seal *Hydrurga leptonyx* was sighted during a visit in 1936 and several Weddell seals *Leptonychotes weddellii* were observed during visits in 1997 and 1998; no further observations of biota have been reported.

6(ii) Access to the Area

Travel to the Area is possible by small boat, by over-snow/ice vehicles or by aircraft, in accordance with section 7(ii) of this plan.

6(iii) Structures within and adjacent to the Area

At the time of writing (March 2015), a fibreglass 'Apple' refuge is situated on the south western summit ridge of Scullin Monolith (approximately 67°47’24”S, 66°41’38”E) (Map B and Map D). There are four 200-litre drums of helicopter fuel and one empty 200-litre drum as well as the (reported) remains of a food cache (1985/86 vintage). It is intended that all of this material be removed from the Area at the first suitable opportunity.

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

There are two ASPAs located to the west of Scullin and Murray; ASPA No. 102, Rookery Islands (67°36’36” S, 62°32’01” E), is approximately 180 km to the west (c.20 km west of Mawson), and ASPA No. 101, Taylor Rookery (67°27’S; 60°53’E), is located approximately 70 km further west of the ASPA No. 102.

6(v) Special zones within the Area

There are no special zones within the Area.

7. Permit conditions

7(i) General permit conditions

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

- it is issued only for compelling scientific or management purposes that cannot be served elsewhere, in particular for scientific study of the avifauna and ecosystem of the Area, or for essential management purposes consistent with plan objectives, such as inspection, maintenance or review;
- the actions permitted are in accordance with this management plan and will not jeopardise the values of the Area;
- it is issued for a specified period;
- it will authorise the entry into the Area of no more than 10 people at any one time during the seabird breeding season, and no more than 15 people at any one time during the remainder of the year;
- the permit or an authorised copy shall be carried at all times when within the Area;
- a visit report shall be supplied to the appropriate national authority at the conclusion of the permitted activity; and
- the appropriate national authority shall be notified of any activities/measures undertaken that were not included in the authorised permit.

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

- Travel to the Area is possible by small boat, by over-snow/ice vehicles or by aircraft.
- Any movement within and around the Area shall observe the minimum specified wildlife approach distances (Appendix 3); closer approach may be allowed specifically under permit.
- Movement by visitors within the Area shall be by foot only.
- Small boats used to approach the Area must be operated at or below five knots within 500 m of the shore.
- It is recommended that visitors not permitted to enter the Area do not approach within 50 m of the shoreline.

- To reduce disturbance to wildlife, noise levels including verbal communication are to be kept to a minimum. The use of motor-driven tools and any other activity likely to generate loud noise and thereby cause disturbance to nesting birds shall not be allowed within the Area during the summer seabird breeding season (1 October to 31 March).

Aircraft may be used to enter the Area subject to the following conditions:

- disturbance of the colonies by aircraft shall be avoided at all times;
- during the breeding season (1 October to 31 March) there shall be no overflights of the Area below 1500 m (5000 ft) for twin-engine helicopters and below 930 m (3050 ft) for single-engine helicopters and fixed-wing aircraft;
- landings within the Area shall only occur at the designated landing site at Scullin monolith (Map D) and only by single-engine helicopters;
- single-engine helicopters shall approach the landing site from the south-west (as shown by the approved flight corridor in Map D);
- during the breeding season, twin-engine helicopters shall not land, take off or fly within 1500 m of the Area;
- during the breeding season, fixed wing aircraft shall not land or take off within 930 m or fly within 750 m (2500 ft) of the Area;
- under no circumstances are aircraft to fly within the Scullin Monolith amphitheatre during the breeding season;
- twin-engine helicopters may land at the designated landing site outside the breeding season (1 October - 31 March); and

- refuelling of aircraft is not to take place within the Area.

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

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

- compelling scientific research that cannot be undertaken elsewhere, including the initiation or continuance of ongoing monitoring programmes; and
- other scientific research and essential management activities consistent with this Management Plan that will not affect the values of the Area or its ecosystem integrity.

7(iv) Installation, modification or removal of structures

No new temporary structures are to be erected within the Area, or scientific equipment installed, except for compelling scientific or management reasons and for a pre-established period, as specified in a permit. Scientific markers and equipment must be secured and maintained in good condition, clearly identifying the permitting country, name of principal investigator and year of installation. All such items should be made of materials that pose minimum risk of harm to fauna and flora or of contamination of the Area.

A condition of the permit shall be that equipment associated with the approved activity shall be removed on or before completion of the activity. Details of markers and equipment temporarily left in situ (GPS locations, description, tags, etc. and expected removal date) shall be reported to the permitting authority.

7(v) Location of field camps

Temporary camps for field parties are permitted within the Area, but must be placed as far from seabird colonies and nesting sites as is practicable without compromising visitor safety. Camps shall be established for the minimum time necessary to undertake approved activities, and shall not be allowed to remain from one seabird breeding season to the next.

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

- A small amount of fuel is permitted within the Area for cooking purposes while field parties are present. Otherwise, fuel is not to be stored within the Area.
- No poultry products, including dried foods containing egg powder, are to be taken into the Area.
- No herbicides or pesticides are to be taken into the Area.
- All chemicals required for research purposes must be approved by permit, and shall be removed at or before the conclusion of the permitted activity to which they relate. The importation and use of radio-nucleides and stable isotopes within the Area is prohibited.
- Deliberate introduction of animals, plant material, micro-organisms and non-sterile soil into the Area is prohibited. The highest level precautions shall be taken to prevent the accidental introduction of animals, plant material, micro-organisms and non-sterile soil from other biologically distinct regions (within or beyond the Antarctic Treaty area) into the Area;
- To the maximum extent practicable, clothing, footwear and other equipment used or brought into the Area (including backpacks, carry-bags and other equipment) shall be thoroughly cleaned before entering and after leaving the Area.
- Boots and sampling/research equipment and markers that comes into contact with the ground shall be disinfected or cleaned with hot water and bleach before entering and after visiting the Area to help prevent accidental introductions of animals, plant material, micro-organisms and non-sterile soil into the Area. Cleaning should be undertaken at station.
- Visitors should also consult and follow as appropriate recommendations contained in the Committee for Environmental Protection Non-native Species Manual (CEP 2011), and in the Environmental Code of Conduct for terrestrial scientific field research in Antarctica (SCAR 2009);

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.* Disturbance to wildlife should be avoided at all times.

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

Material of human origin likely to compromise the values of the Area, which was not brought into the Area by the permit holder or was otherwise authorised, may be removed unless the impact of the removal is likely to be greater than leaving the material in situ. If such material is found, the permit issuing authority shall be notified if possible while the field party is present within the Area.

Specimens of natural materials may only be collected or removed from the Area as authorised in a permit and should be limited to the minimum necessary to meet scientific or management needs.

7(ix) Disposal of waste

All wastes, including human wastes, shall be removed from the Area. Wastes from field parties shall be stored in such a manner to prevent scavenging by wildlife (e.g. skuas) until such time as the wastes can be disposed or removed. Wastes are to be removed no later than the departure of the field party. Human wastes and grey water may be disposed into the sea well outside the Area.

7(x) Measures that may be necessary to ensure that the aims and objectives of the Management Plan continue to be met

- Permits may be granted to enter the Area to carry out biological monitoring and Area inspection activities, which may involve the collection of samples for analysis or review.
- Ornithological surveys, including aerial photographs for the purposes of population census, shall have a high priority.
- All GPS, survey and census data collected by field parties visiting the Area shall be made available to the permit issuing authority and the Party responsible for developing the management plan (if different).
- These data shall be lodged in the Antarctic Master Data Directory.
- Visitors shall take special precautions against the introduction of alien organisms to the Area. Of particular concern are pathogenic, microbial or vegetation introductions sourced from soils, flora or fauna at other Antarctic sites, including research stations, or from regions outside Antarctica. To minimise the risk of introductions, before entering the Area, visitors shall thoroughly clean footwear and any equipment to be used in the Area, particularly sampling equipment and markers.

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, and no later than six months after the visit has been completed. Such visit reports should include, as applicable, 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.

A copy of the report should be forwarded to the Party responsible for development of the Management Plan (Australia) to assist in management of the Area, and the monitoring of bird populations.

8. Supporting documentation

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Appendix 1: Estimates of breeding populations (pairs) of seabirds at Scullin and Murray Monoliths

Species	**Scullin Monolith**	**Murray Monolith**
Adélie penguin *Pygoscelis adeliae*	43,000	8,000
Southern fulmar *Fulmarus glacialoides*	1,350	150
Antarctic petrel *Thalassoica antarctica*	157,000	3,500
Cape petrel *Daption capense*	14	ND
Snow petrel *Pagodroma nivea*	1,200	ND
Wilson's storm petrel *Oceanites oceanicus*	ND	ND
South polar skua *Catharacta maccormicki*	30	ND

Note: ND indicates no census data are available

Appendix 2: Flora recorded at Scullin Monolith

The following taxa were collected at Scullin Monolith in 1972 (R Seppelt) and in 1987 (D Bergstrom), and were published in Bergstrom & Seppelt 1990).

LICHENS **Acarosporaceae**	**Teloschistaceae**
Biatorella cerebriformis (Dodge) Filson	*Caloplaca citrina* (Hoffm.) Th. Fr.
*Acarosporagwynii*Dodge&Rudolph	*Xanthoriaelegans*(Link.)Th.Fr.
Lecanoraceae *Lecanora expectans* Darb *Rhizoplaca melanophthalma* (Ram.) Leuck.	*Xanthoria mawsonii* Dodge **Candelariaceae** *Candellariella hallettensis* Murray
Lecideaceae	**Umbilicariaceae**
Lecidea phillipsiana Filson	*Umbilicaria decussata* (Vill.) Zahlbr.
Lecidea woodberryi Filson **Physciaceae** *Physcia caesia* (Hoffm.) Hampe	**Usneaceae** *Usnea antarctica* Du Rietz *Pseudophebe miniscula* (Nyl. Ex Arnold) Brodo et Hawksw.
Buellia frigida Darb	
Buellia grimmiae Filson *Buellia lignoides* Filson	**BRYOPHYTES**
Rinodina olivaceobrunnea Dodge & Baker	**Grimmiaceae** *Grimmia lawiana* Willis **Pottiaceae** *Sarconeurum glaciale (C.* Muell.) Card. Et Bryhn

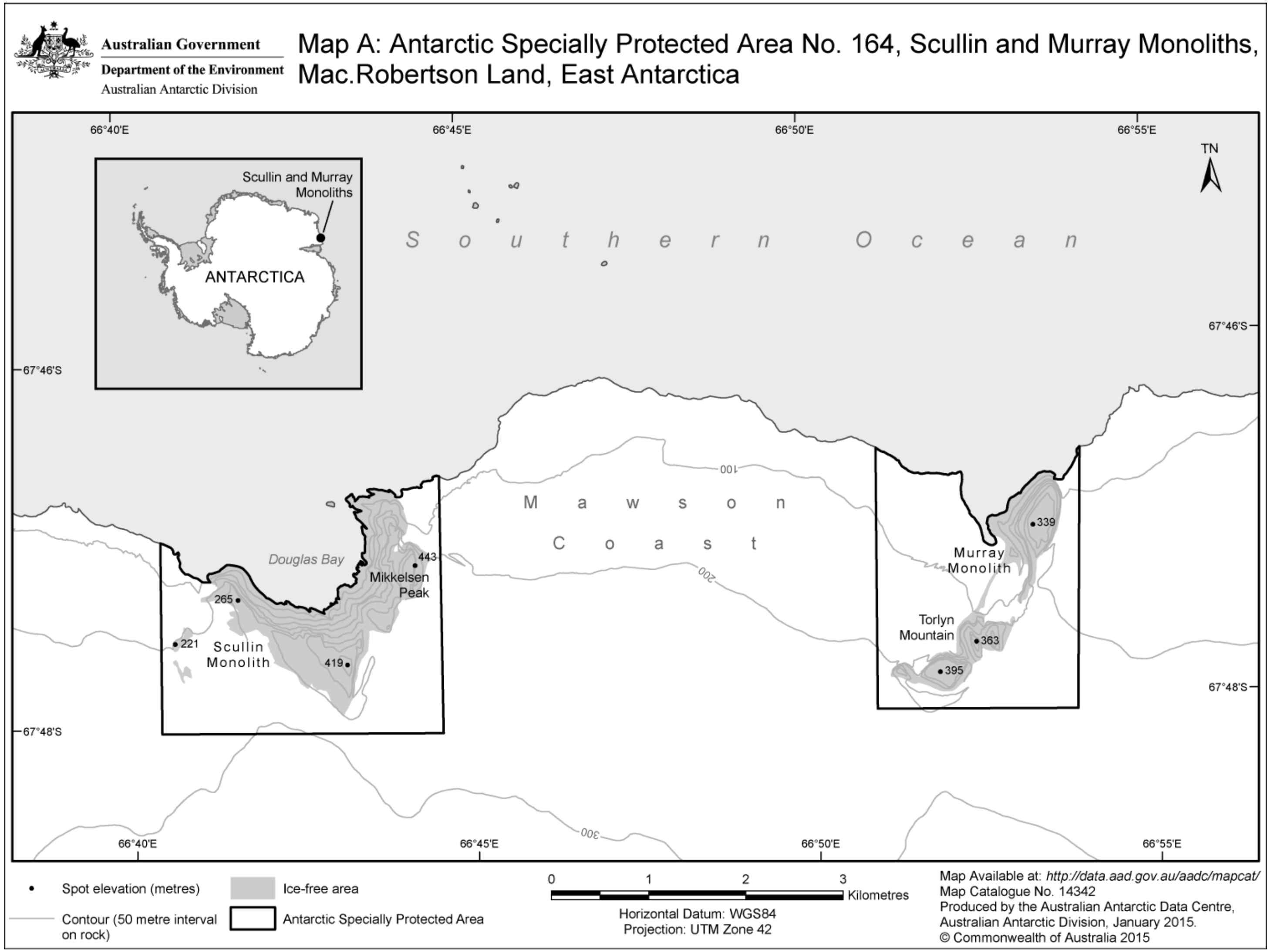
Appendix 3: Approach distances guide: minimum distances (m) to maintain when approaching wildlife without permit.

Species	People on foot/ski	Quad/skidoo	Hagglunds
Southern Giant Petrel	100	150	250
Emperor penguins in colonies	30		
Other penguins in colonies Moulting penguins Seals with pups Seal pups on their own Prions and petrels on nest South Polar Skua on nest	15		
Penguins on sea ice Non-breeding adult seals	5		

Notes:

1. These distances are a guide, and should you find that your activity is disturbing wildlife, a greater distance is to be maintained.

2. 'Prions and petrels' comprises Cape petrels, Antarctic petrels, Wilson's storm petrels, snow petrels and southern fulmars.


Australian Government
Department of the Environment
Australian Antarctic Division
Map A: Antarctic Specially Protected Area No. 164, Scullin and Murray Monoliths, Mac.Robertson Land, East Antarctica
66°40'E
66°45'E
66°50'E
66°55'E
67°46'S
67°48'S
TN
Scullin and Murray Monoliths
ANTARCTICA
Southern Ocean
Mawson Coast
Douglas Bay
Mikkelsen Peak
443
265
221
Scullin Monolith
419
Murray Monolith
339
Torlyn Mountain
363
395
100
200
300
Spot elevation (metres)
Ice-free area
Contour (50 metre interval on rock)
Antarctic Specially Protected Area
0 1 2 3 Kilometres
Horizontal Datum: WGS84
Projection: UTM Zone 42
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14342
Produced by the Australian Antarctic Data Centre, Australian Antarctic Division, January 2015.
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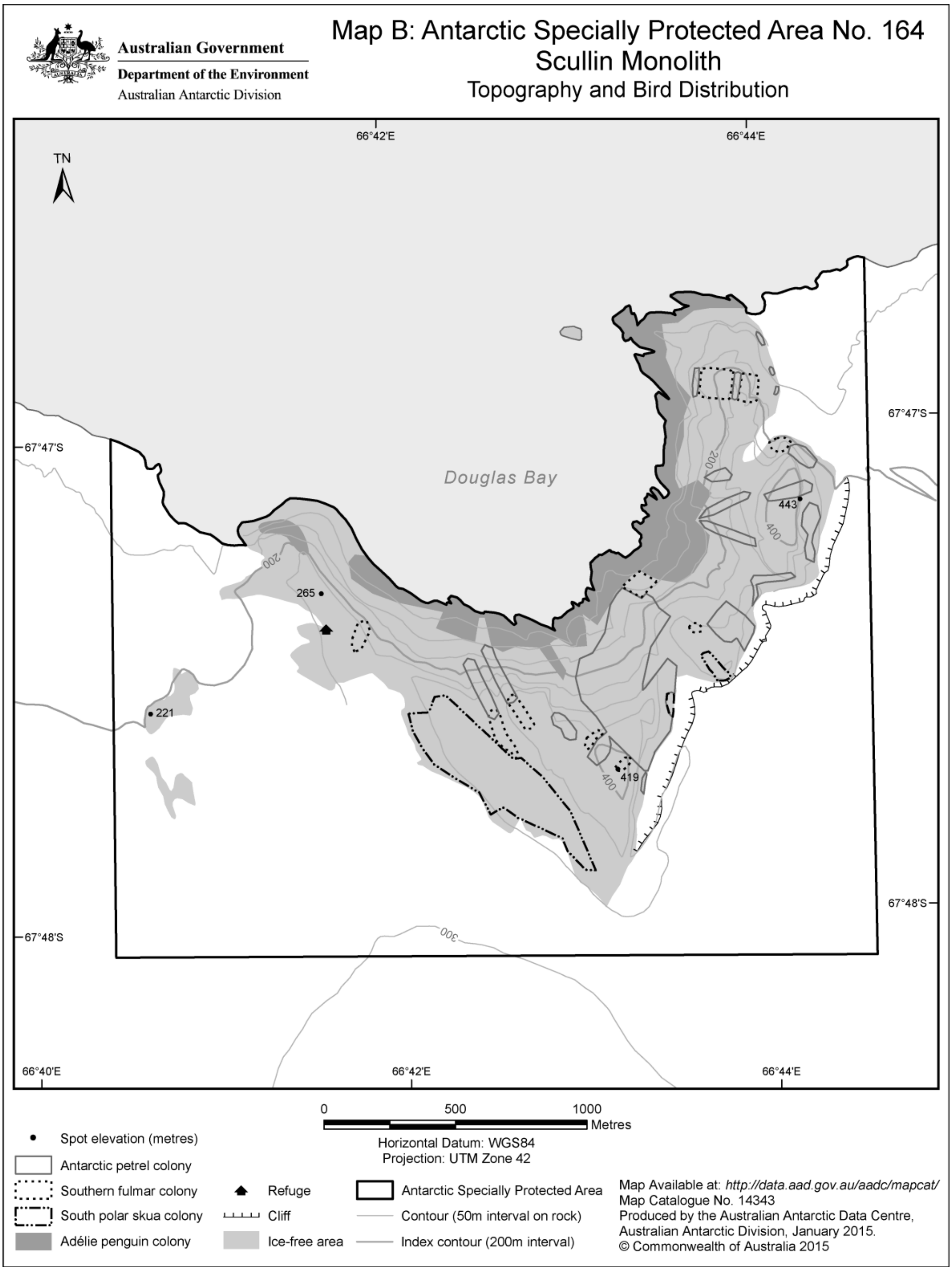
Australian Government
Department of the Environment
Australian Antarctic Division
Map B: Antarctic Specially Protected Area No. 164
Scullin Monolith
Topography and Bird Distribution
TN
66°42'E
66°44'E
67°47'S
67°48'S
66°40'E
Douglas Bay
200
400
300
265
221
443
419
0
500
1000
Metres
Horizontal Datum: WGS84
Projection: UTM Zone 42
Spot elevation (metres)
Antarctic petrel colony
Southern fulmar colony
South polar skua colony
Adélie penguin colony
Refuge
Cliff
Ice-free area
Antarctic Specially Protected Area
Contour (50m interval on rock)
Index contour (200m interval)
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14343
Produced by the Australian Antarctic Data Centre,
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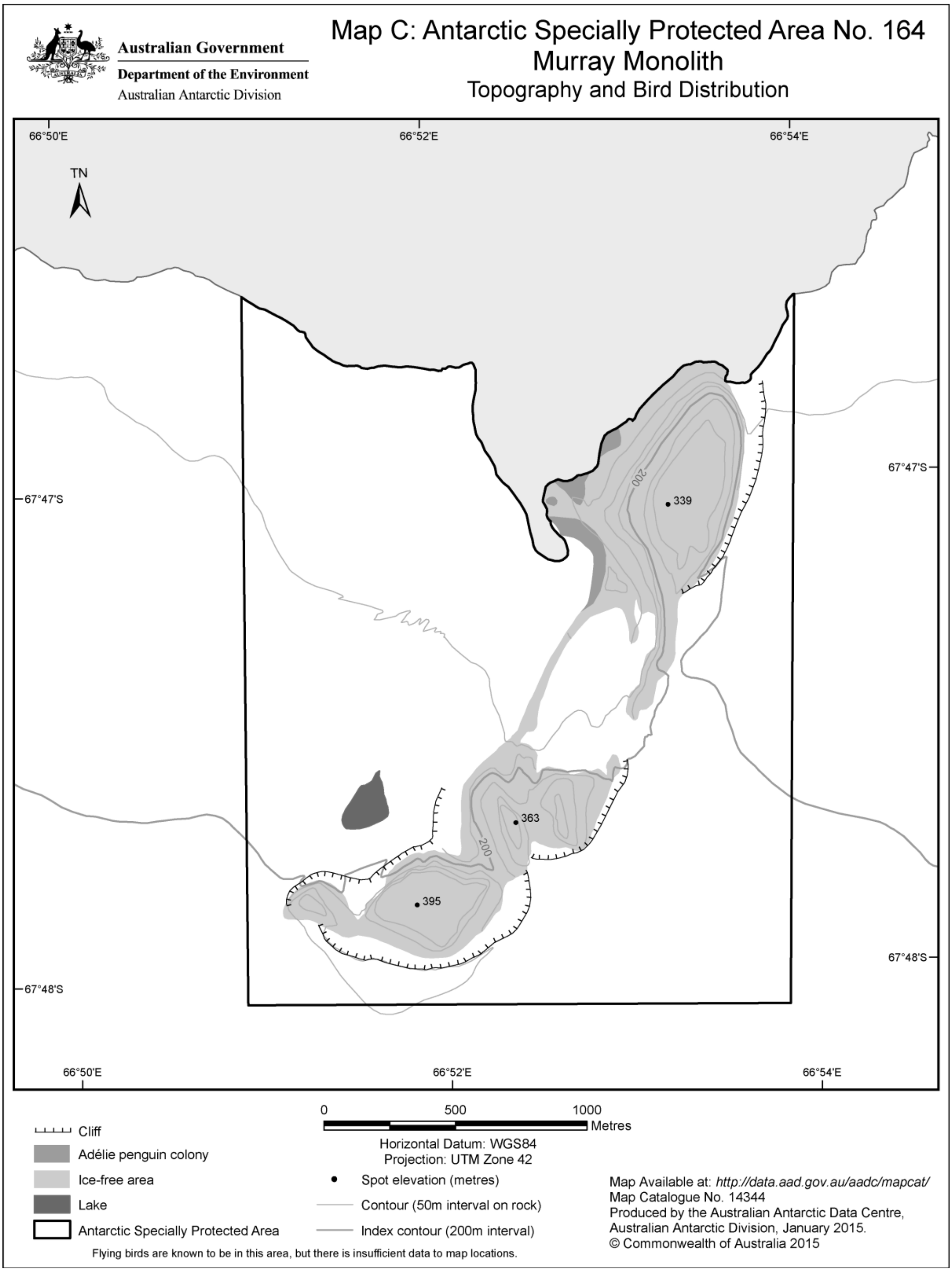
Australian Government
Department of the Environment
Australian Antarctic Division
Map C: Antarctic Specially Protected Area No. 164
Murray Monolith
Topography and Bird Distribution
66°50'E
66°52'E
66°54'E
TN
67°47'S
67°48'S
200
339
363
395
0
500
1000
Metres
Cliff
Adélie penguin colony
Ice-free area
Lake
Antarctic Specially Protected Area
Horizontal Datum: WGS84
Projection: UTM Zone 42
Spot elevation (metres)
Contour (50m interval on rock)
Index contour (200m interval)
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14344
Produced by the Australian Antarctic Data Centre,
Australian Antarctic Division, January 2015.
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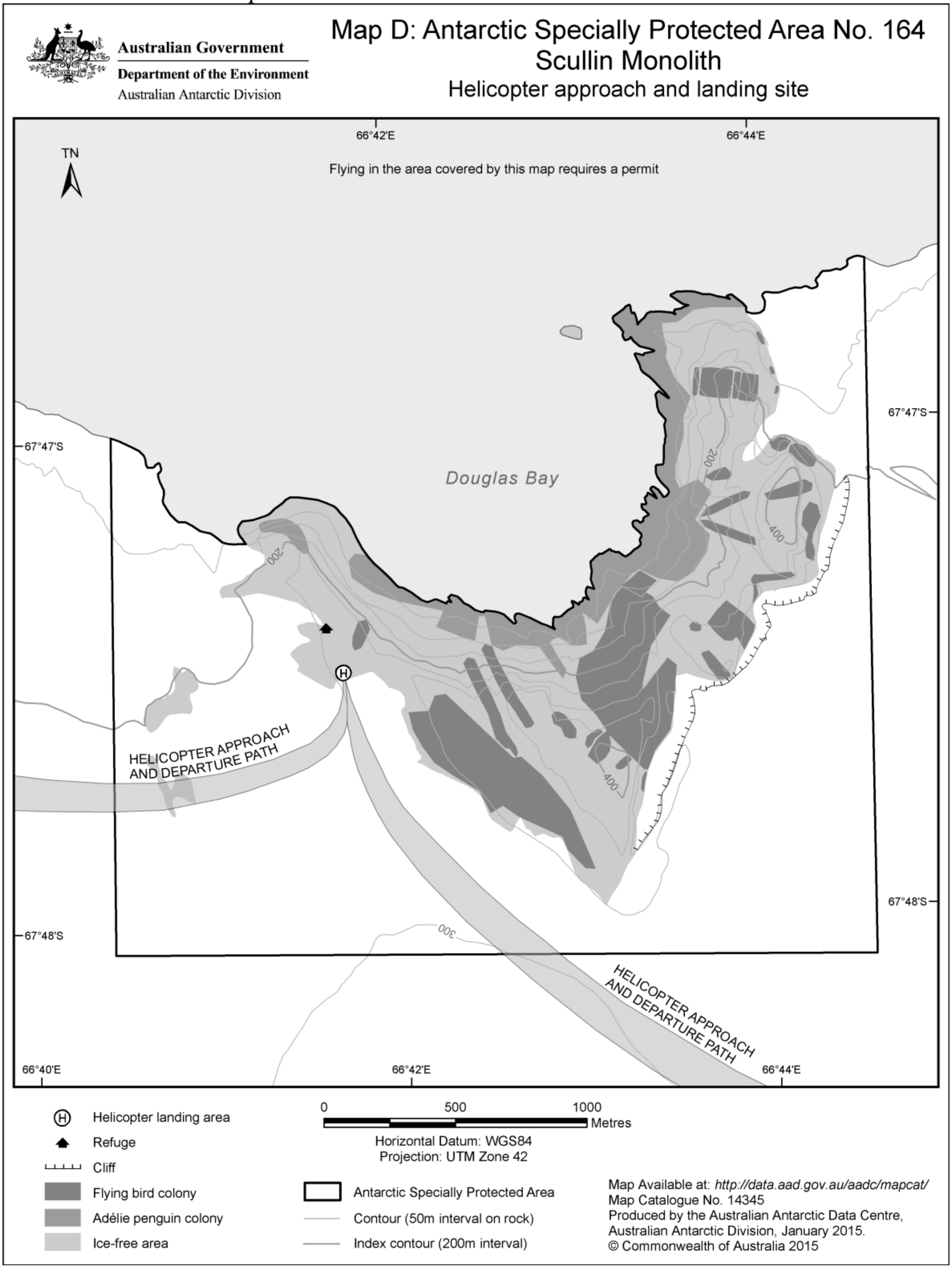
Flying birds are known to be in this area, but there is insufficient data to map locations.


Australian Government
Department of the Environment
Australian Antarctic Division
Map D: Antarctic Specially Protected Area No. 164
Scullin Monolith
Helicopter approach and landing site
66°42'E
66°44'E
TN
Flying in the area covered by this map requires a permit
67°47'S
Douglas Bay
200
400
300
67°48'S
HELICOPTER APPROACH AND DEPARTURE PATH
HELICOPTER APPROACH AND DEPARTURE PATH
66°40'E
Helicopter landing area
Refuge
Cliff
Flying bird colony
Adélie penguin colony
Ice-free area
0
500
1000
Metres
Horizontal Datum: WGS84
Projection: UTM Zone 42
Antarctic Specially Protected Area
Contour (50m interval on rock)
Index contour (200m interval)
Map Available at: http://data.aad.gov.au/aadc/mapcat/
Map Catalogue No. 14345
Produced by the Australian Antarctic Data Centre,
Australian Antarctic Division, January 2015.
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Management Plan for Antarctic Specially Protected Area No 168

Mount Harding, Grove Mountains, East Antarctica

Introduction

The Grove Mountains (72°20’-73°10’S, 73°50’-75°40’E) are located approximately 400km inland (south) of the Larsemann Hills in Princess Elizabeth Land, East Antarctica, on the eastern bank of the Lambert Rift(Map A). Mount Harding (72°51’ -72°57’ S, 74°53’ -75°12’ E) is the largest mount around Grove Mountains region, and located in the core area of the Grove Mountains that presents a ridge-valley physiognomies consisting of nunataks, trending NNE-SSW and is 200m above the surface of blue ice (Map B).

The primary reason for designation of the Area as an Antarctic Specially Protected Area is to protect the unique geomorphological features of the area for scientific research on the evolutionary history of East Antarctic Ice Sheet (EAIS), while widening the category in the Antarctic protected areas system.

Research on the evolutionary history of EAIS plays an important role in reconstructing the paleoclimatic evolution in global scale. Up to now, a key constraint on the understanding of the EAIS behaviour remains the lack of direct evidence of ice sheet surface levels for constraining ice sheet models during known glacial maxima and minima in the post-14 Ma period.

The remains of the fluctuation of ice sheet surface preserved around Mount Harding, will most probably provide the precious direct evidences for reconstructing the EAIS behaviour. There are glacial erosion and wind-erosion physiognomies which are rare in nature and extremely vulnerable, such as the ice-core pyramid, the ventifact, etc. These glacial-geological features have not only important scientific values, but also rare wildness and aesthetic values and the disorderly human activities would cause perpetual, unrepairable damage to it.

The Chinese Antarctic Research Expedition (CHINARE) has visited the Grove Mountains for several times from1998 to 2014, and plans to visit the Area in the coming 2015/2016 season, focusing on research on geological tectonics, glacial geology and landscape, meteorology, ice-cap movement and mass balance, surveying and mapping, especially on fluctuation of Antarctic icecap surface since the Pliocene, and these research results in some new discoveries.

The Australian Antarctic Programme has visited the Grove Mountains to conduct a range of geoscience and glaciology research and support activities for several times. It currently maintains a continuous GPS station on Tianhe Range and expects to continue to access the region for research and operational

purposes. Besides, Russian Antarctic Research Expedition has ever tripped there in 1958 and 1973 for a short stay, but whether they have arrived at the Area is unclear.

1. Description of values to be protected

The Mount Harding area designated as the site for the specially protected area (Map A) has the precious physiognomies of glacier erosion preserved in the ice sheet of inland Antarctic, which is of great scientific, aesthetic and wilderness values. The aim of this protected area is to preserve its scientific, aesthetic and wilderness values.

1(i) Scientific values

A lot of remains of ice sheet advance and retreat are preserved in Mount Harding, which are the direct evidence of the changes of cold and warm in the global environment since Pliocene. In this Area, the scientists have found the rare extreme cold desert soil, the sedimentary rocks formed in the Neogene Period that are not consolidated completely, as well as the valuable spore pollen assemblages in those paleo-soils and sedimentary rocks. All of these imply there was a warm climate event in this area probably resulting in a large-scale retreat of the EAIS, and its margin might be even beyond the Grove Mountains, 400km south from its present coast of the EAIS.

The unique geomorphological features in this Area includes the integral geologic-geomorphic remains and a series of special physiognomy, such as ice-core pyramid, ventifacts, ice-cored moraine (end moraine and lateral moraine), cold-desert soil, sedimentary erratics, pool of melted water, rochemoutonee, etc.

1(ii) Aesthetic and wilderness values

There is ice-eroded ice field geomorphology which is rare in nature in the Area, such as the pool of melted water, hanging moraine dyke, ice-core pyramid, ventifact, etc (photos 1-6). These geological and glacial landscapes contract finely with the vast blue ice, producing extremely significance and beauty to make high aesthetic and wilderness values.

6. Aims and objectives

Management of Mount Harding, Grove Mountains, East Antarctica aims to:

• Facilitate long-term scientific research while avoiding direct or cumulative damage to vulnerable geomorphological features;

• Allow scientific research in the Area provided it is for compelling reasons which cannot be served elsewhere and which will not jeopardize the values in that Area;

• Allow scientific research in the Area which is consistent with the management aims and objectives and which will not jeopardize the values in that Area;

• Allow visits for management purposes in support of the aims of the Management Plan;

• Minimize the introduction to the Area of alien plants, animals and microbes.

1. Management activities

• Copies of the Management Plan (attached with maps) shall be made available at the Zhongshan Station (China), Davis Station (Australia), Progress Station (Russia), and the map of the protected area should be put up at prominent positions in the stations mentioned above. Personnel 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.

• National Antarctic Programmes operating in the Area shall consult together with a view to ensuring the above management activities are implemented.

• The Area shall be visited as necessary, and 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.

• The Management Plan should be reviewed no less than once every five years and, if necessary, updated or revised.

• In case the Antarctic ice sheet continuously retreats so that the new remains of advance and retreat of EAIS are exposed in the vicinity of the protected area and the extent of remains of ice sheet advance and retreat expands, the boundary of the protected area should be updated periodically so as to include the newly exposed remains of ice cap advance and retreat in the area. This should be taken into consideration in examining the Management Plan.

2. Period of designation

Designated for an indefinite period.

3. Maps and photos

• Map A, A1: Position of Grove Mountains. A2: Grove Mountains Area, Antarctica

• Map B, Protected Area around Mount Harding, Grove Mountains, Antarctica

• Map C, Location of Nunataks and Direction of Ice Flow around Mount Harding, Grove Mountains, Antarctica.

•Photo 1, Ventifact

•Photo 2, Ventifact

•Photo 3, Ice-core pyramid

•Photo 4, Hanging moraine dyke

•Photo 5, Pool of ice melted water

•Photo 6, Roches montannees

4. Description of the Area

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

The Area is irregular, and approximately rectangular in shape, with a width of about 10km from east to west, a length of about 12km from south to north and an total area of about 120km^2 (Map A).

The proposed ASPA boundary was defined to ensure that the unique geomorphological features, formed in ice sheet advance and retreat in Mount Harding, can be specially protected as a whole.

Geographical Co-ordinates

The Specially protected Area of Mount Harding, Grove Mountains, includes the open blue-ice zone from the moraine on the west side of Mount Harding to the east side of the Zakharoff Ridge as well as a number of nunataks, detritus zone, and moraine etc. within it (Map B). Its geographical coordinates are: 72°51’ -72°57’ S, 74°53’ -75°12’ E.

Boundary marks

The western boundary of the Area is the moraine on the west side of Mount Harding, with its northern end turning eastward to the open blue-ice detritus zone on the east side of the Zakharoff Ridge via the north flank of the northern ridge of Mount Harding and the northern end of the Zakharoff Ridge, turning southwards to the northern end of Davey Nunataks, and then heading westwards to the southern end of the Xi Lake moraine to close the whole area. The geographical coordinates of the nine control points located at its boundary are counter clockwise: 1. 74°57’E, 72°51’ S, 2. 74°54’E, 72°53’ S, 3.74°53’E, 72°55’ S, 4. 74°54’E, 72°57’ S, 5. 75°00’E, 72°57’ S, 6.75°10’E, 72°57’ S, 7. 75°12’E, 72°55’ S, 8. 75°11’E, 72°52’ S, 9. 75°08’E, 72°51’ S.

No markers or signs are currently in place to mark the boundary.

General climate condition in summer

With an average altitude of more than 2000 meters in the Grove Mountains, the daily temperature range and strong wind frequency are greater than those at Zhongshan Station. When affected by the warm-moist current from the north, snowfall would appear constantly in this area, while under the control of the east current, the weather would mainly be sunny. The trend of daily wind speed change is greater than that at Zhongshan Station, where the maximum wind speed appears at around 05:00 am and minimum wind speed occurs at about 17:00 pm commonly. The daily mean wind speed is 7.5m/s from December 1998 to January 1999. Same as Zhongshan Station, the Grove Mountains area is influenced by the katabatic wind, but with a greater force than Zhongshan Station.

From December 1998 to January 1999, the average highest and lowest air temperature in the Grove Mountains area were -13.1°C and -22.6°C respectively, and the estimated average daily temperature range could be -9.5°C. In this area, in January in particular, the air temperature and snow temperature saw an obvious change during a day, where the average air temperature was -18.5°C, and the snow surface temperature was about -17.9°C, that is, the average snow temperature was higher than the average air temperature.

Physiognomy

Mount Harding in the central GMs is shaped as a crescent open to the north-west. Both the northern and southern ends are steep crests, protruding ~200m above the recent ice surface. The central segment of the ridge-line between two summits descends progressively until it reaches the ice surface in a central col, with a relic ice tongue hanging on the lee side. A stagnant field of blue ice, tens of km^2 wide, lies inside the crescent. All of this, shining each other with the vast blue ice, forms the magnificent, beautiful scene of ice-eroded ice field geomorphology.

The nunataks within the area may be divided into two groups. The one in the west is the tall nunataks represented by Mount Harding, and the other is a small part of the area including the low linear nunatak chain on the Zakharoff Ridge. The stoss slopes of rocky nunataks show smoothly abraded bedrock, with surfaces sparsely erratic till patches. The lee and lateral sides of the nunataks show generally sharp bluffs, resulting from both ice flow scraping and collapse along sub-vertical crevasses of rocks. The nunataks leave pair of “wake zone” of superglacial debris tens km in length on the ice surface, marking the path of present local ice flow.

The upper parts of the higher nunataks are usually jagged ridge populating with well-developed ventifacts on the summits, facing the dominant wind from the SE. The scarcity of glacial erosive imprints, also meters of depth inside the hard rock delved by wind- force blowing out indicate that these higher slopes are ice free since rather long time. But the lower parts of slopes beneath ~100m above ice surface have the features of recent glacial erosion such as fresh trimlines and erratics.

Some of small nunataks are typical “roches moutonnée” resulted from the past ice flow overriding. This regional borderline between wind and glacial erosions are considered to represent a former height of ice surface since certain phase, probably early Quaternary glaciations, and the later rises of ice surface did not exceed this limit.

Mount Harding is the largest nunatak in the Grove Mountains. On the west side of the crescent ridge there is a large stretch of lake shaped stagnant blue ice plain (Kunming Lake, Xi Lake) and a dozen ice-cored pyramids (ice-cored cone) are visible at the juncture of the ice lake and the foot of the rocky nunataks.

The geological and glacial phenomena or landscapes that deserve special protection include (Map C)：Ventifact (photo 1, 2): As a result of long-term blow and erosion by fierce winds, there have developed a large number of ventifacts with peculiar shape around the southern summit of Mount Harding.

These ventifacts are the typical wind-erosion physiognomy rarely seen on the earth and are subject to the perpetual damage by disorderly human activities.

Ice-core pyramids (ice-cored cones, photo 3): Along the northern and southern banks of “Kunming Lake” is scattered a dozen ice-core pyramids. These ice-core pyramids are cone shaped with a height of 20-40m and a base diameter of 50-80m. These pyramids are the best marks for directly measuring the pneumatolysis of blue ice and of great importance to the research on the material balance and evolutionary history of the EAIS. They are extremely vulnerable and any human climbing behaviour will lead to their perpetual alteration and destruction.

Hanging moraine dyke (photo 4): On the north-west side of the stagnant blue ice pool lie some of linear floating moraine. These moraines are about 100m wide, 25-35m high and kilometres long. On the surface of the moraine there is a gravel bed with a thickness of 50-100 cm, below which is the blue ice. These exotic rock masses provide precious source material for studying the tectonics of the underlying base rocks of EAIS. The spore pollen assemblages contained in the sedimentary erratics are the key evidence of the large-scale retreat event of the EAIS during the Pliocene. Any walking or climbing activities will very probably cause the irreparable damage to these moraine dykes.

Cold-desert soil: Several cold-desert soil patches were found on the southern slope of Mount Harding above the regional erosion limit of 100m. The existence of such soils indicates also that the ice fluctuation has never been higher than this limit after the formation of soils because any higher rise of the ice would have scraped all of them away.

Microfossil assemblages in the sedimentary erratics: More than 25 species of Neogene microfossil of plant have been identified from such outwash sedimentary boulders. These spore and pollen assemblages provide useful information on the evolution of the EAIS since they are derived from a suite of glaciogenic strata hidden beneath the EAIS. Most of the pollen and spores are originated from local sources as in situ assemblages, representing a continental flora.

Pool of ice melted water (photo5): At the foot of the lee side of huge nunataks are often developed pools of ice melted water, large or small, each with an area from several dozen square meters up to a thousand square meters. The surface ice of these pools is extremely smooth and transparent, and the air bubbles are rich inside the ice from the bottom. The occurrence of the pool of ice melted water suggests the existence of a megathermal event.

Blue ice cliff: On the east side of the protected area are distributed blue ice cliffs or blue ice precipices, with the length of several thousand meters, usually 30-50m high, with a slope of 40-70°.

Roche moutonnees (photo 6): Typical roche moutonnees are distributed on the east and south sides of the protected area. They are peculiar in shape, have a large number of footprints of ice flow on their surfaces, and possess very high wilderness, aesthetic and scientific values.

Paleo-sedimentary basin (ice sheet leading edge): A paleo-ice erosion basin with the marginal sedimentary layer, at the front edge of ice sheet in the Pliocene is inferred to lie below the blue ice basin on the west side of Mount Harding. It is probably a brand-new type of subglacial lakes. Exploration of these paleo-sedimentary lake basins may yield the precious sedimentary records on the paleo-climatic and environmental changes during the Pliocene in this area.

Geological condition

These nunataks consist mainly of upper amphibolite to granulite facies metamorphic rocks, syn-orogenic to late orogenic granite, and post tectonic granodioritic aplite and pegmatite. The absence of active structures and earthquakes, and the lack of Cenozoic volcanism suggest that this region, along with Prydz Bay, have been geologically stable at least since the Late Mesozoic Epoch. New geological evidence obtained from this area shows that in the inland East Antarctica there exists a huge "Pan-African" stage orogenic zone from the Prydz Bay, Grove Mountains to the Prince Charles Mountains, which should be the last segmented suture zone of the Gondwana land.

6(ii) Access to the Area

Access to the area may be gained overland by vehicle or by aircraft landing on snow- and ice covered sites within or adjacent to the Area.

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

Australia maintains a continuous GPS station on Tianhe Ridge at 72°54’29.17479"S,

74°54’36.43606"E. The station consists of a GPS antenna mounted on a geodynamic survey pillar, three rugged cases containing batteries and GPS receivers, a solar panel frame holding four solar panels and a wind turbine. In addition there are three survey reference marks surrounding the GPS pillar, approximately 20m distant.

CHINARE maintains 1 geodetic control point in the Area using duel frequency GPS receivers (No: Z003) at 72º53’55.07437"S, 75º02’14.00782"E to meet the requirement of the satellite image mapping.

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

There are no other protected areas nearby.

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 for compelling scientific reasons which cannot be served elsewhere, or for reasons essential to the management of the Area. Before the permit is issued, the applicant shall demonstrate to the appropriate competent authorities that the specimens or samples already collected from other parts of the world so far cannot fully meet the needs of the researches proposed;

• 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 scientific, aesthetic and wilderness values of the Area;

• The Permit or its valid copy shall be carried when in the Area;

• The Permit shall be issued for a finite period;

• Report on the activities must be submitted to the national authorities issuing the Permit and in charge of polar issues.

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

• Entry by land vehicles such as snowmobile and aircraft should avoid destroying the local equilibrium line separating the zone of net ablation from the inland zone of net accumulation, paleo-soil distribution zone, ventifacts, blue-ice cliff, ice-core pyramid, and other geological and natural physiognomy of important scientific research and environmental values;

• As there have many ice crevice in this area, it is recommend that entry by snowmobile would drive down the route along the two sides of which Chinese expedition has set colorful poles for the sake of safety;

• Aircraft operations within the Area should be mindful of the mountainous terrain;

• Climbing up the ice-core pyramids, walking on the floating moraine dyke and roches montannees is strictly prohibited.

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

• Compelling scientific research which cannot be undertaken elsewhere and which must not damage the value of the Area;

• Major management activities, including monitoring, inspection, maintenance or review;

• 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.

7(iv) Installation, modification and removal of structures

• No structures are to be erected within the Area, or scientific equipment installed, except for compelling scientific or management reasons；

• All the facilities to be set up and installed within the Area shall be specified in the Permit issued by the competent authority of the particular country. Where possible, such installations should avoid sensitive geomorphological features ;

• All the facilities installed in the Area must be clearly identified by country, name of the principal investigator or agency and year of installation. All such items should be made of materials that pose minimal risk of contamination of the Area. These facilities must be removed when they are no longer required, and so shall other abandoned equipment or materials as far as possible.

7(v) Location of field camps

For safety reasons, the camping sites must be selected in such a way as not to destroy or affect the special geological and natural physiognomy.

If not destroying the local and adjacent geological and natural physiognomy, Camping is allowed within the Area when necessary for purposes consistent with this Management Plan and where authorized in a Permit. In this area, the encampment near Mount Harding (No 9) and the encampment near Zakharoff Ridge (No 8) are the preferred camping site, shown in Map B. Camping should choose snow or ice surface or rock surface to avoid the remnants of ice sheet.

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

• No depots of food or other supplies are to be left within the Area beyond the time period or activity

for which they are required;

• No living animals, plant material or micro-organisms shall be deliberately introduced into the Area. All necessary precautions shall be taken to prevent accidental introduction;

• All materials introduced shall be for a stated period, shall be removed at or before the conclusion ofthat stated period, and shall be stored and handled so as to minimize the risk of environment impacts.

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

No native flora and fauna are present.

7(viii) Collection or removal of materials not imported by the Permit holder

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

• 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 authorized, 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

At a minimum, all wastes, including all human wastes, shall be managed in accordance with Annex III and not disposed of into freshwater streams or lakes, onto ice-free areas, or onto areas of snow or ice which terminate in such areas of high ablation.

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

None.

7(xi) Reporting requirements

• The principal permit holder for each visit to the Area shall submit a report to the appropriate national authority as soon as practicable, and no later than six months after the visit has been completed.

• 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 necessary, the national authority should also make the visit report copy available 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 organizing the scientific use of the Area.

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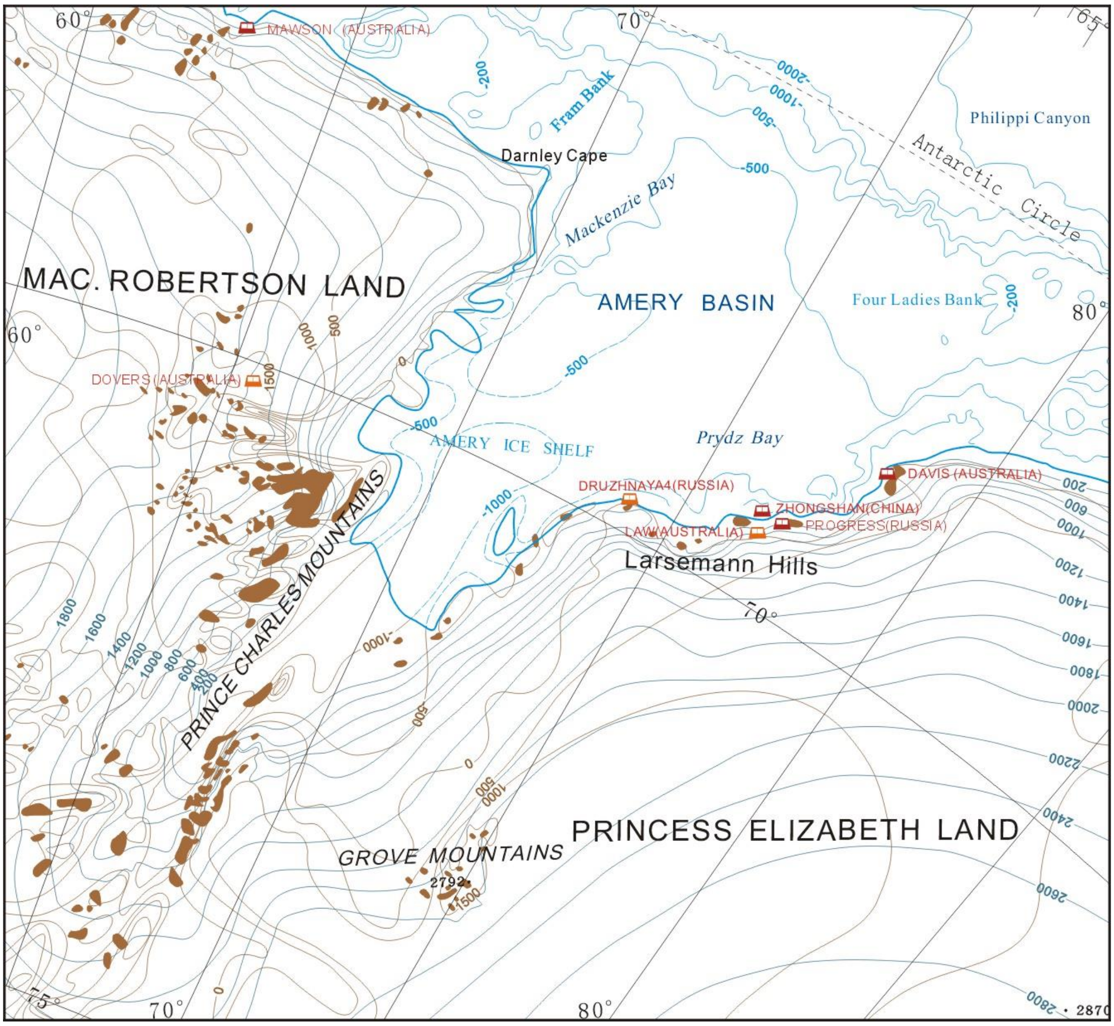
Map A1. Position of Grove Mountains

Mapping Standard: Projection: Normal Stereographic Horizontal datum:WGS-84

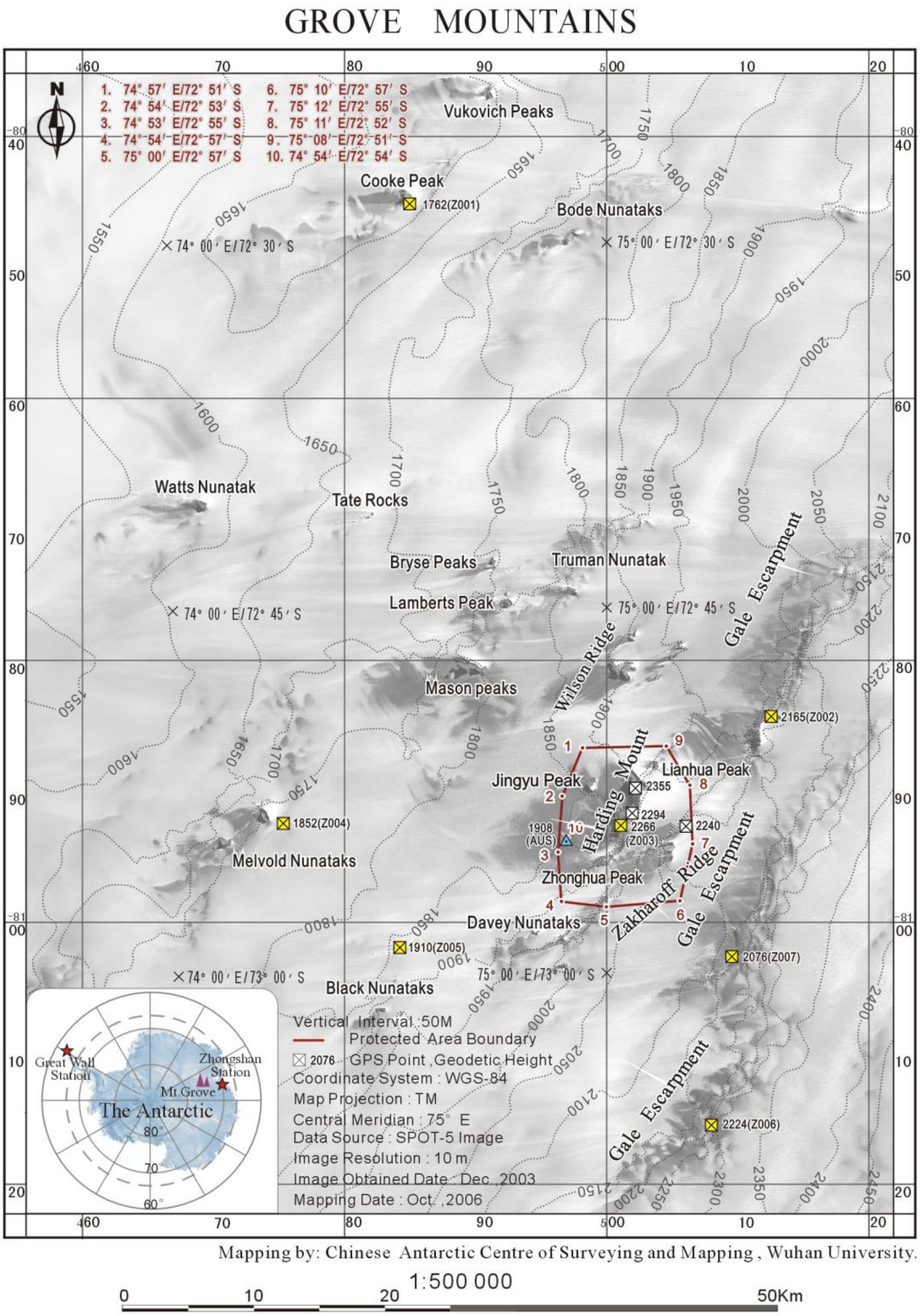
Manufacturer: Chinese Antarctic Centre of Surveying and Mapping, Wuhan University



