

Site of Special Scientific Interest No 17

SATCM XII: Annex to Measure 1(2000)

Management Plan for Site of Special Scientific Interest No. 17

Clark Peninsula, Budd Coast, Wilkes Land

Clark Peninsula was designated as a Site of Special Scientific Interest in 1985 (ATCM Recommendation XIII-8): put forward by Australia. The Area is approximately 9.75 square kilometres in area and is adjacent to the Windmill Islands Group on the Budd Coast, Wilkes Land, Eastern Antarctica. (Maps A and B.) Scientific research within the Area has focused on the plant communities but has also included studies of the Area's penguin colonies. The Area has served as a valuable comparative site for similar plant communities and penguin colonies closer to Casey Station which are subject to greater disturbance.

1. *Description of Values to be Protected*

Excluding the Antarctic Peninsula, the largely undisturbed terrestrial ecosystem of Clark Peninsula supports one of the most extensive and best-developed plant communities on continental Antarctica. The Area has rich associations of macrolichens and bryophytes that occupy very specific ecological niches. Within the relatively complex plant communities, 33 species of bryophytes and macrolichens have been found with 11 cryptogamic sociations being identified. This vegetation forms a continuum of ecological variation along environmental gradients of soil moisture, soil chemistry, and microclimate. As such, the Area has intrinsic ecological value and scientific importance, particularly to botanists, microbiologists, soil scientists and glacial geomorphologists.

Within the Area, moss and lichen communities are used as control plots to monitor the environmental impacts of nearby Casey Station. The Area provides baseline data with which to compare changes in similar plant communities in the immediate surroundings of Casey Station. The cryptogamic plant communities are also being monitored in relation to short-term microclimate fluctuation and long-term climate change in the region since deglaciation 8000-5000 years BP.

Significant and relatively undisturbed breeding populations of Adélie penguin (*Pygoscelis adeliae*), South polar skuas (*Catharacta maccormicki*), Wilson's storm petrels (*Oceanites oceanicus*), and Snow petrels (*Pagodroma nivea*), are established at Whitney and Blakeney Points within the Area. These populations provide valuable comparative data for assessing and measuring human impacts and disturbance of penguin colonies on nearby Shirley Island close to Casey Station.

The Area supports an exceptional vegetation cover for continental Antarctic ice free localities, with a wide range of vegetation communities. The Area requires protection because of its ecological importance, its significant scientific value, and the limited geographical extent of the ecosystem. The Area is vulnerable to disturbance through

trampling, sampling, pollution or alien introductions, while being sufficiently distant from Casey Station to avoid immediate impacts and disturbances from activities carried out there.

It is because of the scientific and ecological values, and the values of the Area for long term monitoring, that it should continue to be protected.

2. *Aims and Objectives*

Management at Clark Peninsula aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing undue human disturbance;
- conserve a part of the natural ecosystem as a reference area for the purpose of comparative studies and to assess direct and indirect effects of Casey Station;
- allow scientific research on the ecosystem and elements of the ecosystem, both geological and biological, while ensuring protection from over-sampling and disturbances;
- 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:

- signs illustrating the location and boundaries, with clear statements of entry restrictions, shall be placed at appropriate locations at the boundaries of the Area to help avoid inadvertent entry;
- information on the location of the Area (stating special restrictions that apply) shall be displayed prominently, and a copy of this Management Plan shall be kept available, at the adjacent abandoned Wilkes Station, the “Wilkes Hilton” (unofficial name) Refuge Hut on Stonehocker Point, “Jack’s Donga” (unofficial name) Refuge Hut, and at Casey Station and will be provided to all visiting ships;
- markers, signs or structures erected within the Area for scientific or management purposes shall be secured and maintained in good condition and removed when no longer required;
- 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: East Antarctica, showing location of Clark Peninsula.

Projection: Polar Stereographic

Horizontal Datum: WGS84. True scale of latitude 71°.

Map B: Windmill Islands, showing location of Clark Peninsula.

Projection: UTM Zone 49

Horizontal Datum: WGS84.

Map C: Topographic map of the Area.

Projection: UTM Zone 49 Horizontal Datum: WGS84.

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Map D: Vegetation map of the Area.

Projection: UTM Zone 49 Horizontal Datum: WGS84. [Not reproduced]

Map E: Distribution of lakes of the Area.

Projection: UTM Zone 49 Horizontal Datum: WGS84. [Not reproduced]

Map F: Geology of the Area.

Projection: UTM Zone 49 Horizontal Datum: WGS84. [Not reproduced]

6. *Description of the Area*

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

Clark Peninsula, an area of rock exposures and permanent ice and snow fields, is situated on the north side of Newcomb Bay at the east end of Vincennes Bay, opposite Windmill Islands region, on Budd Coast, Wilkes Land, in latitude 66°15'S and longitude 110°36'E. The Area is approximately 9.75 square kilometres in area. (Map C.)

The Area comprises all the land on Clark Peninsula within the southern boundary line connecting the east side of Powell Cove at a point which originates at latitude 66.254424° South, longitude 110.53330° East, to trigonometrical station G7 at latitude 66.25809° South, longitude 110.55664° East thence to a point to the east-south-east on Løken Moraine. The eastern boundary is the westernmost limit of Løken Moraines as far north as a point due east of Blakeney Point, and thence to the coast, returning along the coast to the point of origin. The boundary of the Area will be indicated by prominent markers, and is shown on Map C.

Topographically, the Clark Peninsula comprises low lying, rounded ice-free rocky outcrops (maximum altitude approximately 40 metres), rising in the east to the Løken Moraines (altitude approximately 130 metres). Intervening valleys are filled with permanent snow or ice, or glacial moraine and exfoliated debris and contain water catchment areas.

The Windmill Islands represent one of the easternmost outcrops of a Mesoproterozoic low-pressure granulite facies terrain that extends west to the Bunge 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 rocks of the Windmill Islands area 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 late dolerite dykes. Clark Peninsula distinguishes the northern transition of a metamorphic grade transition which separates the northern part of the Windmill Islands area from the southern part.

On Clark Peninsula outcrops of metapelitic rock and leucocratic granite gneiss are dominant. The metapelitic rock is generally foliated, migmatized and fine to medium grained. Mineralogy of the metapelitic rock involves biotite-sillimanite and biotite-sillimanite±cordierite. The sillimanite is strongly lineated in the foliation and the cordierite is generally pinnitized. The early granite gneiss is white, medium grained and foliated, it comprises two felsic to intermediate intrusions which predate and/or are synchronous with the deformation in the Windmill Islands. The larger intrusion, which occupies most of central Clark Peninsula is a quartz, K-feldspar, biotite, white mica and opaque-bearing granitic augen gneiss. Small outcrops of mafics and metapsammite occur. The rock beds lie in a south-west north-east orientation. The geology of Clark Peninsula is shown at Map F.

Gravels and soils appear to be derived from marine sediments deposited in the Pleistocene with a thin cover of weathered rock. Subfossil penguin colonies are common along the central ridge running south-west to north-east on Clark Peninsula and at Whitney Point and Blakeney Point. In the vicinity of abandoned penguin colonies, the soils, derived from penguin guano, are fine and silty with relatively high percentage of organic matter. Melt streams and pools and small lakes are prevalent in summer. The distribution of pools and lakes on Clark Peninsula is shown at Map E.

Conditions on Clark Peninsula, in comparison with many other continental Antarctic areas, are favourable enough to have induced relatively stable, complex, well developed, and species rich vegetation. The ice-free rocks support an extensive cover of lichen and in lower lying areas mosses predominate. Principal factors responsible for the distribution of vegetation on Clark Peninsula are exposure to wind, availability of water and the presence of abandoned penguin colonies which have a marked influence on the distribution and abundance of species.

To the north-east of the Peninsula, well-developed *Umbilicaria decussata*, *Pseudephebe minuscula*, *Usnea sphacelata* communities dominate. Further from the coast, *U. sphacelata* is dominant and forms extensive carpets over the metamorphic rocks and gravel beds in association with *P. minuscula* and *U. decussata*, together with scattered bryophytes. The bryophytes comprise, *Bryum pseudotriquetrum*, *Grimmia antarctici* and *Ceratodon purpureus*. Within these communities, well-developed bryophyte patches dominate in moist,

sheltered sites and locally form closed stands comprising a moss turf up to almost 30 cm depth.

In the north-western and western coastal areas where penguin colonies are present, *Xanthoria mawsonii*, *Candelariella flava* and *Buellia frigida* are more common. On the abandoned penguin colonies in the southern coastal areas, this community type contains a higher proportion of *U. decussata* and *U. sphacelata*.

In the centre of Clark Peninsula the vegetation is dominated by *U. decussata*, *P. minuscula*, *B. soredians* and *B. frigida*, with scattered occurrences of *Pleopsidium chlorophanum*.

The vegetation distribution of Clark Peninsula is shown at Map D.

The microflora comprises algae, with *Botrydiopsis constricta* and *Chlorella conglomerata* dominating, together with bacteria, yeasts and filamentous fungi.

Adélie penguins (*Pygoscelis adeliae*) are abundant within the Area, with colonies present at Whitney and Blakeney Points. Approximately 5,500 breeding pairs were counted in 1999 at Whitney Point, and 4,600 breeding pairs were present at Blakeney Point in 1991. The penguin population has shown a long-term increase since studies commenced in 1959/60. This is in contrast to nearby Shirley Island, opposite Casey Station, where the breeding population of Adélie penguins has remained stable since 1968.

Wilson's storm petrels (*Oceanites oceanicus*), South polar skuas (*Catharacta maccormicki*) and Snow petrels (*Pagodroma nivea*) breed within the Area.

Terrestrial invertebrate microfauna consists of protozoa, nematodes, mites, rotifers and tardigrades. The invertebrates are mainly confined to the moss beds, lichen stands and moist soils.

The climate of the Windmill Islands area is frigid-Antarctic. Meteorological data from Casey Station on nearby 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. The climate is dry with a mean annual snowfall of 195 mm year⁻¹ (rainfall equivalent). There is an annual average of 96 days with gale-force winds, which are predominantly easterly in direction, off the polar ice cap. Snowfall is common during the winter, but the extremely strong winds scour the exposed areas of the Peninsula of snow. On most hill crests on Clark Peninsula snow gathers in the lee of rock outcrops and in depressions in the substratum. Further down the slopes snow forms deeper drifts.

6(ii) Special Zones within the Area

There are no special zones within the Area.

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

The only structures known to exist in the Area are a severely deteriorated wood and canvas hide, known as "Wannigan," located on "Lower Snow Slope" (unofficial name) on the eastern portion of Whitney Point. This hide was constructed in 1959 for behavioural studies

of penguins. There are a number of boundary markers along the southern boundary, and survey markers within the Area.

The “Wilkes Hilton” Refuge Hut is located approximately 200 metres south of the southern boundary. Approximately one kilometre to the south-west is the abandoned Wilkes Station on Stonehocker Point. Another Refuge Hut, “Jack’s Donga” is located approximately 1.5 kilometres north of the northern boundary of the Area.

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

Nearby protected areas to Clark Peninsula are: North-east Bailey Peninsula, Site of Special Scientific Interest No. 16, 66°17’S, 110°33’E, 2.5 km, south-west of Clark Peninsula, across Newcomb Bay, adjacent to Casey Station; and Specially Protected Area, No. 3, Ardery Island, 66°22’S, 110°27’E, and Odber Island, 66°22’S, 110°33’E, Budd Coast lying in Vincennes Bay, 13 km south of the former Wilkes Station.

7. Permit Conditions

Entry into the Area is prohibited except in accordance with a permit issued by an appropriate National Authority.

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, and providing that the actions permitted will not jeopardise the ecological or scientific values of the Area or interfere with existing scientific studies.

Conditions that must be included in the permit are provisos that the permit or an authorised copy shall be carried within the Area, and that the permit specify the period for specific activities. Additional conditions, consistent with the Management Plan’s objectives and provisions, may be included by the issuing Authority.

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

Access into the Area should, except in emergency/exceptional circumstances be from “Wilkes Hilton” Refuge Hut in the south-west, “Jack’s Donga” Refuge Hut in the north-east, or from the over snow route between Casey Station and “Jack’s Donga” by descending the western slope of Løken Moraines in the vicinity east of Stevenson Cove, see Map C.

Access from Casey to abandoned Wilkes Station is via a well-defined marked cane route outside the southern boundary of the Area. As the Casey-Wilkes route is very close to the

boundary, pedestrian and vehicular traffic should take care not to stray northward of it. See Map C.

Vehicles are not allowed within the Area (except for emergency) and access should be by foot. Helicopters (except in emergencies or for essential management activities) are not allowed to land within the Area. Persons authorised to enter the Area should, to the maximum extent possible, avoid walking on visible vegetation. Care should be exercised walking in areas of moist ground, where foot traffic can easily damage sensitive soils, plant or

algae communities, and degrade water quality. Persons should walk around such features, on ice or rocky ground. 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 minimise effects.

Persons should avoid disturbance of penguin populations and individuals, and not approach penguins within 40 metres during the breeding season, October to April, unless this is an integral part of the permitted research activity.

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

The following may be conducted within the Area:

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

7(iii) Installation, modification or removal of structures

No structures are to be erected within the Area, or scientific equipment installed, except for essential scientific or management activities, and as authorised in a permit. All scientific equipment installed in the Area must be clearly identified by country, 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 items should be made of materials that pose minimum risk of contamination of the Area and must be removed at the completion of the study.

7(iv) Location of field camps

Camping is not allowed within the Area and field parties should camp at either “Wilkes Hilton” Refuge Hut or “Jack’s Donga” Refuge Hut (see Map C).

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

No living animals, plant material or microorganisms shall be deliberately introduced into the Area and precautions shall be taken against accidental introductions.

No poultry or poultry products shall be taken into the Area.

No herbicides or pesticides shall be brought into the Area. Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes and which have been authorised, shall be removed from the Area at or before the conclusion of the activity.

Fuel is not to be stored in the Area unless required for essential purposes connected with the authorised activity. Permanent 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 that risk of their introduction to the environment is minimised.

7(vi) 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 authorised, the activity shall, as a minimum standard, be in accordance with the requirements of the Protocol on Environmental Protection to the Antarctic Treaty, 1991, Annex II, Article 3.

7(vii) Collection and removal of anything not brought into the Area by the permit holder

Material may only be collected or removed from the Area as authorised 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 material is to be removed the appropriate Authority must be notified and approval obtained.

7(viii) Disposal of waste

All wastes generated by persons in the Area, including human faeces and urine, shall be removed from the Area, and none deposited within the Area.

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

The following may be necessary to ensure the objectives of the Management Plan are 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; the erection or maintenance of scientific equipment and structures, and signposts; or for 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 plant communities found in the Area, 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. 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.

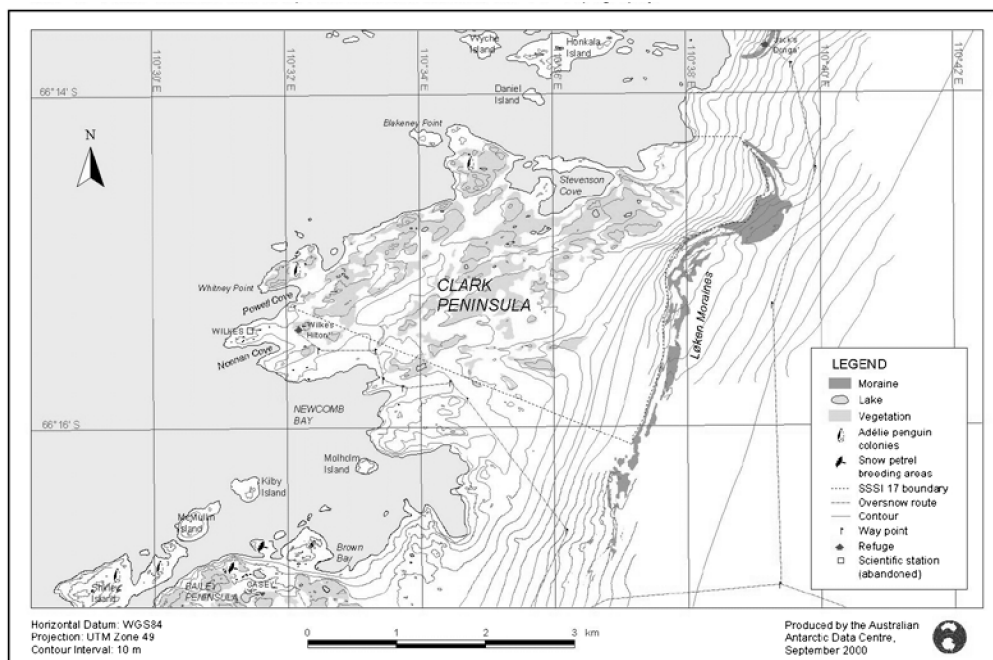
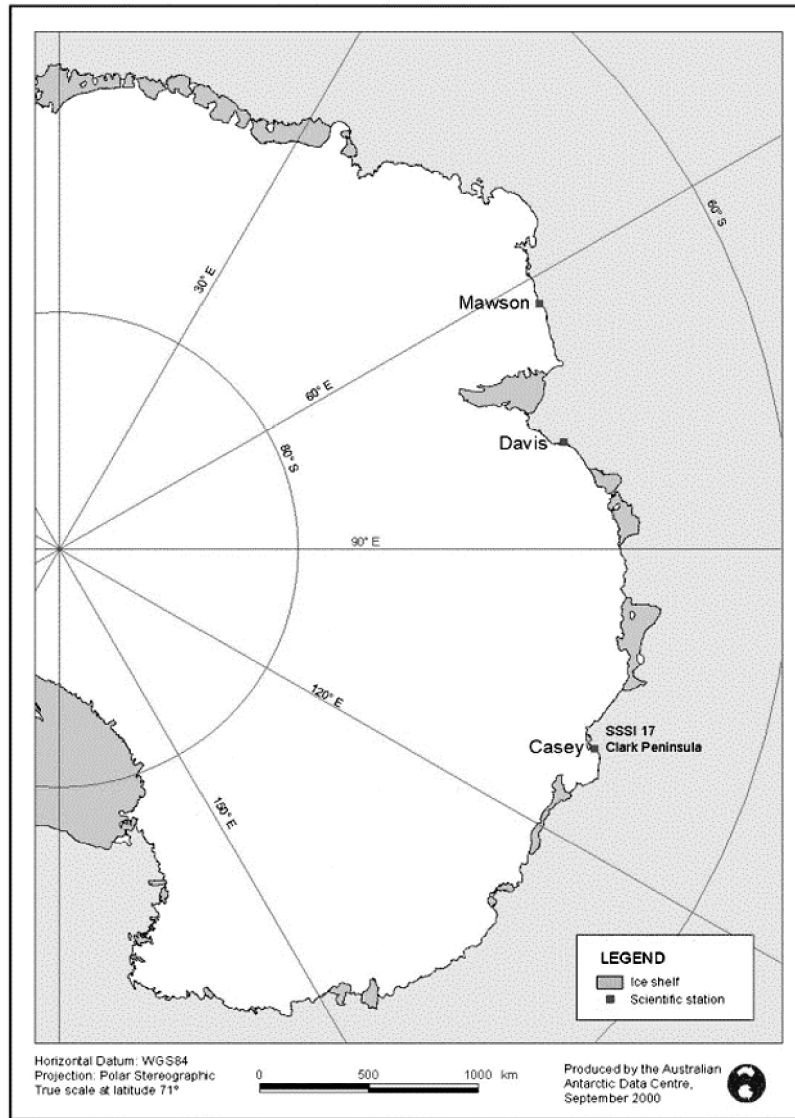
7(x) Requirements for reports

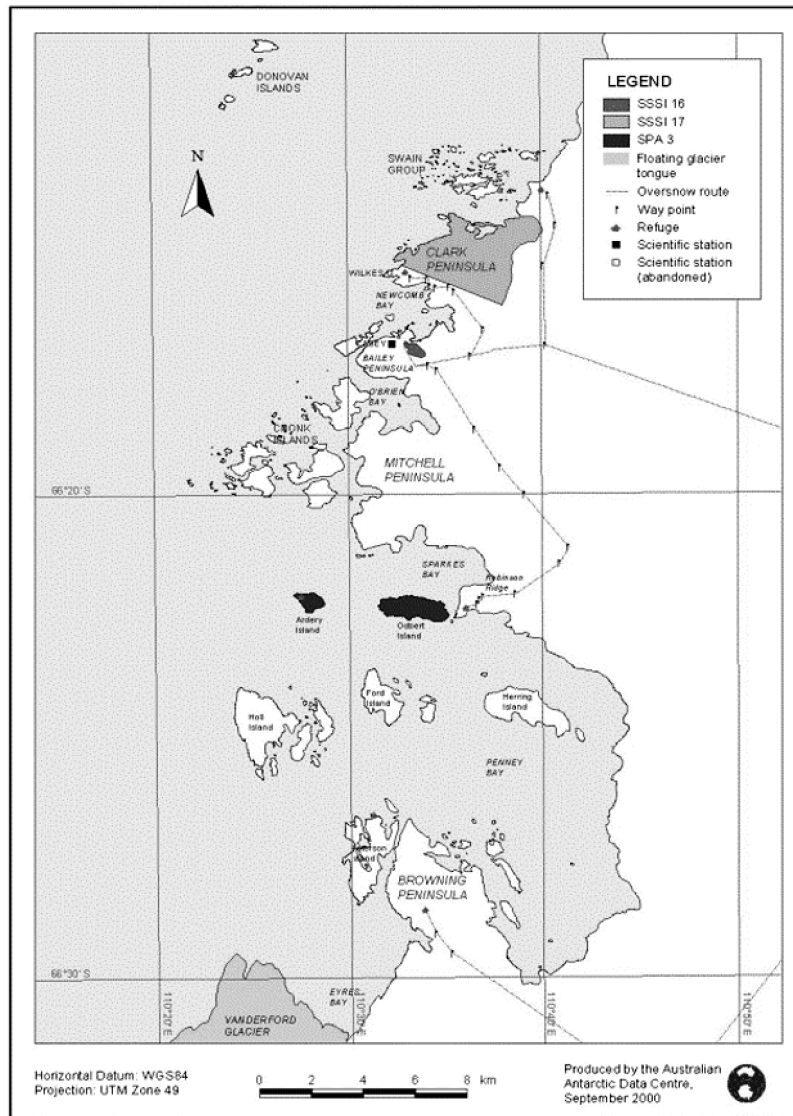
The principal permit holder for each permit issued should submit to the appropriate National Authority a visit report describing the activities undertaken. Such reports should be submitted as soon as possible and include the types of information contained in the SCAR Visit Report form or as required by national laws. The Authority should maintain a record of such activities and make this accessible to interested Parties.

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Annex to Recommendation XIII-8

Site of Special Scientific Interest No 17: Clark Peninsula, Budd Coast, Wilkes Island

Management Plan

i. *Description of Site.* Clark Peninsula is situated on the north side of Newcomb Bay at the west end of Vincennes Bay, opposite Windmill Islands, on Budd Coast, at lat 66°15'S, long 110°36'E. The Site comprises all land on Clark Peninsula within the southern boundary

line connecting the east site of Stevenson Cove to trigonometrical station NM/5/6, trig station G3 and a point to the east-south-east on Loken Moraines. The western boundary is the easternmost limit of Loken Moraines as far north as a point due east of Blakeney Point, and thence to the coast. The boundary of the Site is indicated by prominent markers, and is shown on the attached map.

ii. *Reason for designation.* Within the Site moss and lichen communities are being used as control sites to monitor environmental impact at Casey Station. These remote study areas provide baseline data with which to compare changes associated with the research station.

iii. *Outline of research.* Lakes in a valley running south-west from Stevenson Cove towards the former Wilkes Station contain copepods which are not known elsewhere in the Windmill Islands area and are the subject of ongoing studies. The Adelie penguin colony at Whitney Point has been the site of intensive studies. This well studied site will provide a baseline for comparison with changes in other colonies in the region. Monitoring studies commenced during the summer of 1982-83. Physiological studies of mosses are underway. Ecological studies of bryophyte and lichen vegetation and associated invertebrate fauna, algae and fungi and studies of moss growth and development in relation to taxonomic interpretation will be undertaken.

iv. *Date of expiry of designation.* 31 December 1995.

v. *Access point.* None specified.

vi. *Pedestrian and vehicular routes.* Access to Wilkes Station is via a well-defined route on the southern side of the Site. Pedestrian and vehicular traffic should keep to this route, and in particular should not stray northward of it. Vehicular traffic within the Site should be restricted to oversnow access to Wilkes Station. Helicopters should not land within the Site. It is unlikely that pedestrian traffic will cause undue disturbance to the Site. However, travel should, where possible, be via snow, avoiding ice-free areas.

vii. *Other kinds of scientific investigations which would not cause harmful interference.* Scientific research other than the programmes for which the Site has been designated should be kept to a minimum.

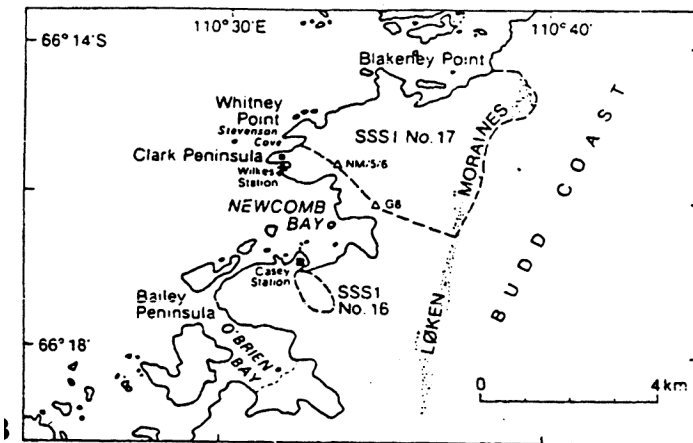
viii. *Scientific sampling.* Sampling should be the minimum required for the approved research programmes.

ix. *Other restraints.* Field refuge huts, if deemed necessary for facilitation of scientific studies, should be placed with care so as to avoid any potential contamination of the environment, or interference with plant or animal life. Maintenance of the existing state of the Site is important for fulfilment of the stated research objectives.

Extract from Report of XVIth ATCM

(76) Following advice from the delegation of Australia about the detection of errors in the original site description for Site of Special Scientific Interest No. 17, it was agreed that the site description should be amended to read as follows:

Clark Peninsula is situated on the north side of Newcomb Bay at the west end of Vincennes Bay, opposite Windmill Islands, on Budd Coast, at lat 66°15'S, long 110°36'E. The site comprises all land on Clark Peninsula within the southern boundary line connecting the east side of Powell Cove to trigonometrical station G7, trigonometrical station G8 and a point to the east-south-east on Loken Moraines. The eastern boundary is the westernmost limit of Loken Moraines as far north as a point due east of Blakeney Point, and thence to the coast. The boundary of the Site will be indicated by prominent markers, and is shown on the attached map. A copy of the revised map showing these corrections is reproduced at Annex F(i).



SSSI 17, Clark Peninsula

Site of Special Scientific Interest No 18

Annex to Recommendation XIII-8

Site of Special Scientific Interest No 18: North-west White Island, McMurdo Sound

Management Plan

i. *Description of Site.* White Island (lat 78°10'S, long 167°25'E) rises out of the Ross Ice Shelf, about 30 km south-south-east of Hut Point, Ross Island. The Site includes the north-west coastline of White Island from Cape Spencer-Smith in the north to a point protruding into the Strait between White and Black Islands in the south-west. It extends from high water mark to 5 km offshore, across the Ross Ice Shelf. The boundary of the Site is shown on the attached map.

ii. *Reason for designation.* This Site supports a small breeding population of Weddell seal (*Leptonychotes weddellii*) which is physically isolated from the rest of mainland Antarctica by shelf ice. It is one of very few areas where Weddell seals feed under shelf ice. It is also one of the most southerly Weddell seal populations and has been studied year round.

iii. *Outline of research.* This unique Weddell seal population is the focus of continuing research in the area. Several hypotheses have been proposed to explain how this population originated and has remained isolated, 25 km from the nearest open water.

iv. *Date of expiry of designation.* 31 December 1991.

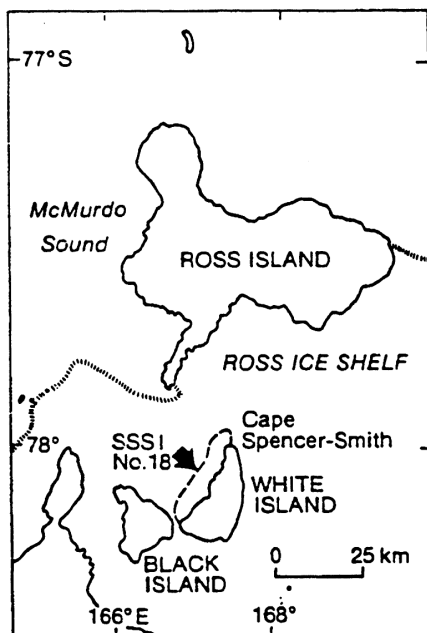
v. *Access points.* None designated.

vi. *Pedestrian and vehicular routes.* Vehicles should approach no closer than 50 m to the seal population and helicopters and low-flying aircraft should avoid the area, approaching no lower than 250 m altitude.

vii. *Other kinds of scientific investigations which would not cause harmful interference.* None specified.

viii. *Scientific sampling.* Taking samples of Weddell seals by killing or capture should be done only for compelling scientific purpose and in accordance with the Agreed Measures for the Conservation of Antarctic Fauna and Flora.

ix. *Other restraints.* No underwater explosives may be used for any purpose.



SSSI 18, White Island

Site of Special Scientific Interest No 19

XX: Annex to Measure 1(1996)

Management Plan for Site of Special Scientific Interest (SSSI) No. 19 Linnaeus Terrace, Asgaard Range, Victoria Land

1. Description of Values to be Protected

Linnaeus Terrace was originally designated in Recommendation XIII-8 (1985, SSSI No. 19) after a proposal by the United States of America on the grounds that the Area is one of the richest known localities for the cryptoendolithic communities that colonize the Beacon Sandstone. Exposed surfaces of the Beacon Sandstone are the habitat of cryptoendolithic microorganisms, which may colonize a zone of up to 10 millimetres deep below the surface of the rocks. The sandstones exhibit a range of biological and physical weathering forms, as well as trace fossils, and many of the formations are fragile and vulnerable to disturbance and destruction by trampling and sampling. Cryptoendolithic communities are known to develop over time periods in the order of tens of thousands of years, and damaged rock surfaces would be slow to recolonize. The excellent examples of these communities found at the site are the subject of the original detailed Antarctic cryptendolithic descriptions. As such, Linnaeus Terrace is considered a type locality with outstanding scientific values related to this ecosystem. These values, as well as the vulnerability of the site to disturbance and destruction, require that it receives long-term special protection.

2. Aims and objectives

Management at Linnaeus Terrace aims to:

- avoid degradation of, or substantial risk to, the values of the Area;
- prevent unnecessary human disturbance to the Area and protect the fragile rock formations from breakage;
- permit research on the cryptoendolithic communities while ensuring they are protected from over-sampling;
- permit visits for management purposes in support of the objectives of the management plan.

