# Deception Island
# Management Package

## Introduction

Deception Island is a unique Antarctic island with important natural, scientific, historic, educational, aesthetic and wilderness values.

Over the years, different parts of the island have been given legal protection under the Antarctic Treaty following piecemeal proposals, but no coherent strategy had been formulated for protecting the whole island. In 2000, an integrated strategy for the management of activities there was agreed by Argentina, Chile, Norway, Spain and the UK.

This strategy recommended an island-wide approach. Deception Island would be proposed as an Antarctic Specially Managed Area (ASMA) comprising a matrix of Antarctic Specially Protected Areas (ASPAs), Historic Sites and Monuments (HSMs), and further zones in which activities would be subject to a code of conduct.

In March 2001, the Instituto Antártico Chileno hosted a workshop in Santiago to progress the Management Plan for Deception Island. The Deception Island working group was widened to include the USA, as well as the Antarctic and Southern Ocean Coalition (ASOC) and the International Association of Antarctica Tour Operators (IAATO) as advisors to the group.

During February 2002, the Dirreción Nacional del Antártico (Argentina) hosted an expedition to the island at Decepción Station. Representatives from the six National Antarctic Programmes, as well as ASOC and IAATO, participated. The overall goal of the expedition was to undertake baseline survey fieldwork to assist with the joint preparation by the six Antarctic Treaty Consultative Parties of a Management Package for Deception Island.

Following further extensive consultation, this Management Package for Deception Island was produced. Its aim is to conserve and protect the unique 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 safeguard those working on, or visiting, the island.

Information Papers submitted to the CEP (XII SATCM/IP8, XXIV ATCM/IP63, XXV ATCM/IP28 and XXVI ATCM/IP48) give further detail of the extensive consultation and site investigations which have resulted in the production of this Management Package for Deception Island.

**Management Plan for Antarctic Specially Managed Area No. 4**

# DECEPTION ISLAND, SOUTH SHETLAND ISLANDS

**Latitude 62°57'S, longitude 60°38'W**

## 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 20$^{th}$ 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 remain 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 unnamed 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).

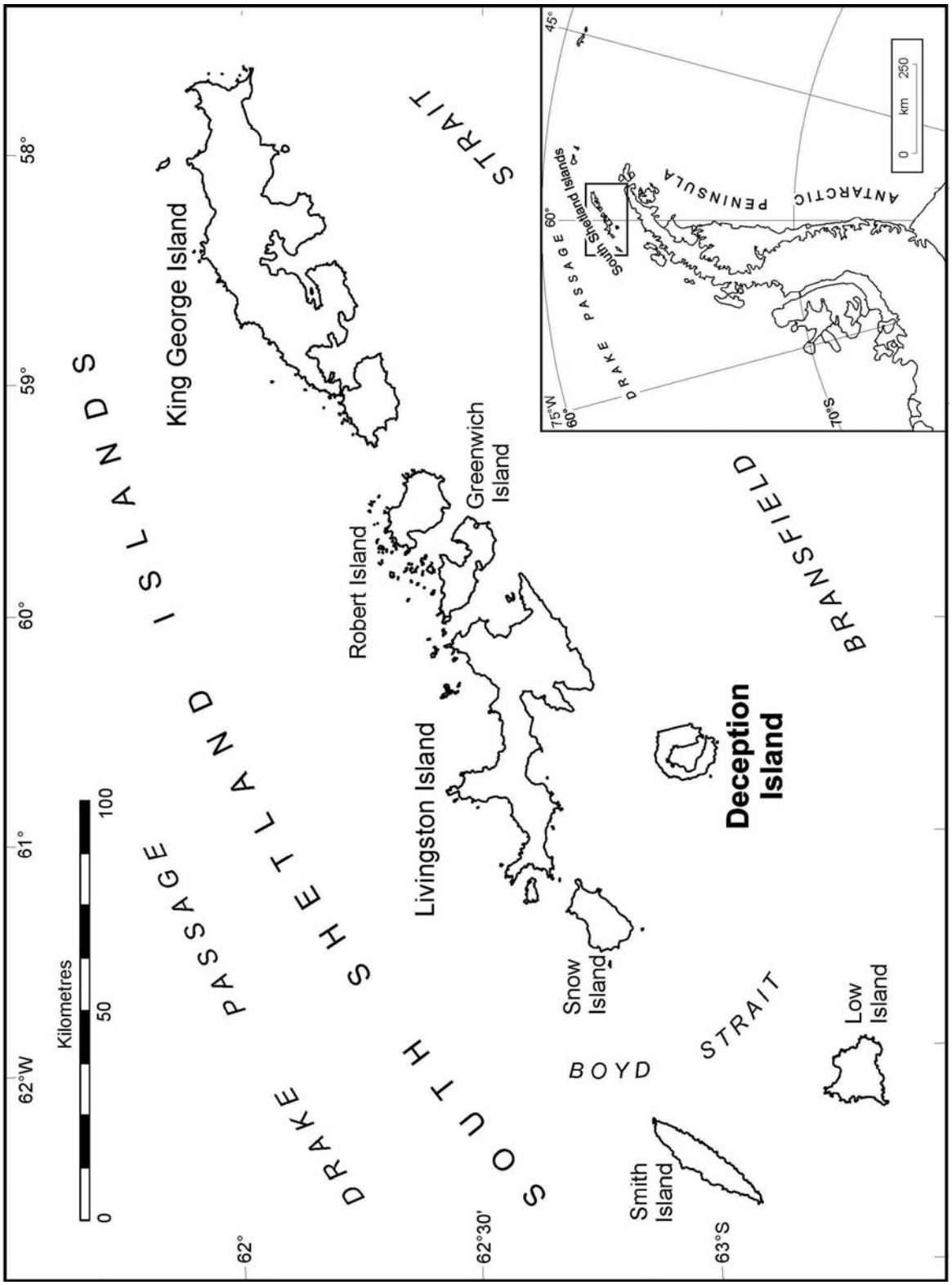



Figure 1. The location of Deception Island in relation to the South Shetland Islands and the Antarctic Peninsula