Map A2. Grove Mountains Area, Antarctica

Mapping standards: Projection: TM, Horizontal datum: WGS-84

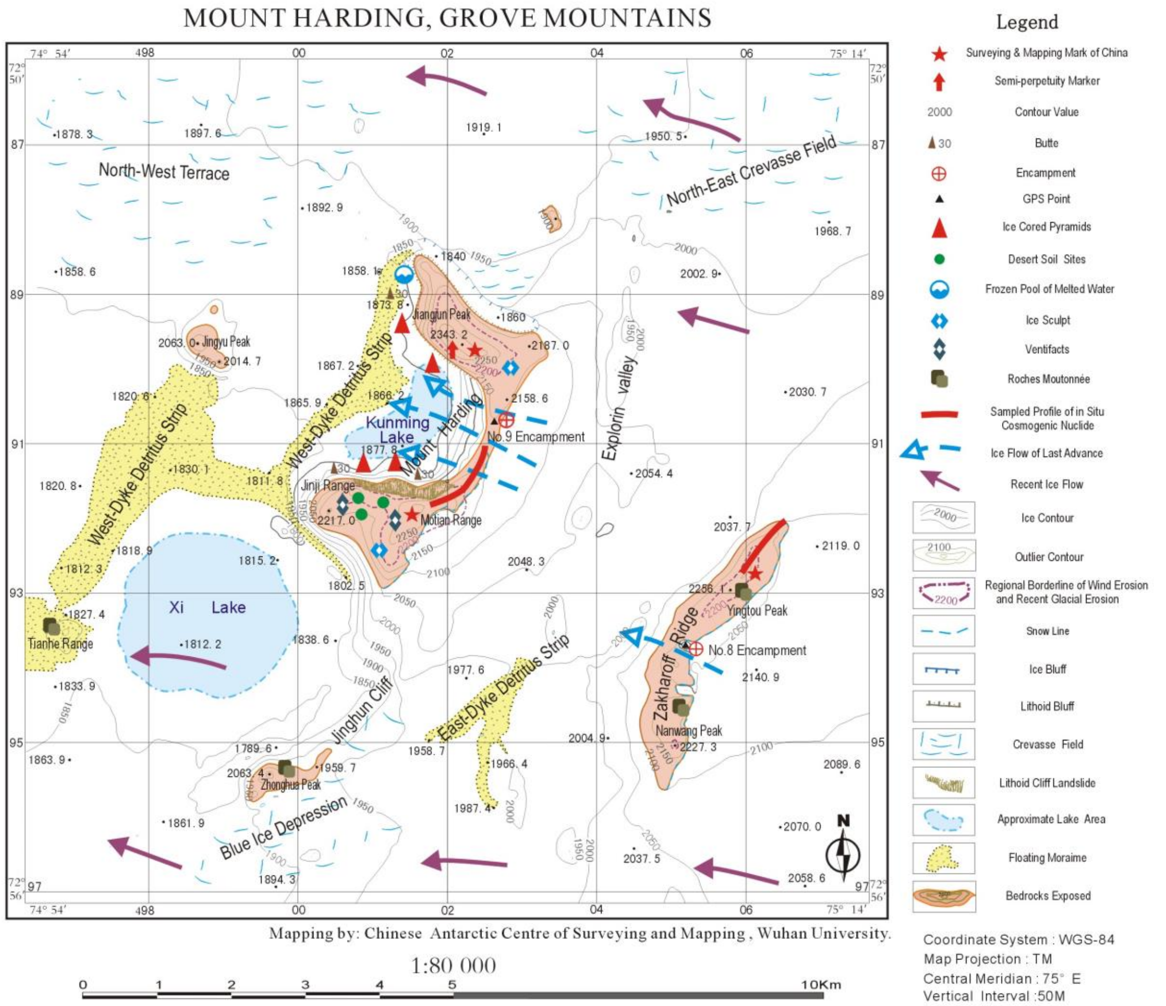
Manufacturer: Chinese Antarctic Centre of Surveying and Mapping, Wuhan University



Map B. Protected Area around Mount Harding, Grove Mountains, Antarctica

Mapping standards: Projection: TM Horizontal datum: WGS-84

Manufacturer: Chinese Antarctic Centre of Surveying and Mapping, Wuhan University



Map C. Location of Nunataks and Direction of Ice Flow around Mount Harding, Grove Mountains, Antarctica

Mapping standards: Projection: TM Horizontal datum: WGS-84

Manufacturer: Institute of Geology and Geophysics, Chinese Academy of Sciences

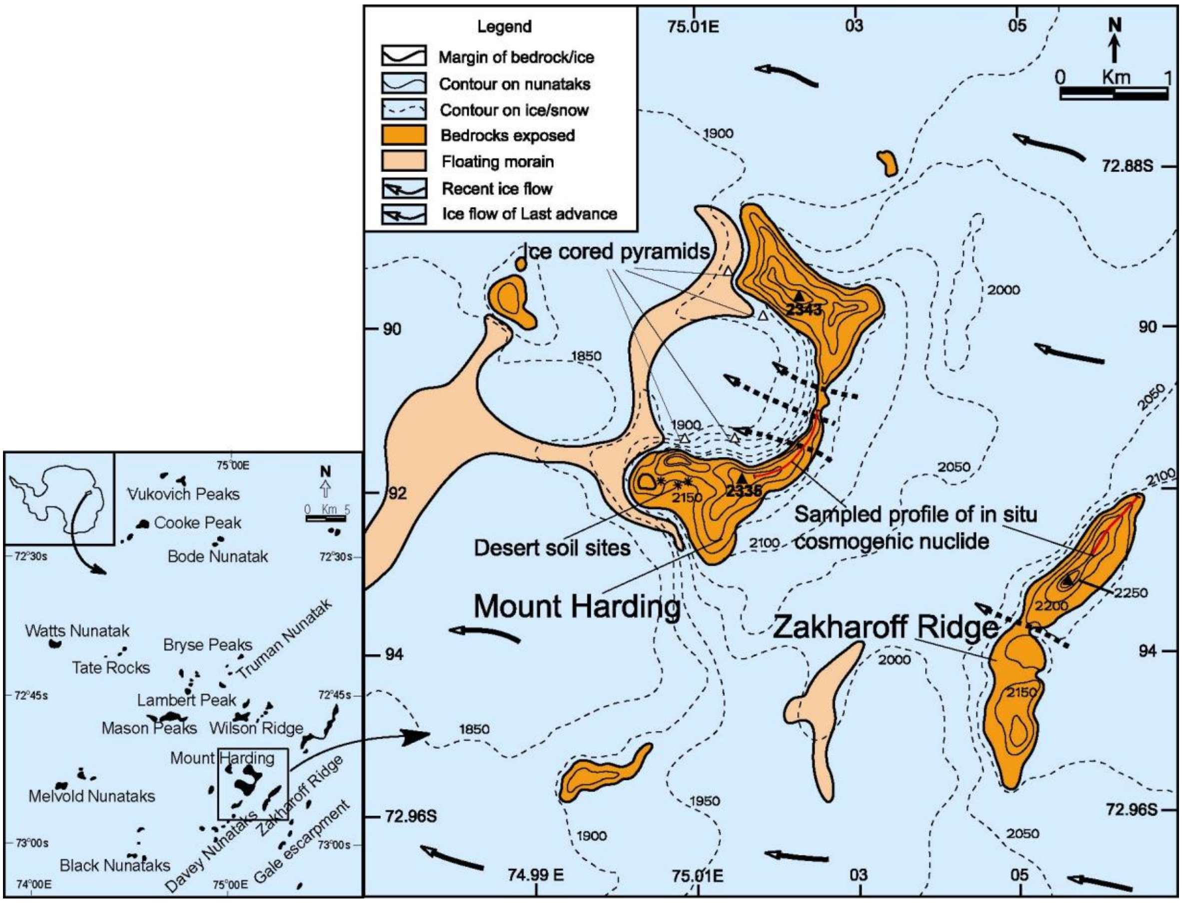


Photo 1: Ventifact, taken on January 13th, 2003

Photo 2: Ventifact, taken on January 13th, 2003

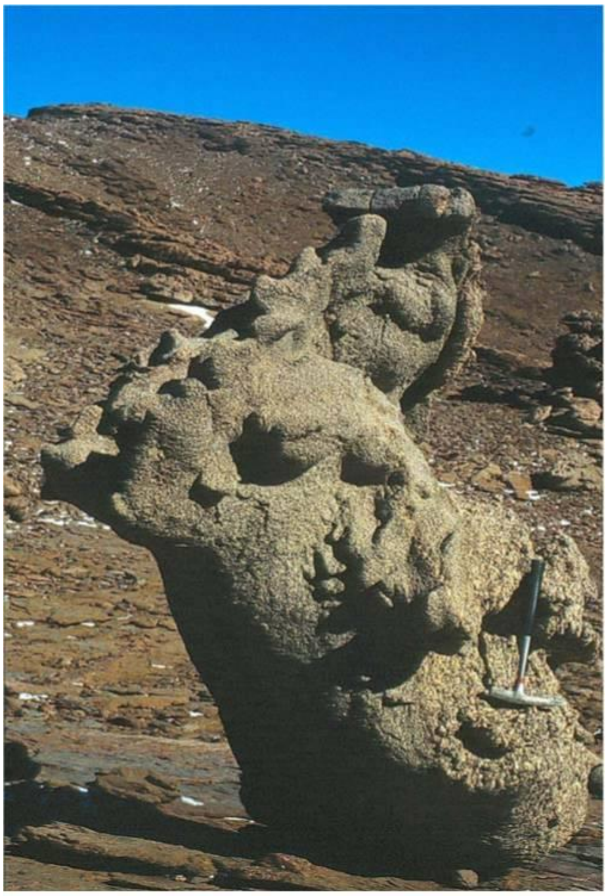


Photo3: Ice-core pyramid, taken on January 12th, 2003

Photo 4: Hanging moraine dyke, taken on January 14th, 2003

Photo 5: Pool of ice melted water, taken on January 14th, 2003

Photo 6: Roches montannees, taken on January 12th, 2003

Management Plan for
Antarctic Specially Managed Area No. 2

MCMURDO DRY VALLEYS, SOUTHERN VICTORIA LAND

Introduction

The McMurdo Dry Valleys are the largest relatively ice-free region in Antarctica with approximately thirty percent of the ground surface largely free of snow and ice. The region encompasses a cold desert ecosystem, whose climate is not only cold and extremely arid (in the Wright Valley the mean annual temperature is –19.8°C and annual precipitation is less than 100 mm water equivalent), but also windy. The landscape of the Area contains mountain ranges, nunataks, glaciers, ice-free valleys, coastline, ice-covered lakes, ponds, meltwater streams, arid patterned soils and permafrost, sand dunes, and interconnected watershed systems. These watersheds have a regional influence on the McMurdo Sound marine ecosystem. The Area's location, where large-scale seasonal shifts in the water phase occur, is of great importance to the study of climate change. Through shifts in the ice-water balance over time, resulting in contraction and expansion of hydrological features and the accumulations of trace gases in ancient snow, the McMurdo Dry Valley terrain also contains records of past climate change. The extreme climate of the region serves as an important analogue for the conditions of ancient Earth and contemporary Mars, where such climate may have dominated the evolution of landscape and biota.

The Area was jointly proposed by the United States and New Zealand and adopted through Measure 1 (2004). This Management Plan aims to ensure the long-term protection of this unique environment, and to safeguard its values for the conduct of scientific research, education, and more general forms of appreciation. The Management Plan sets out the values, objectives and general rules for conduct within the region, and includes a number of maps and appendices that provide more specific guidelines for particular activities and designated zones within the Area, arranged according to the following structure:

Contents

1. Values to be protected and activities to be managed

The McMurdo Dry Valleys are characterized by unique ecosystems of generally low macrobiotic biodiversity and reduced food web complexity, although recent research has shown evidence of highly diverse microbial communities across relatively small areas, as well as between valleys. Moreover, as the largest ice-free region in Antarctica, the McMurdo Dry Valleys also contain relatively diverse habitats compared with other ice-free areas. The Area contains unusual microhabitats and biological communities (such as endolithic and cryoconite systems) as well as rare glaciological and geological features (for example, a brine-rich sub-glacial lake, hyper-saline surface lakes, unique marine deposits and undisturbed desert pavements). These glaciological and geological features are of value because they contain an extremely long record of natural events. The McMurdo Dry Valleys contain indicators of past and present regional climate change, as well as features that play a role in influencing local climate change. A Long Term Ecological Research (LTER) site was established in the Taylor Valley in 1993, and substantial research has been conducted by the program every season for almost twenty years, not only in the Taylor Valley but also more generally across the McMurdo Dry Valleys. The long-term environmental data sets that have been collected through this program, and through a range of other research initiatives in the McMurdo Dry Valleys, are some of the longest in Antarctica. These scientific values are of global and regional importance.

The Area is a valuable resource for understanding landscape processes and the stability of Antarctic ice sheets. The McMurdo Dry Valleys contain unique surface deposits including glacially deposited and modified sediments, sand dunes, desert pavement, glacio-lacustrine sediments, and marine fjord sediments containing valuable records of planetary change. The soil, rock, water, and ice environments and their associated biota are of scientific value as model ecosystems that allow deep insights into natural processes operating throughout the biosphere. Finally, the species that reside in the McMurdo Dry Valleys provide a biological resource for understanding adaptation to extreme environments, and are true end members of ecological continua.

The isolation of the McMurdo Dry Valleys and the extreme environment has generally protected it from human introductions of species from outside of Antarctica. Many parts of the Area are only rarely visited, and one (the Barwick and Balham Valleys protected area) has been set aside as a reference area where entry has been very strictly controlled for almost 40 years and overflight is prohibited. The relatively pristine condition of the McMurdo Dry Valleys, and the relative lack of introduced species established within the Area, are rarely observed elsewhere in the world and have both high scientific and ecological value, especially for comparative studies.

Sites of historic value originating from early exploration of the Area have also been noted, such as 'Granite House' at Botany Bay, Granite Harbor, which was constructed by members of the 1910-1913 British Antarctic Expedition and is designated as Historic Site No. 67.

The McMurdo Dry Valleys are also valued for their aesthetic and wilderness qualities. They represent a relatively pristine environment largely undisturbed and uncontaminated by humans. The dramatic landscape, composed of precipitous mountains, high ridges and sweeping valleys, imposing layered geological formations of dark dolerite set against pale sandstones, and contrasts of ice-free and glacier-covered terrain creates unique vistas with high aesthetic value.

Activities conducted in the area include a variety of scientific research, operations in support of science, media, arts, education and other official National Program visitors, and tourism.

The Area requires special management to ensure that its scientific, environmental, ecological, historic, aesthetic and wilderness values are protected, including that data sets collected over the last 100 years will continue to be of high value. Increasing human activity and potentially conflicting interests have made it necessary to manage and coordinate activities more effectively within the Area.

2. Aims and objectives

The aim of this Management Plan is to conserve and protect the unique and outstanding environment of the McMurdo Dry Valleys by managing and coordinating human activities in the Area such that the values of the McMurdo Dry Valleys are protected and sustained in the long term, especially the value of the extensive scientific datasets that have been collected.

The specific objectives of management in the Area are to:

- Facilitate scientific research while maintaining stewardship of the environment;
- Assist with the planning and coordination of human activities in the McMurdo Dry Valleys to manage actual or potential conflicts among different values (including those of different scientific disciplines), activities and operators;
- Ensure the long-term protection of scientific, ecological, aesthetic, wilderness and other values of the Area by minimizing disturbance to or degradation of these values, including disturbance to natural features and fauna and flora, and by minimizing the cumulative environmental impacts of human activities;
- Prevent the unintended introduction of species not native to the Area, and minimize as far as practicable the unintended transfer of native species within the Area;
- Minimize the footprint of all facilities and scientific experiments established in the Area, including the proliferation of field camps;
- Minimize any physical disturbance, contamination and wastes produced within the Area, and take all practical steps to contain, treat, remove or remediate these whether produced in the course of normal activities or by accident;
- Promote use of energy systems and modes of transport within the Area that have the least environmental impact, and minimize as far as practicable the use of fossil fuels for the conduct of activities within the Area;
- Improve the understanding of natural processes and human impacts in the Area, including through the conduct of monitoring programs; and
- Encourage communication and co-operation between users of the Area, in particular through dissemination of information on the Area and the provisions that apply.

3. Management activities

To achieve the aims and objectives of this Management Plan, the following management activities are to be undertaken:

- National Programs operating within the Area should convene as required, and at least annually, a McMurdo Dry Valleys Management Group (hereafter the Management Group) to oversee coordination of activities in the Area, including to:
  - facilitate and ensure effective communication among those working in or visiting the Area;
  - provide a forum to resolve any actual or potential conflicts in use;
  - help minimize the duplication of activities;
  - maintain a record of activities and, where practical, impacts in the Area;
  - develop strategies to detect and address cumulative impacts;
  - disseminate information on the Area, in particular on the activities occurring and the management measures that apply within the Area, including through maintaining this information electronically at http://www.mcmurdodryvalleys.aq/;
  - review past, existing, and future activities and evaluate the effectiveness of management measures; and
  - make recommendations on the implementation of this Management Plan.
- National Programs operating within the Area shall maintain copies of the current version of the management plan and supporting documentation in appropriate stations and research hut facilities and make these available to all persons in the Area, as well as electronically at http://www.mcmurdodryvalleys.aq/;
- National Programs operating within the Area and tour operators visiting should ensure that their personnel (including staff, crew, passengers, scientists and any other visitors) are briefed on, and are aware of, the requirements of this Management Plan, and in particular the *General Environmental Guidelines* (Appendix A) that applies within the Area;
- Tour operators and any other group or person responsible for planning and / or conducting non-governmental activities within the Area should coordinate their activities with National Programs operating in the Area in advance to ensure they do not pose risks to the values of the Area and that they comply with the requirements of the Management Plan;
- National Programs operating within the Area should seek to develop best practices with a view to achieving the objectives of the Management Plan, and to exchange freely such knowledge and information;
- Signs and / or markers should be erected where necessary and appropriate to show the location or boundaries of zones, research sites, landing sites or campsites within the Area. Signs and markers shall be secured and maintained in good condition, and removed when no longer necessary;
- Visits shall be made as necessary (no less than once every five years) to evaluate whether the Management Plan is effective and to ensure management measures are adequate. The Management Plan, Code of Conduct and Guidelines shall be revised and updated as necessary; and
- National Programs operating within the Area shall take such steps as are necessary and practical to ensure the requirements of the Management Plan are observed.

4. Period of designation

Designated for an indefinite period.

5. Maps and photographs

Table 1: List of maps included in the Management Plan

Map	Title	Source Scale	Estimated Error (+/- m)
Overviews			
Map 1	Overview-ASMA No.2 McMurdo Dry Valleys: boundary and zones	1:900,000	200
Map 2	Overview-Central Dry Valleys	1:400,000	200
Facilities Zones			
Map 3	Explorers Cove, New Harbor	1:25,000	2
Inset:	New Harbor Camp Facilities Zone	1:3000	2
Map 4	Lake Fryxell – Commonwealth Glacier	1:25,000	2
Inset:	F-6 Camp Facilities Zone	1:3000	2
Map 5	Lake Fryxell – Canada Glacier	1:25,000	2
Inset:	Lake Fryxell Camp Facilities Zone	1:3000	2
Map 6	Lake Hoare, Canada Glacier	1:25,000	2
Map 7	Lake Hoare Camp Facilities Zone	1:3000	2
Map 8	Lake Bonney, Taylor Valley	1:35,000	2
Inset 1:	ASPA No. 172 Blood Falls	1:10,000	2
Inset 2:	Lake Bonney Camp Facilities Zone	1:3000	2
Map 9	Mount Newall, Asgard Range	1:25,000	50
Inset:	Mount Newall Radio Repeater Facilities Zone	1:3000	2
Map 10	Marble Point, McMurdo Sound	1:35,000	5
Inset:	Marble Point Refueling Station Facilities Zone	1:5000	2
Map 11	Lower Wright Valley	1:25,000	50
Inset:	Lower Wright Hut Facilities Zone	1:3000	2
Map 12	Lake Vanda, Wright Valley	1:25,000	50
Inset 1:	Lake Vanda Hut Facilities Zone	1:3000	2
Inset 2:	Bull Pass Hut Facilities Zone	1:3000	2
Map 13	Cape Roberts, Granite Harbor	1:10,000	10
Inset:	Cape Roberts Hut Facilities Zone	1:3000	10
Scientific Zones			
Map 14	Explorers Cove Scientific Zone	1:3000	2
Map 15	Boulder Pavement, Wright Valley	1:30,000	50
Inset:	Boulder Pavement Scientific Zone	1:10,000	50
Restricted Zones			
Map 16	Trough Lake Catchment Restricted Zone	1:70,000	10
Map 17	Mount Feather – Beacon Valley	1:130,000	50
Inset:	Mount Feather Sirius Deposit Restricted Zone	1:25,000	50
Map 18	Don Juan Pond, Wright Valley	1:50,000	50
Inset:	Don Juan Pond Restricted Zone	1:10,000	2
Map 19	Argo Gully, Wright Valley	1:30,000	50
Inset:	Argo Gully Restricted Zone	1:3000	15
Map 20	Prospect Mesa, Wright Valley	1:30,000	50
Inset:	Prospect Mesa Restricted Zone	1:5000	50
Map 21	Hart Glacier, Wright Valley	1:25,000	50
Inset:	Hart Ash Deposit Restricted Zone	1:3000	50
Map 22	Victoria Valley Sand Dunes Restricted Zone	1:50,000	50
Map 23	Battleship Promontory Restricted Zone	1:50,000	50
Visitor Zones			
Map 24	Taylor Valley, Lake Fryxell	1:25,000	2
Inset:	Taylor Valley Visitor Zone	1:5000	2

6. Description of the Area

The McMurdo Dry Valleys are located in southern Victoria Land along the western coast of McMurdo Sound, southern Ross Sea, at approximately 77°30’S, 162°00’E. An area of approximately 17,500 km^2 is designated as an Antarctic Specially Managed Area (hereafter referred to as the ‘Area’) to manage human activities in the region for the protection of scientific, environmental, ecological, historic, aesthetic and wilderness values.

Based on the Environmental Domains Analysis for Antarctica (Resolution 3(2008)) the McMurdo Dry Valleys are located within Environment S – McMurdo – South Victoria Land geologic**.** Under the Antarctic Conservation Biogeographic Regions classification (Resolution 6 (2012)) the Area lies within ACBR9 – South Victoria Land.

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

All geographic coordinates in this Management Plan are given in degrees and decimal minutes (dd mm.mm) format.

The Area boundaries have been defined primarily on the basis of the hydrological catchments in the McMurdo Dry Valleys, including all of the ice-free ground and adjacent areas within these catchments, all of the Convoy Range in the north, and bounded by the Koettlitz Glacier in the south (Map 1). Offshore islands, except Tripp Island in the north and Heald Island in the south, are not included within the Area. Proceeding clockwise from the northeast, the boundary of the Area is defined as follows:

From the northeastern extremity of Tripp Island (76°38.09’S, 162°42.90’E) the boundary extends southward following the coastline at the mean low tide level to DeMaster Point (situated east of Marshall Valley at 78°04.20’S, 164°25.43’E), a distance of approximately 170 km. The boundary thence follows the northwestern margin of the Koettlitz Glacier in a southwesterly direction for approximately 25 km to Walcott Bay and Trough Lake, including within the Area all of the streams and lakes along the glacier margin (Map 16). The boundary thence follows the approximate southern grounding line of the Koettlitz Glacier margin in Walcott Bay, extending east towards The Bulwark and encompassing all of Trough Lake. The boundary thence continues east following Bulwark Stream for approximately 1.5 km to the northern extremity of The Bulwark. The boundary thence extends 3 km in a straight line northeast to the northwestern coastline of Heald Island, following around the northern coastline to the eastern extremity of the island at 78°15.00’S, 163°57.80’E.

The boundary extends from Heald Island approximately 14.8 km southwest to the summit of The Pyramid (854 m) (78°20.64’S, 163°29.95’E). The boundary thence continues southwest approximately 13.3 km to the foot of Highway Ridge (78°23.97’S, 162°58.57’E), from where it follows up the ridgeline in a northwesterly direction approximately 3.8 km to the summit of Shark Fin (2242 m) (78°22.11’S, 162°54.66’E). The boundary extends from Shark Fin northwest approximately 6.7 km to the summit of Mount Kempe (3004 m) (78°19.35’S, 162°43.18’E). The boundary continues northwest in a straight line from the summit of Mount Kempe approximately 83 km to the summit of Mount Wisneski (2320 m) (77°57.65’S, 159°33.73’E), which is the most southerly peak of the Lashley Mountains.

From Mount Wisneski, the boundary extends northwards for approximately 8.7 km to Mount Crean (2550 m) (77°53.00’S, 159°30.66’E), the highest peak in the Lashley Mountains. The boundary continues 5.6 km northward to the summit of Mount Koger (2450 m) (77°50.05’S, 159°33.09’E), the most northerly peak in the Lashley Mountains.

The boundary thence extends northeast approximately 15.3 km to Depot Nunatak (1980 m) (77°44.88’S, 160°03.19’E), and thence northwest approximately 19.6 km to the western extremity of the ice-free ground at Horseshoe Mountain (77°34.52’S, 159°53.72’E). The boundary continues north approximately 40 km to the summit of Mount DeWitt (2190 m) (77°13.05’S, 159°50.30’E), thence extends northwest approximately 38.4 km to the summit of Carapace Nunatak (2321 m) (76°53.31'S, 159°23.76'E), and continues a further 39 km north to the summit of Battlements Nunatak (2128 m) (76°32.27'S, 159°21.41'E).

The boundary extends east from Battlements Nunatak approximately 51 km to the summit of Mount Douglas (1750 m) (76°31.25'S, 161°18.64'E), and thence approximately 18 km in a southeasterly direction to the summit of Mount Endeavour (1870 m) (76°32.49'S, 161°59.97'E). The boundary extends southeast from Mount Endeavour approximately 21.3 km to the northeastern extremity of Tripp Island.

The principal basis for the coordinates given above is the USGS / LINZ 1:50,000 digital base map prepared for the McMurdo Dry Valleys, which has an estimated maximum error of +/- 50 m. Because this map does not extend to cover the western boundary, coordinates in these areas are from the USGS 1:250,000 map, with an estimated maximum error of +/- 200 m. Accurate mapping with a maximum error of +/- 2 m is available for a limited number of sites within the Area (see Table 1), mostly in the Taylor Valley, and accurate GPS coordinates are available to describe only parts of the boundaries. The 1:50,000 series was selected as the primary map base for boundary coordinates to ensure that these are given using a map datum that is defined to a consistent standard over most of the Area. For these reasons, GPS coordinates for the boundaries are likely to differ from the coordinates given above by up to 50 m, or in the west by up to ~200 m.

6(ii) Restricted and managed zones within the Area

This Management Plan establishes four types of zones within the Area: Facilities, Scientific, Restricted and Visitor. The management objectives of the different types of zones are set out in Table 2. Maps 1 and 2 show the location of the different types of zones, and Maps 3-24 (which appear in the relevant appendices) show each zone in its context of surrounding geography and the detailed features or infrastructure present at each site (usually shown within an inset). A new zone or zone type may be considered by the Management Group as the need arises, and those no longer needed may be delisted. Zoning updates should be given particular consideration at the time of Management Plan reviews.

Table 2: Management Zones designated within the Area and their specific objectives.

Management Zones	**Specific Zone Objectives**	**Plan Appendix**
Facilities Zone	To ensure that science support facilities and related human activities within the Area are contained and managed within designated areas.	C
Scientific Zone	To ensure those planning science or logistics within the Area, and all visitors to the Area, are aware of sites of current or long-term scientific investigation that may be sensitive to disturbance or have sensitive scientific equipment installed, so these may be taken into account during the planning and conduct of activities within the Area.	D
Restricted Zone	To restrict access into a particular part of the Area and/or activities within it for a range of reasons, e.g. owing to special scientific or ecological values, because of sensitivity, presence of hazards, or to restrict emissions or constructions at a particular site. Access into Restricted Zones should normally be for compelling reasons that cannot be served elsewhere within the Area.	E
Visitor Zone	To provide a means of managing the activities of visitors,	F

Management Zones	Specific Zone Objectives	Plan Appendix
	including program personnel and/or tourists, so their impacts may be contained and, as appropriate, monitored and managed.	

The overall policies applying within the zones are outlined in the sections below, while site-specific guidelines for the conduct of activities at each zone are found in Appendices D to F.

Facilities Zones

Facilities Zones have been established to contain temporary and semi-permanent facilities within pre-defined areas and thereby control their distribution and footprint. Facilities Zones may be areas where human presence is intended to be semi-permanent or for a defined period of time in which significant activity is occurring. They may also be areas where human presence is expected to have regular occupation and/or repetitive activity such as field camps. The establishment of new Facilities Zones should be designed to minimize the footprint of facilities and associated materials.

The following provisions should be observed for Facilities Zones:

- Substantial and repeatedly used facilities, camping sites, helicopter pads, and materials / supplies stores should be located within the boundaries of the Facilities Zones;
- Existing infrastructure, camping and storage sites within the Facilities Zones should be re-used where practicable;
- Provisions for fuel storage and handling within the Facilities Zones should take account of the requirements set out in the *General Environmental Guidelines for the McMurdo Dry Valleys* (Appendix A) by providing secondary containment, appropriate equipment for refilling, decanting or servicing operations, secure storage and appropriate spill response materials;
- Alternative energy sources and energy efficiency should be considered in the planning and maintenance of activities within the Facilities Zones;
- Waste minimization and management should be considered in the planning and maintenance of activities within the Facilities Zone and all waste should be stored securely and then be removed; and
- Contingency plans for emergencies should be developed as appropriate, to take into account the special needs of specific Facilities Zones.

Facilities Zones should not be located within Restricted Zones or Antarctic Specially Protected Areas (ASPAs), or at sites that could otherwise jeopardize the values of the Area.

Facilities Zones are listed in Appendix C with locations, boundary and infrastructure descriptions, designated landing sites, and maps.

Scientific Zones

The Scientific Zones listed in Appendix D have been designated to raise visitor awareness of specific sites of current and on-going scientific research in order to help ensure important scientific values or experiments are not disturbed. There are no general access restrictions that apply within Scientific Zones, although visitors should familiarize themselves with the provisions set out in Appendix D prior to visiting or planning work at these zones.

Restricted Zones

Restricted Zones have been designated at sites of high scientific value and which are particularly sensitive to human disturbance. Restricted Zones are outlined in Appendix E with a brief description of the boundaries, site features, impacts, and any specific guidelines for access and activities. Access to Restricted Zones should be for compelling reasons that cannot be served elsewhere within the Area, and any additional measures to ensure their protection as specified in Appendix E should be strictly observed when visits are made.

Visitor Zones

The Taylor Valley Visitor Zone is designated in order to manage visits by tourists or non-governmental expeditions to the Area within a defined area where the exceptional aesthetic and wilderness values of the McMurdo Dry Valleys can be appreciated at the same time as ensuring that potential impacts by tourist visits on other values present within the Area, particularly scientific and environmental values, are minimized.

The Taylor Valley Visitor Zone is located in the Taylor Valley near the Canada Glacier terminus (Map 24), at a site where safe and relatively easy access and movement can be reasonably assured with minimal impact to science activities or the environment. This site was selected following consultation among the National Programs operating in the Area, tour operators and International Association of Antarctic Tour Operators (IAATO). Specific guidelines for the conduct of activities within the Visitor Zone are included in Appendix F as the Antarctic Treaty Visitor Site Guide: Taylor Valley, Southern Victoria Land, Ross Sea.

6(iii) Structures within and near the Area

The main structures within the Area are located in the Facilities Zones designated within the central McMurdo Dry Valleys (Maps 2 and 13). The Taylor Valley has five semi-permanent field camps (Maps 3-8), and three semi-permanent field camps are present in the Wright Valley (Maps 11 and 12). The most substantial structures are located at the Marble Point Refueling Facility (Map 10), and buildings are also located at Mount Newall (Map 9) and at Cape Roberts (Map 13).

There are a number of sites of scientific and operational instrumentation located throughout the Area outside of Facilities Zones, the most substantial of which are listed in Table 3. Other structures not listed include several Automatic Weather Stations (AWS), radio repeater sites (Mount Cerverus, Mount JJ Thompson), stream weirs and glacier mass balance devices.

Table 3: Structures within the Area outside of Facilities Zones.

Name	**RP**[1]	**Location**[2]	**Location Description**	**Structures**
Mount Coates Radio Repeater	US	77° 47.16'S 161° 58.23'E	Near summit of Mount Coates (1894 m), Kukri Hills. ~14 km from Lake Bonney Facilities Zone, Taylor Valley.	Radio repeater and associated equipment contained in two orange plastic cases. There is one antenna at the site.
Hjorth Hill Radio Repeater	US	77° 30.97'S 163° 37.22'E	Near summit of Hjorth Hill (790 m) ~ 6 km from Cape Bernacchi, northeast of Explorers Cove and the Taylor Valley.	Radio repeater and associated equipment at small hut (2.4m x 2.6m). The antenna is installed on the hut.

1. Party responsible for maintenance
2. Coordinates approximate

There are also several sites in the McMurdo Dry Valleys where semi-permanent camps have been decommissioned and removed (Table 4).

Table 4: Known sites of decommissioned semi-permanent camps in the Area.

Decommissioned site	RP[1]	Geographic coordinates[2]
Asgard Hut	NZ	77° 35′S, 161° 36′E
Brownworth Hut	NZ	77° 27′S, 162° 53′E
Bull Pass Hut (US structures at Bull Pass Hut Facilities Zone remain)	NZ	77° 31.01′S, 161° 51.08′E
Meserve Glacier Camp	US	77° 30.8′S, 162° 17′E
Miers Valley Hut	NZ	78° 08′S, 163° 50′E
Old Lake Bonney Hut	US	77° 42.2′S, 162° 30.6′E
Lake Fryxell Hut	NZ	77° 37′S, 163° 03′E
Vanda Station (some structures relocated to Lake Vanda Hut Facilities Zone)	NZ	77° 31.6′S, 161° 40.1′E
Commonwealth Glacier Camp	NZ	77° 34.94′S, 163° 35.81′E
Old New Harbor Camp	US	77° 34.5′S, 163° 29.9′E
Odell Glacier Camp	US	76° 40.86′S, 159° 54.8′E

1. Responsible Party
2. Coordinates approximate

Eight sites within the Area were drilled, several with multiple boreholes, as a part of the McMurdo Dry Valley Drilling Project (DVDP) carried out between 1971 and 1975. Drill sites for the project are located at Lake Vanda (DVDP 4) (drilled 85.8 m below ice surface), Don Juan Pond (DVDP 5, 3.4 m; DVDP 13, 75 m),Wright Valley North Fork basin (DVDP 14, 78 m), Lake Vida (DVDP 6, 305.8 m; permanently capped and closed by the US Program in 2006-07 and now several meters below the lake surface), Lake Fryxell (DVDP 7, 11.1 m), New Harbor (DVDP 8, 157.5 m; DVDP 9, 38.3 m; DVDP 10, 187 m), Commonwealth Glacier (DVDP 11, 328 m), and Lake Hoare (DVDP 12, 185 m).

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

Entry to an Antarctic Specially Protected Area (ASPA) is prohibited unless a permit for entry has been issued by a national authority. Four ASPAs are designated within the Area (Maps 1 and 2):

ASPA No. 123 Barwick and BalhamValleys, Southern Victoria Land (Maps 1, 2);

ASPA No. 131 Canada Glacier, Lake Fryxell, Taylor Valley, Victoria Land (Maps 2, 5, 24);

ASPA No. 138 Linnaeus Terrace, Asgard Range, Victoria Land (Maps 2, 18);

ASPA No. 154 Botany Bay, Cape Geology, Victoria Land (Map 1);

ASPA No. 172 Lower Taylor Glacier and Blood Falls, Taylor Valley, McMurdo Dry Valleys, Victoria Land (Maps 1, 2, 8, 17).

7. Code of Conduct

The Code of Conduct in this section is the main instrument for the management of activities in the Area. It outlines the overall management and operational principles for the Area.

In addition, further guidance is provided in the *General Environmental Guidelines for the McMurdo Dry Valleys* (Appendix A), *Environmental Guidelines for Scientific Research* (Appendix B), and in the List of Facilities Zone (Appendix C), Scientific Zones (Appendix D), Restricted Zones (Appendix E), and the Visitor Zone (Appendix F). All visitors to the McMurdo Dry Valleys should be aware of the *General Environmental Guidelines* in Appendix A, as a minimum, before entering the Area.

7(i) Access to and movement within the Area

The Area is large and has numerous potential access points. Access to the Area is normally made by helicopter from Ross Island, or over sea ice via New Harbor or Marble Point. Where practical, designated helicopter landing sites should be used: these are listed and shown on maps in Appendices C-F describing the management zones. Designated landing sites within ASPAs are defined and mapped in their relevant Management Plans. Where designated landing sites are unavailable, previously used landing sites should be selected when possible. Where it is expected that helicopters will be used for repetitive access to a particular location, consideration should be given to establishing a designated site for landing. Such suggestions should be referred to the Management Group. Overflight restrictions apply over ASPA No. 123 in the Barwick and Balham Valleys, ASPA No. 131 at Canada Glacier, ASPA No. 154 at Botany Bay, and over the Don Juan Pond and Victoria Valley Sand Dunes Restricted Zones.

All pedestrian access routes and movement within the Area should be undertaken so as to minimize disturbance to the soil and vegetated surfaces. There are a number of walking routes in the Area. In the Taylor Valley, these include routes between F-6 Camp and Lake Fryxell Camp, F-6 Camp and Lake Hoare Camp, Lake Hoare Camp and Lake Fryxell Camp, and Lake Hoare Camp and Lake Bonney Camp. There is a route from the edge of Lake Fryxell to the weir at Canada Stream. There are also routes outside the immediate vicinity of F-6, Lake Fryxell, Lake Bonney, and Lake Hoare camps. A route is defined to manage pedestrian movements within the Taylor Valley Visitor Zone (Appendix F). In the Wright Valley, there is a route between the Vanda Weir and the Vanda Huts. A loosely defined route exists along the Onyx River between Lake Vanda and Lake Brownworth, and tracks from overland vehicles moving along this route in the 1970’s remain in evidence.

In some places where there has been sustained activity, foot tracks have developed in loose moraine soils, forming well-defined routes such as may be found near Facilities Zones and at field sites such as along the northern margin of the lower Taylor Glacier. In such cases, pedestrians should by preference use the existing tracks, unless it becomes evident that to do so would be either unsafe or result in greater impact than following an alternative route.

The use of vehicles within the Area should be restricted to lake ice or sea ice except where specifically authorized to operate on land at Marble Point (Map 11), New Harbor (Maps 3 and 14), and Cape Roberts (Map 13), where vehicles should use existing vehicle tracks.

Access into Restricted Zones should be avoided unless required for compelling reasons, and should be coordinated with National Programs operating within the Area.

Access by tourists and non-governmental expeditions should only be made to the Taylor Valley Visitor Zone in accordance with the guidelines adopted in Appendix F, and shall be coordinated in advance with National Programs operating within the Area.

7(ii) Activities that may be conducted in the Area

Activities which may be conducted in the area include scientific research; operations in support of science; media, arts, education or other official national program visitors; management activities including maintenance or removal of facilities; and tourism visits within the Visitor Zone, where these activities do not jeopardize the values of the Area.

All activities in the McMurdo Dry Valleys should be conducted in such a manner as to minimize impacts on the environment. Alternative energy sources (e.g. solar, wind, fuel cells) should be used wherever practicable in order to minimize fossil fuel usage. Specific guidelines for the conduct of activities in the Area are provided in Appendices A-E.

Tourism and non-governmental expeditions should additionally ensure their activities have minimal impact on the scientific activities being conducted within the Area, and are carried out in accordance with the Antarctic Treaty Visitor Site Guide: Taylor Valley (Appendix F).

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

Care should be exercised when locating and establishing installations to minimize their impact on the environment. Consideration should be given to maximizing the use of existing facilities or sharing those of other programs before new facilities are constructed, and the footprint of all installations should be kept to the minimum practicable. Past installation sites should be re-used where possible and appropriate. In general, permanent or semi-permanent structures should not be installed outside of Facilities Zones, unless they are small in size and pose no significant threat to the values of the Area (e.g. an Automatic Weather Station (AWS) or a small solar- and battery-powered radio repeater with minimal associated infrastructure).

All installations should be maintained while operational and removed when no longer necessary. Installations should be identified by the National Program responsible, name of the principal investigator and year of installation. The types of installations and their coordinates should be recorded, with information provided to the responsible National Program and then shared by the Management Group.

National Programs should exchange information though the Management Group on proposals for new installations in advance of their construction, with the aim of coordinating activities and minimizing the need for new or potentially disruptive or duplicative installations.

7(iv) Field camps

In the McMurdo Dry Valleys, a field camp is considered to be a small temporary camp set up for research in a field season, and generally may comprise a number of tents and include temporary shelters for laboratory work or cooking. Field camps should generally only be established when the work they are intended to support cannot be accomplished practically by access from within one of the Facilities Zones.

Care should be exercised when locating and establishing field camps to minimize their impact on the environment. Consideration should be given to maximizing the use of past or existing field camp sites, or sharing those of other programs before new field camps are established, and the footprint of all field camps should be kept to the minimum practicable.

All field camps should be maintained while operational and removed when no longer necessary. Special care should be taken to secure camp equipment from dispersal by wind.

The coordinates of field camp sites should be recorded, with information provided to the responsible National Program and then shared by the Management Group.

Designated field camp sites outside of Facilities Zones or other zones within the Area are listed in Table 5.

Table 5: Designated field camp sites outside of Facilities Zones or other zones within the Area.

Name	**RP[1]**	**Location**	**Location Description**	**Field camp description**
Blood Falls field camp site	US	77°43.24' S 162°16.29' E 1 helicopter landing site at above location	Northwestern shore of Lake Bonney ~100 m from the terminus of Taylor Glacier and Blood Falls (see Map 8 Inset 1).	Slopes extending ~100 m upslope above the lake shoreline and for ~200 m northeast from Lawson Creek to a permanent survey benchmark (TP02) ~20 m from the lake shore. Tent sites are marked by stone circles. The designated helicopter landing site is located close to a cluster of tent sites in the southwest part of the field camp site.

1. Party responsible for maintenance

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

Taking or harmful interference with native flora or fauna is prohibited, except in accordance with a permit issued under Article 3 of Annex II to the Protocol by the appropriate national authority specifically for that purpose. Where animal taking or harmful interference is involved, this should, as a minimum standard, be in accordance with the Scientific Committee on Antarctic Research (SCAR) Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica.

To help maintain the ecological and scientific values of the Area visitors should take special precautions against the introduction of non-native species. Of particular concern are introductions from other Antarctic sites, including stations, or from regions outside Antarctica. Visitors should ensure that sampling equipment and markers brought into the Area are clean. Visitors should thoroughly clean all equipment (including backpacks, carry-bags and tents), clothing and footwear before entering the Area. Visitors should also be aware of the risk of transfer of species from one part of the Dry Valleys to another, which may also affect the values of the Area. In particular, visitors should aim to minimize the movement of soils from one site to another within the Dry Valleys by cleaning their equipment (e.g. camping and sampling equipment, vehicles, footwear) before transfer to another site.

7(vi) Collection or removal of material found in the Area

Material not covered by 7(v) above should only be collected or removed from the Area for scientific and associated educational purposes or essential management purposes and should be limited to the minimum necessary for those needs. Any meteorites taken are to be collected and curated according to accepted scientific standards, and made available for scientific purposes. Material of human origin likely to compromise the values of the Area should be removed unless the impact of removal is likely to be greater than leaving the material in place. If this is the case the appropriate authority should be notified.

7(vii) Waste management

All materials taken into the Area should, to the maximum extent practicable, be collected and removed from the Area when no longer required. Water used for any human purposes, including scientific purposes, should be removed and/or treated in a gray water evaporator (and residuals removed). All human wastes should be removed from the Area, including residues from incineration.

In accordance with Article 4 of Annex III to the Protocol, wastes shall not be disposed of onto ice-free areas, into freshwater systems or onto snow or in deep ice pits in ice which terminates in ice free areas or in areas of high ablation.

7(viii) Requirements for reports

Reports of activities in the Area should be maintained by the Management Group to the maximum extent practicable, and made available to all Parties.

In accordance with Article 10 of Annex V to the Protocol, arrangements shall be made for collection and exchange of reports of inspection visits and on any significant changes or damage within the Area.

Tour operators should record their visits to the Area, including the number of visitors, dates, and incidents in the Area, and submit these data in accordance with the procedures for reporting on expeditions adopted by the Antarctic Treaty Parties and IAATO.

8. Provisions for the exchange of information in advance of proposed activities

In addition to the normal exchange of information by means of the annual, national reports to the Parties of the Antarctic Treaty, and to SCAR and Council of Managers of National Antarctic Programs (COMNAP), Parties operating in the Area should exchange information through the Management Group.

9. Supporting documentation

Electronic information

National Programs operating within the Area have established a website for the purpose of providing additional information and supporting documentation on the McMurdo Dry Valleys, including up-to-date management documents, protected area management plans, maps, descriptions and policies. This information may be accessed at http://www.mcmurdodryvalleys.aq

Management Plans

Management Plan for Antarctic Specially Protected Area No. 123 Barwick and Balham Valleys, South Victoria Land.

Management Plan for Antarctic Specially Protected Area No. 131 Canada Glacier, Taylor Valley, Victoria Land.

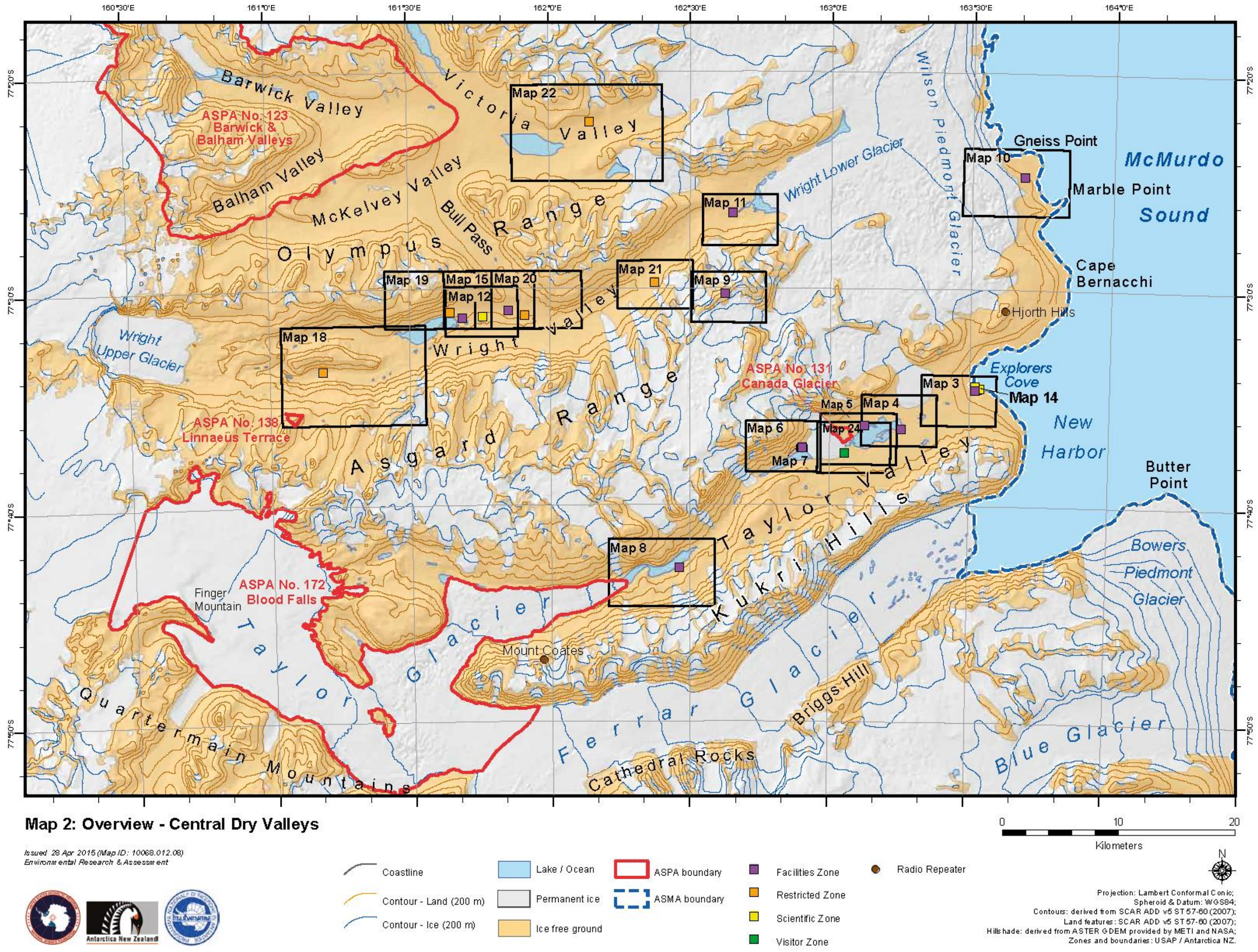
Management Plan for Antarctic Specially Protected Area No. 138 Linnaeus Terrace, Asgard Range, Victoria Land.

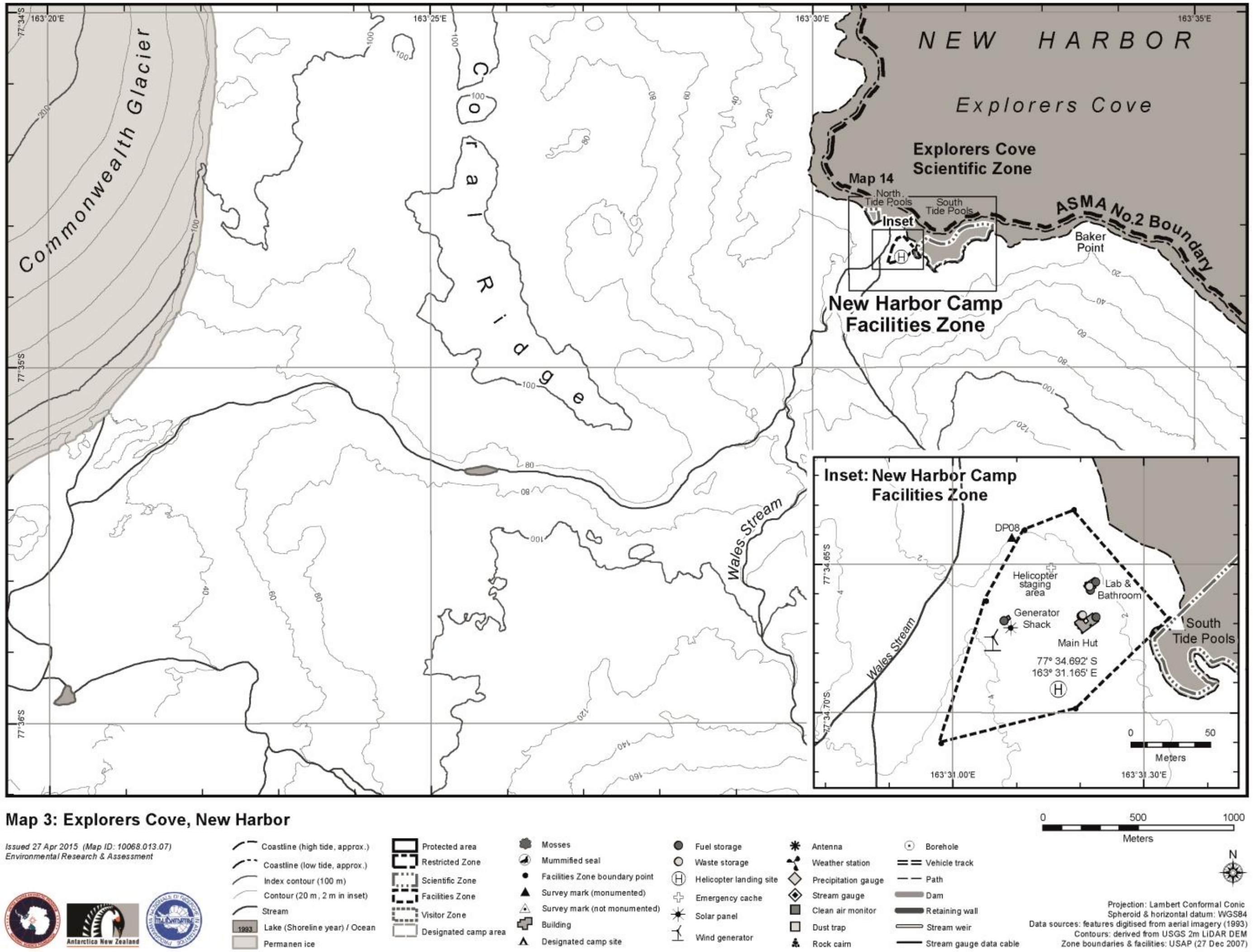
Management Plan for Antarctic Specially Protected Area No. 154 Botany Bay, Cape Geology, Victoria Land.

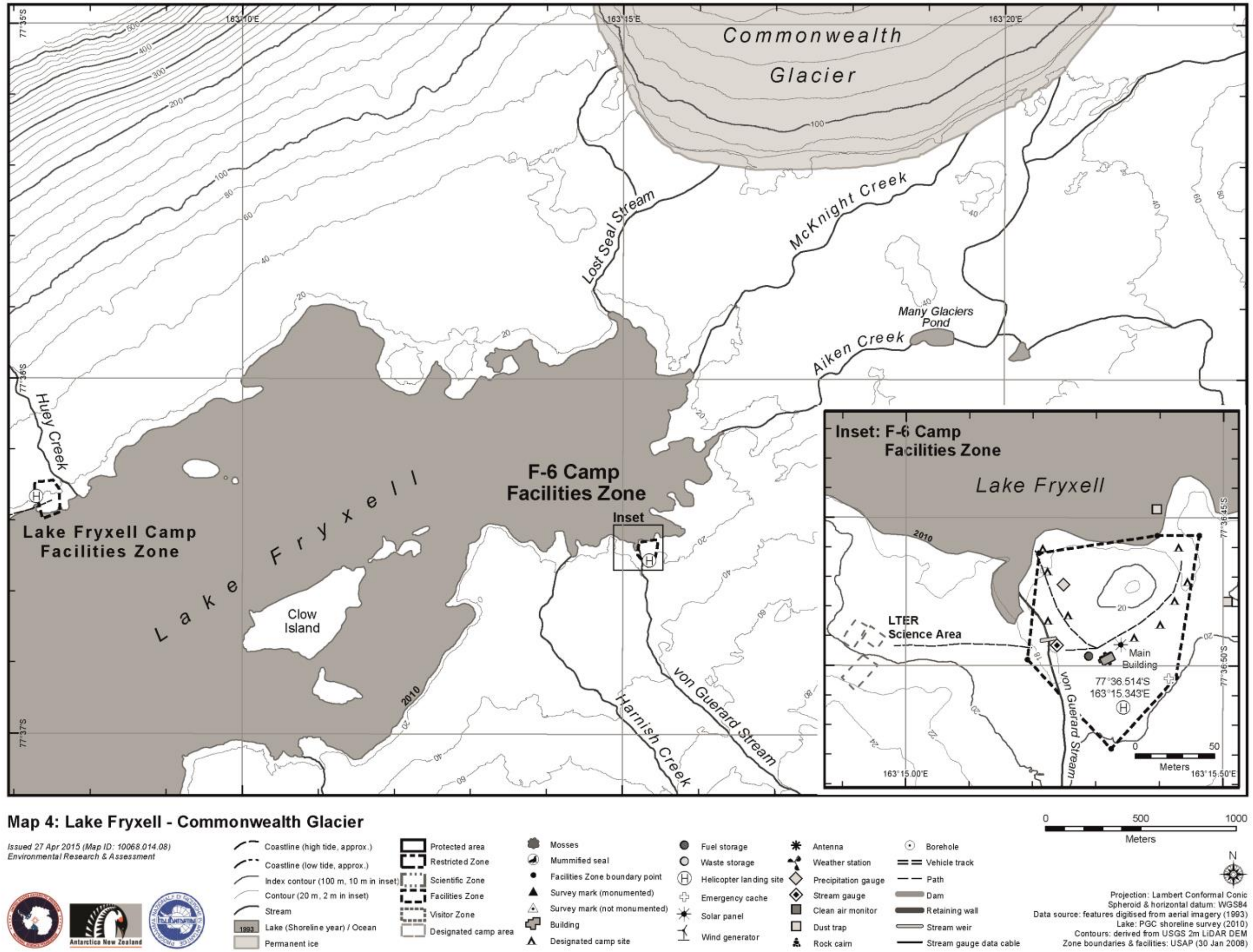
Management Plan for Antarctic Specially Protected Area No. 172 Lower Taylor Glacier and Blood Falls, Taylor Valley, McMurdo Dry Valleys, Victoria Land.