3. Management activities

- Durable wind direction indicators should be erected close to the designated helicopter landing site whenever it is anticipated there will be a number of landings at the Area in a given season. These should be replaced as needed and removed when no longer required.
- Brightly colored markers, which should be clearly visible from the air and pose no significant threat to the environment, shall be placed to mark the helicopter landing pad.
- Markers or structures erected within the Area for scientific or management purposes shall be maintained in good condition.
- Visits shall be made as necessary (no less than once every five years) to assess whether the Area continues to serve the purposes for which it was designated and to ensure management and maintenance measures are adequate.

- National Antarctic Programs operating in the region shall consult together with a view to ensuring these steps are carried out.

4. Period of designation

Designated under ATCM Measure XX-1 (1995) for an indefinite period.

5. Maps and photographs

Map A: Linnaeus Terrace, Wright Valley, location image-map. Orthophotograph specifications:

Projection: Lambert conformal conic; Standard parallels: 1st - 79°18'00"S; 2nd - 76°42'00"S. Central Meridian: 162°30'00"E Latitude of Origin: 78°01'16.211"S Spheroid: WGS84; Positional accuracy of original orthophotograph at 1:10,000 is ca 2m. Photography USGS/DoSLI (SN7856) 22 November 1993[not reproduced]

Map B: Linnaeus Terrace, protected area orthophotograph. Orthophotograph specifications are the same as in Map A, except positional accuracy of original orthophotograph at 1:2,500 is ca. 0.5m. [not reproduced]

Map C: Linnaeus Terrace, topographic map. Map specifications are the same as those for Map B. Contours are derived from the digital elevation model used to generate the orthophotograph in Map B.

Figure 1: Perspective view showing Linnaeus Terrace above the South Fork of Wright Valley and Don Juan Pond. The perspective is from an elevation of 7000m, 20 km out from the Area at a bearing of 65E. [not reproduced]

Figure 2: Linnaeus Terrace, perspective view, showing the boundaries of the Area and the designated helicopter pad (161°04'29"E, 77°35'50"S, elevation 1610m). The perspective is from an elevation of 2000 m, 2300 m out from the Area at a bearing of 65E. Image source: Maps A and B. [not reproduced]

Figure 3: Photograph illustrating some of the fragile rock formations and fossils found on Linnaeus Terrace. [not reproduced]

6. Description of the Area

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

Linnaeus Terrace (161°05'00"E, 77°35'50"S) is an elevated bench of weathered Beacon Sandstone approximately 1.5 km in length and 1 km in width. It is located at the east end of

the Asgaard Range, 1.5 km north of Oliver Peak (161°02'30"E, 77°36'40"S) at an elevation of about 1600 m. The Area overlooks the South Fork of the Wright Valley, is about 4 km from Don Juan Pond and 10 km from the terminus of the Wright Upper Glacier (Map A and Figure 1). The boundaries of the Area and prominent features are shown in the accompanying maps and figures.

On the ground, the lower (northern) boundary of the Area is characterized by the presence of a predominantly sandstone outcrop of approximately 3 m in height which extends for much of the length of the terrace. The lower boundary of the Area is defined as the upper edge of this outcrop, and as straight lines adjoining the visible edges where the outcrop is covered by surface talus (Figure 2). The upper (southern) boundary of the Area is characterized by a line of sandstone outcrop of about 2-5 m in height, occurring between the elevations of 1660-1700 m about 70 m above the general elevation of the terrace. The upper boundary of the Area is defined as the uppermost edge of this outcrop, and shall be considered a straight line between the visible edges where the outcrop is covered by surface talus (Map B, Figure 2). The west end of the Area is defined as where the terrace narrows and merges with a dolerite talus slope on the flank of the NW ridge of Oliver Peak. The boundary at the west dips steeply from where the upper outcrop disappears, following the border of the dolerite talus with the terrace sandstone down to the westernmost corner. The east boundary is defined as the 1615 m contour, which follows closely the edge of an outcrop which extends much of the width of the terrace. At the southernmost corner of the Area the terrace merges with the slopes into the valley to the east: from this point the boundary extends upward to the 1700 m contour, from where it follows the line of outcrop defining the south boundary (Map B, Figure 2).

Winter air temperature at Linnaeus Terrace ranges between -20°C and -45°C, while in January the daily mean is -5°C. Cryptoendolithic microorganisms typically colonize porous Beacon sandstones with a 0.2 - 0.5 mm grain size, with an apparent preference for rocks stained tan or brown by Fe⁺³-containing oxyhydroxides. A silicified crust of about 1 mm thickness on many of the rocks probably facilitates colonization by stabilizing the surface and reducing wind erosion. Three of the five described cryptoendolithic microbial

communities have been found on Linnaeus Terrace: the Lichen Dominated, Red-Gloeocapsa and Chroococcidiopsis Communities. Linnaeus Terrace is the type locality of the endemic green algal genus *Hemichloris* and of the endemic Xanthopycean algal species *Heterococcus endolithicus*. The Area is unusual in that so many different living and fossil endolithic communities are present within a small area. The main physical and biological features of these communities and their habitat are described in Friedmann, E.I. (ed) 1993 *Antarctic Microbiology*, Wiley-Liss, New York.

A small area (Map C) has been contaminated by release of the C(14) radioactive isotope. While the contamination poses no significant human or environmental threat, any samples gathered within this area are considered unsuitable for scientific work using C(14) techniques.

6(ii) Restricted zones within the Area

None.

6(iii) Structures within the Area

A number of rocks within the Area have small instruments installed into them for scientific purposes and should not be disturbed.

6(iv) Location of other Specially Protected Areas or Sites of Special Scientific Interests within close proximity of the Area

None.

7. Permit conditions

Permits may be issued only by appropriate national authorities as designated under Annex V, Article 7 of the Protocol on Environmental Protection to the Antarctic Treaty. Conditions for issuing a Permit to enter the Area are that:

- it is issued only for scientific study of the cryptoendolithic ecosystem, or for a compelling scientific or management purpose that cannot be served elsewhere;
- the actions permitted will not jeopardize the natural ecological system or scientific values of the Area;
- any management activities are in support of the objectives of the Management Plan;
- the actions permitted are in accordance with the Management Plan;
- the Permit, or an authorized copy, shall be carried within the Area;
- a Visit Report is supplied to the authority named in the Permit;
- any Permit issued shall be valid for a stated period.

7(i) Access to and movement within the Area

Access to the Area is permitted by foot or by helicopter. No special restrictions apply to the routes used to move to and from the Area. Helicopters shall land only at the designated site at the west end of the terrace (161°04'29"E, 77°35'50"S, elevation 1610 m: Maps B and C), except when specifically authorized by Permit otherwise for a compelling scientific or management purpose. Use of helicopter smoke bombs within the Area is discouraged. When transporting permitted visitors, pilots, air crew, or passengers en route elsewhere on helicopters are prohibited from moving on foot beyond the immediate vicinity of the designated landing and camping sites unless specifically authorized by a Permit. Land vehicles are prohibited within the area.

Pedestrian traffic should be kept to the minimum necessary consistent with the objectives of any permitted activities. Visitors should avoid breaking fragile rock formations.

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

- Scientific research which will not jeopardize the ecosystem of the Area;
- Essential management activities, including monitoring.

7(iii) Installation, modification or removal of structures

No structures, except boundary markers and signs, are to be erected within the Area except as specified in a Permit. All 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 the responsibility of the authority which granted the original Permit.

7(iv) Location of field camps

Camping is permitted within the Area only at the designated site in the immediate vicinity of the helicopter landing pad (Maps B and C).

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

To avoid compromising the microbial ecosystem for which this site is protected, no living animals, plant material or microorganisms shall be deliberately introduced into the Area and precautions should 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. Food, fuel, and other materials are 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 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 minimized.

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

This is prohibited, except in accordance with a Permit. Where animal taking or harmful interference is involved this should be in accordance with the SCAR Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica, as a minimum standard.

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

Material may be collected or removed from the Area only in accordance with a Permit. 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 any part of the Area.

7(viii) Disposal of waste

All wastes, including all human wastes, must be removed from the Area.

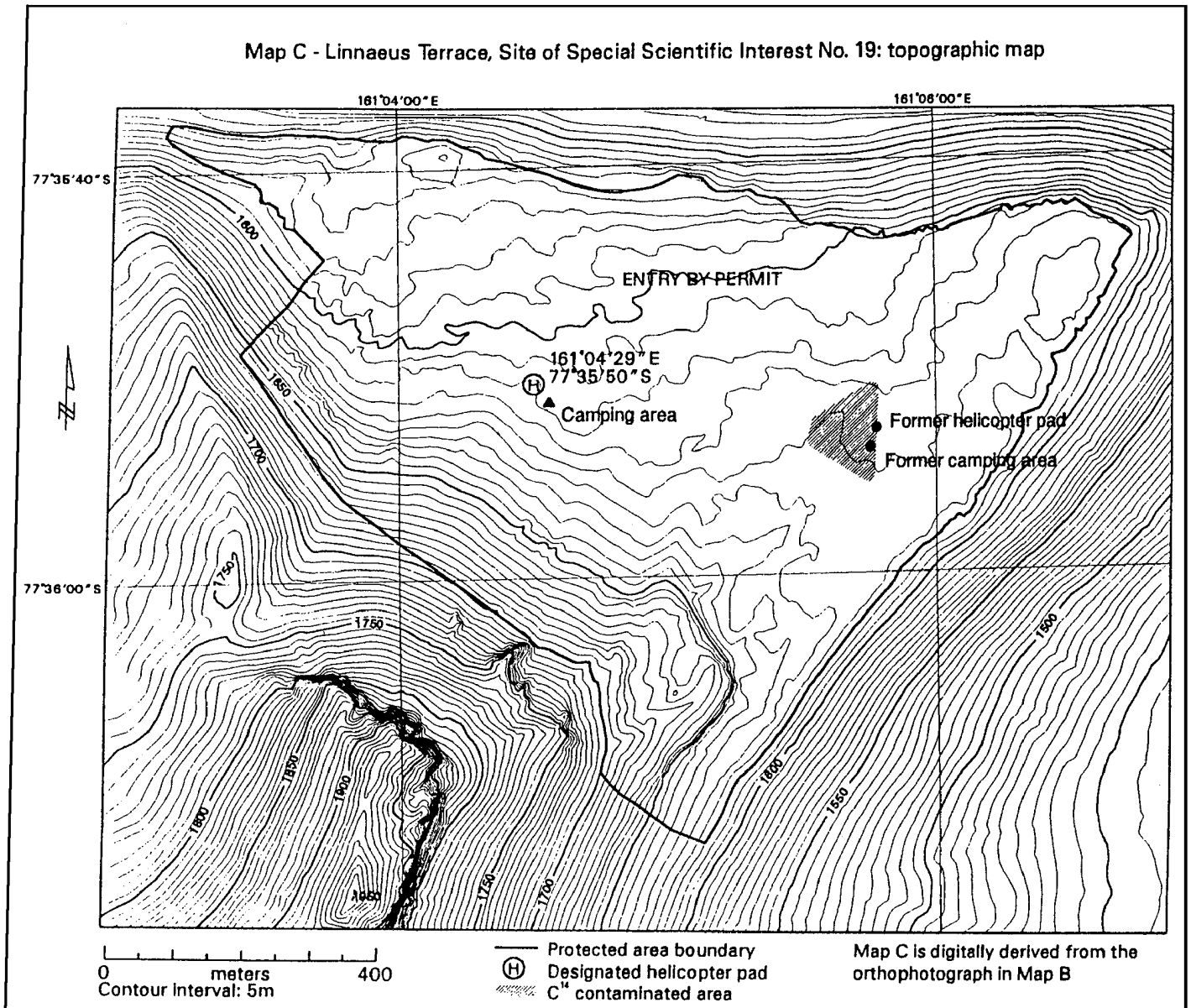
7(ix) Measures that are necessary to ensure that the aims and objectives of the Management Plan can continue to be met

Permits may be granted to enter the Area to carry out biological monitoring and site inspection activities, which may involve the collection of small amounts of biological material for analysis or audit, or to carry out protective measures.

7(x) Requirements for reports

Parties should ensure that the principal holder of each permit issued submit to the appropriate authority a report describing the activities undertaken. Such report should include, as appropriate, the information identified in the Visit Report form suggested by SCAR. Parties should 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 of 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.



**Annex to Recommendation XIII-8
Site of Special Interest No 19: Linnaeus Terrace,
Asgard Range, Victoria Land**

Management Plan

i. *Description of Site.* The Site (lat 77°36'S, long 161°07'E) lies at the east end of the Asgard Range to the north of Oliver Peak. It is between Don Juan Pond in South Fork Valley, south-east of Wright Valley, and Inland Forts, a small mountain range south-east of

the Asgaard Range. The site includes the flat terrace north and east of Oliver Peak, between about 1500 m and 1650 m altitude. Its boundaries are shown on the attached map.

ii. *Reason for designation.* Linnaeus Terrace is one of the richest localities for the unique cryptoendolithic communities which colonize the Beacon Sandstone. Exposed rock surfaces exhibit a range of biological and physical weathering forms.

iii. *Outline of research.* Numerous scientific investigations have been and will continue to be conducted at the Site. The lichen flora has been extensively surveyed. The Site is typical for the monotypic green algal genus *Hemichloris* (*H. antarctica*). Microbiological studies of the cryptoendolithic ecosystem and year-round meteorological and micrometeorological measurements have been undertaken.

iv. *Date of expiry of designation.* 31 December 1995.

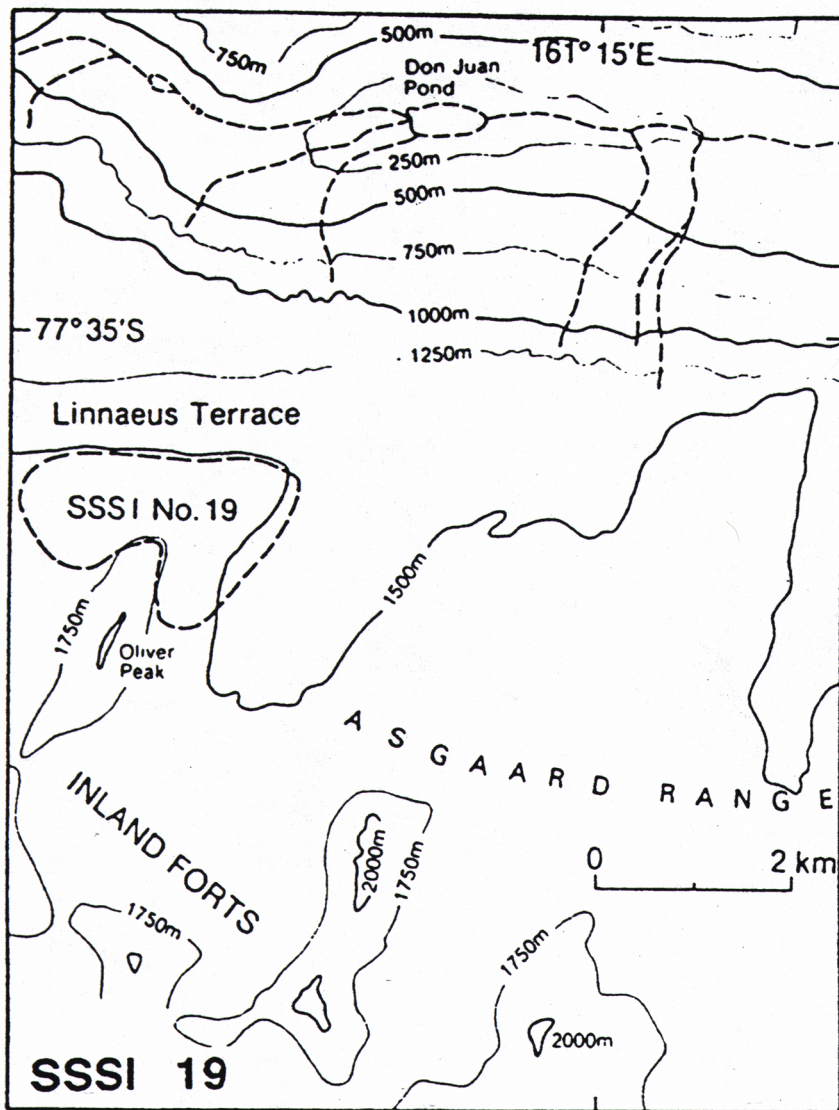
v. *Access points.* No access points are specified for pedestrians but access by helicopter should be at the designated and marked landing site only.

vi. *Pedestrian and vehicular routes.* Vehicles should not enter the Site. Pedestrian traffic should be kept to a minimum.

vii. *Other kinds of scientific investigations which would not cause harmful interference.* All other scientific activities should be kept to an absolute minimum.

viii. *Scientific Sampling.* Scientific sampling and field activities should be restrained and cause minimal disturbance to the environment. Rocks should not be moved from their natural position. Great care should be exercised to avoid accidental breakage of fragile rock formations, and disturbing periglacial features.

ix. *Other restraints.* Camping should be limited to the designated camping area in the immediate vicinity of the landing pad. Urinations should be limited to a marked spot about 20 m east of the landing pad. Other human waste and all refuse should be removed from the Site.



SSSI 19, Linnaeus Terrace

Site of Special Scientific Interest No 20

Annex to Recommendation XIII-8

Site of Special Scientific Interest No 20: Biscoe Point,

Anvers Island

Management Plan

i. *Description of Site.* Biscoe Point (lat 64°49'S, long 63°49'W) is situated on the south-east side of Biscoe Bay on the south side of Anvers Island in the Palmer Archipelago off the mid-west coast of the Antarctic Peninsula. The Site includes the rocky promontory ending in Biscoe Point, the smaller headland immediately to the north and the small islet off the south-west of Biscoe Point. A narrow area of land between the two promontories is included, as is the inshore marine environment within the Site boundaries, which are shown on the attached map.

ii. *Reason for designation.* This Site contains a large (approximately 5,000 m) but discontinuous stand of the two native vascular plants, Antarctic hair grass (*Deschampsia antarctica*) and, less commonly, Antarctic pearlwort (*Colobanthus quitensis*). A relatively well developed loam occurs beneath closed swards of the grass and contains a rich biota, including the apterous midge *Belgica antarctica*. Long-term research programmes could be jeopardized by interference from nearby Palmer Station and from tourist ships.

iii. *Outline of research.* Several plant community studies are in progress. Most of the available surfaces support the two Antarctic vascular plants which form several

communities, particularly on the north facing slope. Some communities are dominated by the vascular plants, particularly the grass; in others the co-dominants or subordinate taxa are mosses or lichens. The discontinuous vascular plant stand occurs on more or less flat, mesic terrain with fine mineral soil. It contains large (up to 20 m²) patches of dead vascular plants which appear to be produced by environmental fluctuations, such as desiccation, flooding and frost during some summers.

iv. *Date of expiry of designation.* 31 December 1995.

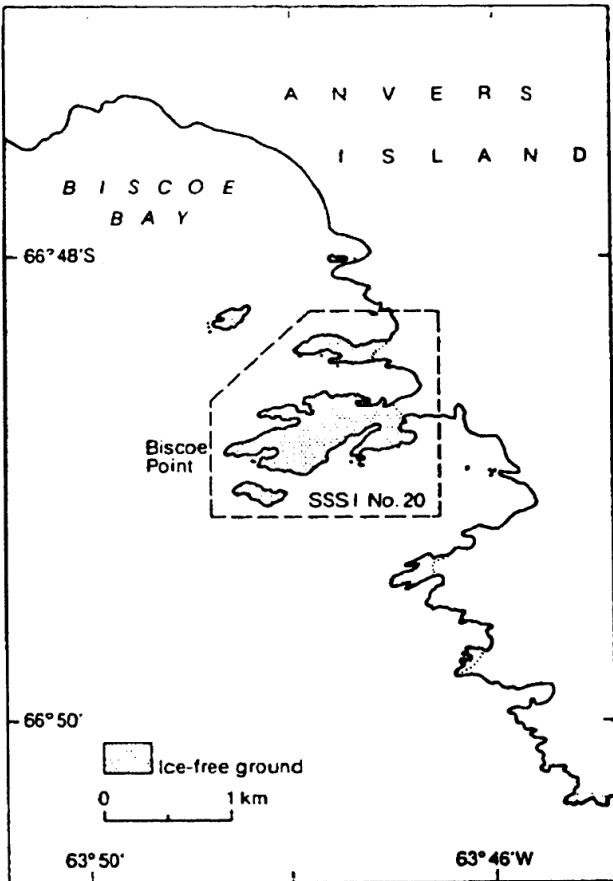
v. *Access points.* None specified.

vi. *Pedestrian and vehicular routes.* Vehicles should not enter the Site and helicopter landings should be made outside the Site. Boat landings are permitted at any point. Tourists and other casual visitors should not enter the Site.

vii. *Other kinds of scientific investigations which would not cause harmful interference.* Besides the botanical studies outlined above, the Site offers excellent opportunities for research on invertebrate fauna and pedology. The littoral and sublittoral, particularly of the cove between the two promontories, could be used for comparative studies with the more perturbed marine environment associated with Palmer Station in Arthur Harbour.

viii. *Scientific sampling.* Sampling the biota and soils should be the minimum required for the research programme, and should not cause undue disturbance to the environment particularly the closed stands of vascular plants.

ix. *Other restraints.* Any long-term experiments left in situ should be checked regularly for maintenance, and all artefacts removed when they are no longer required. No refuse should be deposited within the Site, or at sea beyond the Site in a manner which may allow it to be washed ashore within the Site.



SSSI 20, Biscoe Point

Site of Special Scientific Interest No 21

Annex to Recommendation XIII-8

Site of Special Scientific Interest No 21: Parts of Deception Island, South Shetland Islands

Management Plan

i. *Description of Site.* The Site includes 5 areas on the coast of Port Foster, Deception Island (lat 62°55'S, long 60°37'W):

- Area A. From the west side of Entrance Point to the west side of Collins Point on the south side of Neptune's Bellows, and extending 500 m inland from the shore.
- Area B. Mid Fumarole Bay, south-west of Wensleydale Point extending for 500 m along the shore, to the line precipitous lava cliffs about 100 m inland.
- Area C. The 'island' created during the 1967 eruption in Telefon Bay, and including the low land, containing a lake, which presently joins the new 'island'

to the main island.

- Area D. A strip 100 m wide extending from the high-water mark of the heated shoreline of Pendulum Cove inland to a series of gullies about 750 m inland. The area lies about 300 m south of the former Chilean station Pedro Aguirre Cerda.
- Area E. Kroner Lake including the land within 50 m of its shore. The boundaries of these areas of the Site are shown on the attached map.

ii. *Reason for designation.* Deception Island is exceptional because of its volcanic activity, having had major eruption 1967, 1969 and 1970. Parts of the island were completely destroyed, new areas were created, others covered by varying depths of ash. Few areas of the interior were unaffected. The island offers unique opportunities to study colonization processes in an Antarctic environment (the South Sandwich Islands and Bouvetøya are at a more advanced stage of colonization while Mt. Erebus and Mt. Melbourne are at considerable altitude and the biota are restricted to micro-organisms. Each of the area has been selected for different reasons:

- Area A contains stands of closed vegetation buried by shallow ash but which have regenerated as isolated colonies. The beach area was occupied in summer 1981 by about 200 fur seals.
- Area B was unaffected by the three eruptions and contains the most diverse flora on the island, including a few endemic and rare mosses and lichen.
- Area C provides an entirely new substrate of known age, the colonization of which has been studied since its creation.
- Area D includes two areas of heated ground-on the beach close to the shore and inland in a gully - where unique bryophyte communities have developed containing several species not known elsewhere in the Antarctic.
- Area E is a small shallow crater lake with geothermal activity, the water and shore being warm to hot and the benthos colonized by various thermophilic algae.

iii. *Outline of research.* Several studies of the terrestrial and freshwater biota have been carried out before and after the eruptions, and changes in the biota and recolonization of new surfaces are being studied. Theses will continue but will also be extended to other areas of the island, while the succession of organism associated with heated ground and the biota of the various types of lakes will be investigated in greater detail.

iv. *Date of expiry of designation.* 31 December 1995.

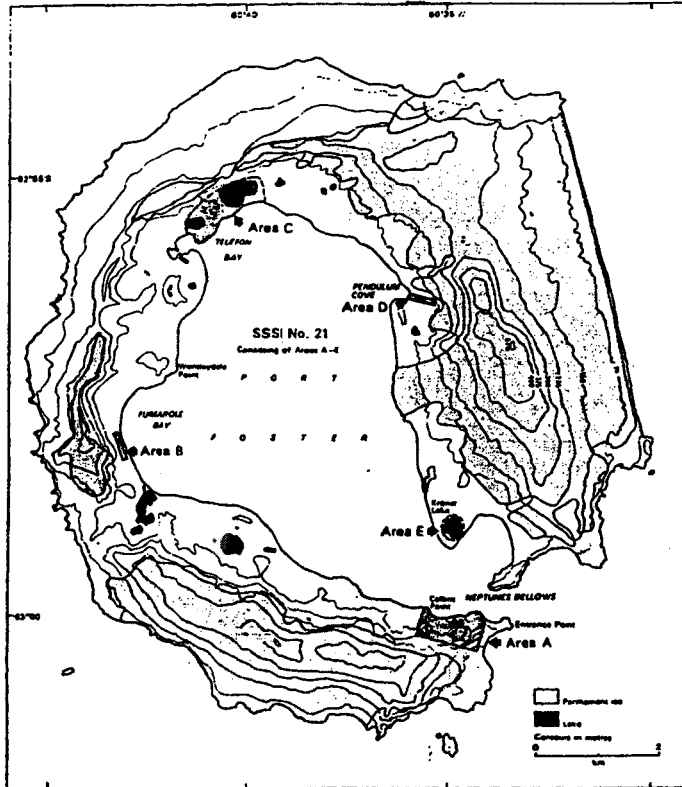
v. *Access points.* No access points are stated.

vi. *Pedestrian and vehicular routes.* Entry to the Areas should be limited to research scientists. Tourists should be excluded. No vehicles, including helicopters, should be used within any Area of the Site. Pedestrians should exercise great care when walking over the terrain which is loose and soft, where the substrate and vegetation are extremely vulnerable to damage by trampling.

vii. *Other kinds of scientific investigations which would not cause harmful interference.* Other research which would not interfere with that outlined above may be carried out.

viii. *Scientific sampling.* The collection of specimens should be the minimum required for the research being undertaken.

ix. *Other restraints.* In order to minimize microbial and cryptogamic contamination of substrate, the soles of footwear should be cleaned and disinfected (for example, by rinsing with alcohol) before entering the Areas.



SSSI 21, Deception Island

Site of Special Scientific Interest No 22

ATSCM XII: Annex to Measure 1(2000)

Management Plan for Site of Special Scientific Interest No 22:

Yukidori Valley, Langhovde, Lützow-Holm Bay

1. *Description of values to be protected*

The Yukidori Valley (69°14'30"S, 39°46'00"E) is located in the middle part of Langhovde on -Holm Bay, continental Antarctica, which is about 20 km south of the Japanese Syowa Station (69°00'22"S, 39°35'24"E) on the Ongul Islands (Map 1). The Valley is 2.0-2.5 km long from east to west, 1.8 km wide and contains a prominent melt stream and two lakes (Map 2). A typical continental fellfield ecosystem has developed in this Valley. Field surveys of geological and biological sciences have been carried out in Langhovde since 1957 of the IGY period and a long-term monitoring program started in the Yukidori Valley area in 1984. More intensive studies have been carried after the Area was designated as SSSI No.22 in 1987. Permanent quadrats for monitoring lichen and moss vegetation have been established in this typical continental ecosystem in relation to long-term environmental change. Therefore, the Area requires protection in order that this long-term scientific monitoring program not be compromised.

The Area was originally designated in Recommendation XIV-5 (1987, SSSI No.22) after a proposal by Japan on the grounds that it contains a typical continental Antarctic fellfield ecosystem. Yukidori Valley is inhabited by several thousand snow petrels and the excrement of snow petrels is important as a major supply of nutrients for mosses and lichens.

These are still valid reasons for maintaining protection. Since 1984, the long-term monitoring program has continued in this Area, in particular to monitor temporal and spatial change in vegetation of mosses and lichens (Map 2).

The values to be protected are those associated with this typical continental Antarctic fellfield ecosystem and the long-term scientific studies that have been carried out since 1984. The Area contains fluvioglacial terraces in the lower part of the Valley and a dissected deltaic fan at the mouth of the stream.

2. *Aims and objectives*

Management at Yukidori Valley aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance to the Area;
- allow a continuation of long-term monitoring programs;
- avoid major changes to the structure and composition of the terrestrial vegetation, in particular the moss and lichen banks.
- prevent unnecessary human disturbance to the snow petrels, as well as to the surrounding environment.

3. *Management activities*

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

- Maps showing the location of the Area (stating the special restrictions that apply) shall be displayed prominently at "Biological research hut" located outside of the western boundary of the Area, where copies of this management plan shall also be made available.
- Signs showing the location and boundaries of the Area and listing entry restrictions should be placed at the entry point at the western boundary of the Area to help avoid inadvertent entry.
- 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.

4. *Period of designation*

Designated for an indefinite period.

5. *Maps*

Map 1: Sôya Coast, Lützow-Holm Bay, East Antarctica.

Map 2: Yukidori Valley, Langhovde and the boundary of the Site of Special Scientific Interest (SSSI No. 22).

Map 3: Simplified geological sketch map of Yukidori Valley. [Not reproduced]

Map 4: The biological research hut and surroundings.

6. *Description of the Area*

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

Yukidori Valley (69°00'30"S, 39°46'00"E) is situated in the middle part of Langhovde, on the -Holm Bay, Continental Antarctica. The Area encompasses 2.0-2.5 km by 1.8 km, located between a tongue of the ice cap and sea at the western end of the Valley.

The location of the Area and its boundaries are shown on the attached maps (Map 2). It is described as all the land within the Area bounded by the following coordinates:

69°14'00"S, 39°44'20"E

69°14'00"S, 39°48'00"E

69°15'00"S, 39°48'00"E

69°15'00"S, 39°45'20"E

The boundary from the point 69°14'00"S, 39°44'20"E to the point 69°15'00"S, 39°45'20"E includes a part of Yatude Valley, the coast line and is delineated with ropes. The Yukidori Valley contains a prominent melt stream and two lakes. The stream flows from the ice cap towards the sea through V-shaped and U-shaped sectors of the Valley and enters Lake Yukidori, in the middle of the Valley, 125 m above sea level; it then flows from the south-west corner of the lake and runs through the lower valley formed by steep cliffs. Sorted stone circles with mean diameter of 1 m are situated on moraines near the northwestern part of Langhovde Glacier to the east of Lake Higasi-Yukidori, which is located at the head of the Valley, about

200 m above sea level abutting the edge of the ice cap. Poorly-developed stone circles are found on fluvioglacial deposits in the Yukidori Valley. Small talus aprons and talus cones are located around Lake Yukidori. In the lower reaches of the Yukidori Valley, at an altitude of about 20 m, fluvioglacial terraces 20 to 30 m wide stand 2 to 3 m high above the present channel bed. These flat terraces consist of rather fine sand and gravel. There is a dissected deltaic fan formed at the mouth of the stream. The Valley is underlain by well-layered sequences of late Proterozoic metamorphic rocks, consisting of garnet-biotite gneiss, biotite gneiss, pyroxene gneiss and hornblende gneiss with metabasite. The foliation of the gneisses strike N10- E and dips monoclinally to the east (Map 3).