Figure 2. Deception Island - Topography

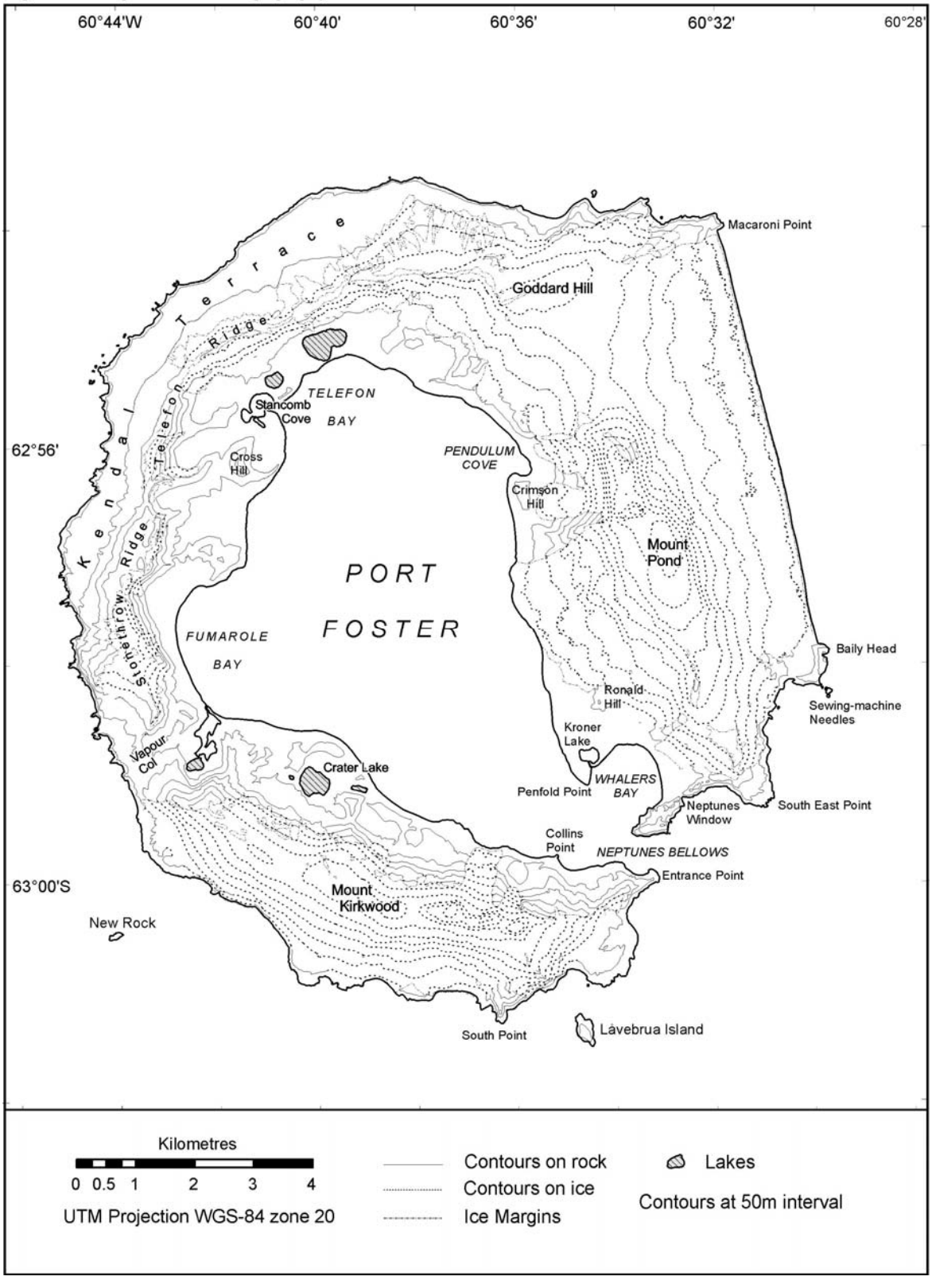
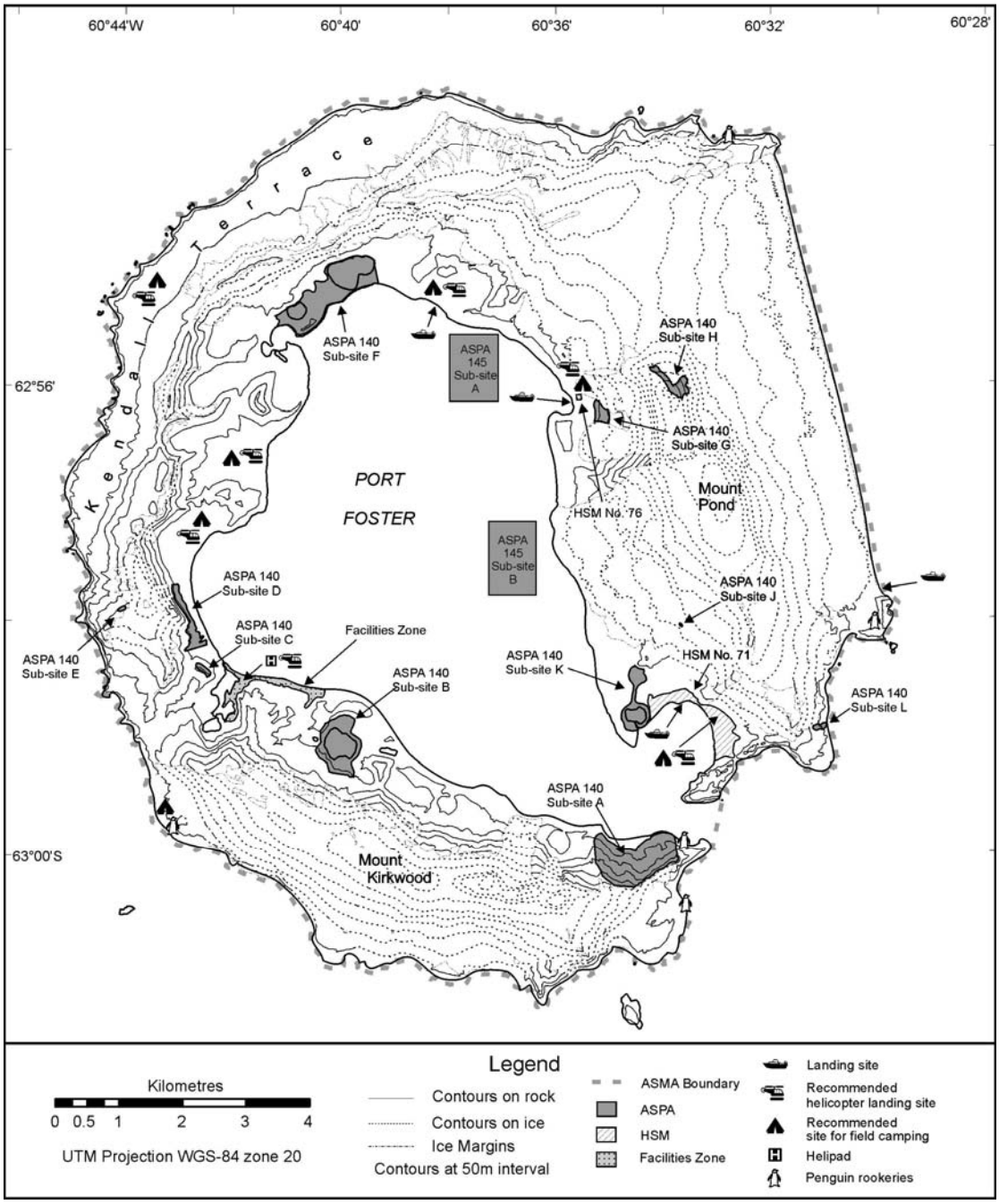


Figure 3. Deception Island Antarctic Specially Managed Area No. 4



# Conservation Strategy for Historic Site and Monument No. 71, Whalers Bay, Deception Island

## 1. Introduction

### *1.1 General background*

Historic Site and Monument No 71, Whalers Bay (latitude 62° 59'S, longitude 60° 34'W), is located on Deception Island, South Shetland Islands, Antarctica.

The buildings, structures and other artefacts on the shore of Whalers Bay, which date from the period 1906-931, represent the most significant whaling remains in the Antarctic. Other buildings, structures and artefacts of the British 'Base B' represent an important aspect of the scientific history of the area (1944-1969).

The remains of the Norwegian *Hektor* whaling station at Whalers Bay were originally listed as Historic Site and Monument No. 71 in ATCM Measure 4 (1995) based on a proposal by Chile and Norway. The extent of the historic site was expanded in 2003 by means of ATCM Measure 3 (2003) (see Section 3).

### *1.2 Brief historical background (1906-1969)*

During the 1906-07 austral summer, the Norwegian Captain Adolfus Andresen, founder of the *Sociedad Ballenera de Magallanes*, Chile, began whaling at Deception Island. Whalers Bay served as a sheltered anchorage for factory ships that processed whale blubber. In 1908 a cemetery was established here. The cemetery was partly buried and partly swept away during a volcanic eruption in 1969, at which time it comprised 35 graves and a memorial to ten men who were lost at sea (only one body was recovered). In 1912, a Norwegian company, *Aktieselskabet Hektor*, established the shore-based whaling station in Whalers Bay. *Hektor* whaling station operated until 1931.

During the 1943-44 austral summer, the UK established a permanent base (Base B) in part of the abandoned whaling station. Base B was operated as a British scientific station, latterly by the British Antarctic Survey, until 1969, when it was severely damaged by a mud and ash flow caused by a volcanic eruption, and was abandoned.

The Attachment A contains further detail on the history of Whalers Bay, including a bibliography.

*1.3 Aim and objectives of the conservation strategy*

The overall aim of the conservation strategy is to protect the values of Whalers Bay Historic Site. The objectives are to:

- ***Maintain and preserve the cultural heritage and the historic values of the site within the constraints of natural processes.*** Minor restoration and conservation work will be considered, whilst it is recognised that natural processes will continue to cause the deterioration of buildings, structures and other artefacts over time.

- ***Prevent unnecessary human disturbance to the site, its features and artifacts***. Every effort shall be made to ensure that human activity at the site does not diminish its historic values. Any damage, removal or destruction of buildings or structures is prohibited in accordance with Article 8 (4) of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty.

- ***Permit ongoing clean up of debris.*** Large quantities of waste are present in and around the buildings at Whalers Bay. Wind-scattered debris is present throughout the site. There is also hazardous waste present, including diesel fuel and asbestos. A major clean up of loose debris and waste, identified by conservation and environmental experts as not forming an important part of the historic remains, was undertaken in April 2004. Furthermore, a program of ongoing clean–up of debris resulting from the gradual deterioration of the structures, will be instigated.

- ***Educate visitors to understand, respect and care for the historic values of the site.*** Whalers Bay Historic Site is one of the most visited sites in Antarctica. Information on the historic significance of the site, and the need to conserve its values, will be made available to visitors.

- ***Protect the natural environment of the site.*** Whalers Bay is an integral part of the unique natural environment of Deception Island. Activities at the site should be undertaken in such a way that minimises any environmental impact.

## 2. Parties undertaking management

Chile, Norway and the UK shall consult within the wider Deception Island Management Group to ensure that the provisions of this conservation strategy are implemented and its aim is met.

## 3. Description of the site

The site comprises all pre-1970 remains on the shore of Whalers Bay, including those from the early whaling period (1906-12) initiated by Captain Adolfus Andresen of the *Sociedad Ballenera de Magallanes,* Chile; the

remains of the Norwegian Hektor Whaling Station established in 1912 and all artefacts associated with its operation until 1931; the site of a cemetery with 35 burials and a memorial to ten men lost at sea; and the remains from the period of British scientific and mapping activity (1944-1969). The site also acknowledges and commemorates the historic value of other events that occurred there, from which nothing remains.

