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Revised

Working Paper Submitted by
United Kingdom

Antarctic Protected Areas System: Revised Management Plans for

Specially Protected Area No. 14 Lynch Island,
South Orkney Islands

and for

Specially Protected Area No. 19 Lagotellerie Island,
Marguerite Bay, Graham Land

ANTARCTIC PROTECTED AREAS SYSTEM: REVISED MANAGEMENT PLANS FOR

**SPECIALLY PROTECTED AREA NO. 14 LYNCH ISLAND,
SOUTH ORKNEY ISLANDS**

and for

**SPECIALLY PROTECTED AREA NO. 19 LAGOTELLERIE ISLAND,
MARGUERITE BAY, GRAHAM LAND**

Preamble

The United Kingdom submits for consideration revised management plans for Specially Protected Area No. 14 Lynch Island, South Orkney Islands, and for Specially Protected Area No. 19 Lagotellerie Island, Marguerite Bay, Graham Land, in accordance with responsibilities identified in Resolution 1 (1998).

The plans have been prepared in compliance with Resolution 9 (1995) adopting a standard structure for the preparation of management plans; Resolution 2 (1998) on the *Guide to the Preparation of Management Plans - Antarctic Specially Protected Areas (XXII ATCM / WP5, May 1998)*; and in conformity with other plans recently adopted in Annex V format by ATCMs.

The United Kingdom would note that earlier draft versions of these plans have been considered by the SCAR Group of Specialists on Antarctic Affairs and Conservation, SCAR National Committees, and the SCAR Executive. A number of helpful comments were received, of which due account has been taken.

A draft Measure for the adoption of these management plans is appended to this Working Paper.

MEASURE .. (2000)

ANTARCTIC PROTECTED AREAS SYSTEM: REVISED MANAGEMENT PLANS FOR

**SPECIALLY PROTECTED AREA NO. 14 LYNCH ISLAND,
SOUTH ORKNEY ISLANDS**

and for

**SPECIALLY PROTECTED AREA NO. 19 LAGOTELLERIE ISLAND,
MARGUERITE BAY, GRAHAM LAND**

The Representatives,

Recommend to their Governments the following Measure for approval in accordance with paragraph 4 of Article IX of the Antarctic Treaty:

1. That the Management Plan for SPA No. 14, annexed to this Measure, be inserted in the Annex to Recommendation IV-14 to replace the plan previously annexed to that Recommendation.
2. That the Management Plan for SPA No. 19, annexed to this Measure, be inserted in the Annex to Recommendation XIII-11 to replace the plan previously annexed to that Recommendation.
3. That the Consultative Parties ensure that their nationals comply with the mandatory provisions of the revised management plans.

**Management Plan for
Specially Protected Area No. 14
LYNCH ISLAND, SOUTH ORKNEY ISLANDS**

1. Description of values to be protected

Lynch Island (latitude 60°39'10" S, longitude 45°36'25" W; 0.1 km²), Marshall Bay, South Orkney Islands, was originally designated as a Specially Protected Area through Recommendation IV-14 (1966, SPA No. 14) after a proposal by the United Kingdom. It was designated on the grounds that the island “supports one of the most extensive and dense areas of grass (*Deschampsia antarctica*) known in the Treaty Area and that it provides an outstanding example of a rare natural ecological system”. These values were amplified and extended by Recommendation XVI-6 (1991) when a management plan for the site was adopted. This pointed out that in addition to the luxuriant growth of Antarctic hair grass *Deschampsia antarctica*, “the only other Antarctic flowering plant, Antarctic pearlwort (*Colobanthus quitensis*), is also abundant”. It was further noted that while the cryptogamic vegetation is typical of the region, several species of moss found on the island (*Polytrichastrum alpinum* (= *Polytrichum alpinum*) and *Muelleriella crassifolia*) are unusually fertile for their southerly location. The shallow loam-like soil associated with the grass swards was noted to contain a rich invertebrate fauna. A rare enchytraeid worm (species as yet unidentified) was also found in moist moss in rock crevices on the northern side of the island. These values noted in the original designation and contained in the original management plan are reaffirmed in this revised management plan.

Further values not referred to originally, but mentioned in scientific descriptions of Lynch Island, are also considered important as reasons for special protection of the Area. These values are:

- It is possibly the only known location in Antarctica where *Polytrichastrum alpinum* develops sporophytes in profusion annually;
- *Polytrichum strictum* (= *Polytrichum alpestre*) occasionally produces male inflorescences in local abundance – a rare occurrence in this species in Antarctica;
- It is one of few sites where the grass *Deschampsia* is known to grow directly on *Polytrichum-Chorisodontium* moss banks;
- The rare moss *Plagiothecium ovalifolium* occurs in moist shaded rock crevices near the shore, although most of these sites have been affected by recent Antarctic fur seal (*Arctocephalus gazella*) activity;
- The population density of the arthropod community associated with *Deschampsia* on Lynch Island appears unusually high, with some measurements suggesting it is one of the highest in the world. The site also shows unusual diversity for an Antarctic site;
- One arthropod species (*Globoppia loxolineata*) is near the northernmost limit of its known distribution, and specimens collected from Lynch Island exhibited unusual morphological characteristics compared to specimens collected elsewhere in the South Orkney – Antarctic Peninsula region;
- *Chromobacterium* bacteria, yeasts and fungi are found in higher densities than on Signy Island, thought to be a result of the lower acidity of the soils associated with *Deschampsia* and the more favourable microclimate at Lynch Island;
- The shallow gravelly loam-like soil beneath the dense swards of *Deschampsia* may represent one of the most advanced soil types in the Antarctic.

Lynch Island is 2.4 km from Signy Island, the location of Signy Research Station (UK), and about 200 m from Coronation Island, the largest of the South Orkney Islands. The Area has been afforded special protection for most of the modern era of scientific activity in the region, with entry permits having been issued only for compelling scientific reasons. Thus, the island has not been subjected to frequent visits, scientific research or sampling.

Since 1983, the numbers of Antarctic fur seals in the South Orkney Islands has increased significantly, with consequent destruction of accessible areas of vegetation where the seals come ashore. Some vegetated areas on Lynch Island have been damaged, although at the time of the most recent inspection (17 February 1999) it was observed that the most luxuriant areas of grass on the northern and north-western slopes had not yet been affected. However, accessible *Polytrichum* and *Chorisodontium* moss banks and *Deschampsia* on the north-eastern and eastern sides of the island have been extensively damaged. Notwithstanding this localised destruction, to date the primary values of the island as noted above have not been significantly compromised by either human or seal access to the island. The Area therefore has potential value as a reference site against which to measure changes in comparable ecosystems which are experiencing substantial changes as a result of Antarctic fur seal activities.

The coastline boundaries of the Area have not changed in this management plan, but the Area is better defined to include the whole island above the low tide water level, excluding offshore islets and rocks.

2. Aims and objectives

Management at Lynch Island aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance to the Area;
- protect the plant communities, especially those associated with the *Deschampsia / Colobanthus*, against direct disturbance by Antarctic fur seals;
- allow scientific research on the ecosystem in the Area provided it is for compelling reasons which cannot be served elsewhere;
- maintain the Area as a potential reference site against which to measure and compare changes occurring as a result of disturbance by Antarctic fur seals at nearby sites where their access is unrestricted;
- ensure that the flora and fauna are not adversely affected by excessive sampling within the Area;
- minimise the possibility of introduction of alien plants, animals and microbes to the Area;
- allow visits for management purposes only in support of the aims of the management plan.

3. Management activities

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

- A map showing the location of the Area (stating the special restrictions that apply) shall be displayed prominently at Signy (UK) and Orcadas (Arg.) research stations, where copies of this management plan shall also be made available;

- A sign showing the location and boundaries of the Area with clear statements of entry restrictions should be placed on a prominent rock near the access beach on the eastern end of the northern side of the island (Map 2) to help avoid inadvertent entry;
- The values for which the Area is protected are at risk of destruction by Antarctic fur seals, which have shown a significant increase in numbers in the South Orkney Islands. At Lynch Island active management may be required in order to exclude Antarctic fur seal access to vegetated areas. This may involve the construction of fences or walls at appropriate locations. Careful assessment of the active management options available to prevent permanent damage to the vegetation will be undertaken in advance. An environmental impact assessment will be carried out before proceeding with any activity of this nature;
- Markers, signs, or other structures erected within the Area for scientific or management purposes shall be secured and maintained in good condition and removed when no longer necessary;
- Visits shall be made as necessary (no less than once every three 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.

4. Period of designation

Designated for an indefinite period.

5. Maps and photographs

Map 1: Lynch Island Specially Protected Area No. 14 in relation to the South Orkney Islands, showing the location of Signy Research Station (UK), and the location of the other protected areas in the region (Moe Island SPA No. 13, Southern Powell Island SPA No. 15, and North Coronation Island SPA No. 18). Inset: the location of the South Orkney Islands in Antarctica.

Map 2: Lynch Island SPA No. 14 topographic map. Map specifications
 Projection: Lambert Conformal Conic; Standard parallels: 1st 60° 40' 00" S; 2nd 63° 20' 00"S;
 Central Meridian: 45° 26' 20" W; Latitude of Origin: 63° 20' 00" S; Spheroid: WGS84; Datum:
 Mean Sea Level. Horizontal accuracy of control points: ±1 m. Vertical contour interval 10 m,
 horizontal and vertical accuracy expected to approximately ±1 m.