Almost all of the plant species recorded from the Langhovde area occur within the Area. They include the mosses *Bryum pseudotriquetrum* (= *Bryum algens*), *Bryum argenteum*, *Bryum amblyodon*, *Ceratodon purpureus*, *Hennediella heimii*, *Pottia austrogeorgica*, *Grimmia lawiana* and lichens *Usnea sphacelata*, *Umbilicaria antarctica*, *Umbilicaria decussata*, *Pseudephebe minuscula*, and *Xanthoria elegans*. Four species of free living mites (*Nanorchestes antarcticus*, *Protereunetes minutus*, *Antarcticicola meyeri*, *Tydeus erebus*), have been reported. There are over sixty species of microalgae, including species endemic to Yukidori Valley, *Cosmarium yukidoriense* and a variety of *Cosmarium clepsydra*. Several pairs of the south polar skua (*Catharacta maccormicki*) and several thousand snow petrels (*Pagodroma nivea*; note "Yukidori" is Japanese for the snow petrel) breed in the Area. The Area does not include any marine area.

6(ii) Restricted and managed zones within the Area

None.

6(iii) Structures within and near the Area

The boundary of the Area near the hut is enclosed by ropes. The biological research hut was constructed in 1986 near the beach at the mouth of the Valley so that there would be minimal impact on the flora, fauna, and terrain of the Area. The location of hut is excluded from the Area. There are three sites for microclimatic observations in the lower, middle and upper reaches of the stream within the Area. In addition, a meteorological station is located near the hut, outside the Area. Microclimatic factors such as relative humidity and air temperatures at ground level, soil temperatures and temperatures at moss level are measured. Hexagon chambers made of acrylic fiber are installed at the vegetated area in the lower and middle reaches in order to assess vegetational and environmental changes. These sites are indicated in the attached maps.

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

None.

7. *Permit conditions*

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

- it is issued only for a compelling scientific reasons that cannot be served elsewhere, or for essential management purposes consistent with plan objectives such as inspection, maintenance or review,
- the actions permitted will not jeopardize the ecological or scientific values of the

Area;

- any management activities are in support of the aims and objectives of the management plan;
- the actions permitted are in accordance with this 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;
- permit shall be issued for a stated period.

The appropriate authority should be notified of any activities/measures undertaken that weren't included in the authorized Permit.

7(i) Access to and movement within the Area

Vehicles are prohibited within the Area and helicopter should not land within the Area. Only those pedestrians with compelling research activities are allowed to enter at the entry point (Map 4). No pedestrian routes are designated within the Area, but persons on foot should at all times avoid walking on vegetated areas or disturbance to birds and natural features.

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

- Compelling scientific research which cannot be undertaken elsewhere and which will not jeopardize the ecosystem of the Area
- Essential management activities, including monitoring

7(iii) Installation, modification or removal of structures

No further structures are to be erected in the Area, or scientific equipment installed, except for essential scientific or management activities, as specified in the Permit.

7(iv) Location of field camps

Camping should be avoided within the Area.

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 to prevent accidental introductions. In view of the presence of breeding bird colonies in the Area, no poultry products, including products containing uncooked dried eggs, shall be taken into the Area. No herbicides or pesticides shall be brought into the Area. Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes specified in the Permit, shall be removed from the Area at or before the conclusion of the activity for which the Permit was granted. Fuel is not to be stored in the Area, unless specifically authorized by Permit for specific scientific or management purposes. Anything introduced shall be for a stated period only, shall be removed at or before the conclusion of that stated period, and shall be stored and handled so that risk of any introduction into the environment is minimized. If release occurs which is likely to compromise the values of the Area, removal is encouraged only where the impact of removal is not likely to be greater than that of leaving the material in situ. The appropriate authority should be notified of anything released and not removed that was not included in the authorized Permit.

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

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

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

Collection or removal of anything not brought into the Area by the Permit holder shall only be in accordance with a Permit and should be limited to the minimum necessary to meet scientific or management needs. Permits shall not be granted in instances where it is proposed to take, remove or damage such quantities of soil, native flora or fauna that their distribution or abundance in the Area would be significantly affected. Anything 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 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. Human wastes may be disposed of into the sea.

7(ix) Measures that are necessary to ensure that 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 small-scale collection of samples for analysis or review, or for protective measures.

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

To help maintain the ecological and scientific values of Yukidori Valley special precautions shall be taken against introductions. Of concern are microbial, invertebrate or plant introductions from other Antarctic sites, including stations, or from regions outside Antarctica. All sampling equipment or markers brought into the Area shall be cleaned or sterilized. 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.

7 (x) Requirements for reports

Parties should ensure that the principal holder for each Permit issued submits to the 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 organizing the scientific use of the Area.

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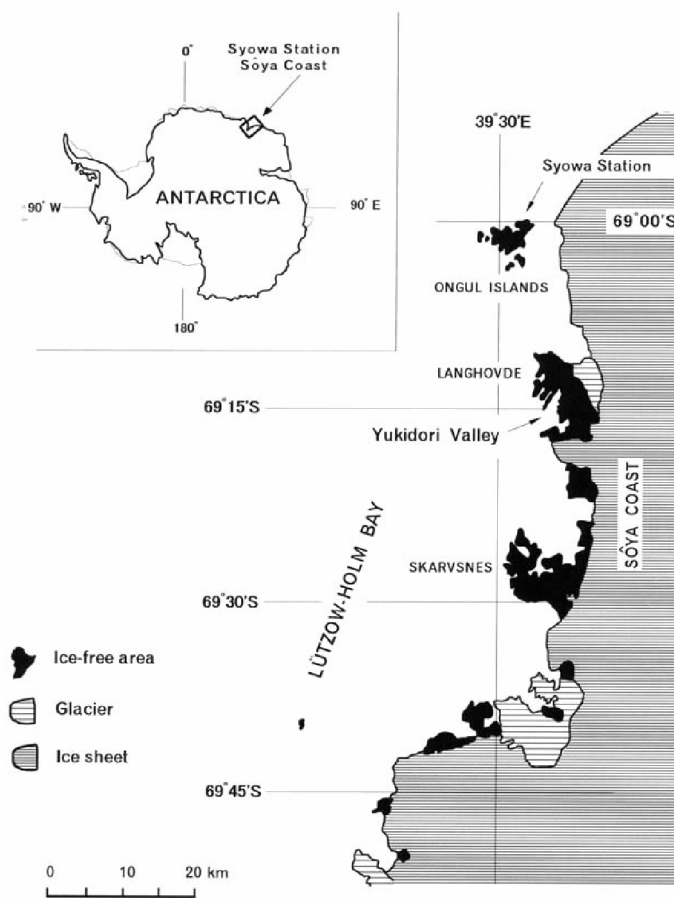
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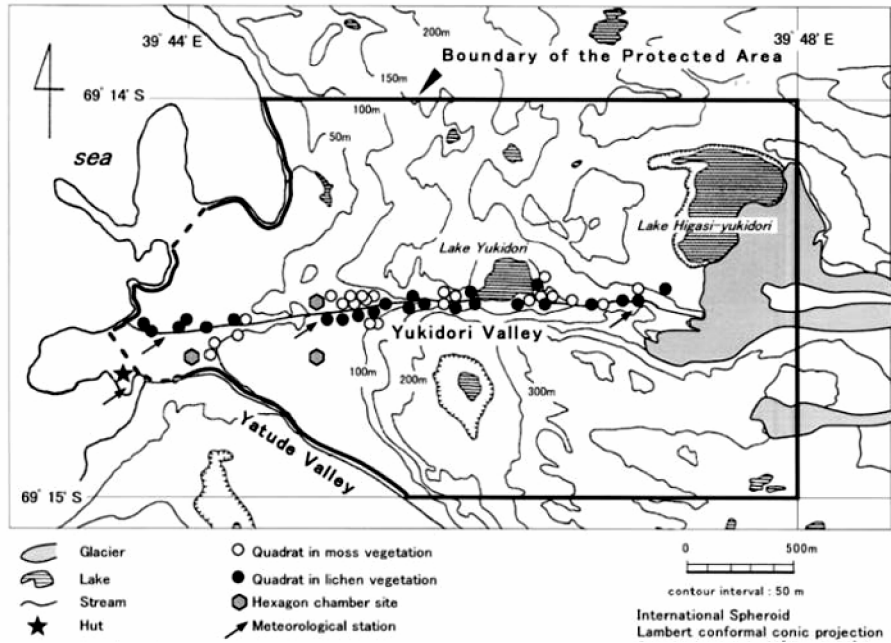
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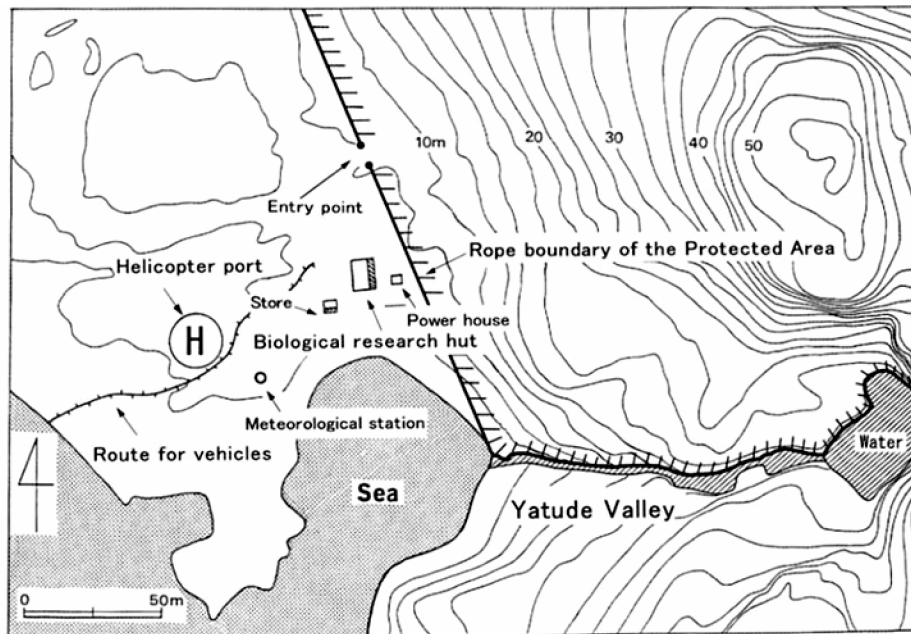
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Map 1: The map of Sôya Coast Lützow-Holm Bay, East Antarctica



Map 2: Yukidori Valley, Langhovde and the boundary of the Protected Area.



Map 3: The biological research hut and surroundings

Annex to Recommendation XIV-5
Site of Special Scientific Interest No 22: Yukidori Valley,
Langhovde, Lutzow-Holm Bay

Management Plan

i. Description of site.

Physical features. Yukidori Valley (lat 69°14'30"S, long 39°46'00"E), is situated in the middle part of Langhovde, on the east coast of Lutzow-Holm Bay, Greater Antarctica. The site encompasses an area of 3 km by 0.5-1.5 km, located between a tongue of the ice cap and sea at the western end of the valley; it extends up to 50m offshore near the mouth of the stream. The location of the site and its boundaries are shown on the attached maps.

Topography. The valley is about 3 km in length from east to west and 0.5 to 1.5 km in width and contains a prominent melt stream and two lakes; the head of the valley, about 200 m above sea level, abuts the edge of the ice cap. Lake Higashi Yukidori lies north of the head of the valley. The stream flows from the ice cap towards the sea through V-shaped and U-shaped sectors of the valley and enters Lake Yukidori, in the middle of the valley, 125m above sea level; it then flows from the south-west corner of the lake and runs through the lower valley formed by steep cliffs. Fluvioglacial terraces in the lower part of the valley consist of fine sand and gavel. There is a dissected deltaic fan formed at the mouth of the stream.

Geology and soils. The valley is underlain by well-layered sequences of late Proterozoic metamorphic rocks, consisting of garnet-biotite gneiss, biotite gneiss, pyroxene gneiss and hornblende gneiss with metabasite. The foliation of the gneisses strike N 10°E and dips monoclinaly to the east.

Meteorology. A continuous climatic record has been maintained since 1957 at Syowa Station, Ongul Island, 30 km north of the site (Published as "Antarctic Meteorological Data" by the Japanese Meteorological Agency).

Biological features. Terrestrial. Almost all of the plant species recorded from the Langhovde area occur within the site. They include the mosses *Bryum pseudotriquetrum* (= *B. algens*), *B. argentum*, *Ceratodon pupueus*, *Pottia heimii*, *Grimmia lawiana*, and the lichens *Usnea sphacelata* (= *U. sulphurea*, *Umbilicaria antarctica*, *U. decussata*, *Alectoria* (= *Psuedephebe*) *Miniscula*, *Xanthoria elegans*. There are no liverworts or vascular plants. Two species of free living mites (*Nanorchestes antarcticus* and *Tydeus erebus*) have been reported. *Inland waters.* Sixty-four species of microalgae, including cyanobacteria and green algae, have been reported from Lake Yukidori and the adjacent area. Among them were one new species of *Cosmarium* (*C. yukidoriense*) and three new varieties of *C. clepsydra*. *Marine.* No information. Birds and seals. Several pairs of the south polar skua (*Catharacta maccormicki*) and numerous snow petrels (*Pagodroma nivea*: note 'Yukidori' is Japanese for the snow petrel) breed in the site. The excrement of snow petrels is especially important as a major supply of nutrients for lichens and mosses. There is no information on seals.

ii. Reason for designation. Yukidori Valley is representative of the typical continental Antarctic fellfield ecosystem. The area has been chosen for an on-going biological research

programme and for long-term monitoring studies. It is therefore necessary to afford protection to the site so as to minimize human impacts. With more extensive expeditions in the ice-free areas, pedestrian traffic is increasing in the vicinity of the exceptional stands of vegetation. A biological research hut has been constructed near the beach at the mouth of the valley, 250m from the western boundary of the site, for the purpose of minimizing impact on the fauna, flora and terrain of the site. Pedestrian access has been limited and no vehicular access has been permitted since the construction of the hut. The valley has not been subjected to any environmental disturbance, with the exception of carefully controlled small-scale biological sampling of lake water, soil lichens, mosses, invertebrates and sea birds.

iii. Outline of research. Field surveys of geoscience and biological science have been carried out in the Langhovde area, including the site, since the first Japanese Antarctic Research Expedition in 1957. A preliminary biological survey of the site was made during JARE 15 and 16 (1973-75). This survey obtained information on the pristine state of the terrestrial ecosystem to compare with that influenced by man around Syowa Station on East Ongul Island. The studies were mainly undertaken in summer, and terminated after two seasons. A three year intensive study of the ecosystem commenced during the 1985-86 season. The present programme is planned to gain a deeper understanding of the terrestrial ecosystems in this site; it consists of several ecological studies on fauna and flora in relation to the climatic and edaphic areas as been conducted from the early stages of the investigation and will be continued.

iv. Date of expiry of designation. 31 December 1992.

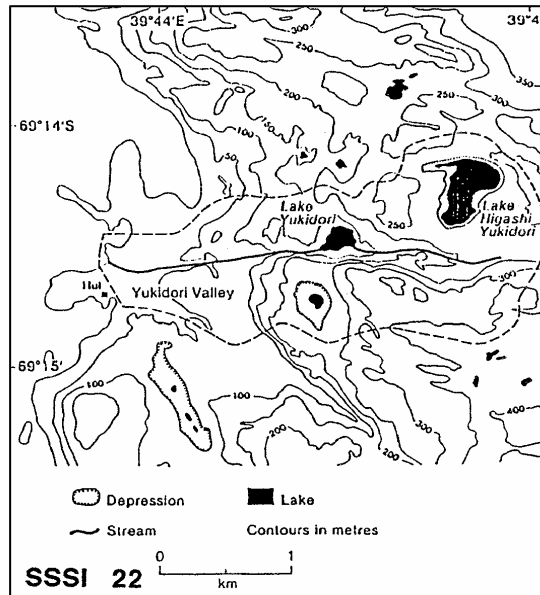
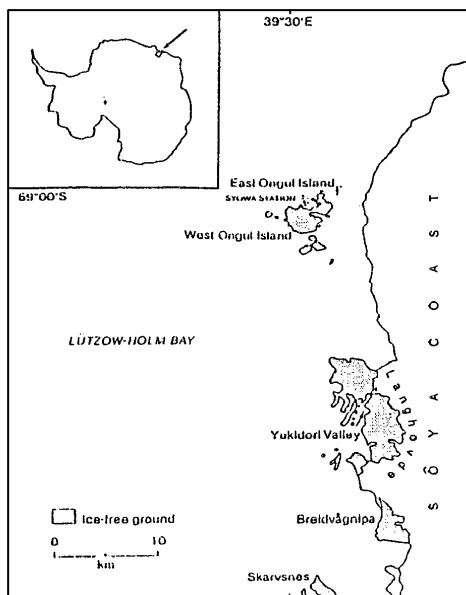
v. Access points. None specified.

vi. Pedestrian and vehicular routes. Pedestrians should enter the site only in connection with research activities. Surface vehicles should not be operated and helicopters should not land within the site.

vii. Other kinds of scientific investigations which would not cause harmful interference. Research of other disciplines that would not affect the continuing biological studies for the protection of which the site has been designated.

viii. Scientific sampling. This should be restricted to the minimum required in connection with programme. No rock samples may be obtained.

ix. Other restraints. None specified.



SSSI 22, Yukidori Vaalley

Site of Special Scientific Interest No 23

XXIII: Annex to Measure 1(1999)

Management Plan

Site of Special Scientific Interest No. 23: Svarthamaren

1. Description of values to be protected

The Area was originally designated in Recommendation XIV-5 (1987, SSSI No. 23) after a proposal by Norway based on the following factors, which still give relevant grounds for designation:

- the fact that the colony of Antarctic petrel (*Thalassoica antarctica*) is the largest known inland seabird colony on the Antarctic continent
- the fact that the colony constitutes a large proportion of the known world population of Antarctic petrel
- the fact that the colony is an exceptional "natural research laboratory" providing for research on the Antarctic petrel, snow petrel (*Pagodroma nivea*) and south polar skua (*Catharacta maccormicki*), and their adaptation to breeding in the inland/interior of Antarctica

2. Aim and objectives

The aim of managing Svarthamaren is to:

- avoid human induced changes to the population structure, composition and size of the seabird colonies present at the site
- prevent unnecessary disturbance to the seabird colonies, as well as to the surrounding environment
- allow for undisturbed research on the adaptations of the Antarctic petrel, snow petrel and south polar skua to the inland conditions in Antarctica (*Primary Research*)

- allow access for other scientific reasons where the investigations will not damage the objectives of the bird research

The focus of the Primary Research in Svarthamaren SSSI is as follows:

- Monitoring of the population size
- Monitoring of the annual variation in hatching success and adult survival rates in the petrel colonies in order to estimate changes in the size and structure of the colony.
- Experimental studies in order to increase the understanding of the mechanisms that regulate nesting success and survival rates, and the adaptation of the Antarctic petrel to the extreme environmental conditions in Antarctica.

3. Management activities

Management activities at Svarthamaren shall:

- ensure that the seabird colonies are adequately monitored, to the maximum extent possible by non-invasive methods.
- allow erection of signs/posters, border markers, etc. in connection to the site, and ensure that these are serviced and maintained in good condition
- include visits 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. Any direct intervention management activity in the area must be subject to an environmental impact assessment before any decision to proceed is taken.

4. Period of designation

Designated for an indefinite period.

5. Maps and Illustrations

Map A: Dronning Maud Land (showing location of Map B). Map specifications:

Projection: Lambert Conformal Conic;

Standard parallels: SP1 70° S, SP2 73°S

Central Meridian: 5°E

Latitude of origin: 71°30'S

Spheroid: WGS84

Map B: Svarthamaren and surroundings (showing location of Svarthamaren SSSI).

Map specifications are the same as for Map A.

Map C: Site of Special Scientific Interest No. 23, protected area topographic map.

Map specifications are the same as for Map A.

6. Description of Area

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

The Svarthamaren SSSI is situated in Mühlig-Hoffmannfjella, Dronning Maud Land, stretching from approx. 71° 33' 17" S, 5° 09' 12" E the north-west to approx. 71° 55' 58" S, 5° 15' 12" E in the south-east. The distance from the ice front is about 200 km. The Area covers approximately 6.4 km², and consists of the ice-free areas of the Svarthamaren nunatak, including the areas in the immediate vicinity of the ice-free areas naturally belonging to the nunatak (i.e. rocks). The Area is shown in Map B and C.

The Norwegian field station Tor is located in the Svarthamaren nunatak at lat. 71° 53' S, long. 5° 10' E. The station, including a 10 metre buffer zone around the station buildings, is excluded from the Svarthamaren Site of Special Scientific Interest. Access to the station is by the shortest route from the ice.

The main rock types in the Area are coarse and medium grained charnockites with small amounts of xenoliths. Included in the charnockitoids are banded gneisses, amphibolites and granites of the amphibolite facies mineralogy. The slopes are covered by decomposed feldspathic sand. The north-eastern side of the Svarthamaren nunatak is dominated by scree slopes (slope 31°-34°), extending 240 metres upwards from the base of the mountain at about 1600 metres above sea level. The major features of this area are two rock amphitheatres inhabited by breeding Antarctic petrels. It is this area which makes up the core of the protected site.

No continuous weather observations have been carried through in the Area, but prevalent air temperature has been observed to range between -5° and -15°C in January, with somewhat lower minimum temperatures in February. The flora and vegetation at Svarthamaren are sparse compared with other areas in Mühlig-Hofmannfjella and Gjelsvikfjella to the west of the site. The only plant species occurring in abundance, but peripherally to the most manured areas, is the foliose green alga, *Prasiola crispa*. There are a few lichen species on glacier-borne erratics 1-2 km away from the bird colonies: *Candelariella hallettensis* (= *C. antarctica*), *Rhizoplaca* (= *Lecanora*) *melanophthalma*, *Umbilicaria* spp. and *Xanthoria* spp. Areas covered with *Prasiola* are inhabited by collembola (*Cryptopygus sverdrupi*) and a rich fauna of mites (*Eupodes anghardi*, *Tydeus erebus*) protozoan, nematodes and rotifers. A shallow pond measuring about 20 x 30 m, lying below the middle and largest bird sub-colony at Svarthamaren, is heavily polluted by petrel carcasses, and supports a strong growth of a yellowish-green unicellular algae, *Chlamydomonas*, sp. No aquatic invertebrates have yet been recorded.

The colonies of breeding seabirds are the most conspicuous biological element in the Area. The north-eastern slopes of Svarthamaren are occupied by a densely populated colony of Antarctic petrels (*Thalassoica antarctica*) divided into three separate sub-colonies. The total number of breeding pairs is estimated to be approximately 250,000 pairs. In addition, 500-1000 pairs of snow petrels (*Pagodroma nivea*) and approximately 80 pairs of south polar skuas (*Catharacta maccormicki*) breed in the area. The two main colonies of Antarctic petrels are situated in the two rocky amphitheatres. The main colonies of snow petrels are located in separate parts of the scree-slope that are characterised by larger rocks.

The south polar skuas nest on the narrow strip of flat, snow-free ground below the scree-slopes. The main concentrations of seabirds are indicated on Map C. Readers should, however, be aware that birds are also found in other areas than these densely populated areas.

6 (ii). Restricted zones within the Area

None

6 (iii). Location of structures within the Area

There are no structures within the Area.

The Norwegian field station Tor is located on the Svarthamaren nunatak, at 71°53.4'S, 5°09.6'E. The station, including a 10 meter buffer zone around the station buildings, is excluded from the Area. Access to the station is by the shortest route from the ice.

6 (iv). Location of other Protected Areas within close proximity

None

7. Permit Conditions

Permits may be issued only by appropriate national authorities as designated under Annex V, Article 7 of the Protocol on Environmental Protection to the Antarctic Treaty. Conditions for issuing a permit to enter the Area are that:

- the actions permitted are in accordance with this Management Plan
- the permit, or a copy, shall be carried within the area
- any permit issued shall be valid for a stated period
- a visit report is supplied to the authority named in the permit

7(i) Access to and movement within the Area

Access to the area is restricted by the following conditions:

- No pedestrian routes are designated, but persons on foot shall at all times avoid disturbances to birds, and as far as possible also to the sparse vegetation cover in the Area.
- Vehicles should not enter the site.
- No flying of helicopters or other aircraft over the Area is allowed.
- Helicopter landings are not allowed within the boundaries of the SSSI. Landings associated with activities at the field station Tor should preferably take place at the north-eastern tip of the Svarthamaren nunatak (as marked on map C).

7(ii) 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 in accordance with permit:

- Primary biological research programs for which the area was designated.
- Other research programs of a compelling scientific nature that will not interfere with the bird research in the Area.

7(iii) Installation, modification or removal of structures

No structures are to be erected in the Area, or scientific equipment installed, except for equipment essential for scientific or management activities as specified in a permit, or for modification of the field station, also as specified in a permit.

7(iv) Location of field camps

No field camps should be established in the Area. The field station Tor should only be used with permission from the Norwegian Polar Institute.

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

- No living animals or plant material shall be deliberately introduced into the Area.
- No poultry products, including food products containing uncooked dried eggs, shall be taken into the Area.
- No herbicides or pesticides shall be brought into the Area.
- Any other chemicals (including fuel), which may be introduced for a compelling scientific purpose specified in the permit, shall be removed from the Area before or at the conclusion of the activity for which the permit was granted.
- All materials introduced shall be for a stated period, 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 and fauna

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

It is recommended that those responsible for the primary research in the Area should be consulted before a permit is granted for taking of birds for purposes not associated with the primary research. Studies requiring taking of birds for other purposes should be planned and carried through in such a manner that it will not interfere with the objectives of the bird research in the Area.

7 (vii). 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, except that debris of man-made origin should be removed and that dead specimens of fauna may be removed for laboratory examination.

7 (viii) Disposal of waste

All wastes is to be removed from the area.

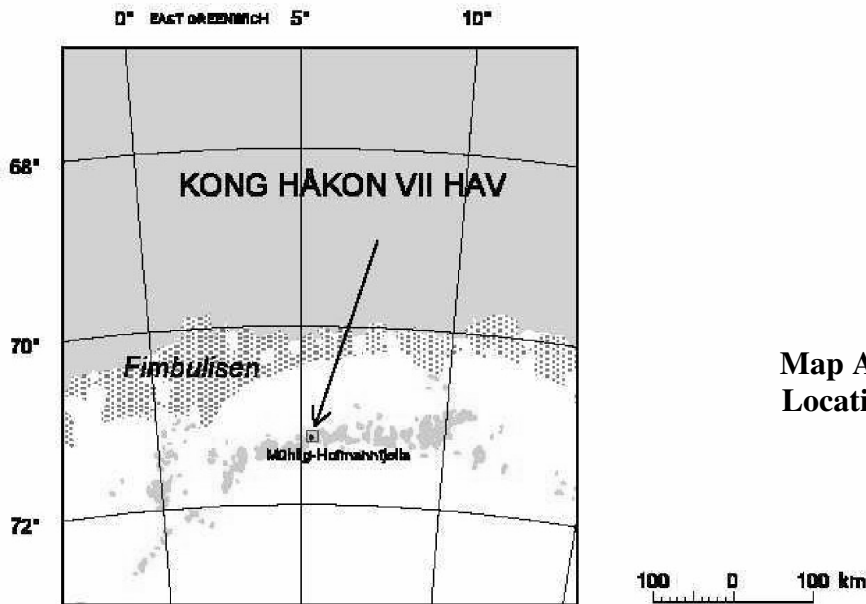
7 (ix) Measures that may be necessary to ensure that the aims and objectives of the Management Plan continue to be met

Permits may be granted to enter the Area to carry out biological monitoring and site inspection activities which may involve the collection of small amounts of plant material or small numbers of animals for analysis or audit, to erect or maintain notice boards, to maintain the field station, or to undertake protective measures.

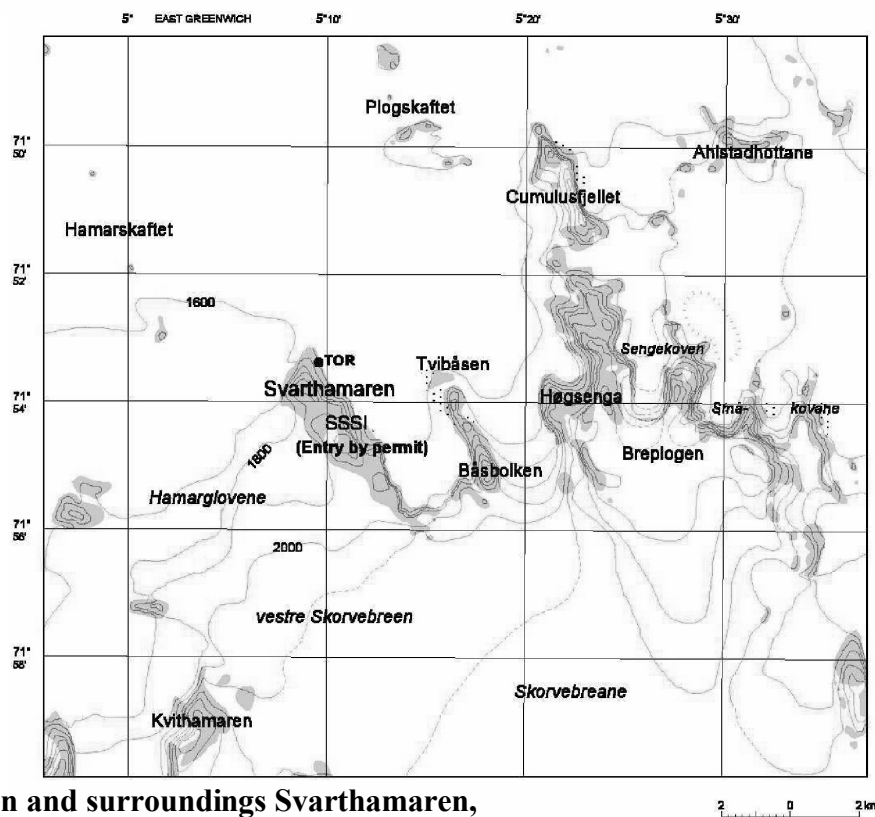
7 (x) Requirements for reports

Parties should ensure that the principal holder of 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

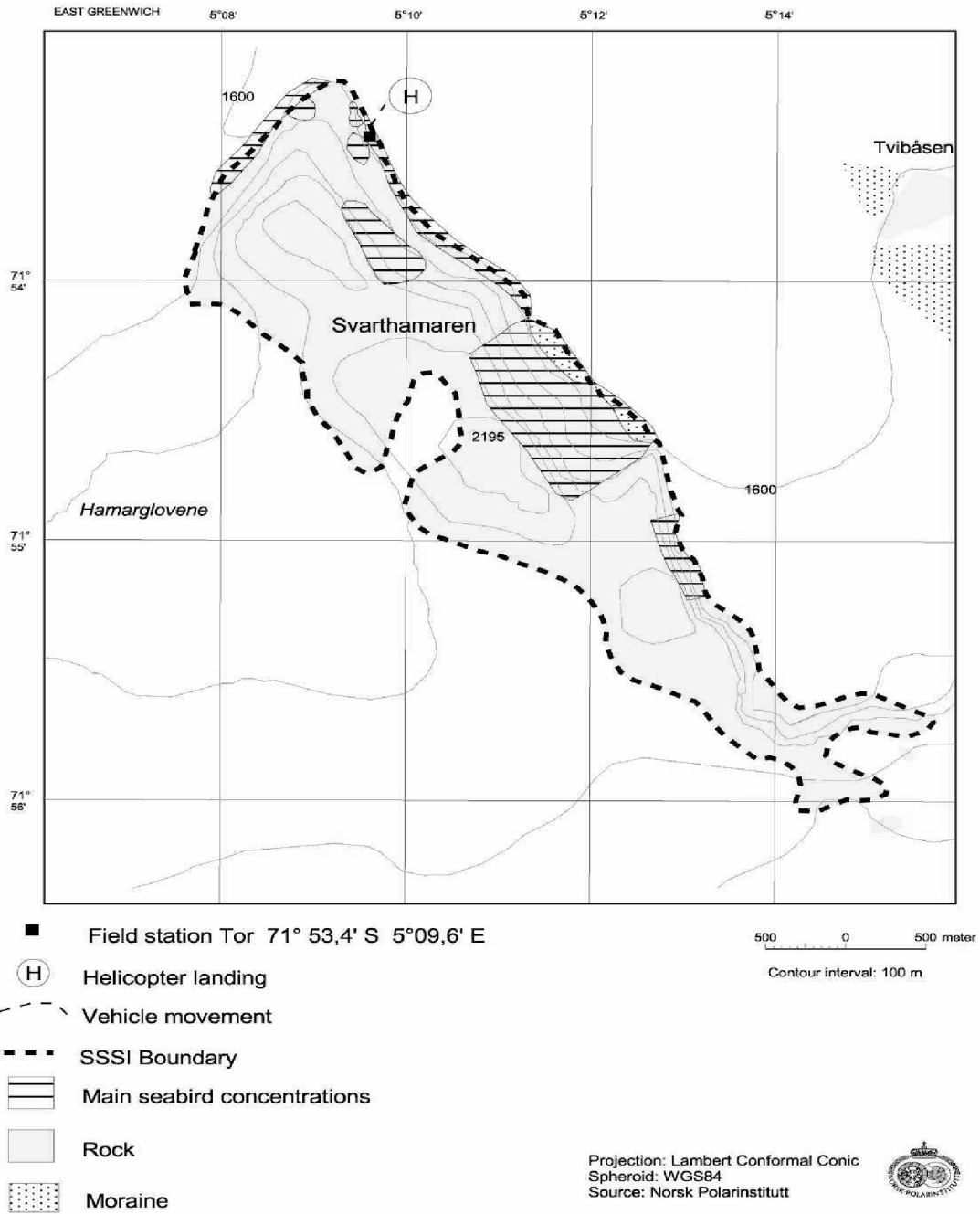
Plan. Parties should, wherever possible, deposit originals or copies of such original reports in a publicly accessible archive to maintain a record of usage, to be used both in any review of the management plan and in organising the scientific use of the Area.