### *3.1 Site boundary*

Figure 1 shows the boundary of the Whalers Bay Historic Site. It comprises most of the beach at Whalers Bay from Neptunes Window to the former BAS aircraft hangar. Boundary markers, which would detract from the aesthetic value of the site, have not been erected. Figure 1 also shows the major historic buildings and structures at the site.

### *3.2 Historic remains*

Table 1 summarises the main buildings, facilities and other structures at the site. More detailed information about these historic structures is provided in Attachment B and their location is shown on Figure 1.

*Table 1: Historic remains at the Whalers Bay Historic Site*

| #[1] | Structure | Map 1[2] |
|---|---|---|
| **Whaling period** | | |
| WB1 | Various remains from the whaling period at Deception Island (1906-1931), including:<br>- Water boats and rowing boats<br>- Wells and well head houses<br>- Storage building<br>- Wooden and metal barrels<br>- Rampart dams | 14 |
| WB2 | Cemetery (1 cross and 1 empty coffin currently visible) | Cross |
| WB3 | Magistrate's residence | 3 |
| WB4 | Hospital/storage building | 2 |
| WB5 | Boilers | 7 |
| WB6 | Cookers and associated equipment, including:<br>- cooking grills<br>- driving wheel<br>- steam winch | 7 |
| WB7 | Foundation of kitchen/mess building (subsequently reused as the foundations for Priestley House) and piggery | 4 |
| WB8 | Fuel storage tanks | 10, 11 |
| WB9 | Half floating dock | 12 |
| WB10 | Whalers Barracks (subsequently renamed Biscoe House) | 5 |
| **Scientific period** | | |
| WB11 | 'Hunting Lodge' (UK company Hunting Aerosurveys) | 9 |
| WB12 | Aircraft hangar [3] | 1 |
| WB13 | Massey Ferguson tractor | 6 |

[1] Reference number is cross-referenced with the information in Attachment B.
[2] Reference to map location (Figure 1)
[3] A de Havilland DHC-3 Single Otter was removed from the site in April 2004 by BAS for safe-keeping. The intention is to return it to Whalers Bay once it is safe to do so.

*3.3 Natural environment*

The 1967 volcanic eruption on Deception Island resulted in the deposition of a 1-5 cm layer of ash over Whalers Bay, whilst the 1969 eruption caused a lahar (mud slide) which partly buried the site. Geologically important, and fragile fluvial terraces are located to the north of the whaling station.

The immediate area to the west of the Historic Site, including Kroner Lake, the Ronald Hill crater plain and the valley connecting them, is designated as part of ASPA 140 due to its exceptional botanical and limnological importance.

Further areas of botanical importance are located within the Historic Site. These include a geothermally active scoria outcrop to the east of the whaling station, around the 'Hunting Lodge', inside the two accessible whale oil tanks, around the site of the cemetery, and on the cliffs and massive boulders at Cathedral Crags and Neptunes Window. Elsewhere, timber and iron structures, bricks and mortar, are colonised by various crustose lichens, all of which are common on natural substrata on the island.

Kelp gulls (*Larus dominicanus*) and Antarctic Terns (*Sterna vittata*) breed at Whalers Bay, and Cape petrels (*Daption capensis*) nest in Cathedral Crags, overlooking the site.

## 4. Management of the site

*4.1 Access to, and movement within, the site*

- The recommended landing site is directly in front of the whalers' boilers (see Figure 1).

- Motorized vehicles are only to be used within the HSM for scientific, conservation or clean-up activities (e.g. removal of waste).

- Access to buildings or other structures including boilers and tanks, is prohibited unless for management purposes, or for shelter in an emergency.

- Helicopter landings, where necessary for conservation or management purposes, should only take place in the designated landing site (shown in Figure 1) to avoid dangers associated with loose debris and to prevent damaging structures or causing disturbance to wildlife.

- Field camps for scientific or management purposes should be established in the area to the east of the half floating dock as indicated in the map provided in Attachment B. The use of buildings for camping purposes is prohibited except in an emergency.

*4.2 Installation, modification and removal of structures*

- In accordance with Article 8 of Annex V to the Protocol on Environmental Protection to the Antarctic Treaty (1998), the historic structures, facilities and artefacts at the site are not to be damaged, removed or destroyed. Graffiti considered to be of historic importance should not be removed. New graffiti should not be added.

- Conservation and/or restoration work agreed by the Parties undertaking management may be carried out. Work on the buildings and structures may be necessary to render them safe or to prevent damage to the environment.

- No new buildings or other structures (apart from interpretative material agreed by Chile, Norway and the UK, in consultation with the wider Deception Island Management Group) are to be erected at the site.

- Historic remains and artefacts found at other locations on Deception Island, or elsewhere, which originate from Whalers Bay may be returned to the site after due consideration by those Parties undertaking management.

*4.3 Visitor guidelines*

The general guidelines, outlined in Code of Conduct for Visitors to Deception Island, apply to all visitors, including visits by commercial tour operators (IAATO and non-IAATO affiliated), private expeditions and National Antarctic Programme staff when undertaking recreational visits. In addition, the following site-specific guidelines apply:

- Stay on the seaward side of the station remains, the water boats, and the piles of barrel staves, in order to avoid the geologically important, and fragile, fluvial terraces located to the north of the whaling station.

- Do not go beyond the western end of the airplane hangar in order to avoid entry into ASPA 140 (Site K).

- Do not enter buildings or tanks or sit or climb on the boats.

- Approach oil and fuel tanks with caution. The foundations are vulnerable to erosion and the tanks are at risk of collapse.

- Beware of flying debris in windy conditions.

- Visitors to Neptunes Window should proceed along the beach on the seaward side of the waterboats. They should then walk up the slope towards the ‘window’ in single file and remaining on existing paths. Extreme caution should be exercised along the steep and friable edge of Neptunes Window. Follow existing paths back down to the beach. Visitors

should not attempt to traverse the scree slope to the south, below Cathedral Crags, which is susceptible to rockfalls.

*4.4 Information*

- An informative sign, agreed by the Parties undertaking management, will be located at the recommended landing site. Appropriate and necessary signs advising visitors of any health and safety issues will also be considered.

- Memorial plaques (e.g. listing the names of those buried in the cemetery, or commemorating Captain Adolfus Andresen) may also be located within the site.

- Boundary markers are not considered necessary, as they would detract from the aesthetic value of the site. The boundary generally follows clearly visible natural features.

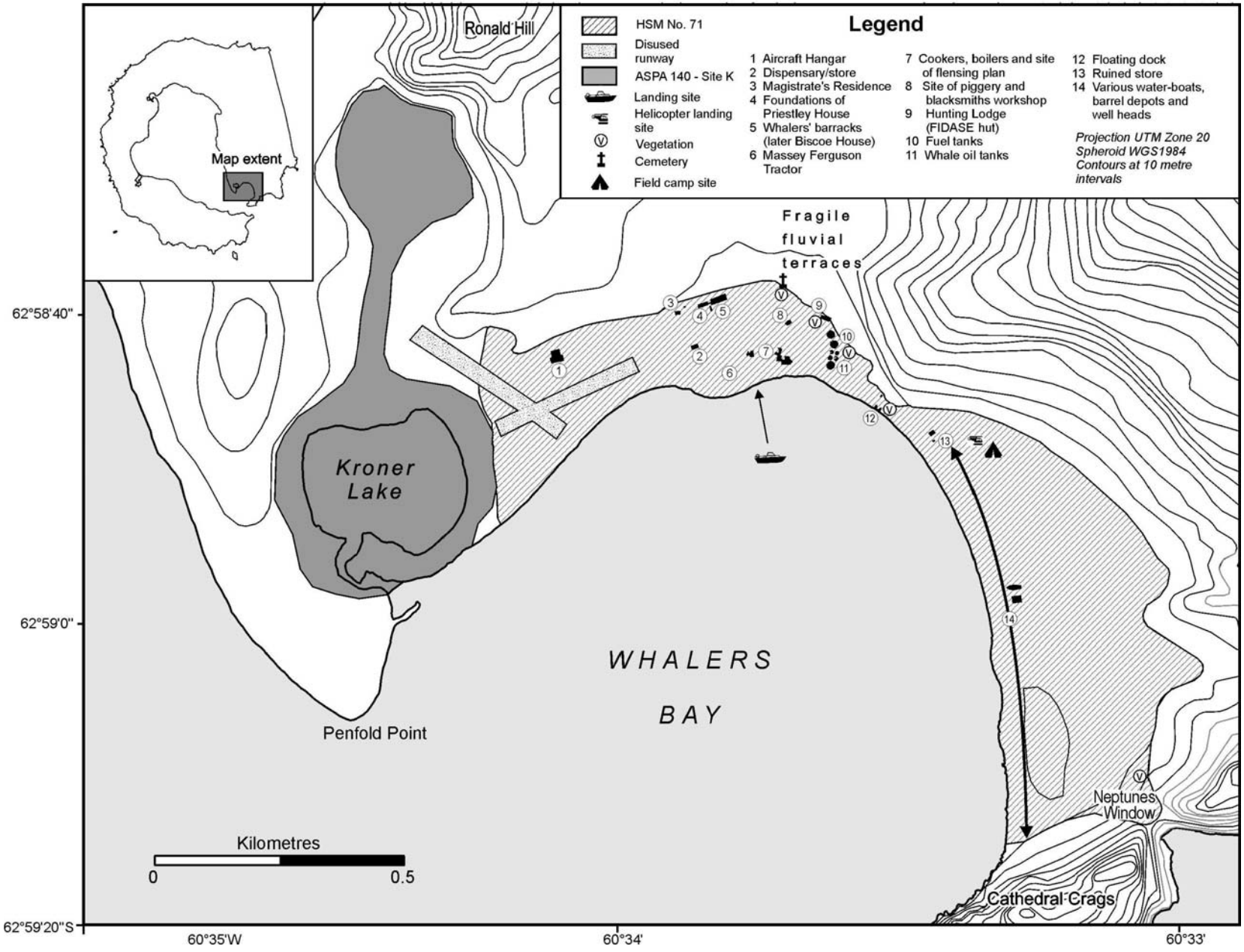
- The Parties undertaking management will disseminate further information about the significance of the historic site and the need to conserve its values.