Map 3: Lynch Island SPA No. 14 vegetation map. Map specifications as for Map 2.

6. Description of the Area

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

Lynch Island (latitude 60°39'10" S, longitude 45°36'25" W; area: 0.1 km²) is a small island situated at the eastern end of Marshall Bay in the South Orkney Islands, about 200 m south of Coronation Island and 2.4 km north of Signy Island (Map 1). The 500 m x 300 m island has low cliffs of up to 20 m in height on the south, east and west sides, dissected by boulder-filled gullies. The northern side has a low cliff below a rock terrace at about 5-8 m altitude, above which moderate slopes rise to a broad plateau at about 40-50 m, with a maximum altitude of 57 m. A beach at the eastern end of the northern coast affords easy access to relatively gentle slopes leading to the central plateau area. The coastal cliffs generally make access to the upper island

by other routes difficult, although access is feasible via one or two of the gullies on the eastern and northern sides.

The designated Area comprises the entire island above the low tide level, at which the coastline is defined as the boundary of the Area (Map 2). Boundary markers have not been installed because the coast itself is a clearly defined and visually obvious boundary feature.

No meteorological data are available for Lynch Island, but conditions are broadly expected to be similar to those experienced at Signy Research Station. However, anecdotal observations suggest that significant microclimatic differences exist on Lynch Island, as the more profuse growth of plant communities would seem to attest. The island is exposed to the south-west and to katabatic and föhn winds descending from Coronation Island to the north. However, in other respects the island is relatively sheltered from regional northerly, easterly and southerly winds by Coronation Island, Cape Hansen and Signy Island respectively. The föhn effect can briefly raise local air temperatures by as much as 10°C at Signy Island. Lynch Island has often been observed to receive sunshine when the surrounding region is shrouded in low cloud. The angle of solar incidence is also relatively high on the northern side of the island because of its general slope and aspect. The above factors may be important reasons for the abundance of the two flowering plants found on the island.

The bedrock of Lynch Island consists of quartzo-feldspathic and micaceous schists of the Scotia metamorphic complex, but is poorly exposed and equivalent rocks are much better displayed in the Cape Hansen area, to the east on Coronation Island. Three main soil types have been identified on Lynch Island:

(i) an acidic (pH 3.8 – 4.5) moss peat, formed by the tall turf-forming mosses *Chorisodontium aciphyllum* and *Polytrichum strictum* (= *Polytrichum alpestre*), occurs mainly at the north-eastern end of the island. This peat reaches a depth of about 50 cm and is similar to peat on Signy Island where it reaches a depth of 2 m. Where the peat depth exceeds about 30 cm there is permafrost. In a few places where the substratum is moist, shallow peat of 10-15 cm depth (pH 4.8 ~ 5.5) has accumulated beneath the carpet-forming mosses *Warnstorfia laculosa* (= *Calliergidium austro-stramineum*) and *Sanionia uncinata* (= *Drepanocladus uncinatus*).

(ii) a shallow, gravelly loam-like soil resembling tundra brown soil occurs beneath dense swards of the grass *Deschampsia antarctica*. It is seldom more than about 30 cm in depth (pH 5.0 – 5.8) and probably represents one of the most advanced soil types in the Antarctic.

(iii) A glacial till with material ranging from fine clay (pH 5.2 – 6.0) and sand to gravel and larger stones. This covers the summit plateau and occurs in rock depressions throughout the island, as well as on parts of the rock terrace. On the plateau cryoturbation has in several places sorted the material into patterned features with small stone circles and polygons on level ground and stone stripes on sloping ground. At the north-eastern end of the island, the deposition of limpet shells (*Nacella concinna*) by gulls (*Larus dominicanus*) has resulted in a more calcareous mineral soil in rock depressions with a pH of 6.5 - 6.8.

Small temporary melt-streams occur on the slopes in summer, but there are no permanent streams or pools, and only a few small late-lying snow patches occur on the southern side of the island.

Cryptogamic and phanerogamic vegetation typical of the maritime Antarctic is found over much of the island (Map 3). The most significant aspect of the vegetation is the abundance and reproductive success of

the two native Antarctic flowering plants, the Antarctic hair grass (*Deschampsia antarctica*) and Antarctic pearlwort (*Colobanthus quitensis*), found especially on the northern slopes (Map 3). Both species flower in profusion and seed viability appears to be much greater than on Signy Island. Lynch Island possesses the largest stands of *Deschampsia* and the greatest abundance of *Colobanthus* known in the South Orkney Islands and one of the most extensive anywhere in the Antarctica Treaty Area.

On the rock terrace and moist slope rising above the northern coast, the grass forms extensive swards of up to 15 m x 50 m. These swards range from continuous stands of relatively luxuriant plants on the moister sites and ledges to small, yellowish, more isolated plants on the drier, stonier and more exposed terrain. *Colobanthus* is generally associated, but here the plants do not coalesce to form closed patches. This is one of very few sites where *Deschampsia* is known to grow directly on *Polytrichum-Chorisodontium* moss banks. Elsewhere on the island, the grass and, to a lesser extent, the pearlwort are frequent associates in other communities, especially stands of denser fellfield vegetation where there is quite high cover afforded by various mosses and lichens (particularly towards the western end of the northern terrace).

Shallow but occasionally extensive (about 50 m²) banks of *Chorisodontium aciphyllum* and *Polytrichum strictum* are frequent at the north-eastern end of the island and, to a lesser extent, on the southern side. These are typical of the moss banks which occur on Signy Island and elsewhere in the northern maritime Antarctic, with several fruticose and crustose lichens growing epiphytically on the moss surface. In small moist depressions, there are carpets of *Warnstorfia laculosa* and *Sanionia uncinata*, with some *Warnstorfia sarmentosa* (= *Calliargon sarmentosum*) and *Cephaloziella varians* (= *C. exiliflora*). On wet soil and rock ledges, *Brachythecium austro-salebrosum* is common.

On the drier, more windswept, stonier soils and rock surfaces – notably in the plateau area – a typical open fellfield community of many bryophyte and lichen taxa form a complex mosaic. The dominant species in this locality are the lichens *Usnea antarctica* and *U. aurantiaco-atra* (= *U. fasciata*) and the moss *Andreaea depressinervis*; *Sphaerophorus globosus* and other species of *Alectoria*, *Andreaea*, *Cladonia*, and *Stereocaulon* are also common, while *Himantormia lugubris* and *Umbilicaria antarctica* are infrequent. Crustose lichens are abundant on all rock surfaces. The mosses and macrolichens in this area are loosely attached on thin soils and are easily damaged. Large thalli of *Usnea* spp. and *Umbilicaria antarctica* are found on moist sheltered boulders and rock faces, especially on the southern side of the island.

Communities of crustose lichens occur on the cliffs above the high water mark, especially where the rock is influenced by breeding or roosting birds. The distribution of several species forms distinctive zones in relation to inundation by sea spray and exposure to wind. The best developed communities of brightly coloured ornithocoprophilous taxa occur at the western end of the island where *Caloplaca* spp., *Haematomma erythromma*, *Mastodia tessellata*, *Physcia caesia*, *Xanthoria candelaria*, *X. elegans*, and species of *Buellia* and *Verrucaria* are frequent. The uncommon halophilous moss *Muelleriella crassifolia* also occurs within the spray zone around the island.

The only rare moss recorded on Lynch Island is *Plagiothecium ovalifolium*, found in moist, shaded rock crevices near the shore. However, the island is possibly the only site known in the Maritime Antarctic where the moss *Polytrichastrum alpinum* develops sporophytes in profusion each year; this occurs among *Deschampsia*, *Colobanthus* and cryptogams on the northern side of the island; elsewhere in the Antarctic

sporophytes are in some years very rare. Also, *Polytrichum strictum* produces male inflorescences in local abundance, a rare phenomenon in this species in the Antarctic. While the thalloid liverwort *Marchantia berteroana* is locally common on Signy Island, Lynch Island is one of very few other localities where it is known in the South Orkney Islands. Several cryptogamic species of very restricted distribution in the Antarctic, but which are locally common on Signy Island and the mainland of Coronation Island only a few hundred metres away, have not been observed at Lynch Island.

The microinvertebrate fauna associated with the rich *Deschampsia* swards described thus far comprises 13 taxa: three springtails (*Cryptopygus antarcticus*, *Friesea woyciechowskii* and *Isotoma (Folsomotoma) octooculata* (= *Parisotoma octooculata*), one mesostigmatid mite (*Gamasellus racovitzai*), two cryptostigmatid mites (*Alaskozetes antarcticus* and *Globoppia loxolineata*), and seven prostigmatid mites (*Apotriophtydeus* sp., *Ereynetes macquariensis*, *Nanorchestes berryi*, *Stereotydeus villosus*, and three species of *Eupodes*). The number of taxa identified is likely to increase with greater sampling. The community is dominated by the Collembolla, especially *Cryptopygus antarcticus* (84% of all arthropods extracted), with relatively large numbers of *I. octooculata*; the principal mite was an undetermined species of *Eupodes*. *Globoppia loxolineata* is near the northernmost limit of its known distribution. In general, the population density of the arthropod community of grass stands on Lynch Island appears unusually high, with some measurements suggesting it is one of the highest in the world. It also shows considerable diversity for an Antarctic site, although this observation was based on a small number of sample replicates and further sampling would be required to establish densities with greater reliability: this is difficult to achieve on Lynch Island given the very limited extent of communities available for sampling.