**Map A: Dronning Maud Land
Location of Map B Shown**



**Map B: Svarthamaren and surroundings Svarthamaren,
SSSI No. 23 slightly left of centre**



Map C: Svarthamaren - Site of Special Scientific Interest No. 23

Annex to Recommendation XIV-5

Site of Special Scientific Interest No. 23: Svarthamaren, Muhlig-Hofmannfjella, Dronning Maud Land

Management Plan

i. Description of site

Physical features. Svarthamaren is an ice free area (lat 71°53'S, long 5°10'E) situated in Muhlig-hofmannfjella, Dronning Maud Land. The distance from the ice front is about 200 km.

The site consists of about 3.9 km² of the north-eastern facing cliffs and screes north of the summit of Svarthamaren. The location of the site and its boundaries are shown in the attached maps.

Topography. Svarthamaren is surrounded by ice and is about 6 km long along a NW-SE axis, with the highest point at 2195 m a.s.l. The northern part of the NE side is dominated by screes (slope 31–34°), extending 240 m upwards from the base of the mountain at about 1600 m a.s.l.

Above these screes are almost vertical cliffs. Beneath the screes is a narrow area of flat ground bordered by glacier ice. The major features of this site are two rock amphitheatres inhabited by breeding Antarctic petrels.

Geology and soils. The main rock types are coarse and medium grained charnockitoids and small amounts of zenoliths. Banded gneisses, biotite amphibolites and granites of the amphibolite facies mineralogy are included in the charnockitoids. The slopes are covered by decomposed feltspathic sand.

Meteorology. Data exist for the period 13 January to 15 February 1985 (prevalent air temperature ranged between -5°C and -15°C). An automatic weather station was set up by the Norwegian Antarctic Research Expedition 1984/85 in an analogous situation at Jutulsessen, 100 km west of Svarthamaren, to obtain long-term weather statistics.

Biological features. Terrestrial. The flora and vegetation at Svarthamaren are sparse compared with other areas in Muhlig Hofmannfjella and Gjelsvikfjella to the west of the site. This is apparently due to the elevation of Svarthamaren, the shortage of meltwater, and the excessive nutrient deposition from the bird colonies. The only plant species occurring in abundance, but peripherally to the most manured areas, is the foliose green alga, *Prasiola crispa*. There are a few lichen species on glacier-borne erratics 1-2 km away from the bird colonies: *Candelariella hallettensis* (= *C. antarctica*), *Rhizoplaca* (= *Lecanora melanophthalma*), *Umbilicaria* spp. and *Xanthoria* spp. Areas covered with *Prasiola* are inhabited by Collembola (*Cryptopygus sverdrupi*) and a rich fauna of mites (*Eupodes angardi*, *Tydeus erebus*), protozoans, nematodes and rotifers.

Inland waters. A shallow pond measuring about 20 x 30 m, lying below the middle and largest bird subcolony, is heavily polluted by petrel carcasses, and supports a strong growth of a yellowish-green unicellular algae, *Chlamydomonas* sp. Smaller concentrations of algae occur on the fringes of a small frozen lake below the northern face of the mountain. No invertebrates have been recorded.

Birds. There are important breeding colonies of seabirds. The northeast slopes of Svarthamaren are occupied by a densely populated colony of Antarctic petrels (*Thalassoica antarctica*), divided into three separate subcolonies. Less than ten breeding colonies of Antarctic petrels are described in the literature, and the Svarthamaren colony is by far the largest known. The colony was first closely examined in January/February 1985 by Norwegian ornithologists. The total number of breeding pairs was estimated to be 208,000. In addition, 500–1000 pairs of snow petrels (*Pagodroma nivea*) and 50 pairs of south polar skuas (*Catharacta maccormicki*) were breeding in the area. The Antarctic petrels nest in the two rocky amphitheatres with a mean density of 0.75 nest per square metre. Most of the snow petrels nest in separate parts of the scree characterized by larger rocks. The south polar skuas nest on the narrow strip of flat, snow-free ground below the screes.

ii. Reason for designation. The Svarthamaren Antarctic petrel colony is the largest known seabird colony situated inland on the Antarctic continent, and probably represents a significant proportion of the world population of this species. The site is of exceptional scientific interest and provides for research on the Antarctic petrel, snow petrel and south polar skua and the study of adaptations of seabirds breeding inland on the Antarctic continent.

iii. Outline of research. A study of the breeding biology and ecophysiological adaptations in the Antarctic petrel was initiated in 1985. This is planned to continue during future Norwegian Antarctic Expeditions. The accessibility of the site is limited by its location far inland. The Antarctic petrel colony was discovered by Soviet geologists in January 1961 when a party landed in the area with an AN-2 aircraft and unexpectedly encountered thousands of birds. During the period 9 January to 16 February 1985 ten of the scientists of the Norwegian Antarctic Research Expedition worked in Muhlig-Hofmannfjella and Gjelsvikfjella, and established a base camp (Camp Norway 5) on the glacier approximately 500 m north-east of the northernmost slope of the site. Three ornithologists, a botanist and an invertebrate zoologist worked in the area and researchers of other disciplines surveyed this and nearby areas. Helicopter landings during the period were kept to a minimum. A wooden laboratory hut has been left to be used by future parties.

iv. Date of expiry of designation. 31 December 1997.

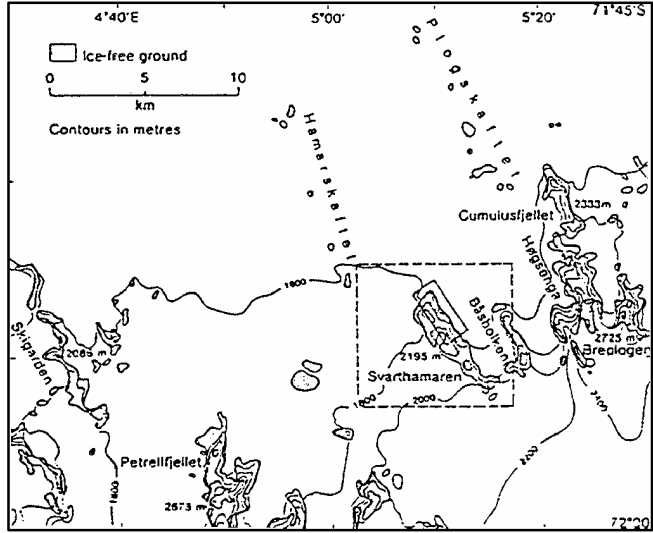
v. Access point. The site may be entered from any direction but access should cause minimum disturbance to the bird colonies.

vi. Pedestrian and vehicular routes. Vehicles should not enter the site. Pedestrians should not move through the populated areas except in the course of scientific investigations. Helicopters and low-flying aircraft should avoid the bird colonies in accordance with the Agreed Measures for the Conservation of Antarctic Fauna and Flora.

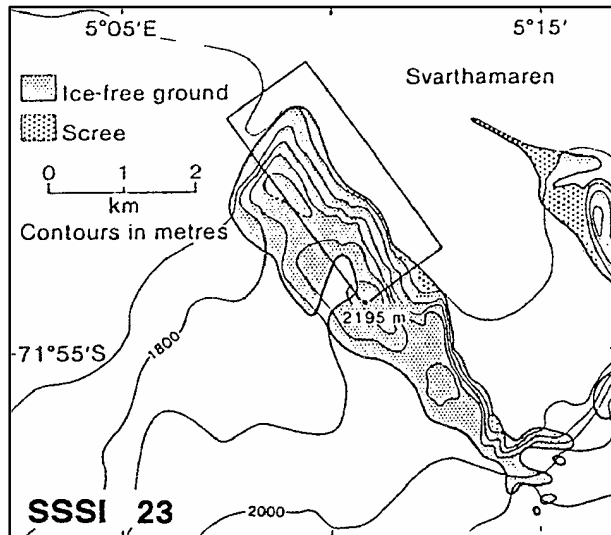
vii. Other kinds of scientific investigation which will not cause harmful interference. Any scientific investigation which will not cause significant disturbance to the biological programmes for which the site has been designated.

viii. Scientific sampling. Taking samples of the bird population by killing, capture, or taking of eggs should be done only for a compelling scientific purpose and in accordance with the Agreed Measures for the Conservation of Antarctic Fauna and Flora.

ix. Other restraints. None specified.



SSSI 23, Svarthamaren



Site of Special Scientific Interest No 24

Annex to Recommendation XIV-5

Site of Special Scientific Interest No 24: Summit of Mt Melbourne, North Victoria Land

Management Plan

i. Description of Site

Physical Features. Mt Melbourne, North Victoria Land (lat 74°21'S, long 164°42'E) is situated between Wood Bay and Terra Nova Bay, on the west side of Ross Sea, and Campbell Glacier, about 10 km to the west. The site comprises all terrain above the 2200 m contour surrounding the main crater of Mt Melbourne. The location of the site and its main features are shown in the attached maps.

Topography. In profile, Mt Melbourne is an almost perfect low-angle volcanic cone rising to 2732 m a.s.l., showing only slight dissection and little or no glacial erosion. Many smaller basaltic cones and mounds occur near the base and on the flanks of the mountain. The summit caldera is about 1 km in diameter and forms a neve for a glacier flowing westward. The two areas of ice-free steaming ground (at A, 'Cryptogam Ridge' and B on the accompanying map) are on the edge of the caldera, with a third area (C) 250 m lower on the northern slopes. 'Cryptogam Ridge', on the southern side of the main crater, is an area of geothermal activity. About 300-400 m of this ridge is ice-free with the remainder covered by numerous ice hummocks. These hummocks are hollow, contain fumaroles and are 1-6 m in diameter and up to 4 m high.

Geology and soils. Mt Melbourne is part of the McMurdo Volcanics which are a line of dormant and extinct volcanoes running along the coast of Victoria Land. The Mt Melbourne area is more likely to be late Quaternary than late Tertiary in age, and the most recent eruption may have been only about 150 years ago. The mountain is a large low-angle strato-volcano containing basalt, trachyandesite and trachyte flows and including pyroclastics. Small basalt scoria cones are scattered around the base, some of which appear to be very recent as they are undissected. Several older slightly dissected cones occur on the summit caldera. Surface ground temperatures vary markedly over distances of centimetres on ice-free warm ground, up to a recorded maximum of 47°C. Random probing to depths of 1 m and detailed temperature transects to depths of 15 cm indicate substrate temperatures of up to 60°C. Within the ice pinnacles soil surface temperatures range from 10°C to over 40°C. Frost heave occurs at some warm areas. Although the substratum is classified as azonal, there are two distinct soil zones within some areas of hot ground probably caused by heat, moisture and gases from below. A typical profile comprises an upper 0-5 cm layer of dark sandy soil with a lower 6-30 cm horizon consisting of large lighter coloured scoria gravels. The upper layer contains organic matter in which there is microbiological activity, including cyanophaecean nitrogen fixation. No clay minerals have been detected.

Meteorology. No detailed data are available for the site. Field party records, during one week in late November 1984, indicate summer air temperatures in the caldera area of -6°C to -20°C, with an absolute minimum of -32°C.

Biological Features. Terrestrial. The warmest areas of ground support patches of yellow-green moss, liverwort and brownish crusts of algae. The site contains an unique bryophyte community comprising the moss *Campylopus pyriformis* and the liverwort *Cephaloziella exiliflora*. *C. pyriformis* is not known elsewhere in the Antarctic biome, and *C. exiliflora* is known from only three other (low altitude) areas of continental Antarctica. Other than at a similar geothermal site at the summit of Mt Erebus (protonemata only) this is the highest altitude at which bryophytes have been found in Antarctica. A single unidentified lichen has been observed as a component of black crusts over small areas of warm soil. The unusual occurrence of shallow peat is evidence of bryophyte growth having taken place over at least several decades.

Algae grow over wide areas of the warm ground and on the surface of warm rocks in some fumaroles. The microflora comprises a range of unicellular and filamentous algae, including the green *Chroococcus* sp., *Tolypothrix* sp. and *Stigonema* sp. and the cyanobacteria *Mastigocladus laminosus* and *Pseudococcomyxa simplex*. Thermotolerant and thermophilic micro-organisms have been isolated from the soil. The only invertebrate reported is a testate amoeba, *Corythion dubium*, amongst the vegetation. The occurrence of plant life is made possible only the water droplets formed by the condensation of steam. Very small 'pools' up to c. 50 cm² and about 1 cm deep have been observed on occasions where dripping condensate gathered in small depressions.

Birds. No observations of birds have been made near the summit of the volcano.

ii. Reason for designation. The site is of exceptional scientific interest because of its extensive ice-free geothermal areas, at high altitude, supporting a unique cryptogamic flora and microbiota and accumulations of organic matter. The closest documented, high-altitude fumarolic ground is 400 km to the south of the summit of Mt Erebus (see SSSI No 11, Tramway Ridge Mt Erebus), but there the organisms differ significantly from those on Mt Melbourne. Elsewhere in Antarctica vegetation on steam-warmed ground is known only in low-altitude maritime areas of the Antarctic Peninsula region where, again, the vegetation differs significantly for botanists, microbiologists, volcanologists and geophysicists. Uncontrolled human activity within this area could cause severe damage by trampling of plants, compacting soil and altering soil temperature gradients, changing rates of steam release and possibly causing the introduction of alien micro-organisms and cryptogamic plants.

iii. Outline of research. There has been little previous research activity in the site. The studies that have been undertaken have involved investigations of geothermal and volcanic activity and a survey of the plant and microbial communities. Future research is likely to include studies of soil microbiology and microfauna, vegetation, volcanology and the geophysics of the area. Mt Melbourne was first sighted in 1841 by James Ross and first climbed in January 1967 by a New Zealand party. Since then the summit area has been visited by New Zealand parties in December 1972 and November 1984. The 1984 party surveyed the biota on 'Cryptogam Ridge'. Brief visits were also made in January 1983 by a United States party and more recently by West German (1984/85) and Italian (1985/86) parties.

iv. Date of expiry of designation. 31 December 1997.

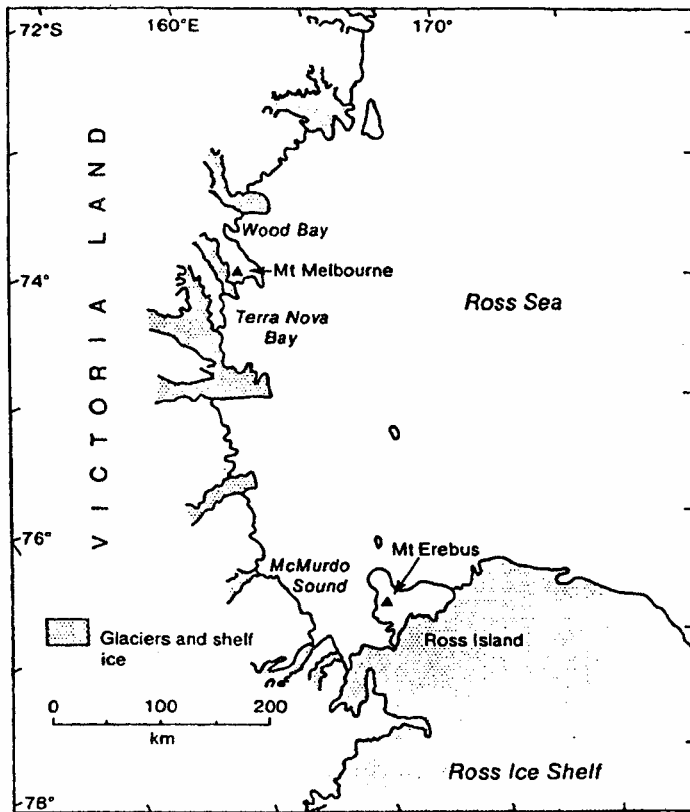
v. *Access points.* Access to the site is normally by helicopter and landings should be made only on the glacier ice in the caldera, thereby avoiding any of the vegetated or other sensitive areas.

vi. *Pedestrian and vehicular routes.* No vehicle should be used within the site. Pedestrians should avoid, whenever possible, walking on any obvious areas of warm ground or disturbing any vegetation. Entry to the 'Cryptogam Ridge' area of the site should be made only from either end of the ridge. Entering the ridge directly up its slopes should be avoided.

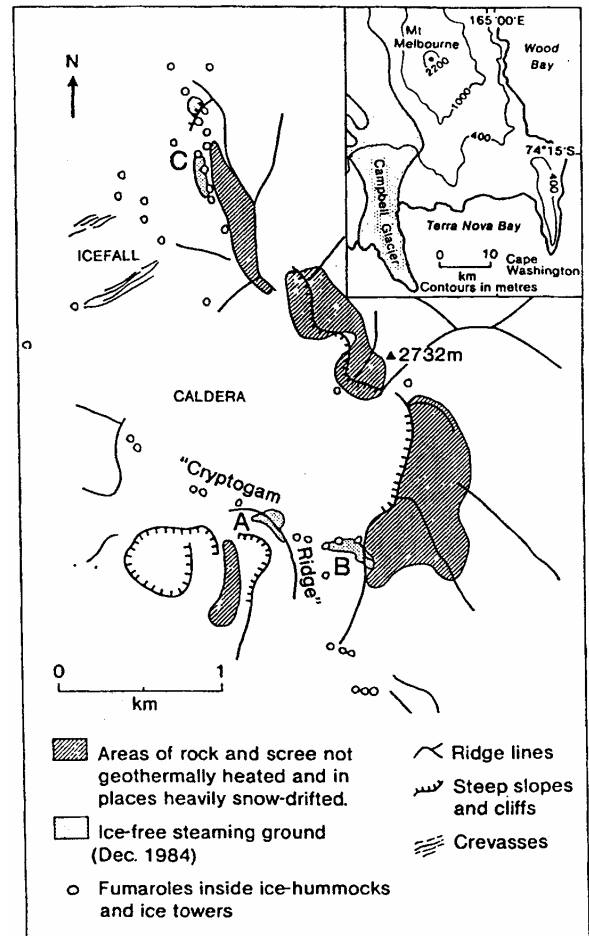
vii. *Other kinds of scientific investigations which would not cause harmful interference.* Low impact studies having a minimal effect on the environment of the site.

viii. *Scientific sampling.* Samples should be taken only for compelling scientific reasons.

ix. *Other restraints.* To prevent the introduction of foreign organisms sterile protective overclothing should be worn and footwear should be sterilized before entering the site. Sterilized sampling equipment should also be used. All wastes should be removed from the site.



SSSI 24, Mount Melbourne



Site of Special Scientific Interest No 25

Extract from the Report of XVIII ATCM

(108) ...An Information Paper (XVIII ATCM/INFO 14 Rev 1) tabled by Australia, provided corrections to the Management Plan for SSSI No. 25. These corrections were accepted by the Meeting as set down in Annex F.

Annex F: Site Description for SSSI 25, Marine Plain, Vestfold Hills, Princess Elizabeth Land

Amendments to the Management Plan for SSSI 25 are shown in bold below:

Physical Features

Under this heading the opening sentence reads “Marine Plain (23.4 km, lat. 68°38’S. long. 78°04’E)...”. This should read:

“Marine Plain (23.4 km², lat. 68°38’S. long. 78°04’E)...”.

The boundary of the site as defined in the second paragraph under this heading should read:

“...commencing at lat. 68°36’30”S, long. 78°09’00”E it runs south easterly to lat. 68°36’45”S, long. 78°10’30”E; then south-easterly to lat. 68°37’30”s, long. 78°12’30”E, then south along the meridian of long. 78°12’30”E to its intersection by the low water mark.....”.

Topography

The penultimate sentence under this heading requires the following alteration:

“...by a marked change in their slope, probably representing **an** old (Holocene?) shoreline.”

Geology

The third sentence under this heading should read:

“Low lying areas consist of at least **8 meters** of early Pliocene....”.

Annex to Recommendation XIV-5

Site of Special Scientific Interest No 25: Marine Plain, Mule Peninsula, Vestfold Hills, Princess Elizabeth Land

Management Plan

i. Description of Site

Physical features. Marine Plain (23.4 km, lat 68°3’S, long 78°08’E) opens into an arm of Crooked Fjord on the southern side of Mule Peninsula, the southernmost of the three major peninsulas which comprise the Vestfold Hills. The Vestfold Hills comprise an essentially ice-free oasis (approx. 400 km²) of bedrock, glacial debris, lakes and ponds at the eastern side of

Prydz Bay, Princess Elizabeth Land. The boundary of the site is as follows: commencing at lat 68°36'30"S, long 78°09'00"E it runs southeasterly to lat 68°36'45"S, long 78°10'30"E; thence southeasterly to lat 68°37'30"S, long 78°10'30"E, then south along the parallel of long 78°12'30"E to its intersection by the low water mark on the northern shore of Crooked Fjord; from here it follows the low water mark of the northern shore of Crooked Fjord to its intersection with the meridian of long 78°03'00"E; thence north along the meridian of long 78°03'00"E to its intersection with the parallel of lat 68°37'30"S, then northeasterly to lat 68°37'00"S, long 78°05'00"E, and finally northeastwards to the point of commencement.

Topography. The site includes Burton Lake (surface at sea level) as a major component of the western part of the region. An extensive low level (less than 20 m above sea level) area occupies the centre of the site with a north-south orientation. In the north-east is another area below 20 m. Areas above 20 m are mostly low, rugged hills of Precambrian rock acting as divides between the lower part and characterized at their base by a marked change in their slope, probably representing an old (Holocene?) shoreline. The surface of the lower areas below 20 m is marked by a series of concave-to-the-south recessional moraine ridges.

Geology. The Precambrian rock consists for the most part of 3000 Ma gneisses from both igneous and metamorphic protoliths intruded in the course of at least three intervals between 1800 and 1375 Ma by numerous metabasalt dykes with a rough north-south orientation. These dykes are a major feature of the Vestfold Hills. Low lying areas consist of at least 8 metres of early Pliocene (40–46 million years) diatomites and, less commonly, lenticular sandstone overlying the Precambrian rock and occupying the sites of what were embayments in the early Pliocene. In the western part of the central area below 20 m a.s.l., the Pliocene deposits are overlain by a thin veneer of Holocene (6490~130 y BP) glacial debris covering an area of 8–10 sq km, in places containing a few molluscs (*Latermula elliptica*) King and Broderip *in situ*. Low scarps in the Pliocene adjacent to small lakes have yielded remains of a new genus, species and probably family, all extinct, of dolphin, and there is evidence of another larger, fossil form.

Meteorology. No data are available from the area, but conditions are similar to those at Davis station, 6 km to the north-west.

Biological features. Terrestrial. Reconnaissance studies have reported few species and no significant stands of vegetation within the site. *Inland waters.* There are many small lakes and ponds. *Marine.* Burton Lake opens to Crooked Fjord at its south-western corner and is affected by tides in summer. It has been the site of biological research for several years. Birds and seals. No bird or seal surveys have been conducted but it is relatively devoid of birds and sea mammals. Wilson's storm petrels (*Oceanites oceanicus*) and snow petrels (*Pagodroma nivea*) occur sporadically and nest in the Precambrian hills.

ii. Reason for designation. The site is of exceptional scientific interest because of its vertebrate fossil fauna. In addition to the dominant important fossils such as molluscs and diatoms, which define the age of the Pliocene marine sediments, the site has yielded well-preserved vertebrate remains of a new species, genus and probably family of fossil dolphin and evidence of at least one other vertebrate species. Burton Lake, as a hypersaline lake which is still in seasonal connection with the sea, presents the opportunity for important limnological research. It represents a unique stage in the biological and physico-chemical evolution of a terrestrial water body from the marine environment. Burton Lake together with several of the smaller lakes, provide important examples of the spectrum of lake types in the Vestfold Hills.

Davis (68°85'S, 77°58'E), a permanently occupied Australian scientific station, is located on Broad Peninsula, the central peninsula of the Vestfold Hills, 6 km to the north-west of the site. It is the focus of continuing biological, including limnological, studies within the Vestfold Hills. As a result of its proximity to Davis station, the scientific value of the site could be diminished by accidental interference. The site lies on the frequently used pedestrian route to the Mule Peninsula lakes (clear, Laternula, Cemetery and McCallum) from Ellis Rapids and it is critical that fossil fauna should be protected from unrecorded sampling or collection.

iii. Outline of research. A palaeontological research programme has commenced following the initial discovery of vertebrate fossils at the site in 1985. The programme consists of the collection of well-preserved fossil molluscs and diatoms and, in particular, fossil vertebrates, with the aim of documenting the fauna of the epoch. Oxygen isotope studies on the well-preserved bivalve fauna will be employed to help quantify water temperature at that time. Burton Lake is the subject of detailed year-round research as part of a programme aimed at understanding the evolution of the hydrological system in the Vestfold Hills, by looking at various stages of isolation from the marine environment.

iv. Date of expiry of designation. 31 December 1997.

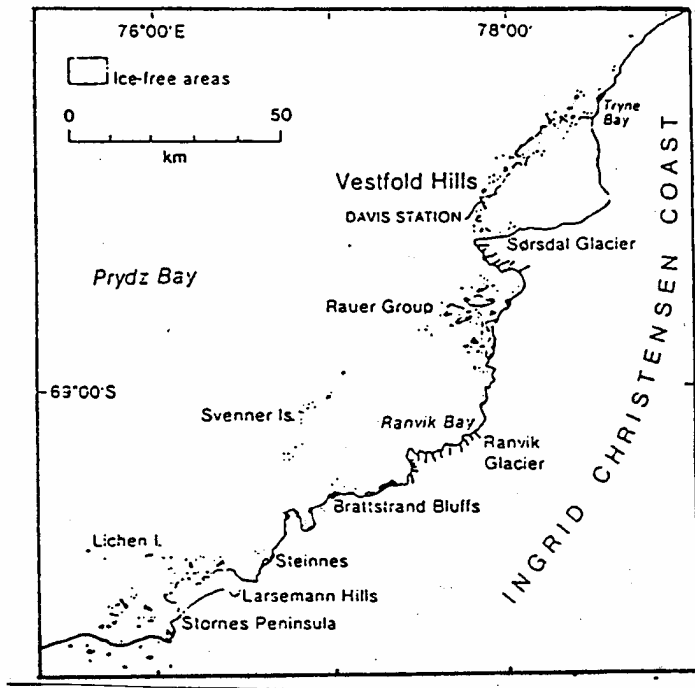
v. Access points. Access should, where possible, be from the sea ice in Ellis Fjord or Crooked Fjord, or by helicopter at places where no disturbance can be caused by the aircraft to water bodies, vegetation or sediment deposits. If these means of access are not possible, access by land, either by vehicle or on foot, should be via Ellis Rapids at the eastern end of Ellis Fjord.

vi. Pedestrian and vehicular routes. Vehicles should not be used within the site except for over-snow travel by motorized toboggan. Pedestrians or vehicles must not damage areas of vegetation, or disturb steep inclines marking sediment outcrops or the lake margins near these outcrops.

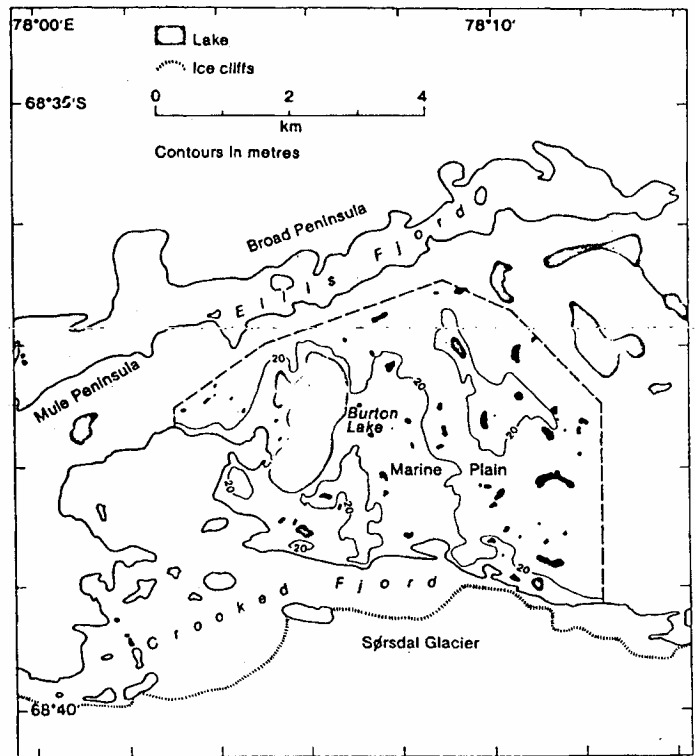
vii. Other kinds of scientific investigations which would not cause harmful interference. Research on the ecology of Wilson's storm petrels, snow petrels, mosses and lichens, and other biota, and investigation of water bodies other than Burton Lake. Other scientific investigations which do not disturb the palaeontological, ecological and limnological programmes being conducted.

viii. Scientific sampling. Scientific sampling should be restricted to that required for the programmes described in (iii) and (vii) above.

ix. Other restraints. All waste materials taken into, or generated within the site should be removed as soon as practicable. No fuel depots should be made within the site, nor should refuelling operations be undertaken. No permanent buildings should be erected within the site. Power boats should not be used on Burton Lake and use of other boats should be restricted to the minimum necessary to support programmes consistent with this plan.