*4.5 Reporting*

The following records are to be maintained by the Parties undertaking management:

- number of tourists landing at the site;
- number of scientists and associated logistics personnel visiting the site;
- conservation and clean-up work carried out; and
- site inspection reports, including reports and photographs on the condition of the historic remains.

Appendix B: Figure 1 - Historic Site and Monument No. 71 - Whalers Bay Deception Island



**Attachment A: Brief historic overview of Whalers Bay, Deception Island**

Deception Island was first visited by British and United States sealers in the austral summer 1820-21.

In 1905 the Norwegian Adolfus Amandus Andresen established the Chilean whaling company *Sociedad Ballenera de Magallanes* in Punta Arenas, having moved there from Norway in 1894. During the 1906-07 season he anchored his floating factory ship *Gobernador Bories* in Whalers Bay and thereby started an extensive use of the bay for whale processing.

In 1908, a cemetery was established for those who lost their lives at, or near to, Deception Island.

The processing method used by the factory ships was inefficient and wastage was high. In the 1912-1913 season, the Stipendiary Magistrate reported 3,000 rotting carcasses in the harbour. In an attempt to reduce this wastage, a 21 year licence was issued to the whaling company Hvalfangerselskabet *Hektor A/S* of Tønsberg for the establishment of a shore-based whaling station at Whalers Bay. The land station was established for processing the carcasses that had already been flensed and discarded from the floating whale factories. As part of the agreement, the company brought a prefabricated wooden house from Norway for the British magistrate, which was of the same type as the barracks used by the factory workers.

The global slump in whale oil prices, and the introduction of pelagic whaling factory ships, heralded the end of shore-based operations at Deception Island. The station was abandoned as it stood on 26 April 1931, after which it was used as a source of materials for other expeditions and bases on the Antarctic Peninsula (e.g. Port Lockroy).

In November 1928, the Australian Sir Hubert Wilkins and the Canadian Carl Ben Eielson undertook the first powered flight in the Antarctic, taking off from the flat beach at Whalers Bay. In 1934-35 Lincoln Ellsworth (USA) assembled his aircraft the *Polar Star* there, but was frustrated by bad weather and moved his plane to Dundee Island for his successful trans-Antarctic flight.

In January 1936, the British Graham Land Expedition, led by John Rymill, visited Deception Island on the schooner *Penola*. Timber collected from the abandoned whaling station was used for the construction of the expedition's winter headquarters at Debenham Islands.

In 1941, the Royal Navy's HMS *Queen of Bermuda* destroyed remaining fuel stocks at the station to deny them to enemy ships that were attacking and capturing Norwegian whaling vessels in the Southern Ocean.

During the 1943 - 1944 austral summer, the Royal Navy, as part of the British Government's secret "Operation Tabarin", established a small permanent British base in part of the abandoned whaling station. "Operation Tabarin" was terminated in 1945 and the station was handed over to the organisation that is now the British Antarctic Survey (BAS).

During the summers of 1955-56 and 1956-57, the UK company Hunting Aerosurveys Ltd. conducted vertical air photography of the South Shetland Islands and the northern Antarctic Peninsula with Canso flying boats based at Whalers Bay. A total of 116,000 $km^2$ of previously unmapped terrain were photographed.

In 1957, HRH Prince Philip visited Base B, Deception Island, aboard the Royal Yacht *Britannia.*

In 1969, the remains of Hektor Whaling Station, Base B and the Whalers cemetery were partially destroyed and buried by a lahar resulting from a volcanic eruption. The station was abandoned, and Whalers Bay has not been reoccupied since then.

In 1992, a partial clean-up of hazardous and non-hazardous waste was carried out by BAS. In 2004, BAS carried out a further clean-up of Base B and removed the wreck of the BAS de Havilland DHC-3 Single Otter from beside the aircraft hanger for safe keeping.

Whalers Bay is currently one of the most visited sites in the Antarctic.

**Bibliography**


Downie, R. and J.L. Smellie. 2001. A Management Strategy for Deception Island. British Antarctic Survey.

Hacquebord, L. 1992: Hector station on Deception Island (South Shetland Islands, Antarctica), an environmental assessment study of a whaling-station. Circumpolar Journal 1-2. Groningen, Netherlands.

Headland, R.K. 1986: Hvalfangernes gravsteder i Antarktis. Sandefjordmuseene Årbok 1981-86.

Headland, R.K. 2001: Antarctic Chronology, extract for Deception Island. SPRI, Cambridge, UK.

Rossnes, Gustav. 1997: Hvalfangstbase og kulturminne, Hektor Hvalfangststasjon. Norsk Sjøfartsmuseum, Årsberetning 1996. Oslo.

Valencia, J. and R. Downie (eds.). 2002. Workshop on a Management Plan for Deception Island. Instituto Antártico Chileno.

## Attachment A: Description of the historic elements in HSM No. 71

| **WB1** | |
|---|---|
| **Remains:** | **Various remains from the whaling period at Deception Island, including:**<br>• Water boats<br>• Well houses<br>• Storage building<br>• Barrel depots<br>• Rowing boats<br>• Wells<br>• Rampart dams |
| **Location:** | Item 14 on the map of the site (Appendix B). Along the beach, east of the whaling station, on the east side of Whalers Bay. |
| **Function and Description:** | Both the shore station and the floating factory ships used steam power. Planks were placed vertically in the sand as a dam to collect melt water from the glacier in the valley behind. Wells were used to supply fresh water. The many water boats were used to transport fresh water to the factory ships. Rowing boats were used for various tasks, mainly for transporting flensers to strip the blubber off the whales beside the floating factories. In the earliest phase of whaling, wood and later iron barrels were used to store and transport the oil. The use of barrels continued at the shore stations until the late 1920s. |
| **Present state (2003):** | Over a distance of approximately 1 km, there are 5 water boats, 2 rowing boats, 6 well houses, 1 storage house, 5 wooden barrel depots, 1 iron barrel depot and a number of dams. Between the two easterly pump houses, a well remains intact. |

*Rowing boat (in the water) and water boat (on deck) used in the whaling industry. From the factory ship "Sir James Clark Ross"*
*Photographer unknown (NPI Archives).*

*One of the remaining water boats at Whalers Bay (1996).*
*Photo: Birgit Njåstad (NPI).*

*The remains of the wooden barrels at Whalers Bay.*
*Photo: Rod Downie (BAS).*

| WB2 | |
|---|---|
| **Structure:** | **Cemetery (1908)** |
| **Location:** | Marked with cross on the map of the site (Appendix B) |
| **Function and Description:** | In 1908 the whalers established a cemetery. A total of 34 Norwegian, Swedish, Chilean and Russian whalers were buried here in the first half of the century, as well as one member of the organisation that is now BAS, in 1953. A memorial was also erected to commemorate ten men lost at sea (only one body was recovered). The cemetery was a neat and orderly site enclosed by a wire fence and with impressive stone monuments and carved wooden crosses marking the separate graves. |
| **Present state (2003):** | In 1969 the site was partly buried and partly swept away when volcanic activity caused a lahar (a mud and ash slide). In February 2002, a cross belonging to Peder Knapstad, a Norwegian carpenter who was buried in the cemetery in 1931, was recovered and re-erected at the site of the cemetery, close to the remains of a coffin that is partially visible. |

*The cemetery at Whalers Bay (1930-31).*
*Photo Gunnar Isachsen (NPI Archives)*

*The remains of the cemetery: one grave and the cross of Peder Knapstad (2002)*
*Photo: Susan Barr (DCH)*

| WB3 | |
|---|---|
| **Structure:** | **The Magistrate's House** |
| **Location:** | Item 3 on the map of the site (Appendix B). |
| **Function and description:** | This building was the residence of the British magistrate during the operation of *Hektor* Whaling Station. It was constructed of machine planed planks with a tongue, groove and dovetail locking in each corner. The moulding and panelled door are typical of buildings from the World War I period in Norway. The building has a sheltered porch with a decorative baluster as a panel. The fretwork on the porch and the decorative details are characteristic of the Swiss style that was common in Norwegian building practices at that time. The building contained an office, a bedroom and a living room. A 10-meter flagpole was also located by the building. |
| **Present state (2003):** | The Magistrate's House was not significantly damaged by volcanic activity, but recently the roof has blown off and lies nearby. |