Lynch Island was the first site in the Antarctic where a terrestrial enchytraeid was found (in soil beneath a moss *Hennediella antarctica* on a rock ledge above the northern shore); only in a few other sites in the South Orkney Islands have these worms been found – although few samples have been gathered and the species has yet to be identified. Of the tardigrade fauna, most of the 16 individuals isolated from a sample of *Brachythecium* were *Hypsibius alpinus* and *H. pinguis* with some *H. dujardini*, while of 27 isolated from a *Prasiola crispa* sample, almost all were the latter species with a few that were other species of *Hypsibius*.

The mineral and organic soils of Lynch Island have a slightly higher pH than corresponding soils on nearby Signy Island. This higher base and nutrient status, together with the more favourable microclimate, is reflected in larger numbers of bacteria (including *Chromobacterium*), yeasts and fungi than occur in comparable soils on Signy Island. Bacterial numbers in the *Polytrichum* peat on Lynch Island are about eight times, and in the *Warnstorfia* peat about six times, greater than in corresponding Signy Island peats; yeasts and fungi are similarly much more abundant. Soil associated with the two flowering plants yielded several nematophagous fungi: in *Deschampsia* soil *Acrostalagmus goniodes*, *Cephalosporium balanoides* and *Dactylaria gracilis*; in *Colobanthus* soil, *Cephalosporium balanoides*, *Dactylaria gracilis*, *Dactylella stenobrocha* and *Harposporium anguillulae* were found. The basidiomycete fungi *Galerina antarctica* and *G. longinqua* occur on moist moss.

The island has no penguin colonies or substantial breeding colonies of other birds. Groups of chinstrap (*Pygoscelis antarctica*), Adélie (*P. adeliae*) and gentoo (*P. papua*) penguins and, sometimes, blue-eyed cormorants (*Phalacrocorax atriceps*) often congregate at the north-eastern and the western ends of the

island. Several pairs of brown skuas (*Catharacta loennbergi*) and at least two pairs of kelp gulls (*Larus dominicanus*) were observed in the early 1980s to nest at the north-eastern corner. A small colony of Antarctic terns (*Sterna vittata*) may also occur in this vicinity, although in February 1994 breeding was not observed. Cape petrels (*Daption capense*) and snow petrels (*Pagodroma nivea*) breed on the higher cliffs at the eastern end and along the north-western coast of the island. A few pairs of snow petrels and Wilson's storm petrels (*Oceanites oceanicus*) nest on ledges and beneath boulders on the south side of the island.

Weddell seals (*Leptonychotes weddellii*), crabeater seals (*Lobodon carcinophagus*), occasional leopard seals (*Hydrurga leptonyx*), and small groups of southern elephant seals (*Mirounga leonina*) are regularly seen on the coast and on ice floes in the vicinity; none have been known to breed on Lynch Island. Since the early 1980s increasing numbers of Antarctic fur seals (*Arctocephalus gazella*), virtually all being immature non-breeding males, have been observed on Lynch Island, some gaining access up the more gentle north-eastern slopes to vegetated areas, where they have caused local, but severe, damage to *Polytrichum-Chorisodontium* moss banks and other communities.

Seal access to the island is principally from a beach on the NE coast. Once seals have gained access, there are no further substantial geographical impediments to their more extensive travel over the island. Groups of seals have been observed near the summit. Destruction of swards of *Deschampsia*, the feature for which the Area is primarily protected, was first reported in 1988. At the time of the most recent inspection (February 1999) it was observed that the most luxuriant areas of *Deschampsia* and *Colobanthus* on the northern and north-western slopes had not yet been affected. Accessible areas of vegetation in the eastern and north-eastern sides of the island, particularly *Polytrichum* and *Chorisodontium* moss banks, had been severely damaged by Antarctic fur seals, while *Deschampsia* had either been damaged or had died (Map 3).

6(ii) Restricted and managed zones within the Area

None.

6(iii) Structures within and near the Area

There are no structures present in the Area apart from several cairns marking sites used for topographical survey. A sign notifying the specially protected status of Lynch Island was erected on a prominent rock outcrop above the recommended landing beach in February 1994, but this was destroyed by strong winds. The same site should be used for a stronger replacement sign.

A small refuge is present at Shingle Cove, 2 km east, around Cape Hansen on Coronation Island. Signy Research Station (UK) is 6.4 km south at Factory Cove, Borge Bay, on Signy Island.

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

The nearest protected areas to Lynch Island are North Coronation Island (SPA No.18) which lies about 5 km to the north, Moe Island (SPA No. 13) which is about 10 km SSW, and Southern Powell Island (SPA No. 15) which is about 35 km to the east (Map 1).

7. Permit conditions

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

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

7(i) Access to and movement within the Area

Vehicles are prohibited within the Area and access shall be by small boat or by helicopter. Landings from the sea should be at the beach on the eastern end of the northern coast of the island (Map 2), unless specifically authorised by Permit to land elsewhere, or when landing at this location is impractical because of adverse conditions. Landing of helicopters within the Area shall be at the designated location on the rock platform (8 m) on the north-western end of the island (Map 2). Use of helicopter smoke grenades is prohibited unless absolutely necessary for safety, and all grenades should be retrieved. No special restrictions apply to the sea or air routes used to move to and from the Area.

Movement within the Area shall be on foot. Pilots, air or boat crew, or other people on aircraft or boats, are prohibited from moving on foot beyond the immediate vicinity of their landing site unless specifically authorised by Permit. All movement should be undertaken carefully so as to minimise disturbance to the soil and vegetated surfaces, walking on rocky terrain if practical, but taking care not to damage or dislodge lichens. Pedestrian traffic should be kept to the minimum consistent with the objectives of any permitted activities, and every reasonable effort should be made to minimise trampling effects.

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

- Scientific research that will not jeopardise the ecosystem or scientific values of the Area, and which cannot be served elsewhere;
- Essential management activities, including monitoring;

7(iii) Installation, modification or removal of structures

Structures shall not 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 a condition of the Permit.

7(iv) Location of field camps

Camping should be avoided within the Area. However, when absolutely necessary for purposes specified in the Permit, camping is allowed at the designated site at the north-western end of the island (Map 2).

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. No herbicides or pesticides shall be brought into the Area. Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes specified in the Permit, shall be removed from the Area at or before the conclusion of the activity for which the Permit was granted. Fuel is not to be stored in the Area, unless specifically authorised by Permit for specific scientific or management purposes. Anything introduced shall be for a stated period only, shall be removed at or before the conclusion of that stated period, and shall be stored and handled so that risk of any introduction into the environment is minimised. If release occurs which is likely to compromise the values of the Area, removal is encouraged only where the impact of removal is not likely to be greater than that of leaving the material *in situ*. The appropriate authority should be notified of anything released and not removed that was not included in the authorised Permit.

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

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

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

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 if there is a reasonable concern that the sampling proposed would take, remove or damage such quantities of soil, native flora or fauna that their distribution or abundance on Lynch Island 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 authorised, may be removed unless the impact of removal is likely to be greater than leaving the material *in situ*: if this is the case the appropriate authority should be notified.

7(viii) Disposal of waste

All wastes, including all human wastes, shall be removed from the Area. Human wastes may be disposed of into the sea.

7(ix) *Measures that are necessary to ensure that the aims and objectives of the management plan can continue to be met*

1. Permits may be granted to enter the Area to carry out biological monitoring and site inspection activities, which may involve the collection of limited samples for analysis or review, or for protective measures.
2. Any specific sites of long-term monitoring shall be appropriately marked.
3. To help maintain the ecological and scientific values of Lynch Island 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 sterilised. To the maximum extent practicable, footwear and other equipment used or brought into the Area (including backpacks, carry-bags and tents) shall be thoroughly cleaned before entering the Area.