SSSI 25, Marine Plain



Site of Special Scientific Interest No 26

Annex to Recommendation XIV-5

Site of Special Scientific Interest No 26: Chile Bay (Discovery Bay), Greenwich Island, South Shetland Islands

Management Plan

i. Description of the site

Physical features. The site comprises two small areas of benthic habitat in Chile Bay located as follows: Benthic habitat A: Between 50 and 100 m depths and the following coordinates: lat 62°28.9'S long 59°41'12"W, lat 62°29.3'S long 59°41'43"W. Benthic habitat B: Between 100 and 200 m depths and between the following coordinates: lat 62°28.3'S long 59°40'15"W, lat 62°28.7'S long 59°40'47"W. The bottom of both sites consists of coarse to fine silt. The lithological and mineralogical composition of the sediments show their provenance from the outcrops and littoral deposits surrounding Chile Bay, i.e., porphyritic andesite, aphanitic andesite, diorite and andesitic volcanic breccia and tuffs. This material is transported to the coastline mainly by glaciers, solifluction and mud flows. These processes are intensified in the inner part of the bay where the glacier terminates. Chile Bay has a transverse submarine barrier, possibly a submerged moraine, separating habitats A and B and dividing the bay into an inner and an outer part. Sediments in the inner bay are protected from the action of waves and currents, thereby preserving the grain size distribution, sorting and shape of the contained material.

Biological features. The benthic assemblages have high species diversity and biomass. Bottom topography and sediment features influence the structure of the communities and distribution pattern. Two assemblages have been recognized: one, dominated by the polychaete *Maldane sarsi antarctica*, is located in the outer part of the bay, mainly below 100 m depth; other characteristic species are *Genaxinus bongranii*, *Cyamonactra denticulum*, *Typhlotanais greenwichensis* and *Pycnogonida* spp. The inner assemblage, on the other hand, is not dominated by any one species but contains *Yoldia eightsii* and *Eudorella gracilor* as characteristic fauna.

ii. Reason for designation. In Chile Bay there has been continued quantitative and qualitative benthic research since 1967. Data being accumulated provide a baseline for long-term investigations. The site is of exceptional scientific interest and therefore requires long-term protection from possible harmful interference.

iii. Outline of research. A long-term research program was started in 1967 in connection with the study of benthic fauna re-establishment within Port Foster, Deception Island, following the volcanic eruption of December 1967. Chile Bay has been designated a control area. These studies are performed yearly in the summer. Community studies to observe biota changes will be augmented with other relevant studies to suit the requirements of a long-term biological monitoring programme.

iv. Date of expiry of designation. 31 December 1997.

v. Access points. Although access points as such are not applicable, free passage of ships through these areas is not in any way prejudiced.

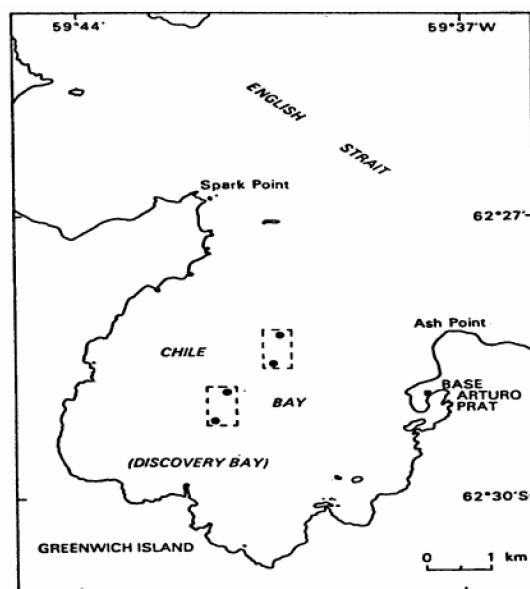
vi. Pedestrian and vehicular routes. Not applicable.

vii. Other kinds of scientific investigations that would not cause harmful interference. Scientific research other than that disturbing benthic habitats and communities.

viii. Scientific sampling. Samples from the benthic habitats should be taken only for compelling scientific purposes.

ix. Other restraints. The dumping of waste from ships and bottom hauling should be avoided. Anchoring should be avoided except in compelling circumstances. Siting of bottom devices should be avoided.

SSSI 26, Chile Bay



Site of Special Scientific Interest No 27

Annex to Recommendation XIV-5

Site of Special Scientific Interest No 27: Port Foster, Deception Island, South Shetland Islands

Management Plan

i. Description of the site

Physical features. The site comprises two small areas of benthic habitat located in Port Foster as follows: Benthic habitat A: between 50 and 150 m depths and the coordinates: lat 62°55.5'S long 60°38'00"W, lat 62°56.2'S long 60°37'00"W. Benthic habitat B: between 100 and 150 m depths and the coordinates: lat 62°57.2'S long 60°37'20"W, lat 62°57.9'S long 60°36'20"W. Deception Island is a caldera formed by subsidence of a group of Cenozoic volcanoes superimposed along radial faults. Port Foster is an almost entirely enclosed body of water which receives large volumes of fresh water during periods of melt. In several places there is geothermal activity. The bottom of habitat A consists of coarse to medium-sized, poorly sorted volcanic sediment, and that of habitat B of medium to fine, better sorted volcanic ash.

Biological features. The composition of the benthic assemblages has varied greatly since the volcanic eruption of December 1967. The most recent data indicate a high dominance of polychaetes, both in terms of numbers and biomass. The most conspicuous macrofauna in dredge samples include the nemertean *Lineus* sp and *Paraborlasia corrugatus*, the isopod *Serolis kemp*, the bivalve *Yoldia eightsii*, the echinoids *Abatus agassizi* and *Sterechinus neumayeri*, the asteroids *Lysasterias perrieri* and *Odontaster validus*, the ophiuroid *Ophionotus victoriae* and the holothurian *Ypsilothuria* sp.

ii. Reason for designation. The area is of exceptional ecological interest because of its actively volcanic character. The two habitat areas are subject to long-term research programmes and the purpose in designating them is, as far as possible, to reduce the risk of accidental interference which could jeopardize these scientific investigations.

iii. Outline of research. Following the volcanic eruption of December 1967 at Deception Island, a long-term programme of research was initiated at Port Foster to study the mechanism and paths of the re-establishment of the benthic communities. Community studies to observe biota changes, augmented with other relevant studies to suit the requirement of a long-term biological monitoring programme, are performed periodically.

iv. Date of expiry of designation. 31 December 1997.

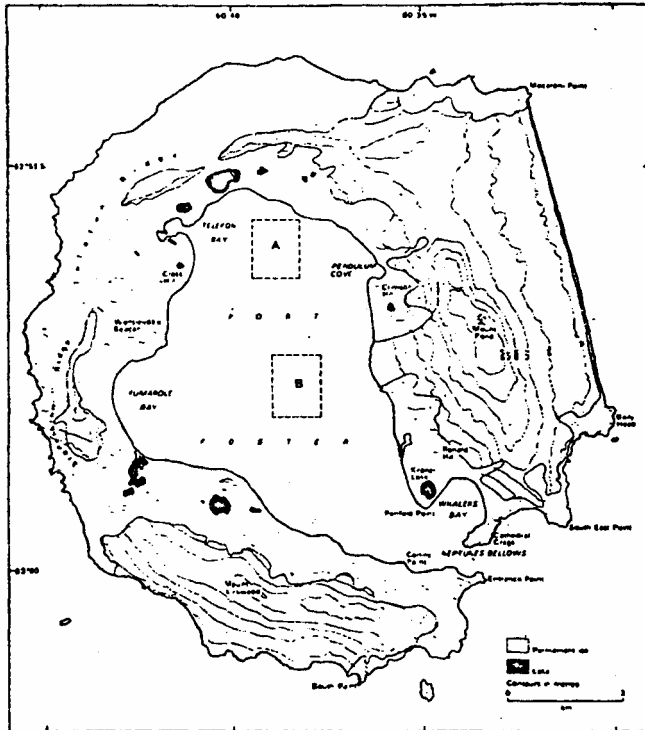
v. Access points. Although access points as such are not designated, free passage of ships through these areas is not in any way prejudiced.

vi. Pedestrian and vehicular routes. Not applicable.

vii. Other kinds of scientific investigation that would not cause harmful interference. Scientific research other than that disturbing benthic habitats and communities.

viii. Scientific sampling. Samples from the benthic habitats should be taken only for compelling scientific purposes.

ix. *Other restraints.* The dumping of waste from ships and bottom trawling should be avoided. Anchoring should be avoided except in compelling circumstances. Siting of bottom devices should be avoided.



SSSI 27, Port Foster

Site of Special Scientific Interest No 28

Annex to Recommendation XIV-5

Site of Special Scientific Interest No 28: South Bay, Doumer Island, Palmer Archipelago

Management Plan

i. Description of site

Physical features. Doumer Island lies at the south-west entrances to Neumayer Channel. It is separated from Wiencke Island by the Peltier Channel. South Bay lies on the south coast of Doumer Island. The site consists of a small area of coastal and sub-tidal benthos down to 45 m depth as follows: lat 64°51'42"S to the north, between long 63°34'00"W and long 63°35'20"W, and to the south by a diagonal line that starts at a point 100 m north of the Refuge (Sub-base Yelcho) on the southern shore of South Bay and extends to lat 64°51'58"S and long 63°34'00"W. Boundaries are shown on the attached map.

Biological features. Four different kinds of bottom surface have been described: rocky with algae growth, from 0 to 30 m depth; predominantly rock, covered by algae, silt and large quantities of sponges, from 30 to 110 m depth; mixed bottoms with predominantly deposits of mud and few rock outcrops with sponges, from 100 to 150 m depth; soft bottoms of silt and mud, from 150 to 200 m depth, corresponding to the deepest depression, occurs near the centre of the bay just outside the site. The benthic macrofauna richness increases with depth and is accentuated in bottoms with a steep slope. Ice scour exerts a strong influence on the

patterns of distribution and the abundance of benthic fauna. Seals, in particular Weddell seals *Leptonychotes weddellii*, visit the area to feed. Cetaceans, like killer whales, *Orcinus orca* and humpback whales *Megaptera novaeangliae* enter the bay. Many Antarctic seabirds occur transiently in the site.

ii. *Reason for designation.* The site is the subject of a long-term research program on marine ecology and the purpose of designating it is to reduce, as far as is possible, the risk of accidental interference which might jeopardize these scientific investigations.

iii. *Outline of research.* The research covers the study of the relationships of the marine organisms in the area. This was started by SCUBA diving in 1972. Since 1981 advanced experiments to elucidate community structure and functioning have been in progress and will continue in the future.

iv. *Date of expiry of designation.* 31 December 1997.

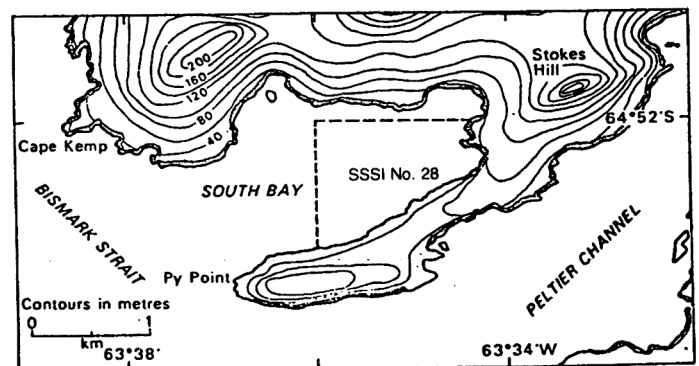
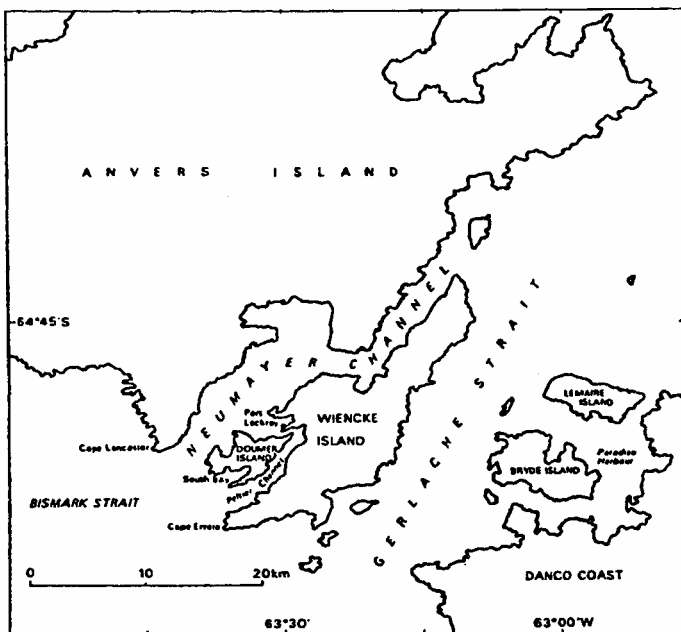
v. *Access points.* None specified. The area is not affected by the passage of boats.

vi. *Pedestrian and vehicular routes.* Not applicable.

vii. *Other kinds of scientific investigation that would not cause harmful interference.* Scientific research other than that disturbing benthic habitats and communities.

viii. *Scientific sampling.* Collection of samples should be made only for compelling scientific reasons.

ix. *Other restraints.* The dumping of wastes from ships or boats and bottom trawling should be avoided. Anchoring should be avoided except for compelling reasons.



SSSI 28, South Bay

Site of Special Scientific Interest No 29

Annex to Recommendation XV-6

Site of Special Scientific Interest No 29: Ablation Point-Ganymede Heights, Alexander Island

1. *Geographical location.* The Ablation Valley-Ganymede Heights massif and its valley systems (70°49'S, 68°25'W) is situated on the mid-east coast of Alexander Island overlooking the shelf ice of George VI Sound and about 120 km from open sea to the north.

2. *Management plan*

i. Description of site. The Site extends from lat. 70°45' to lat. 70°55' and from long. 68°40'W to the George VI Sound coastline. The largely ice-free area comprises three main and two lesser valley systems separated by often precipitous ridges and plateaux 650–760 m high. The site is bounded by Grotto Glacier to the north, Jupiter Glacier to the south and west, and George VI Sound to the east. The area extends 18 km from north to south and 10 km from east to west, rising to a maximum altitude of 1070 m.

ii. Reason for designation. The Site represents one of the largest ablation areas in West Antarctica. It has a complex geology, the main rock types being conglomerates, arkosic sandstones and shales with subordinate pebbly mudstones and sedimentary breccias. The base of the succession is formed of a spectacular *mélange*, including large blocks of lava and agglomerate. This outcrops on the valley floors and at the base of several cliffs. It possesses a wide range of geomorphological features including raised beaches, moraine systems and patterned ground. There are several permanently frozen freshwater lakes and many ice-free ponds supporting a diverse flora (including aquatic bryophytes) and fauna. There are a few major streams and many smaller ones in summer. The vegetation is generally sparse, with a unique moss and liverwort-dominated community type being restricted to 'oases' where water issues from otherwise dry barren hillsides. The terrestrial and freshwater ecosystems are vulnerable to human impact and therefore merit protection from uncontrolled human presence.

iii. Outline of research. Several detailed geological, geomorphological, glaciological and limnological studies have been made by British Antarctic Survey scientists within the Site and it is proposed to undertake terrestrial ecological research throughout the area.

iv. Date of expiry of designation. 31 December 1999

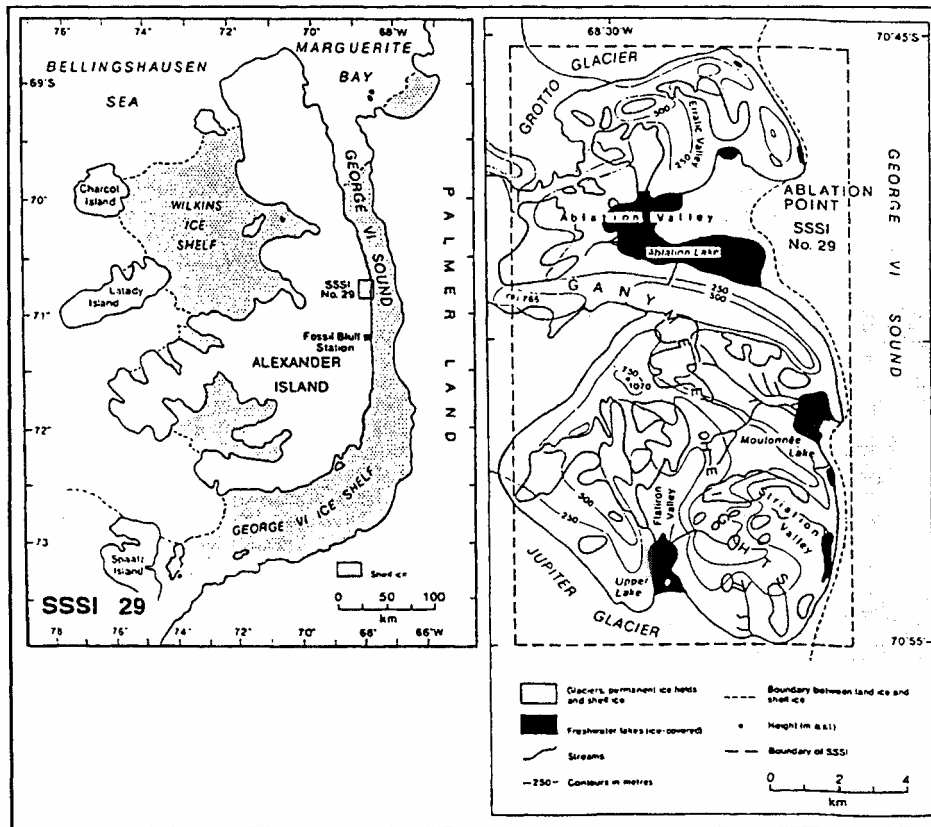
v. Access points. None specified, but the most convenient point is by landing on Ablation Lake. Access is not possible from the shelf ice of George VI Sound because of the dangerous and variable condition of the pressure ice.

vi. Pedestrian and vehicular routes. Vehicles may be used on land with the utmost care, avoiding areas of vegetation, patterned ground and streams whenever possible. Pedestrians should avoid, as far as possible, areas of oasis vegetation, patterned ground, streams and lake margins.

vii. Other kinds of scientific investigations which would not cause harmful interference. None specified.

viii. *Scientific sampling.* Scientific sampling within the Site should be minimal and restricted to that which can be accomplished as far as possible without introducing new organisms, including micro-organisms, and without disturbing the environment.

ix. *Other restraints.* All materials, including combustibles, introduced into the Site should be removed after each visit. Solid human waste should be disposed of into the sea through tide cracks.



SSSI 29, Ablation Point

Site of Special Scientific Interest No 30

Note: Designation of SSSI No. 30, Avian Island, established by Recommendation XV-6 was terminated, and its redesignation as SPA No. 21 was initiated by Recommendation XVI-4. [see under SPA No. 21 for the text of XVI-4]

Annex to Recommendation XV-6

Site of Special Scientific Interest No 30: Avian Island, North-West Marguerite Bay

1. *Geographical location.* Avian Island (67°46'S, 68°54'W) lies c. 1 km south of the south-west tip of Adelaide Island in north-west Marguerite Bay.

2. Management plan

i. *Description of site.* The Site consists of Avian Island together with its littoral zone. It is 1.45 km long by 0.8 km at its widest, and rises to about 45 m altitude. It is largely ice-free in summer and there are several shallow melt pools, the largest being on the eastern raised beach

area. Excluded from the Site is the north-western corner of the island where there is a small refuge hut; this area is bounded by a line extending from the north-east end of the southern of two long inlets at the north-west of the island, due north over the western slope of a low rocky hill, to the north coast of the island. All land to the west of this line is not included in the Site.

ii. Reason for designation. The Site is exceptional for its abundance and diversity of breeding seabirds (e.g. Adelie penguins, *Pygoscelis adeliae*, about 40,000 pairs; blue-eyed shags, *Phalacrocorax atriceps*, about 300 pairs; southern giant petrels, *Macronectes giganteus*, about 200 pairs; dominican gulls, *Larus dominicanus*, about 60 breeding pairs, total adult birds about 200; south polar skuas, *Catharacta maccormicki*, 30 breeding pairs, total adult birds about 200; Wilson's storm petrels, *Oceanites oceanicus*, several hundred pairs). The giant petrel colony is the farthest south known breeding population, while the blue-eyed shags are very close to the southern limit of their breeding range. Avian Island is therefore of outstanding ornithological importance and merits protection from unnecessary human disturbance.

iii. Outline of research. None currently proposed but protection is justified to safeguard the avian populations from potential tourist visits and other disturbance, for the reasons outlined in (ii).

iv. Date of expiry of designation. 31 December 1999.

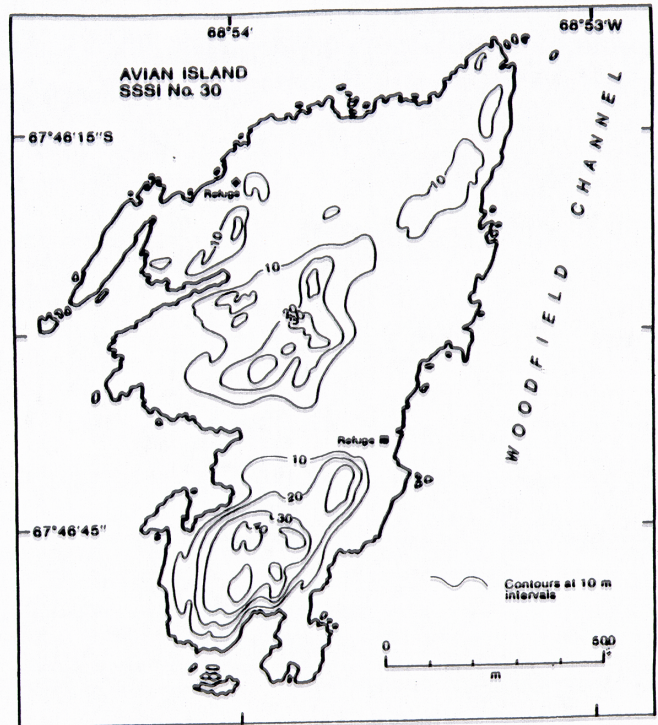
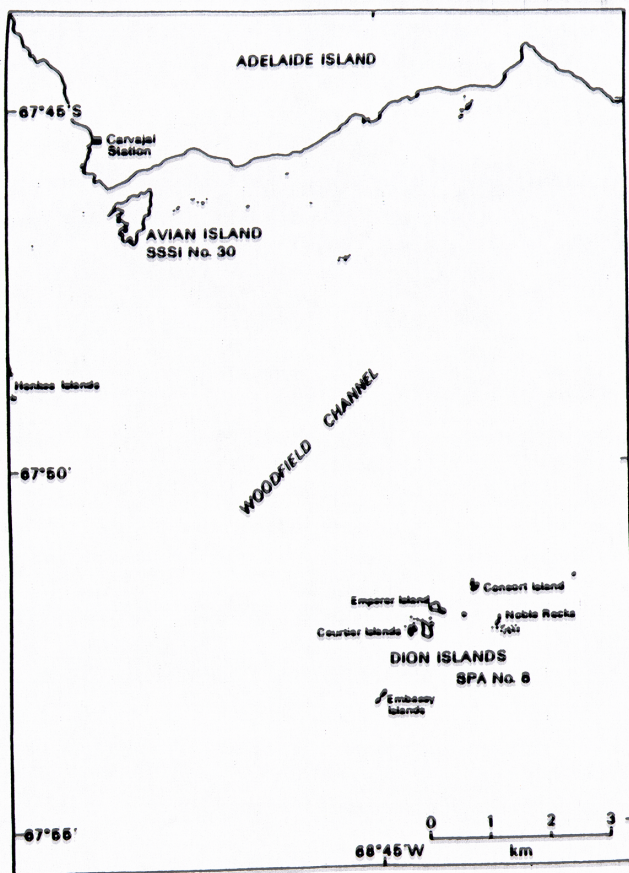
v. Access points. None specified.

vi. Pedestrian and vehicular routes. Vehicles should not be used within the Site. No pedestrian routes need to be marked, but every care must be taken to avoid unnecessary disturbance of the avifauna. No helicopter landings should be made anywhere on the island.

vii. Other kind of scientific investigations which would not cause harmful interference. None specified.

viii. Scientific sampling. All activities involving banding, capture, killing, etc. of any birds must conform with the Agreed Measures for the Conservation of Antarctic Fauna and Flora. Any other sampling should be restricted to the minimum required for the purpose of the respective studies.

ix. Other restraints. None specified.



SSSI 30, Avian Island

Site of Special Scientific Interest No 31

Annex to Recommendation XV-6

Site of Special Scientific Interest No 31: Mount Flora, Hope Bay, Antarctic Peninsula

1. *Geographical location.* Mount Flora (63°25'S, 57°01'W) is situated about 1 km south of Hope Bay and about 1 km south-east of the Argentine station Esperanza, at the northern tip of Trinity Peninsula.

2. *Management Plan.*

i. *Description of Site.* The Site comprises the upper slopes of Mount Flora above 250 m altitude where the plant-beds of sandstone and siltstone outcrops as a distinct black band between the lower band of conglomerates and light coloured volcanic rocks which cap the mountain.

ii. *Reason for designation.* 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 stratigraphic 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. For this reason the Site merits urgent protection.

iii. *Outline of research.* None specified. Designation as an SSSI is justified by the exceptional scientific interest of the site and the vulnerability of its fossils to over collecting.

iv. *Date of expiry of designation.* 31 December 1999.

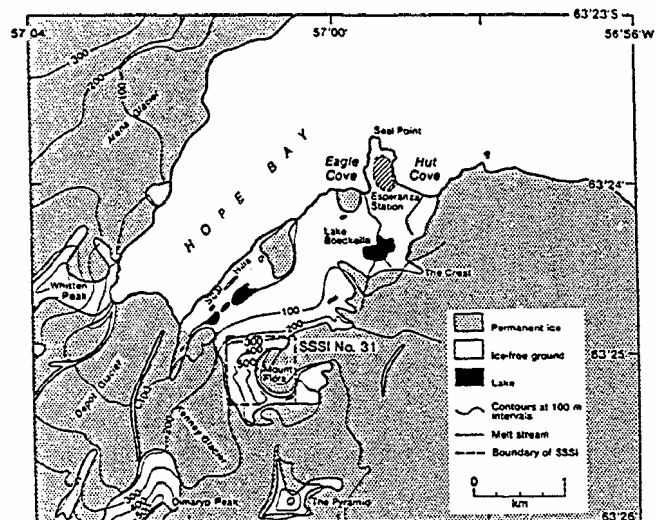
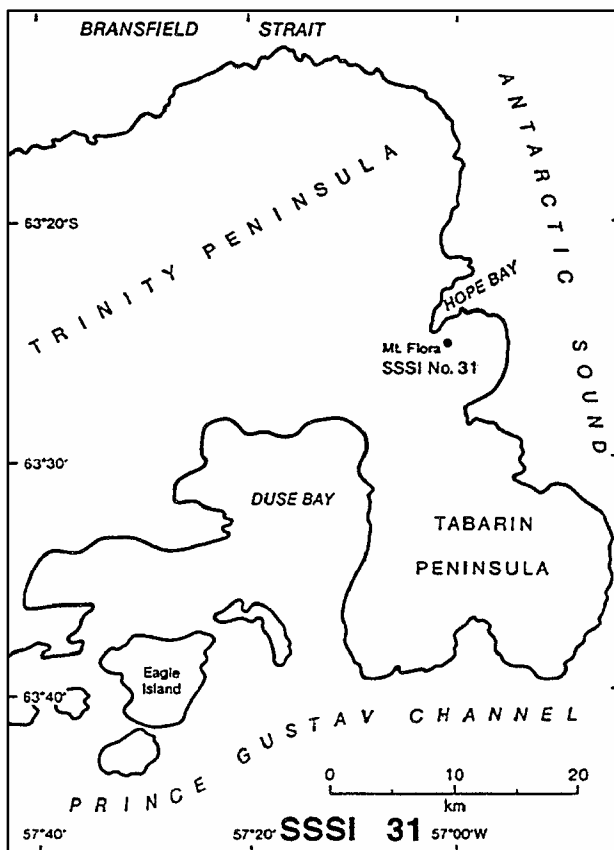
v. *Access points.* None specified.

vi. *Pedestrian and vehicular routes.* None specified.

vii. *Other kinds of scientific investigations which would not cause harmful interference.* None specified.

viii. *Scientific sampling.* The collection of fossiliferous rocks should be restricted to the minimum required for the proposed research studies. Unnecessary destruction of in situ rock and boulders should be avoided.

ix. *Other restraints.* None specified.



SSSI 31, Mount Flora

Site of Special Scientific Interest No. 32

Note. Cape Shirreff was originally designated as SPA No. 11 by Recommendation IV-11. Its designation as an SPA was terminated, and its designation as an SSSI was initiated by Recommendation XV-7. [see under SPA No. 11 for the text of IV-11]

Annex to Recommendation XV-7

Site of Special Scientific Interest No. 32: Cape Shirreff, Livingston Island, South Shetland Islands

1. Geographical location. Cape Shirreff is a low, ice-free peninsula towards the western end of the north coast of Livingston Island, situated at latitude 62°27'S, longitude 60°47'W, between Barclay Bay and Hero Bay. Telmo Island is the largest of a small group of ice-free rock islets, approximately 2 km west of Cape Shirreff.