*The Magistrate's residence .*
*From a postcard with photo by A. Th. Larsen (NPI Archives)*

*The Magistrate's residence in 2002.*
*Photo: Susan Barr (DCH)*

| WB4 | |
|---|---|
| **Structure:** | **Hospital/ laboratory/ storage building/** |
| **Location:** | Item 2 on the map of the site (Appendix B). |
| **Function and Description:** | This building originally served as the hospital and laboratory and housed the doctor's office. The building was erected by the Norwegian whaling company, as indicated by notes inscribed on one of the panels. It was later used as a storage building by the UK. |
| **Present state (2003):** | The building is now half buried in mud and ash. |

*The hospital/ laboratory in 1946*
*Photo: Reece, A.W. (BAS archives)*

*The hospital/storage building/ laboratory in its present condition (2002)*
*Photo: Susan Barr (DCH)*

| WB5 | |
|---|---|
| **Structure:** | **Steam Boilers** |
| **Location:** | Item 7 on the map of the site (Appendix B). |
| **Function and Description:** | The boilers were used to provide steam for processing of the whale meat and bones. |
| **Present state (2003):** | The boiler house has collapsed and is partly disintegrated, but 5 small and 4 large boilers still remain. The large boilers show extensive signs of corrosion. |

*The boilers in their present condition in the middle of the picture (1996).*
*Photo: Birgit Njåstad (NPI)*

| WB6 | |
|---|---|
| **Structure:** | **Boilers/Cookers** |
| **Location:** | Item 7 on the map of the site (Appendix B). |
| **Function and Description:** | Boilers/cookers were used to extract oil from the whale meat and bones and to dry guano. The meat and bone boiling took place in two separate buildings - one on each side of the flensing platform. The boilers were arranged in two rows. The meat and bones were loaded into the boilers from a platform (loft) above the boilers. The guano drying took place in a building behind the flensing platform. |
| **Present state (2003):** | On the west side of the flensing platform are 10 boilers from the two original boiler rows. Of the smaller boilers with a larger diameter originally to the left of the boilers only two remain. On the east side of the flensing platform, 10 boilers are left in two rows together with a row of four boilers of the lower, wider type. Five settling tanks are found north of the boilers. The remains of the boiler kettles used in the process of drying the guano are sited near the guano factory. A large number of cooking grills are found on the remains of the boiler platforms and are also scattered around the boilers. On the west side of what was the flensing platform there are rail tracks, on which a trolley was used to transport meat and bones from the flensing platform to the boilers. |

*The Boilers/Cookers protected in buildings (1929-30). Meat and bone cookers to the left and right, guano dryers at the back.*
*Photo by Gunnar Isachsen (NPI Archives)*

*The Boilers/Cookers in their present condition (1996).*
*Photo: Birgit Njåstad (NPI)*

| WB7 | |
|---|---|
| **Structure:** | **Foundation of the kitchen/mess building and piggery** |
| **Location:** | Item 4 on the map of the site (Appendix B). |
| **Function and Description:** | The kitchen/mess was an essential part of the whaling station. The kitchen/mess building was destroyed by a fire in 1946. A fibreglass hut, Priestley House, was built over the foundations. |
| **Present state (2003):** | Only the foundation of the mess still remains today. Although the fibreglass hut was removed, some items, including the stove and fireplace remain. |

*The fiberglass hut, Priestley House, built on the foundation of the kitchen/mess (1967)*
*Photo by D. R. Gipps (BAS Archives)*

*The foundation of the kitchen/mess building (2002)*
*Photo: Susan Barr (DCH)*

| WB8 | |
|---|---|
| **Structure:** | **Fuel oil and whale oil storage tanks** |
| **Location:** | Item 10 and 11 on the map of the site (Appendix B). |
| **Function and Description:** | During the early whaling period at Whalers Bay, wooden barrels were used for storage of whale oil. Later these were replaced by iron barrels and following World War I by large steel tanks, also used for storage of fuel. |
| **Present state (2003):** | The southerly of the two large fuel storage tanks, which was shot through by the Royal Naval vessel *Queen of Bermuda* in 1941 to prevent enemy raiders from using the fuel, contains approximately 37 $m^3$ of highly weathered diesel below the shell hole and with oil leakage to the ground outside. The roofs of the smaller tanks are rusting through and collapsing. Entry into the tanks is therefore dangerous. Water erosion is causing the south-westerly tank to lean. |

*The fuel oil and whale oil tanks as they appeared in 1961.*
*Photo by John Killingbeck (BAS Archives)*

*The fuel oil and whale oil tanks in their present condition (1996).*
*Photo: Birgit Njåstad (NPI)*

| WB9 | |
|---|---|
| **Structure:** | **Floating dock** |
| **Location:** | Item 13 on the map of the site (Appendix B). |
| **Function and Description:** | The floating dock is U-shaped, and was placed underneath ships to lift either the bow or stern out of the water to enable repairs to the underside of the vessel. |
| **Present state (2003):** | The floating dock is partly sunk in the sand, but in relatively good condition, although corroded. |

*The floating dock in its present state (1996).*
*Photo: Birgit Njåstad (NPI)*

| WB10 | |
|---|---|
| **Structure:** | **Whalers Barracks (Biscoe House)** |
| **Location:** | Item 5 on the map of the site (Appendix B). |
| **Function and description:** | The building was originally a barracks for the workers at Hektor Whaling Station. As with the Magistrate's House, it was constructed of machine planed planks having a tongue, groove and dovetail locking in each corner. The structural interior is comparable to that of the Magistrate's House. The barracks were most likely constructed at the same time, and most likely also delivered by the same lumber supplier as the Magistrate's House. After the UK occupied the barracks, the building was renamed Biscoe House. A room housing a diesel generator was added to the south-west end of the barracks. |
| **Present state (2003):** | The building is now half-destroyed and partly filled with mud from the lahar caused by the 1969 eruption. |

*The barracks (Biscoe House) in the foreground. From a postcard with photo by A. Th. Larsen (NPI Archives)*

*Biscoe House in its present condition (1996). Photo: Birgit Njåstad (NPI)*

| WB11 | |
|---|---|
| **Structure:** | **Hunting Lodge (1955)** |
| **Location:** | Item 9 on the map of the site (Appendix B). |
| **Function and Description:** | Wooden barracks used from 1955 to 57 by the UK-based Hunting Aerosurveys during an early aerial survey expedition and thereafter by the organization that is now BAS. This prefabricated hut was built by the British company *Bolton and Paul*. |
| **Present state (2003):** | The building structure is in relatively good repair, but the inside has been gutted. Window and door openings are uncovered. The foundations of the west wall are in danger of collapsing. |

*Hunting Lodge under construction (1955) Reproduced with the permission of Simmons Aerofilms*

*Hunting Lodge in its present condition(2002) Photo: Rod Downie (BAS)*

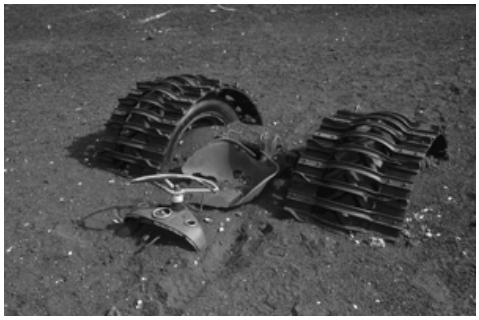
| WB12 | |
|---|---|
| **Structure:** | **Hangar** |
| **Location:** | Item 1 on the map of the site (Appendix B). |
| **Function and Description:** | Between 1960-1962, an aircraft hangar was constructed a few hundred metres west of the whaling station to support the British logistical and aerial survey work. The hangar was used for the repair, maintenance and storage of the aircraft. |
| **Present state (2003):** | The hangar is stable but in poor condition. A De Havilland DHC-3 Otter was removed from the site in April 2004 for safe-keeping. The intention is to return it to Whalers Bay once it is safe to do so. |

*The hangar under construction (1961).*
*Photo by John Killingbeck (BAS Archives)*

*The hangar in its present condition (2002).*
*Photo: Susan Barr (DCH)*

| WB13 | |
|---|---|
| **Structure:** | **Massey Ferguson Tractor** |
| **Location:** | Item 6 on the map of the site (Appendix B). |
| **Function and Description:** | The Massey Ferguson tractor was used to tow aircraft, and for other works around Base B. |
| **Present state (2003):** | The tractor was mostly buried by the lahar caused by the 1969 eruption. Only the top of the tractor is visible. |

*Massey Ferguson Tractor at aircraft hangar, Deception Island ( 1963 or 1964)*
*Photo: Possibly Mole, L..U, BAS archives)*



*The Massey Ferguson Tractor on the beach at Whalers Bay (1999).*
*Photo: Rod Downie (BAS)*

# Code of Conduct for Visitors to Deception Island

## 1. Introduction

This code of conduct has been produced for commercial tour operators (IAATO and non-IAATO affiliated), private expeditions and National Antarctic Programme staff when undertaking recreational visits to Deception Island.