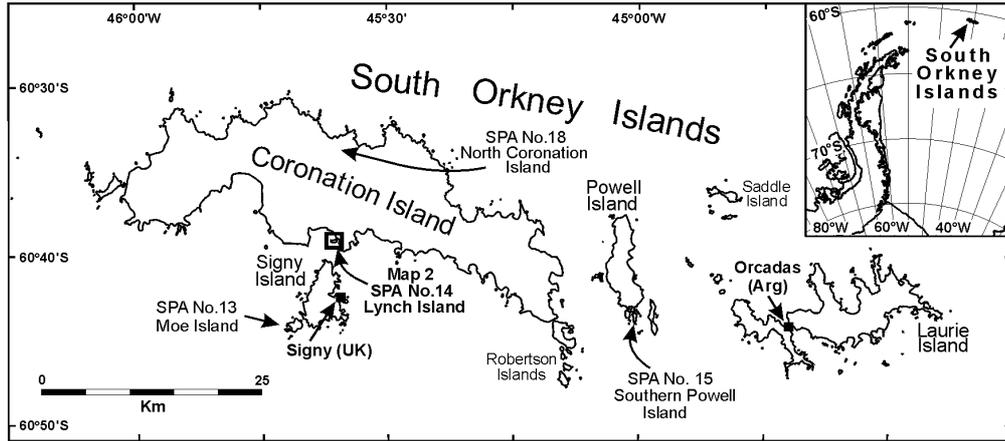
7(x) *Requirements for reports*

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

Bibliography

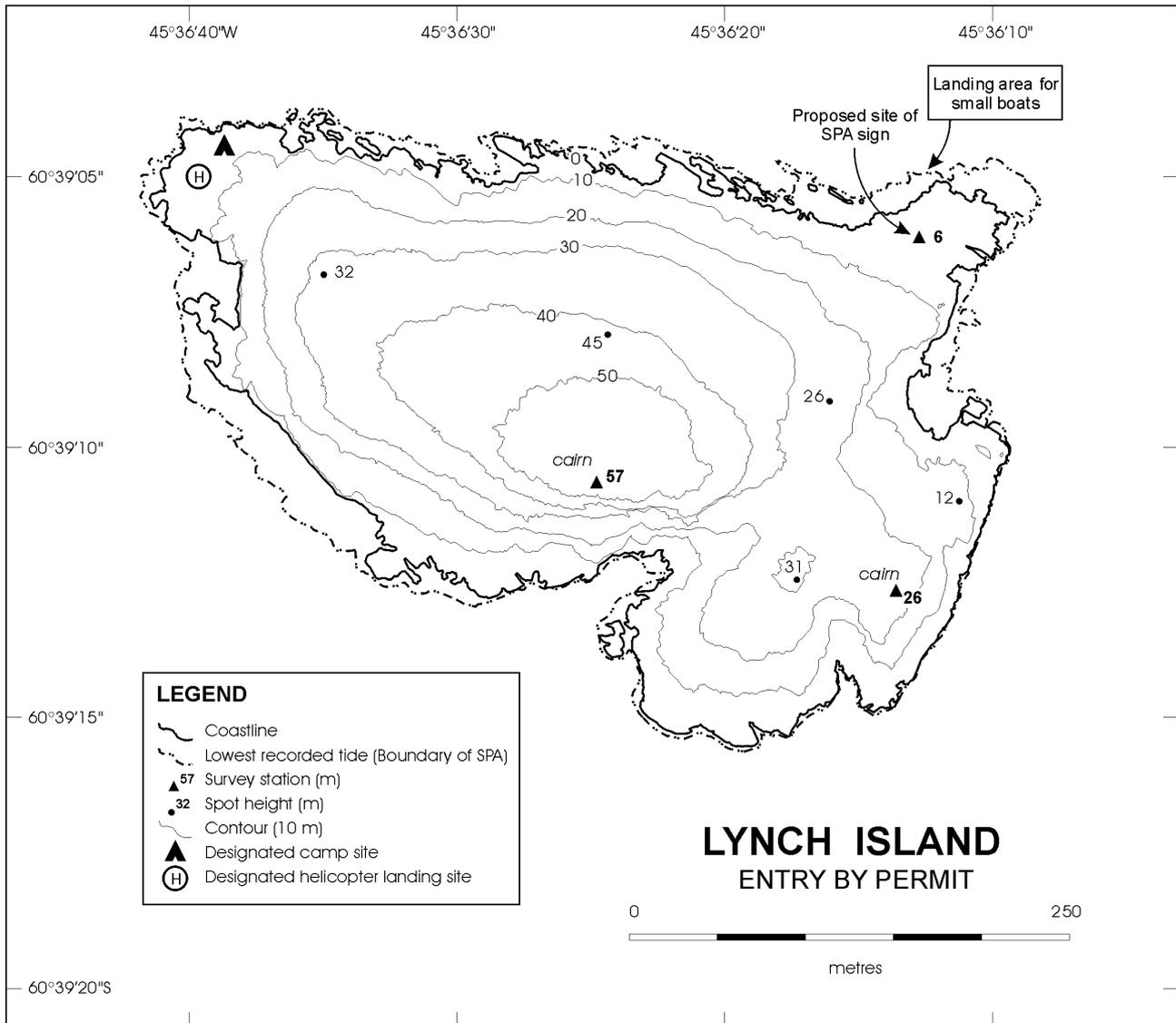
- Convey, P. 1994. Modelling reproductive effort in sub- and maritime Antarctic mosses. *Oecologia* **100**: 45-53.
- Block, W. and Christensen, B. 1985. Terrestrial Enchytraeidae from South Georgia and the Maritime Antarctic. *British Antarctic Survey Bulletin* **69**: 65-70.
- Bonner, W.N. and Smith, R.I.L. (Eds) 1985. *Conservation areas in the Antarctic*. SCAR, Cambridge: 73-84.
- Bonner, W.N. 1994. Active management of protected areas. In Smith, R.I.L., Walton, D.W.H. and Dingwall, P.R. (Eds) *Developing the Antarctic Protected Area system. Conservation of the Southern Polar Region 1*. IUCN, Gland and Cambridge: 73-84.
- Booth, R.G., Edwards, M. and Usher, M.B. 1985. Mites of the genus *Eupodes* (Acari, Prostigmata) from maritime Antarctica: a biometrical and taxonomic study. *Journal of the Zoological Society of London (A)* **207**: 381-406.
- Buryn, R. and Usher, M.B. 1986. A morphometric study of the mite, *Oppia loxolineata*, in the Maritime Antarctic. *British Antarctic Survey Bulletin* **73**: 47-50.
- Chalmers, M.O. 1994. Lynch Island fur seal enclosure report 01/01/94. Unpublished British Antarctic Survey report BAS Ref AD6/2H/1993/NT2.
- Greene, D.M and Holtom, A. 1971. Studies in *Colobanthus quitensis* (Kunth) Bartl. and *Deschampsia antarctica* Desv.: III. Distribution, habitats and performance in the Antarctic botanical zone. *British Antarctic Survey Bulletin* **26**: 1-29.
- Hodgson, D.A. and Johnston, N.M. 1997. Inferring seal populations from lake sediments. *Nature* **387**(1 May).
- Hodgson, D.A., Johnston, N.M., Caulkett, A.P., and Jones, V.J. 1998. Palaeolimnology of Antarctic fur seal *Arctocephalus gazella* populations and implications for Antarctic management. *Biological Conservation* **83**(2): 145-54.
- Hooker, T.N. 1974. Botanical excursion to Lynch Island, 13/03/74. Unpublished British Antarctic Survey report BAS Ref AD6/2H/1973-74/N12.
- Jennings, P.G. 1976. Tardigrada from the Antarctic Peninsula and Scotia Ridge region. *British Antarctic Survey Bulletin* **44**: 77-95.
- Shears, J.R. and Richard, K.J. 1994. Marking and inspection survey of Specially Protected Areas in the South Orkney Islands, Antarctica 07/01/94 – 17/02/94. Unpublished British Antarctic Survey report BAS Ref AD6/2H/1993/NT5.
- Smith, R.I. Lewis 1972. Vegetation of the South Orkney Islands. *BAS Scientific Report* **68**, British Antarctic Survey, Cambridge.
- Smith, R.I. Lewis 1990. Signy Island as a paradigm of environmental change in Antarctic terrestrial ecosystems. In K.R. Kerry and G. Hempel. *Antarctic Ecosystems: ecological change and conservation*. Springer-Verlag, Berlin: 32-50.
- Smith, R.I. Lewis 1994. Introduction to the Antarctic Protected Area System. In Smith, R.I.L., Walton, D.W.H. and Dingwall, P.R. (Eds) *Developing the Antarctic Protected Area system. Conservation of the Southern Polar Region 1*. IUCN, Gland and Cambridge: 14-26.

- Smith, R.I. Lewis 1997. Impact of an increasing fur seal population on Antarctic plant communities: resilience and recovery. In Battaglia, B. Valencia, J. and Walton, D.W.H. *Antarctic communities: species, structure and survival*. Cambridge University Press, Cambridge: 432-36.
- Starý, J. and Block, W. 1998. Distribution and biogeography of oribatid mites (Acari: Oribatida) in Antarctica, the sub-Antarctic and nearby land areas. *Journal of Natural History* **32**: 861-94.
- Usher, M.B. and Edwards, M. 1984. The terrestrial arthropods of the grass sward of Lynch Island, a specially protected area in Antarctica. *Oecologia* **63**: 143-44.
- Usher, M.B. and Edwards, M. 1986. A biometrical study of the family Tydeidae (Acari, Prostigmata) in the Maritime Antarctic, with descriptions of three new taxa. *Journal of the Zoological Society of London (A)* **209**: 355-83.
- Wynn-Williams, D.D. 1982. The microflora of Lynch Island, a sheltered maritime Antarctic site. *Comité National Française Recherche en Antarctiques* **51**: 538.