Map 1: Overview
ASMA No. 2 McMurdo Dry Valleys: boundary & zones

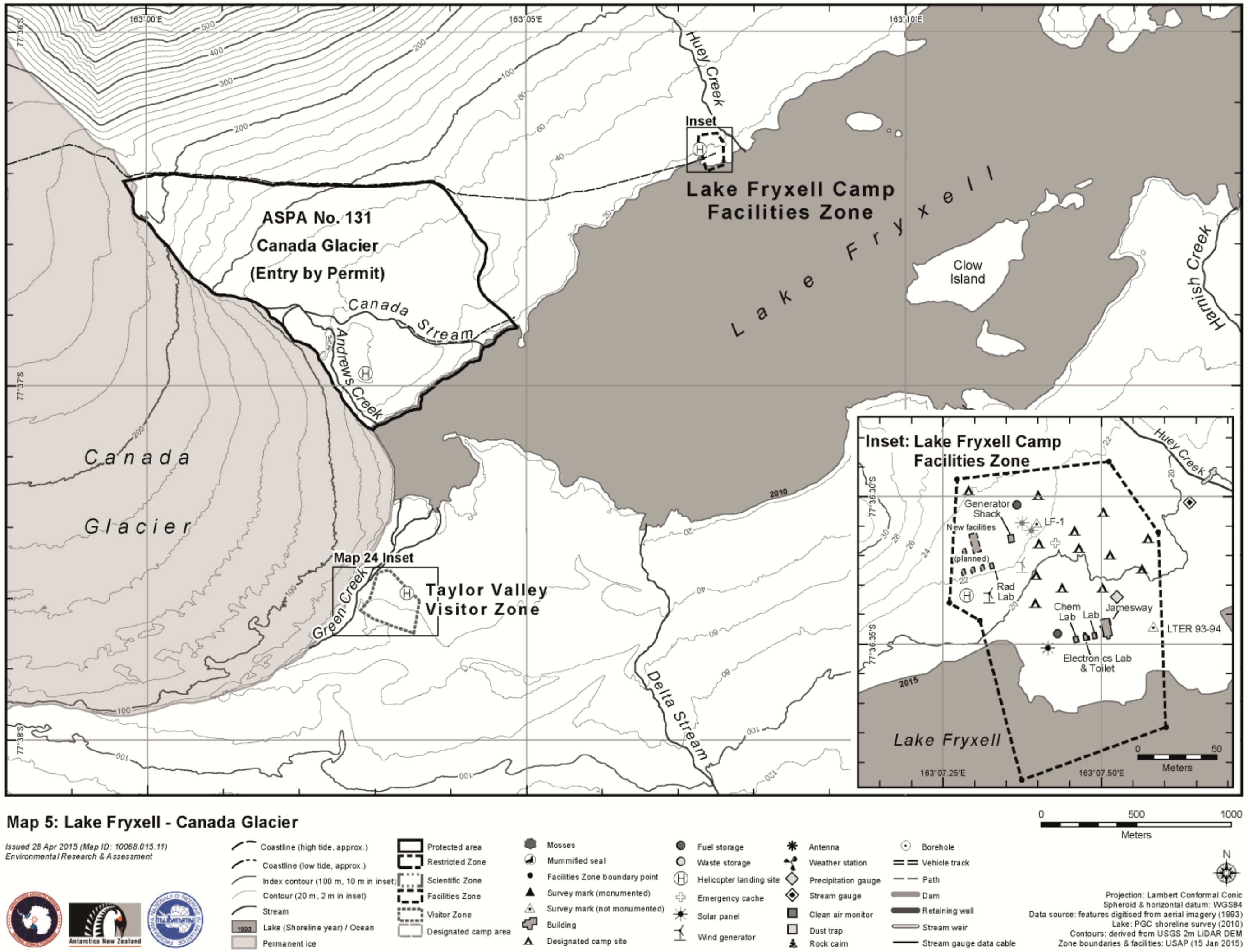
Issued 28 Apr 2015 (Map ID: 10068.011.11)
Environmental Research & Assessment


Barwick Valley
ASPA No. 123 Barwick & Balham Valleys
Balham Valley
McKelvey Valley
Victoria Valley
Bull Pass
Olympus Range
Map 22
Map 11
Map 10
Gneiss Point
McMurdo Sound
Marble Point
Wilson Piedmont Glacier
Wright Lower Glacier
Cape Bernacchi
Hjorth Hills
Map 19
Map 15
Map 20
Map 12
Map 21
Map 9
Wright Valley
Wright Upper Glacier
Map 18
ASPA No. 138 Linnaeus Terrace
Asgard Range
ASPA No. 131 Canada Glacier
Map 3
Explorers Cove
Map 14
Map 5
Map 4
Map 6
Map 24
Map 7
New Harbor
Butter Point
Taylor Valley
Kukri Hills
Map 8
Bowers Piedmont Glacier
Finger Mountain
ASPA No. 172 Blood Falls
Taylor Glacier
Mount Coates
Ferrar Glacier
Briggs Hill
Quartermain Mountains
Cathedral Rocks
Blue Glacier
Map 2: Overview - Central Dry Valleys
Issued 28 Apr 2015 (Map ID: 10068.012.08)
Environmental Research & Assessment
Coastline
Contour - Land (200 m)
Contour - Ice (200 m)
Lake / Ocean
Permanent ice
Ice free ground
ASPA boundary
ASMA boundary
Facilities Zone
Restricted Zone
Scientific Zone
Visitor Zone
Radio Repeater
Kilometers
Projection: Lambert Conformal Conic;
Spheroid & Datum: WGS84;
Contours: derived from SCAR ADD v5 ST57-60 (2007);
Land features: SCAR ADD v5 ST57-60 (2007);
Hillshade: derived from ASTER GDEM provided by METI and NASA;
Zones and boundaries: USAP / Antarctica NZ.

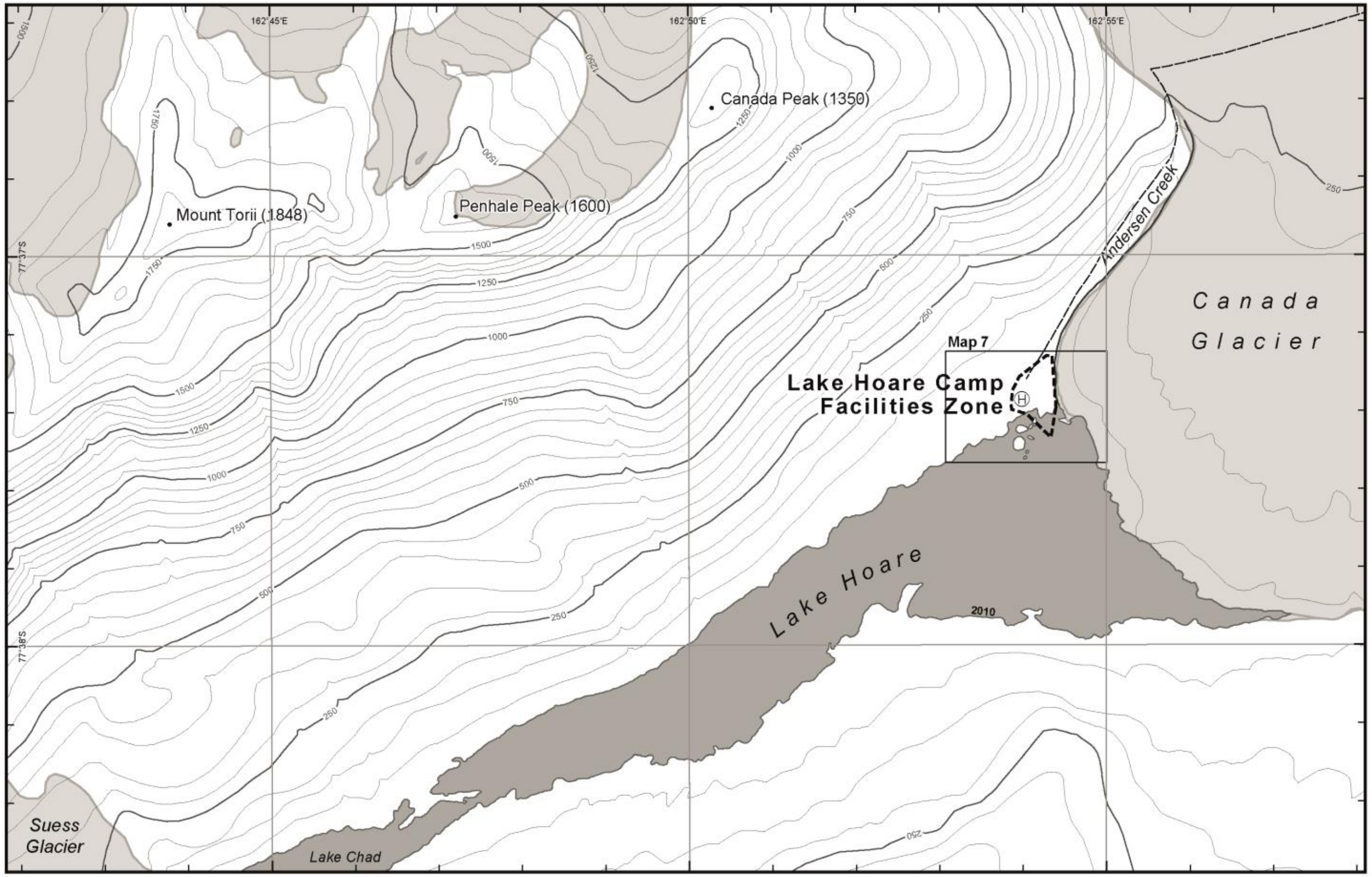

NEW HARBOR
Explorers Cove
Explorers Cove Scientific Zone
Map 14
North Tide Pools
South Tide Pools
Inset
ASMA No.2 Boundary
Baker Point
New Harbor Camp Facilities Zone
Commonwealth Glacier
Coral Ridge
Wales Stream
Inset: New Harbor Camp Facilities Zone
DP08
Helicopter staging area
Lab & Bathroom
Generator Shack
Main Hut
South Tide Pools
77° 34.692' S
163° 31.165' E
Meters
Map 3: Explorers Cove, New Harbor
Issued 27 Apr 2015 (Map ID: 10068.013.07)
Environmental Research & Assessment
Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (100 m)
Contour (20 m, 2 m in inset)
Stream
Lake (Shoreline year) / Ocean
Permanen ice
Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area
Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site
Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn
Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable
Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data sources: features digitised from aerial imagery (1993)
Contours: derived from USGS 2m LiDAR DEM
Zone boundaries & facilities: USAP (27 Dec 2007)



Commonwealth
Glacier
Lost Seal Stream
McKnight Creek
Many Glaciers Pond
Aiken Creek
Huey Creek
Lake Fryxell Camp Facilities Zone
F-6 Camp Facilities Zone
Inset
Lake Fryxell
Clow Island
Harnish Creek
von Guerard Stream
Inset: F-6 Camp Facilities Zone
LTER Science Area
Main Building
77°36.514'S
163°15.343'E
Meters
Map 4: Lake Fryxell - Commonwealth Glacier
Issued 27 Apr 2015 (Map ID: 10068.014.08)
Environmental Research & Assessment
Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (100 m, 10 m in inset)
Contour (20 m, 2 m in inset)
Stream
Lake (Shoreline year) / Ocean
Permanent ice
Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area
Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site
Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn
Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable
Meters
Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data source: features digitised from aerial imagery (1993)
Lake: PGC shoreline survey (2010)
Contours: derived from USGS 2m LiDAR DEM
Zone boundaries & facilities: USAP (30 Jan 2008)



Map 5: Lake Fryxell - Canada Glacier



Map 6: Lake Hoare, Canada Glacier

Issued 27 Apr 2015 (Map ID: 10068.016.08)
Environmental Research & Assessment

Antarctica New Zealand

Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (250 m)
Contour (50 m)
Stream
1993 Lake (Shoreline year) / Ocean
Permanent ice

Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area

Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site

Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator

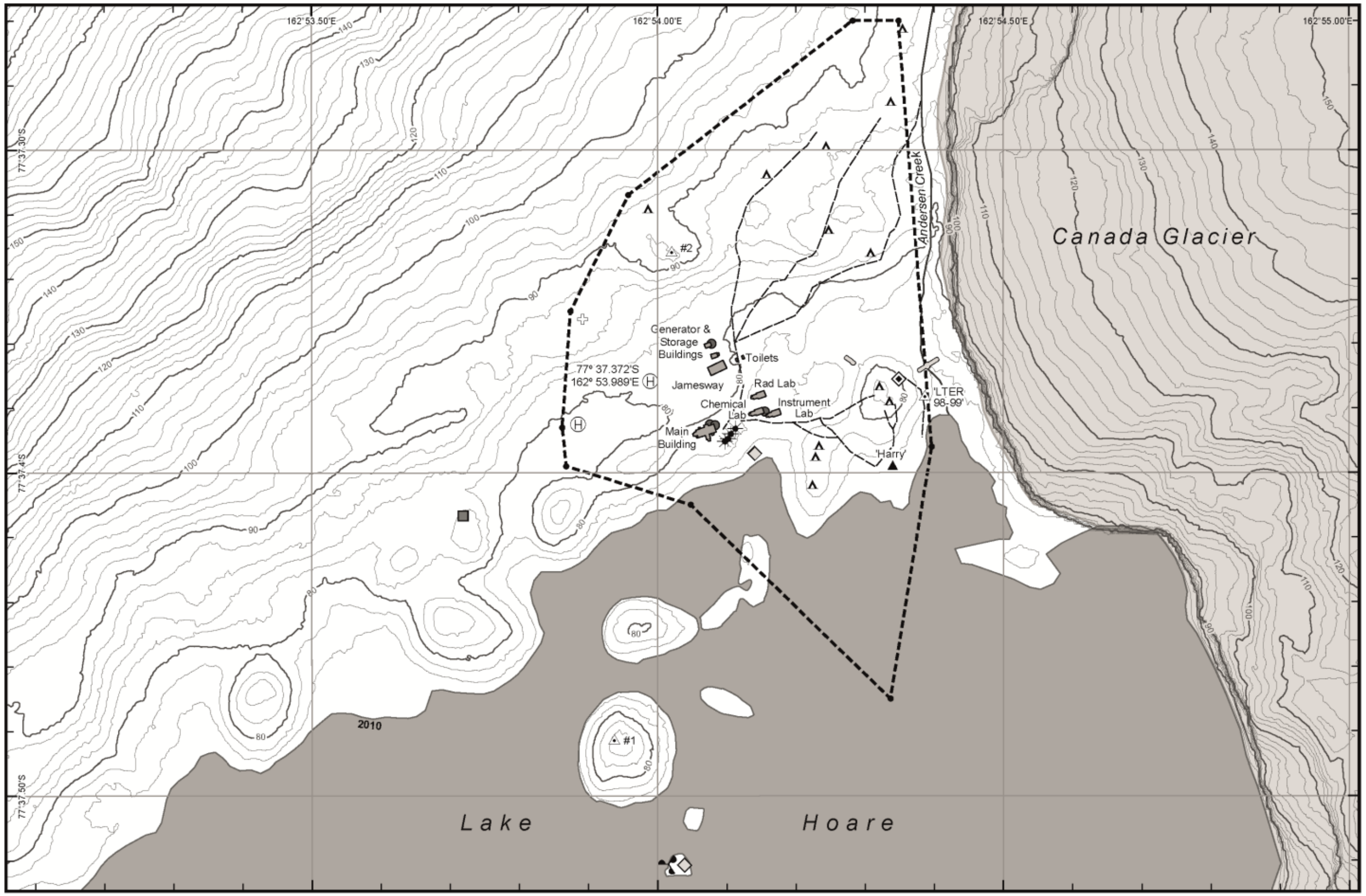
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn

Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable

0 500 1000
Meters

N

Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data source: features digitised from aerial imagery (1993)
Lake: PGC shoreline survey (2010)
Contours: derived from USGS 50K map series
Zone boundaries & facilities: USAP (31 Jan 2011)



Map 7: Lake Hoare Camp Facilities Zone

Issued 27 Apr 2015 (Map ID: 10068.017.08)
Environmental Research & Assessment

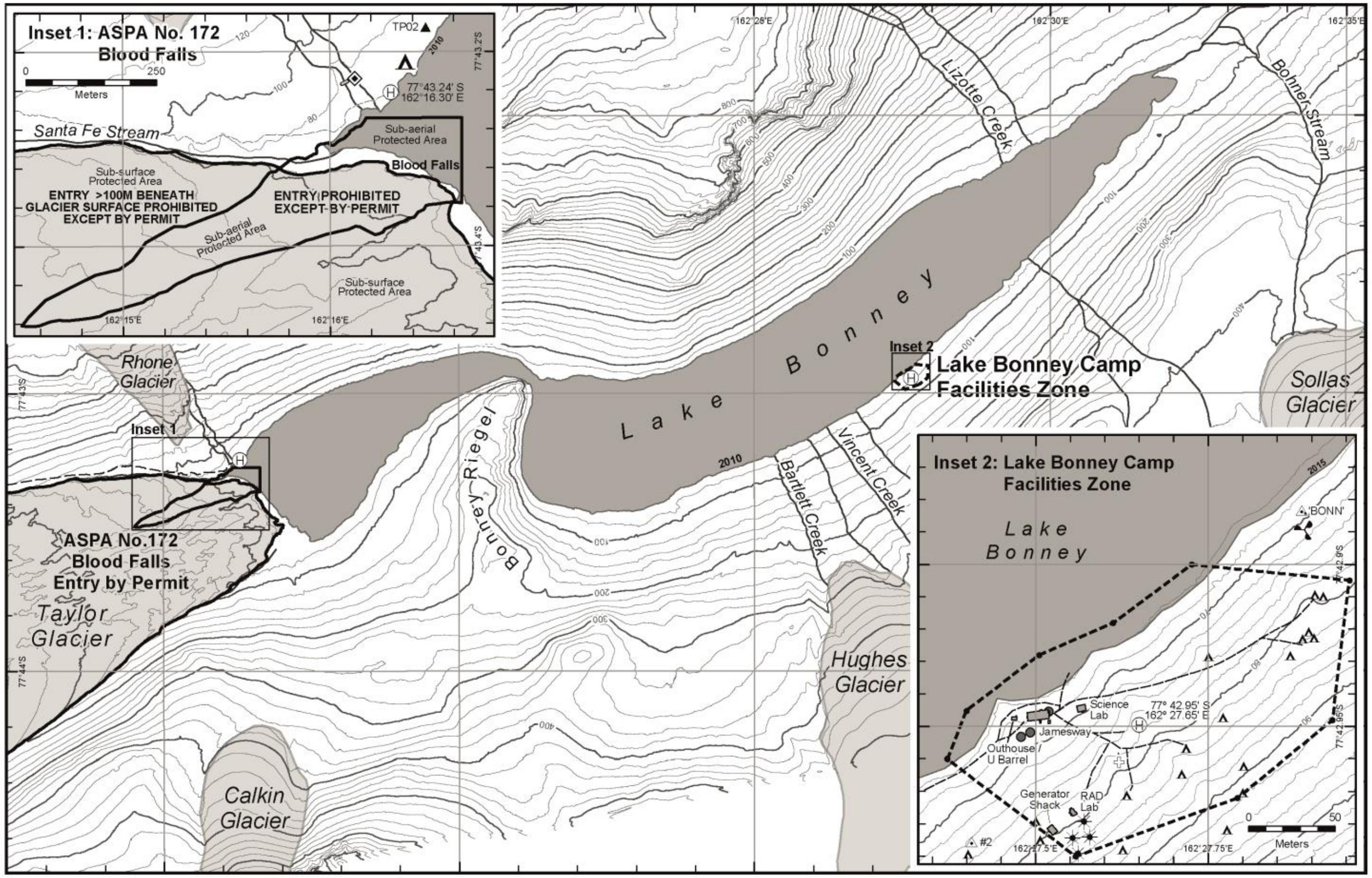
Antarctica New Zealand

Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (10 m)
Contour (2 m)
Stream
Lake (Shoreline year) / Glacier
Permanent ice
Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area
Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site
Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn
Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable

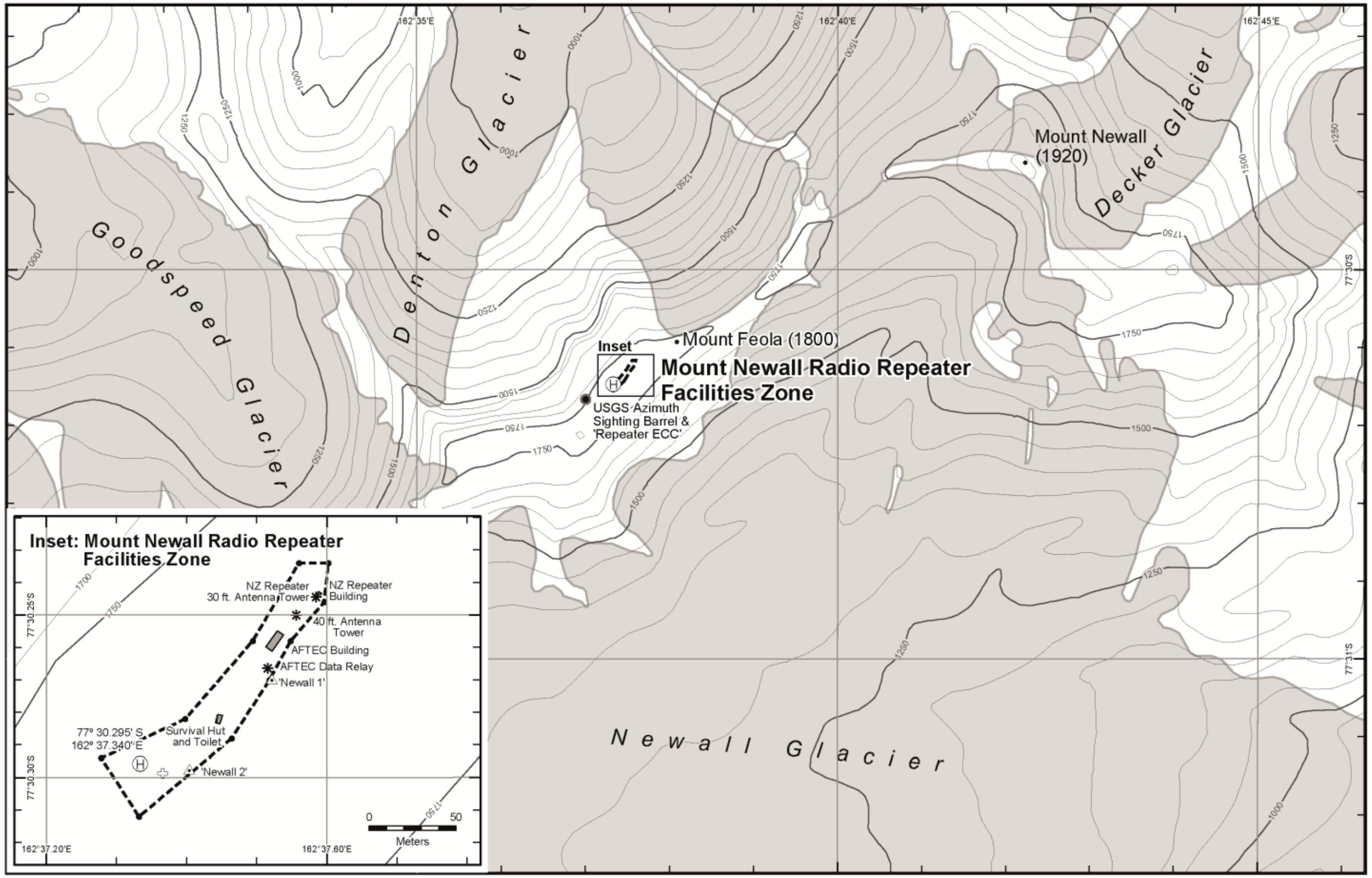
0 50 100
Meters

N

Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data source: features digitised from aerial imagery (1993)
Lake: PGC shoreline survey (2010)
Contours: derived from USGS 2m LiDAR DEM
Zone boundaries & facilities: USAP (03 Feb 2012)

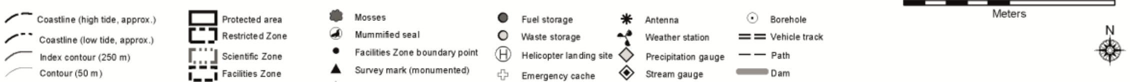


Map 8: Lake Bonney, Taylor Valley

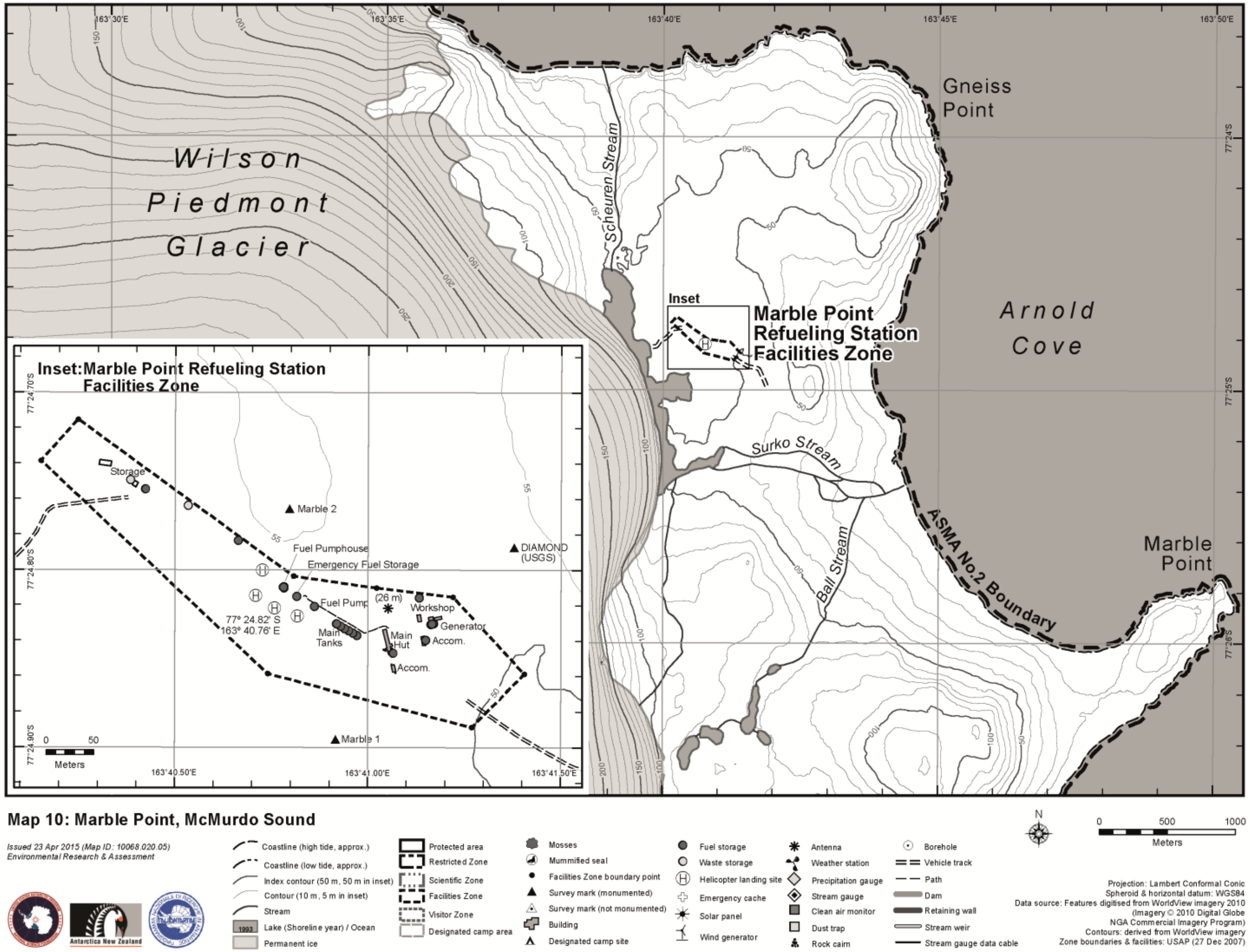


Map 9: Mount Newall, Asgard Range

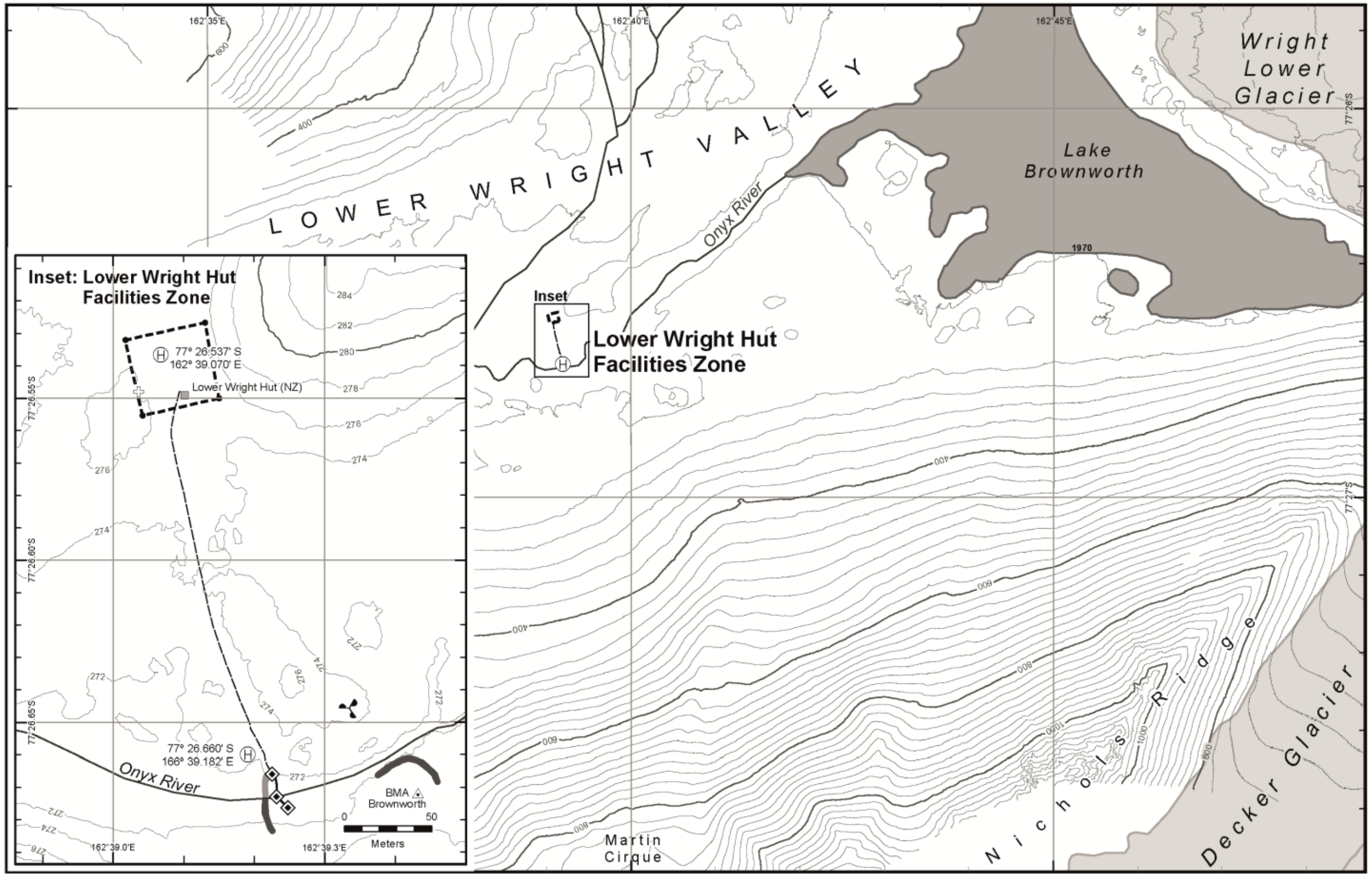
Issued 27 Apr 2015 (Map ID: 10068.019.07)
Environmental Research & Assessment



Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data source: USGS 1:50K map series
Zone boundaries & facilities: USAP (01 Feb 2008)

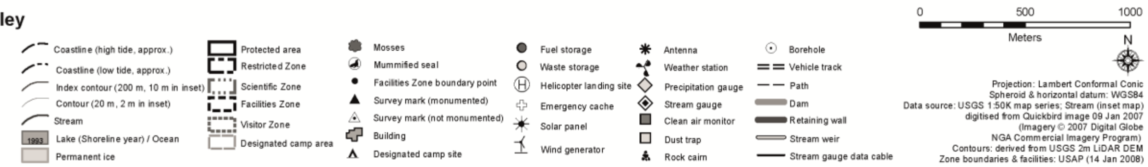


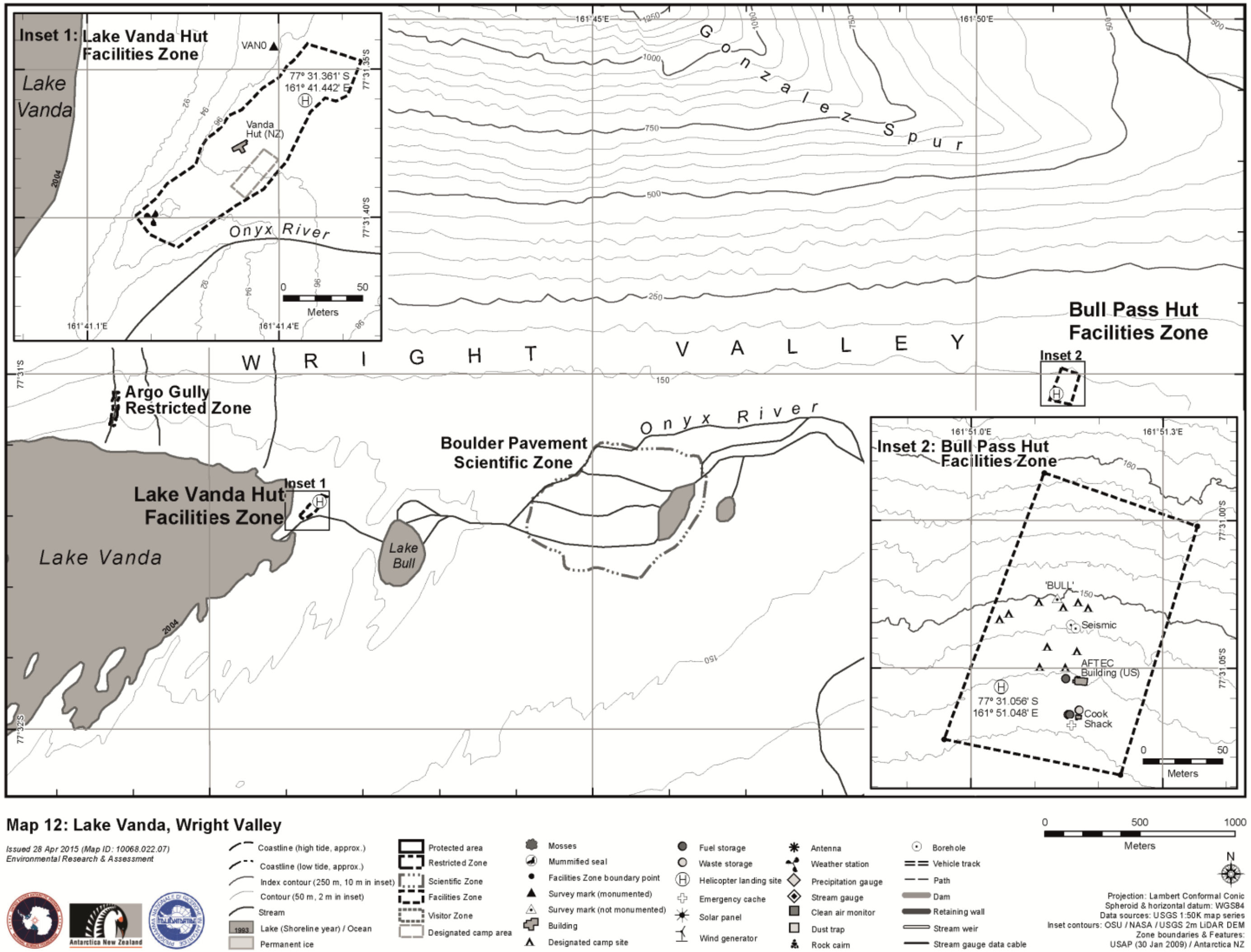
Map 10: Marble Point, McMurdo Sound



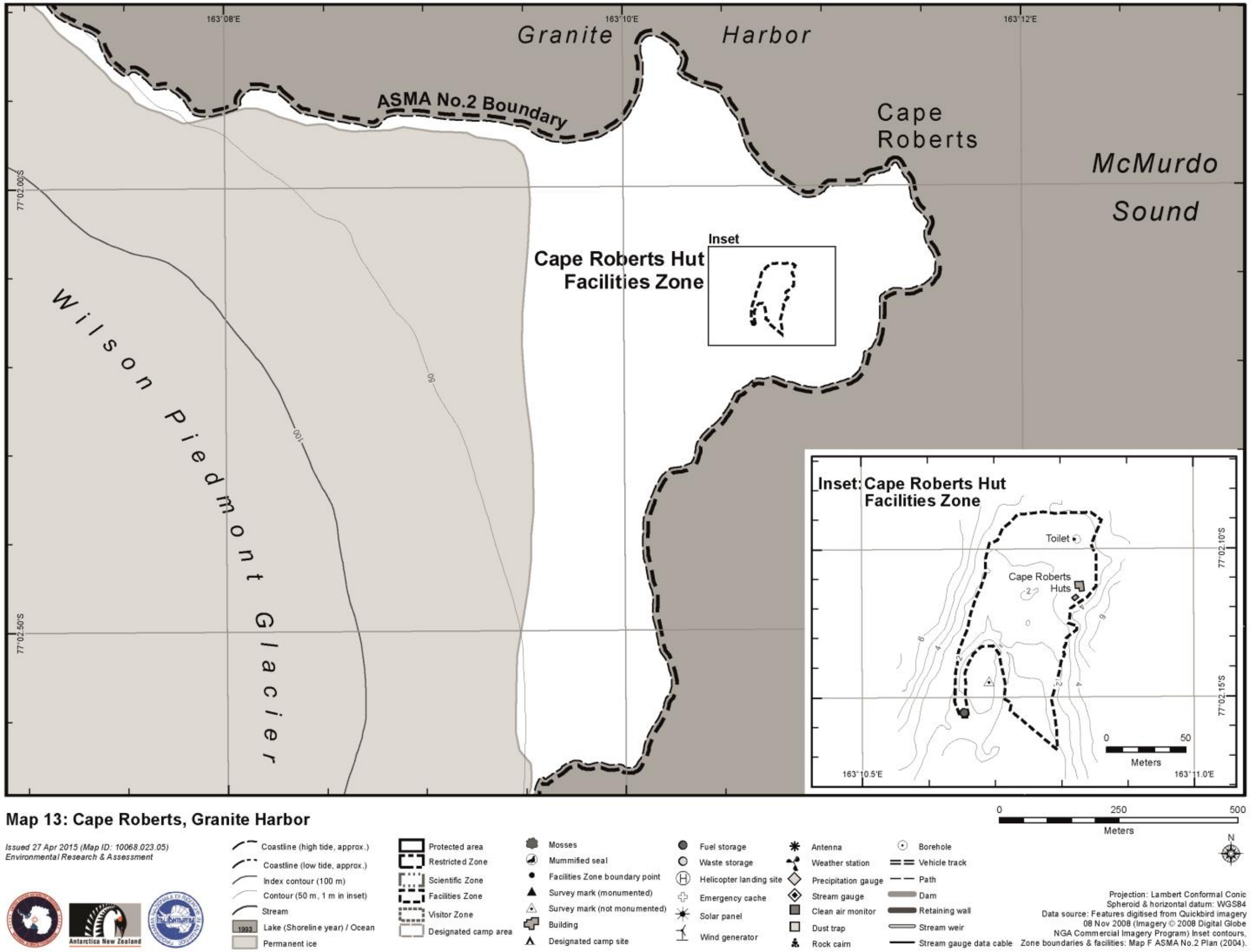
Map 11: Lower Wright Valley

Issued 27 Apr 2015 (Map ID: 10068.021.06)
Environmental Research & Assessment

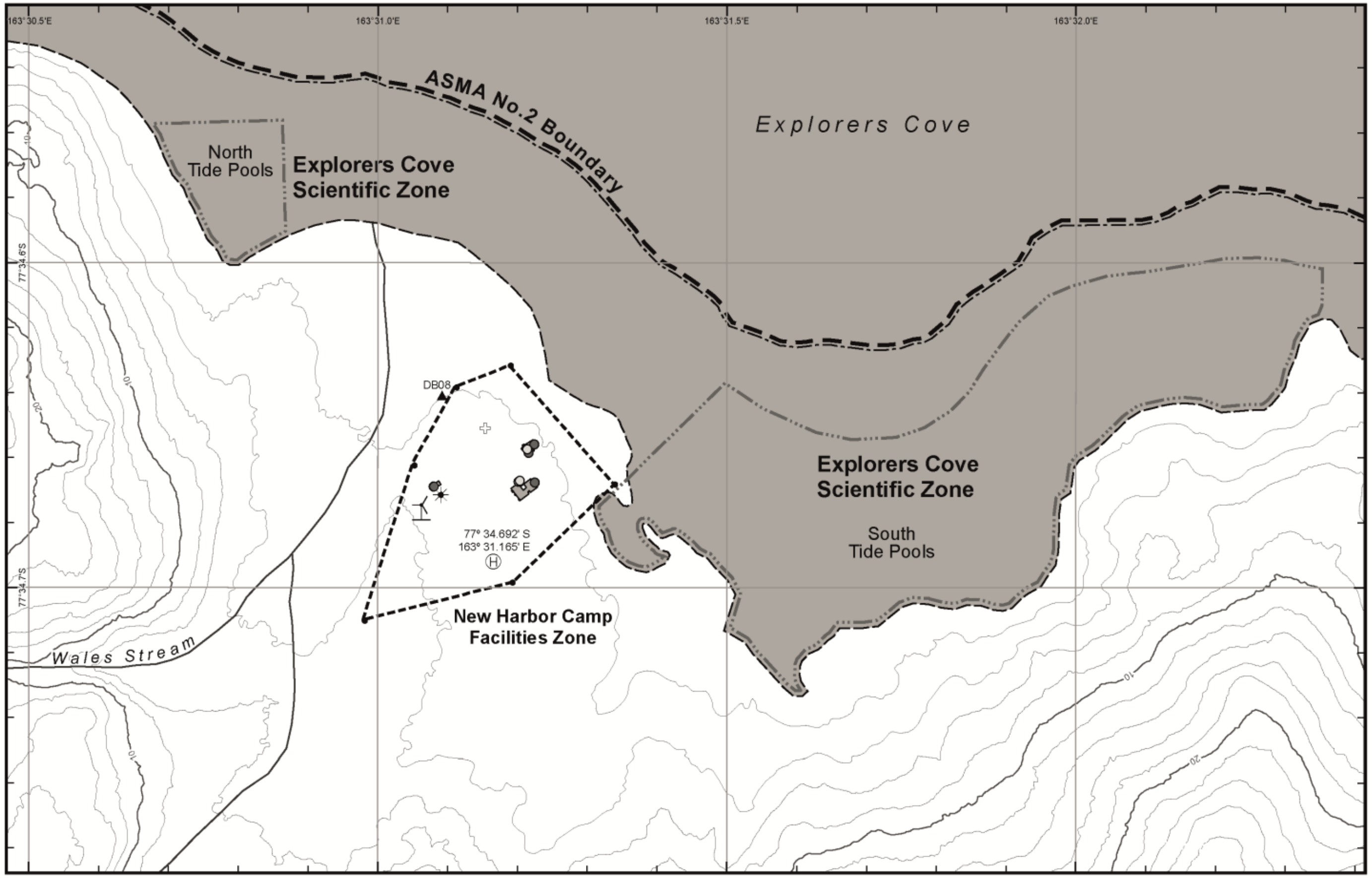




Inset 1: Lake Vanda Hut Facilities Zone
Lake Vanda
VANO
77° 31.361' S
161° 41.442' E
Vanda Hut (NZ)
Onyx River
Meters
Gonzalez Spur
WRIGHT VALLEY
Bull Pass Hut Facilities Zone
Inset 2
Argo Gully Restricted Zone
Onyx River
Boulder Pavement Scientific Zone
Inset 1
Lake Vanda Hut Facilities Zone
Lake Vanda
Lake Bull
Inset 2: Bull Pass Hut Facilities Zone
'BULL'
Seismic
AFTEC Building (US)
77° 31.056' S
161° 51.048' E
Cook Shack
Meters
Map 12: Lake Vanda, Wright Valley
Issued 28 Apr 2015 (Map ID: 10068.022.07)
Environmental Research & Assessment
Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (250 m, 10 m in inset)
Contour (50 m, 2 m in inset)
Stream
Lake (Shoreline year) / Ocean
Permanent ice
Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area
Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site
Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn
Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable
Meters
Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data sources: USGS 1:50K map series
Inset contours: OSU / NASA / USGS 2m LiDAR DEM
Zone boundaries & Features:
USAP (30 Jan 2009) / Antarctica NZ
Antarctica New Zealand

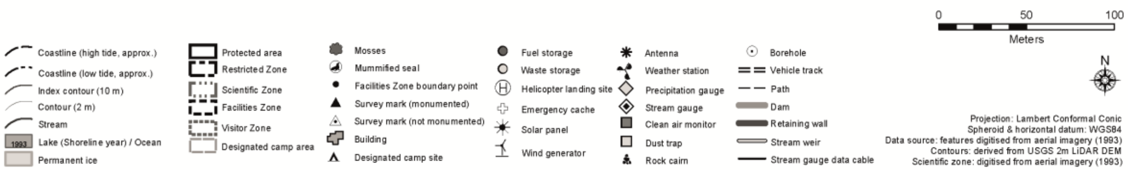


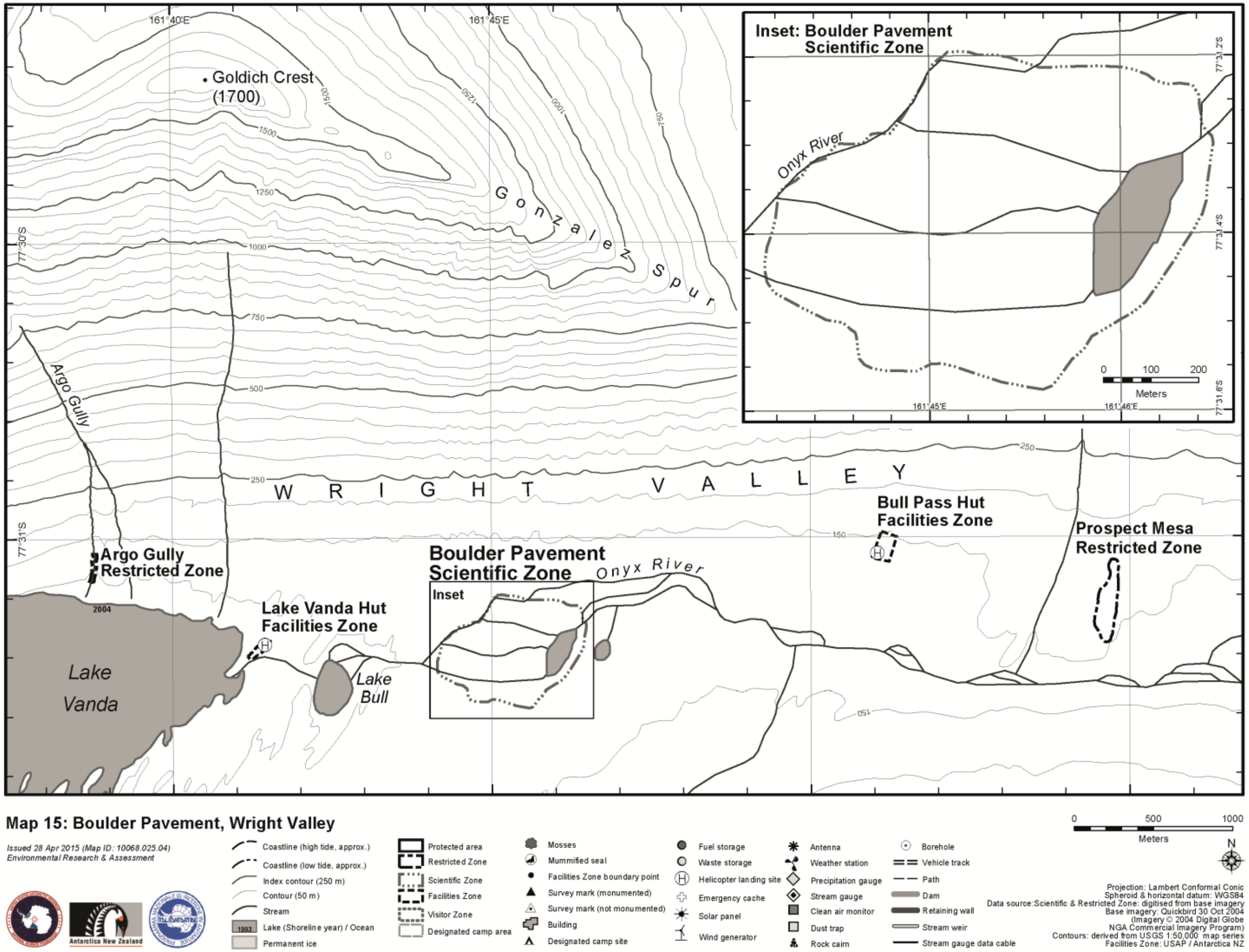
Map 13: Cape Roberts, Granite Harbor



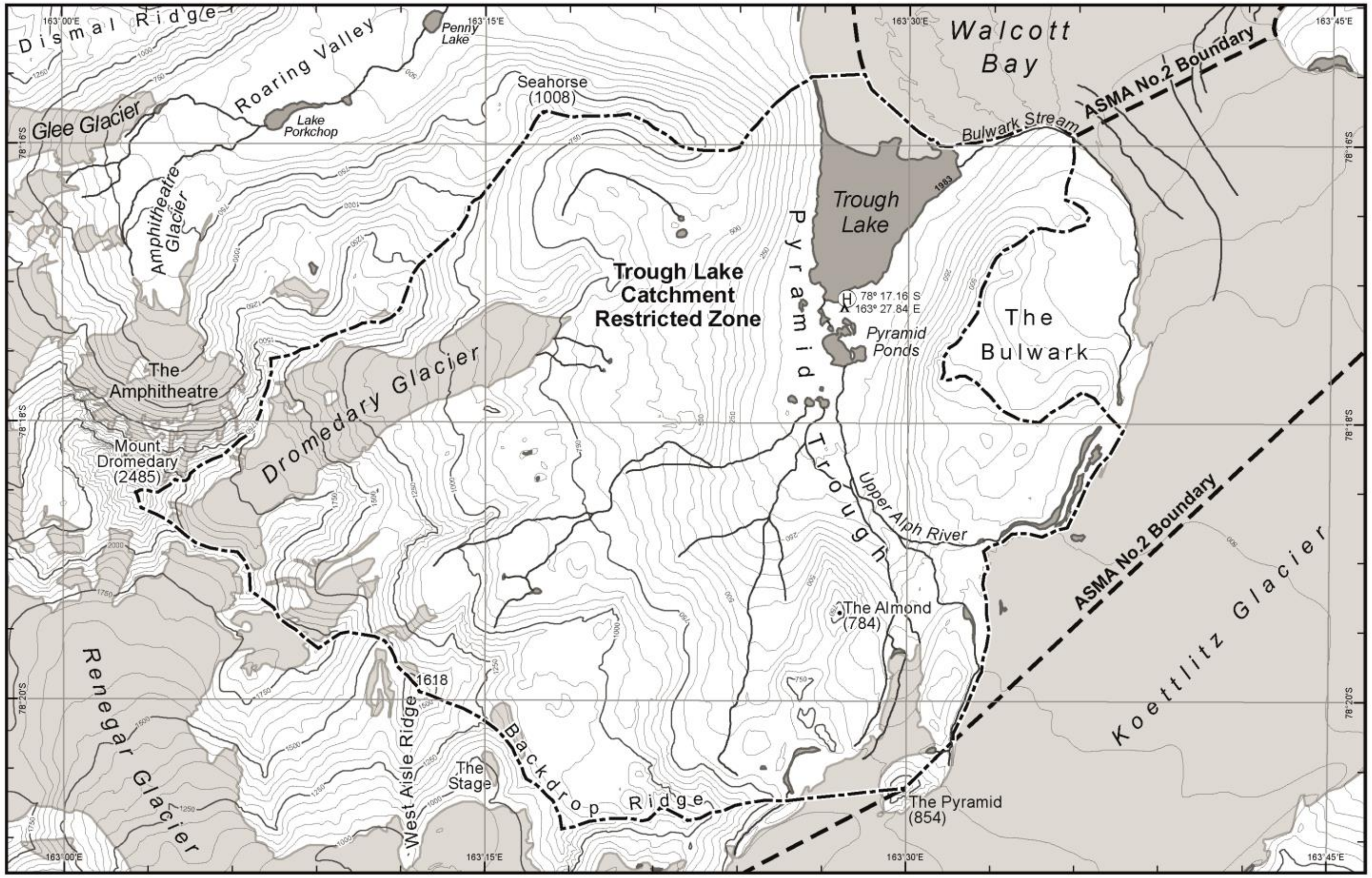
Map 14: Explorers Cove Scientific Zone

Issued 27 Apr 2015 (Map ID: 10068.024.06)
Environmental Research & Assessment





Map 15: Boulder Pavement, Wright Valley



Map 16: Trough Lake Catchment Restricted Zone

Issued 23 Apr 2015 (Map ID: 10068.026.07)
Environmental Research & Assessment

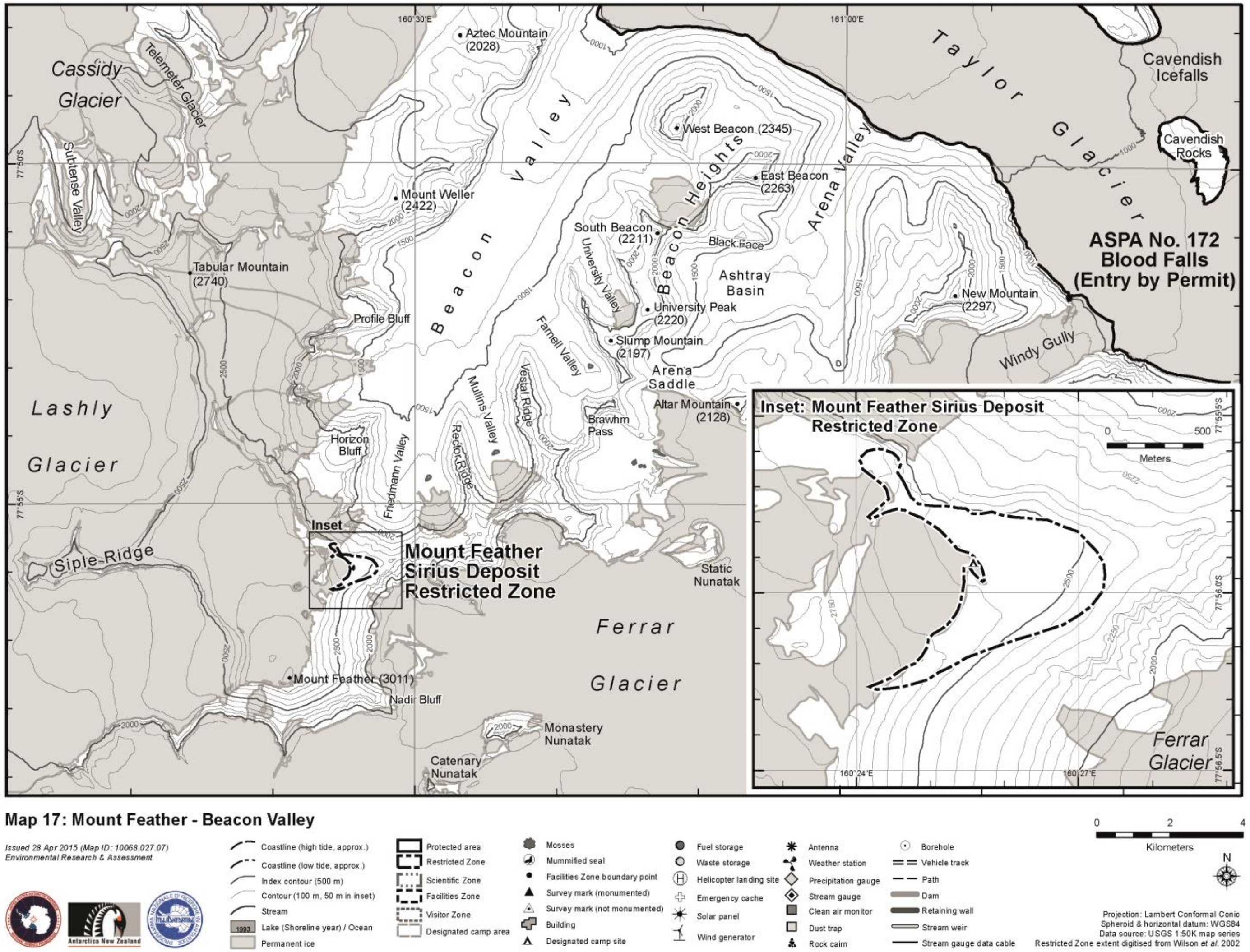
Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (250 m)
Contour (50 m)
Stream
1993 Lake (Shoreline year) / Ocean
Permanent ice
Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area
Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site
Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn
Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable

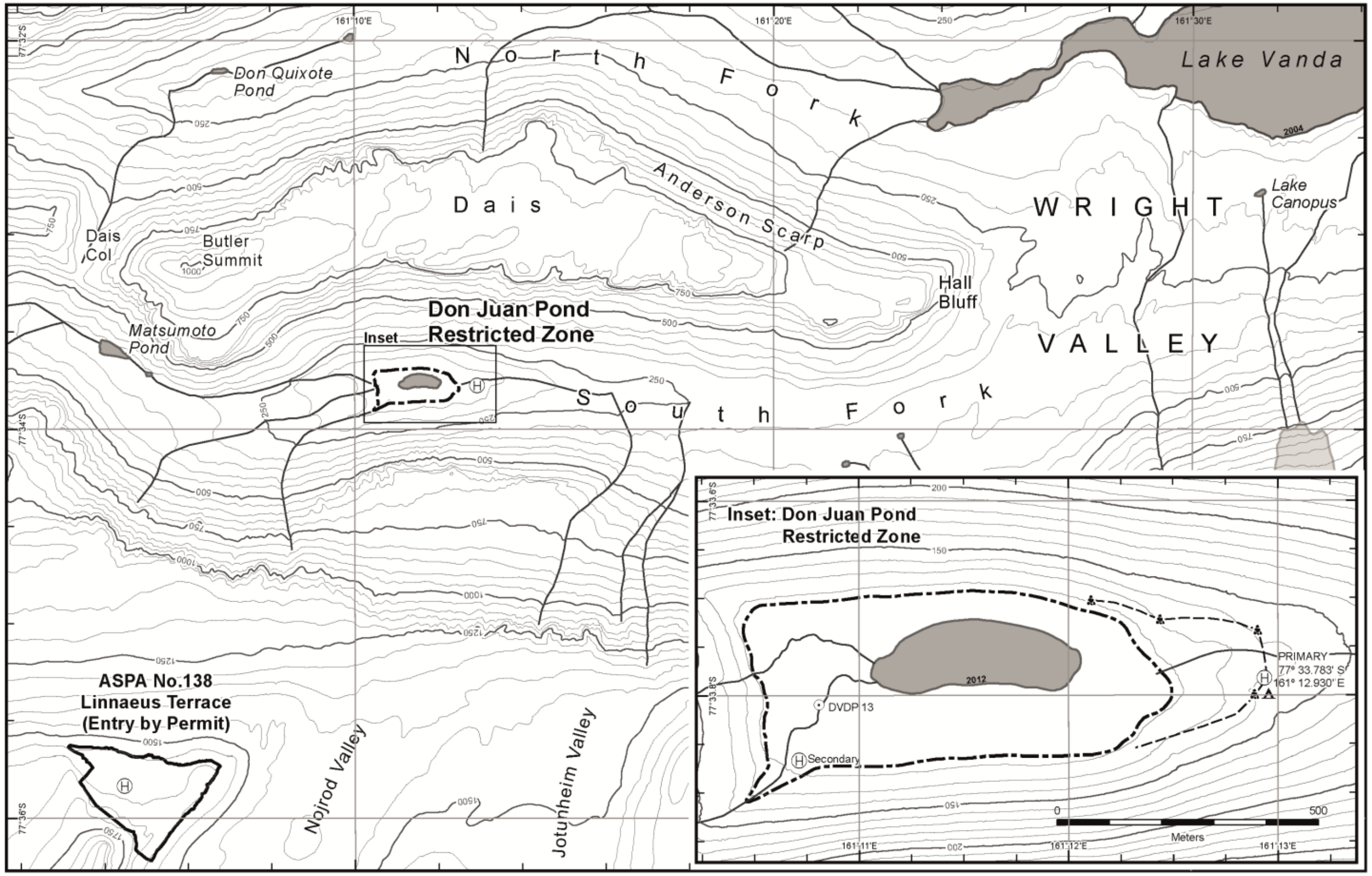
0 1 2 Kilometers

N

Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data source: USGS 1:50K map series
Restricted Zone extent: digitised from USGS contours

Antarctica New Zealand

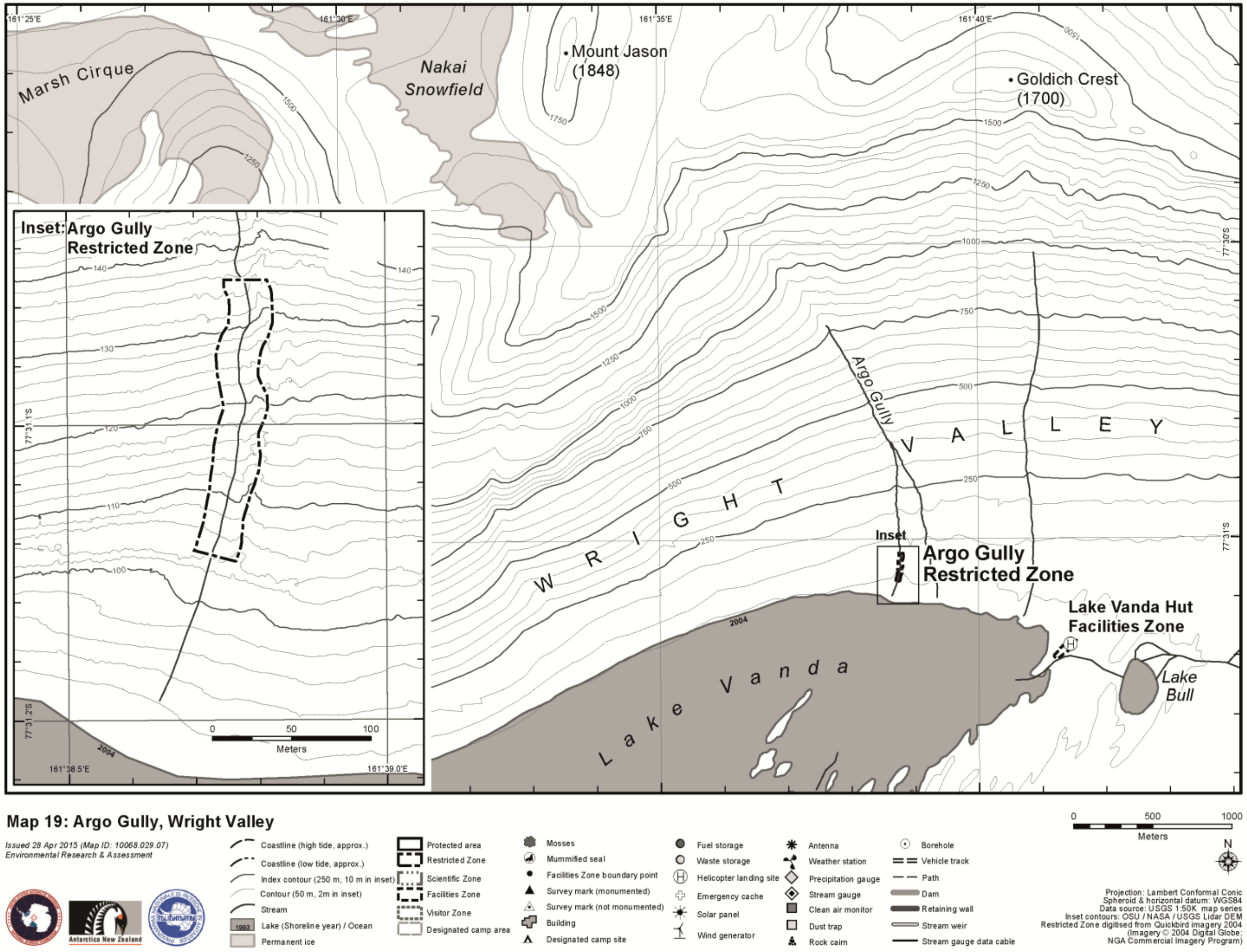

Cassidy Glacier
Telemeter Glacier
Subtense Valley
Aztec Mountain (2028)
Mount Weller (2422)
Tabular Mountain (2740)
Profile Bluff
Beacon Valley
West Beacon (2345)
East Beacon (2263)
Beacon Heights
South Beacon (2211)
University Valley
Black Face
Ashtray Basin
University Peak (2220)
Slump Mountain (2197)
Farnell Valley
Arena Valley
Arena Saddle
Altar Mountain (2128)
Taylor Glacier
Cavendish Icefalls
Cavendish Rocks
ASPA No. 172 Blood Falls (Entry by Permit)
New Mountain (2297)
Windy Gully
Lashly Glacier
Horizon Bluff
Friedmann Valley
Mullins Valley
Vestal Ridge
Recoil Ridge
Brawhm Pass
Siple Ridge
Inset
Mount Feather Sirius Deposit Restricted Zone
Static Nunatak
Ferrar Glacier
Mount Feather (3011)
Nadir Bluff
Monastery Nunatak
Catenary Nunatak
Inset: Mount Feather Sirius Deposit Restricted Zone
Meters
Kilometers
Map 17: Mount Feather - Beacon Valley
Issued 28 Apr 2015 (Map ID: 10068.027.07)
Environmental Research & Assessment
Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (500 m)
Contour (100 m, 50 m in inset)
Stream
Lake (Shoreline year) / Ocean
Permanent ice
Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area
Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site
Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn
Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable
Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data source: USGS 1:50K map series
Restricted Zone extent digitised from Wilson et al. 2002



Map 18: Don Juan Pond, Wright Valley

Issued 28 Apr 2015 (Map ID: 10068.028.10)
Environmental Research & Assessment

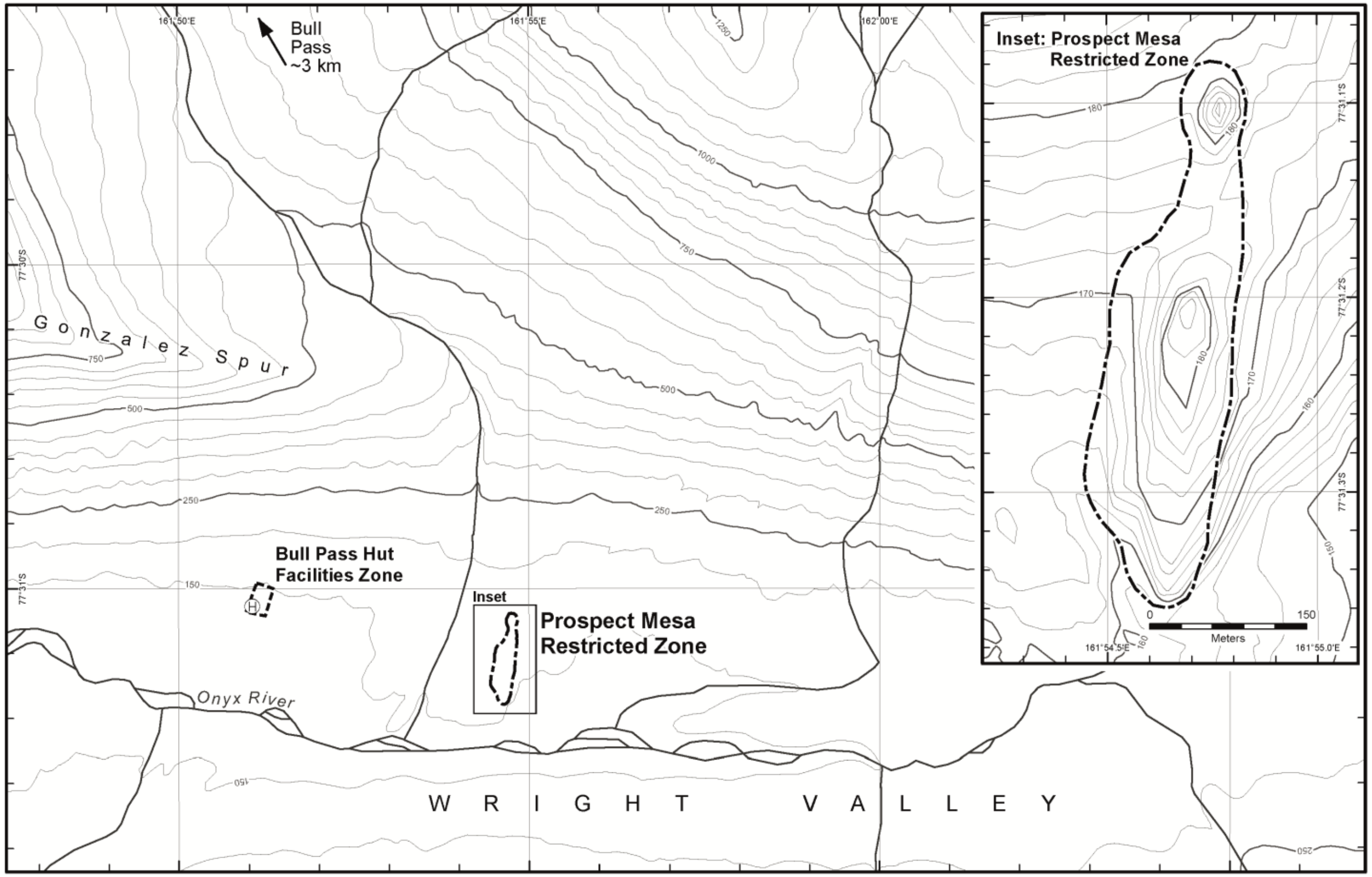
Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data source:
Contours, Stream, Lake, Glacier: USGS 1:50K map series;
Lake Vanda digitised from Quickbird imagery 31 Jan 2004;
Camp site, HLS, Cairn: US/NZ fieldwork (Jan 2012);
Contours (Inset): derived from USGS 2m LiDAR DEM;
Restricted Zone, Don Juan Pond, Stream (Inset):
digitised from WorldView-2 imagery 09 Jan 2012 (Imagery
© 2012 Digital Globe; NGA Commercial Imagery Program)



Map 19: Argo Gully, Wright Valley

Issued 28 Apr 2015 (Map ID: 10068.029.07)
Environmental Research & Assessment

Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data source: USGS 1:50K map series
Inset contours: OSU / NASA / USGS Lidar DEM
Restricted Zone digitised from Quickbird imagery 2004
(Imagery © 2004 Digital Globe;
NGA Commercial Imagery Program)



Map 20: Prospect Mesa, Wright Valley

Issued 28 Apr 2015 (Map ID: 10068.030.05)
Environmental Research & Assessment

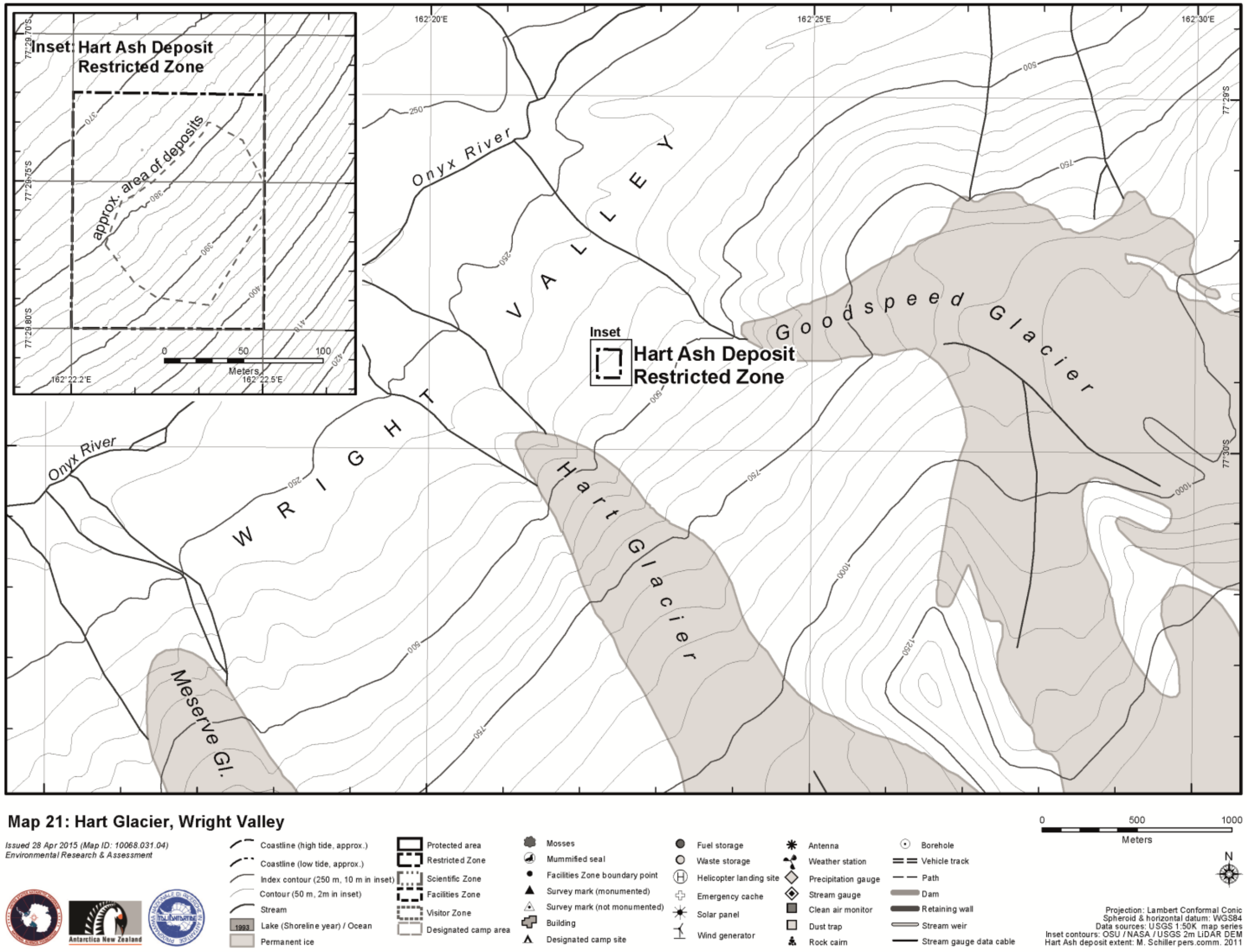
Antarctica New Zealand

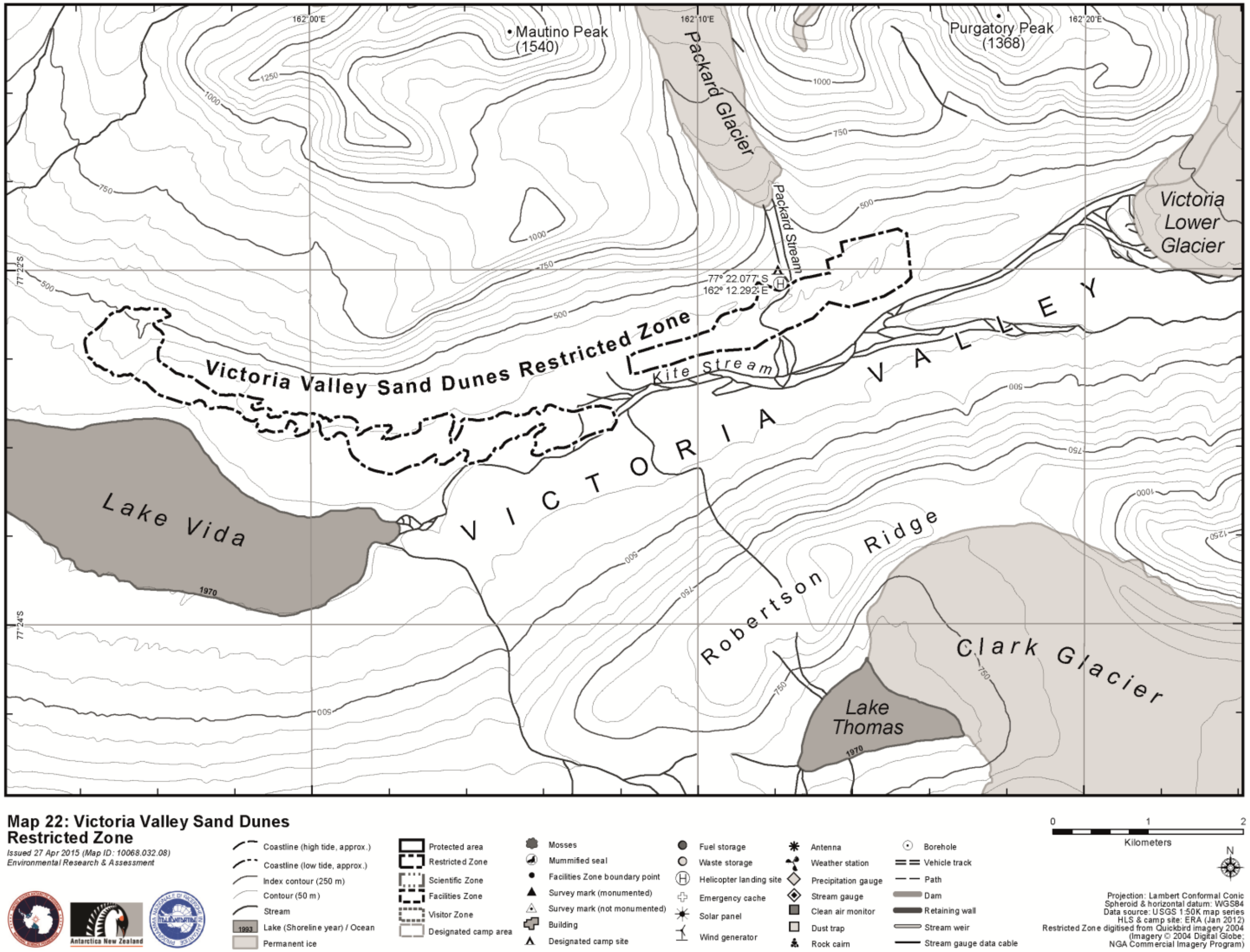
Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (250 m, 10 m in inset)
Contour (50 m, 2m in inset)
Stream
1993 Lake (Shoreline year) / Ocean
Permanent ice
Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area
Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site
Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn
Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable

0 500 1000
Meters

N

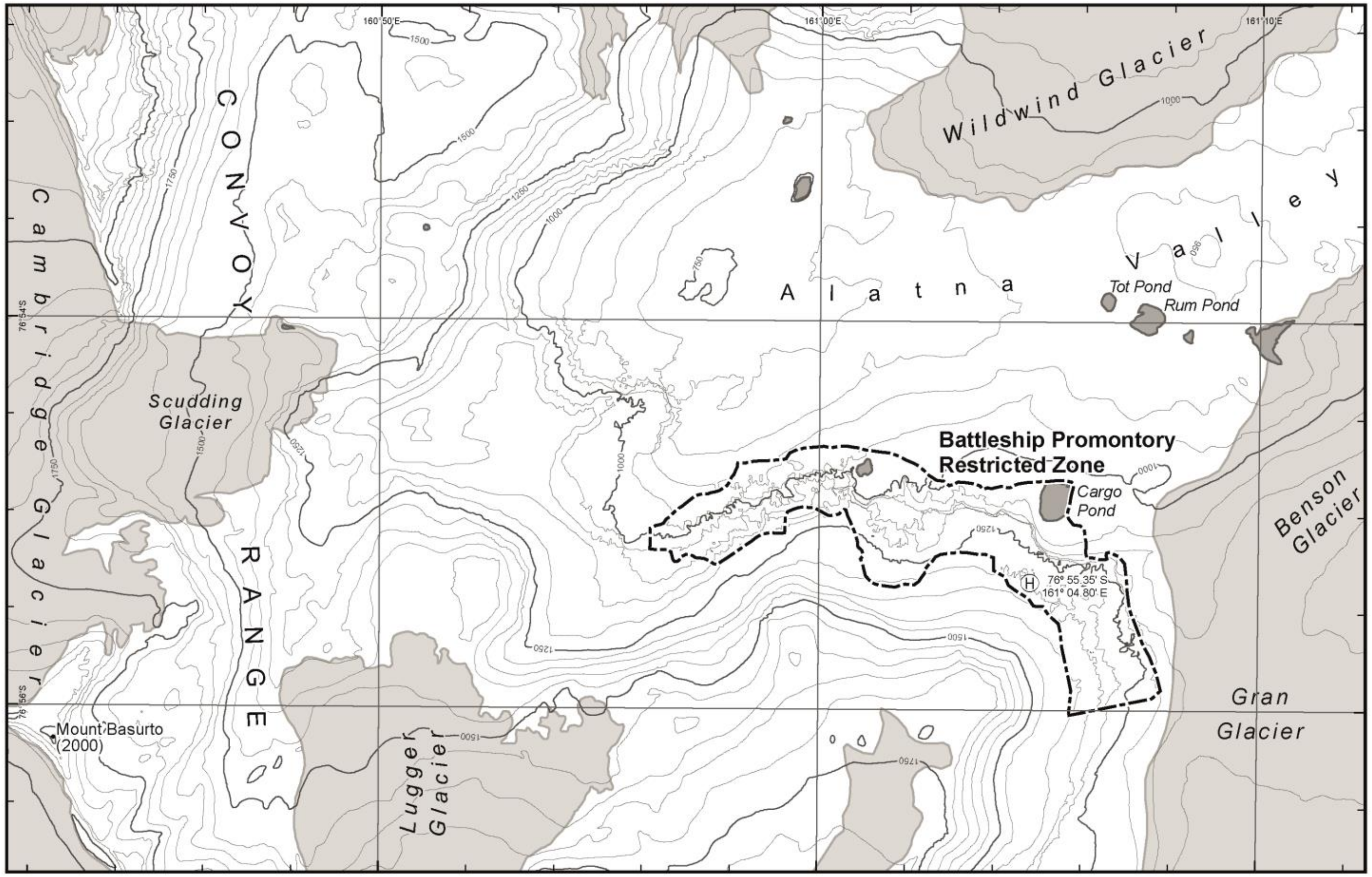
Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data source: USGS 1:50K map series
Inset contours: OSU / NASA / USGS 2m LiDAR DEM
Restricted Zone digitised from elevation data


Inset: Hart Ash Deposit Restricted Zone
approx. area of deposits
Onyx River
WRIGHT VALLEY
Inset
Hart Ash Deposit Restricted Zone
Goodspeed Glacier
Hart Glacier
Meserve Gl.
162°20'E
162°25'E
162°30'E
77°29'S
77°30'S
Map 21: Hart Glacier, Wright Valley
Issued 28 Apr 2015 (Map ID: 10068.031.04)
Environmental Research & Assessment
Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (250 m, 10 m in inset)
Contour (50 m, 2m in inset)
Stream
Lake (Shoreline year) / Ocean
Permanent ice
Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area
Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site
Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn
Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable
0 500 1000
Meters
N
Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data sources: USGS 1:50K map series
Inset contours: OSU / NASA / USGS 2m LiDAR DEM
Hart Ash deposit extent: M. Schiller pers.comm. 2011



Map 22: Victoria Valley Sand Dunes Restricted Zone

Issued 27 Apr 2015 (Map ID: 10068.032.08)
Environmental Research & Assessment



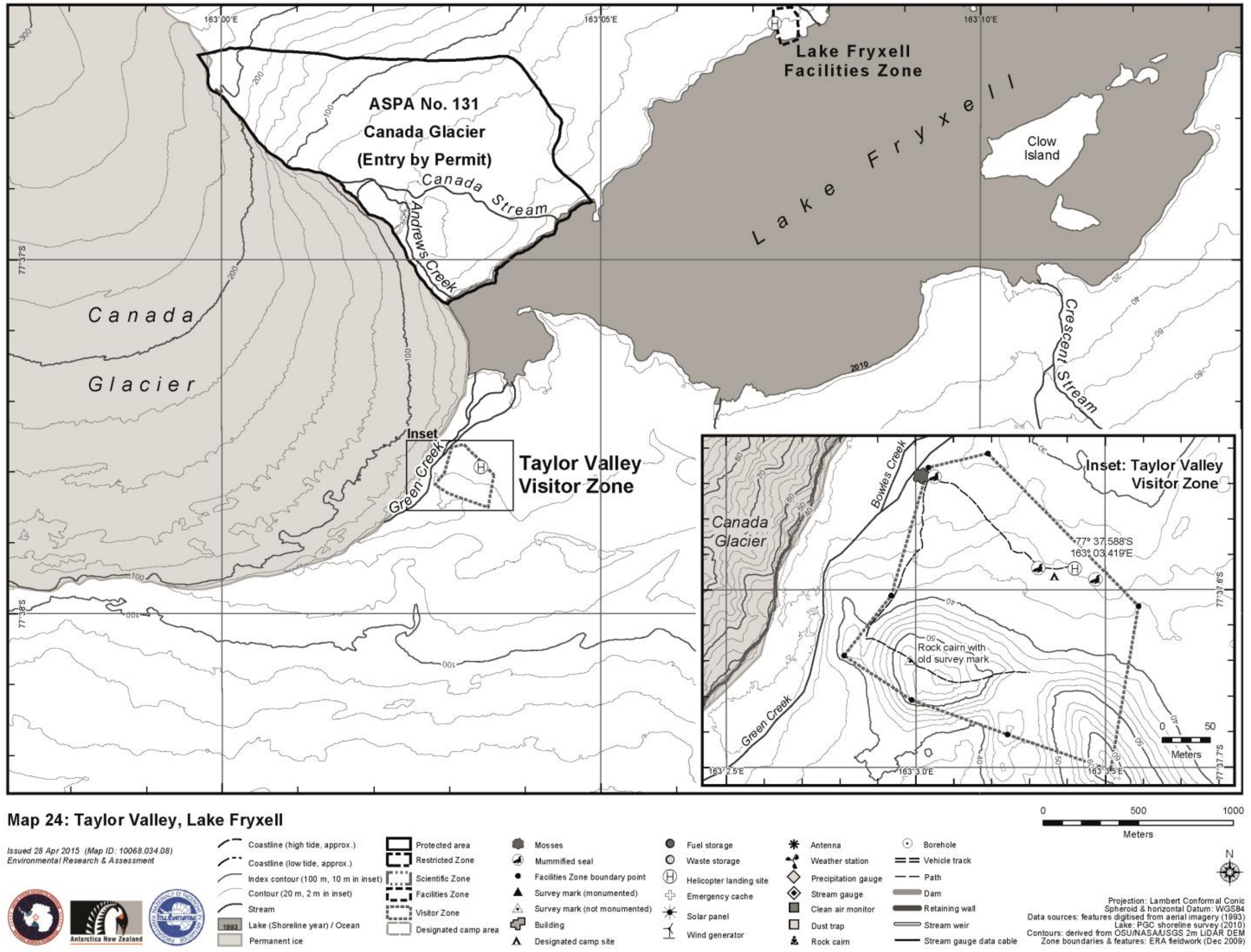
Map 23: Battleship Promontory, Restricted Zone

Issued 23 Apr 2015 (Map ID: 10068.033.06)
Environmental Research & Assessment

Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (250 m)
Contour (50 m)
Stream
1993 Lake (Shoreline year) / Ocean
Permanent ice
Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area
Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site
Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn
Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable

0 1 2
Kilometers
N

Projection: Lambert Conformal Conic
Spheroid & horizontal datum: WGS84
Data source: USGS 1:50K map series
Restricted Zone digitised from Quickbird imagery 2009
(Imagery © 2009 Digital Globe;
NGA Commercial Imagery Program)



Lake Fryxell Facilities Zone
ASPA No. 131
Canada Glacier
(Entry by Permit)
Canada Stream
Andrews Creek
Lake Fryxell
Clow Island
Canada Glacier
Crescent Stream
Inset
Green Creek
Taylor Valley Visitor Zone
Inset: Taylor Valley Visitor Zone
Bowles Creek
77° 37.588'S
163° 03.419'E
Rock cairn with old survey mark
Meters
Map 24: Taylor Valley, Lake Fryxell
Issued 28 Apr 2015 (Map ID: 10068.034.08)
Environmental Research & Assessment
Coastline (high tide, approx.)
Coastline (low tide, approx.)
Index contour (100 m, 10 m in inset)
Contour (20 m, 2 m in inset)
Stream
Lake (Shoreline year) / Ocean
Permanent ice
Protected area
Restricted Zone
Scientific Zone
Facilities Zone
Visitor Zone
Designated camp area
Mosses
Mummified seal
Facilities Zone boundary point
Survey mark (monumented)
Survey mark (not monumented)
Building
Designated camp site
Fuel storage
Waste storage
Helicopter landing site
Emergency cache
Solar panel
Wind generator
Antenna
Weather station
Precipitation gauge
Stream gauge
Clean air monitor
Dust trap
Rock cairn
Borehole
Vehicle track
Path
Dam
Retaining wall
Stream weir
Stream gauge data cable
0 500 1000
Meters
Projection: Lambert Conformal Conic
Spheroid & horizontal Datum: WGS84
Data sources: features digitised from aerial imagery (1993)
Lake: PGC shoreline survey (2010)
Contours: derived from OSU/NASA/USGS 2m LiDAR DEM
Zone boundaries & features: ERA fieldwork (Dec 2009)

APPENDIX A:

General Environmental Guidelines for the McMurdo Dry Valleys

Why are the McMurdo Dry Valleys considered to be so important? The McMurdo Dry Valleys ecosystem contains geological and biological features that date back thousands to millions of years. Many of these ancient features could be easily and irreversibly damaged by human actions. Unusual communities of microscopic life forms, low biodiversity, simple food webs with limited trophic competition, severe temperature stress, aridity and nutrient limitations are other characteristics that make the McMurdo Dry Valleys unique. This ancient desert landscape and its biological communities have very little natural ability to recover from disturbance. Research in such systems must aim to minimize impacts to protect the environment for future generations.

Before you travel to the Area:

- Ensure that your planned activities follow the requirements of the Code of Conduct in the Management Plan, the Environmental Guidelines in Appendices A and B, and any specific guidelines that apply within management zones (Appendices C-F).
- Plan all activities such as travel, camp set up, fuel handling and secondary containment, and waste management (and minimisation), with the aim of minimizing environmental impacts. Individuals or groups should ensure sufficient equipment and survival gear is brought into the Area or available on-site for safety.
- To help prevent the unintended introduction of non-native species to the McMurdo Dry Valleys, thoroughly clean all equipment (including backpacks, carry-bags and tents), clothing and footwear before travel to the Area.

Travel and activities within the Area:

- To reduce the risk of transfer of species from one part of the Dry Valleys to another, clean equipment, vehicles, clothing and footwear before travel to another site.
- Be aware of the site-specific guidelines in Appendices C-F, and avoid Restricted Zones unless access is required for a compelling reason that cannot be served elsewhere within the Area.
- Stream crossings should be avoided; when it is necessary to cross streams, designated crossing points should be used whenever possible.
- Avoid swimming or diving in lakes, unless authorized by a National Program for scientific purposes.
- Avoid disturbing mummified seals or birds.
- Cairns should not be built in the Area unless authorized by a National Program.
- Do not leave any travel equipment behind (e.g. ice screws, pitons).

Pedestrian travel:

- Some biological communities and geological formations are especially fragile, even when concealed by snow; be alert and avoid such features when travelling within the Area. For example, avoid walking on vegetated areas, in streams or on stream bank sides, on dunes, through long-term soil experiments, on raised delta surfaces, on delicate rock formations, or over other sensitive features.
- Where practicable, keep to designated or established tracks. Please refer to site-specific guidelines for Zones (Appendices C-F) for further guidance.

Vehicle use:

- Vehicle use should be restricted to ice surfaces unless specifically authorized to do otherwise, or at Marble Point, Cape Roberts, and New Harbor.
- Vehicles should keep to established tracks wherever these are present.
- Vehicles should always be parked over a secondary containment unit or a drip tray.
- Vehicles should be used on lake ice only when essential, and they should be parked on permanent lake ice rather than moat ice during the period of summer melt.

Helicopter use:

- Designated helicopter pads should be used for helicopter landings where available. Otherwise, known previous landing sites should be used when possible. Designated helicopter pads are listed in Appendices C-F and are shown on Maps 3-24.
- Designated helicopter pads should be marked so they are clearly visible from the air and markers used should be well-secured and durable.
- Helicopter landings on lakes should be avoided as far as practicable.
- Helicopter operations should not use smoke bombs, except for essential safety purposes.
- Care should be taken to ensure that helicopter sling loads are properly secured. Trained personnel should supervise these operations.

Field camps: location and set up

- Use designated, former, or existing campsites, or share those of other programs to the maximum extent practicable before considering the establishment of new campsites.
- Minimize the footprint of all campsites.
- Campsites should be located as far as practical from lakeshores, streambeds, and long-term experiments to avoid damage or contamination. Do not camp in streambeds, even if they are dry.
- Rocks moved for new campsites or other activities in areas not previously disturbed should be replaced after the activity in their original footprint, if possible, and at a minimum should be placed with the salt-encrusted side faced-down. If the campsite is intended for multi-year activity additional guidance should be sought from the supporting National Program.
- The location of field camps should be recorded and submitted to the supporting National Program.
- Ensure that equipment and supplies are properly secured at all times to avoid dispersion by high winds.

Energy use:

- As much as practicable, use energy systems and modes of travel within the Area that have the least environmental impact and minimize the use of fossil fuels.

Use of Materials:

- Everything taken into the Area should be removed and returned to the appropriate National Program station for proper handling.
- Activities that could result in the dispersal of foreign materials should be avoided (e.g. do not use spray paint to mark rocks) or should be conducted inside a hut or tent (e.g. all cutting, sawing and unpacking).
- Explosives should not be used within the Area, unless approved by a National Program for use in support of essential scientific or management purposes.

- Where possible, ensure that nothing is left frozen into glaciers, snow or lake ice that may ablate out and cause later contamination.

Fuel and chemicals:

- Avoid all fuel and chemical spills as much as possible.
- Steps should be taken to prevent the accidental release of chemicals including laboratory reagents and isotopes (stable or radioactive). Chemicals of all kinds should be dispensed over drip trays or other forms of containment. When permitted to use radioisotopes, safety and handling instructions should be followed precisely.
- When using chemicals or fuels, ensure that spill kits and secondary containment units appropriate to the volume of the substance are available. Those working with chemicals and fuels should be familiar with their use and with appropriate spill response procedures.
- Chemical and fuel containers should be securely positioned and capped, particularly on lake ice.
- All fuel drums should be stored with secondary containment.
- Fuel cans with spouts should be used when refueling generators.
- Generators and vehicles should be refueled over drip trays with absorbent spill pads.
- Vehicle oil should not be changed except over a drip tray.

Waste and spills:

- Water used for ANY human purpose should be removed and/or treated in a gray water evaporator (and residuals should be removed from the Area).
- All human waste should be collected and removed.
- Individuals or groups should always carry proper containers for human waste and gray water so that they may be properly and safely transported for disposal.
- Clean up any spills and/or releases to the maximum extent possible and report the location(s) including coordinates, to the appropriate National Program.

APPENDIX B:

Environmental Guidelines for Scientific Research

Scientific activities in the McMurdo Dry Valleys include research on climate, glaciers, streams, lakes, soils, and local geology and geomorphology. The following environmental guidelines for scientific research seek to reduce the impact of research activities specific to key environments in the Area. These guidelines are based on the report McMurdo Dry Valley Lakes: Impacts of Research Activities (Wharton, R.A. and Doran, P.T., 1998), the product of an international workshop of scientists conducting research in the Area.

General requirements

- Do not displace or collect specimens of any kind, including fossils, except under permit for scientific and associated educational purposes.
- The location of sampling (including biological transects), drilling and soil excavation sites, and of any installations (e.g. stream control structures and instrumentation) should be recorded, and the coordinates submitted to the supporting National Program.
- Installations and equipment should pose minimal risk of harmful emissions to the environment (e.g. use gel cells or other non-spill batteries).
- Ensure all installations, materials and equipment are securely stored when not in use and are removed when no longer required.
- Any markers installed should be durable and fastened securely.
- Metadata records describing data collected should be submitted to the supporting National Program and included within the Antarctic Master Directory.

Sampling and experimental sites

- All scientific equipment, particularly equipment used for sampling and drilling, should be clean before being brought into the Area, and cleaned before being transferred to other sites for re-use within the Area.
- Securely tether all sampling equipment where there is a reasonable risk that it could be irretrievably lost.
- Sample sizes of all biomass and non-biological materials should be limited to the minimum required for effective completion of the planned analyses and archiving.
- Sampling sites (e.g. in lake ice, on glaciers or in soils) should be kept clean.
- Minimize, and where possible avoid, the use of drilling fluids.
- Experimental or monitoring sites intended to be used for more than one season should be clearly identified by country, name of the principal investigator and year of installation.

Scientific installations

For scientific installations, including meteorological stations, geographic monuments, communication repeaters, lake monitoring systems, and level recorders:

- Installations should be sited carefully, should be easily retrievable when required, and properly secured at all times to avoid dispersal by high winds.
- All installations in the Area should be clearly identified by country, name of the principal investigator and year of installation.

- Installations should be as energy-efficient as possible and use renewable energy sources wherever practicable.
- Installations should pose minimal risk of harmful emissions to the environment (e.g. use gel cells or other non-spill batteries).
- Installations should be periodically evaluated for deterioration, usefulness, and potential removal. The frequency of evaluation may depend on installation characteristics and the site, although in general this is likely to be needed at least once every 3-5 years.
- Installations should be designed and constructed so they can be decommissioned and removed at the end of their use.

Scientific equipment, fuels and materials

- Minimize the use of fossil-fuel-powered equipment; use solar-powered and hand devices when possible.
- Properly tune generators to minimize emissions and use only when necessary. Always place generators and fuel cans in drip pans.
- Carefully manage fuels, glycol, chemical waste, and all other liquids to avoid spills.
- Always refuel using drip pans.
- Ensure spill kits are always available on-site where liquid fuels or wastes (including chemicals and water extracted from lakes) are present.
- Materials liable to shatter at low temperatures, for example many polyethylene based plastics, should be avoided. Wooden and fabric components in semi-permanent structures should be avoided as these are subject to wind abrasion and occasional failure.

Streams

- Use flumes rather than weirs.
- To the extent practicable, use local materials to construct water measuring and control structures.
- Limit the number of tracer and manipulative experiments. Whenever possible, use modeling approaches to extend the application of experimental results to other streams and lake basins.
- Use only naturally occurring tracers and document tracer use.
- Design tracer experiments to limit the movement of tracers in lakes. The incremental flux from the experiment should be appropriately small in proportion to the average annual total flux for that solute from streams. Choose an experimental site with a long enough reach such that reactions will be completed by the end of the reach.
- Establish specific sites for biomass sampling and document geographic locations, sampling extent, and frequency.
- Develop and apply methods (e.g. spectral analysis) that do not rely on removal of samples for quantifying changes in biomass in streams.

Lakes

- Minimize the duration and extent to which structures are placed on the ice. When placing structures on the ice near shore, place them on the perennial ice rather than the moat (the moat is highly susceptible to rapid melting). Document the geographic location of the placement of structures on the ice.
- Use barriers (e.g. drip pans) between equipment (e.g. motors, tools) and ice to minimize the potential for hydrocarbon introduction into the ice as well as the physical melting of the ice surface.

- Document the area and the extent to which lake ice has been excavated, taking geographic coordinates. Areas that have been used for sampling or accessing the lake should be reused to the greatest extent possible.
- Minimize the use of motorized vehicles. All-terrain vehicles with four-stroke engines are preferable to snowmobiles with two-stroke engines (less efficient combustion in two-stroke engines causes an increase in the release of hydrocarbons and particulates).
- Use extreme caution when driving motorized vehicles to avoid rolling the vehicle or breaking through the ice cover.
- Remove materials brought up from beneath the ice. Do not dump or deposit water and sediment samples on the lake ice.
- Reduce helicopter overflights after the ice surfaces begin to melt and keep landings on lakes to a minimum.
- Avoid storage of materials on the lake ice surface.
- Use separate samplers (e.g. water collectors, plankton nets) and instruments, if feasible, for each lake to avoid cross contamination. Samplers or instruments used in more than one lake should be thoroughly cleaned (sterilize if possible) prior to reuse in a different lake.
- Carefully manage gray water extracted from lakes to avoid spills.
- Consider laboratory-based alternatives to *in situ* experiments involving any radioisotope, stable isotope, or other tracer in view of the future integrity of the biological and chemical properties of the lakes. Complete preliminary calculations to ascertain the potential impact of isotope experiments. Document and record any introductions.
- Incorporate metal-free haul lines and sampling containers such as “go-flow” bottles into sampling protocols to minimize metal contamination of the lakes.
- Promote use of an environmentally friendly substitute for glycol for use in melting access holes (e.g. a biodegradable antifreeze).
- Minimize the amount of gray water waste by collecting the least volume of water and sediment needed for research purposes.
- Train individuals working on the lake ice to take steps to reduce the loss of equipment through ice holes.
- Provide adequate training for research divers and support teams so that impacts to the lake environment are minimized.
- Prior to conducting diving or ROV operations in a particular lake, consider previous diving history at the proposed research site, the proximity of other areas of interest, and the vulnerability of the water column and benthos to disturbance. These considerations should also be applied to other sampling and measuring activities.
- Assemble and maintain records of diving and ROV activities, including timing, intensity, and duration.
- Use technological developments (e.g. rebreather apparatus, push-pull systems) that mitigate the environmental impacts of diving.

Soils

- Minimize surface and subsurface disturbance to the maximum extent practicable.
- Restore disturbed surfaces as close as possible to their natural state upon completion of the work. For larger-scale excavations (greater than 1 m^2), take photographs prior to breaking ground to provide a basis for restoration. Record the location of the remediated site.
- Place excavated soil on mats or groundsheets during soil sampling.

- Backfill all excavations to approximate original contour and replace desert pavement where possible. The desert pavement can be skimmed from the surface prior to digging and kept aside for replacement.
- Conduct thorough environmental assessment of proposed exogenous amendment experiments.
- Limit use of mechanical equipment (e.g. Cobra drills, soil augers).

Glaciers

- Minimize the use of liquid water (e.g. with hot water drills).
- Avoid the use of chemicals and chemical solutions on the ice.
- If stakes or other markers are placed on a glacier, use the minimum number of stakes required to meet research needs; where possible, label these with event number and project duration.
- Use electric chainsaws powered by a four-stroke generator whenever possible for large-scale sawing operations (less contamination than from two-stroke engines). Avoid the use of chainsaw blade lubricants when cutting cold ice.
- Upon completion of a research project, remove all materials – wood, metal, and sensors – embedded in the ice to minimize contamination.

APPENDIX C:

Guidelines for Facilities Zones

Facilities Zones include a designated area around the following facilities operated by National Programs in the Area:

- New Harbor Camp, Taylor Valley;
- F-6 Camp, Taylor Valley;
- Lake Fryxell Camp, Taylor Valley;
- Lake Hoare Camp, Taylor Valley;
- Lake Bonney Camp, Taylor Valley;
- Mount Newall Radio Repeater, Asgard Range;
- Marble Point Refueling Station, Marble Point;
- Lower Wright Camp, Wright Valley;
- Lake Vanda Hut, Wright Valley;
- Bull Pass Hut, Wright Valley;
- Cape Roberts Camp, Granite Harbor.

The locations, boundaries, helicopter landings sites, and infrastructure at Facilities Zones, together with an identification of the Maintaining Party are listed in Table C-1, which is followed by maps of the Facilities Zones and their local geographical context (Maps 3-13).

Facilities Zone	**Map No.**	**Boundary Description**	**Boundary Coordinates**	**Helicopter Landing Site Coordinates**	**RP**[1]	**Structures in Zone**
New Harbor Camp	3	The boundary goes from a point northwest of the generator shed (on the bank edge), southwest beyond the sling load area, east to a point south of the helicopter pad, northeast to a point east of the main Jamesways, northwest to a point north of the lab building, southwest to a point just north of the old bore hole, and southwest along the bank edge back to the point by the generator shed.	77° 34.66′S, 163° 31.05′E 77° 34.71′S, 163° 30.98′E 77° 34.70′S, 163° 31.19′E 77° 34.67′S, 163° 31.34′E 77° 34.63′S, 163° 31.19′E 77° 34.64′S, 163° 31.11′E	77° 34.692′S, 163° 31.165′E 1 helicopter landing pad plus sling load area.	US	Main building consists of two Jamesways connected by a wooden passageway, one 42 m^2 (448 sq. ft.) and the other 30 m^2 (320 sq. ft.). Adjacent to the main building are a 3 m^{2S} (32 sq. ft.) storage shed and a 1.5 m^2 (16 sq. ft.) outhouse. The camp also includes a 21 m^2 (224 sq. ft.) Jamesways that serve as a laboratory, an 8.9 m^2 (96 sq. ft.) generator shack, and a 1.5 m^2 (16 sq. ft.) diving equipment storage box. One survival cache box and one wind generator tower.
F-6 Camp	4	The boundary goes from a point southwest of the helicopter pad, northeast to a point just east of the emergency cache (survival box), north around the northern-easternmost tent site, west to a point northwest of the tent sites (by the lake), south around the stream weir, and southeast to the original point by the helicopter pad.	77° 36.53'S, 163° 15.32'E 77° 36.50'S, 163° 15.43'E 77° 36.46'S, 163° 15.46'E 77° 36.46'S, 163° 15.40'E 77° 36.46'S, 163° 15.21'E 77° 36.50'S, 163° 15.19'E	77° 6.514′S, 163° 15.343′E 1 helicopter landing pad.	US	A 42 m^2 (448 sq. ft.) main building with outhouse adjacent. Emergency cache.
Lake Fryxell Camp	5	The boundary follows the lake edge in the southeast corner to a point southwest of the helicopter pad, up to the small plateau below a hill, behind the farthest tent site in the northwest corner, east to the stream, southeast along the stream bank to the eastern most tent and south back to	77° 36.38'S, 163° 07.60'E 77° 36.40'S, 163° 07.37'E 77° 36.34'S, 163° 07.31'E 77° 36.34'S, 163° 07.26'E	77° 36.33′S, 163° 07.428′E	US	A 62.7 m^2 (675 sq. ft.) Jamesway (main building), four 13.9 m^2 (150 sq. ft.) laboratories, and one 13.9 m^2 (150 sq. ft.) generator building. Wind generator tower, solar panel and one outhouse. Emergency cache. Proposed building sites, wind generator tower, &

Facilities Zone	Map No.	Boundary Description	Boundary Coordinates	Helicopter Landing Site Coordinates	RP[1]	Structures in Zone
		original point by the lake.	77° 36.29'S, 163° 07.27'E 77° 36.29'S, 163° 07.51'E 77° 36.31'S, 163° 07.59'E 77° 36.38'S, 163° 07.60'E			solar panels are shown.
Lake Hoare Camp	6 & 7	The boundary goes from the rocky area southeast of the helicopter pads, north around the emergency cache, northeast to a rock northwest of the westernmost tent site, northeast to a point north of another tent site, northeast again to the northeastern most tent site, south along the stream/glacier to a point east of the old Lake Hoare facilities (shower and dive storage buildings), southwest to the end of the spit, northwest to the beach below the main building, and northwest to the original point by the helicopter pads.	77° 37.40'S, 162° 53.87'E 77° 37.39'S, 162° 53.86'E 77° 37.35'S, 162° 53.87'E 77° 37.31'S, 162° 53.96'E 77° 37.26'S, 162° 54.28'E 77° 37.26'S, 162° 54.35'E 77° 37.39'S, 162° 54.40'E 77° 37.47'S, 162° 54.34'E 77° 37.41'S, 162° 54.05'E	77° 37.372′S, 162° 53.989′E 2 helicopter landing pads plus sling load area. Secondary pad is 46 m SW of the main pad.	US	A 55.7 m^2 (600 sq. ft.) main building, three 13.9 m^2 (150 sq. ft.) labs, a generator building (96 sq. ft.), a tool shed (96 sq. ft.), and three outhouses: two 2.2 m^2 (24 sq. ft.) and one 1.7 m^2 (18 sq. ft.), a 49.3 m^2 (530 sq. ft.) Jamesway. Solar panels and an emergency cache.
Lake Bonney Camp	8	The boundary goes from a point west of the generator shed by the lake, southeast up to a boulder behind a tent site, northeast to a hill above a tent site, northeast to a point northeast of the easternmost tent site, west to the shoreline, southwest along the shoreline passing north of the helicopter landing pad, continuing southwest along the lake shore to a point northwest of the meteorological station and back to the original point below the generator shed.	77° 42.96'S, 162° 27.37'E 77° 42.99'S, 162° 27.56'E 77° 42.97'S, 162° 27.79'E 77° 42.95'S, 162° 27.93'E 77° 42.90'S, 162° 27.73'E 77° 42.92'S, 162° 27.61'E	77° 42.95′S, 162° 27.65′E 1 helicopter landing pad.	US	A 55.7 m^2 (600 sq. ft.) Jamesway, a 2.2 m^2 (24 sq. ft.) outhouse, an 8.9 m^2 (96 sq. ft.) generator building, a 11 m^2 (118 sq. ft.) science laboratory and a RAD lab. Solar panels and emergency cache.

Facilities Zone	Map No.	Boundary Description	Boundary Coordinates	Helicopter Landing Site Coordinates	RP[1]	Structures in Zone
Mount Newall Radio Repeater	9	The boundary goes from the northeastern most point northeast of the green equipment shelter, southwest along the southeastern side of the ridge around the green equipment shelter, the NZ Repeater, the wind turbine, the AFTEC Hut, the antenna, the survival camp hut, the survival cache, around the helicopter landing pad, northeast along the north western side of the ridge around the camp hut, the antenna, the AFTEC Hut, the wind turbine, the NZ Repeater, and the green equipment shelter back to the original point.	77° 30.23'S, 162° 37.60'E 77° 30.25'S, 162° 37.60'E 77° 30.26'S, 162° 37.55'E 77° 30.27'S, 162° 37.52'E 77° 30.27'S, 162° 37.52'E 77° 30.29'S, 162° 37.46'E 77° 30.31'S, 162° 37.33'E 77° 30.29'S, 162° 37.28'E 77° 30.28'S, 162° 37.40'E 77° 30.26'S, 162° 37.49'E 77° 30.23'S, 162° 37.56'E	77° 30.295′S, 162° 37.340′E 1 helicopter landing pad.	US / NZ	The site includes both a US and a NZ radio repeater. There are three huts on Mt. Newall, including an 8.9 m^2 (96 sq. ft.) survival hut, a 22.3 m^2 (240 sq. ft.) shed encompassing a hybrid power system (both US), and a green equipment shelter 2.2 m^2 (24 sq. ft.) housing the NZ repeater. US repeater equipment contained in two orange plastic cases. There are two antennae (one US, one NZ) and a wind turbine (US) at the site.
Marble Point Refueling Station	10	The boundary goes from the easternmost point (east of soil pits), northwest around the main facilities area, northwest around the fuel storage tanks and pipe, northwest along the road, southwest around the end of the road and staging area, southeast along the road and around the helicopter pads, southeast around the pond, and northeast back to the point east of the soil pits.	77° 24.86'S, 163° 41.41'E 77° 24.82'S, 163° 41.22'E 77° 24.81'S, 163° 41.02'E 77° 24.80'S, 163° 40.81'E 77° 24.71'S, 163° 40.25'E 77° 24.74'S, 163° 40.15'E 77° 24.86'S, 163° 40.74'E 77° 24.89'S, 163° 41.27'E	77° 24.82′S, 163° 40.76′E 4 helicopter landing pads. The four pads are in close proximity (~25 m – 30 m apart). Coordinates are given for the central pad (second from main fuel tanks).	US	A 69.7 m^2 (750 sq. ft.) main building, a 41.8 m^2 (450 sq. ft.) bunkhouse, a 55.7 m^2 (600 sq. ft.) bunkhouse, a 7.4 m^2 (80 sq. ft.) fuel shack, 6 fuel storage tanks (25,000 gallons each), a 2.2 m^2 (24 sq. ft.) outhouse and incinerator for solid waste, a 1.9 m^2 (20 sq. ft.) storage shed, a 21 m^2 (224 sq. ft.) generator shed, a 27 m^2 (288 sq. ft.) workshop and storage building, and a 7 m^2 (76 sq. ft.) ASOS weather station. Fuel shed and outhouse at refuelling station.
Lower Wright	11	The boundary encompasses the hut, a	77° 26.56'S, 162° 39.04'E	77° 26.537′S, 161° 39.070′E	NZ	One small hut with accommodation for

Facilities Zone	Map No.	Boundary Description	Boundary Coordinates	Helicopter Landing Site Coordinates	RP[1]	Structures in Zone
Hut		marked helicopter landing site, and an emergency box and is bounded by rising slopes on the western and eastern sides, a large pavement crack at the southern end and rocky areas at the northern end. A met screen and weir are outside the zone within walking distance of the site.	77° 26.53'S, 162° 39.02'E 77° 26.53'S, 162° 39.13'E 77° 26.55'S, 162° 39.15'E	1 helicopter landing pad.		2 people with a floor area of 6 m^2 (65 sq. ft.). Emergency cache.
Lake Vanda Hut	12 Inset 1	The boundary follows the edge of the flat area on which the huts, AWS, marked helicopter landing site and tent sites are located.	77° 31.42'S, 161° 41.15'E 77° 31.40'S, 161° 41.17'E 77° 31.34'S, 161° 41.45'E 77° 31.34'S, 161° 41.51'E 77° 31.36'S, 161° 41.51'E 77° 31.41'S, 161° 41.25'E	77° 31.361′S, 161° 41.442′E 1 helicopter landing pad.	NZ	Three interconnected huts with a total floor area of 30 m^2 (323 sq. ft.). Automatic Weather Station (AWS).
Bull Pass Hut	12 Inset 2	The boundary encompasses the pebbly flat ground on which the huts and tent sites are situated, and is bounded by a large boulder to the north, small rocky ridges to the east and west, and a line between ridge ends to the south. An AWS is established well to the west of the zone boundary.	77° 31.09'S, 161° 51.23'E 77° 31.07'S, 161° 50.96'E 77° 30.98'S, 161° 51.11'E 77° 31.00'S, 161° 51.35'E	77° 31.056′S, 161° 51.048′E 1 helicopter landing pad.	US	Two shelters located at this site, an equipment shelter and an environmental shelter approximately 28.7 m^2 (290 sq. ft.) which houses a hybrid power system. Emergency cache.
Cape Roberts Camp	13	The boundary encompasses all of the flat area between north and south beaches on Cape Roberts, including the two huts and fuel rack. The southeast corner of the zone is at the fuel rack, and the boundary continues north along the edge of a	77° 2.08'S, 163° 10.73'E 77° 2.08'S, 163° 10.79'E 77° 2.09'S, 163° 10.84'E 77° 2.16'S, 163° 10.79'E	No helicopter landing pads.	NZ	Two huts on the ice-free area of Cape Roberts with accommodation for four people (approximately 10 m^2.) as well a living hut 19 m^2 (205 sq. ft.). A storage rack for drummed fuel is also at the site.