There are four sites on Deception Island which may generally be visited: Whalers Bay, Baily Head, Pendulum Cove, and Telefon Bay (east). Stancomb Cove, in Telefon Bay, is also used as an anchorage for yachts. Visits to Decepción Station (Argentina) and Gabriel de Castilla Station (Spain) are only permitted by prior agreement with the respective Station Leaders. Tourist or recreational visits to other sites on the island are discouraged.

## 2. General Guidelines

The following general guidelines apply to all the above sites visited on Deception Island:

- Visits are to be undertaken in line with the Management Plan for Deception Island ASMA 4 and with Recommendation XVIII-1.

- All visits must be planned and conducted taking into account the significant risk to human life posed by the threat of volcanic eruption.

- Expedition Leaders of cruise ships and Masters of national programme support vessels are encouraged to exchange itineraries in order to avoid two ships unintentionally converging on a site simultaneously.

- Vessels approaching or departing from Port Foster must announce over VHF Marine Channel 16 the intended time and direction of passage through Neptunes Bellows.

- For commercial cruise operators, no more than 100 passengers may be ashore at a site at any time, accompanied by a minimum of one member of the expedition staff for every 20 passengers.

- Do not walk on vegetation such as moss or lichen. The flora of Deception Island is of exceptional scientific importance. Walking on the alga *Prasiola crispa* (associated with penguin colonies) is permissible as it will not cause it any adverse disturbance.

- Maintain an appropriate distance from birds or seals which is safe and does not cause them disturbance. As a general rule, maintain a distance of 5 metres. Where practicable, keep at least 15 metres away from fur seals.

- In order to prevent biological introductions, carefully wash boots and clean clothes, bags, tripods and walking sticks before landing.

- Do not leave any litter.

- Do not take biological or geological souvenirs or disturb artefacts.

- Do not write or draw graffiti on any man-made structure or natural surface.

- Scientific equipment is routinely deployed during the austral summer by National Antarctic Programmes at a number of locations on Deception Island. The Spanish Antarctic Programme deploy equipment for important and necessary seismic monitoring. Such equipment is highly sensitive to disturbance. At least 20 metres must be maintained from seismic monitoring equipment, which will be marked with a red flag. This distance is under examination - any revisions will be provided as necessary.

- Do not touch or disturb other types of scientific instruments or markers (e.g. wooden stakes marking botanical plots).

- Do not touch or disturb field depots or other equipment stored by National Antarctic Programmes.

## 3. Site Specific Guidelines

### *3.1 Whalers Bay (latitude 62°59'S, longitude 60°34'W)*

Whalers Bay is the most visited site on Deception Island, and one of the most visited sites in the Antarctic. It is a small bay immediately to the east after passing into Port Foster through Neptunes Bellows. It was named by the French explorer Jean-Baptiste Charcot because of the whaling activity that took place there. The site includes the remains of the Norwegian Hektor Whaling Station, the site of the cemetery and the abandoned British 'Base B', as well as the whaling remains along the length of the beach, some of which pre-date the whaling station. Appendix 3, Conservation Strategy for Whalers Bay Historic Site and Monument No. 71, contains further information about Whalers Bay.

- Visits to Whalers Bay must be undertaken in line with the Conservation Strategy for Whalers Bay Historic Site and Monument No 71.

*3.2 Pendulum Cove (latitude 62º56'S, longitude 60º36'W)*

Pendulum Cove (see figure 1) is a small cove on the north east side of Port Foster. It was named by Henry Foster of the British Royal Naval vessel HMS *Chanticleer* who, in 1828, undertook magnetic observations there using pendulums. The gently sloping ash and cinder beach leads to the remains of the abandoned Presidente Pedro Aguirre Cerda Station (Chile), Historic Site and Monument No. 76, which was destroyed by a volcanic eruption in 1967. Thermal springs along the shallow shoreline of Pendulum Cove offer visitors the opportunity to 'bathe' in warm water.

- Water temperatures in excess of 70° C have been recorded at Pendulum Cove. Bathers are to be made aware of the potential risk of scalding. Expedition staff should carefully choose a 'bathing area' for passengers where the hot water mixes with the cooler sea-water.

- Shoes or boots should be worn when entering the water to avoid scalding ones feet.

- Educational visits to Historic Site and Monument No. 76 are welcomed. The remains are a dramatic visual representation of the force of a volcanic eruption. At least one member of the expedition staff is to be present at the site during visits. For safety reasons, large groups of visitors are not to approach the site simultaneously. Do not go inland beyond the station ruins.

- Equipment is routinely deployed by the Spanish Antarctic programme for important and necessary seismic monitoring at Pendulum Cove. A distance of 20 metres must be maintained from seismic monitoring equipment, which will be marked with a red flag.

- Do not walk on vegetated areas. Elsewhere, tread gently to avoid disturbing ground surfaces which may host inconspicuous biota.

- The slope to the south east of HSM No. 76 is designated as Site G of ASPA 140 and must not be entered without a permit issued by the appropriate National Authority. This surface, created during the 1969 eruption, is being colonized by numerous moss and lichen species. Two species of moss that grow here are not found anywhere else in the Antarctic.

*3.3 Baily Head (latitude 62º58'S, longitude 60º30'W)*

Baily Head (see figure 2) is a rocky headland exposed to the Bransfield Strait on the south east coast of Deception Island. It was named after Francis Baily, the English astronomer who reported on Foster's magnetic observations at Pendulum Cove. The site comprises the southern end of a long linear beach which runs along most of the eastern side of Deception Island, and a narrow valley that rises

steeply inland to a semi-circular ridgeline, giving the impression of a natural 'amphitheatre'. It is bounded to the north by a large glacier and to the south by the cliffs of Baily Head. A substantial melt-stream runs through the centre of the valley during the austral summer.

Within this unnamed valley, and to the south of it, is one of the largest colonies of chinstrap penguins (*Pygoscelis antarctica*) in Antarctica - it is estimated that 100,000 pairs breed here. Brown skuas (*Catharacta antarctica lonnbergi*), cape petrels (*Daption capensis*) and snowy sheathbills (*Chionis alba*) also nest at Baily Head. Antarctic fur seals (*Arctocephalus gazella*) haul out along the beach in large numbers during the austral summer.

- No more than 350 visitors are to land at Baily Head in any one day.

- Total visiting time is not to exceed 6 hours in any one day.

- Staff and visitors are to exercise extreme caution when undertaking landings by small boat - such landings may be hazardous due to the swell resulting from the steeply sloping beach.

- Maintain a safe distance from the rock cliffs and the glacier front to avoid falling rock or ice.

- Maintain an appropriate and safe distance from birds or seals which does not cause them disturbance. Remain outside the natural 'boundary' of discrete colonies.

- Walk slowly and carefully when near to penguins, in particular when birds are nesting, moulting, crèching or returning from foraging trips. Give 'right of way' to penguins at all times.

- Hiking between Baily Head and Whalers Bay is discouraged because of environmental and safety concerns.

### *3.4 Telefon Bay (east) (latitude 62º56'S, longitude 60º40'W)*

Telefon Bay (see figure 3) was named after the whaling vessel *Telefon* which was moored in the bay for repairs in 1909 by Adolfus Amandus Andresen, founder of the company Sociedad Ballenera de Magallanes. At the easternmost end of Telefon Bay a gently sloping beach leads to a shallow valley which rises sharply to the rim of an unnamed volcanic crater.

- Exercise extreme caution when approaching the steep edge of the crater lip. The soil is friable and may collapse underfoot.

*3.5 Decepción Station (Argentina) and Gabriel de Castilla Station (Spain)*

Visits to Decepción Station (Argentina) and Gabriel de Castilla Station (Spain) may only be undertaken with the prior agreement of the appropriate Station Leader. Visits to the stations must be undertaken in line with the Code of Conduct for the Deception Island Facilities Zone (Appendix 4).