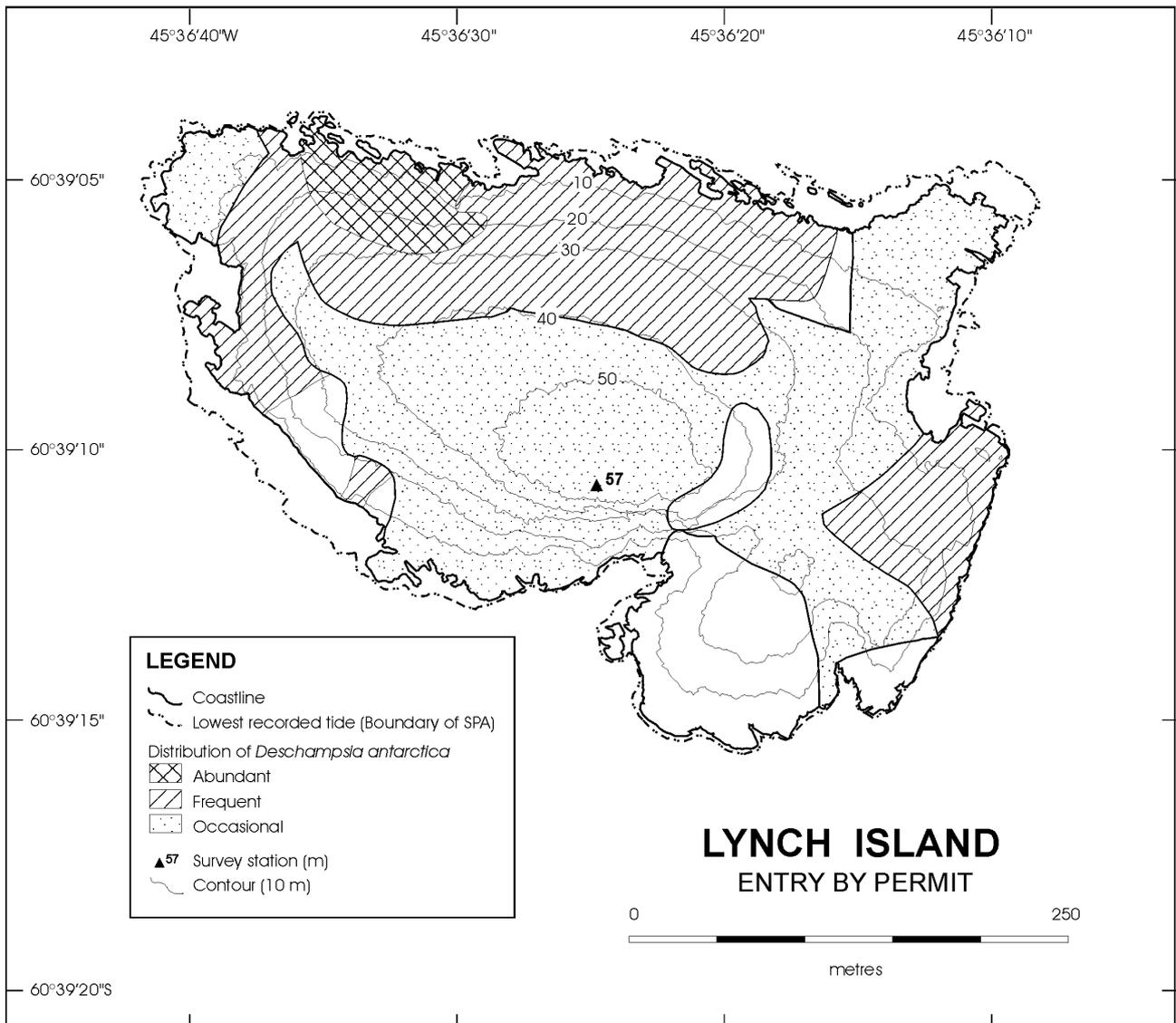


Map 1. Lynch Island (SPA No. 14), South Orkney Islands, location map. Inset: location of the South Orkney Islands.

Map 2. Lynch Island (SPA No. 14) topographic map.



Map 3. Lynch Island (SPA No. 14) vegetation map.



Management Plan for Specially Protected Area No. 19

LAGOTELLERIE ISLAND, MARGUERITE BAY, GRAHAM LAND

1. Description of values to be protected

Lagotellerie Island (Latitude 67°53'20" S, Longitude 67°25'30" W, 1.58 km²), Marguerite Bay, Graham Land, was originally designated as a Specially Protected Area through Recommendation XIII-11 (1985, SPA No. 19) after a proposal by the United Kingdom. It was designated on the grounds that the island “contains a relatively diverse flora and fauna typical of the southern Antarctic Peninsula region; that of particular interest is the abundance of the only two Antarctic flowering plants *Deschampsia antarctica* and *Colobanthus quitensis* which form stands up to 10 m²; that these are amongst the largest stands known south of the South Shetland Islands, being only 90 km north of their southern limit; that here both species flower profusely and the seeds have a greater viability than those produced in the South Orkney or South Shetland Islands; that numerous mosses and lichens also form well-developed communities on the island; that a few of the mosses are fertile, a rare phenomenon in most Antarctic localities; that the invertebrate fauna is rich and that the island is one of the southernmost sites for the apterous midge *Belgica antarctica*; that the shallow loamy soil developed beneath these swards and its associated invertebrate fauna and microbiota are probably unique at this latitude; that there is a colony of about 1000 Adélie penguins (*Pygoscelis adeliae*) and one of the farthest south colonies of a few dozen blue-eyed cormorants (*Phalacrocorax atriceps*) at the south-east corner of the island and that numerous pairs of brown and south polar skuas (*Catharacta loennbergi* and *C. maccormicki*) breed on the island.”. (It is probable the original reference to 1000 Adélie penguins was meant to be 1000 pairs).

These values were reiterated in Recommendation XVI-6 (1991) when a management plan for the site was adopted, and are largely reaffirmed again in the present management plan. In addition, Lagotellerie Island is notable for the occurrence of *Deschampsia antarctica* at the highest recorded altitude south of 56° S, with scattered small plants observed at heights of up to 275 m. The island therefore has a particular scientific value for study of the influence of altitudinal gradient on biological viability for plant species represented at this site. The values associated with the penguin and skua colonies are now considered to be their ecological interrelationship with the other biological features of exceptional value noted above. Fossiliferous strata present at the eastern end of the island are of particular geological value, as such formations are not commonly exposed in the Antarctic Peninsula Volcanic Group.

The island is 3.25 km west of the southern end of Horseshoe Island, 29 km NW of General San Martín Station (Arg.), almost 70 km east from Teniente Luis Carvajal (Chile) and 46 km SE from Rothera Research Station (UK). The island has not been subject to frequent visits, scientific research or sampling.

The boundary of the Area is defined in this management plan to include the whole island, and offshore islets within 200 m of the coast, above the low tide water level.

2. Aims and objectives

Management at Lagotellerie Island aims to:

- avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human disturbance and sampling in the Area;
- preserve the ecosystem of the Area for its potential as a largely undisturbed reference area;
- allow scientific research on the ecosystem in the Area provided it is for compelling reasons which cannot be served elsewhere, in particular research which is expected to improve knowledge of the features and communities identified of special value, and which gathers baseline data on the island's features for which information is poor or not available;
- 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 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 any operational research station located within 50 km 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 access beaches on the northern coast and eastern promontory of the island 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.
- 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.

4. Period of designation

Designated for an indefinite period.

5. Maps and photographs

Map 1: Lagotellerie Island Specially Protected Area No. 19, Marguerite Bay, location map, showing the location of General San Martín Station (Arg.), the station Teniente Luis Carvajal (Chile), Adelaide Island, Rothera Research Station (UK) and nearby SSSI No. 9 at Rothera Point, also on Adelaide Island, and the location of the other protected areas in the region (Dion Islands (SPA No. 8) and Avian Island (SPA No. 21)). 'Base Y' (UK) (Historic Monument No. 63) on Horseshoe Island is shown. Inset: the location of Lagotellerie Island along the Antarctic Peninsula.

Map 2: Lagotellerie Island (SPA No. 19) topographic map.

Map specifications: Projection: Lambert Conformal Conic;

Standard parallels: 1st 63° 20' 00" S; 2nd 76° 40' 00" S; Central Meridian: 65° 00' 00" W;

Latitude of Origin: 70° 00' 00" S; Spheroid: WGS84; Datum: Mean Sea Level;

Vertical contour interval 20 m. Horizontal and vertical accuracy expected to be better than ±5 m.

Map 3: Lagotellerie Island (SPA No. 19) geological sketch map.

6. Description of the Area

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

Lagotellerie Island (Latitude 67°53'20" S, Longitude 67°25'30" W; area 1.58 km²), is situated in Marguerite Bay, Fallières Coast, Graham Land, 46 km SE of Rothera Point on Adelaide Island, 11 km south of Porquois Pas Island and 3.25 km west of the south end of Horseshoe Island. Lagotellerie Island is 2 km by 1.3 km, oriented generally in an E-W direction. Two year-round scientific research stations operate in the vicinity: General San Martín (Argentina; Latitude 68°08' S, Longitude 67°06' W) which is 29.5 km SSE, and Rothera Research Station (UK; Latitude 67°34' S, Longitude 68°07' W) which is 46 km to the NW. A summer-only station, Teniente Luis Carvajal (Latitude 67°46' S, Longitude 68°55' W), has been operated by Chile at the southern end of Adelaide Island since 1985. Lagotellerie Island was first mapped by Jean-Baptiste Charcot during the *Deuxième Expédition Antarctiques Française* in 1908-10. There are no records of further visits until the 1940s, when the island was visited occasionally by American, Argentine and British field parties from nearby scientific stations. The island has not been the subject of any major scientific investigations and is thus largely undisturbed by human activities.

The designated Area comprises the entire main island, and offshore islets within 200 m of the coast, above the low tide water level, which is defined as the boundary of the Area (Map 2). Boundary markers have not been installed because the coast itself is a clearly defined and visually obvious boundary. Signs should be installed on the northern coast and at the penguin colony on the SE promontory of the island, as described in Section 6(iii) below.

Lagotellerie Island is steep-sided and rocky, with about 13% permanent ice cover, most of which is on the southern slopes. The island rises to twin peaks of 268 m and 288 m separated by a broad saddle at around 200 m, with precipitous cliffs up to this height on the south, west and east sides. The upper northern slopes also have steep cliffs, intersected by gullies, screes and traversed by broad rock terraces. The lower northern slopes are more gentle, particularly on the eastern half of the island, with a broad rocky terrace at an elevation of about 15 m which is formed of frost-shattered raised beach debris.

