Management Plan for Antarctic Specially Managed Area No. 4 Deception Island, South Shetland Islands, Antarctica

1. Values to be protected and activities to be managed

Deception Island (latitude 62°57'S, longitude 60°38'W), South Shetland Islands, is an unique Antarctic island with important natural, scientific, historic, educational, aesthetic and wilderness values.

i. Natural value

- Deception Island is one of only two volcanoes in the Antarctic at which eruptions have been observed. It was responsible for numerous ash layers dispersed across the South Shetland Islands, Bransfield Strait and the Scotia Sea. Ash from the island has even been recorded in an ice core at the South Pole. The volcano erupted during two short periods during the 20th century, most recently between 1967-1970. It contains a restless caldera that is actively deforming. It is therefore likely that Deception Island will witness further eruptions in the future.

- The Area has an exceptionally important flora, including at least 18 species which have not been recorded elsewhere in the Antarctic. No other Antarctic area is comparable. Of particular importance are the very small, unique biological communities associated with the island's geothermal areas, and the most extensive known community of the flowering plant Antarctic pearlwort (*Colobanthus quitensis*).

- Eight species of seabird breed on the island, including the worlds largest colony of chinstrap penguins (*Pygoscelis antarctica*).

- The benthic habitat of Port Foster is of ecological interest due to the natural perturbations caused by volcanic activity.

ii. Scientific value and activities

- The Area is of outstanding scientific interest, in particular for studies in geoscience and biological science. It offers the rare opportunity to study the effects of environmental change on an ecosystem, and the dynamics of the ecosystem as it recovers from natural disturbance.

- Long term seismological and biological data-sets have been collected at Decepción Station (Argentina) and Gabriel de Castilla Station (Spain).

iii. Historic value

- The Area has had a long history of human activity since *c.*1820, including exploration, sealing, whaling, aviation and scientific research, and as such has played a significant role in Antarctic affairs.

- At Whalers Bay, the Norwegian Hektor whaling station, the cemetery and other artefacts, some of which pre-date the whaling station, are the most significant whaling remains in the Antarctic. The British 'Base B', which was established in the abandoned whaling station, was the first base of the secret World War II expedition 'Operation Tabarin', the forerunner to the British Antarctic Survey. As such, it was one of the earliest permanent research stations in Antarctica. The whalers remains and Base B are listed as Historic Site and Monument (HSM) No. 71. Appendix 3 contains the Conservation Strategy for HSM No. 71.

- The remains of the Chilean Presidente Pedro Aguirre Cerda Station at Pendulum Cove are listed as HSM No. 76. Meteorological and volcanological studies were undertaken at the base from 1955 until its destruction by volcanic eruptions in 1967 and 1969.

v. Aesthetic value

- Deception Island's flooded caldera, its 'horse-shoe' shape and linear glaciated eastern coastline, its barren volcanic slopes, steaming beaches and ash-layered glaciers provide an unique Antarctic landscape.

iv. Educational and Tourism activities

- Deception Island is the only place in the world where vessels can sail directly into the centre of a restless volcanic caldera, providing the opportunity for visitors to learn about volcanoes and other aspects of the natural world, as well as early Antarctic exploration, whaling and science. Deception Island is also one of the most frequently visited sites in Antarctica by tourists.

2. Aims and objectives

The main aim of this Management Package is to conserve and protect the unique and outstanding environment of Deception Island, whilst managing the variety of competing demands placed upon it, including science, tourism, and the conservation of its natural and historic values. It also aims to protect the safety of those working on, or visiting the island.

The objectives of management at Deception Island are to:

- assist in the planning and co-ordination of activities in the Area, encourage co-operation between Antarctic Treaty Parties and other stakeholders, and manage potential or actual conflicts of interest between different activities, including science, logistics and tourism;

- avoid unnecessary degradation, by human disturbance, to the unique natural values of the Area;

- minimise the possibility of non-native species being introduced through human activities;

- prevent unnecessary disturbance, destruction or removal of historic buildings, structures and artefacts;

- safeguard those working in or near to, or visiting, the Area from the significant volcanic risk;

- manage visitation to this unique Island, and promote an awareness, through education, of its significance.

3. Management activities

To achieve the aims and objectives of this Management Plan, the following management activities will be undertaken:

- Parties with an active interest in the Area should establish a Deception Island Management Group to:

  - oversee the co-ordination of activities in the Area;
  - facilitate communication between those working in, or visiting, the Area;
  - maintain a record of activities in the Area;
  - disseminate information and educational material on the significance of Deception Island to those visiting, or working there;
  - monitor the site to investigate cumulative impacts
  - oversee the implementation of this Management Plan, and revise it when necessary.