Figure 1. Pendulum Cove

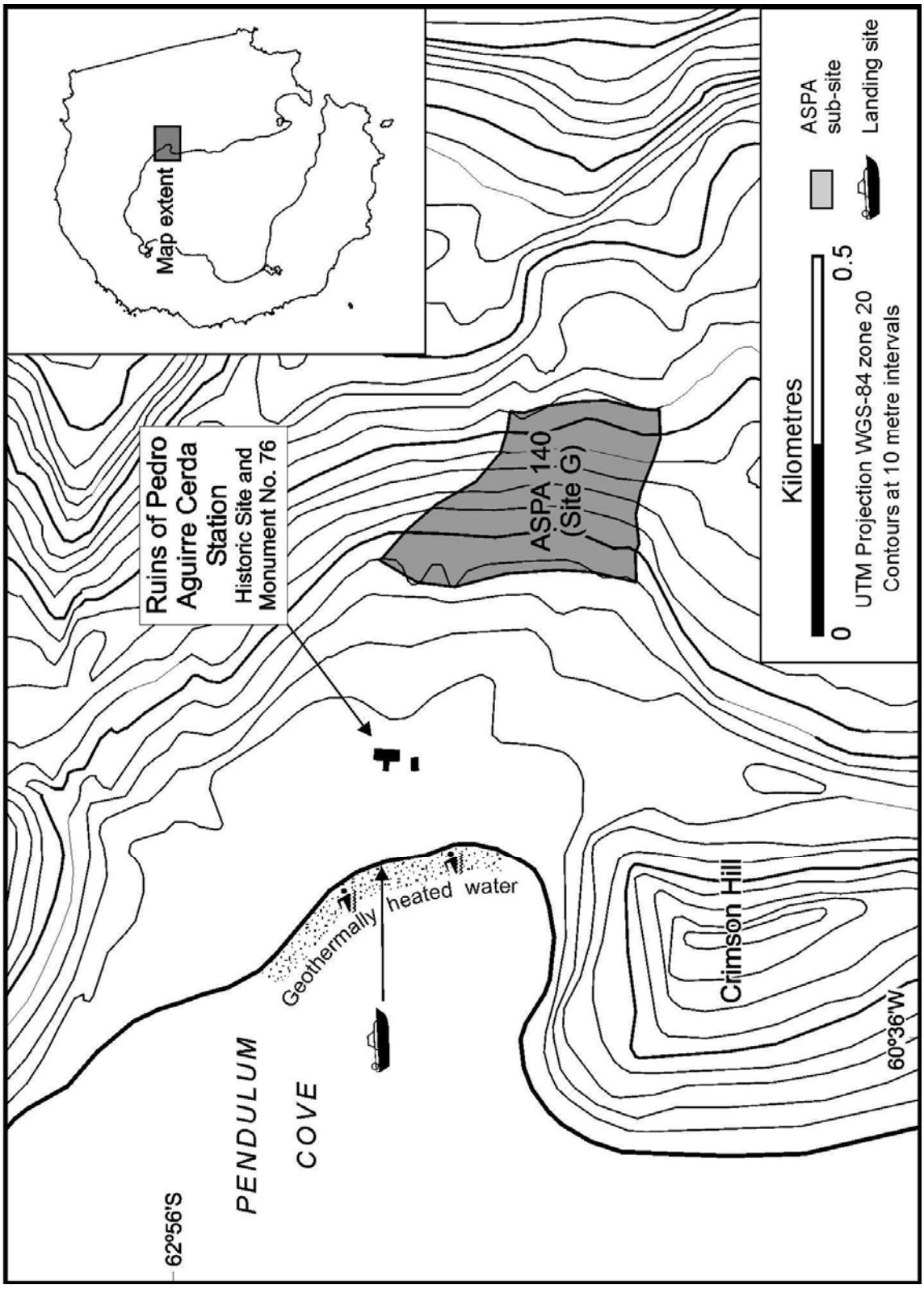


Figure 2. Baily Head

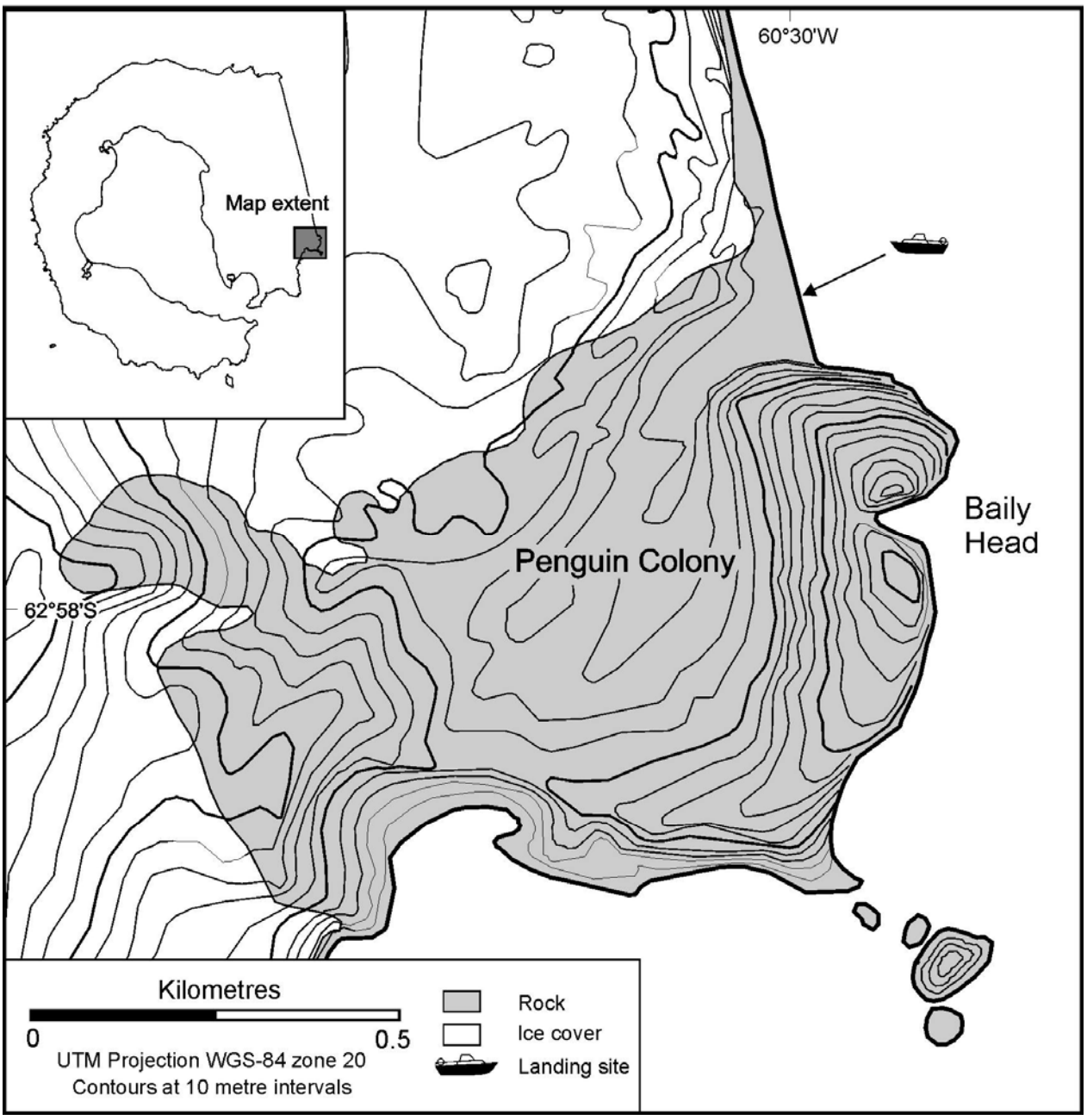
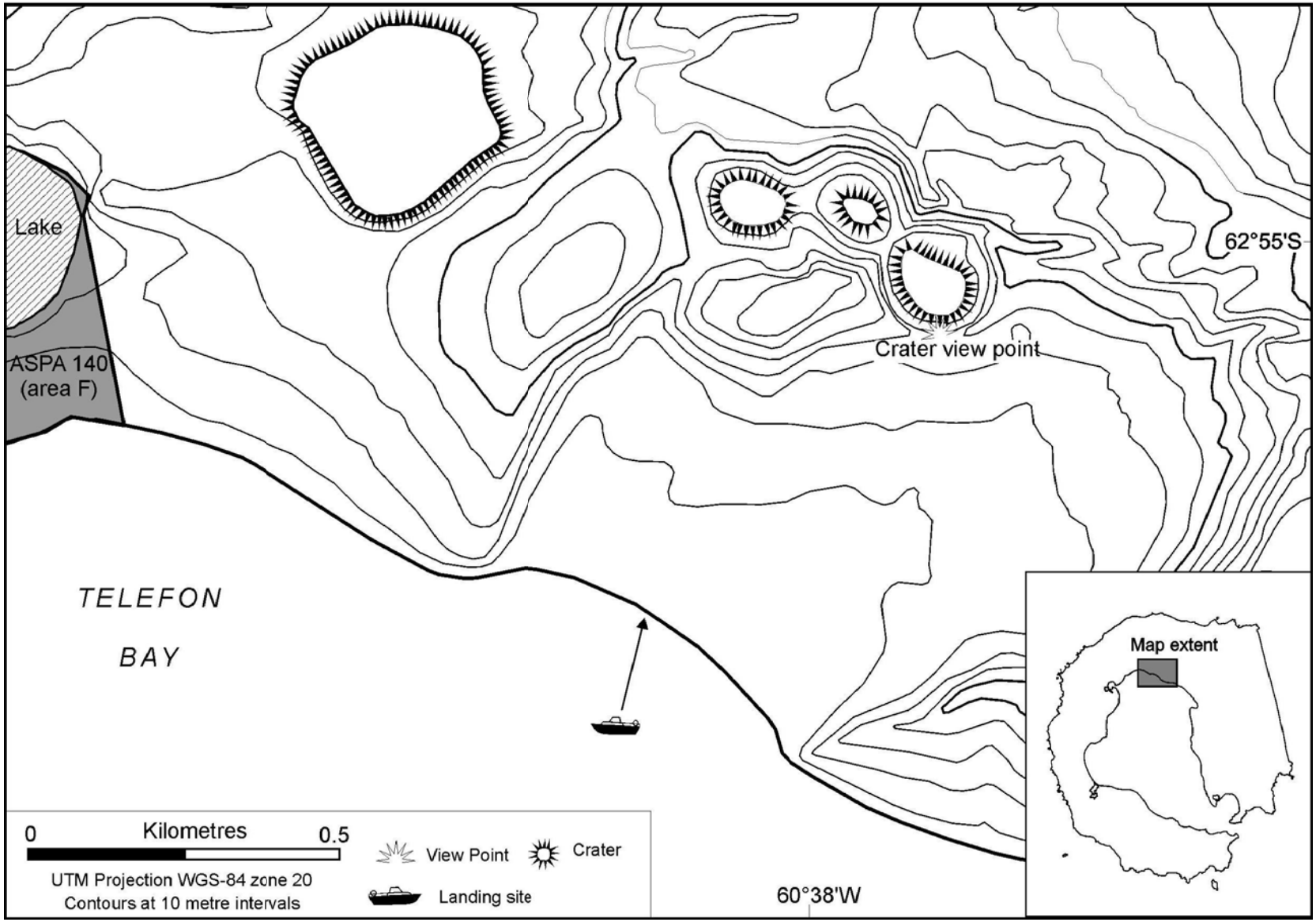