The bulk of Lagotellerie Island is formed of quartz diorite of unknown age, cut by pink, coarse-grained granodiorite and numerous basic and felsic dykes (Map 3). At the eastern end of the island the plutonic rocks are in fault contact with folded, mildly hornfelsed volcanic rocks of Jurassic–Cretaceous age. These consist of agglomerates, andesitic lavas and tuffs of the Antarctic Peninsula Volcanic Group, with plant remains – probably Jurassic – present in shaly beds interbedded with tuff. Such fossiliferous strata are not commonly exposed in the Antarctic Peninsula Volcanic Group, and are therefore of particular geological importance.

Locally extensive areas of coarse sand and gravel derived from weathered quartz-diorite occur on slopes, ledges, gullies and depressions; the most extensive accumulations are on the saddle between the two summits where the soil is sorted into well-developed stone polygons, circles and stripes. On the broad rock terraces closed stands of moss and grass have developed a relatively rich loamy earth up to 25 cm in depth. Glacial erratics are common on the island.

The island has a relatively diverse flora and luxuriant development of plant communities, representative of the southern maritime Antarctic region. The rich terrestrial biology of Lagotellerie Island

was first noted by Herwil Bryant, biologist at East Base (US, on Stonington Island; now Historic Monument No. 55), during a visit in 1940-41 when he observed growths of moss, the Antarctic hair grass *Deschampsia antarctica*, and “a small flowering plant” (almost certainly the Antarctic pearlwort *Colobanthus quitensis*), in a small gully – believed to be that found at the north-eastern end of the island – which he considered of such unusual richness for the region that he unofficially referred to it as “Shangri-la Valley”. He did not describe the less luxuriant but more extensive communities of *Deschampsia antarctica* and *Colobanthus quitensis* found on the higher north-facing slopes of the island. These slopes and terraces also provide favourable microclimatic conditions for growth, with a relatively long snow-free growing season, and support an abundance of *Deschampsia antarctica* and *Colobanthus quitensis*, the grass forming closed swards of up to 10 m² on some of the terraces. These are among the largest stands of these plants known south of the South Shetland Islands. Both species flower abundantly and the seeds have a greater viability than those produced in the South Orkney or South Shetland Islands, yet they are close to the southern limit of their range. Lagotellerie Island, however, is notable for the growth of *Deschampsia antarctica* at the highest altitude recorded south of 56° S, with scattered small plants observed at heights of up to 275 m. *Colobanthus quitensis* has been observed growing up to 120 m on the island.

Lagotellerie Island also has a rich cryptogamic flora, with small stands of well-developed communities containing several mosses and lichens which are rare at this latitude (notably the mosses *Platydictya jungermannioides* and *Polytrichastrum alpinum*, and lichens *Caloplaca isidioclada*, *Fuscoparmelia gerlachei* and *Usnea trachycarpa*). The number of bryophyte species thus far identified include 20 mosses and two liverworts (*Barbilophozia hatcheri* and *Cephaloziella varians*), and there are at least 60 lichen species. A comprehensive floristic survey of the island has not yet been undertaken, and numerous species, especially of crustose lichens, remain to be accurately determined.

Vegetation is best developed on a series of rock terraces at around 30-50 m a.s.l. on the northern side of the island. Here, both *Deschampsia* and *Colobanthus* are abundant, and closed grass swards form stands of several square metres. Associated with these, especially on the moister terraces, are usually the mosses *Brachythecium austro-salebrosum*, *Bryum* spp., *Pohlia nutans*, *Polytrichastrum alpinum* and *Sanionia uncinata*, and liverworts *Barbilophozia hatcheri* and *Cephaloziella varians*. Many of these grass swards are used as nest sites by skuas.

In drier habitats, especially on scree and rock faces, there are locally dense stands dominated by the macrolichens *Usnea sphacelata* and *U. subantarctica*, with *Pseudephebe minuscula*, *Umbilicaria decussata*, and a large number of crustose taxa. Several lichens are associated with the grass and moss communities (e.g. *Cladonia* spp., *Leproloma* spp., *Leptogium puberulum*, *Ochrolechia frigida*, *Psoroma* spp.). Near the penguin and cormorant colonies several colourful nitrophilous lichens are abundant (e.g. *Buellia* spp., *Caloplaca* spp., *Fuscoparmelia gerlachei*, *Xanthoria* spp.).

Numerous lichens (notably *Caloplaca isidioclada*, *Pseudephebe minuscula*, *Usnea sphacelata*, *Umbilicaria decussata* and many crustose taxa) and a few mosses (notably *Grimmia refelxidens*) occur close to the summit of the island, as do scattered individual plants of *Deschampsia*. Few bryophytes produce sporophytes at far southern latitudes, but several mosses are fertile on Lagotellerie Island (e.g. *Andreaea*

regularis, *Bartramia patens*, *Bryum amblyodon*, *B. pseudotriquetrum*, *Grimmia reflexidens*, *Hennediella heimii*, *Pohlia nutans*, *Schistidium antarctici*, *Syntrichia princeps*).

Specific studies of the invertebrate fauna have not been conducted on Lagotellerie Island. However, at least six species of arthropod have been recorded: *Alaskozetes antarcticus*, *Gamasellus racovitzai*, *Globoppia loxolineata* (Acari), *Cryptopygus antarcticus*, *Friesea grisea* (Collembola), and *Belgica antarctica* (Diptera, Chironomidae). Several species of nematophagous fungi have been isolated from the soils associated with mosses and *Deschampsia* on Lagotellerie Island (*Cephalosporium balanoides*, *Dactylaria gracilis*, *Dactylella ellipsospora*), species widely distributed in similar habitats throughout the Antarctic and also commonly found in temperate soils.

Bryant reported several small pools present on the island in the early 1940s, which presumably are the same as, or close to, those observed more recently on the extensive flat low-lying ground on the northern side of the island. He recorded the pools contained many phyllopod crustaceans identified as *Branchinecta granulosa*. Rocks in one of the pools were coated in a bright green filamentous alga, on which the mites *Alaskozetes antarcticus* were observed. *A. antarcticus* was also common under pebbles on the pool floor. Other microorganisms of the trochelmith type were observed living in the algae, with a pink rotifer identified as *Philodina gregaria* being especially numerous. Small tufts of a grey-green alga were observed on large pebbles close to the pool bottom. The algae have not been described in more detail, although the presence of *Prasiola crista* has been noted. More recent observations in the early 1980s suggested there were no permanent freshwater bodies on the island, but temporary runnels in summer were found, with some brackish pools in rock depressions near the northern coast. An inspection visit on 12 January 1989 again noted the presence of several small melt pools of around 5-10 m², some with fringing wet moss carpets, and suggested these were probably the habitat of *Belgica antarctica*. No record has been found of any more comprehensive freshwater surveys on the island.

A small Adélie penguin (*Pygoscelis adeliae*) colony occupies the eastern promontory of the island (Map 2). Numbers have varied from a low of perhaps 350-400 pairs based on an estimate made in December 1936 to a high of 2402 pairs recorded in an accurate nest count in November 1955. The colony was regularly used as a source of eggs for personnel stationed at the nearby British Base Y on Horseshoe Island between 1955-60. It was reported that some 800 eggs were taken during 1955. The number of breeding pairs dropped to around 1000 in 1959 and 1960. Adélie penguin colonies are known to exhibit high interannual change in numbers as a result of a variety of natural factors, and in March 1981 it was observed that all of the approximately 1000 chicks in the colony had died. A chick count made in February 1983 suggested the colony consisted of approximately 1700 pairs, which is considered accurate to within 15-25%.

A small colony of blue-eyed cormorants (*Phalacrocorax atriceps*) has been observed on the eastern promontory of the island, which is one of the most southerly breeding sites reported for the species. Some 200 immature birds were observed close to the island, within view of the colony, on 16 January 1956. The colony was reported to consist of 10 nests on 17 February 1983. However, the colony was not seen in the January 1989 inspection on Lagotellerie Island. Brown and south polar skuas (*Catharacta loennbergi* and *C. maccormicki*) are also present, with 12 nests reported in 1956, when it was noted that many of the chicks were definitely south polar skua (*C. maccormicki*). It was estimated in 1958 that five pairs nested around the

penguin colony and that both species occurred. A group of 59 non-breeding birds of both species was recorded on 12 January 1989 mid-way along the northern side of the island. Two Wilson's storm petrel (*Oceanites oceanicus*) nests were recorded on 14 January 1956. A kelp gull (*Larus dominicanus*) nest, with eggs, was recorded in the 'Shangri-La Valley' by Bryant in December 1940.

The inspection visit in January 1989 reported 12 Weddell seals (*Leptonychotes weddellii*) hauled out on a small shingle beach at the base of a rocky spit on the north coast, but no other seals were seen. However, southern elephant (*Mirounga leonina*) and Antarctic fur (*Arctocephalus gazella*) seals are commonly observed in Marguerite Bay and it is possible that they also haul out at accessible parts of the island.

The most significant environmental impact at Lagotellerie Island appears to have been from the practice of egg harvesting to feed personnel at bases operating nearby in the period 1955-60. The only evidence of human activity currently thought to exist on the island are the remains of a survey mast on the summit. The inspection visit of January 1989 reported there was no evidence of any recent physical or biological change on the island and it was concluded that the Area was continuing to serve the purpose for which it was designated.

6(ii) Restricted and managed zones within the Area

None.