Facilities Zone	Map No.	Boundary Description	Boundary Coordinates	Helicopter Landing Site Coordinates	RP[1]	Structures in Zone
		bouldery slope, west along the edge of a rocky area, and south behind the huts along the edge another rocky slope. The zone is bounded to the south by the shoreline of a small bay.				

APPENDIX D:

Guidelines for Scientific Zones

The following sites within the Area are designated Scientific Zones:

- Explorers Cove, New Harbor, Taylor Valley;
- Boulder Pavement, Wright Valley.

Brief site descriptions, guidelines for activities within each Scientific Zone, and Maps 14 and 15 showing the zone boundaries are attached.

Scientific Zone

Explorers Cove

Location: New Harbor, Taylor Valley
Two components centered on:
North tide pools (490 m^2):
77° 34.57' S, 163° 30.79' E; and
South tide pools (4360 m^2):
77° 34.66' S, 163° 31.82' E.

Purpose

To avoid disturbance to local marine environment and ecology which are the subject of long-term scientific studies.

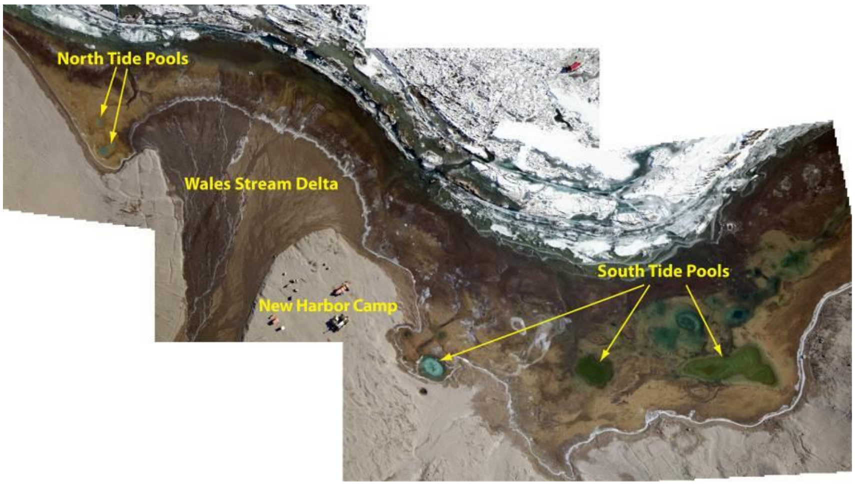


Photo montage: S. Bowser, USAP (28 Jan 2005)

Description

Zone area: 4850 m^2

The Scientific Zone comprises two tide pool systems on the coast of Explorers Cove, both located close to the New Harbor Camp Facilities Zone and extending ~ 75 – 100 m offshore (Map 14). The southern component lies immediately east of New Harbor Camp, extending along the coast for ~ 500 m. The smaller northern component lies ~ 200 m northwest of New Harbor Camp, immediately west of the Wales Stream delta, and extends along the coast for ~ 100 m. These tidally inundated sand flats are characterized by tide pools containing benthic mats of diatoms and cyanobacteria, a significant source of nutrients for the Explorers Cove near-shore marine ecosystem.

Boundaries

The coastline boundary of both tide pools follows the mean high water mark, while the seaward boundary extends parallel to the coast following the approximate grounding line of sea ice pressure ridges (when present), which occur ~ 75 – 100 m offshore (see Map 14).

South Tide Pools: The western boundary extends 100 m NE from the coast at the NE corner of the New Harbor Camp Facilities Zone. The eastern extent of the Scientific Zone is marked on the shore of a small coastal promontory ~ 500 m east of the Facilities Zone by a small rock cairn, from which the eastern boundary extends due north ~ 30 m offshore.

North Tide Pools: The western boundary extends 100 m along the coast from a small embayment west of the Wales Stream delta. The northern boundary thence extends ~ 80 m due east from the coast, while the eastern boundary extends 70 m due north from the coast at the edge of the Wales Stream delta.

Impacts

KNOWN IMPACTS	None.
POTENTIAL IMPACTS	Shoreline sediments are soft and easily disturbed when not frozen.

Access requirements

HELICOPTER ACCESS	Use designated helicopter landing site at New Harbor Facilities Zone: 77° 34.692' S, 163° 31.165' E
SURFACE ACCESS	Access to the New Harbor Facilities Zone over sea ice may pass through the southern component of the Scientific Zone.

Special site guidance

- Avoid walking in the zone unless conducting scientific research, especially when the ice has thawed.
- Sterilize all sampling equipment before sampling at the site to avoid introducing non-native species.

Key references

Gooday, A.J., Bowser, S.S. & Bernhard, J.M. 1996. Benthic foraminiferal assemblages in Explorers Cove, Antarctica: A shallow-water site with deep-sea characteristics. *Progress in Oceanography* **37**: 117-66.

Site Map – Map 14.

Scientific Zone

Boulder Pavement

Location: Onyx River, central Wright Valley, 4 km east and upstream from Lake Vanda:
77° 31.33' S; 161° 54.58' E

Purpose

To avoid disturbance to extensive microbial mats and ecology which are the subject of long-term scientific studies.

Boulder Pavement: N. Biletnikoff, USAP (29 Jan 2009)

Description

Zone area: 0.47 km^2

The Scientific Zone comprises a part of the Onyx River which fans out and flows slowly through an extensive and relatively flat area of boulders, where conditions are favorable for the growth of algae and cyanobacteria, forming the most extensive microbial mats in the Wright Valley and a biofilter for Lake Vanda.

Boundaries

The Scientific Zone extends to the perimeter of the extensive flat boulder pavement that is typically inundated by the Onyx River, which comprises an area ~ 0.8 km wide and 1.5 km long (Map 15).

Impacts

KNOWN IMPACTS	None.
POTENTIAL IMPACTS	Trampling may damage the microbial mats. The mats may be difficult to identify when the site is frozen. Activities within the zone increase the risk of the introduction of non-native species.

Access requirements

HELICOPTER ACCESS	Helicopter landings within the Scientific Zone should be avoided. Where practicable, visitors should use the designated helicopter landing sites at Lake Vanda Hut Facilities Zone (77° 31.361' S; 161° 41.442' E) or Bull Pass Hut Facilities Zone (77° 31.056' S 161° 51.048' E) (Maps 12 & 15).
SURFACE ACCESS	The zone should be accessed on foot. Avoid walking in this area unless necessary for scientific or management purposes.

Special site guidance

- Avoid crossing the Scientific Zone unless necessary for scientific purposes, such as sampling.
- Walk only on the rocks and avoid trampling the microbial mats.
- Avoid the introduction of non-native species by sterilizing all sampling equipment before use at this site.

Key references

Howard-Williams, C., Vincent, C.L., Broady, P.A. & Vincent, W.F. 1986. Antarctic stream ecosystems: variability in environmental properties and algal community structure. *International Revue der gesamten Hydrobiologie und Hydrographie* **71**(4): 511-44.

Howard-Williams, C., Hawes, I., Schwarz, A.M. & Hall, J.A. 1997. Sources and sinks of nutrients in a polar desert stream, the Onyx River, Antarctica. In: Lyons, W.B., Howard-Williams, C. & Hawes, I. (Eds) *Ecosystem processes in Antarctic ice-free landscapes*. Proceedings of an International Workshop on Polar Desert Ecosystems, Christchurch, New Zealand: 155-70.

Green, W.J., Stage, B.R., Preston, A., Wagers, S., Shacat, J. & Newell, S. 2005. Geochemical processes in the Onyx River, Wright Valley, Antarctica: major ions, nutrients, trace metals. *Geochimica et Cosmochimica Acta* **69**(4): 839-50.

Site Map – Map 15.

APPENDIX E:

Guidelines for Restricted Zones

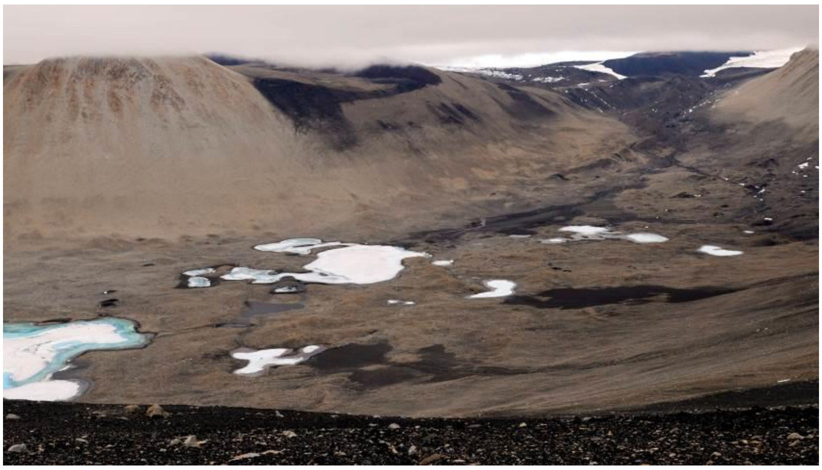
The following sites within the Area are designated Restricted Zones:

- Trough Lake catchment, Pyramid Trough, Royal Society Range;
- Mount Feather Sirius Deposit, Mount Feather;
- Don Juan Pond, South Fork, Wright Valley
- Argo Gully, Lake Vanda, Wright Valley;
- Prospect Mesa, Wright Valley;
- Hart Ash Deposit, Wright Valley;
- Victoria Valley sand dunes, Victoria Valley;
- Battleship Promontory, Alatna Valley, Convoy Range.

Brief site descriptions, guidelines for activities within each Restricted Zone, and maps showing the zone boundaries (Maps 16 – 23) are attached.

Restricted Zone

Trough Lake Catchment



Pyramid Trough: C. Harris, ERA / USAP (09 Dec 2009)

Location

Trough Lake catchment, Royal Society Range, several km northwest of the Koettlitz Glacier and southwest of Walcott Bay: 78° 18.17' S, 163° 20.57' E

Purpose

To avoid disturbance to a pristine hydrological catchment and its ecology, and to ensure the aesthetic and wilderness values of the zone are maintained.

Description **Zone area:** 79.8 km²

The Trough Lake catchment is enclosed by Mount Dromedary (2485 m), The Pyramid (854 m), The Bulwark (~ 600 m) and Seahorse (1008 m), and comprises a network of four main drainage systems feeding into Trough Lake (Map 16). The valley floor of Pyramid Trough contains a significant wetland system comprising a variety of pond and stream habitats in a confined area that support a range of rich biological communities that are representative of the region. Sparse communities of bryophytes and lichens are present. The catchment also contains some unique features, most notable of which are the presence of groups of cyanobacteria that are rare in other wetland systems in the region. Specifically, in addition to the common oscillatorian cyanobacteria, microbial mats in ponds and streams contain *Dichothrix* and *Schizothrix*, and a range of coccoid taxa. Trough Lake catchment has been visited infrequently compared to the other Dry Valleys, and the ecosystem is considered to be almost pristine.

Boundaries

The Restricted Zone boundary is defined by the Trough Lake catchment. Clockwise from The Pyramid, the boundary crosses a small tongue of the Koettlitz Glacier extending into the catchment, thence follows Backdrop Ridge to an unnamed peak (1618 m) at the top of West Aisle Ridge, thence northwest following the ridge to Mount Dromedary, from where it follows a ridge northeast to Seahorse. The boundary thence follows a ridge eastward and descends to Walcott Bay. The boundary proceeds due east ~800 m from the shoreline of Walcott Bay to the approximate grounding line of the Koettlitz Glacier, and thence follows the ASMA boundary to Bulwark Stream to the foot of the northeast ridge of The Bulwark. The boundary proceeds southward following The Bulwark ridge crest, crosses the head of the Upper Alph River, and follows the Koettlitz Glacier margin to ascend the northeastern ridge of The Pyramid.

Impacts

KNOWN IMPACTS	Rocks have been moved at the campsite, where an iron survey marker is installed on a small knoll at: 78° 17.17' S, 163° 27.83' E (18 m). Sampling has been undertaken at a number of lakes in the catchment.
POTENTIAL IMPACTS	Disturbance to water bodies, terrestrial ecology and sensitive soils by sampling or trampling. Introduction of non-native species.

Access requirements

HELICOPTER ACCESS	Helicopters should land at the designated site at: 78° 17.16' S, 163° 27.84' E (11 m).
SURFACE ACCESS	Movement within the zone should generally be on foot. Helicopters may be used for essential travel to sites that would be impracticable to access on foot from the campsite.

Special site guidance

- Visits to this catchment should be minimized and semi-permanent structures should not be installed within the zone.
- Avoid the introduction of non-native species by sterilizing all sampling equipment before visiting this site.
- Camping within the Restricted Zone should be at the site previously used (adjacent to the designated helicopter landing site) at: 78° 17.15' S, 163° 27.79' E (11 m).

Key references

Chinn, T.J.H. 1993. Physical hydrology of Dry Valleys lakes. *Antarctic Research Series* **59**: 1 –51.

Hendy, C.H. & Hall, B.L. 2006. The radiocarbon reservoir effect in proglacial lakes: examples from Antarctica. *Earth and Planetary Science Letters* **241**: 413-21.

Hawes, I., Webster-Brown, J., Wood, S. & Jungblut, A. 2010. A brief survey of aquatic habitats in the Pyramid Trough region, Antarctica. Unpublished report prepared for USAP on the aquatic ecology of the Trough Lake catchment.

Site Map – Map 16

Restricted Zone

Mount Feather Sirius Deposit

Location

Northeast flank of Mount Feather (3011 m) between Lashley Glacier and the upper Ferrar Glacier:
77º 56.05' S, 160º 26.30' E

Purpose

To avoid disturbance or damage to an area of Sirius Deposits, which are of high scientific value.

Mount Feather: C. Harris, ERA / USAP (11 Dec 2009)

Description **Zone area:** 0.57 km²

The Mount Feather Diamicton is an area of semi-lithified glacigenic deposits that have been included within the Sirius Group at the upper Ferrar Glacier, ~3 km NE of Mount Feather (3011 m) (Map 17). The deposits lie at an elevation of between ~2400-2650 m, extending over ground of relatively gentle slope near the ridge crest and also outcropping on the steep eastern cliffs of the Mount Feather massif above Friedmann Valley and the Ferrar Glacier. The diamicton surface has distinct melt-water runnels near its perimeter and on steeper slopes. The deposits, which extend over an area of ~1.5 km x 1 km, contain microfossils and other evidence of high scientific importance for interpretation of the Neogene glacial history of the Dry Valleys and of the East Antarctic ice sheet as a whole.

Boundaries

The boundary of the Restricted Zone (Map 17) is defined based on the extent of the Mount Feather Diamicton as mapped by Wilson *et al.* (2002: Fig.1). Owing to limitations in the accuracy of available mapping in the region, the boundary is considered approximate, with an estimated accuracy of at least +/- 100 m.

Impacts

KNOWN IMPACTS	Rock samples have been collected. At least four shallow drill cores (of 3.2 m in depth or less) have been recovered from the site, although drilling fluids were not employed.
POTENTIAL IMPACTS	Drilling operations, especially those employing drilling fluids. Sampling and disturbance to sedimentary sequences.

Access requirements

HELICOPTER ACCESS	Helicopter operations in this location can be difficult owing to altitude and winds, and no specific landing site has yet been designated.
SURFACE ACCESS	Movement within the Restricted Zone should be on foot.

Special site guidance

- Do not move sediments, rocks and boulders, unless necessary for scientific purposes, and avoid disturbance to or alteration of the sedimentary sequences and melt-water runnels.
- Camping should be at the site previously used on adjacent snow surfaces at: 77 º 55.93' S, 160 º 25.66' E.

Key references

Wilson, G.S., Barron, J.A., Ashworth, A.C., Askin, R.A., Carter, J.A., Curren, M.G., Dalhuisen, D.H., Friedmann, E.I., Fyodorov-Davidov, D.G., Gilichinsky, D.A., Harper, M.A., Harwood, D.M., Hiemstra, J.F., Janecek, T.R, Licht, K.J., Ostroumov, V.E., Powell, R.D., Rivkina, E.M., Rose, S.A., Stroeven, A.P., Stroeven, P., van der Meer, J.J.M., and Wizevich M.C. 2002. The Mount Feather Diamicton of the Sirius Group: an accumulation of indicators of Neogene Antarctic glacial and climatic history. *Palaeogeography, Palaeoclimatology, Palaeoecology* **182**: 117-31.

Site Map – Map 17

Restricted Zone

Don Juan Pond

Location

At the foot of a rock glacier in South Fork, Wright Valley, in a closed basin at 118 m elevation below the Dais, ~ 7.5 km from Lake Vanda:
77° 33.77' S, 161° 11.32' E

Purpose

To protect a rare and sensitive hypersaline ecosystem of high scientific value from disturbance and damage.

Don Juan Pond: C. Harris, ERA / USAP (14 Dec 2009)

Description

Zone area: 23 ha

Don Juan Pond is a small hypersaline lake currently of ~400 x 150 m containing a calcium-chloride-rich brine with a salinity level of ~40%, making it the most saline natural water body known on Earth. Water levels have fluctuated over time, although recently the pond has been ~10 cm in depth. While water levels vary, the Restricted Zone extends to the perimeter of the pond floor salt deposits (Map 18). Microbial life, including numerous heterotrophic bacteria and a yeast, are found in the pond. A mat of mineral material and detritus cemented together by organic matter, referred to as the Don Juan Pond Salt Deposits, is found at the edge of the pond where the calcium chloride concentrations are reduced. Don Juan Pond is also the site where Antarcticite ($CaCl_2$ 6H20), a hygroscopic colorless mineral, was first identified forming naturally.

Boundaries

The Restricted Zone boundary is defined by the outer extent of the Don Juan Pond Salt Deposits, which extend to the edge of the basin pond floor, occupying an area of ~750 x 315 m (Map 18).

Impacts

KNOWN IMPACTS	The Dry Valleys Drilling Project drilled two boreholes at Don Juan Pond: DVDP 5 (3.5 m depth) and DVDP 13 (75 m depth), situated within the salt deposit area ~60 m and ~110 m respectively east of the rock glacier. DVDP 13 remains in evidence as an iron tube (capped) protruding ~ 1 m above the dry pond floor (Map 18). Small quantities of waste (e.g. rusted cans) were observed in soils ~50-100 m south and east of the Restricted Zone in Dec 2009, most likely originating from early camps established near the site.
POTENTIAL IMPACTS	Disturbance to water body, salt deposits and sensitive soils by sampling or trampling.

Access requirements

HELICOPTER ACCESS	Helicopters should land at the **Primary** Helicopter Landing Site (HLS), marked by a circle of rocks, ~180 m east of the Don Juan Pond salt deposits at 77° 33.783' S, 161° 12.930' E. Landings may be made at the Secondary HLS (Map 18) only to support essential scientific or management purposes that cannot practically be met from the Primary HLS. Helicopters should avoid overflight below 50 m above ground level within the Restricted Zone.
SURFACE ACCESS	Access to and movement within the Restricted Zone should be on foot.

Special site guidance

- Avoid walking through the pond and adjacent salt deposits unless necessary for scientific or management purposes.
- Walk carefully to minimize disturbance to the salt deposits and surrounding soft soils and sensitive slopes.
- Do not move any boulders.
- Camping is not permitted within the Restricted Zone. Camping should be at the designated site ~40 m south of the Primary HLS, marked by circles of rocks: 77° 33.795' S, 161° 12.950' E.

Key references

Harris, H.J.H. & Cartwright, K. 1981. Hydrology of the Don Juan Basin, Wright Valley, Antarctica. *Antarctic Research Series* **33:** 161-84.

Chinn, T.J. 1993. Physical hydrology of the Dry Valley lakes. *Antarctic Research Series* **59:** 1-51.

Samarkin, V.A., Madigan, M.T., Bowles, M.W., Casciotti, K.L., Priscu, J.C., McKay, C.P. & Joye, S.B. 2010. Abiotic nitrous oxide emission from the hypersaline Don Juan Pond in Antarctica. *Nature Geoscience* Online: 25 April 2010. DOI: 10.1038/NGEO847.

Site Map – Map 18

Restricted Zone

Argo Gully

Location
Northeastern shore of Lake Vanda, Wright Valley, below Mount Jason, at an elevation between 104 m and 235 m:
77° 31.09' S, 161° 38.77' E

Purpose
To avoid damage to exposed stratified marine fossiliferous deposits within the gully, which are of high scientific value.

Argo Gully: K. Pettway, USAP (31 Jan 2011)

Description
Zone area: 4800 m^2

Part of the lower reach of a prominent stream channel in Argo Gully, below Mount Jason (1920 m), Olympus Range (Map 19), contains exposed beds (up to 2.8 meters thick) of massive glacial silts containing abundant marine diatom and silicoflagellate material overlying sediment. Pecten shell fragments have reportedly been found in the upper few centimeters of the deposit. The beds are horizontally stratified, which is in contrast to the underlying sediments. The deposits are overlain by deltaic sands, silts and gravels, deposited by the stream in Argo Gully. The deposits are indicative that the Wright Valley was formerly a shallow marine fjord, and have been dated as Middle Miocene. The full extent of the deposits below the overlying sediment is unknown, and the intermittent exposures along the channel change over time as a result of natural erosion.

Boundaries
The Restricted Zone extends from the first prominent raised beach (elevation 104 m) above, and ~140 meters from, the shore of Lake Vanda, for 175 meters up the stream channel to an elevation of ~135 m. The zone extends 25 meters either side of the stream channel (Map 19).

Impacts
KNOWN IMPACTS	None.
POTENTIAL IMPACTS	The deposit is within the permafrost but the surface continually slumps when the permafrost melts. The surface of the deposit if friable when touched.

Access requirements
HELICOPTER ACCESS	Helicopters should land at the designated site at Lake Vanda Hut Facilities Zone ~1.2 km to the east at: 77° 31.361' S, 161° 41.442' E.
SURFACE ACCESS	Access to and movement within the Restricted Zone should be on foot.

Special site guidance
- Avoid walking on the edges of the gully or above the exposed outcrops.
- Minimize disturbance to the sediments surrounding the deposits.
- Avoid touching the exposed outcrops unless conducting scientific research.

Key references

Brady, H.T. 1980. Palaeoenvironmental and biostratigraphic studies in the McMurdo and Ross Sea regions, Antarctica. Unpublished PhD thesis, Macquarie University, Australia.

Brady, H.T. 1979. A diatom report on DVDP cores 3, 4a, 12, 14, 15 and other related surface sections. In: Nagatta, T. (Ed) *Proceedings of the Seminar III on Dry Valley Drilling Project, 1978.* Memoirs of National Institute of Polar Research, Special Issue 13: 165-75.

Site Map – Map 19.

Restricted Zone

Prospect Mesa

Location

Below Bull Pass ~250 m north of the Onyx River, Wright Valley:
77° 31.33' S; 161° 54.58' E

Purpose

To avoid damage to a fragile deposit of fossilized extinct marine pecten (scallop) shells of a single species.

Prospect Mesa: C. Harris, ERA / USAP (15 Dec 2009)

Description **Zone area:** 4.76 ha

Prospect Mesa is a deposit of fossiliferous gravels overlying till containing a high density of well-preserved extinct marine pecten (scallop) shells of a single species, *Chlamys (Zygochlamys) tuftsensi*, of the Family Pectinidae. This is the only known site where this species is found. A stratified layer of sand and gravel overlying till is exposed in a gully cut by a stream flowing from Bull Pass a few hundred meters from its junction with the Onyx River (Map 20). The precise age of the deposit is unknown, although the presence of articulated shells, the abundance of complete shells, the lack of abrasion, the similarity of internal and external matrix, the lack of good size segregation and a generally very poor sorting of the clasts suggest that the fossils were deposited *in situ* in a marine fjord. Sponge spicules, radiolarian and a few ostracod fragments are also present but foraminifera are the most abundant and diverse microfossil group present.

Boundaries

The Restricted Zone boundary is defined around two adjacent mesa features, the smaller of the two being ~100 m north of the main feature. The boundary follows the well-defined NE bank of the stream descending from Bull Pass in the SW of the zone, and then follows around the base of the slopes that define the two features (Map 20).

Impacts

KNOWN IMPACTS	An excavation from early research exists on the southwest slope of the mesa (see photo), which is marked by a pole at the base.
POTENTIAL IMPACTS	Isolation of unbroken pecten fragments is extremely difficult. Disturbance or damage to the sediments may cause damage to the fossils.

Access requirements

HELICOPTER ACCESS	Helicopters should not land within the Restricted Zone. Use the designated helicopter landing site at Bull Pass Hut Facility Zone: 77° 31.056'S, 161° 51.048'E
SURFACE ACCESS	Access to and movement within the Restricted Zone should be on foot.

Special site guidance

- Avoid walking on top of the mesa.
- Pedestrians should walk carefully to minimize disturbance to fragile sedimentary structures, deposits and slopes.
- Camping is not permitted within the Restricted Zone.

Key references

Turner, R.D. 1967. A new species of fossil Chlamys from Wright Valley, McMurdo Sound, Antarctica. *New Zealand Journal of Geology and Geophysics* **10**: 446-55.

Vucetich, C.G. & Topping, W.W. 1972. A fjord origin for the pecten deposits, Wright Valley, Antarctica. *New Zealand Journal of Geology and Geophysics* **15**(4): 660-73.

Webb, P.N. 1972. Wright fjord, Pliocene marine invasion of an Antarctic Dry Valley. *Antarctic Journal of the United States* **7**: 227-34.

Prentice, M.L., Bockheim, J.G., Wilson, S.C., Burckle, L.H., Jodell, D.A., Schluchter, C. & Kellogg, D.E. 1993. Late Neogene Antarctic glacial history: evidence from central Wright Valley. *Antarctic Research Series* **60**: 207-50.

Site Map – Map 20

Restricted Zone

Hart Ash Deposit

Location

On a relatively featureless slope between the Goodspeed and Hart Glaciers, Wright Valley, at an elevation of ~400 m:
77° 29.76' S, 162° 22.35' E

Purpose

To avoid damage to an *in situ* deposit of volcanic ash airfall tephra that is of high scientific value.

Hart Ash deposit: J. Aislabie
Antarctica NZ Pictorial Collection (2005)

Description

Zone area: 1.8 ha

The Hart Ash deposit is an *in situ* preserved deposit of volcanic ash airfall tephra protected by a surface layer of gravel. The surface gravel protecting the ash layer has a wide spatial extent and the Hart Ash is not immediately visible unless the surface gravel is removed, making field identification difficult. The full extent of the Hart Ash deposit is thus unknown, although its maximum extent has been estimated as ~100 x 100 m (Map 21). The Hart Ash deposit, dated 3.9 ± 0.3 million years old, is of high scientific importance for interpreting the paleoclimate of the McMurdo Dry Valleys.

Boundaries

Owing to a lack of prominent surface landmarks, the boundary of the Restricted Zone is defined as an area of 150 m x 120 m following lines of latitude and longitude (Map 21) extending from the coordinates:
Upper Left: 77°29.72' S, 162°22.2' E
Lower Right: 77 29.8ˈ S, 162 22.5' E

Impacts

KNOWN IMPACTS	None.
POTENTIAL IMPACTS	The deposit is covered by a thin gravel desert pavement which is easily disturbed by walking. Wind erosion of the ash deposits would be rapid if the desert pavement is disturbed.

Access requirements

HELICOPTER ACCESS	Helicopters should avoid landings and overflight below 50 m above ground level within the Restricted Zone. Helicopter landings should be made at least 100 m from the boundary.
SURFACE ACCESS	Access to and movement within the Restricted Zone should be on foot.

Special site guidance

- Avoid walking on the desert pavement overlying the ash deposits unless necessary for essential scientific or management purposes, and then walk carefully to minimize disturbance.
- Should the desert pavement be removed for essential scientific purposes, ensure the material is replaced to protect the feature.
- Camping is not permitted within the Restricted Zone.

Key references

Hall, B.L., Denton, G.H., Lux, D.R. & Bockheim, J. 1993. Late tertiary Antarctic paleoclimate and ice-sheet dynamics inferred from surficial deposits in Wright Valley. *Geografiska Annaler* **75A**(4): 239-67.

Morgan, D.J., Putkonen, J., Balco, G. & Stone, J. 2008. Colluvium erosion rates in the McMurdo Dry Valleys, Antarctica. Proceedings of the American Geophysical Union, Fall Meeting, 2008.

Schiller, M., Dickinson, W., Ditchburn, R.G., Graham, I.J. & Zondervan, A. 2009. Atmospheric 10Be in an Antarctic soil: implications for climate change. *Journal of Geophysical Research* **114**, FO1033.

Site Map – Map 21

Restricted Zone

Victoria Valley Sand Dunes

Location

In two main groups between Lake Vida and Victoria Lower Glacier, ~ 1 km south from the Packard Glacier terminus, Victoria Valley:
77° 22.19' S, 162° 12.45' E

Purpose

To avoid damage to the sand dune system, which is fragile and of high scientific value.

Victoria Valley sand dunes (eastern group below Packard Glacier) H. McGowan, Antarctica NZ Pictorial Collection (Dec 2004).

Description **Zone area:** 3.16 km²

The extensive Victoria Valley sand dune system is comprised of two distinctive areas made up of crescent-, transverse- and whaleback-shaped dunes and numerous sand mounds (Map 22). The largest group of dunes in the west extends over ~6 km and ranges between 200 to 800 m wide, with a total area of ~1.9 km^2. The smaller group of dunes in the east, which is bisected by Packard Stream and bounded to the south by Kite Stream, extends over ~3 km and ranges between 300 to 600 m wide with a total area of ~1.3 km^2. The source of sediment is from the surface and margins of the Victoria Lower Glacier and from ground moraine, which are transported west toward Lake Vida by the dominant easterly wind and meltwater streams. It is the only area where major eolian sand depositional forms occur in Antarctica. The dunes differ from the usual desert and coastal formations because the sand in the dunes is interbedded with compacted snow and contains permafrost.

Boundaries

The Restricted Zone boundary is defined by the outer extent of the main sand dune system in Victoria Valley, which extends in two groups for a distance of ~9 km with a width from varying from 200 to 800 m (Map 22).

Impacts

KNOWN IMPACTS	None
POTENTIAL IMPACTS	A thin surface layer of the sand dunes is mobile and dynamic. Damage or disruption to the internal permafrost of the dunes, can affect the integrity of the sand dune structure.

Access requirements

HELICOPTER ACCESS	Helicopters should avoid landing within the Restricted Zone and avoid overflight below 50 m above ground level. A designated helicopter landing site is located at the Packard Stream camp site at 77° 22.077' S, 162° 12.292' E.
SURFACE ACCESS	Access to and movement within the Restricted Zone should be on foot.

Special site guidance

- Avoid walking through the dunes unless necessary for scientific or management purposes.
- Walk carefully to minimize disturbance to the sensitive dune surfaces and slopes. Avoid disturbing the internal permafrost and structure of the sand dunes.
- Camping is not permitted within the Restricted Zone. Camping should be at the designated site at Packard Stream north of the eastern sand dunes group, marked by circles of rocks: 77° 22.077' S, 162° 12.292' E.

Key references

Lindsay, J.F. 1973. Reversing barchans dunes in Lower Victoria Valley, Antarctica. *Geological Society of America Bulletin* **84**: 1799-1806.

Calkin, P.E. & Rutford, R.H. 1974. The sand dunes of Victoria Valley, Antarctica. *The Geographical Review* **64**(2): 189-216.

Selby, M.J., Rains, R.B. & Palmer, R.W.P. 1974. Eolian deposits of the ice-free Victoria Valley, Southern Victoria Land, Antarctica. *New Zealand Journal of Geology and Geophysics* **17**(3): 543-62.

Speirs, H.C., McGowan, J.A. & Neil, D.T. 2008. Meteorological controls on sand transport and dune morphology in a polar-desert: Victoria Valley, Antarctica. *Earth Surface Processes and Landforms* **33**: 1875-91.

Site Map – Map 22

Restricted Zone

Battleship Promontory

Location

Southwest Alatna Valley, Convoy Range, ~1 km west of Benson Glacier: 76° 55.17' S, 161° 02.77' E

Purpose

To avoid damage to the fragile sandstone rock formations that host microbial communities, and to ensure aesthetic and wilderness values of the site are maintained.

a) Aerial from Alatna Valley. b) from Cargo Pond.
C. Harris, ERA / USAP (16 Dec 2009)

Description **Zone area:** 4.31 km²

Battleship Promontory is an area of dramatic Beacon Sandstone outcrops rising from the southwestern floor of Alatna Valley, near Cargo Pond (Map 23). The cliff formation is ~5 km in length, and extends over an area of between 0.4 – 1.2 km in width. The promontory stands ~300 m in height at an elevation of between ~900-1200 m in the west and ~1050-1350 m in the east. The russet and white sandstone outcrops are deeply weathered into striking spires, ledges and eroded gully formations, into which dark boulders and sediments have accumulated from the overlying dolerite as it weathers from above. The environment hosts rich microbial communities, including lichens, cyanobacteria, non-photosynthetic bacteria, and fungi, with the highest microbial biodiversity yet recorded in the Dry Valleys. Cryptoendolithic microbial communities live in pore spaces within the sandstone rock, and comprise lichens and cyanobacteria growing to depths of up to 10 mm beneath the surface. These communities are extremely slow-growing, and the rocks in which they live are susceptible to breakage.

Boundaries

The Restricted Zone boundaries encompass the main area of sandstone outcrops at Battleship Promontory, extending from and including several small lakes present the foot of the formation, to its maximum upper extent (Map 23).

Impacts

KNOWN IMPACTS	Small instruments have previously been installed in rocks for *in situ* measurements, and a small quantity of rock samples collected. The designated helicopter landing site is marked by cloth flags weighed down by rocks, some of which were selected to ensure they were not used by subsequent scientists because they were modified by an early experiment (E. Friedmann, pers. comm. 1994). Air safety smoke canisters have been released at the site, causing localized contamination, a practice discontinued in the 1990s.
POTENTIAL IMPACTS	Breakage of fragile rock formations, over-sampling, introduction of non-native species.

Access requirements

HELICOPTER ACCESS	Helicopters should land at the designated site at: 76° 55.35' S, 161° 04.80' E (1296 m). If access is required to the base of the cliffs, or parts of the zone that are impractical to reach on foot, helicopters should avoid landing on sandstone surfaces or on lakes / ponds.
SURFACE ACCESS	Movement within the Restricted Zone should be on foot.

Special site guidance

- Walk carefully to minimize disturbance, avoid moving rocks and boulders, and do not break the fragile sandstone rock formations.
- Camping within the Restricted Zone should be at the site previously used, which is adjacent to the designated helicopter landing site at 76° 55.31' S, 161° 04.80' E (1294 m).

Key references

Friedmann, E.I., Hua, M.S., Ocampo-Friedmann, R. 1988. Cryptoendolithic lichen and cyanobacterial communities of the Ross Desert, Antarctica. *Polarforschung* **58**: 251-59.

Johnston, C.G. & Vestal, J.R. 1991. Photosynthetic carbon incorporation and turnover in Antarctic cryptoendolithic microbial communities: are they the slowest-growing communities on Earth? *Applied & Environmental Microbiology* **57**(8): 2308-11.

Site Map – Map 23

APPENDIX F:

Guidelines for Visitor Zones

The following site within the Area is designated a Visitor Zone:

- Taylor Valley

The Visitor Zone is located in the lower Taylor Valley near Canada Glacier. The location, boundaries, helicopter landing site, and features at the Visitor Zone are shown in Map 24.

The boundary of the Visitor Zone is defined as follows: proceeding in a clockwise direction from the northern limit of the zone on a low hill at 77° 37.523' S, 163° 03.189' E, the boundary extends 225 m southeast, past the designated helicopter landing site, to a point in moraine soils at 77° 37.609' S, 163° 03.585' E, thence extends 175 m southward ascending the summit of a small hill (elevation 60 m) at 77° 37.702' S, 163° 03.512' E. From this small hill, the boundary extends northwest 305 m towards and beyond a second small hill (summit elevation 56 m, marked nearby with a rock cairn and old survey marker), following a line ~30 m south of the main ridge joining the two hills, directly to a point on the western ridge of this second small hill at 77° 37.637' S, 163° 02.808' E. From this ridge, the boundary extends northeast 80 m directly to the western face of a prominent boulder located at 77° 37.603' S, 163° 02.933' E, which is ~70 m northwest from the cairn on the hill. The boundary thence extends northeast 130 m, descending parallel with the designated walking track (which follows a low moraine ridge) to a point near Bowles Creek at 77° 37.531' S, 163° 03.031' E. A mummified (dessicated) seal is located here, adjacent to a small area of mosses. The boundary thence extends eastward 65 m to return to the northern limit of the zone at 77° 37.523' S, 163° 03.189' E.

Special guidelines for activities within the Visitor Zone include that:

- Tour operators should ensure that all visitors to the Visitor Zone for which they are responsible have clean boots and equipment before visiting the site;
- Tour expedition helicopter landings should be made at the designated landing site at 77° 37.588' S, 163° 03.419' E (elevation 34 m);
- Tour operators should ensure that foot tracks within the Visitor Zone are clearly marked and that visitors stay on those routes. Markers used to mark tourist routes and sites of interest should be installed securely and removed at the end of each visit;
- Tents should only be erected at the designated tent site for health and safety reasons, and tour groups should not camp in the Visitor Zone except for reasons of safety;
- Tourist movement within the Visitor Zone should be conducted in small, guided groups;
- Stream and pond beds should be avoided; and
- Activities planned for and conducted within the Visitor Zone should be in accordance with ATCM Recommendation XVIII-1.

Further site-specific guidelines for the conduct of activities within the Visitor Zone are attached as the Antarctic Treaty Visitor Site Guide: Taylor Valley, Southern Victoria Land, Ross Sea (available from the Antarctic Treaty Secretariat at http://www.ats.aq/siteguidelines/documents/Taylor_e.pdf and from http://www.mcmurdodryvalleys.aq).

PART III

Opening and Closing Addresses and Reports

1. Opening and Closing Addresses

Welcoming Address by the President of Bulgaria
Mr Rosen Plevneliev

1 June, National Palace of Culture, Sofia

Esteemed Mr. Raychev

Ladies and Gentlemen Ministers,

Your Excellencies,

Ladies and Gentlemen Delegates,

Dear Researchers,

Welcome to Bulgaria. Welcome to the country of roses and the most healthy yogurt, the country of a talented and hospitable people, which established one of the oldest states in Europe more than 1,300 years ago. It is an honor to us to host the current forum. Our country ratified the Antarctic Treaty in 1978, and since 1998 has been a full member. I take pride in the fact that Bulgaria is among the few East European countries which has its own scientific base on the ice-covered Continent. Our base is on the Livingston Island, which our researchers share with a lot of scholars from other countries every polar season.

The 38th consultative meeting, which we are opening today in Sofia, is held only a couple of months after we marked 55 years since the Antarctic Treaty was signed. It is an international treaty of historical significance for preserving one of the most valuable reserves for humankind – Antarctica. The countries under the treaty have different legal systems and forms of government, have diverse national, religious and cultural traditions. However, all of us are united by one common aim – to freely conduct scientific research in Antarctica, to meet the scientific interests and ensure the prosperity of our global world.

The international documents adopted by the Antarctic System Treaty and its specialized bodies for governing its activities succeeded in creating something unique – governing the scientific research system in the most efficient way, a system open to the scientific projects of teams from each scientific sphere so that they can share the results achieved. At the same time a network for scientific exchange and joint work should be established, which provides an opportunity for revolutionary discoveries – the basis for developing new technologies, which are based on bold decisions and visions and on the results of the projects, activities should be carried out on the ice-covered continent which ensure a sustainable and wonderful Planet Earth.

The Antarctic system is among the best examples of successful international cooperation. The fundamental values of the Antarctic Treaty include using it above all for peaceful aims, demilitarization of the south polar region and international cooperation, which will guarantee full freedom of the scientific research and exchange of information and which will create the only continent on our planet on which there are no military actions and which is mostly designed to conduct scientific research, to protect the environment and unique eco-systems.

Climate changes are the first items on the world agenda, together with the shortage of resources and the implementation of new technologies which are in conformity with nature. Nature constantly reminds us that it is high time we took actions. We should adjust our priorities to the planet and our children. In the autumn of 2014, at a meeting of the General Assembly of the United Nations, I quoted the words of a wise person: “We have not inherited this land from our ancestors, but have borrowed it from our children.” These words are more than ever topical today. We are facing serious challenges and we should not wait, postpone or shift the responsibility to the next government or generation. We can achieve sustainable growth only if we cooperate, pool efforts and share a common will.

Antarctica is a strategic region. The majority of the member states of the Antarctic Treaty are the countries with the most well-developed economy, industry and science in the world. The contribution every country makes, regardless of its size, regardless of how strong its economy is, is important. It is invaluable in achieving our common aim – it is possible to preserve the environment clean and preserve the animal species and plant life by implementing innovative methods.

For quite some time already cooperation has not been a matter of choice, but of necessity. No single nation, irrespective of its political will and economic strength, can alone cope with the global issues and challenges. A shared long-term vision and aims are necessary to strengthen cooperation. Joint forums, such as the consultative meeting of the Antarctic Treaty nations and also the meeting of the Environment Protection Committee have not only the potential, but also the energy to come up with good and commonly acceptable solutions.

The Republic of Bulgaria is an active full member of the Antarctic Treaty. The teams of 23 Bulgarian polar expeditions worked together with scholars from leading countries who signed the Treaty in the distant 1959. Our country enjoys a good reputation and is a trusted partner in all international scientific programs.

Research conducted not only by the Bulgarian Antarctic Institute is carried out in the Bulgarian St. Kliment Ohridski scientific polar base. Scholars from Spain, Portugal, Germany, South Korea, Japan, Argentina, Chile, the United States, Canada, Mongolia, Turkey, Luxemburg and the Republic of Macedonia have worked in our base on joint international projects with their Bulgarian counterparts.

The results of the scientific projects they run are important not only for the present, but also for the future of our planet. The discoveries made within the framework of the scientific projects on studying global climate changes are valuable for addressing the priorities in different scientific fields. In an international context, also important are the results concerning the local climate changes. The seismological and geomorphological research conducted in the Bulgarian base provided the opportunity to come up with new general regularities about the geological evolution of the Gondwana continent. A lot of articles have been published in renowned scientific journals and editions. A lot of Bulgarian geologists, geo-morphologists, geo-physicists, biologists, glaciologists have taken part in national and international research projects related mainly to research focused on climate changes. The Bulgarian scholars contribute to solving global scientific problems.

It is a great privilege and responsibility to me as President to name sites after the ice-covered continent. More than 535 geographical sites in Antarctica bear Bulgarian names. A big part of them are unique.

Extremely important not only for the Bulgarian, but also for world alpinism is the climbing and accurate measuring of the height of Great Needle Peak in the Tangra mountain on the Livingston island made during the last Antarctic season. Equally important is the climbing and accurate measuring of the height of a peak named after Bulgaria’s capital, the wonderful city of Sofia, by the alpinists Doichin Boyanov, Nikolay Petkov and Alexander Shopov during the 23rd Bulgarian expedition to the ice-covered continent. The results achieved by the 23rd Bulgarian expedition (2014-2015) within the framework of the international project on studying the frozen soil are a step ahead in getting to know the climate changes better.

As Head of State I actively support the Bulgarian scientific Antarctic program. Committed to the cause for the better development of our country and the region, I support the scholars and institutions working to solve the global problems. I am happy to see so many young, competent and ambitious ministers who are together with you today and who represent the Bulgarian government and its vision and willingness to support this research. The participants in the Bulgarian polar expeditions are fully assisted in their missions by the institution I head, as well as by the first state institutions. Proud of the achievements of our scholars, every autumn I hand over the national flag to professor Pimpirev for the next expedition.

Dear ladies and gentlemen,

The Republic of Bulgaria will expand its cooperation with the other scientific teams and will continue to actively participate in the scientific Antarctic program. We have set the priority to ensure close cooperation with all other countries in support of the aims of the Antarctic Treaty to assist science, scientific research and sustainable growth.

I believe all of us share a common cause – to preserve this unique continent. Therefore I am proud that Bulgaria is hosting the current forum. The latter is also an acknowledgement of the success of the Bulgarian Antarctic scientific program and the value of the achieved results. The current forum has also made the dream come true of one of the great Bulgarians and polar researchers professor Pimpirev, chair and founder of the Bulgarian Antarctic Institute and head of the Bulgarian Antarctic expeditions. A great scholar who has a big heart for Planet Earth and its remarkably beautiful ice-covered continent.

I wish you successful and constructive work!

2. Reports by Depositaries and Observers

Report of the Depositary Government of the Antarctic Treaty and its Protocol in accordance with Recommendation XIII-2

Information Paper submitted by the United States

This report covers events with respect to the Antarctic Treaty and the Protocol on Environmental Protection to the Antarctic Treaty.

In the past year, there have been two accessions to the Treaty and two accessions to the Protocol. For the Treaty, Kazakhstan deposited its instrument of accession on January 27, 2015, and Mongolia deposited its instrument of accession on March 23, 2015. For the Protocol, Venezuela deposited its instrument of accession on August 1, 2014, and Portugal deposited its instrument of accession on September 10, 2014. There are fifty-two (52) Parties to the Treaty and thirty-seven (37) Parties to the Protocol.

The following countries have provided notification that they have designated the persons so noted as Arbitrators in accordance with Article 2(1) of the Schedule to the Protocol:

Bulgaria	Mrs. Guenka Beleva	30 July 2004
Chile	Amb. María Teresa Infante	June 2005
	Amb. Jorge Berguño	June 2005
	Dr. Francisco Orrego	June 2005
Finland	Amb. Holger Bertil Rotkirch	14 June 2006
India	Prof. Upendra Baxi	6 October 2004
	Mr. Ajai Saxena	6 October 2004
	Dr. N. Khare	6 October 2004
Japan	Judge Shunji Yanai	18 July 2008
Rep. of Korea	Prof. Park Ki Gab	21 October 2008
United States	Prof. Daniel Bodansky	1 May 2008
	Mr. David Colson	1 May 2008

Lists of Parties to the Treaty, to the Protocol, and of Recommendations/Measures and their approvals are attached.

Date of most recent action: March 23, 2015

The Antarctic Treaty

Done: Washington; December 1, 1959

Entry into force: June 23, 1961
In accordance with Article XIII, the Treaty was subject to ratification by the signatory States and is open for accession by any State which is a Member of the United Nations, or by any other State which may be invited to accede to the Treaty with the consent of all the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX of the Treaty; instruments of ratification and instruments of accession shall be deposited with the Government of the United States of America. Upon the deposit of instruments of ratification by all the signatory States, the Treaty entered into force for those States and for States which had deposited instruments of accession to the Treaty. Thereafter, the Treaty enters into force for any acceding State upon deposit of its instrument of accession.

Legend: (no mark) = ratification; **a** = accession; **d** = succession; **w** = withdrawal or equivalent action

Participant	Signature	Consent to be bound		Other Action	Notes
Argentina	December 1, 1959	June 23, 1961			
Australia	December 1, 1959	June 23, 1961			
Austria		August 25, 1987	a		
Belarus		December 27, 2006	a		
Belgium	December 1, 1959	July 26, 1960			
Brazil		May 16, 1975	a		
Bulgaria		September 11, 1978	a		
Canada		May 4, 1988	a		
Chile	December 1, 1959	June 23, 1961			
China		June 8, 1983	a		
Colombia		January 31, 1989	a		
Cuba		August 16, 1984	a		
Czech Republic		January 1, 1993	d		i
Denmark		May 20, 1965	a		
Ecuador		September 15, 1987	a		
Estonia		May 17, 2001	a		
Finland		May 15, 1984	a		
France	December 1, 1959	September 16, 1960			
Germany		February 5, 1979	a		ii
Greece		January 8, 1987	a		
Guatemala		July 31, 1991	a		
Hungary		January 27, 1984	a		
India		August 19, 1983	a		
Italy		March 18, 1981	a		
Japan	December 1, 1959	August 4, 1960			
Kazakhstan		January 27, 2015	a		
Korea (DPRK)		January 21, 1987	a		
Korea (ROK)		November 28, 1986	a		
Malaysia		October 31, 2011	a		
Monaco		May 31, 2008	a		
Mongolia		March 23, 2015	a		
Netherlands		March 30, 1967	a		iii

New Zealand	December 1, 1959	November 1, 1960			
Norway	December 1, 1959	August 24, 1960			
Pakistan		March 1, 2012	**a**		
Papua New Guinea		March 16, 1981	**d**		iv
Peru		April 10, 1981	**a**		
Poland		June 8, 1961	**a**		
Portugal		January 29, 2010	**a**		
Romania		September 15, 1971	**a**		v
Russian Federation	December 1, 1959	November 2, 1960			vi
Slovak Republic		January 1, 1993	**d**		vii
South Africa	December 1, 1959	June 21, 1960			
Spain		March 31, 1982	**a**		
Sweden		April 24, 1984	**a**		
Switzerland		November 15, 1990	**a**		
Turkey		January 24, 1996	**a**		
Ukraine		October 28, 1992	**a**		
United Kingdom	December 1, 1959	May 31, 1960			
United States	December 1, 1959	August 18, 1960			
Uruguay		January 11, 1980	**a**		viii
Venezuela		March 24, 1999	**a**		

[i] Effective date of succession by the Czech Republic. Czechoslovakia deposited an instrument of accession to the Treaty on June 14, 1962. On December 31, 1992, at midnight, Czechoslovakia ceased to exist and was succeeded by two separate and independent states, the Czech Republic and the Slovak Republic.

[ii] The Embassy of the Federal Republic of Germany in Washington transmitted to the Department of State a diplomatic note, dated October 2, 1990, which reads as follows:

"The Embassy of the Federal Republic of Germany presents its compliments to the Department of State and has the honor to inform the Government of the United States of America as the depositary Government of the Antarctic Treaty that, t[h]rough the accession of the German Democratic Republic to the Federal Republic of Germany with effect from October 3, 1990, the two German states will unite to form one sovereign state which, as a contracting party to the Antarctic Treaty, will remain bound by the provisions of the Treaty and subject to those recommendations adopted at the 15 consultative meetings which the Federal Republic of Germany has approved. From the date of German unity, the Federal Republic of Germany will act under the designation of "Germany" within the framework of the [A]ntarctic system.
"The Embassy would be grateful if the Government of the United States of America could inform all contracting parties to the Antarctic Treaty of the contents of this note.
"The Embassy of the Federal Republic of Germany avails itself of this opportunity to renew to the Department of State the assurances of its highest consideration."

Prior to unification, on November 19, 1974, the German Democratic Republic deposited an instrument of accession to the Treaty, accompanied by a declaration, a Department of State English translation of which reads as follows:

"The German Democratic Republic takes the view that Article XIII, paragraph 1, of the Treaty is inconsistent with the principle that all States which are guided in their policies by the purposes and principles of the United Nations Charter have the right to become parties to treaties which affect the interest of all States."

Subsequently, on February 5, 1979, the Federal Republic of Germany deposited an instrument of accession to the Treaty accompanied by a statement, an English translation of which, provided by the Embassy of the Federal Republic of Germany, reads as follows:

"My dear Mr. Secretary,
"In connection with the deposit today of the instrument of accession to the Antarctic Treaty signed in Washington December 1, 1959, I have the honor to state on behalf of the Federal Republic of Germany that with effect from the day on which the treaty enters into force for the Federal Republic of Germany it will also apply to Berlin (West) subject to the rights and responsibilities of the French Republic, the United Kingdom of Great Britain and Northern Ireland and the United States of America including those relating to disarmament and demilitarization.
"Accept, Excellency, the expression of my highest consideration."

[iii] The instrument of accession to the Treaty by the Netherlands states that the accession is for the Kingdom in Europe, Suriname and the Netherlands Antilles.

Suriname became an independent state on November 25, 1975.

The Royal Netherlands Embassy in Washington transmitted to the Department of State a diplomatic note, dated January 9, 1986, which reads as follows:

"The Royal Netherlands Embassy presents its compliments to the Department of State and has the honor to request the Department's attention for the following with respect to the Department's capacity of depositary of [the Antarctic Treaty].
"Effective January 1, 1986 the island of Aruba – formerly part of the Netherlands Antilles – obtained internal autonomy as a country within the Kingdom of The Netherlands. Consequently the Kingdom of The Netherlands as of January 1, 1986 consists of three countries, to wit: the Netherlands proper, the Netherlands Antilles and Aruba.
"Since the abovementioned event concerns only a change in internal constitutional relations within the Kingdom of The Netherlands, and as the Kingdom as such, under international law, will remain the subject with which treaties are concluded, the aforementioned change will have no consequences in international law with regard to treaties concluded by the Kingdom, the application of which (treaties) were extended to the Netherlands Antilles, including Aruba.
"These treaties, thus, will remain applicable for Aruba in its new status as autonomous country within the Kingdom of The Netherlands effective January 1, 1986.
"Consequently the [Antarctic Treaty] to which the Kingdom of the Netherlands is a Party, and which [has] been extended to the Netherlands Antilles will as of January 1, 1986 apply to all three countries of the Kingdom of The Netherlands.
"The Embassy would appreciate if the other Parties concerned would be notified of the above.
"The Royal Netherlands Embassy avails itself of this opportunity to renew to the Department of State the assurance of its highest consideration."