- a general island-wide Code of Conduct for activities in the Area is included in this ASMA Management Plan (see Section 9). Further site-specific Codes of Conduct are included in the Conservation Strategy for Whalers Bay HSM No.71 (Appendix 3), as well the Code of Conduct for the Facilities Zone (Appendix 4), and the Code of Conduct for Visitors (Appendix 5). These Codes of Conduct should be used to guide activities in the Area;

- National Antarctic Programmes operating within the Area should ensure that their personnel are briefed on, and are aware of, the requirements of this Management Plan and supporting documentation;

- tour operators visiting the Area should ensure that their staff, crew and passengers are briefed on, and are aware of, the requirements of this Management Plan and supporting documentation;

- signs and markers will be erected where necessary and appropriate to show the boundaries of ASPAs and other zones, such as the location of scientific activities. Signs and markers will be well designed to be informative and obvious, yet unobtrusive. They will also be secured and maintained in good condition, and removed when no longer necessary;

- the volcanic alert scheme (as at Appendix 6) will be implemented. It, and the emergency evacuation plan, will be kept under review;

- copies of this Management Plan and supporting documentation, in English and Spanish, will be made available at Decepción Station (Argentina), and Gabriel de Castilla Station (Spain). In addition, the Deception Island Management Group should encourage National Antarctic Operators, tour companies and, as far as practicable, yacht operators visiting the Area, to have available copies of this Management Plan when they visit the Area;

- visits should be made to the Area as necessary (no less than once every 5 years) by members of the Deception Island Management Group to ensure that the requirements of the Management Plan are being met.

4. Period of designation

Designated for an indefinite period of time.

5. Description of the Area

i. General description, including geographical co-ordinates, boundary markers and natural features that delineate the area.

General description

Deception Island (latitude 62°57'S, longitude 60°38'W) is situated in the Bransfield Strait at the southern end of the South Shetland Islands, off the north-west coast of the Antarctic Peninsula (Figures 1 and 2). The boundary of the ASMA is defined as the outer coastline of the island above the low tide water level. It includes the waters and seabed of Port Foster to the north of a line drawn across Neptunes Bellows between Entrance Point and Cathedral Crags (Figure 3). No boundary markers are required for the ASMA, as the coast is clearly defined and visually obvious.

Geology, geomorphology and volcanic activity

Deception Island is an active basaltic volcano. It has a submerged basal diameter of approximately 30 km and rises to 1.5 km above the sea floor. The volcano has a large flooded caldera, giving the island a distinctive horseshoe shape broken only on the south-eastern side by Neptunes Bellows, a narrow shallow passage about 500 m wide.

The eruption which formed the caldera occurred possibly 10,000 years ago. A large scale, violently explosive eruption evacuated about 30 km^3 of molten rock so rapidly that the volcano summit region collapsed to form the Port Foster caldera. Associated ashfalls and tsunamis had a significant environmental impact on the northern Antarctic Peninsula region. The volcano was particularly active during the late 18th and 19th centuries, when numerous eruptions occurred. By contrast, 20th century eruptions were restricted to two short periods, around 1906–1910 and 1967–1970. In 1992, seismic activity on Deception Island was accompanied by ground deformation and increased groundwater temperatures around Decepción Station.

The volcano has since returned to its normal, essentially quiescent state. However, the floor of Port Foster is rising at a geologically rapid rate (approximately 30 cm per annum). Together with the record of historical eruptions and the presence of long lived areas of geothermal activity, it is classified as a restless caldera with a significant volcanic risk.

Approximately 57% of the island is covered by permanent glaciers, many of which are overlain with volcanic ash. Mounds and low ridges of glacially transported debris (moraines) are present around the margins of the glaciers.

An almost complete ring of hills, rising to 539 m at Mount Pond, encircles the sunken interior of Port Foster, and is the principal drainage divide on the island. Ephemeral springs flow toward the outer and inner coast. Several lakes are located on the inner divide of the watershed.

Climate

The climate of Deception Island is polar maritime. Mean annual air temperature at sea level is –2.9°C. Extreme monthly temperatures range from 11°C to – 28 °C. Precipitation, which falls on more than 50% of summer days, is high, with a mean annual equivalent of rainfall of approximately 500 mm. Prevailing winds are from the north-east and west.