6(iii) Structures within and near the Area

The remains of a mast erected for survey purposes in the 1960s are present on the summit of the island. No other structures are known to exist on the island. Signs marking the Area have yet to be installed. It is proposed to install two signs: one on the SE promontory close to the penguin colony, another on a prominent access point on the northern coast.

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

The nearest protected areas to Lagotellerie Island are the Dion Islands (SPA No. 8) about 55 km west, Avian Island (SPA No. 21) 65 km west, and Rothera Point (SSSI No. 9) 46 km to the NW (Map 1). Several Historic Sites and Monuments are located in the vicinity: 'Base Y' (UK) on Horseshoe Island (HSM No. 63); 'Base E' (UK) (HSM No. 64) and buildings and artefacts at and near East Base (US) (HSM No. 55), both on Stonington Island; and installations of San Martín Station (Argentina) at Barry Island (HSM No. 26).

7. Permit conditions

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

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

7(i) Access to and movement within the Area

Vehicles are prohibited within the Area and access shall be by small boat or by helicopter. Access from the sea should be to the northern coast of the island (Map 2), unless specifically authorised by Permit to land elsewhere or when landing along this coast is impractical because of adverse conditions. Access into the Area at the 200 m section of NE coast immediately below the “Shangri-la Valley”, which contains the richest vegetation growth on the island, is strongly discouraged at all times (Map 2). No special restrictions apply to the sea or air routes used to move to and from the Area. These restrictions apply equally to persons wishing to access the Area via sea ice in the winter.

Overflight of the eastern end of the island over the penguin / cormorant colony is prohibited below 750 m (2500 feet) (Map 2). Landing of helicopters within the Area shall be at the designated location on the broad rock / permanent snow platform about half-way along the NW coast at about 15 m altitude, and 200 m inland from the sea (Map 2). Use of helicopter smoke grenades is prohibited within the Area unless absolutely necessary for safety, and all grenades should be retrieved.

Movement within the Area shall be on foot. Pilots, helicopter or boat crew, or other people on helicopters or boats, are prohibited from moving on foot beyond the immediate vicinity of their landing site unless specifically authorised by Permit. All movement should be undertaken carefully so as to minimise disturbance to the soil and vegetated surfaces, walking on rocky terrain if practical. Pedestrian traffic should be kept to the minimum consistent with the objectives of any permitted activities and every reasonable effort should be made to minimise trampling effects.

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

- Scientific research that will not jeopardise the ecosystem or scientific values of the Area and which cannot be served elsewhere;
- Essential management activities, including monitoring;

7(iii) Installation, modification or removal of structures

Structures shall not 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 a condition of the Permit.

7(iv) Location of field camps

When necessary for purposes specified in the Permit, temporary camping is allowed at the designated site on the broad rock / permanent snow platform about half-way along the NW coast at about 15 m altitude, and 200 m inland from the sea (Map 2).

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

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

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

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

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 on Lagotellerie Island 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 authorised, may be removed unless the impact of removal is likely to be greater than leaving the material *in situ*: if this is the case the appropriate authority should be notified.

7(viii) Disposal of waste

All wastes, including all human wastes, shall be removed from the Area. Human wastes may be disposed of into the sea.

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

4. Permits may be granted to enter the Area to carry out monitoring and site inspection activities, which may involve the small-scale collection of samples for analysis or review, or for protective measures.
5. Any specific long-term monitoring sites shall be appropriately marked.
6. To help maintain the ecological and scientific values of Lagotellerie Island 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 sterilised. To the maximum extent practicable, footwear and other equipment used or brought into the Area (including backpacks, carry-bags and tents) shall be thoroughly cleaned before entering the Area.