2. Management plan

i. Description of site. The Site includes the entire area of the Cape Shirreff peninsula north of the glacier ice tongue margin, and most of the Telmo Island group (see map).

ii. Reason for designation. The presence of both Antarctic fur seal and penguin breeding colonies, and of krill fisheries within the foraging range of these species, make this a critical site for inclusion in the ecosystem monitoring network being established to help meet the objectives of the Convention on the Conservation of Antarctic Marine Living Resources. The purpose of the designation is to allow planned research and monitoring to proceed, while avoiding or reducing, to the greatest extent possible, other activities which could interfere with or affect the results of the research and monitoring programme or alter the natural features of the Site.

iii. Outline of research. Long-term studies are being planned better to assess and monitor the feeding ecology, growth and condition, reproductive success, behaviour, vital rates, and abundance of pinnipeds and seabirds that breed in the area. The results of these studies will be compared with environmental data, offshore sampling data, and fishery statistics to identify possible cause-effect relationships.

iv. Date of expiry of designation. 31 December 1999.

v. Access points. The Cape Shirreff part of the Site may be entered at any point where pinniped or seabird rookeries are not present on or near the beach. Access to the islands in the Telmo group is unrestricted but should be at the least densely populated areas and cause minimal disturbance to the fauna. Access for other than the aforementioned types of research should avoid disturbing pinnipeds and seabirds.

vi. Pedestrian and vehicular routes. Boats, helicopters, fixed-wing aircraft and land vehicles should avoid the Site except for operations directly supporting authorized scientific activities. During these operations, boats and aircraft should travel routes that avoid or minimize disturbance of pinnipeds and seabirds. Land vehicles should not be used except to transport

needed equipment and supplies to and from the field camp to be established. As far as possible, establishment and resupply of the field camp should be done before or after the pinniped and seabird breeding seasons. Pedestrians should not walk through wildlife population areas, especially during the breeding season, or disturb other fauna or flora except as necessary to conduct authorized research.

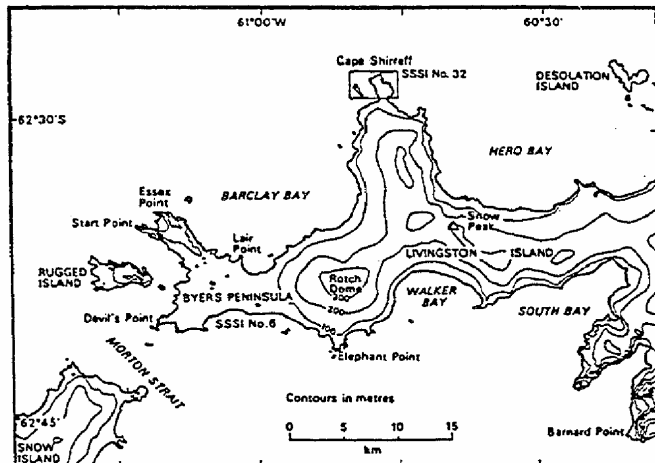
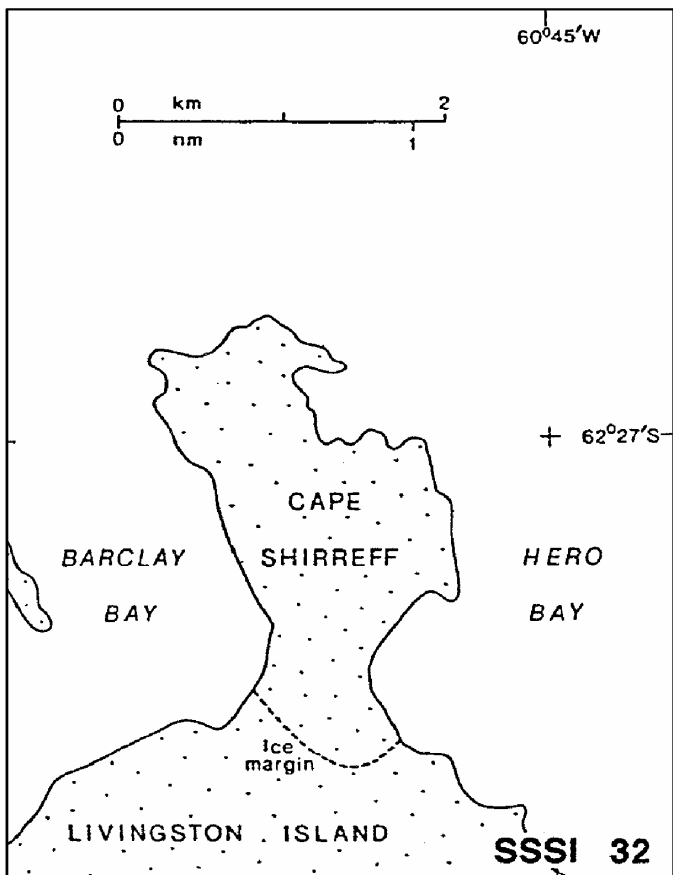
vii. Other kinds of scientific investigations which would not cause harmful interference

Geological, glaciological, and other studies which can be done outside of the pinniped and seabird breeding seasons, and which will not damage or destroy pinniped or seabird breeding areas, or access to those areas, would not adversely affect the planned assessment and monitoring studies. Likewise, the planned assessment and monitoring studies would not be affected adversely by periodic biological surveys or studies of other species which do not result in killing, injuring or disturbing pinnipeds or seabirds, or damage or destroy pinnipeds or seabird breeding areas or access to those areas.

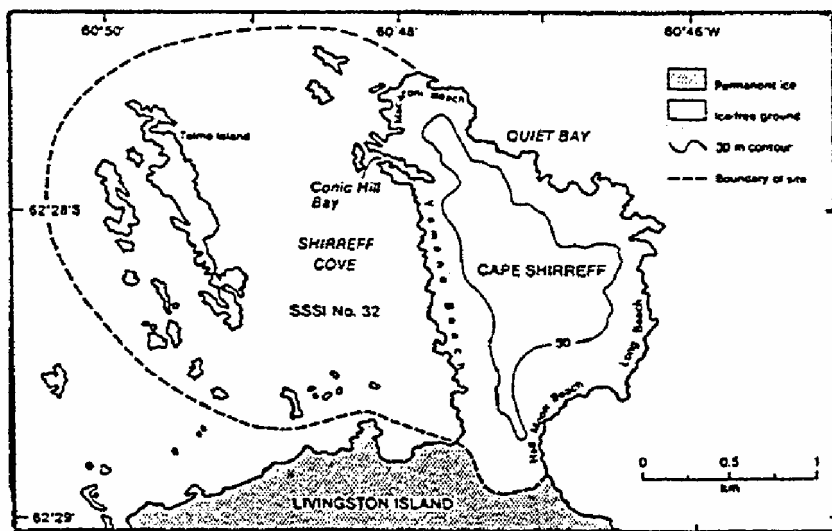
viii. Scientific sampling. Killing, capturing, handling, photographing, and taking eggs, blood, or other biological samples from pinnipeds and seabirds should be limited to that necessary to characterize and monitor individual and population parameters that may change in detectable ways in response to changes in food availability or other environmental factors. Sampling should be done and reported in accordance with: 1) the Agreed Measures for the Conservation of Antarctic Fauna and Flora, and 2) the Convention for the Conservation of Antarctic Seals.

ix. Other restraints.

- a. Only structures directly supporting authorized scientific research and monitoring programmes may be built within the Site to house research personnel and their equipment, and shall be occupied only within the period 1 September to 1 June.
- b. All non-burnable or non-biodegradable materials brought to the Site should be removed when no longer in use. Landfill disposal of non-biodegradable materials, and the burning of non-organic materials, is not permitted.



SSSI 32 Cape Shirreff



Site of Special Scientific Interest No. 33

Annex 1 to Recommendation XVI-2

Site of Special Scientific Interest No. 33: Ardley Island, Maxwell Bay, King George Island

1. Geographical location: Ardley Island (62°13'S, 58°54'W) is situated about 500 m east of the coast of Fildes Peninsula, Maxwell Bay, King George Island. It is about 1 km south-east of the Soviet station Bellingshausen and the Chilean station Teniente Marsh, and about 0.5 km east of the Chinese station Great Wall.

2. Management Plan

i. Description of Site. The Site comprises the entire island and its associated littoral zone, including the isthmus between the island and Fildes Peninsula to the west. The island is about 2.0 km long and 1.5 km at its widest, and rises to about 50 m altitude. It comprises mainly Tertiary andesitic-basaltic lavas and tuffs, and there are some raised beach terraces. It is snow- and ice-free in summer. There is a small (about 100 m long) freshwater pond on the south-west of the island. There is a refuge hut (FRG) near Braillard Point, and two more refuge huts (Argentina, Chile) are situated near the middle of the northern coast of the island, the latter comprising several huts.

ii. Reason for Designation. The Site is of exceptional biological interest. It has a diverse avifauna with 12 breeding species, and is of particular importance for its breeding colonies of Gentoo penguins (*Pygoscelis papua*); the average number of breeding pairs is about 4,000 which is the largest concentration of Gentoos within the South Shetland Islands and probably in the Antarctic. There are also about 1,200 pairs of breeding Adélie penguins (*Pygoscelis adeliae*) and a small number of Chinstrap penguins (*P. antarctica*). Other breeding species of particular importance are Southern Giant petrels (*Macronectes giganteus*), Wilson's storm petrels (*Oceanites oceanicus*) and Black-bellied storm petrels (*Fregatta tropica*).

The island possesses some of the best-developed and most extensive plant communities in the South Shetland Islands, notably the climax fellfield ecosystem dominated by macro lichens (*Himantormia lugubris*, *Usnea* spp.). Such vegetation is extremely sensitive to human intervention and is very easily damaged.

iii. Outline of Research. Detailed ornithological and botanical research has been undertaken on Ardley Island for many years by Chilean, FRG and GDR scientists, with brief studies made also by scientists from other national stations in the area.

Results of a 10-year census and breeding study, commencing in 1979, of pygoscelid penguins have revealed large between-season fluctuations in numbers and the breeding success of each species. Also, the Giant petrel breeding population has declined by about 80% in recent years. There is strong evidence that these population fluctuations are a direct response to disturbance by large numbers of visitors and to vehicles and low-flying aircraft. The effects of these impacts will continue to be monitored as an integral part of the long-term ornithological research being undertaken at this site.

Detailed investigations of the phytosociology of the island's vegetation and of the physiology of selected lichen species have been undertaken. Further terrestrial botanical, zoological and littoral research is planned. Because of the extreme importance of this area to biological research it is imperative that it is protected from the severe threat of human intervention so as to minimise its impact on this exceptional ecosystem.

iv. Date of expiry of designation. 31 December 2001

v. Access points. None specified, although not more than five persons should enter the site from the sea anywhere east of a north–south line running through the beacon on the mid-north coast of the island.

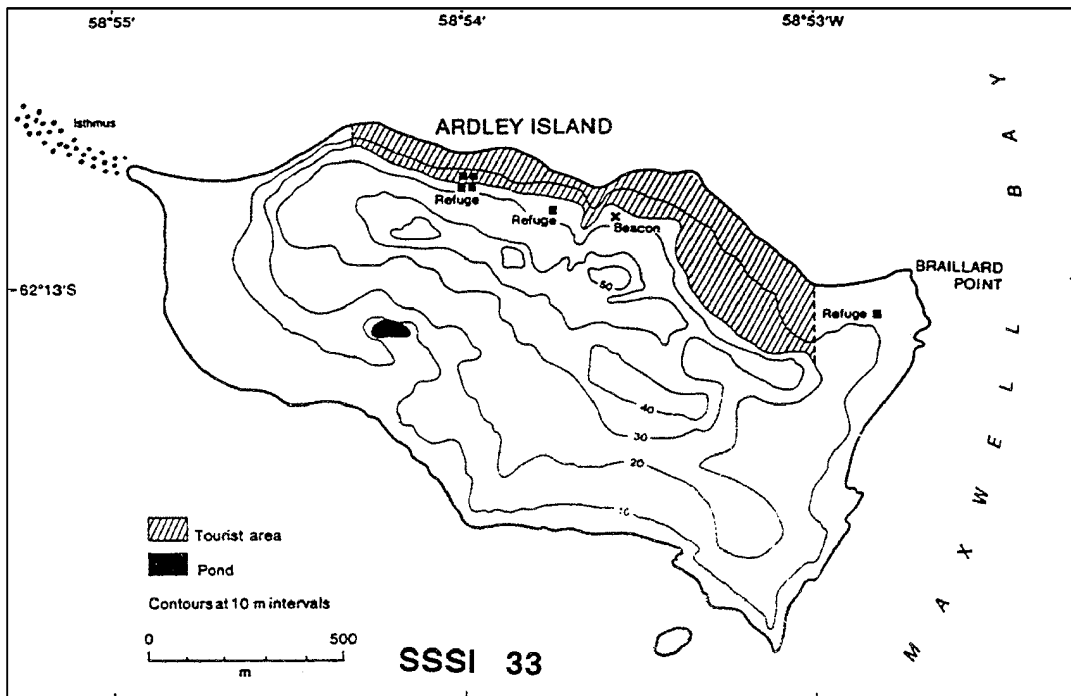
vi. Pedestrian and vehicular routes. Pedestrian activity should be restricted whenever possible to areas with minimal vegetation, and should avoid any bird breeding sites, except as required for approved research studies. Tourists and non-scientific station and ship personnel should visit only the area designated for this purpose (see (ix)) in order to minimise disturbance of biota. The use of any type of vehicle, including amphibious craft on land, is not permitted. Helicopters should not land on or overfly the island below 300 m altitude. Aircraft landing at and taking off from Teniente Marsh airfield should avoid overflying the island.

vii. Other kinds of scientific investigations which would not cause harmful interference

Other scientific investigations may be permitted as long as they cause minimum impact on the biota and ecosystems. All markers and structures associated with field experiments must be removed as soon as the research is completed.

viii. Scientific sampling. All activities involving banding, capture, killing, etc of any bird must conform with the Agreed Measures for the Conservation of Antarctic Fauna and Flora. Any other sampling should be restricted to the minimum required for the purpose of the respective studies.

ix. Other restraints. Large groups of visitors to the Site should be limited to a maximum of 20 persons at any time. Such groups of persons should have access only to the ‘tourist area’ marked on the map, i.e. the north coast of the island as far as 300 m west of Braillard Point and 300 m west of the Chilean refuge, up to an altitude of 20 m above sea level. Groups should be accompanied by a guide, provided from the national station approving the visit, who will be responsible for their conduct and who is fully conversant with the Site Management Plan, the Agreed Measures for the Conservation of Antarctic Fauna and Flora, and the current research programmes. There should be no access for dogs whether or not they are required for sleding purposes. All human waste materials should be removed from the Site and returned to the Station of origin; no combustible materials should be incinerated within the site.



SSSI 33, Ardley Island

Site of Special Scientific Interest No. 34

ATSCM XII: Annex to Measure 1(2000)

Management Plan for Site of Special Scientific Interest No. 34:

Lions Rump, King George Island, South Shetland Islands

1. Description of Values to be Protected

The Area was originally designated as a Site of Special Scientific Interest in Recommendation XVI-2 (1991, SSSI No. 34) after a proposal by Poland on the grounds that it contains diverse biota and geological features and is a representative example of the terrestrial, limnological, and littoral habitats of the maritime Antarctic. The Area is designated primarily to protect the site's ecological values. It is also valuable as a reference site with its diverse avian and mammalian Antarctic fauna, against which disturbance at other site can be measured.

The grounds are still relevant. There is rich lichen flora and frequent stands of *Colobanthus quitensis* and *Deschampsia antarctica*. There are colonies of Adélie Penguin (*Pygoscelis adeliae*), Gentoo Penguin (*Pygoscelis papua*) and Chinstrap Penguin (*Pygoscelis antarctica*) and breeding areas of nine other birds: Giant Petrel (*Macronectes giganteus*), Cape Pigeon (*Daption capense*), Wilson's Storm Petrel (*Oceanites oceanicus*), Black-bellied Storm Petrel (*Fregatea tropica*), Sheathbill (*Chionis alba*), McCormick's Skua (*Catharacta maccormicki*), Antarctic Skua (*Catharacta antarctica*), Dominican Gull (*Larus dominicanus*), and Antarctic Tern (*Sterna vittata*). Furthermore, Elephant Seals (*Mirounga leonina*), Weddell Seals (*Leptonychotes weddelli*), and Fur Seals (*Arctocephalus gazella*) breed on the beaches.

In the littoral zone of the Area approximately 13 taxa of benthic macroalgae are represented. The *Rhodophyta* are represented by 5 species, *Chlorophyta* by 5 species and *Phaeophyta* by 3 species. Macroalgae colonize King George Bay to depths of 90-100 m. Both considerable abundance and biomass values of benthic fauna were noted. Bivalve molluscs are clearly dominant. Both *Amphipoda* and *Polychaeta* contribute significantly to benthic fauna abundance. The species composition and proportion of endemics indicate that King George Bay is transitional between Subantarctic and coastal zone of the Antarctic continent.

The Area includes several features of geological interest, such as raised beaches, Tertiary lavas and tuffs with brown coal intercalations, and silicified wood fragments.

The Area takes its name from the distinctive rocky hill lying between the southern extremity of King George Bay and Lions Cove.

The values to be protected are those associated with an example of a site which has been subjected to minimal disturbance by human activity, except for occasional monitoring studies of the mammal and bird populations, and geological and geomorphological studies.

2. *Aims and Objectives*

Management of the Area aims to:

- protect all bird colonies and seal breeding areas against unnecessary and potentially damaging human activities
- ensure that sites of geological and geomorphological interest be protected from oversampling and fragile vegetation cover be protected against pedestrian activity;
- undertake essential management activities necessary to protect the values of the site;
- avoid degradation of, or substantial risk to, the littoral and limnological values of the Area.

3. *Management Activities*

Ensure that the biological condition of the Area is adequately monitored, preferably by non-invasive methods, and that any sign-boards and boundary markers are serviced.

4. *Period of Designation*

The Area is designated for an indefinite period.

5. *Maps*

Map A shows the location of King George Island in Antarctica.

Map B shows the Lions Rump, Site of Special Scientific Interest (SSSI) No. 34, in relation to King George Island.

Map C shows the Area in greater detail.

Map D Vegetation map of the Area.

Map E Geological map of the Area.

6. *Description of the Area*

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

The site is located on the southern coast of King George Bay, King George Island, in the South Shetlands Islands. It is described as all the land and sea falling within the area bounded by the following co-ordinates:

62°07'48"S, 58°09'17"W;

62°07'49"S, 58°07'14"W;

62°08'19"S, 58°07'19"W;

62°08'16"S, 58°09'15"W.

The Area includes the littoral and sublittoral zones extending from the eastern end of Lajkonik Rock to the most northerly point of Twin Pinnacles. From this point the boundary extends to the easternmost end of the columnar plug of Lions Head to the east of White Eagle Glacier. On land, the Area includes the coast of raised beaches, freshwater pools and streams on the south side of King George Bay, around Lions Cove, and the moraines and slopes which lead to the lower ice tongue of White Eagle Glacier, then westward to a small moraine which protrudes through the ice cap south-east of Sukiennice Hills.

The ice-free area exhibits a range of geomorphological features, including beaches of various width and length, moraines, hills and inland rocks. The highest point rises to an altitude c. 190 m.

Geologically, Lions Rump consists of Tertiary lavas and tuff containing thin brown coal intercalations and petrified wood fragments. The front of White Eagle Glacier is marked by large, dome-shaped moraine ridges belonging to several Holocene stages of glacier advance and retreat.

Large numbers of penguins breed throughout the Area. There were: 7825 pairs of Adelie penguin (*Pygoscelis adeliae*) in 1995/96, 7 pairs of Chinstrap penguin (*Pygoscelis antarctica*) in 1995/96, and 2207 pairs of Gentoo Penguin (*Pygoscelis papua*) in 1995/96.

There are at least 9 other breeding species of bird.

Approximately 13 taxa of macroalgae were found in the littoral zone of the Area. The most common among them were: green alga (*Monostroma hariotti*), red algae (*Georgiella confluens*, *Iridaea cordata* and *Leptosarca simplex*), and brown algae (*Adenocystis utricularis* and *Ascoseira mirabilis*).

The lichen flora of the Area consists of 104 taxa. The most diverse genera are *Caloplaca* (16 species) and *Buellia* (7 species). The highest species richness was found in places with diversified habitats, e.g. with rocks, near penguin colonies or in places of bird perching. The lowest species richness was found in recently deglaciated terrain (young moraines) or in snowbeds. Liverworts have little importance in local plant communities. They most frequently occur in moss banks. Fungi are rare or uncommon. Knowledge of the Area freshwater algae is poor.

6(ii) *Restricted zones within the Area*

None.

6(iii) Location of structures within the Area

Removable caravan (belonging to Poland) functioning as a summer field laboratory for two persons.

6(iv) Location of other Protected Areas within close proximity

Fildes Peninsula, SSSI No. 5 and SSSI No. 33, Ardley Island lie about 50 km west of Lions Rump. Potter Peninsula, SSSI No. 13 lies about 35 km to the west and Antarctic Specially Managed Area (ASMA), Admiralty Bay, King George Island (South Shetland Islands) containing the western shore of Admiralty Bay, SSSI No. 8, lies about 20 km to the west.

7. Permit Conditions

Permits may be issued only by appropriate national authorities as designated under Annex V Article 7 of the Protocol on Environmental Protection to the Antarctic Treaty.

Conditions for issuing a permit for the Area are that:

- it is issued only for a scientific purpose which cannot be served elsewhere,
- the actions permitted will not jeopardize the natural ecological system or scientific values of the Area,
- any management activities are in support of the objectives of the Management Plan,
- the action permitted are in accordance with this Management Plan,
- the permit, or a copy, must be carried within the Area,
- a report is supplied to the authority named in the Permit, and
- a permit is issued for a stated period only.

7(i) Access to and movement within the Area

No helicopters or terrestrial vehicles are allowed within the Area. Overflights of the Area, either by helicopters or fixed wings aeroplanes must be offshore 250m. Helicopters should land only outside the Area.

Access to the Area from the sea must be to the west of the Area. No pedestrian routes are designated within the Area, but persons on foot should avoid walking on vegetated areas or disturbing wildlife whenever possible.

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

Scientific research which cannot be conducted outside the Area, and which will not damage or interfere with any aspect of the Area's biological, geological, or aesthetic values.

Essential management activities, including monitoring.

7(iii) Installation, modification or removal of structures

No further structures are to be erected in the Area, or scientific equipment installed, except for essential scientific or management activities, as specified in the Permit. The temporary refuge will be removed when appropriate.

7(iv) Location of the field camp

If camping in the Area, is necessary it should be close to the caravan. The caravan is normally available to two persons.

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

No living animals or plant material shall be deliberately introduced into the Area.

No poultry products, including food products containing uncooked dried eggs, shall be taken into the Area.

Any chemical which may be introduced for compelling scientific 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 stored in the Area except in support of activities for which the Permit has been granted. All such materials should be kept to a minimum, made secure against the elements and removed when no longer required.

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

This is prohibited, except in accordance with a Permit. Any animal sampling or interference involved should be in accordance with the SCAR Code of Conduct for Use of Animal for Scientific Purpose in Antarctica, as a minimum standard.

7(vii) 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. Marine debris may be removed from the beaches of the Area. Exceptionally, dead specimens of fauna or flora may be removed for laboratory examination without a Permit.

7(viii) Disposal of waste

All waste shall be removed from the Area, with the exception that human waste should be deposited in the sea.

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

The Permit, or a copy, must be carried within the Area.

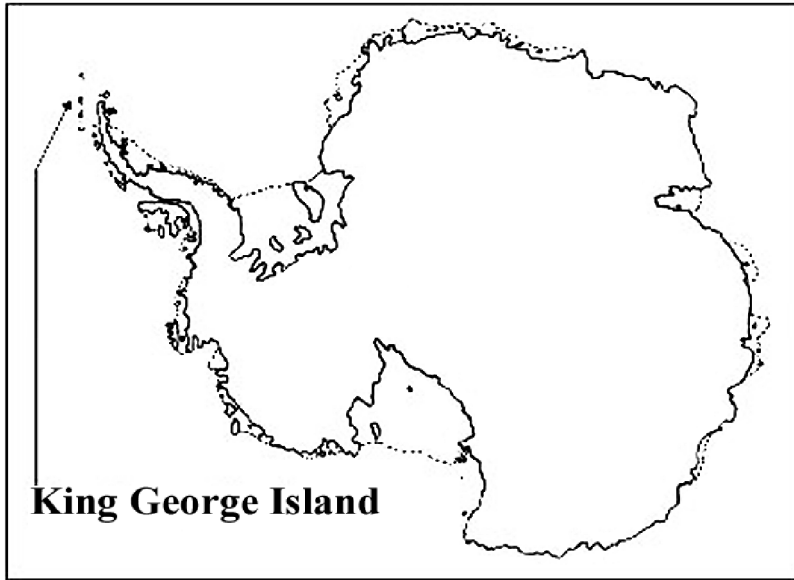
Permits may be granted to enter the Area to carry out biological monitoring and site inspection activities, which may involve the collection of small samples for analysis or audit, or to erect or maintain signpost, or protective measures.

Access to and movement within the Area shall, in any case, be limited in order to avoid disturbance to birds, and damage to vegetation and geological features.

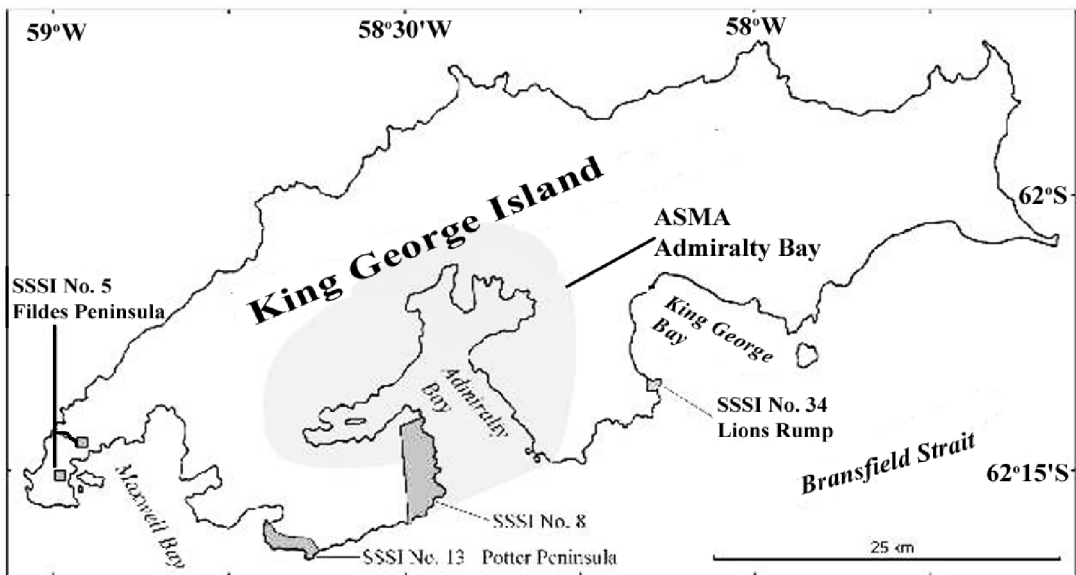
7(x) Requirements for reports

The principal Permit Holder for each issued Permit shall submit a report of activities conducted in the Area. The Visit Report form suggested by SCAR provides a suitable model. This report shall be submitted to the authority named in the Permit as soon as practicable, but no later than 6 months after the visit has taken place. Such reports should be stored indefinitely and made accessible to interested Parties, SCAR, CCAMLR and COMNAP if requested, to provide the

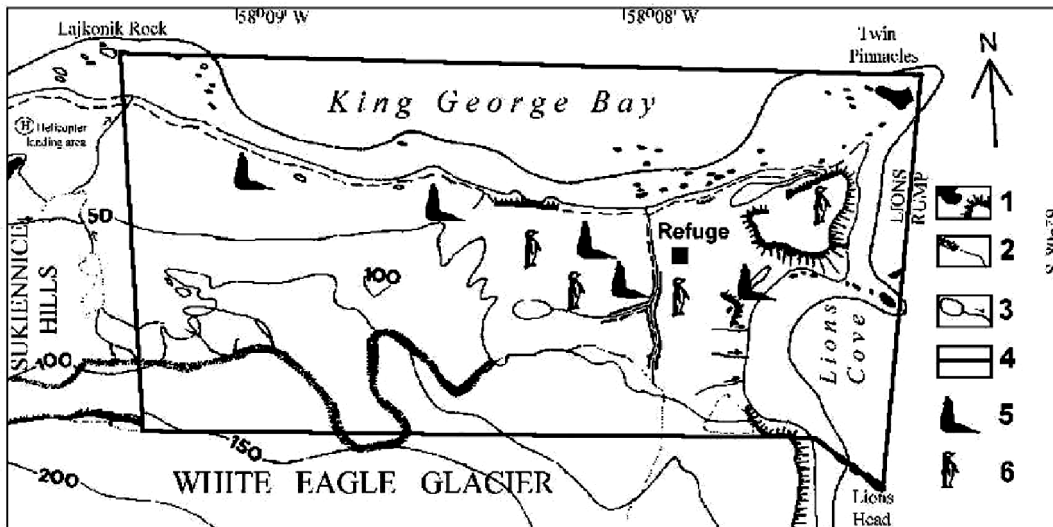
documentation of human activities within the Area, which could be utilized for good management.



Map A. Location of King George Island

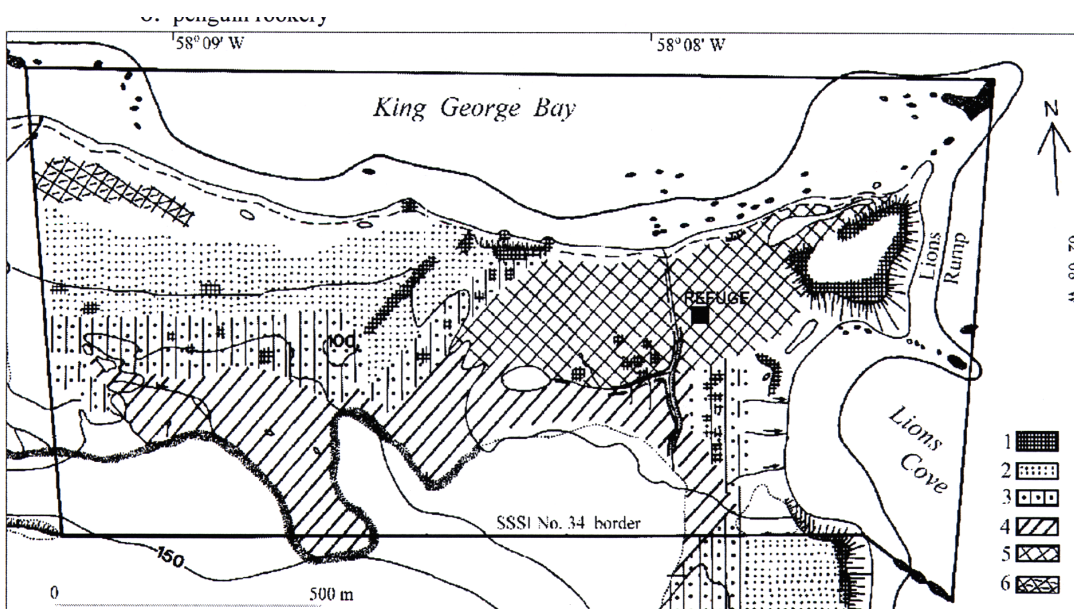


Map B. Lions Rump, SSSI No. 34, in relation to Antarctic Specially Managed Area (ASMA) and other SSSI's on King George Island.