Marine ecology

The marine ecology of Port Foster has been significantly influenced by volcanic activity and sediment deposition. ASPA No. 145, comprising two sub-sites, is located in the Area. The Management Plan for ASPA 145, contained in Appendix 2, gives further detail of the marine ecology of Port Foster.

Flora

Deception Island is an unique and exceptionally important botanical site. The flora includes at least 18 species of moss, liverwort and lichen which have not been recorded elsewhere in the Antarctic. Small communities, which include rare species and unique associations of taxa, grow at a number of geothermal areas on the island, some of which have fumaroles. Furthermore, the most extensive known concentration of Antarctic pearlwort (*Colobanthus quitensis*) is located between Baily Head and South East Point.

In many areas, ground surfaces created by the 1967-70 eruptions are being colonized rapidly, probably enhanced by the increasing summer temperatures now occurring in the Antarctic Peninsula.

ASPA No. 140, comprising 11 sub-sites, is located in the Area. The Management Plan for ASPA No. 140 is contained in Appendix 1. This gives further detail of the flora of Deception Island.

Invertebrates

Recorded terrestrial and freshwater invertebrates on Deception Island include 18 species of Acarina (mite), 1 species of Diptera (fly), 3 species of Tardigrada (tardigrade), 9 species of Collembola (springtail), 3 freshwater Crustacea (crustacean), 14 Nematoda (nematode), 1 Gastrotricha (gastrotrich) and 5 Rotifera (rotifer).

Birds

Eight species of bird breed within the Area. The most numerous is the chinstrap penguin (*Pygoscelis antarctica*), with an estimated 140,000 to 191,000 breeding pairs. The largest rookery is at Baily Head, with an estimated 100,000 breeding pairs. Macaroni penguins (*Eudyptes chrysolophus*) occasionally nest in small numbers on the island, their southernmost breeding limit. Brown skuas (*Catharacta antarctica lonnbergi*), kelp gulls (*Larus dominicanus*), cape petrels (*Daption capensis*), Wilson's storm-petrels (*Oceanites oceanicus*), Antarctic terns (*Sterna vittata*) and snowy sheathbills (*Chionis alba*) also breed within the Area.

Mammals

Deception Island has no breeding mammals. Antarctic fur seals (*Arctocephalus gazella*), Weddell seals (*Leptonychotes weddelli*), crabeater seals (*Lobodon carcinophagus*), southern elephant seals (*Mirounga leonina*) and leopard seals (*Hydrurga leptonyx*) haul out on the beaches of the inner and outer coast.

ii. Structures within the Area

Decepción Station (Argentina) (latitude 62'58 "20°S, longitude 60' 41"40°W) is situated on the southern shore of Fumarole Bay. Gabriel de Castilla Station (Spain) (latitude 62'58"40°S, longitude 60'40"30°W) is located approximately 1km to the south-east. Further details on both stations are contained in the Facilities Zone Code of Conduct (Appendix 4).

The remains of Hektor Whaling Station (Norway) and other remains which pre-date the whaling station, the Whalers Cemetery and the former British 'Base B' (Historic Site and Monument (HSM) No. 71) are located at Whalers Bay (see Appendix 3). A number of steam boilers from the whaling station can be found washed up on the southwest coast of Port Foster. The remains of the Chilean Presidente Pedro Aguirre Cerda Station (HSM No. 76) is located at Pendulum Cove. A derelict wooden refuge hut is located approximately 1 km to the south-west of HSM No.76.

A light beacon, maintained by the Chilean Navy, is located on Collins Point. A collapsed light tower, dating from the whaling era, is below it. The remains of a further light tower dating from the whaling era is located at South East Point.

The stern of the *Southern Hunter*, a whale-catcher belonging to the Christian Salvesen Company, which foundered on Ravn Rock, Neptunes Bellows in 1956, remains on the un-named beach to the west of Entrance Point.

A number of beacons and cairns marking sites used for topographical survey are present within the Area.

6. Protected areas and managed zones within the Area

Figure 3 shows the location of the following ASPAs, HSMs, Facility Zone and other sites with special management provisions within the Area.