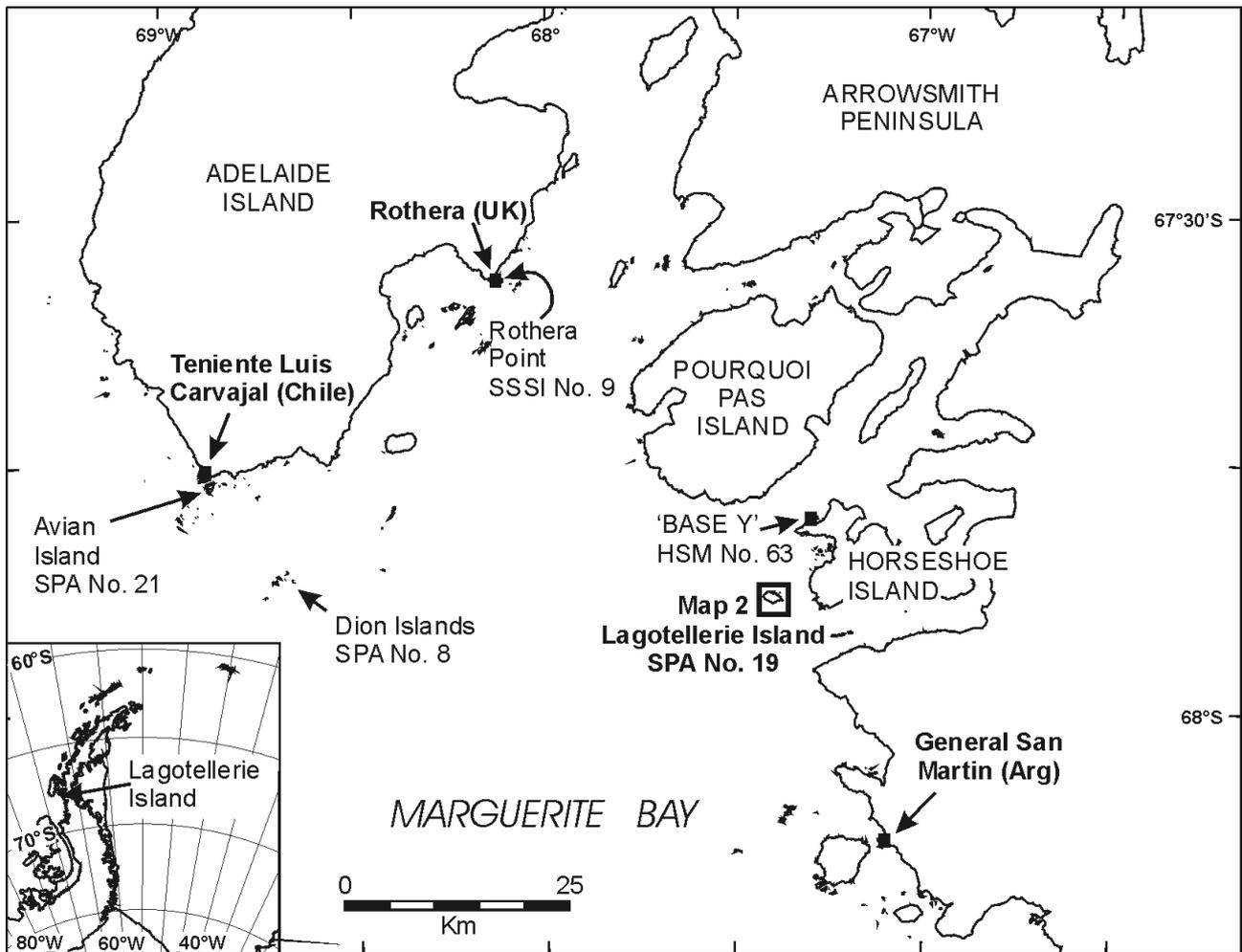
7(x) *Requirements for reports*

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

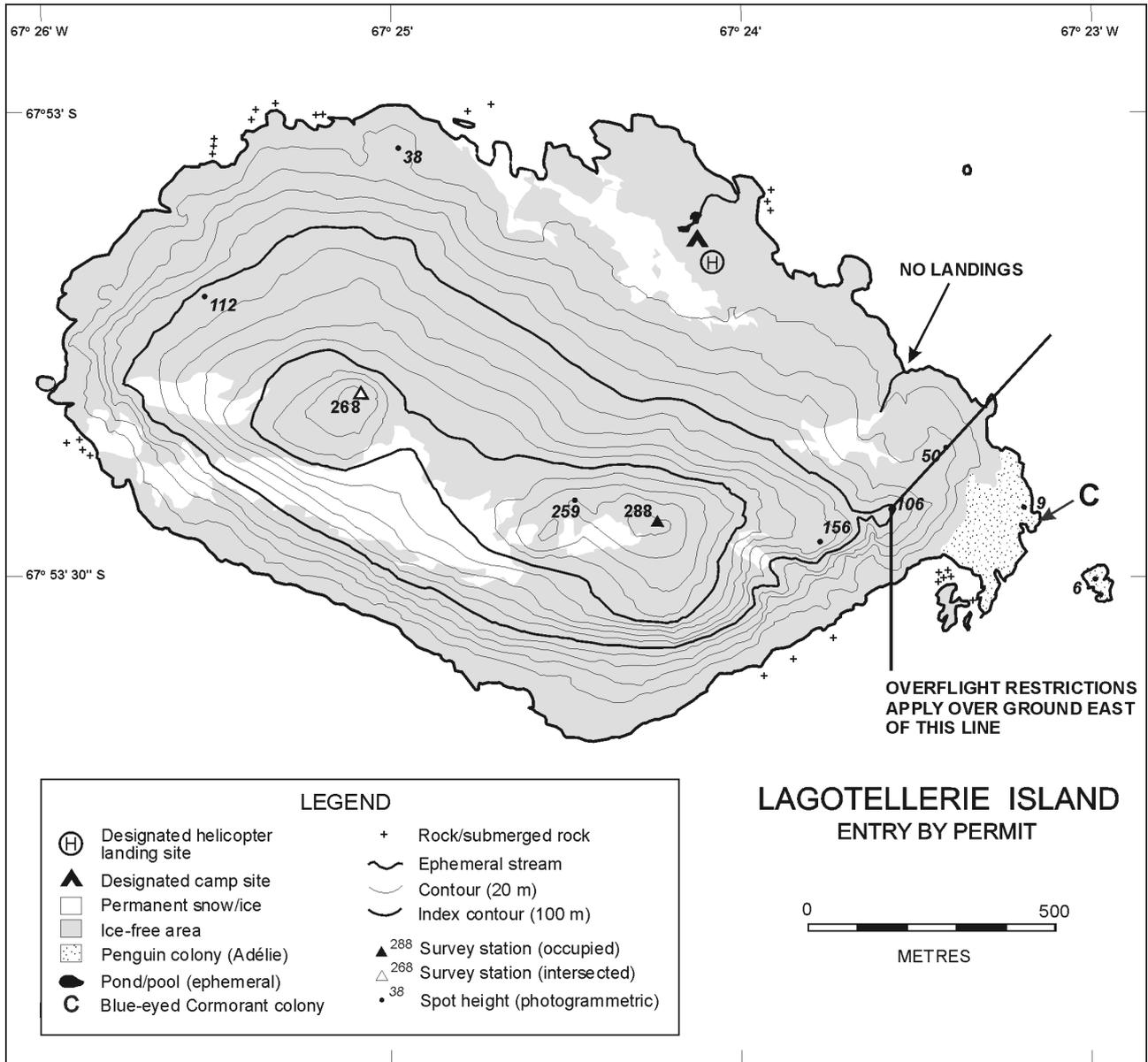
Bibliography

- Bryant, H.M. 1945. Biology at East Base, Palmer Peninsula, Antarctica. Reports on scientific results of the United States Antarctic Service Expedition 1939-1941. In *Proceedings of the American Philosophical Society* **89**(1):256-69.
- Block, W. and Starý, J. 1996. Oribatid mites (Acari: Oribatida) of the maritime Antarctic and Antarctic Peninsula. *Journal of Natural History* **30**: 1059-67.
- Convey, P. and Smith, R.I. Lewis 1997. The terrestrial arthropod fauna and its habitats in northern Marguerite Bay and Alexander Island, maritime Antarctic. *Antarctic Science* **9**(1):12-26.
- Croxall, J.P. and Kirkwood, E.D. 1979. *The distribution of penguins on the Antarctic Peninsula and the islands of the Scotia Sea*. British Antarctic Survey, Cambridge.
- Farquharson, G.W and Smellie, J.L. 1993. Sedimentary section, Lagotellerie Island. Unpublished document, British Antarctic Survey Archives Ref 1993/161.
- Gray, N.F. and Smith, R.I. Lewis. 1984. The distribution of nematophagous fungi in the maritime Antarctic. *Mycopathologia* **85**: 81-92.
- Lamb, I.M. 1964. Antarctic lichens: the genera *Usnea*, *Ramalina*, *Himantormia*, *Alectoria*, *Cornicularia*. *BAS Scientific Report* **38**, British Antarctic Survey, Cambridge.
- Matthews D.W. 1983. The geology of Horseshoe and Lagotellerie Islands, Marguerite Bay, Graham Land. *British Antarctic Survey Bulletin* **52**: 125-154.
- McGowan, E.R. 1958. Base Y Ornithological report 1958-59. Unpublished BAS internal report AD6/2Y/1958/Q.
- Poncet, S. and Poncet, J. 1987. Censuses of penguin populations of the Antarctic Peninsula, 1983-87. *British Antarctic Survey Bulletin* **77**: 109-129.
- Smith, H.G. 1978. The distribution and ecology of terrestrial protozoa of sub-Antarctic and maritime Antarctic islands. *BAS Scientific Report* **95**, British Antarctic Survey, Cambridge.
- Smith, R.I. Lewis, 1982. Farthest south and highest occurrences of vascular plants in the Antarctic. *Polar Record* **21**: 170-73.

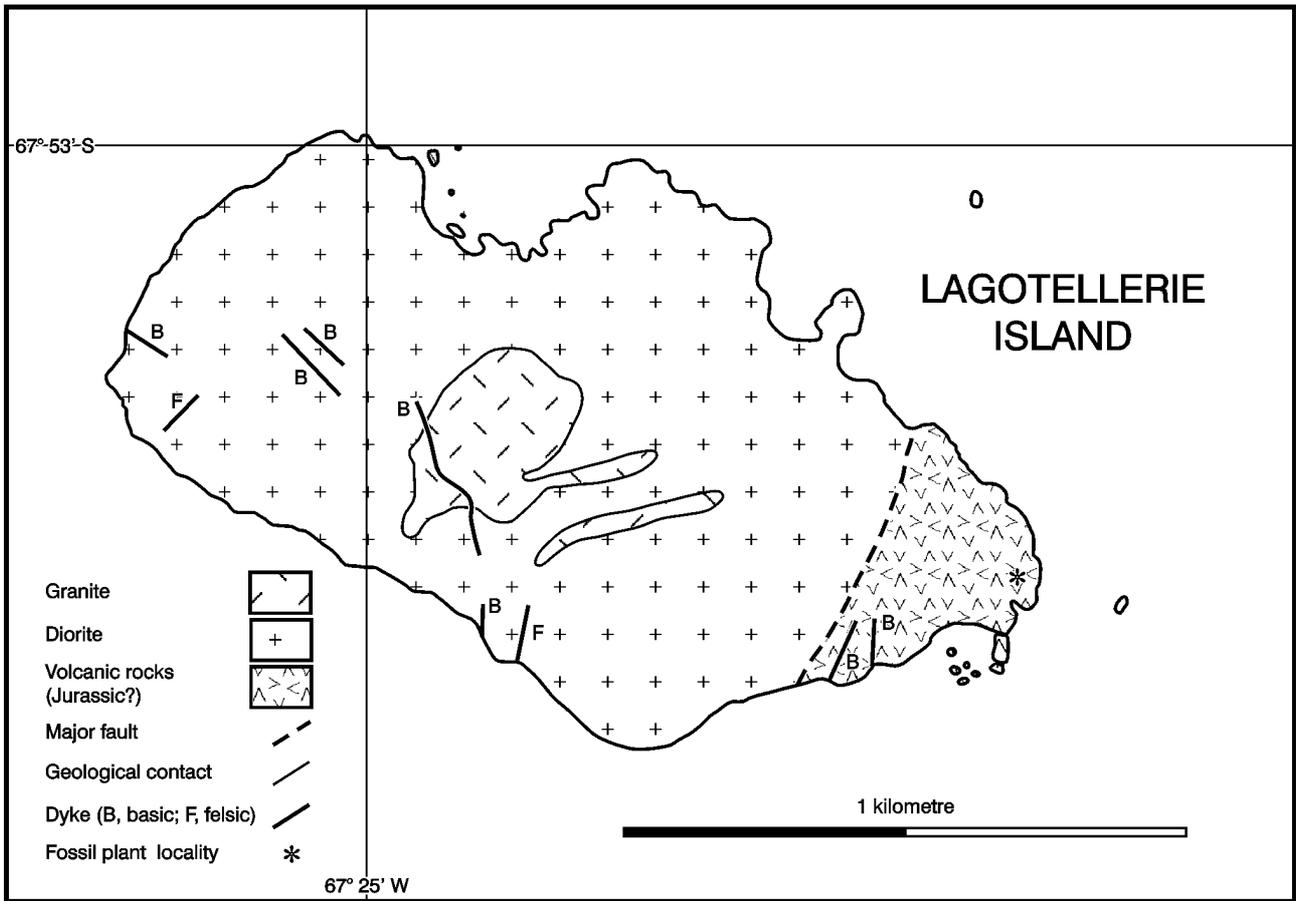
- Smith, R.I. Lewis, 1996. Terrestrial and freshwater biotic components of the western Antarctic Peninsula. In Ross, R.M., Hofmann, E.E. and Quetin, L.B. *Foundations for ecological research west of the Antarctic Peninsula*. Antarctic Research Series **70**: American Geophysical Union, Washington D.C.: 15-59.
- Starý, J. and Block, W. 1998. Distribution and biogeography of oribatid mites (Acari: Oribatida) in Antarctica, the sub-Antarctic and nearby land areas. *Journal of Natural History* **32**: 861-94.
- United Kingdom. 1997. *List of protected areas in Antarctica*. Foreign and Commonwealth Office, London.
- Usher, M.B. 1986. Further conserved areas in the maritime Antarctic. *Environmental Conservation* **13**: 265-66.
- Vaughan, A. 1994. A geological field report on N and E Horseshoe Island and SE Lagotellerie Island, Marguerite Bay, and some adjoining areas of S. Graham Land. 1993/94 Field Season. Unpublished report, BAS Archives Ref R/1993/GL5.
- Woehler, E.J. (ed) 1993. The distribution and abundance of Antarctic and sub-Antarctic penguins. *SCAR, Cambridge*.



Map 1. Lagotellerie Island (SPA No. 19), Marguerite Bay, location map. Inset: location of Lagotellerie Island on the Antarctic Peninsula.



Map 2. Lagotellerie Island (SPA No. 19) topographic map.



Map 3. Lagotellerie Island (SPA No. 19) geological sketch map (note: sketch based on earlier data than Map 2).