The Royal Netherlands Embassy in Washington transmitted to the Department of State a diplomatic note, dated October 6, 2010, which reads in pertinent part as follows:

"The Kingdom of the Netherlands currently consists of three parts: the Netherlands, the Netherlands Antilles and Aruba. The Netherlands Antilles consists of the islands of Curaçao, Sint Maarten, Bonaire, Sint Eustatius and Saba.
"With effect from 10 October 2010, the Netherlands Antilles will cease to exist as a part of the Kingdom of the Netherlands. From that date onwards, the Kingdom will consist of four parts: the Netherlands, Aruba, Curaçao and Sint Maarten. Curaçao and Sint Maarten will enjoy internal self-government within the Kingdom, as Aruba and, up to 10 October 2010, the Netherlands Antilles do.
"These changes constitute a modification of the internal constitutional relations within the Kingdom of the Netherlands. The Kingdom of the Netherlands will accordingly remain the subject of international law with which agreements are concluded. The modification of the structure of the Kingdom will therefore not affect the validity of the international agreements ratified by the Kingdom for the Netherlands Antilles; these agreements will continue to apply to Curaçao and Sint Maarten.
"The other islands that have until now formed part of the Netherlands Antilles – Bonaire, Sint Eustatius and Saba – will become part of the Netherlands, thus constituting 'the Caribbean part of the Netherlands'. The agreements that now apply to the Netherlands Antilles will also continue to apply to these islands; however, the Government of the Netherlands will now be responsible for implementing these agreements."

[iv] Date of deposit of notification of succession by Papua New Guinea; effective September 16, 1975, the date of its independence.

[v] The instrument of accession to the Treaty by Romania was accompanied by a note of the Ambassador of the Socialist Republic of Romania to the United States of America, dated September 15, 1971, which reads as follows:
"Dear Mr. Secretary:
"Submitting the instrument of adhesion of the Socialist Republic of Romania to the Antarctic Treaty, signed at Washington on December 1, 1959, I have the honor to inform you of the following:
'The Council of State of the Socialist Republic of Romania states that the provisions of the first paragraph of the article XIII of the Antarctic Treaty are not in accordance with the principle according to which the multilateral treaties whose object and purposes are concerning the international community, as a whole, should be opened for universal participation.'
"I am kindly requesting you, Mr. Secretary, to forward to all parties concerned the text of the Romanian instrument of adhesion to the Antarctic Treaty, as well as the text of this letter containing the above mentioned statement of the Romanian Government.

"I avail myself of this opportunity to renew to you, Mr. Secretary, the assurances of my highest consideration."

Copies of the Ambassador's letter and the Romanian instrument of accession to the Treaty were transmitted to the Antarctic Treaty parties by the Secretary of State's circular note dated October 1, 1971.

[vi] The Treaty was signed and ratified by the former Union of Soviet Socialist Republics. By a note dated January 13, 1992, the Russian Federation informed the United States Government that it "continues to perform the rights and fulfil the obligations following from the international agreements signed by the Union of Soviet Socialist Republics."

[vii] Effective date of succession by the Slovak Republic. Czechoslovakia deposited an instrument of accession to the Treaty on June 14, 1962. On December 31, 1992, at midnight, Czechoslovakia ceased to exist and was succeeded by two separate and independent states, the Czech Republic and the Slovak Republic.

[viii] The instrument of accession to the Treaty by Uruguay was accompanied by a declaration, a Department of State English translation of which reads as follows:
"The Government of the Oriental Republic of Uruguay considers that, through its accession to the Antarctic Treaty signed at Washington (United States of America) on December 1, 1959, it helps to affirm the principles of using Antarctica exclusively for peaceful purposes, of prohibiting any nuclear explosion or radioactive waste disposal in this area, of freedom of scientific research in Antarctica in the service of mankind, and of international cooperation to achieve these objectives, which are established in said Treaty.
"Within the context of these principles Uruguay proposes, through a procedure based on the principle of legal equality, the establishment of a general and definitive statute on Antarctica in which, respecting the rights of States as recognized in international law, the interests of all States involved and of the international community as a whole would be considered equitably.
"The decision of the Uruguayan Government to accede to the Antarctic Treaty is based not only on the interest which, like all members of the international community, Uruguay has in Antarctica, but also on a special, direct, and substantial interest which arises from its geographic location, from the fact that its Atlantic coastline faces the continent of Antarctica, from the resultant influence upon its climate, ecology, and marine biology, from the historic bonds which date back to the first expeditions which ventured to explore that continent and its waters, and also from the obligations assumed in conformity with the Inter-American Treaty of Reciprocal Assistance which includes a portion of Antarctic territory in the zone described in Article 4, by virtue of which Uruguay shares the responsibility of defending the region.
"In communicating its decision to accede to the Antarctic Treaty, the Government of the Oriental Republic of Uruguay declares that it reserves its rights in Antarctica in accordance with international law."

PROTOCOL ON ENVIRONMENTAL PROTECTION TO THE ANTARCTIC TREATY
Signed at Madrid on October 4, 1991*

State	Date of Signature	Date deposit of Ratification, Acceptance (A) or Approval (AA)	Date deposit of Accession	Date of entry into force	Date Acceptance ANNEX V**	Date of entry into force of Annex V
CONSULTATIVE PARTIES						
Argentina	Oct. 4, 1991	Oct. 28, 1993 [3]		Jan. 14, 1998	Sept. 8, 2000 (A) Aug. 4, 1995 (B)	May 24, 2002
Australia	Oct. 4, 1991	Apr. 6, 1994		Jan. 14, 1998	Apr. 6, 1994 (A) June 7, 1995 (B)	May 24, 2002
Belgium	Oct. 4, 1991	Apr. 26, 1996		Jan. 14, 1998	Apr. 26, 1996 (A) Oct. 23, 2000 (B)	May 24, 2002
Brazil	Oct. 4, 1991	Aug. 15, 1995		Jan. 14, 1998	May 20, 1998 (B)	May 24, 2002
Bulgaria			April 21, 1998	May 21, 1998	May 5, 1999 (AB)	May 24, 2002
Chile	Oct. 4, 1991	Jan. 11, 1995		Jan. 14, 1998	Mar. 25, 1998 (B)	May 24, 2002
China	Oct. 4, 1991	Aug. 2, 1994		Jan. 14, 1998	Jan. 26, 1995 (AB)	May 24, 2002
Czech Rep.[1,2]	Jan. 1, 1993	Aug. 25, 2004 [4]		Sept. 24, 2004	Apr. 23, 2014 (B)	
Ecuador	Oct. 4, 1991	Jan. 4, 1993		Jan. 14, 1998	May 11, 2001 (A) Nov. 15, 2001 (B)	May 24, 2002
Finland	Oct. 4, 1991	Nov. 1, 1996 (A)		Jan. 14, 1998	Nov. 1, 1996 (A) Apr. 2, 1997 (B)	May 24, 2002
France	Oct. 4, 1991	Feb. 5, 1993 (AA)		Jan. 14, 1998	Apr. 26, 1995 (B) Nov. 18, 1998 (A)	May 24, 2002
Germany	Oct. 4, 1991	Nov. 25, 1994		Jan. 14, 1998	Nov. 25, 1994 (A) Sept. 1, 1998 (B)	May 24, 2002
India	July 2, 1992	Apr. 26, 1996		Jan. 14, 1998	May 24, 2002 (B)	May 24, 2002
Italy	Oct. 4, 1991	Mar. 31, 1995		Jan. 14, 1998	May 31, 1995 (A) Feb. 11, 1998 (B)	May 24, 2002
Japan	Sept. 29, 1992	Dec. 15, 1997 (A)		Jan. 14, 1998	Dec. 15, 1997 (AB)	May 24, 2002
Korea, Rep. of	July 2, 1992	Jan. 2, 1996		Jan. 14, 1998	June 5, 1996 (B)	May 24, 2002
Netherlands	Oct. 4, 1991	Apr. 14, 1994 (A) [6]		Jan. 14, 1998	Mar. 18, 1998 (B)	May 24, 2002
New Zealand	Oct. 4, 1991	Dec. 22, 1994		Jan. 14, 1998	Oct. 21, 1992 (B)	May 24, 2002
Norway	Oct. 4, 1991	June 16, 1993		Jan. 14, 1998	Oct. 13, 1993 (B)	May 24, 2002
Peru	Oct. 4, 1991	Mar. 8, 1993		Jan. 14, 1998	Mar. 8, 1993 (A) Mar. 17, 1999 (B)	May 24, 2002
Poland	Oct. 4, 1991	Nov. 1, 1995		Jan. 14, 1998	Sept. 20, 1995 (B)	May 24, 2002
Russian Federation	Oct. 4, 1991	Aug. 6, 1997		Jan. 14, 1998	June 19, 2001 (B)	May 24, 2002
South Africa	Oct. 4, 1991	Aug. 3, 1995		Jan. 14, 1998	June 14, 1995 (B)	May 24, 2002
Spain	Oct. 4, 1991	July 1, 1992		Jan. 14, 1998	Dec. 8, 1993 (A) Feb. 18, 2000 (B)	May 24, 2002
Sweden	Oct. 4, 1991	Mar. 30, 1994		Jan. 14, 1998	Mar. 30, 1994 (A) Apr. 7, 1994 (B)	May 24, 2002
Ukraine			May 25, 2001	June 24, 2001	May 25, 2001 (A)	May 24, 2002
United Kingdom	Oct. 4, 1991	Apr. 25, 1995 [5]		Jan. 14, 1998	May 21, 1996 (B)	May 24, 2002
United States	Oct. 4, 1991	Apr. 17, 1997		Jan. 14, 1998	Apr. 17, 1997 (A) May 6, 1998 (B)	May 24, 2002
Uruguay	Oct. 4, 1991	Jan. 11, 1995		Jan. 14, 1998	May 15, 1995 (B)	May 24, 2002

** The following denotes date relating either

to acceptance of Annex V or approval of Recommendation XVI-10
(A) Acceptance of Annex V (B) Approval of Recommendation XVI-10

-2-

State	Date of Signature	Ratification Acceptance or Approval	Date deposit of Accession	Date of entry into force	Date Acceptance ANNEX V**	Date of entry into force of Annex V
NON-CONSULTATIVE PARTIES						
Austria	Oct. 4, 1991					
Belarus			July 16, 2008	Aug. 15, 2008		
Canada	Oct. 4, 1991	Nov. 13, 2003		Dec. 13, 2003		
Colombia	Oct. 4, 1991					
Cuba						
Denmark	July 2, 1992					
Estonia						
Greece	Oct. 4, 1991	May 23, 1995		Jan. 14, 1998		
Guatemala						
Hungary	Oct. 4, 1991					
Korea, DPR of	Oct. 4, 1991					
Malaysia						
Monaco			July 1, 2009	July 31, 2009		
Pakistan			Mar. 1, 2012	Mar. 31, 2012		
Papua New Guinea						
Portugal			Sept. 10, 2014	Oct. 10, 2014		
Romania	Oct. 4, 1991	Feb. 3, 2003		Mar. 5, 2003	Feb. 3, 2003	Mar. 5, 2003
Slovak Rep.[1,2]	Jan. 1, 1993					
Switzerland	Oct. 4, 1991					
Turkey						
Venezuela			Aug. 1, 2014	Aug. 31, 2014		

* Signed at Madrid on October 4, 1991; thereafter at Washington until October 3, 1992.
The Protocol will enter into force initially on the thirtieth day following the date of deposit of instruments of ratification, acceptance, approval or accession by all States which were Antarctic Treaty Consultative Parties at the date on which this Protocol was adopted. (Article 23)

**Adopted at Bonn on October 17, 1991 at XVIth Antarctic Consultative Meeting.

1. Signed for Czech & Slovak Federal Republic on Oct. 2, 1992 - Czechoslovakia accepts the jurisdiction of the International Court of Justice and Arbitral Tribunal for the settlement of disputes according to Article 19, paragraph 1. On December 31, 1992, at midnight, Czechoslovakia ceased to exist and was succeeded by two separate and independent states, the Czech Republic and the Slovak Republic.

2. Effective date of succession in respect of signature by Czechoslovakia which is subject to ratification by the Czech Republic and the Slovak Republic.

3. Accompanied by declaration, with informal translation provided by the Embassy of Argentina, which reads as follows: "The Argentine Republic declares that in as much as the Protocol to the Antarctic Treaty on the Protection of the Environment is a Complementary Agreement of the Antarctic Treaty and that its Article 4 fully respects what has been stated in Article IV, Subsection 1, Paragraph A) of said Treaty, none of its stipulations should be interpreted or be applied as affecting its rights, based on legal titles, acts of possession, contiguity and geological continuity in the region South of parallel 60, in which it has proclaimed and maintained its sovereignty."

4. Accompanied by declaration, with informal translation provided by the Embassy of the Czech Republic, which reads as follows: "The Czech Republic accepts the jurisdiction of the International Court of Justice and of the Arbitral Tribunal under Article 19, paragraph 1, of the Protocol on Environmental Protection to the Antarctic Treaty, done at Madrid on October 4, 1991."

5. Ratification on behalf of the United Kingdom of Great Britain and Northern Ireland, the Bailiwick of Jersey, the Bailiwick of Guernsey, the Isle of Man, Anguilla, Bermuda, the British Antarctic Territory, Cayman Islands, Falkland Islands, Montserrat, St. Helena and Dependencies, South Georgia and the South Sandwich Islands, Turks and Caicos Islands and British Virgin Islands.

6. Acceptance is for the Kingdom in Europe. At the time of its acceptance, the Kingdom of the Netherlands stated that it chooses both means for the settlement of disputes mentioned in Article 19, paragraph 1 of the Protocol, i.e. the International Court of Justice and the Arbitral Tribunal.

   On October 27, 2004, the Kingdom of the Netherlands deposited an instrument, dated October 15, 2004, declaring that the Kingdom of the Netherlands accepts the Protocol for the Netherlands Antilles with a statement confirming that it chooses both means for the settlement of disputes mentioned in Article 19, paragraph 1 of the Protocol.

   The Royal Netherlands Embassy in Washington transmitted to the Department of State a diplomatic note, dated October 6, 2010, which reads in pertinent part as follows:

   “The Kingdom of the Netherlands currently consists of three parts: the Netherlands, the Netherlands Antilles and Aruba. The Netherlands Antilles consists of the islands of Curaçao, Sint Maarten, Bonaire, Sint Eustatius and Saba.
   “With effect from 10 October 2010, the Netherlands Antilles will cease to exist as a part of the Kingdom of the Netherlands. From that date onwards, the Kingdom will consist of four parts: the Netherlands, Aruba, Curaçao and Sint Maarten. Curaçao and Sint Maarten will enjoy internal self-government within the Kingdom, as Aruba and, up to 10 October 2010, the Netherlands Antilles do.
   “These changes constitute a modification of the internal constitutional relations within the Kingdom of the Netherlands. The Kingdom of the Netherlands will accordingly remain the subject of international law with which agreements are concluded. The modification of the structure of the Kingdom will therefore not affect the validity of the international agreements ratified by the Kingdom for the Netherlands Antilles; these agreements will continue to apply to Curaçao and Sint Maarten.
   “The other islands that have until now formed part of the Netherlands Antilles – Bonaire, Sint Eustatius and Saba – will become part of the Netherlands, thus constituting ‘the Caribbean part of the Netherlands’. The agreements that now apply to the Netherlands Antilles will also continue to apply to these islands; however, the Government of the Netherlands will now be responsible for implementing these agreements.”

   On October 16, 2014, the Kingdom of the Netherlands deposited an instrument, dated September 3, 2014, declaring that the Kingdom of the Netherlands approves Annex V to the Protocol for the Caribbean part of the Netherlands (the islands of Bonaire, Sint Eustatius and Saba).

Department of State,
Washington, April 3, 2015.

Approval, as notified to the Government of the United States of America, of measures relating to the furtherance of the principles and objectives of the Antarctic Treaty

	16 Recommendations adopted at First Meeting (Canberra 1961) Approved	**10 Recommendations adopted at Second Meeting (Buenos Aires 1962) Approved**	**11 Recommendations adopted at Third Meeting (Brussels 1964) Approved**	**28 Recommendations adopted at Fourth Meeting (Santiago 1966) Approved**	**9 Recommendations adopted at Fifth Meeting (Paris 1968) Approved**	**15 Recommendations adopted at Sixth Meeting (Tokyo 1970) Approved**
Argentina	ALL	ALL	ALL	ALL	ALL	ALL
Australia	ALL	ALL	ALL	ALL	ALL	ALL
Belgium	ALL	ALL	ALL	ALL	ALL	ALL
Brazil (1983)+	ALL	ALL	ALL	ALL	ALL	ALL except 10
Bulgaria (1998)+						
Chile	ALL	ALL	ALL	ALL	ALL	ALL
China (1985)+	ALL	ALL	ALL	ALL	ALL	ALL except 10
Czech Rep. (2014)+	1-7, 10 & 12-14	1, 4, 6-7 & 9	1-2, 7 & 11	14-15, 18, 21-24 & 27	2-3 & 6-7	1, 3, 5-7 & 10-13
Ecuador (1990)+						
Finland (1989)+						
France	ALL	ALL	ALL	ALL	ALL	ALL
Germany (1981)+	ALL	ALL	ALL except 8	ALL except 16-19	ALL except 6	ALL except 9
India (1983)+	ALL	ALL	ALL except 8***	ALL except 18	ALL	ALL except 9 & 10
Italy (1987)+	ALL	ALL	ALL	ALL	ALL	ALL
Japan	ALL	ALL	ALL	ALL	ALL	ALL
Korea, Rep. (1989)+	ALL	ALL	ALL	ALL	ALL	ALL
Netherlands (1990)+	ALL except 11 & 15	ALL except 3, 5, 8 & 10	ALL except 3, 4, 6 & 9	ALL except 20, 25, 26 & 28	ALL except 1, 8 & 9	ALL except 15
New Zealand	ALL	ALL	ALL	ALL	ALL	ALL
Norway	ALL	ALL	ALL	ALL	ALL	ALL
Peru (1989)+	ALL	ALL	ALL	ALL	ALL	ALL
Poland (1977)+	ALL	ALL	ALL	ALL	ALL	ALL
Russia	ALL	ALL	ALL	ALL	ALL	ALL
South Africa	ALL	ALL	ALL	ALL	ALL	ALL
Spain (1988)+	ALL	ALL	ALL	ALL	ALL	ALL
Sweden (1988)+						
U.K.	ALL	ALL	ALL	ALL	ALL	ALL
Uruguay (1985)+	ALL	ALL	ALL	ALL	ALL	ALL
U.S.A.	ALL	ALL	ALL	ALL	ALL	ALL

* IV-6, IV-10, IV-12, and V-5 terminated by VIII-2

*** Accepted as interim guideline

\+ Year attained Consultative Status. Acceptance by that State required to bring into force Recommendations or Measures of meetings from that year forward.

Approval, as notified to the Government of the United States of America, of measures relating to the furtherance of the principles and objectives of the Antarctic Treaty

	9 Recommendations adopted at Seventh Meeting (Wellington 1972)	14 Recommendations adopted at Eighth Meeting (Oslo 1975)	6 Recommendations adopted at Ninth Meeting (London 1977)	9 Recommendations adopted at Tenth Meeting (Washington 1979)	3 Recommendations adopted at Eleventh Meeting (Buenos Aires 1981)	8 Recommendations adopted at Twelfth Meeting (Canberra 1983)
	Approved	**Approved**	**Approved**	**Approved**	**Approved**	**Approved**
Argentina	ALL	ALL	ALL	ALL	ALL	ALL
Australia	ALL	ALL	ALL	ALL	ALL	ALL
Belgium	ALL	ALL	ALL	ALL	ALL	ALL
Brazil (1983)+	ALL except 5	ALL	ALL	ALL	ALL	ALL
Bulgaria (1998)+						
Chile	ALL	ALL	ALL	ALL	ALL	ALL
China (1985)+	ALL except 5	ALL	ALL	ALL	ALL	ALL
Czech Rep. (2014)+	4 & 6-8	1, 4, 6-10, 12 & 14	1 & 2	1-3 & 8	ALL except 2	ALL except 3-5
Ecuador (1990)+						
Finland (1989)+						
France	ALL	ALL	ALL	ALL	ALL	ALL
Germany (1981)+	ALL except 5	ALL except 2 & 5	ALL	ALL	ALL	ALL
India (1983)+	ALL	ALL	ALL	ALL except 1 & 9	ALL	ALL
Italy (1987)+	ALL except 5	ALL	ALL	ALL except 1 & 9		
Japan	ALL	ALL	ALL	ALL	ALL	ALL
Korea, Rep. (1989)+	ALL	ALL	ALL	ALL	ALL	ALL
Netherlands (1990)+	ALL	ALL	ALL except 3	ALL except 9	ALL except 2	ALL
New Zealand	ALL	ALL	ALL	ALL	ALL	ALL
Norway	ALL	ALL	ALL	ALL	ALL	ALL
Peru (1989)+	ALL	ALL	ALL	ALL	ALL	
Poland (1977)+	ALL	ALL	ALL	ALL	ALL	ALL
Russia	ALL	ALL	ALL	ALL	ALL	ALL
South Africa	ALL	ALL	ALL	ALL	ALL	ALL
Spain (1988)+	ALL	ALL	ALL	ALL except 1 & 9	ALL except 1	ALL
Sweden (1988)+						
U.K.	ALL	ALL	ALL	ALL	ALL	ALL
Uruguay (1985)+	ALL	ALL	ALL	ALL	ALL	ALL
U.S.A.	ALL	ALL	ALL	ALL	ALL	ALL

* IV-6, IV-10, IV-12, and V-5 terminated by VIII-2
*** Accepted as interim guideline
+ Year attained Consultative Status. Acceptance by that State required to bring into force Recommendations or Measures of meetings from that year forward.

Approval, as notified to the Government of the United States of America, of measures relating to the furtherance of the principles and objectives of the Antarctic Treaty

	16 Recommendations adopted at Thirteenth Meeting (Brussels 1985) Approved	10 Recommendations adopted at Fourteenth Meeting (Rio de Janeiro 1987) Approved	22 Recommendations adopted at Fifteenth Meeting (Paris 1989) Approved	13 Recommendations adopted at Sixteenth Meeting (Bonn 1991) Approved	4 Recommendations adopted at Seventeenth Meeting (Venice 1992) Approved	1 Recommendation adopted at Eighteenth Meeting (Kyoto 1994) Approved
Argentina	ALL	ALL	ALL	ALL	ALL	ALL
Australia	ALL	ALL	ALL	ALL	ALL	ALL
Belgium	ALL	ALL	ALL	ALL	ALL	ALL
Brazil (1983)+	ALL	ALL	ALL	ALL	ALL	ALL
Bulgaria (1998)+				XVI-10		
Chile	ALL	ALL	ALL	ALL	ALL	ALL
China (1985)+	ALL	ALL	ALL	ALL	ALL	ALL
Czech Rep. (2014)+	1-3, 5-6, 8, 11 & 15-16	1, 3, 5, 7-8 & 10	2, 5, 12-19 & 21	1, 2, 5-6 & 10-12	ALL except 2	ALL
Ecuador (1990)+				XVI-10		
Finland (1989)+			ALL	ALL	ALL	ALL
France	ALL	ALL	ALL	ALL	ALL	ALL
Germany (1981)+	ALL	ALL	ALL except 3, 8, 10, 11 & 22	ALL	ALL	ALL
India (1983)+	ALL	ALL	ALL	ALL	ALL	ALL
Italy (1987)+		ALL	ALL	ALL	ALL	ALL
Japan	ALL	ALL	ALL	ALL except 1, 3-9, 12 & 13	ALL except 1-2 & 4	ALL
Korea, Rep. (1989)+	ALL	ALL	ALL except 1-11, 16, 18 & 19	ALL except 12	ALL except 1	ALL
Netherlands (1990)+	ALL	ALL except 9	ALL except 22	ALL	ALL	ALL
New Zealand	ALL	ALL	ALL	ALL	ALL	ALL
Norway	ALL	ALL	ALL	ALL	ALL	ALL
Peru (1989)+			ALL except 22	ALL except 13	ALL	ALL
Poland (1977)+	ALL	ALL	ALL	ALL	ALL	ALL
Russia	ALL	ALL	ALL	ALL	ALL	ALL
South Africa	ALL	ALL	ALL	ALL	ALL	ALL
Spain (1988)+	ALL	ALL	ALL	ALL	ALL	ALL
Sweden (1988)+			ALL	ALL	ALL	ALL
U.K.	ALL	ALL except 2	ALL except 3, 4, 8, 10 & 11	ALL except 4, 6, 8 & 9	ALL	ALL
Uruguay (1985)+	ALL	ALL	ALL	ALL	ALL	ALL
U.S.A.	ALL	ALL	ALL except 1-4, 10 & 11	ALL	ALL	ALL

* IV-6, IV-10, IV-12, and V-5 terminated by VIII-2

*** Accepted as interim guideline

\+ Year attained Consultative Status. Acceptance by that State required to bring into force Recommendations or Measures of meetings from that year forward.

Approval, as notified to the Government of the United States of America, of measures relating to the furtherance of the principles and objectives of the Antarctic Treaty

	5 Measures adopted at Nineteenth Meeting (Seoul 1995)	2 Measures adopted at Twentieth Meeting (Utrecht 1996)	5 Measures adopted at Twenty-First Meeting (Christchurch 1997)	2 Measures adopted at Twenty-Second Meeting (Tromso 1998)	1 Measure adopted at Twenty-Third Meeting (Lima 1999)
	Approved	**Approved**	**Approved**	**Approved**	**Approved**
Argentina	ALL	ALL	ALL	ALL	ALL
Australia	ALL	ALL	ALL	ALL	ALL
Belgium	ALL	ALL	ALL	ALL	ALL
Brazil (1983)+	ALL	ALL	ALL	ALL	ALL
Bulgaria (1998)+					
Chile	ALL	ALL	ALL	ALL	ALL
China (1985)+	ALL	ALL	ALL	ALL	ALL
Czech Rep. (2014)+	ALL except 1 & 2	ALL except 1	ALL except 1 & 2	ALL except 1	
Ecuador (1990)+					
Finland (1989)+	ALL	ALL	ALL	ALL	ALL
France	ALL	ALL	ALL	ALL	ALL
Germany (1981)+	ALL	ALL	ALL	ALL	ALL
India (1983)+	ALL	ALL	ALL	ALL	ALL
Italy (1987)+	ALL	ALL			
Japan	ALL (except 2&5)	ALL (except 1)	All (except 1-2 & 5)		
Korea, Rep. (1989)+	ALL	ALL	ALL	ALL	ALL
Netherlands (1990)+	ALL	ALL	ALL	ALL	ALL
New Zealand	ALL	ALL	ALL	ALL	ALL
Norway	ALL	ALL	ALL		
Peru (1989)+	ALL	ALL	ALL	ALL	ALL
Poland (1977)+	ALL	ALL	ALL	ALL	ALL
Russia	ALL	ALL	ALL	ALL	ALL
South Africa	ALL	ALL	ALL	ALL	ALL
Spain (1988)+	ALL	ALL	ALL	ALL	ALL
Sweden (1988)+	ALL	ALL	ALL	ALL	ALL
U.K.	ALL	ALL	ALL	ALL	ALL
Uruguay (1985)+	ALL	ALL	ALL	ALL	ALL
U.S.A.	ALL	ALL	ALL	ALL	ALL

"+Year attained Consultative Status. Acceptance by that state required to bring into force Recommendations or Measures of meetings from that Year forward."

Approval, as notified to the Government of the United States of America, of measures relating to the furtherance of the principles and objectives of the Antarctic Treaty

	2 Measures adopted at Twelfth Special Meeting (The Hague 2000) Approved	**3 Measures adopted at Twenty-Fourth Meeting (St. Petersburg 2001) Approved**	**1 Measure adopted at Twenty-Fifth Meeting (Warsaw 2002) Approved**	**3 Measures adopted at Twenty-Sixth Meeting (Madrid 2003) Approved**	**4 Measures adopted at Twenty-Seventh Meeting (Cape Town 2004) Approved**
Argentina			*	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **, XXVII-4
Australia	ALL	ALL	ALL	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **, XXVII-4
Belgium	ALL	ALL	ALL	ALL	ALL
Brazil (1983)+	ALL	ALL	ALL	ALL	XXVII-1, XXVII-2, XXVII-3
Bulgaria (1998)+			*	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **
Chile	ALL	ALL	ALL	ALL	ALL
China (1985)+	ALL	ALL	ALL	ALL	XXVII-1 *, XXVII-2 *, XXVII-3 **
Czech Rep. (2014)+	ALL	ALL	ALL	ALL	ALL
Ecuador (1990)+			*	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **
Finland (1989)+	ALL	ALL	*	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **, XXVII-4
France	ALL (except SATCM XII-2)	ALL	*	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1, XXVII-2 *, XXVII-3, XXVII-4
Germany (1981)+	ALL	ALL	ALL	ALL	XXVII-1 *, XXVII-2 *, XXVII-3 **
India (1983)+	ALL	ALL	ALL	ALL	XXVII-1 *, XXVII-2 *, XXVII-3 **
Italy (1987)+			*	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **
Japan		ALL	*	ALL	XXVII-1 *, XXVII-2 *, XXVII-3 **, XXVII-4
Korea, Rep. (1989)+	ALL	ALL	*	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **
Netherlands (1990)+	ALL	ALL	ALL	ALL	ALL
New Zealand	ALL	ALL	ALL	ALL	XXVII-1 *, XXVII-2 *, XXVII-3 **, XXVII-4
Norway		ALL	*	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **
Peru (1989)+	ALL	ALL	ALL	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **
Poland (1977)+		ALL	ALL	ALL	ALL
Russia	ALL	ALL	ALL	XXVI-1, XXVI-2, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **
South Africa	ALL	ALL	ALL	ALL	ALL
Spain (1988)+			*	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **
Sweden (1988)+	ALL	ALL	ALL	ALL	XXVII-1 *, XXVII-2 *, XXVII-3 **
Ukraine (2004)+					XXVII-1 *, XXVII-2 *, XXVII-3 **
U.K.	ALL (except SATCM XII-2)	ALL (except XXIV-3)	ALL	ALL	XXVII-1 *, XXVII-2 *, XXVII-3 **, XXVII-4
Uruguay (1985)+	ALL	ALL	*	XXVI-1, XXVI-2 *, XXVI-3	XXVII-1 *, XXVII-2 *, XXVII-3 **, XXVII-4

U.S.A.	ALL	ALL	*	XXVI-1, XXVI-2 *, XXVI-3 **	XXVII-1 *, XXVII-2 *, XXVII-3 **

"+Year attained Consultative Status. Acceptance by that state required to bring into force Recommendations or Measures of meetings from that Year forward."

* Management Plans annexed to this Measure were deemed to have been approved in accordance with Article 6(1) of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty and the Measure not specifying a different approval method.

** Revised and updated List of Historic Sites and Monuments annexed to this Measure was deemed to have been approved in accordance with Article 8(2) of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty and the Measure not specifying a different approval method.

Approval, as notified to the Government of the United States of America, of measures relating to the furtherance of the principles and objectives of the Antarctic Treaty

	5 Measures adopted at Twenty-Eighth Meeting (Stockholm 2005) **Approved**	4 Measures adopted at Twenty-Ninth Meeting (Edinburgh 2006) **Approved**	3 Measures adopted at Thirtieth Meeting (New Delhi 2007) **Approved**	14 Measures adopted at Thirty-first Meeting (Kyiv 2008) **Approved**
Argentina	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Australia	XXVIII-1, XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Belgium	ALL except Measure 1	ALL	ALL	XXXI-1 - XXXI-14 *
Brazil (1983)+	ALL except Measure 1	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Bulgaria (1998)+	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Chile	ALL except Measure 1	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
China (1985)+	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Czech Rep. (2014)+	ALL except Measure 1	ALL	ALL	ALL except Measure 8
Ecuador (1990)+	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Finland (1989)+	XXVIII-1, XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
France	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Germany (1981)+	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
India (1983)+	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Italy (1987)+	XXVIII-1, XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Japan	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Korea, Rep. (1989)+	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Netherlands (1990)+	ALL	ALL	ALL	ALL
New Zealand	XXVIII-1, XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Norway	XXVIII-1, XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Peru (1989)+	XXVIII-1, XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Poland (1977)+	ALL	ALL	ALL	XXXI-1 - XXXI-14 *

Russia	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
South Africa	XXVIII-1, XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	ALL	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Spain (1988)+	XXVIII-1, XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Sweden (1988)+	XXVIII-1, XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Ukraine (2004)+	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
U.K.	XXVIII-1, XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
Uruguay (1985)+	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *
U.S.A.	XXVIII-2 *, XXVIII-3 *, XXVIII-4 *, XXVIII-5 **	XXIX-1 *, XXIX-2 *, XXIX-3 **, XXIX-4 ***	XXX-1 *, XXX-2 *, XXX-3 **	XXXI-1 - XXXI-14 *

"+Year attained Consultative Status. Acceptance by that state required to bring into force Recommendations or Measures of meetings from that Year forward."

* Management Plans annexed to this Measure deemed to have been approved in accordance with Article 6(1) of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty and the Measure not specifying a different approval method.

** Revised and updated List of Historic Sites and Monuments annexed to this Measure deemed to have been approved in accordance with Article 8(2) of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty and the Measure not specifying a different approval method.

*** Modification of Appendix A to Annex II to the Protocol on Environmental Protection to the Antarctic Treaty deemed to have been approved in accordance with Article 9(1) of Annex II to the Protocol on Environmental Protection to the Antarctic Treaty and the Measure not specifying a different approval method.

Approval, as notified to the Government of the United States of America, of measures relating to the furtherance of the principles and objectives of the Antarctic Treaty

	16 Measures adopted at Thirty-second Meeting (Baltimore 2009) Approved	15 Measures adopted at Thirty-third Meeting (Punta del Este 2010) Approved	12 Measures adopted at Thirty-fourth Meeting (Buenos Aires 2011) Approved	11 Measures adopted at Thirty-fifth Meeting (Hobart 2012) Approved	21 Measures adopted at Thirty-sixth Meeting (Brussels 2013) Approved
Argentina	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Australia	XXXII-1 - XXXII-13* and XXXII-14**; XXXII-15	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Belgium	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Brazil (1983)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Bulgaria (1998)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Chile	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
China (1985)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Czech Rep. (2014)+	ALL except 2 and 16	ALL	ALL	ALL	ALL
Ecuador (1990)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Finland (1989)+	XXXII-1 - XXXII-13* and XXXII-14**; XXXII-16	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
France	XXXII-1 - XXXII-13* and XXXII-14**; XXXII-15	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Germany (1981)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
India (1983)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Italy (1987)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Japan	XXXII-1 - XXXII-13* and XXXII-14**; XXXII-15	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Korea, Rep. (1989)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Netherlands (1990)+	XXXII-1 - XXXII-13 and XXXII-14; XXXII-15 - XXXII-16	ALL	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	ALL	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
New Zealand	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Norway	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Peru (1989)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and	XXXIV-1 - XXXIV-10* and XXXIV-11	XXXV-1 - XXXV-10* and	XXXVI-1 - XXXVI-17* and XXXVI-18

		XXXIII-15**	- XXXIV-12**	XXXV-11**	- XXXVI-21**
Poland (1977)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Russia	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
South Africa	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Spain (1988)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Sweden (1988)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Ukraine (2004)+	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
U.K.	XXXII-1 - XXXII-13* and XXXII-14**; XXXII-15 - XXXII-16	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
Uruguay (1985)+	XXXII-1 - XXXII-13* and XXXII-14**; XXXII-15	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**
U.S.A.	XXXII-1 - XXXII-13* and XXXII-14**	XXXIII-1 - XXXIII-14* and XXXIII-15**	XXXIV-1 - XXXIV-10* and XXXIV-11 - XXXIV-12**	XXXV-1 - XXXV-10* and XXXV-11**	XXXVI-1 - XXXVI-17* and XXXVI-18 - XXXVI-21**

"+Year attained Consultative Status. Acceptance by that state required to bring into force Recommendations or Measures of meetings from that Year forward."

* Management Plans annexed to these Measures deemed to have been approved in accordance with Article 6(1) of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty and the Measure not specifying a different approval method.

** Modifications and/or additions to List of Historic Sites and Monuments deemed to have been approved in accordance with Article 8(2) of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty and the Measure not specifying a different approval method.

Approval, as notified to the Government of the United States of America, of measures relating to the furtherance of the principles and objectives of the Antarctic Treaty

	16 Measures adopted at Thirty-seventh Meeting (Brasilia 2014)
	Approved
Argentina	XXXVII-1 - XXXVII-16*
Australia	XXXVII-1 - XXXVII-16*
Belgium	XXXVII-1 - XXXVII-16*
Brazil (1983)+	XXXVII-1 - XXXVII-16*
Bulgaria (1998)+	XXXVII-1 - XXXVII-16*
Chile	XXXVII-1 - XXXVII-16*
China (1985)+	XXXVII-1 - XXXVII-16*
Czech Rep. (2014)+	XXXVII-1 - XXXVII-16*
Ecuador (1990)+	XXXVII-1 - XXXVII-16*
Finland (1989)+	XXXVII-1 - XXXVII-16*
France	XXXVII-1 - XXXVII-16*
Germany (1981)+	XXXVII-1 - XXXVII-16*
India (1983)+	XXXVII-1 - XXXVII-16*
Italy (1987)+	XXXVII-1 - XXXVII-16*
Japan	XXXVII-1 - XXXVII-16*
Korea, Rep. (1989)+	XXXVII-1 - XXXVII-16*
Netherlands (1990)+	XXXVII-1 - XXXVII-16*
New Zealand	XXXVII-1 - XXXVII-16*
Norway	XXXVII-1 - XXXVII-16*
Peru (1989)+	XXXVII-1 - XXXVII-16*
Poland (1977)+	XXXVII-1 - XXXVII-16*
Russia	XXXVII-1 - XXXVII-16*
South Africa	XXXVII-1 - XXXVII-16*
Spain (1988)+	XXXVII-1 - XXXVII-16*
Sweden (1988)+	XXXVII-1 - XXXVII-16*
Ukraine (2004)+	XXXVII-1 - XXXVII-16*
U.K.	XXXVII-1 - XXXVII-16*
Uruguay (1985)+	XXXVII-1 - XXXVII-16*
U.S.A.	XXXVII-1 - XXXVII-16*

"+Year attained Consultative Status. Acceptance by that state required to bring into force Recommendations or Measures of meetings from that Year forward."

* Management Plans annexed to these Measures deemed to have been approved in accordance with Article 6(1) of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty and the Measure not specifying a different approval method.

** Modifications and/or additions to List of Historic Sites and Monuments deemed to have been approved in accordance with Article 8(2) of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty and the Measure not specifying a different approval method.

Office of the Assistant Legal Adviser for Treaty Affairs
Department of State
Washington, April 3, 2015.

Report of the Depositary Government for the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)

Information paper submitted by Australia

Abstract

A report is provided by Australia as Depositary of the *Convention on the Conservation of Antarctic Marine Living Resources* 1980.

Background

Australia, as Depositary of the *Convention on the Conservation of Antarctic Marine Living Resources* 1980 ('the Convention') is pleased to report to the Thirty-eighth Antarctic Treaty Consultative Meeting (ATCM XXXVIII) on the status of the Convention.

Australia advises Antarctic Treaty Parties that, since the Thirty-seventh Antarctic Treaty Consultative Meeting (ATCM XXXVII), there has been no depositary activity.

A copy of the status list for the Convention is available via the internet on the Australian Treaties Database at the following address:

http://www.austlii.edu.au/au/other/dfat/treaty_list/depository/CCAMLR.html

The status list is also available on request to the Treaties Secretariat of the Australian Government Department of Foreign Affairs and Trade. Requests can be conveyed through Australian diplomatic missions.

Report of the Depositary Government for the Agreement on the Conservation of Albatrosses and Petrels (ACAP)

Information paper submitted by Australia

Abstract

A report is provided by Australia as Depositary of the *Agreement on the Conservation of Albatrosses and Petrels* 2001.

Background

Australia, as Depositary of the *Agreement on the Conservation of Albatrosses and Petrels* 2001 (‘the Agreement’) is pleased to report to the Thirty-eighth Antarctic Treaty Consultative Meeting (ATCM XXXVIII) on the status of the Agreement.

Australia advises Antarctic Treaty Parties that, since the Thirty-seventh Antarctic Treaty Consultative Meeting (ATCM XXXVII), no States have acceded to the Agreement.

A copy of the status list for the Agreement is available, via the internet, on the Australian Treaties Database at the following address:

http://www.austlii.edu.au/au/other/dfat/treaty_list/depository/consalbnpet.html

The status list is also available on request to the Treaties Secretariat of the Australian Government Department of Foreign Affairs and Trade. Requests can be conveyed through Australian diplomatic missions.

Report by the United Kingdom as Depositary Government for the Convention for the Conservation of Antarctic Seals (CCAS) in Accordance with Recommendation XIII-2, Paragraph 2(D)

Parties to the Convention and new accessions

The United Kingdom, as Depositary Government for the Convention for the Conservation of Antarctic Seals (CCAS), has not received any requests to accede to the Convention, or any instruments of accession, since the previous report (ATCM XXXVII/IP4 rev.1).

The full list of countries which were original signatories to the Convention, and countries which have subsequently acceded is attached to this report (Annex A).

CCAS Annual Return 2013/2014

Annex B lists all capturing and killing of Antarctic seals by Contracting Parties to CCAS for the reporting year 1 March 2013 to 28 February 2014. All reported captures were for scientific research.

Next CCAS Annual Return

The United Kingdom would like to remind Contracting Parties to CCAS that the Exchange of Information, referred to in Paragraph 6(a) in the Annex to the Convention, for the reporting period of 1 March 2014 to 28 February 2015 is due by **30 June 2015.** CCAS Parties should submit their returns, including nil returns, to both the United Kingdom and SCAR. The UK would like to encourage all Contracting Parties to CCAS to submit their returns on time.

The CCAS report for the reporting period 2014/2015 will be submitted to ATCM XXXIX, once the June 2015 deadline for exchange of information has passed.

ANNEX A

Parties to the Convention for the Conservation of Antarctic Seals (CCAS)

London, 1 June-31 December 1972; the Convention entered into force on 11 March 1978.

State	Date of Signature	Date of Deposit (Ratification or Acceptance)
Argentina*	9 June 1972	7 March 1978
Australia	5 October 1972	1 July 1987
Belgium	9 June 1972	9 February 1978
Chile*	28 December 1972	7 February 1980
France**	19 December 1972	19 February 1975
Japan	28 December 1972	28 August 1980
Norway	9 June 1972	10 December 1973
Russia****	9 June 1972	8 February 1978
South Africa	9 June 1972	15 August 1972
United Kingdom**	9 June 1972	10 September 1974***
United States of America	28 June 1972	19 January 1977

Accessions

State	Date of deposit of Instrument of Accession
Brazil	11 February 1991
Canada	4 October 1990
Germany	30 September 1987
Italy	2 April 1992
Poland	15 August 1980
Pakistan	25 March 2013

* Declaration or Reservation
** Objection
*** The instrument of ratification included the Channel Islands and the Isle of Man
**** Former USSR

ANNEX B

Annual CCAS Report 2013/2014

Synopsis of reporting in accordance with Article 5 and the Annex of the Convention: Capturing and killing of seals during the period 1 March 2013 to 28 February 2014.

Contracting Party	**Antarctic Seals Captured**	**Antarctic Seals Killed**
Argentina	381 (a)	1 (b)
Australia	0	0
Belgium	0	0
Brazil	0	0
Canada	0	0
Chile	0	0
France	80 (c)	0
Germany	9 (d)	0
Italy	0	0
Japan	0	0
Norway	0	0
Pakistan	No return received	No return received
Poland	0	0
Russia	No return received	No return received
South Africa	0	0
United Kingdom	0	0
United States of America	3201 (e)	2 (f)

All reported capturing was for scientific research.

(a) **Southern Elephant Seals:** 13 juvenile male, 27 adult male, 41 juvenile/adult male, 17 recaptured juvenile/adult male and 217 pups. **Leopard Seals:** 45 juvenile/adult and 5 recaptured adult male. **Weddell** and **Crabeater Seals:** 16 adult.

(b) 1 adult male **Leopard Seal** reportedly accidentally died during the immobilisation process due to some physiological problem.

(c) **Weddell Seals:** 60 juvenile and 20 adult.

(d) **Weddell Seals:** 7 adult female and 2 adult male.

(e) **Antarctic fur seals:** 73 adult/juvenile and 545 pups. **Leopard Seals:** 26 adult/juvenile. **Southern Elephant Seals:** 22 adult/juvenile and 35 pups. **Weddell Seals:** 321 adult (221 female, 99 male, 1 unknown), 3 juvenile (2 female, 1 male), 597 pups (299 female, 279 male, 19 unknown), 1 not categorised and 1565 observation only. **Crabeater Seals:** 10 observation only. **Elephant seals:** 3 not categorised.

(f) **Antarctic fur seals:** 1 adult and 1 pup (accidental mortality). The US also reported 1 female **Weddell Seal** found dead post capture (autopsy suspects an aggressive male seal) and 2 female **Weddell Seals** not captured found dead.

Report by the CCAMLR Observer to the Thirty-eighth Antarctic Treaty Consultative Meeting

Report of the Thirty-third
Meeting of the Commission
(Hobart, Australia, 20 to 31 October 2014)

1. Opening of the meeting

1. The Thirty-third Annual Meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR-XXXIII) was held in Hobart, Tasmania, Australia, from 20 to 31 October 2014. It was chaired by Mr L. Dybiec (Poland).

2. Twenty four Members, two additional Contracting Parties and nine Observers from non-government or industry organisations participated.

2. Organisation of the meeting

Status of the Convention

3. Australia, as Depository, reported that the status of the Convention had not changed during the last intersessional period.

3. Implementation and compliance

4. The Commission approved the CCAMLR Compliance Report for 2014 noting that the Compliance Report includes an assessment of Members' compliance status, recommendations on remedial action and amendments to conservation measures, obligations and any responsive action required.

5. It also considered:

- work during 2015 to further review CCAMLR Conservation Measures concerning licensing and inspection obligations, transhipment and the Vessel Monitoring System
- fishery notifications submitted by Members for exploratory and krill fisheries for 2014/15
- A review of illegal, unreported and unregulated (IUU) fishing activities in the Convention Area, including that no new vessels were proposed for either the CP- or the NCP-IUU Vessel List, and issues associated with anomalous data submitted to CCAMLR. The Commission also agreed that it will work on developing a strategy for increased non-Contracting Party cooperation more broadly.
- The Independent Review of CCAMLR's Catch Documentation Scheme (CDS) including further work to promote cooperation in the CDS with non-Contracting Parties
- The acquisition of a new Vessel Monitoring System (VMS)
- The adoption of an Arrangement for the release CCAMLR VMS data to support search and rescue (SAR) efforts in the CAMLR Convention Area (refer to previous discussions regarding SAR at ATCMXXXVI and ATCMXXXVII)
- Consideration of the Cape Town Agreement of 2012, which updates and amends a number of provisions of the 1993 Torremolinos Protocol, and which offers potential to enhance safety standards for fishermen and fishing vessels, and
- The use of satellite derived imagery to enhance efforts to detect IUU fishing in the Convention Area.

4. Administration and Finance

6. Among other matters, the Commission endorsed:

- the Secretariat's Strategic Plan (2015–2018) and its associated Staffing and Salary Strategy
- a Budget for 2015
- on-going work to secure sustainable funding for the organisation.

5. Report of the Scientific Committee

Krill resources

7. In 2013/14 five Members fished for krill with a total reported catch (to 3 October 2014) is approximately 291 370 tonnes[1] - the highest reported catch since 1991. Most of this catch was taken off the West Antarctic Peninsula (Subarea 48.1), which reached 94% of its allocated trigger level (155 000 tonnes) and was closed on 17 May 2014.

8. Notifications for krill fishing in 2014/15 were received from six Members and 21 vessels. There were no notifications for exploratory krill fisheries.

9. The Commission noted the discussion of the Scientific Committee with respect to ecosystem monitoring and estimates of penguin populations and the development of a feedback management strategy for the krill fishery.

10. The Commission agreed that based on current knowledge, a continuation of the distribution of the trigger level in the krill fishery (Conservation Measure CM 51-07) in its current form is consistent with the objectives of Article II and that the current interim distribution in Subareas 48.1 to 48.4 be carried forward while the science needed to move to stage 2 of feedback management is progressed.

11. The Commission welcomed the use the CCAMLR Ecosystem Monitoring Program (CEMP) Fund to support a proposal to use remote cameras for penguin population monitoring in Subarea 48.1.

Fish resources

12. In 2013/14, 13 Members fished (including research fishing) for toothfish (*Dissostichus eleginoides* and/or *D. mawsoni*) in the Convention Area. The reported total catch of *Dissostichus* spp. to 20 September 2014 was 11 590 tonnes[2]. In comparison, the total reported catch of toothfish in 2012/13 was 15 330 tonnes. In addition, four Members targeted icefish during the season.

13. The Commission endorsed the advice of the Scientific Committee on catch limits for CCAMLR regulated fisheries during 2014/15.

14. The Commission endorsed the recommendations of the Scientific Committee regarding fish and invertebrate by-catch, including fish by-catch in the krill fishery and skate by-catch.

New and exploratory finfish fisheries

15. Notifications for exploratory fisheries for *Dissostichus* spp. in 2014/15 were submitted by ten Members for a total of 27 vessels. These, and associated research and survey plans were considered by the Commission on the basis of advice provided by the Scientific Committee.

Incidental mortality of seabirds and marine mammals associated with fisheries

16. The Commission revised Conservation Measures regarding protection afforded to seabirds during fishing operations.

Bottom fishing and vulnerable marine ecosystems

17. The Commission revised its Conservation Measures to avoid and mitigate significant adverse impacts on vulnerable marine ecosystems (VMEs) during bottom fishing and agreed to review current management arrangements to ensure they are sufficient for all fisheries to avoid causing significant adverse impacts on VMEs.

Marine protected areas

18. The Commission welcomed the update on the preparatory work for the spatial planning of marine protected areas (MPAs) in (i) Domain 1 (Western Antarctic Peninsula–South Scotia Arc), (ii) Domains 3 and 4 (Weddell Sea), (iii) Domain 7 (East Antarctic Representative System of MPAs) and Domain 8 for the Ross Sea Region. The Commission encouraged all Members to undertake research and monitoring, including associated with the CCAMLR MPAs, noting that the responsibility for research and monitoring is not restricted to the proponents of MPAs.

19. The Commission welcomed the proposed MPA checklist presented by Japan.

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[1] The total krill harvest at 30 November 2014 was 294 145 t.
[2] The total toothfish harvest at 30 November 2014 was 15 218 t.

20. The Commission noted the deliberation of the Scientific Committee in respect of the South Orkney Islands Southern Shelf (SOISS) MPA, including the agreement of the Scientific Committee that the MPA Report for the SOISS MPA and the research and monitoring plan provided a good format for describing research and monitoring activities.

Climate change

21. The Commission noted the Scientific Committee's discussions on climate change and endorsed advice from the Scientific Committee that development of a feedback management strategy for the krill fishery offers the opportunity to adapt to the impacts of climate change.

22. The Commission noted the importance of the impact of climate change to the work of CCAMLR and noted the previous important advice on climate change prepared by SCAR. The Scientific Committee was encouraged to liaise with SCAR to receive regular updates and advice on climate change impacts in the Southern Ocean.

Capacity building

23. The Commission endorsed the advice of the Scientific Committee in relation to capacity building including through the CCAMLR Scientific Scholarship. A krill researcher from VNIRO, Russia, was selected to receive a CCAMLR scholarship in 2014/15.

Conservation measures

24. Conservation measures and resolutions adopted at CCAMLR-XXXIII has been published on the CCAMLR website (*Schedule of Conservation Measures in Force 2014/15)*.

Marine protected areas

25. New Zealand and the USA introduced a revised proposal for the establishment of a Ross Sea Region MPA and Australia, France and the EU introduced a revised proposal to establish an East Antarctic Representative System of MPAs. After considerable discussion the Commission encouraged further consideration of both proposals at future meetings of the Commission.

Implementation of Convention objectives

CCAMLR Symposium

26. The Commission endorsed a CCAMLR Symposium to mark the 35th anniversary of the adoption of the Convention to be held in Puerto Varas, Chile, 5 to 8 May 2015.

Performance Review

27. The Commission agreed to consider draft terms of reference for the second Performance Review inter sessionally.

Cooperation with the Antarctic Treaty System and international organisations

Cooperation with Antarctic Treaty Consultative Parties

28. The Commission received reports relating to the outcomes of the 37th Antarctic Treaty Consultative Meeting. Opportunities to increase information exchange with the Council of Managers of National Antarctic Programs (COMNAP), especially with respect to the work of CCAMLR on spatial planning and MPAs and sightings and reporting of IUU vessels in the CAMLR Convention Area, were discussed.

29. The Commission welcomed the proposal for a Second Joint CEP–SC-CAMLR Workshop on the topics of ecosystem and environmental monitoring to detect the effects of climate change.

Next meeting

Election of officers

30. The Commission elected Russia to Chair the Commission meetings in 2015 and 2016.

Next meeting

31. The Commission agreed that its Thirty-fourth Meeting will be held at the CCAMLR Headquarters building (181 Macquarie Street) in Hobart from 19 to 30 October 2015. The Thirty-fourth Meeting of the Scientific Committee will be held in Hobart from 19 to 23 October 2015.

The Scientific Committee on Antarctic Research (SCAR) Annual Report 2014/15

1. Background

The Scientific Committee on Antarctic Research (SCAR) is a non-governmental, Interdisciplinary Scientific Body of the International Council for Science (ICSU), and Observer to the Antarctic Treaty and the UNFCCC.

SCAR's Mission is (i) to be the leading, independent, non-governmental facilitator, coordinator, and advocate of excellence in Antarctic and Southern Ocean science and research and (ii) to provide independent, sound, scientifically-based advice to the Antarctic Treaty System and other policy makers including the use of science to identify emerging trends and bring these issues to the attention of policy makers.

2. Introduction

SCAR's scientific research adds value to national efforts by enabling researchers to collaborate on large-scale scientific programmes to accomplish objectives not easily obtainable by any single country. SCAR's Members currently include 39 countries and 9 ICSU Scientific Unions. During the SCAR Delegates' Meeting held in New Zealand in September 2014, the Czech Republic and the Islamic Republic of Iran joined SCAR.

SCAR's success depends on the quality and timeliness of its scientific outputs. Descriptions of SCAR's research programmes and scientific outputs are available at: www.scar.org. This paper should be read in conjunction with a separate Background Paper (BP 4) that highlights recent science papers published since the last Antarctic Treaty Meeting.

SCAR produces an electronic quarterly Newsletter highlighting relevant science and other SCAR related issues. Please email: info@scar.org if you wish to be added to the mailing list. SCAR is also available on social media such as Facebook, LinkedIn and Twitter.

3. SCAR Highlights (2014/15)

SCAR has a number of groups and programmes that focus on different science or science-related activities in the Antarctic region. Here we highlight updates to SCAR activities that we believe to be of particular interest to Treaty Parties.

The Standing Committee on the Antarctic Treaty System (SCATS)

(www.scar.org/antarctic-treaty-system/scats)

SCATS is the body tasked with developing SCAR's scientific advice to the Antarctic Treaty. In addition to providing and co-ordinating scientific advice for SCAR, SCATS members are also actively involved in research. During the last SCAR Delegates' meeting a new Chief Officer, Aleks Terauds, was appointed, as were several new members (see http://www.scar.org/antarctic-treaty-system/scats). SCATS is supporting the Antarctic Environments Portal where the SCATS Chief Officer sits on the editorial board, playing an important role in content development.

Southern Ocean Acidification *(www.scar.org/ssg/physical-sciences/acidification)*

SCAR has undertaken a synthesis of the scientific understanding of Southern Ocean acidification. This landmark report will be highlighted at the ATCM XXXVIII - CEP XVIII in Sofia, Bulgaria. This is also the topic of this year's Treaty Lecture (See BP 1). A pdf of the report will be made available from the SCAR website.

The Biogeographic Atlas of the Southern Ocean

The Biogeographic Atlas presents the distribution patterns and processes of a significant representation of Southern Ocean organisms, illustrated by more than 800 distribution maps and 200 pictures and graphs. The Atlas is a legacy of the International Polar Year 2007-2008 and a contribution to the SCAR scientific research programmes AntEco

(State of the Antarctic Ecosystem) and AnT-ERA (Antarctic Thresholds - Ecosystem Resilience and Adaptation). The Atlas was launched at the last SCAR Meeting and Open Science Conference (Auckland, New Zealand August 25-28th 2014).