- ASPA No. 140, comprising 11 terrestrial sites;
- ASPA No. 145, comprising 2 marine sites within Port Foster;
- HSM No. 71, the remains of Hektor Whaling Station and other remains which pre-date the whaling station, the Whalers Cemetery and 'Base B', Whalers Bay;
- HSM No. 76 , the remains of Pedro Aguirre Cerda Station, Pendulum Cove;
- A Facilities Zone, located on the west side of Port Foster, which includes Decepción Station and Gabriel de Castilla Station;

- Three further sites requiring special management provisions are also located at Pendulum Cove, Baily Head and an unnamed beach at the eastern end of Telefon Bay.

7. Maps

Map 1: The location of Deception Island ASMA No. 4 in relation to the Antarctic Peninsula.

Map 2: Deception Island - topography

Map 3: Deception Island Antarctic Specially Managed Area No 4

8. Supporting Documents

This Management Plan includes the following supporting documents as appendices:

- Management Plan for Antarctic Specially Protected Area No. 140 (Appendix 1)
- Management Plan for Antarctic Specially Protected Area No. 145 (Appendix 2)
- Conservation Strategy for HSM No. 71, Whalers Bay (Appendix 3)
- Code of Conduct for Facilities Zone (Appendix 4)
- Code of Conduct for visitors at Deception Island (Appendix 5)
- Alert Scheme and Escape Strategy for volcanic eruptions on Deception Island (Appendix 6).

9. General Code of Conduct

i. Volcanic risk

All activities undertaken within the Area should be planned and conducted taking into account the significant risk to human life posed by the threat of volcanic eruption (see Appendix 6).

ii. Access to and movement within the Area

Access to the Area is generally by ship or yacht, with landings usually taking place by small boat, or less frequently by helicopter.

Vessels arriving in or departing from Port Foster should announce over VHF Marine Channel 16 the intended time and direction of passage through Neptunes Bellows.

Ships may transit ASPA 145, but anchoring within either of the two sub-sites should be avoided except in compelling circumstances.

There are no restrictions on landings on any beaches outside the protected areas covered in Section 6, although recommended landing sites are shown in Figure 3. Boat landings

should avoid disturbing birds and seals. Extreme caution should be exercised when attempting landings on the outer coast owing to the significant swell and submerged rocks.

Recommended landing sites for helicopters are shown in Figure 3.

Movement within the area should generally be on foot. All-Terrain Vehicles may also be used with care for scientific support or logistical purposes along the beaches outside of ASPA 140. All movement should be undertaken carefully to minimise disturbance to animals, soil and vegetated areas, and not damage or dislodge flora.

iii. Activities that are or may be conducted within the Area, including restrictions on time or place

- scientific research, or the logistical support of scientific research, which will not jeopardise the values of the Area;

- management activities, including the restoration of historic buildings, clean-up of abandoned work-sites, and monitoring the implementation of this Management Plan;

- tourist or private expedition visits consistent with the Codes of Conduct for Visitors (Appendix 5) and the provisions of this Management Plan;

Further restrictions apply to activities within ASPA 140 and ASPA 145 (see Appendices 1 and 2).

iv. Installation, modification or removal of structures

Site selection, installation, modification or removal of temporary refuges, hides, or tents should be undertaken in a manner that does not compromise the values of the Area.

Scientific equipment installed in the Area should be clearly identified by country, name of principal investigator, contact details, and date of installation. All such items should be made of materials that pose minimal risk of contamination to the area. All equipment and associated materials should be removed when no longer in use.

v. Location of field camps

Field camps should be located on non-vegetated sites, such as on barren ash plains, slopes or beaches, or on thick snow or ice cover when practicable, and should also avoid concentrations of mammals or breeding birds. Field camps should also avoid areas of geothermally heated ground or fumaroles. Similarly, campsites should avoid dry lake or stream beds. Previously occupied campsites should be re-used where appropriate.

Figure 3 shows the recommended sites for field camps within the Area.

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* (1998). Where taking or harmful interference with animals for scientific purposes is involved, the *SCAR Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica* should be used as a minimum standard.

vii. Collection or removal of anything not brought into the Area

Material should only be removed from the area for scientific, management, conservation or archeological purposes, and should be limited to the minimum necessary to fulfill those needs.

viii. The disposal of waste

All wastes other than human wastes and domestic liquid waste shall be removed from the Area. Human and domestic liquid wastes from stations or field camps may be disposed of to Port Foster below the high water mark, and not within the boundaries of ASPA No. 145. Freshwater streams or lakes, or vegetated areas, shall not be used to dispose of human wastes.

ix. Requirement for reports

Reports of activities within the Area, which are not already covered under existing reporting requirements should be made available to the Chair of the Deception Island Management Group.