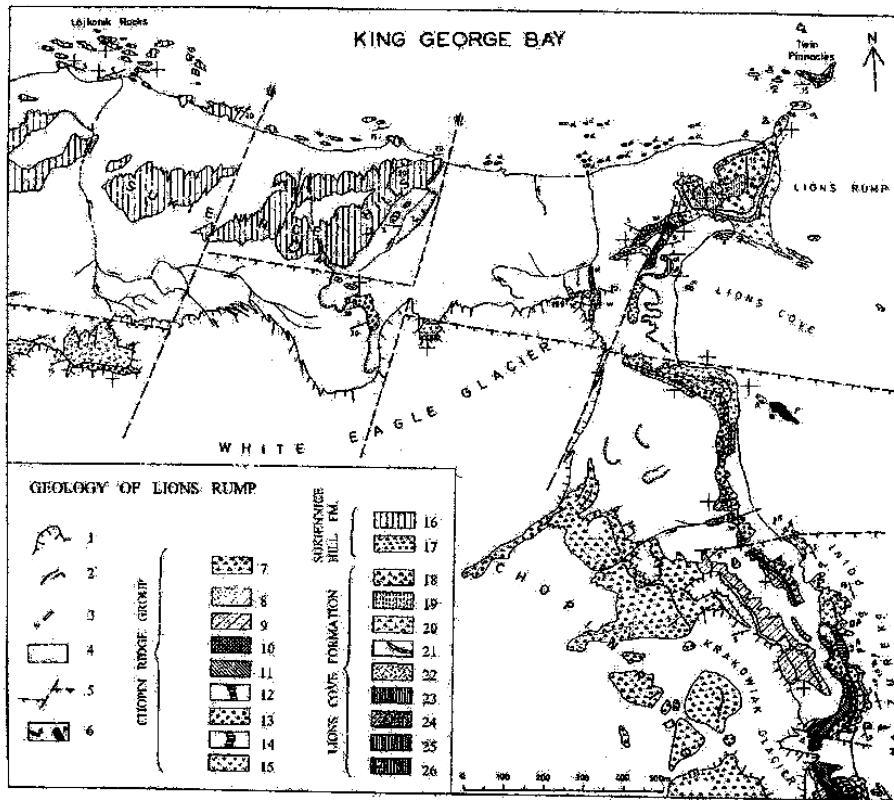
Map C. Lions Rump, SSSI No. 34.

1. cliffs and rocks
2. recent moraines and glaciers
3. lakes and streams
4. boundary of the SSSI No. 34
5. seal colony
6. penguin rookery



Map D. Vegetation map of Lions Rump SSSI No. 34.

1. Ornithocoprophilous lichen communities.
2. Mosaic composed of communities with screes on the hill sides, moraine slopes and snowbeds with primary lichen communities; There are sparse saxicolous and terricolous lichens such as *Lecanora polytropa*, *Rhizocarpon geographicum*, *Carbonea assenitiens* and *Leptogium puberulum*. In moister areast he community with *Leptogium puberulum*, *Staurothele gelida* and *Aspicilia* sp. dominates.
3. Terricolous lichens communities with *Usnea antarctica*; A mosaic of communities with abundant of *Usnea antarctica*, *Ochrolechia frigida*, *Psoroma hypnotum*, *Leptogium puberulum*. There are also mosses and locally *Deschamsia antarctica*, *Colobanthus quitensis*. The communities develop on the tops of moraines and also on their gentle slopes.
4. Moraines with plants. Usually the youngest moraines with substratum.
5. Community of *Drepanocladus uncinatus* occurs on beaches, floristically poor.
6. *Prasiola crispa* and *Deschamsia antarctica* communities. The nitrophilous alga, *Prasiola crispa* dominates here in cover. Locally associated with tussocks of *Deschampsia*.



Map E. Geological map of Lions Rump.

1. glacier margin
2. scarps
3. waterfall
4. Quaternary cover (moraines, alluvium, talus, recent and raised beaches, etc.)
5. faults (ticks on downthrown side)
6. Cape Syrezol (d - basaltic dyke, p - basaltic plug)
7. lava, tuffs and agglomerates
8. arkosic sandstone devoid of marine shells
9. basaltic sandstone, passing to conglomerate, with scattered dropstones
10. basaltic lava flows
11. basaltic hyaloclastite and basaltic conglomerate/breccias
12. fine- to medium-grained sandstone
13. basaltic conglomerate and sandstone, and basaltic hyaloclastite
14. coarse diamictite
15. basaltic lava with columns 1-3 m in diameter
16. basaltic lava flow and tuffs
17. agglomerate
18. hypersthene-augite-andesite
19. agglomerate and shale with coal
20. augite-andesite
21. tuff agglomerate and clay
22. tuff agglomerate and clay
23. tuff agglomerate and clay
24. tuff-shale with feldspar-rich sand and conglomerate interactions, with coal and petrified wood in the lower part
25. tuff-shale with feldspar-rich sand and conglomerate interactions, with coal and petrified wood in the lower part vesicular
26. vesicular andesite

Annex 2 to Recommendation XVI-2

Site of Special Scientific Interest No. 34: Lions Rump, King George Island, South Shetland Islands

1. *Geographical location.* The Site is situated on the south coast of King George Bay, King George Island, South Shetland Islands, and is bounded by the following co-ordinates: 62°07'48"S, 58°09'17"W: 62°07'49"S, 58°07'14"W: 62°08'19"S, 58°07'19"W: 62°08'16"S, 58°09'15"W.

2. *Management Plan*

i. *Description of Site.* The Site is named after Lions Rump, a prominent rocky hill between the southern extremity of King George Bay and Lion Cove. It includes the littoral and sublittoral extending from the eastern end of 'Lajkonik Rock' to the northernmost end of Twin Pinnacles Island, and from that point to the easternmost end of the columnar plug 'Lions Head' to the east of White Eagle Glacier. On land the Site includes the coastline of raised beaches, freshwater pools and the streams on the south side of King George Bay and, around Lion Cove, moraines and slopes leading up to the lower ice tongue of White Eagle Glacier and westward to a small moraine protruding through the ice cap south-east of Sukiennice Hills. Lions Rump comprises Tertiary lavas and tuffs with thin brown coal intercalations and silicified wood fragments. The moraine west of Lion Cove consists of several Holocene stages of glacier advance and retreat. A small refuge is situated near the shore close to the main stream within the Site, about 300 m west of Lions Rump.

ii. *Reason for Designation.* The Site is representative of the terrestrial, limnological and littoral ecosystems of King George Island, possessing diverse biota and rock formations.

There is a rich flora, especially of lichens, and the two native vascular plants, *Colobanthus quitensis* and *Deschampsia antarctica*, are frequent. Twelve species of birds breed within the Site, including many colonies of three species of pygoscelid penguins, Adélie, Chinstrap and Gentoo. There are large numbers of Elephant seals and Fur seals on the beaches. It is a rich part of the coastal ecosystem which has not been disturbed by human activity, other than various biological, geological and geomorphological studies which have been undertaken within the Site.

iii. *Date of designation and originator.* July 1990; Poland

iv. *Date of expiry of designation.* 31 December 2001.

v. *Access Points.* Access from the sea should be close to the outflow of the main stream within the Site about 300 m west of Lions Rump. Helicopter landings should be restricted to the area south of the southern boundary of the Site, so as not to disturb the fauna.

vi. *Entry permit requirement.* Entry into the Site should be in strict accordance with a current permit, issued by a Participating Government or its authorised representative, specifically for a compelling scientific purpose which cannot be served elsewhere or for site inspection, and which will not jeopardise any aspect of the natural ecosystem or its biota within the Site (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII).

However, access to the Site shall be unlimited to parties wishing only to traverse or pass through the Site to carry out bona fide scientific research inland of the Site. Such parties shall pass through the Site as speedily as is reasonable and shall not disturb any part of the Site. Details of the visit should be included in the national annual report of Exchange of information for the same Antarctic season in which the activities were carried out. Research parties passing through the site as permitted above should also report their visits in the same way.

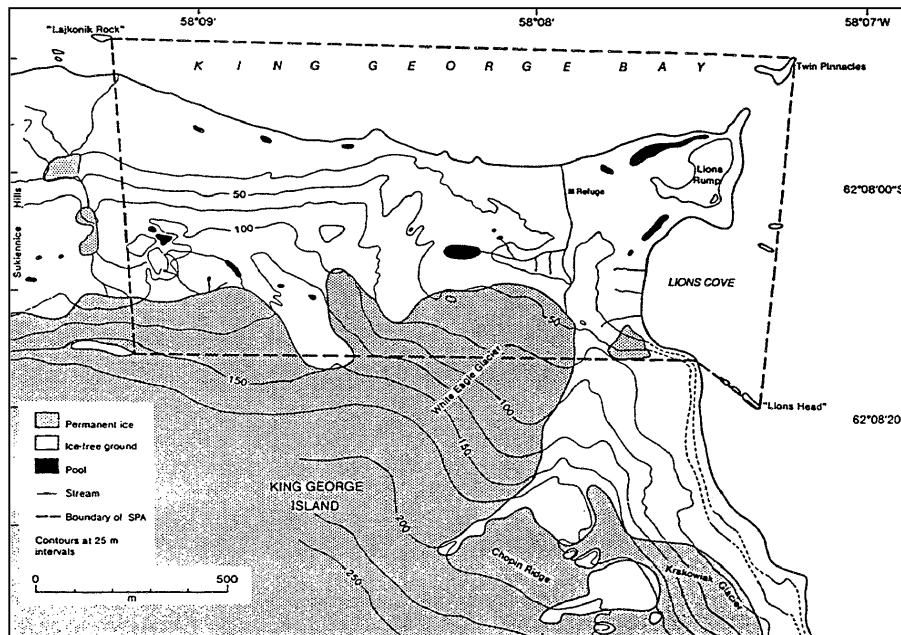
vii. *Prohibitions.* To avoid or minimise human impact it is prohibited to:

- a. drive any vehicle within the Site;
- b. land a helicopter within the Site;
- c. overfly the Site by any aircraft below 250 m above the highest point;
- d. anchor or moor any seacraft within the Site, except in accordance with the permit;
- e. incinerate, bury or otherwise dispose of any human waste within the Site; all such waste must be removed from the Site;
- f. leave depots of fuel, food or any other supplies within the Site, unless they are further required within the same season, at the end of which they must be removed;
- g. erect any form of building additional to the existing refuge within the Site.

viii. *Pedestrian routes.* None specified, but precautions must be taken to avoid disturbance to any breeding bird or seal or stand of vegetation, unless required as specified in the permit.

ix. *Scientific research and sampling.* All activities must conform strictly with those specified in the permit to enter the Site.

x. *Inspection and maintenance.* Inspection visits to the Site should be made at least once every five years to assess its state and to monitor significant biological or environmental changes. Other visits should be made as necessary to maintain boundary markers, notices, etc.



SSSI 34, Lions Rump

Site of Special Scientific Interest No. 35

Annex to Recommendation XVI-3

Marine Site of Special Scientific Interest No. 35: Western Bransfield Strait

1. Geographical location. The Site is located off the southern shore of Low Island, western South Shetland Islands, between latitudes 63°20'S and 63°35'S and between longitudes 61°45'W and 62°30'W (with reference to U.S. Defense Mapping Agency Hydrographic/Topographic Center Chart No. 29121). A small portion of the Low Island landmass/snowmass projects into the northern boundary of this domain; here the northern limit of the Site will be the associated intertidal zone. East, west, and south of the island the bottom slopes gently from the intertidal zone to depths of approximately 200 m and then drops off rapidly near the boundary limits of the Site.

2. Management Plan

i. Description of site. The bottom consists of a sand/mud/cobbled-rock matrix and supports a rich benthos, e.g. 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 include *Notothenia gibberifrons*, *Chaenocephalus aceratus*, *Harpagifer bispinis*, *Parachaenichthys charcoti*, *Trematomus newnesi*, and *N. corriceps neglecta*. Species rarely found at Low Island include *Pseudochaenichthys georgianus*, *Champscephalus gunnari*, and *Chionodraco rastrospinosus*. In addition, the Low Island shelf appears to be a major spawning ground for several fish species (e.g. *N. corriceps neglecta* and the ice fish *C. aceratus*).

ii. Reason for designation. 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.

iii. Outline of research. Studies of this area by scientists from Palmer Station began in the early 1970s. The current research programme uses fish from Low Island to study the biochemical adaptations that enable proteins to function at low temperatures and physiological adaptation of muscle and energy metabolism to low temperatures. These studies are conducted each year during the austral summer.

iv. Date of expiry of designation. 31 December 2001.

v. Access points. Any boundary point may be used for entry. Free passage of ships through this Site is permitted.

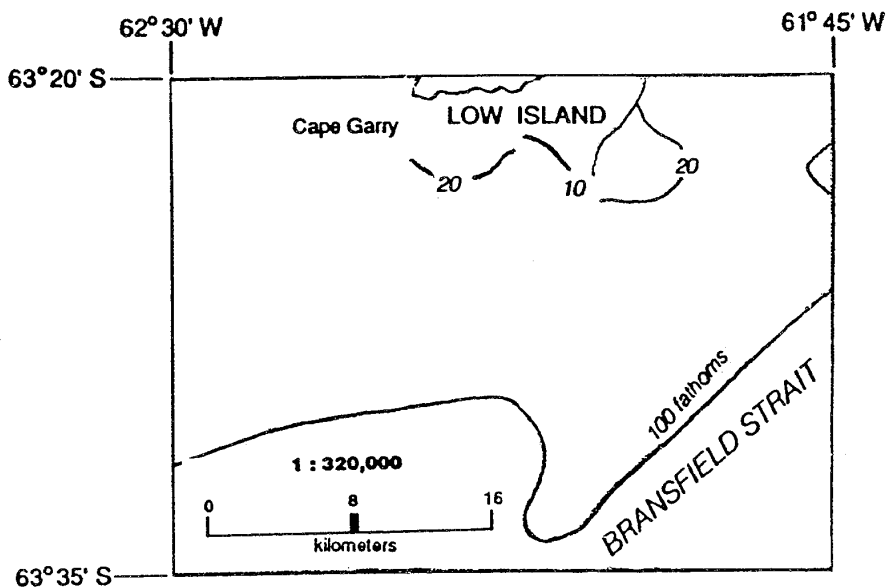
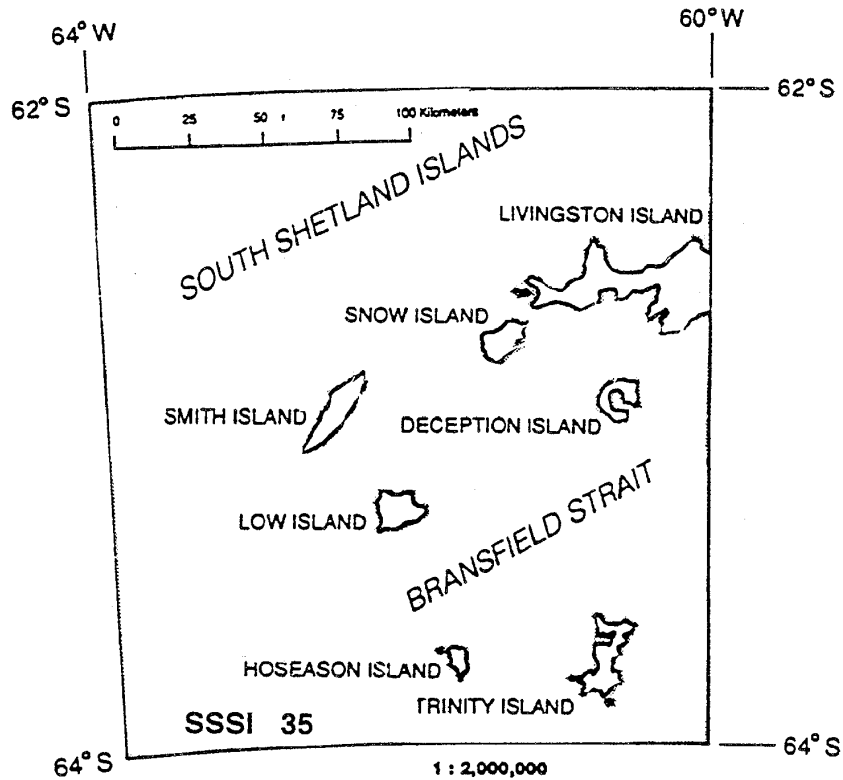
vi. Pedestrian and vehicular routes. Not applicable.

vii. Other kinds of scientific investigations that would not cause harmful interference

Ecological studies of the sea floor and its benthos by any method should be restricted to the minimum necessary for research activities and should be carried out with minimal disturbance of the Site.

viii. *Scientific sampling.* Sampling of the sea floor and its benthos by any method should be restricted to the minimum necessary for research activities and should be carried out with minimal disturbance of the Site.

ix. *Other restraints.* Ships should, where possible, avoid anchoring within the boundaries of the Site.



35, Western Bransfield Strait

Site of Special Scientific Interest No. 36

Annex 2 to Recommendation XVI-3

Marine Site of Special Scientific Interest No. 36: East Dallmann Bay

1. Geographical location. The Site is located in East Dallmann Bay off the western shore of Brabant Island, Palmer Archipelago, between latitudes 64°00'S and 64°20'S and from longitude 62°50'W east to the intertidal zone of the island's western shore (with reference to U.S. Defense Mapping Agency Hydrographic/Topographic Center, Chart No. 29121). West of Brabant Island the bottom forms a gently sloping shelf from the intertidal zone to depths of approximately 200 m and then drops off rapidly near the western boundary of the Site.

2. Management Plan

i. Description of the Site. The bottom consists of a sand/mud/cobbled-rock matrix. The benthic community includes numerous fish species, invertebrates (sponges, anemones, annelids, molluscs, crustaceans, asteroids, ophiuroids, echinoids, holothurioids, tunicates), and marine plants. Fish species commonly collected at East Dallmann Bay include *Notothenia gibberifrons*, *Chaenocephalus aceratus*, *Champscephalus gunnari*, *Pseudochaenichthys georgianus*, and *Chionodraco rastrispinosus*. Specimens of *Trematomus newnesi* and *Notothenia coriiceps neglecta* are rare in this area.

ii. Reason for designation. 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.

iii. Outline of research. Studies of this area by scientists from Palmer Station began in the early 1970s. The current research programme uses fish from East Dallmann Bay to study the biochemical adaptations that enable proteins to function at low temperatures and the physiological adaptation of muscle and energy metabolism to low temperatures.

iv. Date of expiry of designation. 31 December 2001.

v. Access points. Any boundary point may be used for entry. Free passage of ships through this Site is permitted.

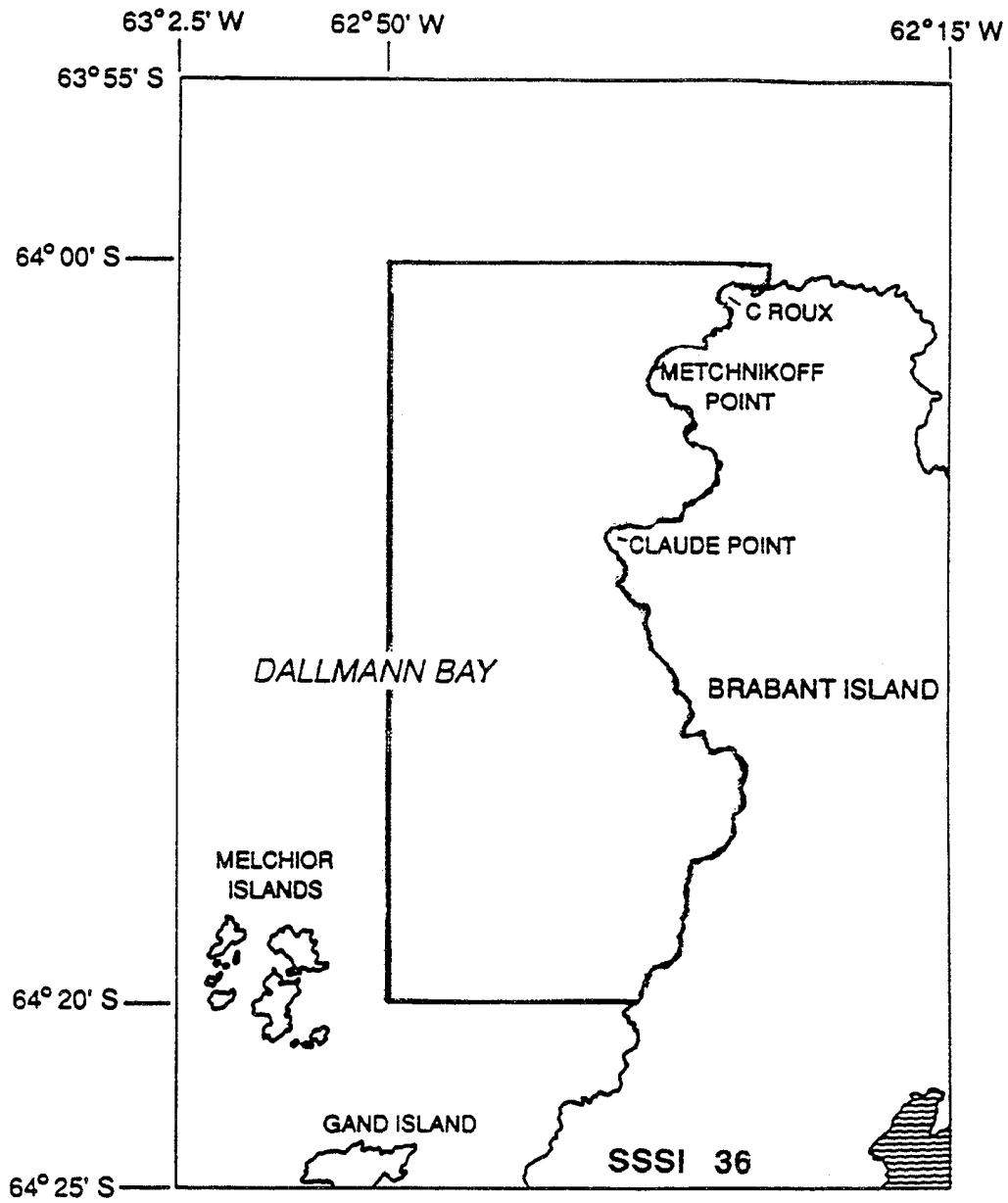
vi. Pedestrian and vehicular routes. Not applicable.

vii. Other kinds of scientific investigations that would not cause harmful interference

Ecological studies of the composition, structure, and dynamics of the marine communities would not be harmful.

viii. Scientific sampling. Sampling of the sea floor and its benthos by any method should be restricted to the minimum necessary for research activities and should be carried out with minimal disturbance of the Site.

ix. Other restraints. Ships should where possible, avoid anchoring within the boundaries of the Site.



SSSI 36, East Dallmann Bay

Site of Special Scientific Interest No. 37

XXI: Annex to Measure 3(1997)

Management Plan for Site of Special Scientific Interest No. 37: Botany Bay, Cape Geology, Victoria Land

1. Description of Values to be Protected

The Area at Botany Bay and Cape Geology (Granite Harbour, Victoria Land) has been proposed by New Zealand on the grounds that it is an extremely rich botanical refuge for such a high latitude location (162°34' 00"E, 77°00' 30"S), with a lichen and moss species diversity and abundance that is unique for Southern Victoria Land. In addition to a high diversity and abundance of lichens and mosses there are abundant growths of algae, large populations of invertebrates (collembola, mites, nematodes, rotifers) and a colony (in excess of 40 pairs) of South polar skua (*Catharacta maccormicki*). The area is the type locality for the collembolan *Gomphiocephalus hodgsoni* Carpenter.

The structure and development of the moss and lichen communities is similar to that found more than 10° of latitude further north, with several species at their known southern limit. The Area contains the most southerly record of an hepatic (*Cephaloziella exiliflora*). Of great significance is the size (up to 15cm diameter) of some lichen thalli (e.g., *Umbilicaria aprina*). The boulder beach has rich populations of both epilithic and endolithic lichens.

In addition to the biological values described, the Area contains the remains of a rock shelter and associated artefacts of historical importance, known as 'Granite House', designated as Historic Site No. 67 in Measure 4(1995). Constructed by members of the 1910-1913 British Antarctic Expedition, the shelter and associated artefacts are vulnerable to disturbance and are therefore managed as a Managed Zone within the Area, which is subject to access restrictions.

The limited geographical extent of the ecosystem, its unusual ecological features and importance, its exceptional scientific and historical value and the vulnerability of the Area to disturbance through trampling, sampling, pollution or alien introductions, are such that the Area requires long-term special protection.

2. Aims and Objectives

- 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 and elements of the ecosystem in particular on lichen and moss species, algae, invertebrates and skuas while ensuring protection from over-sampling;
- allow other scientific research provided it is for compelling reasons which cannot be served elsewhere;
- preserve a part of the natural ecosystem as a reference area for the purpose of future comparative studies;
- minimise the possibility of introduction of alien plants, animals and microbes to the Area;
- allow visits to 'Granite House', but under strict control by Permits;
- allow visits for management purposes in support of the aims of the management

plan.

3. Management Activities

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

- Signs showing the location of the Area (stating the special restrictions that apply) shall be displayed prominently, and a copy of this Management Plan shall be kept available, in all of the research hut facilities within 25 km of the Area;
- Signs illustrating the location, boundaries and clearly stating entry restrictions shall be placed at appropriate locations at the boundaries of the Area and Zones within to help avoid inadvertent entry;
- Markers, signs or structures erected within the Area for scientific or management purposes shall be secured and maintained in good condition;
- Visits shall be made as necessary (no less than once every five years) to assess whether the Area continues to serve the purposes for which it was designated and 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: Botany Bay and Cape Geology, protected area topographic map.

Map specifications:

Projection: Lambert conformal conic;

Standard parallels: 1st 79°20'00"S, 2nd 76°40'00"S

Central Meridian: 162°30'00"E Latitude of Origin: 78°01'16.211"S;

Spheroid: WGS84

Insert 1: Southern Victoria Land, Ross Sea and Ross Island, showing location of Granite Harbour

Insert 2: Cape Geology location map, and Granite Harbour region.

Map B: Botany Bay and Cape Geology, protected area orthophotograph. Map specifications are the same as those in Map A. The original orthophotograph was prepared at 1:2500 with a positional accuracy of $\pm 1.25\text{m}$ (horizontal) and $\pm 2.5\text{m}$ (vertical) with an on-ground pixel resolution of 0.5m. Photography: USGS/DoSLI (SN7851) 22 November 1993. [not reproduced]

Map C: Managed Zone with 'Granite House' site orthophotograph, derived from Map B. The richest areas of vegetation, sensitive to disturbance, are shown. [not reproduced]

6. Description of the Area

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

Cape Geology is situated in the south-western corner of Granite Harbour, southern Victoria Land, at 162°32'52"E, 77°00'14"S, approximately 100 km north-west of Ross Island (Map A, Insets). The Area encompasses much of the catchment above Botany Bay and consists of raised boulder beach terraces, weathered rocky steppes and irregular rock platforms around Cape Geology, extending south to include a well-defined elevated cirque containing a small ice field. The bedrock geology at Cape Geology has been described as a porphyritic grey biotite-granite, with phenocrysts of orthoclase of reddish colour, casting the weathered rock with a reddish tinge.

The northwest corner of the Area is marked by a brass plaque in a boulder (M1, 2 m: Maps A and B) 400 m SW of Cape Geology. The west boundary is defined by a line extending first 260 m SSE from M1 to a large boulder (marked by a cairn) with terrier bolt (M2) at an elevation of 118 m on the ridge above the campsite; thence the boundary extends 250 m up this ridge to a point at 162 m elevation marked by an iron tube with bamboo pole. The west boundary extends a further 300 m up this ridge to a large pointed rock at 255 m elevation near the edge of the permanent ice field. The boundary then extends 150 m south across the ice field to the west edge of a prominent line of exposed rock and moraine in the SW corner of the Area at 325 m elevation. The south boundary follows this line of rock east until the exposure is buried by the ice-field, thence SE across the ice field for 500 m to the edge of a second and more prominent exposure at an elevation of just over 400 m (M3). The boundary follows the upper edge of this exposure and then crosses the ice field SE to an elevation of approximately 325 m where the ice-free eastern boundary ridge and the ice field converge. The east boundary follows the ridge crest for 1550 m in a NE direction to a large pointed rock on the ridge (M4, 392 m) where the east boundary turns to descend due north to the coast at the eastern extremity of the boulder beach of Botany Bay (M5, 5 m). The mean high water mark of the coastline of Botany Bay and Cape Geology forms the northern boundary of the Area.

The Area is extremely rich botanically for such a high-latitude location - it is also one of the richest sites in the whole of continental Antarctica. There is a high diversity and abundance of lichens (more than 30 species) and mosses (eight species), and the structure and development of these communities are similar to those found 10° of latitude further north. Some lichen thalli (e.g. *Umbilicaria aprina*) measure up to 15 cm diameter. The boulder beach has rich populations of both epilithic and endolithic lichens. The Area contains by far the most southerly record of an hepatic (*Cephaloziella exiliflora*) and the mosses *Brycerythrophyllum recurvirostre* and possibly *Ceratodon purpureus*. There are abundant growths of algae (at least 85 taxa), although the algal flora is not considered particularly unusual for the locality. There are large populations of invertebrates (collembola, mites, nematodes, rotifers) and the area is the type locality for the collembolan *Gomphiocephalus hodgsoni* Carpenter. There is a colony of between 40 – 50 breeding pairs (and numerous non-breeders) of the south polar skua (*Catharacta maccormicki*), which is approximately the same number present in 1911-12. No other bird species are known to breed in the Cape Geology area.

6(ii) Restricted and managed zones within the Area

Restricted Zone: An area directly above Botany Bay is designated a Restricted Zone in order to preserve part of the Area as a reference site for future comparative studies, while the remainder of the Area (which is similar in biology, features and character) is more generally

available for research programmes and sample collection. The west boundary of the Restricted Zone is defined by a line from a marker (Iron tube in rock, 20 metres from mean high water mark, elevation 8 m) at the west side of Botany Bay (Map A), extending SW for 170 m up to a second iron tube marker on the crest of the adjacent ridge (87 m). This boundary extends 100 m to a third iron tube and a cairn (98 m), thence 50 m to a large flat rock in the centre of the main flush (marked '1' on Maps A and B). The south boundary of the Restricted one extends from the flat rock in the flush in a straight line 820 m to the first of two prominent boulders closely adjacent to each other, approximately in the middle of the ice-free slopes above Botany Bay (marked '2' on Maps A and B at 165 m). The east boundary extends 300 m from there to a large rock at 135 m elevation, thence NE downslope to the NE boundary point (M5, 5 m). The north boundary of the Restricted Zone is the mean high water mark of Botany Bay and is coincident with the north boundary of the Area. Access to the Restricted Zone is allowed only for compelling scientific or management (such as inspection or review) purposes which cannot be served elsewhere in the Area.

Managed Zone: Situated at the coast at the northernmost tip of Cape Geology, a Managed Zone is designated to protect historic artifacts and plant communities within this vicinity, yet also to allow access to the rock shelter known as 'Granite House',. Which was designated as Historic Site No. 67 in Measure 4(1995). The Managed Zone is an enclave of approximately 100 m by 80 m that surrounds a rock ridge leading from the coast at Cape Geology to the old shelter. The boundaries are marked on Map C, with the southern-most corner marked by a cairn on a prominent boulder overlooking the rock shelter. The shelter was constructed by members of the 1910-1913 British Antarctic Expedition, and used between December 1911 and January 1912 while the party carried out geological and biological exploration in the vicinity. The structure was build using a natural hollow in the rocks, with walls build up from granite bounders and a roof of seal skins: in December 1993 parts of the walls remained, but while several of the skins were present the roof had collapsed. Access to the Managed Zone may be allowed by Permit, subject to the conditions of this management plan.