The SCAR Science Horizon Scan *(www.scar.org/horizonscanning/)*

Following the crowdsourcing of over 850 unique scientific questions by the SCAR community, the 1st SCAR Antarctic and Southern Ocean Science Horizon Scan assembled more than 70 of the world's leading Antarctic scientists, policy makers and visionaries (including early career scientists) in Queenstown, New Zealand, in April 2014. Their remit was to identify the most important scientific questions that should, be addressed by research in and from the southern polar regions over the next two decades and beyond. The initial outcomes were published in the journals *Nature* (http://www.nature.com/news/polar-research-six-priorities-for-antarctic-science-1.15658) and *Antarctic Science* (http://dx.doi.org/10.1017/S0954102014000674). See IP 20.

Many national Antarctic programmes are now developing their own strategies on how they will deliver their science programmes in the future. Delivery of such a "roadmap" is not without its challenges. Therefore, with SCAR's assistance, COMNAP is leading a second stage in the process with the Antarctic Research Challenges (ARC) Project (www.comnap.aq) in order to assist national Antarctic programmes to understand, and develop ways to address the challenges, and share any innovation or access to such technology. The ARC project focuses on answering the question: "How will national Antarctic programmes meet the challenges of delivery of their Antarctic science in the next 20 to 30 years?"

Antarctic Conservation in the 21st Century *(www.scar.org/antarctic-treaty-system/scats)*

SCAR, in collaboration with several partners, continued its development of the 'Antarctic Conservation for the 21st Century' strategy. The activity has encouraged participation from all stakeholders in the region. The approach is also structured to align with both the Protocol on Environmental Protection to the Antarctic Treaty and the Five Year Work Plan of the Committee for Environmental Protection. It also links closely with the Antarctic Environments Portal (See WP 21 and IP 11). As part of this process, a symposium was held during the SCAR Open Science Conference in New Zealand in August 2014, which will feed into the final process.

SCAR Data and Products *(www.scar.org/data-products)*

SCAR promotes free and unrestricted access to Antarctic data and information through open and accessible archives, managed by its Standing Committees on Antarctic Data Management (SCADM) and Antarctic Geographic Information (SCAGI). SCAR also has several products of use to the Antarctic community, such as the recent Quantarctica (http://www.scar.org/data-products/quantarctica) and the Antarctic Map Catalogue (http://www.scar.org/data-products/mapcat).

New SCAR groups

Several new groups were approved in 2014 during the last SCAR Delegates' Meeting, including:

- ***SnowAnt (Snow in Antarctica) Action Group*** aims to identify undisturbed snow areas in Antarctica and to characterize their properties. *www.scar.org/ssg/physical-sciences/snowant*
- ***ANTOS (Antarctic Nearshore Terrestrial Observing System) Action Group*** aims to establish an integrated and coordinated trans-continental and trans-regional environmental surveillance system to identify and track environmental variability and change at biologically relevant scales, and to use this information to inform biological, physical, and earth science studies. *www.scar.org/ssg/life-sciences/antos*
- ***Action Group on Geological Mapping Update of Antarctica*** aims to capture existing geological map data, update its spatial reliability, improve representation of glacial sequences and geomorphology, and enable data delivery via web-feature services. *www.scar.org/ssg/geosciences/geomap*
- ***Action Group on Antarctic Volcanism*** will promote the study of Antarctic volcanism; discuss protocols, methods, best practices; and integrate and share geological information. *http://www.scar.org/ssg/geosciences/volcanism*
- ***Action Group on Geoheritage and Geoconservation*** was also approved during the last Delegates Meeting. Details are being finished and advances are expected during the meeting that will be held at the margins of the XII ISAES (13-17 July, Goa, India).

4. SCAR Fellowships and Prizes

In order to expand capacity in all its Members, SCAR runs several Fellowship and Prize Schemes (*www.scar.awards*):

- ***SCAR/COMNAP Fellowships*** are focused on early career scientists and engineers in Antarctic scientific research, to build new connections and further strengthen international capacity and cooperation in Antarctic research. The fellowships are being launched in tandem with the CCAMLR Scholarships. In 2014 four fellowships were awarded. *http://www.scar.org/awards/fellowships*
- ***SCAR Visiting Professor Scheme*** provides mid- to late-career scientists the opportunity to undertake short-term visits to a facility in, or operated by, SCAR member countries, to provide training and mentoring. Three Visiting Professorships were awarded in 2014. *http://www.scar.org/awards/visitingprofs*
- ***Martha T Muse Prize for Science and Policy in Antarctica***, sponsored by the Tinker Foundation, is a USD $100,000 unrestricted award presented to an individual in the fields of Antarctic science or policy. Tim Naish was awarded the 2014 Muse Prize, for his outstanding research in understanding Antarctica's response to past and present climate change and the role of Antarctica's ice sheets in global sea-level change through time. *www.museprize.org*.
- ***SCAR Medals*** were awarded during the SCAR Open Science Conference in New Zealand, 2014. The SCAR Medal for Excellence in Antarctic Research went to Steven Chown (Australia) for his extensive contributions to Antarctic Science and policy and to SCAR; and the SCAR Medal for International Scientific Coordination was awarded jointly to Mahlon "Chuck" Kennicutt (USA) and Rasik Ravindra (India) for their collaborative and coordination roles in the science community.
- A new ***Communications Award*** has been instigated for the most innovative presentation of Antarctic research results in any discipline at the SCAR Open Science Conference. See https://youtu.be/i8DzllRokTw for the 2014 winner, Molly Zhongnan Jia.

5. Other News

During the SCAR Delegates' meeting, two new Vice Presidents were elected – Azizan Abu Samah (Malaysia) and Terry Wilson (USA). In December 2014, Eoghan Griffin was appointed as SCAR Executive Officer, replacing Renuka Badhe who became the new Executive Secretary of the European Polar Board. In May 2015, Mike Sparrow also left SCAR to take up a UN position with the Joint Planning Staff of the World Climate Research Programme.

6. Future major SCAR Meetings

There are several major SCAR Meetings coming up (*www.scar.org/events/*), including:

- ***XII International Symposium on Antarctic Earth Sciences (ISAES) 2015***. 13-17th July 2015, Goa, India. *http://www.isaes2015goa.in*
- ***XXXIV SCAR Meetings and Open Science Conference***. 19-31 August 2016, Kuala Lumpur, Malaysia. The SCAR Open Science Conference will be held on 25-29 August. See: *http://scar2016.com*
- ***The XXXV SCAR Meetings and Open Science Conference in 2018*** in Davos, Switzerland, will cover both polar regions, being organized jointly with the International Arctic Science Committee (IASC).

Annual Report for 2014/15 of the Council of Managers of National Antarctic Programs (COMNAP)

COMNAP is the organisation of National Antarctic Programs which brings together, in particular, the managers of those programs, that is, the national officials responsible for planning, conducting and managing support to science in Antarctica on behalf of their respective governments, all Antarctic Treaty Consultative Parties.

COMNAP was established in September 1988, and has grown into an international association whose Members are the 29 National Antarctic Programs from the countries of Argentina, Australia, Belgium, Brazil, Bulgaria, Chile, China, Czech Republic, Ecuador, Finland, France, Germany, India, Italy, Japan, Republic of Korea, Netherlands, New Zealand, Norway, Peru, Poland, Russian Federation, South Africa, Spain, Sweden, United Kingdom, Ukraine, Uruguay and USA. Presently, the National Antarctic Program of the Republic of Belarus is a COMNAP observer organisation. The National Antarctic Program of Portugal has also recently indicated interest in COMNAP observer organisation status.

COMNAP's purpose is to develop and promote best practice in managing the support of scientific research in the Antarctic. As an organisation, COMNAP acts to add value to National Antarctic Program's efforts by serving as a forum to develop practices that improve effectiveness of activities in an environmentally responsible manner, by facilitating and promoting international partnerships, and by providing opportunities and systems for information exchange.

COMNAP strives to provide the Antarctic Treaty System with objective, practical, technical and non-political advice drawn from the National Antarctic Programs' extensive pool of expertise and their first-hand Antarctic knowledge. Since 1988, COMNAP has been an active contributor to ATCM and CEP discussion, with the presentation of 30 Working Papers and 99 Information Papers to date.

COMNAP continues to have a close working relationship with other Antarctic organisations, in particular with SCAR. A joint COMNAP/SCAR Executive Committee Meeting was held in Auckland in August 2014. The bi-annual COMNAP Symposium was also held in August 2014 in Auckland, New Zealand, during the SCAR Open Science Conference. COMNAP attended the FARO meeting as an invited observer and the Executive Secretary participated in the National Institute of Polar Research (NIPR) Polar Symposium in Tachikawa, Japan. COMNAP and CCAMLR trialled an intern exchange scheme for two early career people. Each intern undertook a 4-week exchange programme at one of the Secretariats.

The COMNAP Annual General Meeting was held in August 2014 in Christchurch, New Zealand, hosted by Antarctica New Zealand. Professor Heinrich Miller (AWI) completed his three-year term as COMNAP Chair and Professor Kazuyuki Shiraishi of Japan's NIPR was elected as the COMNAP Chair for a three-year period to AGM 2017. Michelle Rogan-Finnemore continues as Executive Secretary under a new six-year term of office. COMNAP renewed its MOU with the University of Canterbury in Christchurch, New Zealand, to continue to host the COMNAP Secretariat for an additional six-year term, until 30 September 2021.

COMNAP Highlights and Achievements for 2014/15

COMNAP Symposium & Proceedings

On 25 August, 2014, COMNAP held its 13th Symposium which was convened by John Hall (BAS) in Auckland, New Zealand, on day 1 of the SCAR Open Science Conference and attracted over 300 participants. The theme of the Symposium was "Success Through International Co-operation". The Symposium Review Committee selected nine oral presentations for the programme and thirteen posters. The Proceedings of the COMNAP Symposium have been published (ISBN 978-0-473-31397-5) and a copy will be given to each ATCM delegation.

Waste Water Management Workshop

Sandra Potter (AAD) and José Retamales (INACH) co-convened this COMNAP workshop in Christchurch, New Zealand (28 August 2014) to discuss practical and technical solutions to waste water management in Antarctica. The workshop presentations and discussions highlighted: how the management of waste water is becoming an increasingly complex issue; the wide range of technologies currently in use to treat station waste water and the value in information-sharing on environment protection challenges and solutions. An Information Paper which presents the Waste Water Management Convenors Report is available at this ATCM.

Sea Ice Challenges Workshop

Rob Wooding (AAD) convened the COMNAP Sea Ice Challenges Workshop on 12–13 May 2015, co-hosted by AAD and the ACE CRC in Hobart, Tasmania, Australia. The open workshop provided an opportunity for the science and operations communities to discuss regional sea ice trends around Antarctica and to propose technical and practical ways to address the challenging nature of supporting national Antarctic program operations. The workshop was timely given that sea ice conditions vary across regions of the Antarctic, but generally, have over recent years been difficult and in some cases impossible to successfully complete resupply and science delivery campaigns. Sea ice conditions not only affect national Antarctic programs operations but also those of other operators in the area. Representatives from other operators were invited to attend along with those from rescue coordination centres. Because of the timing of the workshop, information is not available for this ATCM on workshop outcomes. See: https://www.comnap.aq/SitePages/SeaIceWorkshop.aspx

COMNAP Antarctic Research Fellowship

COMNAP established the Antarctic Research Fellowship in 2011. For the 2014 round, COMNAP was able to offer two fellowships. One to Sandra Potter (University of Tasmania, Australia) to undertake travel to the Arctic and Antarctic Research Institute (AARI)/Russian Antarctic Expedition (RAE) to undertake research on “Quantifying factors limiting implementation of Annex III of the Protocol on Environmental Protection to the Antarctic Treaty". A second fellowship went to Keith Soal (University of Stellenbosch, South Africa) to undertake research on "Ice and hydrodynamic loading on a polar supply and research vessel in Antarctic conditions" at Technische Hochschule Ingolstad (Germany) and Aalto University (Finland). COMNAP and SCAR have agreed to once again offer the Fellowships for 2015. Both organisations are also working with CCAMLR to promote their scholarships. The 2015 COMNAP Antarctic Research Fellow will be announced in August 2015 as part of the COMNAP AGM in Tromsø, Norway. COMNAP and CCAMLR also trialled an intern exchange which provided two early-career persons the opportunity to work at the COMNAP and CCAMLR Secretariats. See https://www.comnap.aq/SitePages/fellowships.aspx

COMNAP Antarctic Roadmap Challenges (ARC) Project

At the COMNAP AGM XXVI (2014) members agreed that COMNAP should lead the next step in the Antarctic Horizon Scan process. SCAR initiated a Horizon Scan process in regards to Antarctic research which ultimately lead to the publication of 80 science questions that were collectively considered to be a vision for future Antarctic science directions. The outcomes are published in *Nature* and *Antarctic Science* (Kennicutt II et al, 2014). This “roadmap” for Antarctic research for the next 20 years and beyond brings with it a number of challenges for delivering such science. Addressing these challenges is the focus of the COMNAP ARC project which has to date completed the first of two on-line open surveys and which is expected to result in a high-level strategic document to assist national Antarctic programs to develop their own science support strategies into the future. See https://www.comnap.aq/Projects/SitePages/ARC.aspx and also an Information Paper is available at this ATCM.

COMNAP Products and Tools

Search and Rescue (SAR) Webpage www.comnap.aq/membersonly/SitePages/SAR.aspx

As requested in ATCM Resolution 4 (2013), COMNAP has established a SAR webpage in consultation with RCCs which is regularly updated. COMNAP will convene the SAR Workshop III in 2016. Details will be made available soon.

Accident, Incident & Near-Miss Reporting (AINMR) www.comnap.aq/membersonly/AINMR/SitePages/Home.aspx

Information on problems encountered in Antarctica has always been exchanged. The AINMR System was developed to assist in such exchange and is available on the members-only area of the COMNAP website. The AINMR's primary objective is: to capture information about events that had, or could have had, serious consequences; and/or reveal lessons; and/or are novel, very unusual events. Full reports on accidents can also be posted and shared on the site and can be discussed and reviewed. National Antarctic Programs can learn from each other to reduce the risk of serious consequences occurring in the course of their Antarctic activities.

COMNAP Ship Position Reporting System (SPRS) https://www.comnap.aq/sprs/SitePages/Home.aspx

The SPRS is an optional, voluntary system for exchange of information about National Antarctic Program ship operations. Its primary purpose is to facilitate collaboration. It can also, however, make a very useful contribution to safety with all SPRS information made available to the RCCs as an additional source of information complementing all other national and international systems in place. Position information is delivered via email and can be graphically displayed in Google Earth.

The Antarctic Flight Information Manual (AFIM)

AFIM is a handbook of aeronautical information published by COMNAP as a tool towards safe air operations in Antarctica as per Resolution 1 (2013). COMNAP continues with the trial phase of an electronic AFIM alongside the paper AFIM format (see Information Paper available at this ATCM). The AFIM continues to be updated via information from National Antarctic Programs.

Antarctic Telecommunications Operators Manual (ATOM)

ATOM is an evolution of the handbook of telecommunications practices to which ATCM Recommendation X-3 *Improvement of Telecommunications in Antarctica and the Collection and Distribution of Antarctic Meteorological Data* refers. COMNAP Members and SAR authorities have access to the latest version (March 2015) via the COMNAP website.

For more information see www.comnap.aq or email info@comnap.aq.
Also, see Attachment 1.

Attachment 1: COMNAP officers, projects, expert groups and meetings

Executive Committee (EXCOM)

The COMNAP Chair and Vice-Chairs are elected officers of COMNAP. The elected officers plus the Executive Secretary, compose the COMNAP Executive Committee as follows:

Position	Officer	Term expires
Chair	Kazuyuki Shiraishi (NIPR) kshiraishi@nipr.ac.jp	AGM 2017
Vice-Chairs	Hyoung Chul Shin (KOPRI) hcshin@kopri.re.kr	AGM 2016
	John Hall (BAS) jhal@bas.ac.uk	AGM 2016
	José Retamales (INACH) jretamales@inach.cl	AGM 2017
	Rob Wooding (AAD) rob.wooding@aad.gov.au	AGM 2017
	Yves Frenot (IPEV) yves.frenot@ipev.fr	AGM 2017
Executive Secretary	Michelle Rogan-Finnemore michelle.finnemore@comnap.aq	

Table 1 – COMNAP Executive Committee.

Projects

Project	Project Manager	EXCOM officer (oversight)
Antarctic Flight Information Manual (AFIM) – Electronic Format Implementation	Paul Morin & Brian Stone	John Hall
Antarctic Roadmap Challenges (ARC)	Michelle Rogan-Finnemore	Kazuyuki Shiraishi
Antarctic Peninsula Advanced Science Information (APASI)		José Retamales
Fuel Tank Automated Warning System	Oleksandr Kuzko	Yves Frenot
Sea Ice Challenges Workshop	Rob Wooding	Rob Wooding & Yves Frenot
Ship Position Reporting System (SPRS) Review	Robb Clifton	Hyoung Chul Shin
Station Infrastructure Catalogue		Yves Frenot
Suppliers Database	Graeme Ayres	John Hall
Telemedicine Workshop	Jeff Ayton	John Hall

Table 2 – COMNAP projects currently in progress.

Expert Groups

Expert Group (topic)	Expert Group leader	EXCOM officer (oversight)
Air	Giuseppe Di Rossi & Brian Stone	John Hall
Energy & Technology	Felix Bartsch & Pavel Kapler	Rob Wooding
Environment	Anoop Tiwari	Hyoung Chul Shin
Medical	Jeff Ayton	John Hall
Outreach/Education	Eva Gronlund	Yves Frenot
Safety	Henrik Törnberg	Kazuyuki Shiraishi
Science	Javier Arata	José Retamales
Shipping	Miguel Ojeda	José Retamales
Training	Veronica Vlasich	Yves Frenot

Table 3 – COMNAP Expert Groups.

Meetings

Previous 12 months

24 August 2014, COMNAP/SCAR joint Executive Meeting, Auckland, New Zealand.

25 August 2014, COMNAP Symposium “Success through International Co-operation”, Auckland, New Zealand.

27–29 August 2014, COMNAP Annual General Meeting (COMNAP AGM XXVI), hosted by Antarctica New Zealand, Christchurch, New Zealand (included the Safety Workshop and the Waste Water Management Workshop on 28 August 2014).

20–21 October 2014, COMNAP EXCOM Meeting hosted by National Institute of Polar Research (NIPR), Tachikawa, Japan.

12–13 May 2015, COMNAP Sea Ice Challenges Workshop, co-hosted by Australian Antarctic Division (AAD) and the Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC), Hobart, Tasmania, Australia.

Upcoming 12 months

22–24 August 2015 (TBC), Antarctic Roadmap Challenges Workshop, venue TBC.

25 August 2015, COMNAP/SCAR Joint Executive Committee Meeting, Norwegian Polar Institute (NPI), Tromsø, Norway.

26–28 August 2015, COMNAP Annual General Meeting (COMNAP AGM XXVII), hosted by the Norwegian Polar Institute (NPI), Tromsø, Norway (includes Safety session and the Joint Expert Group on Human Biology and Medicine Telemedicine Workshop).

3. Reports by Experts

Report by the International Hydrographic Organization (IHO)

Improving Hydrography and Nautical Charting in Antarctic Waters

Introduction

The International Hydrographic Organization (IHO) is an intergovernmental consultative and technical organization. It comprises 85 Member States. Each State is normally represented by its national Hydrographer.

The IHO coordinates on a worldwide basis the setting of standards for hydrographic data and the provision of hydrographic services in support of safety of navigation and the protection and sustainable use of the marine environment. The principal aim of the IHO is to ensure that all the world's seas, oceans and navigable waters are surveyed and charted.

What is Hydrography?

Hydrography deals with the measurement and description of the physical features of oceans, seas, coastal areas, lakes and rivers. Hydrographic surveying identifies the shape and nature of the seafloor and the hazards that lie upon it, together with an understanding of the impact of tides on the depth and water movement. This knowledge supports all marine activities, including transport, economic development, security and defence, scientific studies, and environmental protection.

Importance of Hydrography in Antarctica

Hydrographic information is a fundamental pre-requisite for the development of successful and environmentally sustainable human activities in the seas and oceans. Unfortunately, there is little or no hydrographic information for a number of parts of the world, especially in Antarctica.

In this particular region, where vessels may face the most severe weather conditions, any grounding due to a lack of adequate surveying or nautical charting may have serious consequences. Unfortunately, the grounding of vessels operating outside previously navigated routes in Antarctica is not uncommon.

The Polar Code, adopted by the International Maritime Organization (IMO) in 2014, includes significant cautions concerning hydrography and nautical charting.

Most scientific studies and an understanding of the marine environment benefit significantly from a knowledge of the nature and shape of the seafloor and the movement of the water caused by tides. Therefore the lack of such hydrographic knowledge in most Antarctic waters, particularly in the coastal and shallower regions, must compromise many scientific endeavours being undertaken under the auspices of ATCM and individual Member States.

Status of Hydrography and Charting in Antarctica

The state of hydrographic surveying and nautical charting in Antarctica poses serious risks for the safety of navigation as well as impeding the conduct of most activities taking place in the surrounding seas and oceans.

Over 90% of Antarctic waters remain unsurveyed. Large areas are uncharted and where charts do exist, they have limited utility because of a lack of reliable or comprehensive depth information.

Hydrographic surveying in Antarctic waters is expensive and problematic. This is because of hostile and unpredictable sea conditions, short seasons for surveying and the long logistic train involved in supporting ships and equipment.

According to IMO international requirements (Safety of Life at Sea - SOLAS), Electronic Nautical Charts (ENCs) are now required for navigation in all passenger vessels and an increasing number of vessels of other types - all of which are operating in Antarctic waters. So far, only half of about 170 ENCs that have been identified by the IHO Hydrographic Commission on Antarctica (IHO HCA) as being required for navigation in the region have been published.

The production of ENCs for Antarctica is severely hampered by the lack of data, the poor state of the corresponding paper charts that they are intended to replace and the production and financial priorities of those States that have volunteered to make the ENCs; only 10 ENCs were produced in 2014.

IHO Hydrographic Commission on Antarctica

The IHO HCA is dedicated to improving the quality, coverage and availability of nautical charting and other hydrographic information and services covering the region. The HCA comprises 23 IHO Member States (Argentina, Australia, Brazil, Chile, China, Ecuador, France, Germany, Greece, India, Italy, Japan, Republic of Korea, New Zealand, Norway, Peru, Russian Federation, South Africa, Spain, United Kingdom, Uruguay, USA, Venezuela), all of which have acceded to the Antarctic Treaty and are therefore also directly represented in the ATCM.

The IHO HCA attempts to work closely with stakeholder organizations such as COMNAP, IAATO, SCAR, IMO and IOC, However, with the exception of successful work with IAATO, no co-operative programmes or packages using ships of opportunity or other resources have been achieved in order to improve hydrographic data in critical shipping areas.

Ways and Means to Improve Hydrography and Nautical Charting in Antarctica

The IHO has reported regularly on the unsatisfactory level of hydrographic knowledge in Antarctica since ATCM XXXI (Kiev, 2008). The IHO has consistently indicated the requirement to obtain support at the highest political levels if things are to improve significantly.

It is pleasing that the last meeting (ATCM XXXVII) adopted Resolution 5 (2014) on strengthening cooperation in hydrographic surveying and charting of Antarctic waters. It is too early to report any noticeable impact, the more so as the IHO HCA, through which ATCM Parties are invited to coordinate their hydrographic surveying and charting activities, has not met since ATCM XXXVII.

In this context, it is unfortunate that the 14^{th} annual meeting of the IHO HCA, planned to take place in March 2015, has been postponed until 2016, due to the low level of registrations from Member States and from Observer Organizations. This does not bode well for the reconsideration of the low priority that governments have been placing on improving hydrographic and bathymetric knowledge in the region.

Recommendation for Consideration by ATCM

The IHO invites ATCM to encourage Parties to participate in the next meeting of the HCA and contribute effectively to its activities in accordance with Resolution 5 (2014).

Report of the Antarctic and Southern Ocean Coalition

1. *Introduction*

ASOC is pleased to be in Sofia for the XXXVIII Antarctic Treaty Consultative Meeting. This report briefly describes ASOC's work over the past year, and outlines some key issues for this ATCM.

ASOC's Secretariat is in Washington DC, USA and its website is http://www.asoc.org. ASOC has 24 full member groups in 10 countries and supporting groups in those and several other countries. ASOC campaigns are carried out by teams of experts in Argentina, Australia, China, France, Germany, Japan, The Netherlands, New Zealand, Norway, South Africa, South Korea, Spain, Russia, Ukraine, UK and USA.

2. *Intersessional activities*

Since XXXVII ATCM ASOC and its member groups' representatives participated actively in intersessional discussions in the ATCM and CEP fora, including ICGs on 'outstanding values' in the Antarctic marine environment, a review of the guidelines for environmental impact assessment in Antarctica, climate change, and the preparation of a Special Working Group session on competent authority issues.

In addition, ASOC and member group representatives attended a range of meetings relevant to Antarctic environmental protection including the XXXIII CCAMLR Meeting, the CCAMLR Symposium, the Weddell Sea MPA workshop, and a number of International Maritime Organization meetings relating to the Polar Code. ASOC representatives also submitted papers to several scientific conferences as a way of reaching out to the Antarctic and marine science communities, including in particular the SCAR Open Science conference.

3. *Papers for XXXVIII ATCM*

ASOC has submitted six Information Papers to the XXXVIII ATCM. These papers address key environmental issues, and contain recommendations for the ATCM and CEP that will help achieve more effective environmental protection and conservation of Antarctica.

Antarctic Tourism and Protected Areas (IP 109) The paper discusses the interface between protected areas, in a broad sense, and the regulation and management of tourism. It also discusses how area protection may be used with respect to potential vectors of tourism expansion, particularly the use of airstrips and dedicated land based tourism facilities. Overall, tourism dynamics and current tourism developments suggest that tourism regulation should be examined from a regional focus. This would require "zooming out" spatial management instruments, rather than solely "zooming in" in to specific sites managed by guidelines. Recognising the dynamic of Antarctic tourism, ASOC recommends that Parties consider strategically using ASPAs and ASMAs to regulate current and potential future tourism. Specific recommendations are detailed in the document.

Climate Change 2015: A Report Card (IP 110) ASOC annually composes a climate change report card to present a summary of up-to-date scientific findings about current and future climate change in the Antarctic. In it, we reviewed environmental changes including temperature, ice sheets and glaciers, sea ice, ocean acidification, and species impacts. This year, we introduce a new category of "blue carbon" reflecting the uptake of carbon by krill. Climate change in Antarctica is happening now—it is not a future event. This makes scientific research in Antarctic worthy of the highest support possible. However, climate change in Antarctica is not simply a matter of scientific understanding. If we want to protect the Antarctic and its ecosystems, the Antarctic Treaty Consultative Parties should seek solutions enabling, to the greatest possible extent, the adaptation of the Antarctic environment to climate changes on the continent, while also working to limit the growth in climate change through international agreements.

Cumulative Impact Assessment (IP 111) This paper briefly reviews some of the discussions on cumulative impact assessment based on relevant documents submitted to the ATCM/CEP, and takes an environmentally-focused approach to cumulative impact assessment to suggest further action by ATCPs and CEP. ASOC recommends that Parties: review earlier recommendations on cumulative impact assessment documents listed here; complete the review of EIA guidelines so that it adequately considers cumulative impacts, take into account early considerations as required; carry out case studies of cumulative impacts at particular sites; and augment and improve the consideration of cumulative impacts in the implementation of Annex I.

Expanding Antarctica's Protected Areas System (IP 112) Article 3, Annex V of the Environment Protocol states that Parties shall create protected areas within a systematic framework. To date over 70 Antarctic Specially Protected Areas (ASPAs) have been designated by the Antarctic Treaty System (ATS), but a recent analysis in a peer-reviewed journal finds that these areas are not fulfilling the terms of the Protocol. This paper discusses that analysis and recommends that ATCPs can remedy this situation by increasing the size and number of ASPAs, with a focus on achieving representation of all known Antarctic Conservation Biogeographic Regions (ACBRs) and designating inviolate areas, wilderness areas, and areas of interest to science, as well as protecting outstanding values of the marine environment. This will increase and enhance the protection of Antarctica in line with the Protocol, the separate work of CCAMLR on Marine Protected Areas, and with other international recommendations.

Next Steps for Vessel Management in the Southern Ocean (IP 113) This paper summarises several requirements of the new Polar Code, highlighting some areas which ASOC believes would benefit by further consideration during Step 2 of work on the Polar Code. Step 2 of the work focuses on vessels such as fishing vessels, private yachts, and cargo vessels under 500GT, and is due to commence in 2016. In light of the number of incidents involving so-called "non-SOLAS" vessels (particularly fishing vessels and yachts) in Antarctic waters in recent years, ASOC urges the Antarctic Treaty Parties to formally assist Step 2 of the development of a mandatory Polar Code by contributing to an information gathering exercise through the provision of copies of relevant ATCM papers and reports to the IMO. ASOC welcomes the adoption of the first mandatory Polar Code to improve the management of vessels operating in the polar waters, and urges concerted participation by ATPs in Step 2 of work to complete consideration of the requirements of non-SOLAS vessels.

The Antarctic Treaty System, Climate Change and Strengthened Scientific Interface with Relevant Bodies of the United Nations Framework Convention on Climate Change (UNFCCC) (IP 114)
The Antarctic is critical to our global understanding of anthropogenic climate change. As such, the Antarctic Treaty System has an important role to play in promoting the relevance of climate-related Antarctic research to the climate change community, including the United Nations Framework Convention on Climate Change (UNFCCC), in accordance with the intent of the Antarctic Treaty and the CAMLR Convention. ASOC urges better realization and action based on this role by the ATCM and related bodies, most notably the CEP and SCAR. This could be similar to the regular input by the relevant Arctic Council working groups in updating climate-relevant research to the broader climate community. ASOC also urges the ATCM to take all possible actions to address climate change in the Antarctic region, including through focused dialogue with CCAMLR.

4. *Other Important Issues for XXXVIII ATCM*

Tourism – ASOC is pleased to see WP 24 on a strategic approach to tourism management. Parties have discussed this issue for years, and now is the time for the ATCM to take action and ensure that it is proactive and not reactive in the years to come.

Anniversary of the Environmental Protocol – ASOC hopes that the anniversary of the Protocol is an occasion for the ATCM not only to recall past successes but to also work on future visioning, including identifying current gaps in implementation and planning action steps to remedy them.

Liability – Bringing Annex VI into force should be a high priority for the ATCM. ASOC urges Parties to continue their efforts, whether by assisting those who have not approved Measure 1 (2005) or by working to obtain the necessary domestic legislation.

UAVs - While not in the same category as other issues discussed here, the growing use of UAVs in Antarctica is an example of how technological change impacts on Antarctic operations and potentially the Antarctic environment, and requires early action by the ATCM.

5. *Concluding Remarks*

Over the past year, ASOC has engaged with many and varied partners, including IAATO, SCAR, CCAMLR, the Coalition of Legal Toothfish Operators (COLTO), and the Antarctic Wildlife Research Fund (AWR), to work broadly to identify strengths and weaknesses existing in the Antarctic Treaty System procedures and practices, while suggesting solutions to these gaps. We value our engagement with these groups, as well as with Antarctic Treaty Parties.

ASOC notes that many promising discussions and initiatives on important aspects of environmental protection are either underway or proposed, as do our partners. In particular, ASOC welcomes the contributions of various Parties to this ATCM proposing to make progress on the various issues listed above, including but not limited to climate change, liability, safety and management of fishing vessels and yachts, strategic tourism management, and UAVs. It is important that the results of such discussions translate into tangible action. Prudent stewardship of Antarctica requires Parties to be leaders, to anticipate emerging issues, and to take decisive action.

Report of the International Association of Antarctica Tour Operators 2014-15

Under Article III (2) of the Antarctic Treaty

Introduction

The International Association of Antarctica Tour Operators (IAATO) is pleased to report its activities to ATCM XXXVIII, under Article III (2) of the Antarctic Treaty.

IAATO continues to focus activities in support of its mission statement to advocate, promote and practice safe and environmentally responsible private sector travel to Antarctica by ensuring:

- Effective day-to-day management of member activities in Antarctica;
- Educational outreach, including scientific collaboration; and
- Development and promotion of Antarctic tourism best practices.

A detailed description of IAATO, its mission statement, primary activities and recent developments can be found in the *2015-16 Fact Sheet*, and on the IAATO website: www.iaato.org.

IAATO Membership and Visitor Levels during 2014-15

IAATO comprises 124 Members, Associates and Affiliates, representing businesses from 66% of the Antarctic Treaty Consultative Party countries. IAATO member operators carry nationals from nearly all Treaty Parties annually to Antarctica. Since 2010, IAATO has represented all passenger vessels operating in Antarctic waters under the International Convention for the Safety of Life at Sea (SOLAS).

During the 2014-15 Antarctic tourism season, the total number of visitors travelling with IAATO member companies was 36,702, a slight decrease of 2% compared to the previous season. Tourism continued to be well below the 2007-08 season, when IAATO operators transported 46,265 visitors to the continent.

Details on tourism statistics including activities and nationalities can be found in ATCM XXXVIII IP53 *IAATO Overview of Antarctic Tourism: 2014-15 Season and Preliminary Estimates for 2015-16*. The Membership Directory and additional statistics on IAATO member activities can be found at www.iaato.org.

Recent Work and Activities

A number of initiatives were undertaken during the year:

- Strengthening of the Association’s corporate governance and institutional robustness. This includes finalising anti-trust and liability policies and the increase from part to full-time for the Environmental and Operations Manager position within the Secretariat.
- In February 2015, two IAATO operators conducted a live Search and Rescue Communications Exercise in partnership with IAATO and the Maritime New Zealand's Rescue Coordination Centre New Zealand (RCCNZ). Details of the exercise can be found in ATCM XXXVIII IP52 *Joint Search and Rescue Exercise in the Antarctic*.
- The Dockside Observer program for IAATO yachts is now an established component of the association’s Enhanced Observer Scheme, which involves making field observations of member operations to promote best practice. IAATO continues its Yacht Outreach Campaign, aimed at

commercial and private yacht operators intending to visit Antarctica. Details can be found at www.iaato.org/yachts.

- The IAATO online Field Staff Assessment and Certification Programme continues to evolve, testing staff's working knowledge of the IAATO Field Operations Manual, which is updated annually and incorporates all relevant outcomes from the ATCM and CEP. Certification is a mandatory part of the hiring process for many IAATO operators. The assessments are tailored by Antarctic location. Since 2010, 560 field staff have passed at least one of the assessments.

- In September 2015, IAATO, in conjunction with its sister organization in the Arctic, the Association of Arctic Expedition Cruise Operators (AECO), will hold its inaugural Field Staff Conference.

- Educating members, their field staff and clients about Antarctic science and conservation issues is an important component of IAATO's work. Key documents including guidelines, standard operating procedures and briefings have been translated into multiple languages (English, French, Russian, Spanish, Dutch, German, Chinese, Japanese, Korean and Portuguese) to assist in communicating key messages.
- IAATO receives many enquiries on an annual basis from individuals, yachts and private groups who are at various stages of planning expeditions to Antarctica. IAATO explains the Antarctic Treaty System and permitting process to all of these and passes any relevant information onto a Competent Authority that may be involved.
- Improving hydrographic information on a trial and opportunistic basis by a number of IAATO vessel operators continues. Initiatives include Crowd Sourcing trials in conjunction with Hydrographic Offices and AECO. In 2014, a breakthrough was made that enables IAATO and AECO operators to share accumulated historic depth sounding data from the Polar Regions.

- In preparation for the expected entry into force of the Polar Code on 1 January 2017, IAATO is holding a Vessel Operators Meeting, *'Towards Polar Code Ready',* in June, 2015.

IAATO Meeting and Participation at Other Meetings during 2014-15

IAATO's 26th Annual Meeting took place from April 28-May 1st, 2015 in Rotterdam, The Netherlands. This report was written in advance of IAATO 26 to meet the Information Paper deadline but, in addition to the above-mentioned initiatives, the meeting includes:

- Discussions on IAATO's draft guidelines on Kayaking and Underwater Activities (See IP86 *New IAATO Activity Guidelines*;
- Reviewing IAATO's draft Unmanned Aerial Vehicle (UAV) policies following feedback from the previous season (see IP 88 *IAATO Policies on Unmanned Aerial Vehicles (UAV)*);
- Next steps to be taken in the 2015/2016 season by the IAATO Enhanced Observer Scheme;
- Establishment of a new Air/Cruise working group;
- A half-day facilitated workshop to 'train the trainer' on Emergency Exercise Planning.

Treaty Party representatives are invited to join any of the open sessions during IAATO's Annual Meeting and any subsequent workshops.

IAATO Secretariat staff and member representatives participated in internal and external meetings, liaising with National Antarctic Programs, governmental, scientific, environmental and industry organisations. These included:

- **Council of Managers of National Antarctic Programs (COMNAP) 26th Annual Meeting**, Christchurch, New Zealand, August 2014. IAATO places great merit in good cooperation and collaboration between its Membership and National Antarctic Programs.
- **SCAR Open Science Conference,** Auckland, New Zealand, August 2014.

- **International Polar Tourism Research Network,** Christchurch, New Zealand, August 2014.
- **Association of Arctic Expedition Cruise Operators Conference & Annual Meeting,** October 2014, Oslo, Norway.
- **International Hydrographic Bureau Conference**, Monaco, October 2014.
- **International Ice Charting Working Group Meeting,** Punta Arenas, Chile, October 2014.
- **Assessing Vulnerability of Flora and Fauna in Polar Areas Symposium,** Norwegian Polar Institute, Tromso, November, 2014.
- IAATO continues to be active in the development of the **International Maritime Organization**'s (IMO) mandatory Polar Code as an advisor to Cruise Lines International Association (CLIA), participating in various IMO meetings.

Environmental Monitoring

IAATO continues to provide ATCM and CEP with detailed information on member activities in Antarctica and works collaboratively with scientific institutions particularly on long term environmental monitoring and educational outreach. This includes the Antarctic Site Inventory, the Lynch Lab at Stony Brook University and the Zoological Society of London/Oxford University. Additionally, IAATO operators note sightings of fishing vessels for subsequent reporting to CCAMLR in support of the work against IUU fishing.

IAATO welcomes opportunities for collaboration with other organisations.

Tourism Incidents 2014-15

IAATO continues to follow a policy of disclosing incidents to ensure risks are understood and appropriate lessons are learned for all Antarctic operators. Incidents involving IAATO Operators that have been reported during the 2014-15 season include:

- On November 21 2014, a compass went missing from the Port Lockroy museum, managed by the UKAHT. Two cruise ships that had visited that day were contacted immediately. Despite swift action by all parties involved, the compass was not recovered. IAATO sent reminders to Peninsula operators and field staff of the importance of reminding visitors that the museum and its contents are protected under the Antarctic Treaty System as a Historic Site and Monument.

- In January 2015, an individual making a solo attempt to the pole was advised that his slow progress would result in him missing key Search and Rescue (SAR) deadlines and that he was at risk of being without SAR cover due to the logistical difficulties of extending it. The individual acknowledged the advice but continued anyway (his Competent Authority was advised). His pre-arranged SAR cover involved a hand-over between two IAATO deep field operators as he approached the Pole, a system that has worked well in the past. In this case, the initial lack of cooperation by the individual resulted in a notional lack cover for a period of a few days, breaking the conditions of his permit. The IAATO operators involved resolved the issue between them and the individual was flown out of 84S. The 'gap' in cover raises questions for deep field operators and competent authorities.

- During the 2014-2015 season, there were several incidents involving non-IAATO yachts. These included a grounding in the South Shetlands that resulted in an IAATO operator repatriating seven Polish nationals. Any such incidents are reported back to the associated Treaty Party or Competent Authority if there is one.

- At time of writing (22 April), nine medevacs had been reported.

Scientific and Conservation Support

During the 2014-15 season, IAATO Members cost-effectively or freely transported over 50 scientific, support and conservation staff, and their equipment and supplies between stations, field sites and gateway ports. This included:

- Transfers of scientists between stations;

- Non-urgent medical evacuations;
- Field support of research projects
- Collection of scientific samples and other data collection for research programs (all permitted);
- Transport of scientific equipment to/from stations.

Initial reports indicate that IAATO operators and their passengers also contributed more than US$531,000 to scientific and conservation organisations active in Antarctica and the sub-Antarctic during 2014-2015.

Over the past decade, these donations have totalled over US $4 million.

With Thanks

IAATO appreciates the opportunity to work cooperatively with Antarctic Treaty Parties, COMNAP, SCAR, CCAMLR, IHO/HCA, ASOC and others toward the long-term protection of Antarctica.

PART IV

Additional Documents from ATCM XXXVIII

1. Abstract of SCAR Lecture

Abstract of the SCAR Lecture:

Southern Ocean Acidification

Richard Bellerby, Norwegian Institute for Water Research, Bergen, Norway and State Key Laboratory for Estuarine and Coastal Research, East China Normal University, China on behalf of the SCAR Action Group on Ocean Acidification

The pH and carbonate system of the Southern Ocean is changing as a consequence of increasing uptake of carbon dioxide (CO2) in response to rising atmospheric CO2 concentrations. This process, termed ocean acidification, may significantly impact ocean services. The climate service that the Southern Ocean provides in absorbing atmospheric CO2 may be compromised as the oceanic sink is weakened and a larger proportion of future CO2 emissions remain in the atmosphere, exacerbating global warming. Secondly, the ecosystem service potential may be changed through a deregulation of the order of biological systems in the ocean, challenging present ecosystem productivity, richness and biodiversity, and potentially leading to local extinction of keystone species.

This presentation will describe the changes in carbonate chemistry observed in recent decades across the Southern Ocean and deliver the latest simulations of future ocean acidification under different CO2 emission scenarios. We will demonstrate the highly regional nature of Southern Ocean acidification, with some areas undergoing little change while others indicate changes that exceed those reported elsewhere in the global ocean. We will additionally show how various Southern Ocean species respond to these future acidification scenarios under controlled experimental conditions. Factors that can be impacted include reproductive health, organism growth and physiology, species composition and distributions, food web structure and nutrient flow. Finally we will summarise key findings from the SCAR Ocean Acidification report.

2. List of Documents

2. List of Documents

Working Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
WP001	CEP 9a	Revised Management Plan for Antarctic Specially Protected Area No. 106 Cape Hallett, Northern Victoria Land, Ross Sea	United States					ASPA 106 Map 1 ASPA 106 Map 2 ASPA 106 Map 3 ASPA 106 Map 4 ASPA 106 Revised Management Plan
WP002	CEP 9a	Revised Management Plan for Antarctic Specially Protected Area No. 119 Davis Valley and Forlidas Pond Dufek Massif, Pensacola Mountains	United States					ASPA 119 Map 1 ASPA 119 Map 2 ASPA 119 Revised Management Plan
WP003	CEP 9a	Revised Management Plan for Antarctic Specially Protected Area No. 152 Western Bransfield Strait	United States					ASPA 152 Map 1 ASPA 152 Revised Management Plan
WP004	CEP 9a	Revised Management Plan for Antarctic Specially Protected Area No. 153 Eastern Dallmann Bay	United States					ASPA 153 Map 1 ASPA 153 Revised Management Plan
WP005	CEP 3	Five-Year Work Plan adopted at the 17th meeting of the Committee for Environmental Protection (CEP XVII)	Australia					CEP XVII Five-year Work Plan
WP006	CEP 5	Proposed Joint CEP/SC-CAMLR Workshop (2016) on climate change and monitoring	United States United Kingdom					
WP007	ATCM 5	Referencing ATCM Measures, Decisions and Resolutions	United Kingdom					
WP008	CEP 9a	Updated Management Plan and maps for Antarctic Specially Managed Area No. 2 McMurdo Dry Valleys, Southern Victoria Land	New Zealand United States					ASMA 2 Maps 1 to 6 ASMA 2 Maps 13 to18 ASMA 2 Maps 19 to 24 ASMA 2 Maps 7 to 12 ASMA 2 Revised Management Plan
WP009	CEP 9a	Revision of the Management Plan for Antarctic Specially Protected Area (ASPA) No. 103 Ardery Island and Odbert Island, Budd Coast, Wilkes Land, East Antarctica	Australia					ASPA 103 Map A ASPA 103 Map B ASPA 103 Map C ASPA 103 Map D ASPA 103 Revised Management Plan
WP010	CEP 9a	Revision of the Management Plan for	Australia					ASPA 101 Map A ASPA 101 Map B

Working Papers								
Number	Ag. Items	Title	Submitted By	E	F	R	S	Attachments
		Antarctic Specially Protected Area (ASPA) No. 101 Taylor Rookery, Mac.Robertson Land						ASPA 101 Map C ASPA 101 Map D ASPA 101 Revised Management Plan
WP011	CEP 9a	Revision of the Management Plan for Antarctic Specially Protected Area (ASPA) No. 164 Scullin and Murray Monoliths, Mac.Robertson Land	Australia					ASPA 164 Map A ASPA 164 Map B ASPA 164 Map C ASPA 164 Map D ASPA 164 Revised Management Plan
WP012	CEP 9a	Revision of the Management Plan for Antarctic Specially Protected Area (ASPA) No. 102 Rookery Islands, Holme Bay, Mac.Robertson Land	Australia					ASPA 102 Map A ASPA 102 Map B ASPA 102 Map C ASPA 102 Revised Management Plan
WP013	CEP 8b	Initial report of the intersessional contact group established to review the Guidelines for Environmental Impact Assessment in Antarctica	Australia United Kingdom					
WP014	ATCM 16 CEP 4	Report of the intersessional contact group established to review information exchange requirements	Australia					
WP015	CEP 9a	Subsidiary Group on Management Plans – Report on 2014/15 Intersessional Work	Norway					
WP016	ATCM 13	The role of Antarctica in global climate processes	United Kingdom Norway					
WP017	CEP 9b	Proposal to add the Lame Dog Hut at the Bulgarian base St. Kliment Ohridski on Livingston Island to the List of Historic Sites and Monuments	Bulgaria					
WP018	ATCM 11	Inspection of Yachts under the Antarctic Treaty and its Protocol on Environmental Protection	United Kingdom					
WP019 rev.1	ATCM 12 CEP 12	General Recommendations from the Joint Inspections undertaken by the United Kingdom and the Czech Republic under Article VII of	United Kingdom Czech Republic					

Working Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		the Antarctic Treaty and Article 14 of the Environmental Protocol						
WP020	CEP 9d	The concept of "outstanding values" in the marine environment under Annex V of the Protocol	Belgium					
WP021	CEP 3	Antarctic Environments Portal: Project completion and next steps	Australia Belgium New Zealand Norway SCAR					
WP022	ATCM 10 CEP 8b	UAV Use in Antarctica – Risks and Benefits	COMNAP					
WP023	CEP 9b	Ross Sea Heritage Restoration Project: A model for conserving heritage values in Antarctic Specially Protected Areas	New Zealand					
WP024	ATCM 11	Adopting a Strategic Approach to Environmentally Managed Tourism and non-governmental activities in Antarctica	New Zealand United Kingdom Netherlands Norway					
WP025	CEP 9a	Revision of the Management Plan for Antarctic Specially Protected Area (ASPA) No. 104 Sabrina Island, Balleny Islands	New Zealand					ASPA 104 Map 1 ASPA 104 Map 2 ASPA 104 Revised Management Plan
WP026	CEP 9a	Revision of the Management Plans for Antarctic Specially Protected Areas (ASPAs) No.105, 155, 157, 158 and 159	New Zealand					ASPA 105 Map A ASPA 105 Map B ASPA 105 Map C ASPA 105 Revised Management Plan ASPA 155 Map A ASPA 155 Map B ASPA 155 Revised Management Plan ASPA 157 Map 1 ASPA 157 Map 2 ASPA 157 Revised Management Plan ASPA 158 Map A ASPA 158 Map B ASPA 158 Revised Management Plan ASPA 159 Map A ASPA 159 Map B ASPA 159 Revised Management Plan
WP027	ATCM 13	Wildlife Approach Distances in	SCAR					

Working Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
	CEP 10c	Antarctica						
WP028	CEP 10a	Revision of the CEP Non-native Species Manual (Edition 2011)	United Kingdom France New Zealand					Attachment A Attachment B
WP029	CEP 9e	A suggested ASPA/ASMA prior assessment process	Norway					
WP030	CEP 8a	Towards the submission of a Draft Comprehensive Environmental Evaluation for the construction and operation of a gravel runway in the area of Mario Zucchelli Station, Victoria Land, Antarctica	Italy					Proposed construction and operation of a gravel runway in the area of Mario Zucchelli Station, Victoria Land, Antarctica
WP031 rev.1	CEP 9b	Proposal on inclusion of the oversnow heavy tractor “Kharkovchanka” that was used in Antarctica from 1959 to 2010 to the List of Historical Sites and Monuments	Russian Federation					
WP032	ATCM 11	On possibilities of monitoring adventure tourism and non-governmental expeditions in the Antarctic	Russian Federation					
WP033	ATCM 9	On the problems of approval of Annex VI “Liability Arising From Environmental Emergencies” to the Protocol on Environmental Protection to the Antarctic Treaty	Russian Federation					
WP034	CEP 9a	Revised Management Plan for Antarctic Specially Protected Area No. 148, Mount Flora, Hope Bay, Antarctic Peninsula	United Kingdom Argentina					ASPA 148 Revised Management Plan
WP035	CEP 9e	Code of Conduct for Activities within Terrestrial Geothermal Environments in Antarctica	New Zealand Spain United Kingdom United States					Draft code of conduct for activities within terrestrial geothermal environments in Antarctica
WP036	ATCM 9	Annex VI to the Protocol on Environmental Protection to the Antarctic Treaty: Next Steps	New Zealand Finland Netherlands Sweden					

Working Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
WP037	CEP 7	Report from ICG on Climate Change	Norway United Kingdom					CEP Discussion Draft: Climate Change Response Work Programme
WP038	CEP 7	Application of the RACER (Rapid Assessment of Circum-Arctic Ecosystem Resilience) Conservation Planning Tool to James Ross Island	United Kingdom Czech Republic					
WP039	ATCM 14 CEP 7	Shared science priorities and cooperation: systematic observations and modelling in the Southern Ocean	United States Australia					
WP040	CEP 10c	Important Bird Areas (IBAs) in Antarctica	Australia New Zealand Norway United Kingdom United States					
WP041	CEP 9a	Revision of the Management Plan for Antarctic Specially Protected Area (ASPA) No. 168 Mount Harding, Grove Mountains, East Antarctica	China					ASPA 168 Revised Management Plan
WP042	CEP 9a	Review of Management Plan for Antarctic Specially Protected Area (ASPA) No 163: Dakshin Gangotri Glacier, Dronning Maud Land	India					ASPA 163 Figure 1 ASPA 163 Map 1 ASPA 163 Map 2 ASPA 163 Map 3 ASPA 163 Map 4 ASPA 163 Map 5 ASPA 163 Map 6 ASPA 163 Revised Management Plan
WP043	ATCM 5	Report of the Intersessional Contact Group to promote broader Antarctic cooperation	Chile					
WP044	ATCM 5 CEP 3	A symposium celebrating the 25th anniversary of the Environmental Protocol to the Antarctic Treaty	Norway Australia Chile France New Zealand United Kingdom					
WP045	ATCM 6	On Payment of Contributions by Consultative Parties to the Antarctic Treaty Secretariat by Instalments	Ukraine					
WP046	CEP 10a	Study to determine occurrence of non-native species introduced into	Argentina					

Working Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		Antarctica through natural pathways						
WP047	ATCM 15 CEP 3	Workshop on Education and Outreach - Report of the Informal Discussions on the Development of a Publication on the Occasion of the 25th Anniversary of the Madrid Protocol	Argentina					
WP048	CEP 9a	Report of the Informal Discussions for Another Intersessional Period on the Proposal for a New Antarctic Specially Managed Area at Chinese Antarctic Kunlun Station, Dome A	China					Summary of the Comments and Responds in the Second Round of Discussion
WP049	CEP 6	Environmental Remediation in Antarctica	Brazil Argentina					
WP050	CEP 9e	Findings from ad hoc Surveys related to the Protection of Fossils in Antarctica. Potential Courses of Action for Further Discussion	Argentina					
WP051	ATCM 11	How to address the problem of commercial tour vessels navigating under a third-party flag in the Antarctic Treaty Area	Ecuador					
WP052	ATCM 13	Co-chairs’ Report of the Workshop on Education and Outreach.	Bulgaria Belgium Brazil Chile Portugal United Kingdom					

Information Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
IP001	ATCM 4	Report by the CCAMLR Observer to the Thirty-eighth Antarctic Treaty Consultative Meeting	CCAMLR					
IP002	ATCM 15	Workshop on Education and Outreach - Portugal’s Antarctic Education and Outreach Activities	Portugal					
IP003	ATCM 13	Portugal’s Antarctic Science and Policy Activities: a Review	Portugal					
IP004	ATCM 11	Special WG on Competent Authorities issues: Summary of the United Kingdom’s Antarctic Permitting Process	United Kingdom					
IP005	ATCM 4	Report by the Depositary Government for the Convention for the Conservation of Antarctic Seals (CCAS) in Accordance with Recommendation XIII-2, Paragraph 2(D)	United Kingdom					
IP006 rev.1	ATCM 11	Special WG on Competent Authorities issues: Summary of Japan’s Certification Process of Antarctic Activity	Japan					
IP007	ATCM 4	Activity of the Republic of Belarus in Antarctica in 2007–2014 and Today	Belarus					
IP008	ATCM 4 CEP 5	The Annual Report for 2014/15 of the Council of Managers of National Antarctic Programs (COMNAP)	COMNAP					
IP009 rev.1	ATCM 15	Workshop on Education and Outreach - Making an Impact: National Antarctic Program Activities which Facilitate Education and Outreach	COMNAP					Compilation of national Antarctic program information on education and outreach activities.
IP010	CEP 9d	The concept of "outstanding values" in the marine environment under	Belgium					

Information Papers

Number	Ag. Items	Title	Submitted By	E	F	R	S	Attachments
		Annex V of the Protocol						
IP011	CEP 3	Antarctic Environmental Portal content development and editorial process	Australia Belgium New Zealand Norway SCAR					
IP012	CEP 5	Report by the SC-CAMLR Observer	CCAMLR					
IP013	CEP 9b	Supporting Images for Working Paper: Ross Sea Heritage Restoration Project: A model for conserving heritage values in Antarctic Specially Protected Areas	New Zealand					
IP014	ATCM 13	Research Activity Report. Czech Antarctic Expedition to James Ross Island Jan-Feb 2015	Czech Republic					
IP015	ATCM 13 CEP 8b	Proposed routes for all-terrain vehicles based on impact on deglaciated area of James Ross Island	Czech Republic					
IP016	CEP 6	Bioremediation on the Brazilian Antarctic Station area	Brazil					
IP017	ATCM 15	Workshop on Education and Outreach - APECS-Brazil E&O activities during the XXXVII Antarctic Treaty Consultative Meeting (ATCM)	Brazil					
IP018	ATCM 15	Workshop on Education and Outreach - Cultural Contest - “Brasil in Antarctica”	Brazil					
IP019 rev.1	ATCM 4 CEP 5	The Scientific Committee on Antarctic Research (SCAR) Annual Report 2014/15	SCAR					
IP020	ATCM 13 CEP 13	Outcomes of the 1st SCAR Antarctic and Southern Ocean Science Horizon Scan	SCAR					A roadmap for Antarctic and Southern Ocean science for the next two decades and beyond
IP021	ATCM 4	Report of the Depositary Government for the Agreement on the Conservation of Albatrosses and Petrels (ACAP)	Australia					