10. Advance exchange of information

- IAATO should, as far as practicable, provide the Chair of the Deception Island Management Group with details of scheduled visits by IAATO-registered vessels. Tour operators not affiliated to IAATO should also inform the Chair of the Deception Island Management Group of planned visits.

- All National Antarctic Programmes should, as far as practicable, notify the Chair of the Deception Island Management Group of the location, expected duration, and any special considerations related to the deployment of field parties, scientific instrumentation or botanical quadrats at the four sites commonly visited by tourists (Whalers Bay, Pendulum Cove, Baily Head or the eastern end of Telefon Bay). This information will be relayed to IAATO (and as far as practicable to non-IAATO members) .

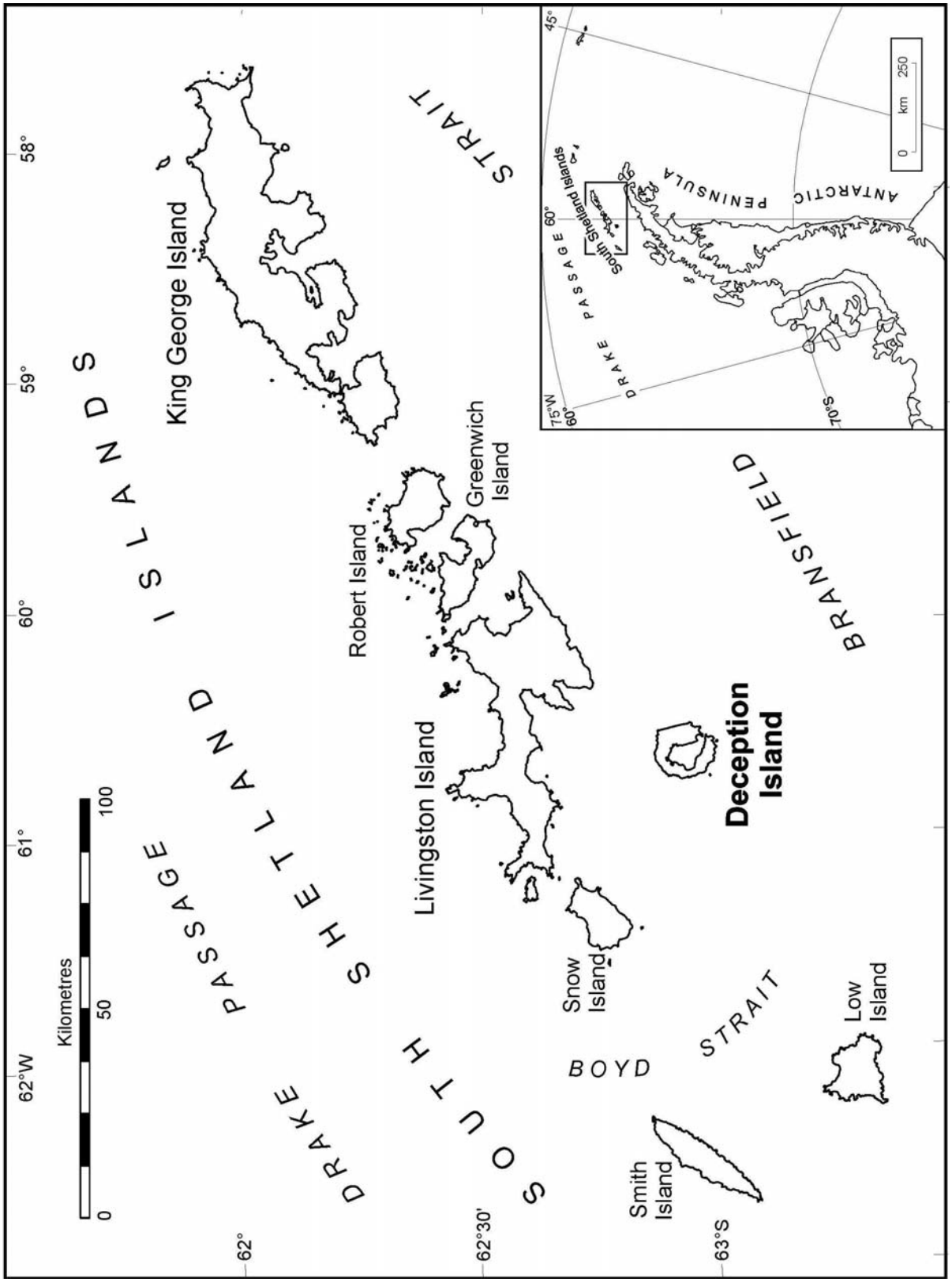

Figure 1. The location of Deception Island in relation to the South Shetland Islands and the Antarctic Peninsula