6(iii) Structures within and near the Area

The only structures known to exist in the Area are 'Granite House', the boundary survey markers and signposts in appropriate locations.

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

The nearest protected area to Cape Geology is SSSI-3 at Barwick Valley, 50 km distant in a SW direction in the Victoria Land Dry Valleys.

7. Permit Conditions

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 are that:

- outside of the Restricted and Managed Zones, it is issued only for scientific study of the ecosystem, or for compelling scientific reasons that cannot be served elsewhere, or for essential management purposes consistent with plan objectives such as inspection or review;
- access to the Restricted Zone is allowed only for compelling scientific or management reasons that cannot be served elsewhere in the Area;
- access to the Managed Zone may be permitted for scientific, management, historical, educational or recreational purposes;

- the actions permitted will not jeopardise the ecological, scientific or historic values of the Area;
- any management activities are in support of the objectives of the Management Plan;
- the actions permitted are in accordance with the Management Plan;
- the Permit, or an 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

Vehicles are prohibited within the Area and access should be by foot. Helicopters are normally prohibited from landing within the Area: there is a designated site 60 m outside of the Area (162°31' 55"E, 77°00' 19"S: Map A). Access to the landing site should be from the open water / sea ice to the north of the Area. Overflight of the Area lower than 300 m (~1000 ft) above ground level is normally prohibited. When required for essential scientific or management purposes, transient overflight or landing may be allowed: conduct of such anticipated overflights or landings must be specifically authorised by Permit. Use of helicopter smoke grenades within the Area is prohibited unless necessary for safety, and all grenades should be retrieved. All helicopter landing or overflight lower than 300 m AGL is prohibited within the Restricted Zone.

Access into the Area should preferably be from the recommended camping area along a preferred walking route 10-20 m from the coast, which is relatively devoid of vegetation. Visitors should avoid walking on visible vegetation, or unnecessary disturbance to bird populations. Care should be exercised walking in areas of moist ground, where foot traffic can easily damage sensitive soils, plant and algal communities, and degrade water quality: walk around such areas, on ice or rocky ground. 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 minimise effects.

Access to the Managed Zone should preferably be from the coast, following the ridge leading up to 'Granite House' (Map C). An alternative route may be used from the west of the Managed Zone if sea-ice travel is unsafe (Maps A-C). Unless specifically authorised by Permit, visitors are prohibited from entering the historic shelter, and are limited to access and viewing from the rock ridge designated for access from the coast in order to prevent damage to the rich vegetation within the Managed Zone. Visitors shall not venture south of 'Granite House', unless specifically authorised by Permit. A maximum of 10 people is permitted to enter the Managed Zone at any one time, and a maximum of 5 people is allowed in the viewing area overlooking 'Granite House' at any one time (Map C).

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;
- essential management activities, including monitoring;
- limited visits to the Managed Zone for reasons other than science or management subject to the conditions described in this plan;
- activities with the aim of preserving or protecting the historic resources within the Area.

7(iii) Installation, modification or removal of structures

No structures are to be erected within the Area except as specified in a Permit. All scientific equipment installed in the Area must be authorised 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 within the Area is prohibited and should be at a site outside of the Area, 100 m from the NW corner (Map A), adjacent to the designated helicopter landing site. This camping site has been disturbed by previous activities and visitors should reoccupy these disturbed positions for tents and other facilities.

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 precautions 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

This is prohibited, except in accordance with a Permit. 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.

Unless specifically authorised by Permit, visitors are prohibited from interfering with or attempting restoration of 'Granite House' in any way, or from handling, taking or damaging any artifacts found within the Managed Zone. Evidence of recent changes, damage or new artifacts observed should be notified to the appropriate national authority. Relocation or removal of artifacts for the purposes of preservation, protection or to re-establish historical accuracy is allowable by Permit.

7(viii) Disposal of waste

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

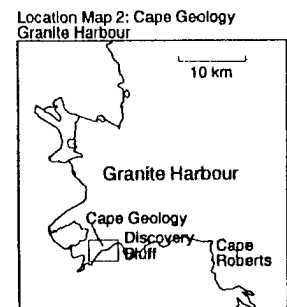
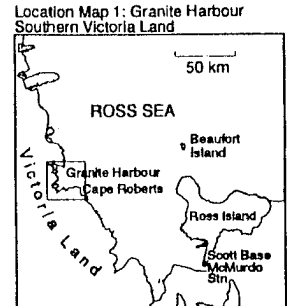
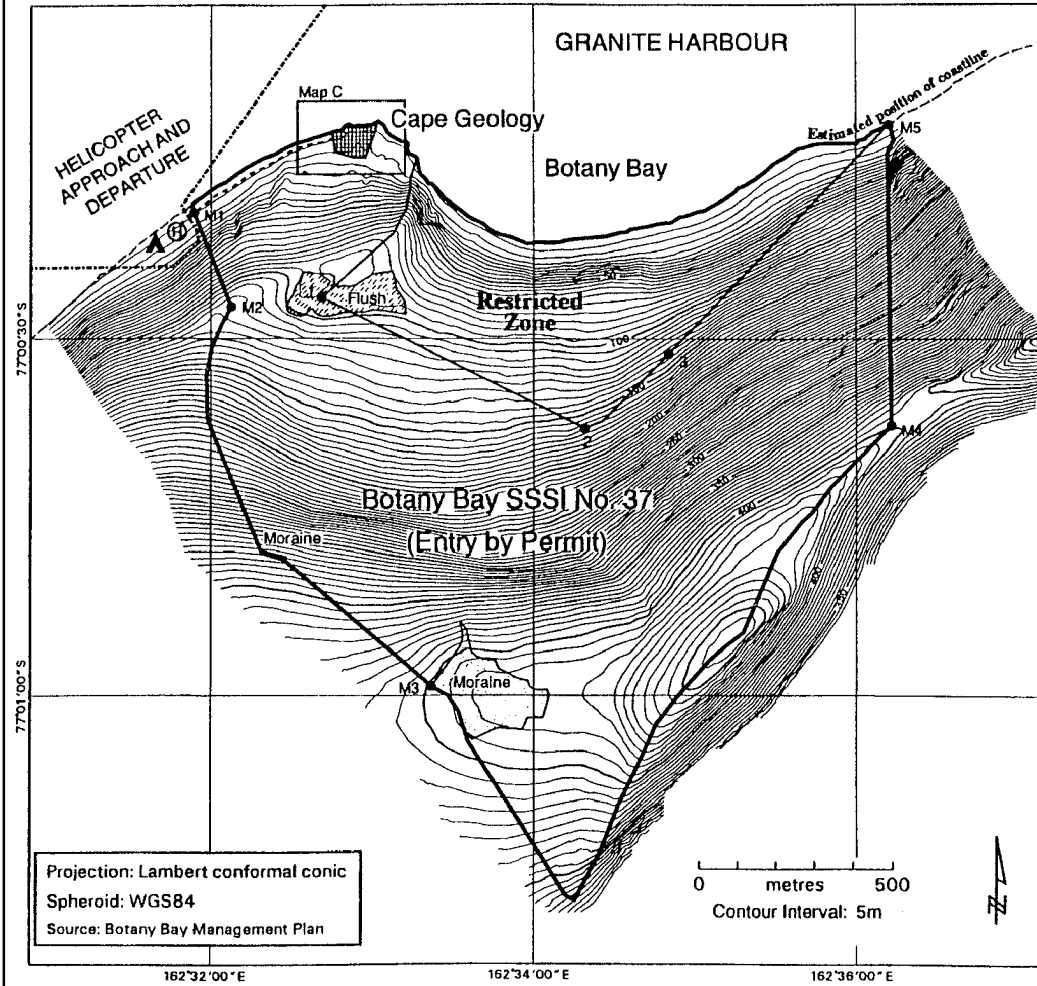
7(ix) Measures that are necessary to ensure that the aims and objectives of the Management Plan can continue to be met

1. 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, to erect or maintain signposts, or for management activities, especially those associated with the Historic Site.
2. Any specific sites of long-term monitoring shall be appropriately marked.
3. To help maintain the ecological and scientific values of the isolation and relatively low level of human impact at the Area 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. To minimise the risk of introductions, visitors shall thoroughly clean footwear and any equipment to be used in the area - particularly sampling equipment and markers - before entering the Area.

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.

Map A - Botany Bay Site of Special Scientific Interest No. 37, site topographic map



- Key**
- Preferred walking route
 - Protected area boundary
 - Ⓜ Designated helicopter pad
 - ▲ Designated camp site
 - ▣ Managed Zone (Granite House (Map C))
 - 1,3 Large Boulders
 - 2 "Double" Boulders
 - M1 Boundary Marker

Historic Sites and Monuments.

Annex to Recommendation VII-9

List of Historic Monuments Identified and Described by the Proposing Government or Governments

Note: the Consultative Meeting does not approve or disapprove the place names appearing in the texts of this List in the different languages.

1. Flag mast erected in December 1965 at the South Geographical Pole by the First Argentine Overland Polar Expedition.
2. Rock cairn and plaques at Syowa Station (Lat 69°00'S, Long 39°35'E) in memory of Shin Fukushima, a member of the 4th Japanese Antarctic Research Expedition, who died in October 1960 while performing official duties. The cairn was erected on 11 January 1961, by his colleagues. Some of his ashes repose in the cairn.
3. Rock cairn and plaque on Proclamation Island, Enderby Land, erected in January 1930 by Sir Douglas Mawson (Lat 65°51'S, Long 53°41'E). The cairn and plaque commemorate the landing on Proclamation Island of Sir Douglas Mawson with a party from the British, Australian and New Zealand Antarctic Research Expedition of 1929-31.
4. Station building to which a bust of V. I. Lenin is fixed, together with a plaque in memory of the conquest of the Pole of Inaccessibility by Soviet Antarctic explorers in 1958 (Lat 83°06'S, Long 54°58'E).
5. Rock cairn and plaque at Cape Bruce, Mac.Robertson Land, erected in February 1931 by Sir Douglas Mawson (Lat 67°25'S, Long 60°47'E). The cairn and plaque commemorate the landing on Cape Bruce of Sir Douglas Mawson with a party from the British, Australian and New Zealand Antarctic Research Expedition of 1929-31.
6. Rock cairn at Walkabout Rocks, Vestfold Hills, Princess Elizabeth Land, erected in 1939 by Sir Hubert Wilkins (Lat 68°22'S, Long 78°33'E). The cairn houses a canister containing a record of his visit.
7. Stone with inscribed plaque, erected at Mirny Observatory, Mabus Point, in memory of driver-mechanic Ivan Kharma who perished on fast ice in the performance of official duties in 1956 (Lat 66°33'S, Long 93°01'E).
8. Metal monument-sledge at Mirny Observatory, Mabus Point, with plaque in memory of driver-mechanic Anatoly Shcheglov who perished in the performance of official duties (Lat 66°33'S, Long 93°01'E).
9. Cemetery on Buromskiy Island, near Mirny Observatory, in which are buried Soviet, Czechoslovakian and GDR citizens, members of Soviet Antarctic Expeditions, who

perished in the performance of official duties on 3 August, 1960 (Lat 66°32'S, Long 93°01'E).

10. Building (magnetic observatory) at Dobrowolsky Station, Bunger Hills, with plaque in memory of the opening of Oasis Station in 1956 (Lat 66°16'S, Long 100°45'E).

11. Heavy tractor at Vostok Station with plaque in memory of the opening of the Station in 1957 (Lat 78°28'S, Long 106°48'E).

12. Cross and plaque at Cape Denison, George V Land, erected in 1913 by Sir Douglas Mawson on a hill situated 300 metres west by south from the main hut of the Australasian Antarctic Expedition of 1911-14 (Lat 67°00'S, Long 142°42'E). The cross and plaque commemorate Lieutenant B. E. S. Ninnis and Dr. X. Mertz, members of the expedition, who died in 1913 while engaged in the work of the expedition.

13. Hut at Cape Denison, George V Land, built in January 1912 by Sir Douglas Mawson for the Australasian Antarctic Expedition of 1911-14 (Lat 67°00'S, Long 142°42'E). This was the main base of the expedition.

14. Inexpressible Island, Terra Nova Bay, Scott Coast, Site of ice cave at Inexpressible Bay, Terra Nova Bay, constructed in March 1912 by Victor Campbell's Northern Party, British Antarctic Expedition, 1910-13 (Lat 70°54'S, Long 163°43'E). The Party spent the winter of 1912 in this ice cave.

15. Hut at Cape Royds, Ross Island, built in February 1908 by Ernest Shackleton (Lat 77°38'S, Long 166°07'E). Restored in January 1961 by Antarctic Division of New Zealand Department of Scientific and Industrial Research.

16. Hut at Cape Evans, Ross Island, built in January 1911 by Captain Robert Falcon Scott (Lat 77°38'S, Long 166°24'E). Restored in January 1961 by Antarctic Division of New Zealand Department of Scientific and Industrial Research.

17. Cross on Wind Vane Hill, Cape Evans, Ross Island, erected by the Ross Sea Party of Ernest Shackleton's Trans-Antarctic Expedition, 1914-16, in memory of three members of the party who died in the vicinity in 1916 (Lat 77°38'S, Long 166°24'E).

18. Hut at Hut Point, Ross Island, built in February 1902 by Captain Robert Falcon Scott (Lat 77°51'S, Long 166°37'E). Partially restored in January 1964 by the New Zealand Antarctic Society, with assistance from the United States Government.

19. Cross at Hut Point, Ross Island, erected in February 1904 by the British Antarctic Expedition, 1901-04, in memory of T. Vince, a member of that expedition who died in the vicinity. (Lat 77°51'S, Long 166°37'E.)

20. Cross on Observation Hill, Ross Island, erected in January 1913 by the British Antarctic Expedition, 1910-13, in memory of Captain Robert Falcon Scott's party which perished on the return journey from the South Pole, March 1912. (Lat 77°51'S, Long 166°40'E).

21. Stone hut at Cape Crozier, Ross Island, constructed in July 1911 by Edward Wilson's party (British Antarctic Expedition, 1910-13) during the winter journey to collect Emperor penguin eggs. (Lat 77°32'S, Long 169°18'E).
22. Hut at Cape Adare built in February 1899 during *Southern Cross* Expedition led by C. E. Borchgrevink (Lat 71°17'S, Long 170°15'E). There are three huts at Cape Adare; two date from Borchgrevink's expedition, and one from Scott's Northern Party, 1910-11. Only the southernmost Borchgrevink hut survives in a reasonable state of repair.
23. Grave at Cape Adare of Norwegian biologist, Nicolai Hanson, a member of C. E. Borchgrevink's *Southern Cross* Expedition, 1899-1900 (Lat 71°17'S, Long 170°15'E). This is the first known grave in the Antarctic.
24. Rock cairn, known as 'Amundsen's Cairn', on Mount Betty, Queen Maud Range (Lat 85°11'S, Long 163°45'W) erected by Roald Amundsen on 6 January 1912, on his way back to *Framheim* from the South Pole.
25. Hut and plaque on Peter I Øy, built by the Norwegian Captain Nils Larsen in February 1929 at Framnaesodden (Lat 68°47'S, Long 90°42'W). The plaque is inscribed 'Norvegia-ekspedisjonen 2/2 1929'.
26. Abandoned installations of Argentine Station 'General San Martin' on Barry Island, Debenham Islands, Marguerite Bay, with cross, flag mast, and monolith built in 1951. (Lat 68°08'S, Long 67°08'W)
27. Cairn with plaque on Megalestris Hill, Petermann Island, erected in 1909 by the second French expedition led by J.-B. Charcot. (Lat 65°10'S, Long 64°10'W). Restored by the British Antarctic Survey in 1958.
28. Rock cairn at Port Charcot, Booth Island, with wooden pillar and plaque inscribed with the names of the first French expedition led by J.-B. Charcot which wintered here in 1904 aboard *Le Français* (Lat 65°03'S, Long 64°01'W).
29. Lighthouse named 'Primero de Mayo' erected on Lambda Island, Melchior Islands, by Argentina in 1942. (Lat 64°18'S, Long 62°59'W). This was the first Argentine light-house in the Antarctic.
30. Shelter at Paradise Harbour erected in 1950 near the Chilean Base 'Gabriel Gonzales Videla' to honour Gabriel Gonzales Videla, the first Head of State to visit the Antarctic. (Lat 64°49'S, Long 62°51'W).
31. Memorial plaque marking the position of a cemetery on Deception Island (Lat 62°59'S, Long 60°34'W) where some 40 Norwegian whalers were buried in the first half of the twentieth century. The cemetery was swept away by a volcanic eruption in February 1969.
32. Concrete monolith erected in 1947, near Arturo Prat Base on Greenwich Island. Point of reference for Chilean Antarctic hydrographic work. (Lat 62°29'S, Long 59°40'W).

33. Shelter and cross with plaque near Arturo Prat Base, Greenwich Island (Lat 62°30'S, Long 59°41'W). Named in memory of Lieutenant-Commander Gonzalez Pacheco, who died tragically while in charge of the station in 1960.
34. Bust of the Chilean naval hero Arturo Prat erected in 1947 at the base of the same name on Greenwich Island. (Lat 62°30'S, Long 59°41'W).
35. Wooden cross and statue of the Virgin of Carmen erected in 1947 near Arturo Prat Base on Greenwich Island (Lat 62°30'S, Long 59°41'W). There is also nearby a metal plaque of Lions International Club.
36. Metal plaque at Potter Cove, King George Island, erected by Eduard Dallmann to commemorate the visit of his German expedition on 1 March, 1874. (Lat 62°13'S, Long 58°42'W).
37. Statue of Bernardo O'Higgins, erected in 1948 in front of the station of the same name (Lat 63°19'S, Long 57°54'W). To honour the first ruler of Chile to envisage the importance of Antarctica.
38. Hut on Snow Hill Island built in February 1902 by the main party of the Swedish South Polar Expedition, led by Otto Nordenskjöld. (Lat 64°24'S, Long 57°00'W).
39. Stone hut at Hope Bay built in January 1903 by a party of the Swedish South Polar Expedition. (Lat 63°24'S, Long 56°59'W).
40. Bust of General San Martin, grotto with a statue of the Virgin of Lujan, and a flag mast at Base 'Esperanza', Hope Bay, erected by Argentina in 1955; together with a graveyard with stele in memory of members of Argentine expeditions who died in the area. (Lat 63°24'S, Long 56°59'W).
41. Stone hut on Paulet Island built in February 1903 by C. A. Larsen, Norwegian captain of the wrecked vessel *Antarctic* of the Swedish South Polar Expedition led by Otto Nordenskjöld, together with the grave of a member of that expedition (Lat 63°35'S, Long 55°47'W) and the rock cairn built by the survivors of the wreck at the highest point of the island to draw the attention of rescue expeditions.
42. Area at Scotia Bay, Laurie Island, South Orkney Island, in which are found: stone hut built in 1903 by the Scottish Expedition led by W. S. Bruce; the Argentine Meteorological and magnetic Observatory, built in 1905; and a graveyard with seven tombs (dating from 1903). (Lat 60°46'S, Long 44°40'W).
43. Cross erected in 1955, at a distance of 1,300 metres north-east of the Argentine Base 'General Belgrano' at Piedrabuena Bay, Filchner Ice Shelf (Lat 77°49'S, Long 38°02'W).
44. Plaque erected at the temporary Indian station 'Dakshin Gangotri', Princess Astrid Kyst, Dronning Maud Land, listing the names of the members of the First Indian Antarctic Expedition which landed nearby on 9 January 1982 (Lat 70°45'S, Long 11°38'E).

45. Plaque on Brabant Island, on Metchnikoff Point, Lat 64°02'S, Long 62°34'W, mounted at a height of 70 m on the crest of the moraine separating this point from the glacier and bearing the following inscription:

This monument was built by François de Gerlache and other members of the Joint Services Expedition 1983-85 to commemorate the first landing on Brabant Island by the Belgian Antarctic expedition 1897-99: Adrien de Gerlache (Belgium) leader, Roald Amundsen (Norway), Henryk Arctowski (Poland), Frederick Cook (USA) and Emile Danco (Belgium) camped nearby from 30 January to 6 February 1898.

46. All the buildings and installations of Port Martin base, Terre Adélie (Lat 66°49'S, Long 141°24'E) constructed in 1950 by the 3rd French expedition in Terre Adélie and partly destroyed by fire during the night of 23 to 24 January 1952.

47. Wooden building called 'Base Marret' on the Ile des Pétrels, Terre Adélie (Lat 66°40'S, Long 140°01'E) where seven men under the command of Mario Marret overwintered in 1952 following the fire at Port Martin base.

48. Cross erected on the North-East headland of the Ile des Pétrels, Terre Adélie (Lat 66°40'S, Long 140°01'E) in memory of André Prudhomme, head meteorologist in the 3rd International Geophysical Year expedition who disappeared during a storm on 7 January 1959.

49. The concrete pillar erected by the First Polish Antarctic Expedition at Dobrolowski station on the Bunger Hill to measure acceleration due to gravity $g = 982,439.4 \text{ mgal} \pm 0.4 \text{ mgal}$ in relation to Warsaw, according to the Potsdam system, in January 1959 (Lat 66°16.3'S, Long 100°45'E, h = 35.4m).

50. A brass plaque bearing the Polish eagle, the national emblem of Poland, the dates 1975 and 1976, and the following text in Polish, English and Russian:

In memory of the landing of members of the first Polish Antarctic marine research expedition on the vessels 'Profesor Siedlecki' and 'Tazar' in February 1976.

This plaque, south-west of the Chilean and Soviet stations, is mounted on a cliff facing Maxwell Bay, Fildes Peninsula, King George Island.

51. The grave of Włodzimierz Puchalski, surmounted by an iron cross, on a hill to the south of Arctowski station on King George Island. W. Puchalski, was an artist, a producer of documentary nature films, who died on 19 January 1979 whilst working at the station.

52. Monolith erected to commemorate the establishment on 20 February 1985 by the People's Republic of China of the 'Great Wall Station' (Lat 62°13'S, Long 58°58'W) on Fildes Peninsula, King George Island, in the South Shetland Islands. Engraved on the monolith is the following inscription in Chinese: 'Great Wall Station, First Chinese Antarctic Research Expedition, 20 February 1985'.

53. Monoliths and Commemorative Plaques celebrating the rescue of survivors of the British ship 'Endurance' by the Chilean Navy cutter *Yelcho* displaying the following words:

“Here, on August 30th., 1916, the Chilean Navy cutter *Yelcho* commanded by Pilot Luis Pardo Villalón rescued the 22 men from the Shackleton Expedition who survived the wreck of the 'Endurance' living for four and one half months in this Island”

The Monolith and the plaques have been placed on Elephant Island (61°03' Lat.S., 54°50' Long.W.) and their replicas on the Chilean bases 'Arturo Prat' (62°30' Lat.S., 59°49' Long.W.) and 'Rodolfo Marsh' (62°12' Lat.S., 62°12' Long.W.). Bronze busts of the pilot Luis Pardo Villalón were placed on the three above-mentioned monoliths during the XXIVth Chilean Antarctic Scientific Expedition in 1987–88.

54. Richard E. Byrd Historic Monument, McMurdo Station, Antarctica (77°51'S, 166°40'E). Bronze bust on black marble, 5ft high x 2ft square, on wood platform, bearing inscriptions describing the polar achievements of Richard Evelyn Byrd. Erected at McMurdo Station (77°51'S, 166°40'E) in 1965.

55. East Base, Antarctica, Stonington Island (68°11'S, 67°00'W). Buildings and artefacts at East Base, Stonington Island and their immediate environs. These structures were erected and used during two U.S. wintering expeditions: the Antarctic Service Expedition (1939-1941) and the Ronne Antarctic Research Expedition (1947–1948). The size of the historic area is approximately 1,000 meters in the north-south direction (from the beach to Northeast Glacier adjacent to Back Bay) and approximately 500 metres in the east-west direction.

56. Waterboat Point, Danco Coast, Antarctic Peninsula (64°49'S, 62°52'W). The remains and immediate environs of the Waterboat Point hut, situated close to the unoccupied Chilean station, 'President Gabriel González Videla'. The Waterboat Point hut, of which only the base of the boat, roots of door posts and an outline of the hut and extension still exist, was occupied by the UK two-man expedition of Bagshawe and Lester in 1921–22. This was, and indeed remains, the smallest expedition ever to overwinter in Antarctica.

57. Commemorative plaque at Yankee Bay, MacFarlane Strait, Greenwich Island, South Shetland Islands, near the Chilean refuge located at latitude 62°32'S, and longitude 59°45'W, to the Memory of Captain Robert MacFarlane, who in 1820 explored the Antarctic Peninsula area in the brigantine *Dragón*.

58. Cairn with memorial plaque erected at Whalers' Bay, Deception Island, South Shetland Islands, in the vicinity of the whalers' cemetery (Historic Monument No. 31) 62°59'S, 60°34'W, to honour Captain Adolphus Amandus Andresen, Antarctic pioneer who was first to establish a whaling operation at Deception Island in 1906.

59. A cairn on Half Moon beach, Cape Shirreff, Livingston Island, South Shetland Islands, commemorating the officers, soldiers and seamen on board the *San Telmo*, which sank in September 1819; possibly the first people to live and die in the wastes of Antarctica.

60. Wooden plaque and rock cairn located at Penguins Bay, southern coast of Seymour Island (Marambio), James Ross Archipelago (64°16'00"S, 56°39'10"W). This plaque was placed on 10 November 1903 by the crew of a rescue mission of the Argentinian Corvette *Uruguay* in the site where they met members of the Swedish expedition led by Dr Otto Nordenskjöld. The text of the wooden plaque reads as follows:

“10.XI.1903 *Uruguay* (Argentine Navy) in its journey to give assistance to the Swedish Antarctic expedition.”

In January 1990, a rock cairn was erected by Argentina in memory of this event in the place where the plaque is located.

61. Port Lockroy, Base A, on Goudier Island, off Wiencke Island, Antarctic Peninsula (Lat 64°49' S. Long 63°31' W). Of historic importance as an Operation Tabarin base and for scientific research.

62. Argentine Islands, Base F (Wordie House), South-west corner of Winter Island, one of the group known as the Argentine Islands (Lat 65°15' S. Long 64°16' W). Of historic interest as an example of an early British scientific base.

63. Horseshoe Island, Base Y. Marguerite Bay, West Graham Land (Lat 67°49' S. Long 67°18' W). Noteworthy as a relatively unaltered and completely equipped base of a later period. Blaiklock, the refuge hut nearby, is taken to be an integral part of the base.

64. Stonington Island, Base E, Northern end of Stonington Island, Marguerite Bay, West Graham Land (Long 68°11' S. 67°00' W). Of historical importance in the early period of exploration and later British Antarctic Survey (BAS) history of the 1960s and 70s.

65. Message Post, Svend Foyn Island. A pole with a box attached was placed on 16 January 1895 during the whaling expedition of Henryk Bull and Captain Leonard Kristensen of the ship *Antarctica*. It was examined and found intact by the British Antarctic Expedition of 1898-1900 and then sighted from the beach by the USS *Edisto* in 1956 and USCGS *Glacier* in 1965 (latitude approximately 71°52'S, longitude 171°10'E).

66. Prestrud's Cairn, at the foot of main bluff Scott Nunataks, Queen Alexandra Mountains. A small rock cairn at the foot of the main bluff on the north side of the Nunataks by Lieutenant K. Prestrud on 3 December 1911 during the Norwegian Antarctic Expedition of 1910- 1912 (latitude 77°12' S. longitude 154°30' W).

67. Rock Shelter "Granite House", Cape Geology, Granite Harbour. This shelter was constructed in December 1911 for use as a field kitchen by Taylor's second geological excursion during the British Antarctic Expedition of 1910-1913. It was enclosed on three sides with granite boulder walls and used as a sledge to form a roof tree which supported seal skins anchored by heavy rocks (latitude 77°00'E, longitude 162°32'E). A 1981 inspection of the "house" found it in good condition although the sledge had begun to disintegrate. The most recent visit to the site in 1990 reported that this deterioration was accelerating.

68. Depot, Hells Gate Moraine, Inexpressible Island, Terra Nova Bay. An emergency depot, consisting of a sledge loaded with supplies and equipment, was placed on 25 January 1913 by the British Antarctic Expedition at the close of the 1910-1913 expedition. The depot was established by the crew of the *Terra Nova* to provide security in the event the ship was unable to return and pick them up (latitude 74°56'S, longitude 163°48'E). In 1994, the sledge and supplies were removed in order to stabilise their condition as wind and scoria particles had started to cause rapid deterioration.

69. Message Post, Cape Crozier. Erected on 22 January 1902 by Captain Robert F Scott's *Discovery* Expedition (the National Antarctic Expedition of 1901-1904) and consists of a post to which a metal cylinder was attached containing an account of the Expedition's movements. It was intended to provide information for the expedition relief ships (latitude 77°27'S, longitude 169°16'E). The message post, although weathered, still stands, its grain blasted into high relief by countless storms. The record cylinder no longer exists.

70. Message Post, Cape Wadsworth Coulman Island. A metal cylinder nailed to a red pole 8 meters above sea level placed by Captain R. F. Scott on 15 January 1902. He also painted the rocks behind the post red and white to make it more conspicuous (latitude 73°19'S, longitude 169°47'E).

71. Whalers Bay Whaling Station, Whalers Bay, Deception Island. Established in 1906 by Captain Adolfo Andresen. Of historical importance as an example of an Antarctic whaling station.

72. Mikkelsen Cairn, Tryne Islands, Vestfold Hills. A rock cairn and a wooden mast erected by the landing party led by Captain Klarius Mikkelsen of the Norwegian whaling ship *Thorshavn* and including Caroline Mikkelsen, Captain Mikkelsen's wife, the first woman to set foot on East Antarctica. The cairn, at latitude 68°22'34"S longitude 78°24'33"E was discovered by Australian National Antarctic Research Expedition field parties in 1957 and again in 1995.

73. Memorial Cross for the 1979 Mount Erebus Crash Victims, Lewis Bay, Ross Island. A cross of stainless steel which was erected in January 1987 on a rocky promontory three kilometres from the Mount Erebus crash site in memory of the 257 people of different nationalities who lost their lives when the aircraft in which they were travelling crashed into the lower slopes of Mount Erebus, Ross Island. The Cross was erected as a mark of respect and in remembrance of those who died in this tragedy.

74. The south-west coast of Elephant Island between the southern side of Mensa Bay (61°10'S, 55°24'W) and Cape Lookout (61°17'S, 55°13'W), including all of the fore-shore and intertidal areas, in which the wreckage of a large wooden sailing ship has been found.

75. The A Hut of Scott Base, being the only existing Trans Antarctic Expedition 1956/1957 building in Antarctica sited at Pram Point, Ross Island, Ross Sea Region, Antarctica.

76. The ruins of the base Pedro Aguirre Cerda, being a Chilean meteorological and volcanological center situated at Pendulum Cove, Deception Island, Antarctica, that was destroyed by volcanic eruptions in 1967 and 1969.