Information Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
IP022	ATCM 4	Report of the Depositary Government for the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)	Australia					
IP023	ATCM 13	First Colombian Scientific Expedition to Antarctica 2014/2015	Colombia					
IP024	CEP 9e	Code of Conduct for Activities within Terrestrial Geothermal Environments in Antarctica	New Zealand Spain United Kingdom United States					
IP025	ATCM 13	Finland's Antarctic Research Strategy 2014	Finland					
IP026	ATCM 13	Antarctic Scientific Agenda of Colombia 2014 - 2035	Colombia					
IP027	CEP 10c	Important Bird Areas (IBAs) in Antarctica	Australia New Zealand Norway United Kingdom United States					Important Bird Areas in Antarctica 2015: Summary
IP028	ATCM 10	Contribution of Colombia to the Maritime Safety in Antarctica	Colombia					
IP029	CEP 10a	The successful eradication of Poa pratensis from Cierva Point, Danco Coast, Antarctic Peninsula	Argentina Spain United Kingdom					
IP030	ATCM 13	Japan's Antarctic Research Highlights 2014–15	Japan					
IP031	ATCM 15	Workshop on Education and Outreach - UK's Antarctic Education and Public Engagement Programmes	United Kingdom					
IP032	ATCM 13	Document withdrawn	United Kingdom					
IP033	ATCM 10 ATCM 4	The role of the United Kingdom in charting the waters of the Antarctic	United Kingdom					
IP034	CEP 7	Results of RACER workshop focused on James Ross Island	United Kingdom Czech Republic					Results of RACER workshop focused on James Ross Island
IP035	ATCM 11	Special WG on Competent	France					

Information Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		Authorities session - French issues and experiences of relevance to the paragraphs III to VII of the agenda						
IP036	ATCM 11	Special WG on Competent Authorities session - Brief summary of the French competent authority domestic process	France					
IP037	ATCM 11	French measures to increase the security of tourism and non-governmental activities in the Antarctic	France					
IP038	ATCM 11	Special WG on Competent Authorities Issues - Summary of South Africa's Antarctic Authorisation Process	South Africa					
IP039	CEP 8a	Construction and Operation of Belarusian Antarctic Research Station at Mount Vechernyaya, Enderby Land. Final Comprehensive Environmental Evaluation	Belarus					Final Comprehensive Environmental Evaluation
IP040	ATCM 4	Report of the Depositary Government of the Antarctic Treaty and its Protocol in accordance with Recommendation XIII-2	United States					Antarctic Treaty status table List of Recommendations/Measures and their approvals Protocol status table
IP041	CEP 6	Remediation and Closure of Dry Valley Drilling Project Boreholes in Response to Rising Lake Levels	United States					
IP042	CEP 11	EIA Field Reviews of Science, Operations, and Camps	United States					USAP Field Camp Review Checklist
IP043	ATCM 15	Workshop on Education and Outreach - Education and Outreach Activities of the United States Antarctic Program (USAP)	United States					
IP044	ATCM 10	Australia's Antarctic Hydrographic Surveys	Australia					

Information Papers

Number	Ag. Items	Title	Submitted By	E	F	R	S	Attachments
IP045 rev.1	ATCM 4	Australia's Approval of Measure 4 (2004), Measure 1 (2005), and Measure 15 (2009)	Australia					
IP046	CEP 10a	Colonisation status of known non-native species in the Antarctic terrestrial environment: a review	United Kingdom Chile Spain					Attachment A: Biological invasions in terrestrial Antarctica: what is the current status and how can we spond? Attachment B: Supplementary information
IP047	ATCM 13	VIII Campaña Venezolana a la Antártida 2014-2015	Venezuela					
IP048	ATCM 15	Taller sobre Educación y Difusión - Proyecto Libro Digital Juguemos en la Antártida	Venezuela					Juguemos en la Antártida. Guía para el estudiante Juguemos en la Antártida. Manual del docente La aventura de un osito polar perdido en la Antártida
IP049	ATCM 11	The unauthorised voyage of the SV Infinity (2014): Next Steps	New Zealand Germany					
IP050	ATCM 10 CEP 9b	Damage to the Observation Hill Cross (HSM 20)	New Zealand					
IP051	ATCM 10	Search and Rescue Incident: Antarctic Chieftain (2015)	New Zealand					
IP052	ATCM 10	Joint Search and Rescue Exercise in the Antarctic	IAATO New Zealand					
IP053	ATCM 11	IAATO Overview of Antarctic Tourism	IAATO					
IP054	ATCM 11	Special WG on Competent Authorities Issues - Agenda Item V - Development of Domestic Guidance on Emergency Preparedness, Response Planning and Insurance Requirements (Measure 4 (2004))	New Zealand					
IP055	ATCM 10	Antarctic Flight Information Manual (AFIM)	COMNAP					
IP056	ATCM 10	COMNAP Sea Ice Challenges Workshop	COMNAP					
IP057	ATCM 12 CEP 12	Report of the Joint Inspections undertaken by the United Kingdom and the Czech Republic under Article VII of	United Kingdom Czech Republic					UK and Czech Republic Antarctic Treaty Inspection Report 2014-15

Information Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		the Antarctic Treaty and Article 14 of the Environmental Protocol						
IP058	ATCM 11	Special Working Group on Competent Authorities issues - Examples and Issues from the United Kingdom	United Kingdom					
IP059	ATCM 13	The COMNAP Antarctic Roadmap Challenges (ARC) project	COMNAP					
IP060	ATCM 10	COMNAP Search & Rescue Workshop III - Advance notice of workshop plans	COMNAP					
IP061	ATCM 10	Improving Sea Ice Information in Antarctica	Germany					
IP062	ATCM 15	Workshop on Education and Outreach - Whom, how and what do we reach with Antarctic education and outreach?	Germany					
IP063	ATCM 13	EU-PolarNet – Connecting Science with Society	Germany Belgium Bulgaria France Portugal					
IP064 rev.1	ATCM 11	The yacht Sarah W. Vorwerk within the Antarctic Treaty area during the season 2014/2015	Germany Argentina					
IP065	ATCM 11	Alleged solo Expedition to the South Pole by a German National	Germany					
IP066	ATCM 11	Special Working Group on Competent Authorities session – German contribution	Germany					
IP067	ATCM 13	Russian studies of subglacial Lake Vostok in the season 2014–2015	Russian Federation					
IP068	ATCM 16	Russia-U.S. Removal of Radioisotope Thermoelectric Generators from the Antarctic	Russian Federation United States					
IP069	CEP 10c	Update of the status of the rare moss formations on Caliente Hill (ASPA	Spain					

Information Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		140 – site C)						
IP070	ATCM 13 ATCM 4	Report from Asian Forum of Polar Sciences to the ATCM XXXVIII	Korea (ROK)					
IP071	CEP 11	Environmental Monitoring at Jang-Bogo Station, Terra Nova Bay	Korea (ROK)					
IP072	ATCM 11	Secial WG on Competent Authorities session - Authorisation Procedure for Non-Governmental Activities in Antarctica	Chile					
IP073	ATCM 15	Workshop on Education and Outreach - Key Dissemination and Education Activities in the Chilean Antarctic Science Programme	Chile					
IP074	ATCM 10 CEP 13	Waste Water Management in Antarctica COMNAP Workshop	COMNAP					COMNAP Waste Water Management Workshop 2014 Convenor's Report
IP075	ATCM 11	Special WG on Competent Authorities session - An illustration of successful cooperation between NCAs	Chile France					
IP076	ATCM 15	Workshop on Education and Outreach - Antarctic Education & Outreach in Italy before and after the 4th International Polar Year	Italy					
IP077	CEP 8b	UAV remote sensing of environmental changes on King George Island (South Shetland Islands): preliminary information on the results of the first field season 2014/2015	Poland					Supporting figures
IP078	CEP 10a	Eradication of a non-native grass Poa annua L. from ASPA No 128 Western Shore of Admiralty Bay, King George Island, South Shetland Islands	Poland					

Information Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
IP079	ATCM 13	Chilean Antarctic Science Program: Evolution and challenges	Chile					
IP080	CEP 8b	South Africa's use of Unmanned Aerial Vehicles (UAV) in Antarctica	South Africa					
IP081	ATCM 11	Special WG on Competent Authorities issues - Summary of the United States Framework for Regulation of Antarctic Tourism	United States					
IP082	ATCM 10 CEP 8b	A risk-based approach to safe operations of unmanned aircraft systems in the United States Antarctic Program (USAP)	United States					General UAS Risk Assessment
IP083	ATCM 10 CEP 8b	Guidance on unmanned aerial system (UAS) use in Antarctica developed for applications to scientific studies on penguins and seals	United States					Michael E. Goebel et al. Polar Biology.
IP084	ATCM 4	Report of the International Association of Antarctica Tour Operators 2014-15	IAATO					
IP085	ATCM 11 CEP 9c	Report on IAATO Operator Use of Antarctic Peninsula Landing Sites and ATCM Visitor Site Guidelines, 2013-14 and 2014-15 Season	IAATO					
IP086	ATCM 11	IAATO Guidelines for Sea Kayaking and Underwater activities	IAATO					
IP087	ATCM 15	Workshop on Education and Outreach - Using Education to Create a Task Force for Antarctic Conservation	IAATO					
IP088	ATCM 10 CEP 8b	IAATO Policies on the use of unmanned aerial vehicles (UAVs) in Antarctica	IAATO					
IP089	ATCM 15	Workshop on Education and	New Zealand					

Information Papers

Number	Ag. Items	Title	Submitted By	E	F	R	S	Attachments
		Outreach – New Zealand Ice-Reach: Inspiring Communities to Connect with Antarctica						
IP090	ATCM 15	Workshop on Education and Outreach - Education and Outreach in the Australian Antarctic Programme	Australia					
IP091	ATCM 13	Cooperation between Romania and Korea (ROK) in Antarctica	Romania					
IP092	ATCM 14 CEP 7	Antarctic Climate Change and the Environment – 2015 Update	SCAR					
IP093	CEP 10a	Monitoring biological invasion across the broader Antarctic: a baseline and indicator framework	SCAR					
IP094	ATCM 13 CEP 7	Climate Change in Antarctica	United Kingdom					Patterns of Change in Antarctica
IP095	ATCM 11	Special WG on Competent Authorities session - Implementing the Madrid Protocol. Dutch experiences and questions for the ATCM workshop of Competent Authorities	Netherlands					
IP096	ATCM 11	Data Collection and Reporting on Yachting Activity in Antarctica in 2014-15	United Kingdom IAATO					
IP097	ATCM 15	Workshop on Education and Outreach – Examples of educational and outreach activities of the Belgian scientists, school teachers and associations in 2013-2015	Belgium					
IP098	ATCM 13 CEP 11	Report on the 2014-2015 activities of the Southern Ocean Observing System (SOOS)	SCAR					
IP099	ATCM 13	Recent Developments in Indian Ice-core	India					

Information Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		Drilling Program in Dronning Maud Land, East Antarctica						
IP100	ATCM 13	Antarctic Lakes and Global Climate Perspectives: The Indian Footprint	India					
IP101	ATCM 15 CEP 10a	COMNAP Practical Training Modules: Module 2 – Non-native Species	COMNAP					COMNAP Training Module 2: Non-native Species
IP102	ATCM 11 CEP 9c	Antarctic Site Inventory: Results from long-term monitoring	New Zealand United States					
IP103	CEP 11	A Methodology to Assess Site Sensitivity at Visitor Sites: Progress Report	Australia New Zealand Norway United Kingdom United States					
IP104 rev.1	ATCM 11	Towards a Comprehensive, Proactive and Effective Antarctic Tourism Policy: Turning Recommendations into Action	India					
IP105	ATCM 15	Workshop on Education and Outreach - Antarctic Education and Outreach activities in Bulgaria	Bulgaria					
IP106	CEP 5	Report by the CEP Observer to the XXXIII SCAR Delegates' Meeting	Chile					
IP107	ATCM 11	Special WG on Competent Authorities Issues - Recent Canadian Permitting Issues	Canada					
IP108	ATCM 11	Special WG on Competent Authorities Issues - Summary of Canada's Antarctic Permitting System	Canada					
IP109	ATCM 11 CEP 9e	Antarctic Tourism and Protected Areas	ASOC					
IP110	ATCM 14 CEP 7	Climate Change 2015: A Report Card	ASOC					
IP111	CEP 8b	Cumulative Impact Assessment	ASOC					
IP112	CEP 9e	Expanding Antarctica's	ASOC					

Information Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		Protected Areas System						
IP113	ATCM 10	Next steps for Vessel Management in the Southern Ocean	ASOC					
IP114	ATCM 14 CEP 7	The Antarctic Treaty System, Climate Change and Strengthened Scientific Interface with Relevant Bodies of the United Nations Framework Convention on Climate Change (UNFCCC)	ASOC					
IP115	ATCM 13	Australian Antarctic Science Program: highlights of the 2014/15 season	Australia					
IP116	ATCM 13	East Antarctic / Ross Sea Workshop on Collaborative Science	Australia China					
IP117	ATCM 11	Special WG on Competent Authorities issues - Summary of Parties' competent authority domestic process	Norway					
IP118 rev.1	ATCM 15	Workshop on Education and Outreach - Norway's Antarctic Education and Outreach Activities	Norway					
IP119	CEP 9c	National Antarctic Programme use of locations with Visitor Site Guidelines in 2014-15	United Kingdom Argentina Australia United States					
IP120	ATCM 15	Workshop on Education and Outreach - Summary of CCAMLR initiatives	CCAMLR					
IP121	CEP 4	Committee for Environmental Protection (CEP): summary of activities during the 2014/15 intersessional period	Australia					
IP122	ATCM 4	Report by the International Hydrographic Organization (IHO)	IHO					
IP123	ATCM 11	Special WG on competent Authorities session - Experiences and examples from the	Norway					

Information Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		Norwegian competent authorities						
IP124	ATCM 15	Workshop on Education and Outreach - South Africa's Antarctic Education and Outreach Activities	South Africa					
IP125	ATCM 13	¨From East to West¨ initiative	Uruguay					
IP126	ATCM 11	Report on Antarctic tourist flows and cruise ships operating in Ushuaia during the 2014/2015 Austral summer season	Argentina					
IP127 rev.1	ATCM 11	Non-commercial pleasure and/or sport vessels that travelled to Antarctica through Ushuaia during the 2014/2015 season	Argentina					
IP128	ATCM 11	Areas of tourist interest in the Antarctic Peninsula and South Orkney Islands region. 2014/2015 austral summer season	Argentina					
IP129	ATCM 15	Workshop on Education and Outreach - Argentina´s Art Programme and International Cooperation: Art in Antarctica, a ten-year project	Argentina					
IP130	ATCM 13	XXXIV SCAR Biennial Meetings including the 2016 Open Science Conference, 19-31 August, 2016, Kuala Lumpur, Malaysia	Malaysia					
IP131	CEP 9c	Tourism Management Policy for Brown Scientific Station	Argentina					Visitor site guide for Brown Scientific Station
IP132	ATCM 11	Tourist Activity in Brown Scientific Station. Study, analysis and management measures	Argentina					
IP133	ATCM 17	An Update on Status and Trends Biological Prospecting in Antarctica and	Netherlands					

Information Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		Recent Policy Developments at the International Level						
IP134	ATCM 13	Update on the Canadian Polar Commission and Canadian High Arctic Research Station (CHARS) Project	Canada					
IP135	ATCM 13	Cooperation of Romania with Australia in Antarctica	Romania					
IP136	ATCM 13	Cooperation of Romania with Bulgaria in the Antarctic field	Romania					
IP137	ATCM 4	Report of the Antarctic and Southern Ocean Coalition	ASOC					

Background Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
BP001	ATCM 13 CEP 7	Abstract of the SCAR Lecture: Southern Ocean Acidification	SCAR					
BP002	ATCM 10	Cooperation Visit to Stations/ Bases Facilities in Antarctica	Brazil					
BP003	ATCM 10	XXXIII Brazilian Antarctic Operation	Brazil					
BP004	ATCM 13 CEP 5	The Scientific Committee on Antarctic Research (SCAR) Selected Science Highlights for 2014/15	SCAR					
BP005	ATCM 13	Action Plan: Development of the Brazilian Antarctic science	Brazil					
BP006	CEP 5	Submission to the CCAMLR CEMP database of Adélie penguin data from the Ross Sea region	New Zealand					
BP007	ATCM 15	Workshop on Education and Outreach – Poster Abstract on Education and Outreach Activities of the United States Antarctic Program (USAP)	United States					
BP008	ATCM 13	Report from the Republic of Korea on Its Cooperation with the Consultative Parties and the Wider Polar Community	Korea (ROK)					
BP009	ATCM 10	Polish Sailing Yacht Accident at King George Island (Antarctic Peninsula)	Poland					
BP010	ATCM 13	Actividades del Programa Nacional Antártico Perú periodo 2014 – 2015	Peru					
BP011	ATCM 10	Vigésima Tercera Expedición Científica del Perú a la Antártida (ANTAR XXIII)	Peru					
BP012	CEP 6	Remediation of fuel-contaminated soil using biopile technology at Casey Station	Australia					
BP013	CEP 6	Remediation and reuse of soil from a	Australia					

Background Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		fuel spill near Lake Dingle, Vestfold Hills						
BP014	CEP 12	Follow-up to the Recommendations of the Inspection Teams to Maitri Station	India					
BP015	ATCM 13	Síntesis de biodiesel a partir de aceite producido por microalgas antárticas	Ecuador					
BP016	ATCM 10	Desarrollo y aplicación de eco-materiales para un prototipo habitable de emergencia en la Antártida	Ecuador					
BP017	CEP 13	Manejo de residuos sólidos en la XIX Expedición Ecuatoriana	Ecuador					
BP018	ATCM 10	Results of an Investigation into the Aircraft Incident Mount Elizabeth, Antarctica on January 23, 2013	Canada					
BP019	ATCM 15	El tema antártico en los textos del nivel secundario del Ecuador	Ecuador					
BP020	ATCM 15	Uruguayan Antarctic Institute: Outreach, Culture and Education Program	Uruguay					
BP021	ATCM 15	Workshop on Education and Outreach – Poster Abstract on Education and Outreach Activities of Bulgarian Antarctic Institute (BAI)	Bulgaria					
BP022	ATCM 13 CEP 10c	A meta-analysis of human disturbance impacts on Antarctic wildlife	SCAR					
BP023	ATCM 15	Workshop on Education and Outreach - First Uruguayan Antarctic Research School: training the next generation of Uruguayan Antarctic researchers	Uruguay					
BP024	ATCM 13	Determinación del marco de referencia geodésico oficial de la Estación Maldonado	Ecuador					
BP025	ATCM 13	Implementación de UAV's en la generación de	Ecuador					

Background Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
		cartografía oficial de la Estación Maldonado						
BP026	ATCM 15	Report on the ATCM XXXVIII Workshop on Education and Outreach	Bulgaria Belgium Brazil Chile Portugal United Kingdom					

Secretariat Papers

Number	Ag. Items	Title	Submitted By	E	F	R	S	Attachments
SP001 rev.4	ATCM 3 CEP 2	ATCM XXXVIII and CEP XVIII Agenda and Schedule	ATS					ATCM Multi-Year Strategic Work Plan
SP002	ATCM 6	Secretariat Report 2014/15	ATS					Appendix 1: Audited Financial Report 2013/14 - Auditors Report Appendix 1: Audited Financial Report 2013/14 - Financial Report Appendix 2: Provisional Financial Report 2014/15 Appendix 3: Contributions Received by the Antarctic Secretariat 2014/15
SP003	ATCM 6	Secretariat Programme 2015/16	ATS					Appendix 1: Provisional Report for the Financial Year 2014/15, Budget for the Financial Year 2015/16, Forecast Budget for the Financial Year 2016/17 Appendix 2: Contribution scale 2016/17 Appendix 3: Salary Scale 2015/16
SP004	ATCM 6	Five Year Forward Budget Profile 2015-2019	ATS					Five Years Forward Budget Profile 2015 - 2019
SP005	CEP 8b	Annual list of Initial Environmental Evaluations (IEE) and Comprehensive Environmental Evaluations (CEE) prepared between April 1st 2014 and March 31st 2015	ATS					
SP007	ATCM 14 CEP 7	Actions taken by the CEP and the ATCM on the ATME recommendations on climate change	ATS					
SP008	ATCM 5	Operational Recommendations subject to review	ATS					Review of recommendations (From ATCM36/WP1 attachment 004)
SP012	CEP 2	CEP XVIII Summary of Papers	ATS					CEP XVIII Annotated Agenda
SP013	ATCM 16 ATCM 17 ATCM 5 ATCM 6 ATCM 7 ATCM 9	WG on Legal and Institutional Matters - Summary of papers	ATS					
SP014 rev.2	ATCM 10 ATCM 12 ATCM 13	WG on Operational Matters - Summary of Papers	ATS					Operations WG work programme

Secretariat Papers								
Number	**Ag. Items**	**Title**	**Submitted By**	**E**	**F**	**R**	**S**	**Attachments**
	ATCM 14 ATCM 15							
SP015 rev.1	ATCM 11	WG on Tourism and Non-governmental Activities - Summary of papers	ATS					
SP016 rev.1	ATCM 11	Special Working Group on competent authorities issues relating to tourism and non-governmental activities in Antarctica - Agenda and Summary of Papers	ATS					
SP017	ATCM 15	Workshop on Education and Outreach - Summary of Papers	ATS					

3. List of Participants

3. List of Participants

Consultative Parties				
Party	**Name**	**Position**	**Arrival Date**	**Dep.Date**
Argentina	Azrak, Guillermo	Delegate	30/05/2015	11/06/2015
Argentina	Capurro, Andrea	Delegate	29/05/2015	11/06/2015
Argentina	Coria, Nestor	Delegate	30/05/2015	11/06/2015
Argentina	Giudici, Tomás Martín	Delegate	30/05/2015	07/06/2015
Argentina	Gowland, Máximo	Alternate	30/05/2015	11/06/2015
Argentina	Humarán, Adolfo Ernesto	Advisor	30/05/2015	11/06/2015
Argentina	López Crozet, Fausto	Head of Delegation	30/05/2015	11/06/2015
Argentina	Memolli, Mariano A.	CEP Representative	30/05/2015	11/06/2015
Argentina	Ortúzar, Patricia	Delegate	30/05/2015	11/06/2015
Argentina	Rebull, Fernanda	Delegate	30/05/2015	11/06/2015
Argentina	Sartor, Jorge	Delegate	30/05/2015	11/06/2015
Argentina	Sotelo, Emanuel	Advisor	30/05/2015	11/06/2015
Argentina	Tarapow, Marcelo Cristian	Advisor	30/05/2015	11/06/2015
Argentina	Vereda, Marisol	Advisor	30/05/2015	11/06/2015
Argentina	Vlasich, Verónica	Delegate	30/05/2015	11/06/2015
Australia	Bourke, Deborah	Delegate	28/05/2015	08/06/2015
Australia	Cooper, Katrina	Head of Delegation	31/05/2015	10/06/2015
Australia	Fleming, Tony	Alternate	30/05/2015	10/06/2015
Australia	Gales, Nicholas	Delegate	31/05/2015	10/06/2015
Australia	Goldsworthy, Lyn	Advisor	30/05/2015	10/06/2015
Australia	Lees, Alexandra	Delegate	01/06/2015	10/06/2015
Australia	McIvor, Ewan	Delegate	28/05/2015	11/06/2015
Australia	Miller, Denzil	Advisor	30/05/2015	09/06/2015
Australia	Mundy, Jason	Delegate	30/05/2015	11/06/2015
Australia	Scott-Kemmis, Cary	Delegate	30/05/2015	10/06/2015
Australia	Tracey, Phillip	CEP Representative	29/05/2015	11/06/2015
Belgium	André, François	CEP Representative	30/05/2015	12/06/2015
Belgium	Badhe, Renuka	Delegate	04/06/2015	09/06/2015
Belgium	Touzani, Rachid	Delegate	01/06/2015	10/06/2015
Belgium	Vancauwenberghe, Maaike	Alternate	31/05/2015	05/06/2015
Belgium	Vanden Bilcke, Christian	Head of Delegation	06/06/2015	10/06/2015
Belgium	Wilmotte, Annick	Delegate	29/05/2015	06/06/2015
Brazil	Bueno, Rodrigo	Delegate	30/05/2015	11/06/2015
Brazil	Chaim Mattos, Bianca	Delegate	01/06/2015	06/06/2015
Brazil	Fontes Faria, Maria Rita	Head of Delegation	29/05/2015	11/06/2015
Brazil	Guerra De Araujo, Ricardo	Advisor	01/06/2015	10/06/2015
Brazil	Leite, Márcio	Delegate	30/05/2015	11/06/2015
Brazil	Schneider Costa, Erli	Delegate	30/05/2015	11/06/2015
Brazil	Silva Rodrigues, Marcos	Delegate	30/05/2015	11/06/2015
Bulgaria	Antov, Grigor	Workshop Part.	31/05/2015	31/05/2015
Bulgaria	Asenova, Mina	Advisor	01/06/2015	10/06/2015
Bulgaria	Chakarov, Danail	Head of Delegation	31/05/2015	10/06/2015
Bulgaria	Chipev, Nesho	Delegate	20/05/2015	12/06/2015
Bulgaria	Chirkova, Rossina	Advisor	01/06/2015	10/06/2015
Bulgaria	Dimitrova, Lora	Advisor	01/06/2015	10/06/2015
Bulgaria	Doncheva, Svetla	Workshop Part.	01/06/2015	04/06/2015
Bulgaria	Dragoev, Petar	Advisor	01/06/2015	10/06/2015
Bulgaria	Ivanov, Lyubomir	Delegate	20/05/2015	12/06/2015
Bulgaria	Jivkov, Christo	Alternate	31/05/2015	10/06/2015
Bulgaria	Konakchiyska, Kaliopa	Advisor	01/06/2015	10/06/2015
Bulgaria	Kotlarov, Borislav	Staff	01/06/2015	06/06/2015
Bulgaria	Kotlarova, Siviliana	Staff	01/06/2015	01/06/2015
Bulgaria	Kuchev, Yuriy	Delegate	20/05/2015	12/06/2015

Consultative Parties				
Party	**Name**	**Position**	**Arrival Date**	**Dep.Date**
Bulgaria	Manolova, Ekaterina	Advisor	01/06/2015	10/06/2015
Bulgaria	Mateev, Dragomir	Delegate	25/05/2015	11/06/2015
Bulgaria	Mihaylova, Elisaveta	Advisor	01/06/2015	10/06/2015
Bulgaria	Mihaylova, Ivanka	Advisor	01/06/2015	10/06/2015
Bulgaria	Natova, Anna	Delegate	01/06/2015	10/06/2015
Bulgaria	Pavlova, Veradina	Advisor	01/06/2015	10/06/2015
Bulgaria	Peicheva, Detelina	Delegate	30/05/2015	10/06/2015
Bulgaria	Petrova, Teodora	Advisor	01/06/2015	10/06/2015
Bulgaria	Pimpirev, Christo	Alternate	20/05/2015	12/06/2015
Bulgaria	Raycheva, Sasha	Delegate	30/05/2015	10/06/2015
Bulgaria	Raytchev, Rayko	ATCM Chairman	31/05/2015	10/06/2015
Bulgaria	Romanska, Tsvety	Alternate	31/05/2015	10/06/2015
Bulgaria	Stoytchev, Tihomir	Delegate	01/06/2015	10/06/2015
Bulgaria	Tagarinska, Vera	Delegate	01/06/2015	10/06/2015
Bulgaria	Tcotcorkov, Lachazar	Delegate	30/05/2015	10/06/2015
Bulgaria	Todorova, Rusiana	Advisor	01/06/2015	10/06/2015
Bulgaria	Todorova-Yakimova, Mariya	Advisor	01/06/2015	10/06/2015
Bulgaria	Trassieva, Albena	Delegate	01/06/2015	10/06/2015
Bulgaria	Trendafilov, Valeri	Advisor	01/06/2015	10/06/2015
Bulgaria	Trifonova, Iglika	Advisor	20/05/2015	12/06/2015
Bulgaria	Vergiev, Stoyan	Advisor	01/06/2015	10/06/2015
Bulgaria	Videnova, Galina	Advisor	20/05/2015	12/06/2015
Bulgaria	Yordanov, Yordan	Delegate	20/05/2015	12/06/2015
Bulgaria	Zamfirov, Yordan	Advisor	01/06/2015	10/06/2015
Chile	Arias, Germán	Advisor	31/05/2015	11/06/2015
Chile	Barticevic, Elías	Delegate	29/05/2015	04/06/2015
Chile	Berguño, Francisco	Head of Delegation	25/05/2015	11/06/2015
Chile	Casiccia, Claudio	Advisor	31/05/2015	11/06/2015
Chile	Echeverría, Eduardo	Advisor	31/05/2015	11/06/2015
Chile	Espinoza, Luis	Advisor	05/06/2015	11/06/2015
Chile	Figueroa, Miguel	Advisor	31/05/2015	11/06/2015
Chile	Madrid, Santiago	Advisor	31/05/2015	11/06/2015
Chile	Mayorga, Pedro	Advisor	31/05/2015	11/06/2015
Chile	Sardiña, Jimena	Delegate	04/06/2015	11/06/2015
Chile	Vallejos, Verónica	CEP Representative	31/05/2015	11/06/2015
Chile	Velásquez, Ricardo	Advisor	31/05/2015	11/06/2015
Chile	Villalón, Gilberto	Advisor	31/05/2015	11/06/2015
Chile	Villanueva, Tamara	Alternate	25/05/2015	11/06/2015
China	FANG, LIJUN	Delegate	31/05/2015	11/06/2015
China	HAN, ZIXUAN	Delegate	31/05/2015	11/06/2015
China	LIU, YANG	Delegate	30/05/2015	11/06/2015
China	QIN, WEIJIA	Delegate	31/05/2015	06/06/2015
China	QU , WENSHENG	Head of Delegation	30/05/2015	11/06/2015
China	XU, CHEN	Delegate	31/05/2015	06/06/2015
China	ZHENG, CHENG	Delegate	30/05/2015	11/06/2015
Czech Republic	Bartak, Milos	Delegate	31/05/2015	05/06/2015
Czech Republic	Filippiova, Martina	Alternate	31/05/2015	11/06/2015
Czech Republic	Kapler, Pavel	Delegate	31/05/2015	05/06/2015
Czech Republic	Nyvlt, Daniel	CEP Representative	31/05/2015	05/06/2015
Czech Republic	Prošek, Pavel	Delegate	31/05/2015	05/06/2015
Czech Republic	Sladký, Pavel	Delegate	04/06/2015	11/06/2015
Czech Republic	Št?pánek, P?emysl	Alternate	01/06/2015	10/06/2015
Czech Republic	Válek, Petr	Head of Delegation	30/05/2015	02/06/2015
Czech Republic	Venera, Zdenek	CEP Representative	31/05/2015	05/06/2015
Ecuador	Borbor Córdova, Mercy Julia	CEP Representative	30/05/2015	11/06/2015

Consultative Parties				
Party	**Name**	**Position**	**Arrival Date**	**Dep.Date**
Ecuador	Proaño Silva, Mario Renato	Delegate	30/05/2015	11/06/2015
Ecuador	Velastegui Herrera, Marcela	Head of Delegation	01/06/2015	11/06/2015
Finland	Jarvenpaa, Jesse	Delegate	01/06/2015	10/06/2015
Finland	Mähönen, Outi	CEP Representative	31/05/2015	06/06/2015
Finland	Valjento, Liisa	Head of Delegation	30/05/2015	10/06/2015
France	Belna, Stéphanie	CEP Representative	31/05/2015	05/06/2015
France	Choquet, Anne	Advisor	03/06/2015	10/06/2015
France	Frenot, Yves	CEP Representative	30/05/2015	10/06/2015
France	Guyomard, Ann-Isabelle	Delegate	30/05/2015	11/06/2015
France	Guyonvarch, Olivier	Head of Delegation	31/05/2015	10/06/2015
France	Lebouvier, Marc	CEP Representative	30/05/2015	10/06/2015
France	Lorraine, Monclar	Staff	01/06/2015	10/06/2015
France	Mayet, Laurent	Delegate	31/05/2015	02/06/2015
France	Pozzo di Borgo, Cécile	Delegate	07/06/2015	09/06/2015
France	Rocard, Michel	Delegate	31/05/2015	02/06/2015
France	Runyo, Fabienne	Alternate	31/05/2015	10/06/2015
Germany	Duebner, Walter	Delegate	08/06/2015	10/06/2015
Germany	Fabris, Rita	Delegate	03/06/2015	10/06/2015
Germany	Gaedicke, Christoph	Delegate	01/06/2015	06/06/2015
Germany	Gatti, Susanne	Workshop Part.	31/05/2015	01/06/2015
Germany	Guretskaya, Anastasia	Delegate	31/05/2015	10/06/2015
Germany	Hain, Stefan	Delegate	30/05/2015	10/06/2015
Germany	Herata, Heike	Delegate	31/05/2015	10/06/2015
Germany	Hertel, Fritz	Delegate	01/06/2015	06/06/2015
Germany	Heyn, Andrea	Delegate	01/06/2015	08/06/2015
Germany	Hilbert, Jacqueline	Delegate	06/06/2015	09/06/2015
Germany	Lassig, Rainer	Head of Delegation	31/05/2015	10/06/2015
Germany	Läufer, Andreas	Delegate	01/06/2015	06/06/2015
Germany	Liebschner, Alexander	Delegate	31/05/2015	06/06/2015
Germany	Miller, Heinrich	Delegate	31/05/2015	06/06/2015
Germany	Nixdorf, Uwe	Delegate	01/06/2015	09/06/2015
Germany	Schulz, Christian	Head of Delegation	09/06/2015	10/06/2015
Germany	Sven, Missling	Delegate	31/05/2015	11/06/2015
Germany	Vöneky, Silja	Delegate	03/06/2015	10/06/2015
Germany	Winterhoff, Esther	Delegate	08/06/2015	10/06/2015
India	Chaturvedi, Sanjay	Delegate	30/05/2015	11/06/2015
India	Mohan, Rahul	Head of Delegation	30/05/2015	11/06/2015
India	Reddy, A Sudhakara	Delegate	31/05/2015	11/06/2015
India	Tiwari, Anoop Kumar	CEP Representative	30/05/2015	11/06/2015
Italy	Bianchi Fasani, Gianluca	Advisor	01/06/2015	05/06/2015
Italy	Cattadori, Matteo	Delegate	30/05/2015	01/06/2015
Italy	De Rossi, Giuseppe	Advisor	01/06/2015	05/06/2015
Italy	Fioretti, Anna	Delegate	31/05/2015	11/06/2015
Italy	Sgrò, Eugenio	Head of Delegation	30/05/2015	11/06/2015
Italy	Tomaselli, Maria Stefania	Delegate	30/05/2015	06/06/2015
Italy	Torcini, Sandro	CEP Representative	30/05/2015	11/06/2015
Japan	Hirano, Jun	Advisor	30/05/2015	11/06/2015
Japan	Miyamori, Joji	Head of Delegation	30/05/2015	10/06/2015
Japan	Shiraishi, Kazuyuki	Advisor	30/05/2015	06/06/2015
Japan	Takeda, Sayako	Advisor	31/05/2015	10/06/2015
Japan	Tanaka, Kenichiro	Advisor	30/05/2015	10/06/2015
Japan	Teramura, Satoshi	Advisor	30/05/2015	11/06/2015
Japan	Watanabe, Kentaro	Advisor	30/05/2015	11/06/2015
Korea (ROK)	Chung, Rae-kwang	Delegate	31/05/2015	09/06/2015
Korea (ROK)	Go, Song Ju	Delegate	31/05/2015	05/06/2015

Consultative Parties				
Party	**Name**	**Position**	**Arrival Date**	**Dep.Date**
Korea (ROK)	Kim, Ji Hee	CEP Representative	30/05/2015	09/06/2015
Korea (ROK)	Kim, Yeadong	Advisor	03/06/2015	07/06/2015
Korea (ROK)	Lee, sangmin	Delegate	30/05/2015	09/06/2015
Korea (ROK)	Lee, Won Young	Delegate	30/05/2015	09/06/2015
Korea (ROK)	Moon, Jihye	Delegate	31/05/2015	11/06/2015
Korea (ROK)	Seo, won-sang	Delegate	31/05/2015	09/06/2015
Korea (ROK)	Shin, Hyoung Chul	Delegate	31/05/2015	06/06/2015
Netherlands	Bastmeijer, Kees	Advisor	01/06/2015	10/06/2015
Netherlands	Elstgeest, Marlynda	Advisor	03/06/2015	11/06/2015
Netherlands	Hernaus, Reginald	CEP Representative	31/05/2015	08/06/2015
Netherlands	Kroef, van der, Dick A.	Advisor	31/05/2015	08/06/2015
Netherlands	Lefeber, René J.M.	Head of Delegation	31/05/2015	10/06/2015
Netherlands	Lubbe, Suzanne	Workshop Part.	07/06/2015	09/06/2015
Netherlands	Malherbe, René	Workshop Part.	30/05/2015	02/06/2015
Netherlands	Peijs, Martijn	Delegate	31/05/2015	10/06/2015
New Zealand	Beggs, Peter	Advisor	30/05/2015	11/06/2015
New Zealand	Dempster, Jillian	Head of Delegation	30/05/2015	11/06/2015
New Zealand	East, Paul	Delegate	01/06/2015	04/06/2015
New Zealand	Gilbert, Neil	CEP Representative	30/05/2015	07/06/2015
New Zealand	Kendall, Rachel	Advisor	30/05/2015	11/06/2015
New Zealand	Morgan, Fraser	Advisor	01/06/2015	08/06/2015
New Zealand	Poirot, Ceisha	Advisor	30/05/2015	11/06/2015
New Zealand	Stent, Danica	Advisor	30/05/2015	11/06/2015
New Zealand	Townend, Andrew	Advisor	31/05/2015	05/06/2015
New Zealand	Weeber, Barry	Advisor	31/05/2015	11/06/2015
Norway	Eikeland, Else Berit	Head of Delegation	31/05/2015	10/06/2015
Norway	Gaalaas, Siv Christin	Delegate	03/06/2015	10/06/2015
Norway	Guldahl, John E.	Delegate	03/06/2015	05/06/2015
Norway	Halvorsen, Svein Tore	Delegate	31/05/2015	06/06/2015
Norway	Høgestøl, Astrid Charlotte	Delegate	31/05/2015	09/06/2015
Norway	Korsvoll, Marie Helene	Delegate	04/06/2015	09/06/2015
Norway	Nicolaisen, Kristine Oftedal	Delegate	07/06/2015	10/06/2015
Norway	Njaastad, Birgit	CEP Representative	29/05/2015	10/06/2015
Norway	Storvik, Kristin	Advisor	08/06/2015	09/06/2015
Norway	Strengehagen, Mette	Alternate	03/06/2015	10/06/2015
Peru	Garcia Paredes, Gladys Mabel	Head of Delegation	31/05/2015	11/06/2015
Poland	Kidawa, Anna	Delegate	31/05/2015	10/06/2015
Poland	Krawczyk-Grzesiowska, Joanna	Alternate	31/05/2015	05/06/2015
Poland	Misztal, Andrzej	Head of Delegation	08/06/2015	10/06/2015
Poland	Tatur, Andrzej	CEP Representative	31/05/2015	10/06/2015
Russian Federation	Chernysheva, Larisa	Delegate	31/05/2015	10/06/2015
Russian Federation	Gonchar, Dmitry	Head of Delegation	31/05/2015	10/06/2015
Russian Federation	Lukin, Valery	CEP Representative	29/05/2015	12/06/2015
Russian Federation	Pomelov, Victor	Delegate	29/05/2015	11/06/2015
Russian Federation	Tarasenko, Sergey	Delegate	29/05/2015	11/06/2015
South Africa	Abader, Moegamat Ishaam	Advisor	30/05/2015	06/06/2015
South Africa	Dwarika, Yolande	Head of Delegation	30/05/2015	11/06/2015
South Africa	Kingsley, Angela	Delegate	30/05/2015	11/06/2015
South Africa	Malaza, Sabelo	Advisor	30/05/2015	06/06/2015
South Africa	Mphepya, Jonas	Alternate	31/05/2015	11/06/2015
South Africa	Siko, Gilbert	Advisor	30/05/2015	11/06/2015
South Africa	Skinner, Richard	Advisor	30/05/2015	11/06/2015
South Africa	Valentine, Henry	Advisor	30/05/2015	11/06/2015
Spain	Benayas, Javier	Advisor	02/06/2015	04/06/2015
Spain	Catalan, Manuel	CEP Representative	31/05/2015	10/06/2015

Consultative Parties				
Party	**Name**	**Position**	**Arrival Date**	**Dep.Date**
Spain	Muñoz de Laborde Bardin, Juan Luis	Head of Delegation	31/05/2015	11/06/2015
Spain	Ojeda, Miguel Angel	Delegate	02/06/2015	05/06/2015
Spain	R. Pertierra, Luis	Advisor	30/05/2015	04/06/2015
Spain	Ramos, Sonia	Delegate	30/05/2015	11/06/2015
Sweden	Euren Hoglund, Lisa	Head of Delegation	30/05/2015	10/06/2015
Sweden	Selberg, Cecilia	CEP Representative	07/06/2015	10/06/2015
Sweden	Tornberg, Henrik	Advisor	02/06/2015	05/06/2015
Ukraine	Lytvynov, Valerii	Head of Delegation	31/05/2015	06/06/2015
Ukraine	Tereshchenko, Artur	Advisor	31/05/2015	06/06/2015
Ukraine	Tereshchenko, Zoia	Advisor	31/05/2015	06/06/2015
United Kingdom	Burgess, Henry	CEP Representative	30/05/2015	11/06/2015
United Kingdom	Capper, Linda	Delegate	30/05/2015	02/06/2015
United Kingdom	Clarke, Rachel	Delegate	30/05/2015	06/06/2015
United Kingdom	Coleman, Julie	Delegate	07/06/2015	09/06/2015
United Kingdom	Downie, Rod	Advisor	01/06/2015	05/06/2015
United Kingdom	Francis, Jane	Delegate	31/05/2015	05/06/2015
United Kingdom	Griffiths, Lowri	Delegate	30/05/2015	11/06/2015
United Kingdom	Hall, John	Delegate	30/05/2015	11/06/2015
United Kingdom	Hughes, Kevin	Delegate	30/05/2015	06/06/2015
United Kingdom	Rumble, Jane	Head of Delegation	30/05/2015	11/06/2015
United Kingdom	Stockings, Tim	Delegate	31/05/2015	05/06/2015
United States	Bergmann, Trisha	Advisor	31/05/2015	10/06/2015
United States	Bloom, Evan T.	Head of Delegation	31/05/2015	11/06/2015
United States	Edwards, David	Advisor	31/05/2015	10/06/2015
United States	Falkner, Kelly	Delegate	31/05/2015	10/06/2015
United States	Hahs, Ona	Advisor	31/05/2015	11/06/2015
United States	Heung, Justin	Advisor	02/06/2015	10/06/2015
United States	Karentz, Deneb	Advisor	31/05/2015	06/06/2015
United States	Naveen, Ron	Advisor	31/05/2015	10/06/2015
United States	O'Reilly, Jessica	Advisor	31/05/2015	10/06/2015
United States	Penhale, Polly A.	CEP Representative	30/05/2015	11/06/2015
United States	Rudolph, Lawrence	Advisor	31/05/2015	11/06/2015
United States	Schandlbauer, Alfred	Alternate	30/05/2015	11/06/2015
United States	Stone, Brian	Advisor	31/05/2015	05/06/2015
United States	Tonev, Danko	Advisor	03/06/2015	10/06/2015
United States	Trice, Jessica	Advisor	31/05/2015	10/06/2015
United States	Wheatley, Victoria	Advisor	31/05/2015	11/06/2015
Uruguay	Cristina, Juan	Workshop Part.	29/05/2015	02/06/2015
Uruguay	Lluberas, Albert	Alternate	29/05/2015	11/06/2015
Uruguay	Romano, Claudio	Head of Delegation	30/05/2015	11/06/2015
Uruguay	Vieira, Manuel	Delegate	30/05/2015	06/06/2015
Uruguay	Vignali, Daniel	Advisor	31/05/2015	11/06/2015

Non Consultative Parties				
Party	**Name**	**Position**	**Arrival Date**	**Dep.Date**
Belarus	Kakareka, Sergey	CEP Representative	31/05/2015	06/06/2015
Belarus	Loginov, Vladimir F.	Head of Delegation	31/05/2015	10/06/2015
Belarus	Snytin, Oleg	Delegate	07/06/2015	11/06/2015
Canada	File, Susan	Delegate	02/06/2015	07/06/2015
Canada	Taillefer, David	Head of Delegation	31/05/2015	11/06/2015
Colombia	González Hernández, César Felipe	Head of Delegation	30/05/2015	07/06/2015
Colombia	Mojica, Diego Fernando	Delegate	31/05/2015	14/06/2015
Colombia	Molano, Mauricio	Advisor	05/06/2015	10/06/2015
Colombia	Molares Babra, Ricardo	Delegate	30/05/2015	11/06/2015
Colombia	Plata, Javier	Delegate	31/05/2015	11/06/2015
Colombia	Sanchez, Dania Lorena	Delegate	31/05/2015	11/06/2015
Colombia	Soltau, Juan Manuel	Delegate	31/05/2015	11/06/2015
Kazakhstan	Izbastin, Temirtay	Head of Delegation	08/06/2015	10/06/2015
Kazakhstan	Sarsembekov, Baurzhan	Advisor	01/06/2015	10/06/2015
Malaysia	Abd Rahman, Mohd Nasaruddin	Delegate	31/05/2015	06/06/2015
Malaysia	Ho, Yun Shiang	Delegate	31/05/2015	05/06/2015
Malaysia	Mohd Nor, Salleh	Delegate	31/05/2015	09/06/2015
Malaysia	Yahaya, Mohd Azhar	Advisor	31/05/2015	05/06/2015
Monaco	Impagliazzo, Céline	CEP Representative	31/05/2015	05/06/2015
Mongolia	Amartuvshin, Amgalanbayar	Delegate	31/05/2015	10/06/2015
Mongolia	Dugerjav, Lkhamsuren	Head of Delegation	24/05/2015	11/06/2015
Portugal	Ferraz, Luís	Delegate	30/05/2015	11/06/2015
Portugal	Xavier, José Carlos Caetano	Head of Delegation	29/05/2015	13/06/2015
Romania	Andreea, Radu	Alternate	31/05/2015	05/06/2015
Romania	Cotta, Mihaela	Advisor	31/05/2015	05/06/2015
Romania	Prisecaru, Tudor	Head of Delegation	01/06/2015	02/06/2015
Romania	Sidoroff, Manuela Elisabeta	Delegate	01/06/2015	03/06/2015
Switzerland	Denis, Knobel	Delegate	31/05/2015	10/06/2015
Switzerland	Krebs, Martin	Delegate	31/05/2015	11/06/2015
Switzerland	Suter, Yves	Delegate	31/05/2015	05/06/2015
Turkey	Bozkurt, Ahmet	Staff	01/06/2015	10/06/2015
Turkey	Evlice, Onur	Delegate	30/05/2015	11/06/2015
Turkey	Gökce, Süleyman	Delegate	01/06/2015	10/06/2015
Turkey	Örek, Hasan	Delegate	30/05/2015	06/06/2015
Turkey	Özsoy Çiçek, Burcu	Delegate	30/05/2015	06/06/2015
Turkey	Ozturk, Bayram	Delegate	30/05/2015	04/06/2015
Turkey	?ahin, ?akir	Delegate	30/05/2015	11/06/2015
Turkey	Tabak, Haluk	Delegate	30/05/2015	11/06/2015
Turkey	Türkel, Mehmet Ali	Delegate	30/05/2015	11/06/2015
Turkey	Türkel, Ebuzer	Delegate	30/05/2015	11/06/2015
Venezuela	Carlos , Castellanos	Delegate	29/05/2015	11/06/2015
Venezuela	Handt, Helga Helena	Delegate	29/05/2015	11/06/2015
Venezuela	Perez, Janly	Advisor	01/06/2015	10/06/2015
Venezuela	Sira, Eloy	Head of Delegation	30/05/2015	11/06/2015

Observers, Experts and Guests				
Party	**Name**	**Position**	**Arrival Date**	**Dep.Date**
CCAMLR	Jones, Christopher	Advisor	30/05/2015	11/06/2015
CCAMLR	Reid, Keith	Advisor	31/05/2015	11/06/2015
CCAMLR	Wright, Andrew	Head of Delegation	29/05/2015	13/06/2015
COMNAP	Rogan-Finnemore, Michelle	Head of Delegation	30/05/2015	11/06/2015
SCAR	Bellerby, Richard	Delegate	02/06/2015	04/06/2015
SCAR	Chown, Steven L.	Delegate	30/05/2015	05/06/2015
SCAR	López-Martínez, Jerónimo	Head of Delegation	30/05/2015	10/06/2015
SCAR	Terauds, Aleks	CEP Representative	31/05/2015	06/06/2015
ASOC	Christian, Claire	Delegate	29/05/2015	10/06/2015
ASOC	Dolan, Ryan	Delegate	30/05/2015	10/06/2015
ASOC	Epstein, Mark S.	Head of Delegation	30/05/2015	10/06/2015
ASOC	Hepp, Jill	Delegate	30/05/2015	10/06/2015
ASOC	Johnson, Chris	Delegate	30/05/2015	06/06/2015
ASOC	Roura, Ricardo	CEP Representative	30/05/2015	10/06/2015
ASOC	Wallace, Cath	Delegate	30/05/2015	11/06/2015
ASOC	Walsh, Dave	Delegate	08/06/2015	10/06/2015
ASOC	Werner Kinkelin, Rodolfo	Delegate	30/05/2015	10/06/2015
IAATO	Crosbie, Kim	Head of Delegation	29/05/2015	11/06/2015
IAATO	Hohn-Bowen, Ute	Delegate	03/06/2015	10/06/2015
IAATO	Lynnes, Amanda	CEP Representative	29/05/2015	11/06/2015
IAATO	Morgan, Tudor	Alternate	29/05/2015	11/06/2015
IAATO	Rootes, David	Advisor	31/05/2015	10/06/2015
IAATO	Schillat, Monika	Advisor	31/05/2015	10/06/2015
UNEP	Ruis, Barbara	Head of Delegation	01/06/2015	05/06/2015

Host Country Secretariat				
Party	**Name**	**Position**	**Arrival Date**	**Dep.Date**
HC Secretariat	Apostolova, Denitsa	Staff	31/05/2015	10/06/2015
HC Secretariat	Atanassova, Alexandra	Staff	21/05/2015	11/06/2015
HC Secretariat	Bonev, Kamen	Staff	01/06/2015	10/06/2015
HC Secretariat	Bontchev, Stephane	Staff	21/05/2015	12/06/2015
HC Secretariat	Chervenakova, Genoveva	Staff	21/05/2015	12/06/2015
HC Secretariat	Chilev, Mario	Staff	30/05/2015	10/06/2015
HC Secretariat	Dahood, Adrian	Staff	24/05/2015	11/06/2015
HC Secretariat	Dimitrova, Elena	Staff	01/06/2015	10/06/2015
HC Secretariat	Dochev, Docho	Staff	31/05/2015	10/06/2015
HC Secretariat	Elias-Piera, Francyne	Staff	02/06/2015	10/06/2015
HC Secretariat	Erceg, Diane	Staff	24/05/2015	11/06/2015
HC Secretariat	Filipova, Ludmila	Staff	01/06/2015	10/06/2015
HC Secretariat	Georgiev, Dimitar	Staff	22/05/2015	12/06/2015
HC Secretariat	Georgiev, Nikolay	Staff	28/05/2015	11/06/2015
HC Secretariat	Giurov, Victor	Staff	22/05/2015	12/06/2015
HC Secretariat	González Vaillant, Joaquín	Staff	24/05/2015	11/06/2015
HC Secretariat	Hodgson-Johnson, Indiah	Staff	24/05/2015	11/06/2015
HC Secretariat	Jivkova, Eva	Staff	21/05/2015	12/06/2015
HC Secretariat	Kiossemarliev, Dimitar	Staff	21/05/2015	12/06/2015
HC Secretariat	Klayn, Laslo	Staff	31/05/2015	10/06/2015
HC Secretariat	Klayn, Stefania	Staff	31/05/2015	10/06/2015
HC Secretariat	Krastev, Plamen	Staff	22/05/2015	12/06/2015
HC Secretariat	Lapteva, Gergana	Staff	01/06/2015	10/06/2015
HC Secretariat	Minchev, Evgeny	Staff	24/05/2015	11/06/2015
HC Secretariat	Mladenov, Atanas	Staff	31/05/2015	10/06/2015
HC Secretariat	Moteva, Denitsa	Staff	25/05/2015	11/06/2015
HC Secretariat	Mutafchiev, Rumen	Staff	22/05/2015	12/06/2015
HC Secretariat	Penev, Boyko	Staff	22/05/2015	12/06/2015
HC Secretariat	Petkov, Nikola	Staff	31/05/2015	10/06/2015
HC Secretariat	Phillips, Andrew	Staff	25/05/2015	11/06/2015
HC Secretariat	Sabev, Atanas	Staff	24/05/2015	11/06/2015
HC Secretariat	Slavova, Albena	Staff	24/05/2015	11/06/2015
HC Secretariat	Stefanov, Ivelin	Staff	22/05/2015	12/06/2015
HC Secretariat	Stoianova, Elena	Staff	31/05/2015	10/06/2015
HC Secretariat	Stoynev, Svetoslav	Staff	01/06/2015	10/06/2015
HC Secretariat	Stoynova, Boriana	Staff	22/05/2015	12/06/2015
HC Secretariat	Tomov, Yavor	Staff	22/05/2015	12/06/2015
HC Secretariat	Trifonova, Ida	Staff	21/05/2015	12/06/2015
HC Secretariat	Tzanev, Nicolay	Staff	22/05/2015	12/06/2015
HC Secretariat	Valchev, Vesselin	HC Executive Secretary	22/05/2015	12/06/2015
HC Secretariat	Van der Watt, Susanna	Staff	25/05/2015	11/06/2015
HC Secretariat	Veselinov, Krasimir	Staff	30/05/2015	10/06/2015
HC Secretariat	Zarkov, Angel	Staff	30/05/2015	10/06/2015
HC Secretariat	Zhelyazkova, Marina	Staff	21/05/2015	10/06/2015

Antarctic Treaty Secretariat				
Party	**Name**	**Position**	**Arrival Date**	**Dep.Date**
ATS	Acero, José María	Alternate	27/05/2015	12/06/2015
ATS	Agraz, José Luis	Staff	24/05/2015	12/06/2015
ATS	Balok, Anna	Staff	27/05/2015	12/06/2015
ATS	Davies, Paul	Staff	28/05/2015	11/06/2015
ATS	Portella Sampaio, Daniela	Staff	27/05/2015	11/06/2015
ATS	Reinke, Manfred	Head of Delegation	24/05/2015	12/06/2015
ATS	Wainschenker, Pablo	Staff	25/05/2015	12/06/2015
ATS	Walton, David W H	Staff	25/05/2015	11/06/2015
ATS	Wydler, Diego	Staff	24/05/2015	12/06/2015
T&I staff	Alal, Cecilia	Staff	28/05/2015	11/06/2015
T&I staff	Babaev, David	Staff	31/05/2015	11/06/2015
T&I staff	Boury, Marjorie	Staff	31/05/2015	11/06/2015
T&I staff	Cook, Elena	Staff	31/05/2015	10/06/2015
T&I staff	Coussaert, Joelle	Staff	31/05/2015	11/06/2015
T&I staff	Falaleyev, Andrey	Staff	31/05/2015	11/06/2015
T&I staff	Fernandez, Jimena	Staff	28/05/2015	11/06/2015
T&I staff	Garteiser, Claire	Staff	31/05/2015	10/06/2015
T&I staff	Hale, Sandra	Staff	31/05/2015	11/06/2015
T&I staff	Kasimova, Katya	Staff	31/05/2015	10/06/2015
T&I staff	Malmontet, Benoit	Staff	31/05/2015	11/06/2015
T&I staff	Malofeeva, Elena	Staff	31/05/2015	11/06/2015
T&I staff	Mullova, Ludmila	Staff	31/05/2015	11/06/2015
T&I staff	Orlando, Marc	Staff	31/05/2015	12/06/2015
T&I staff	Perino, María del Valle	Staff	31/05/2015	11/06/2015
T&I staff	Speziali, Maria Laura	Staff	31/05/2015	11/06/2015
T&I staff	Tanguy, Philippe	Staff	31/05/2015	11/06/2015
T&I staff	Vignal, Edith	Staff	31/05/2015	11/06/2015
T&I staff	Wallace, Roslyn	Staff	31/05/2015	11/06/2015