Figure 2. Deception Island - Topography

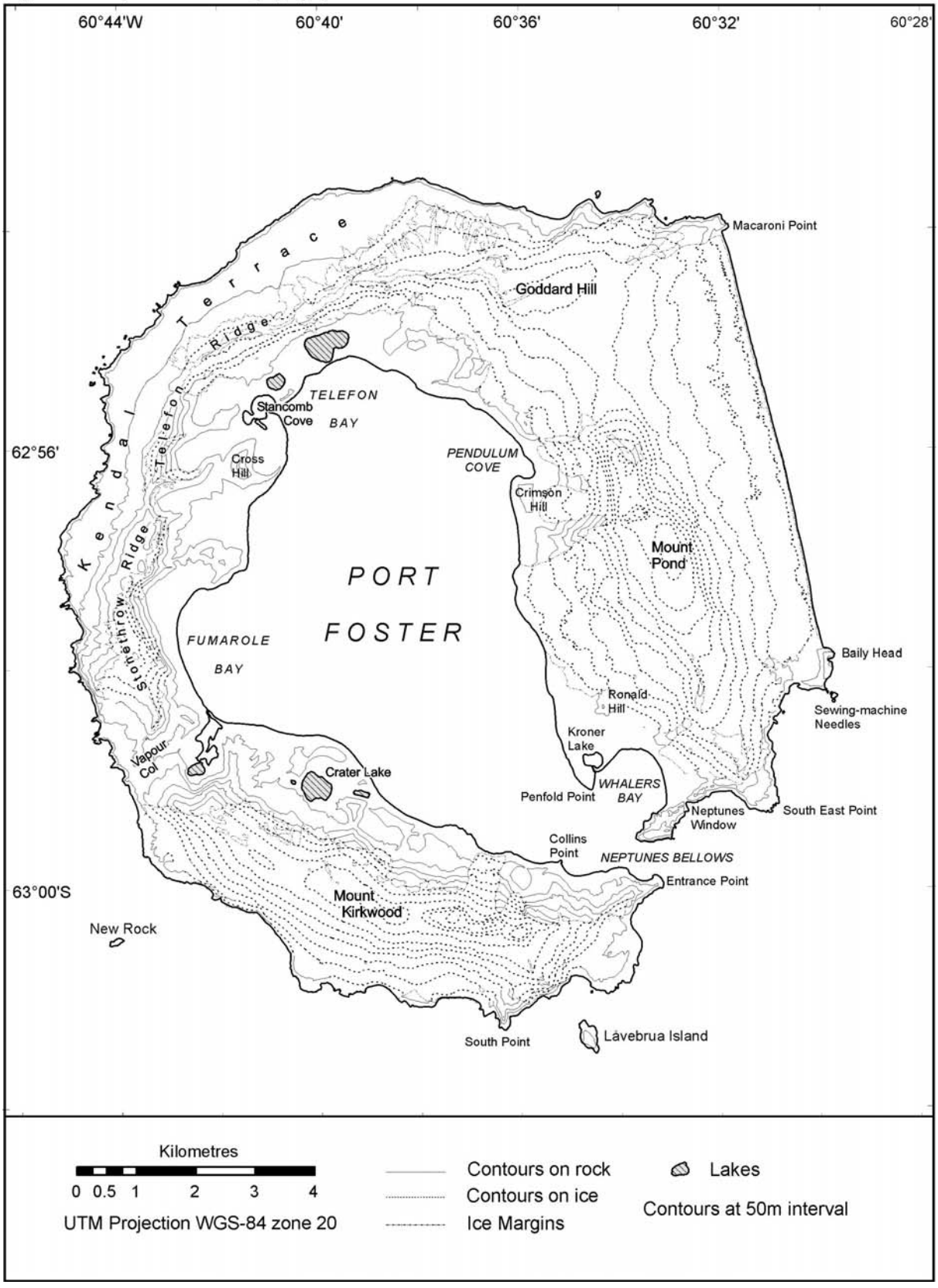

Figure 3. Deception Island Antarctic Specially Managed Area No. ***