Figure 3. Telefon Bay (East)



**Alert Scheme and Escape Strategy for volcanic eruptions on Deception Island**[1]

Spanish seismologists monitor seismographs on the island for about three months each year (generally between late November and late February). That period also corresponds to the major period of human activity on the island.

The schematic arrangement presented in Table 1 is adapted from that used by the Alaska Volcano Observatory (United States Geological Survey;

http://www.avo.alaska.edu/avo4/updates/color_code.html).

This type of scheme is well suited to Deception Island.

Masters of vessels intending to enter Deception Island, or pilots of aircraft flying near to the island, should pay attention to any bulletins on the current state of activity of the volcano that are issued from Gabriel de Castilla Station (Spain), or by an appropriate spokesperson representing a national Antarctic programme operating in the Antarctic (e.g. Argentine Antarctic Institute, British Antarctic Survey, National Science Foundation (USA) or Spanish Antarctic Programme).

Table 1. Alert scheme for eruptions on Deception Island (modified after system used by USGS Alaska Volcano Observatory).

| Colour code | Alert state | Description |
|---|---|---|
| GREEN | No eruption is anticipated. | Volcano is quiet, in dormant state. Normal seismicity and fumarolic activity occurring. This is the normal alert state for Deception Island. |
| YELLOW | An eruption is possible in the next few weeks and may occur with little or no additional warning. | Volcano is restless; an eruption may occur. Increased levels of small earthquakes detected locally and/or increased volcanic gas emissions. |
| ORANGE | Explosive eruption occurring or is possible within a few days and may occur with little or no warning. Ash plume(s) not expected to reach 10 000 m above sea level. | Volcano in eruption, or eruption may occur at any time. Increased numbers and/or magnitudes of local earthquakes. Extrusion of lava flows (non-explosive eruption) may be occurring. |
| RED | Major explosive eruption is in progress or expected within 24 hours. Large ash plume(s) expected to exceed 10 000 m above sea level. | Significant eruption is occurring or major explosive activity expected at any time. Strong earthquake activity detected even at distant monitoring stations. |

[1] Adapted from Smellie, J.L. (2002) Volcanic Hazard. In: Smellie, J.L., López-Martínez, J., Headland, R.K., Hernández-Cifuentes, Maestro, A., Miller, I.L., Rey, J., Serrano, E., Somoza, L. and Thomson, J.W. 2002. *Geology and geomorphology of Deception Island*, 78 pp. BAS GEOMAP Series, Sheets 6-A and 6-B, 1:25,000, British Antarctic Survey, Cambridge.

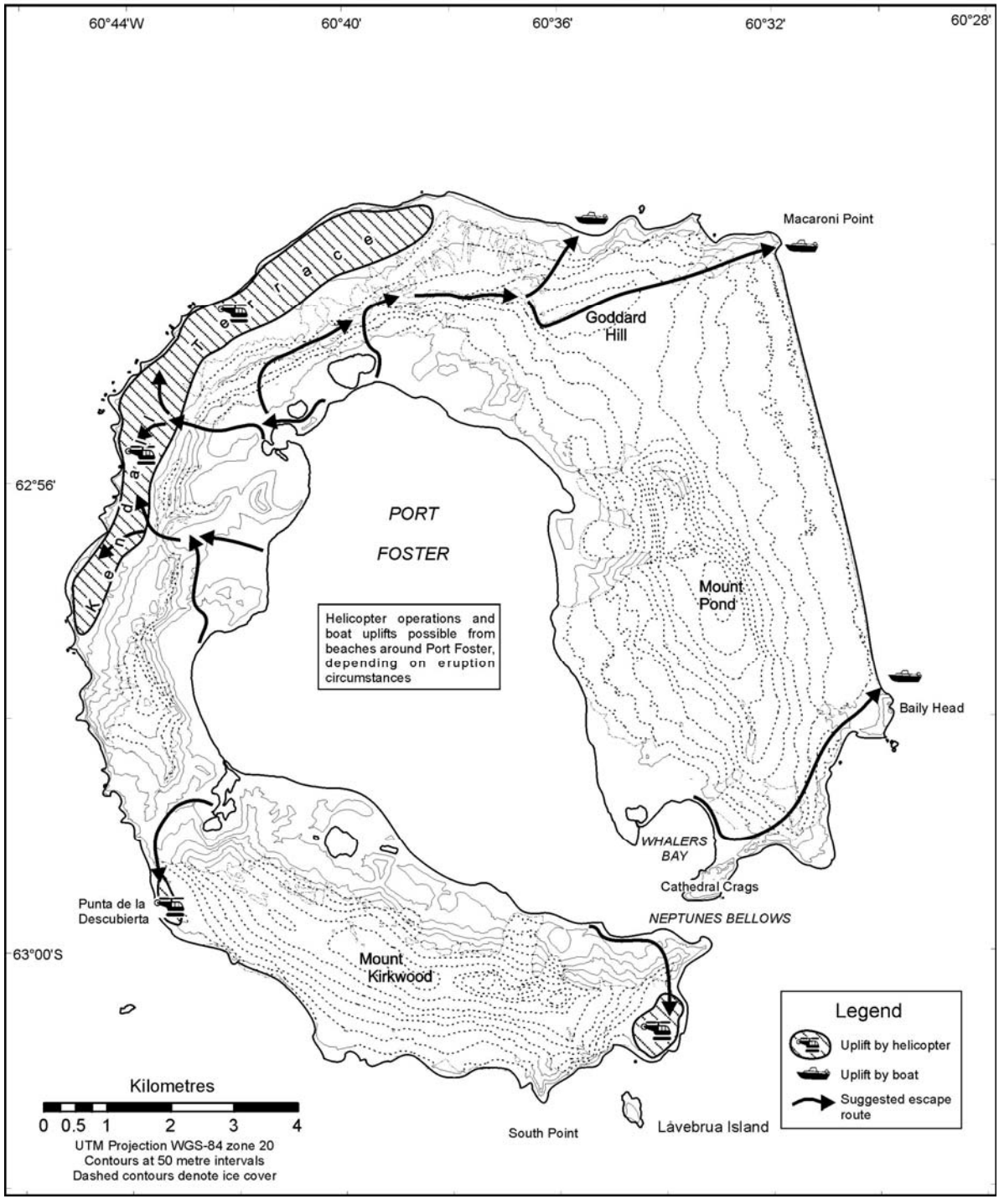
**Escape strategy in case of a volcanic eruption on Deception Island**

This escape strategy is based on the premise that eruptions will be similar to those documented in 1967-1970, i.e. with a limited geographical impact on the island (code orange alert state; Table 1). A sudden collapse of the caldera could result in a much more serious eruption, with potentially devastating effects on anyone on the island at the time. Escape from the island during a caldera collapse eruption is unlikely. However, the probability of this is very low and it would likely be preceded by significant precursory activity, particularly widespread ground inflation and associated earthquakes, during several days or weeks prior to the eruption. However, any eruptions can take place with relatively little immediate warning.

1. Inner coast areas are likely to be hazardous because of ash fall, possible pyroclastic surges (within c. 2 km of an eruption centre), tsunami and irregular rapid tidal oscillations. Tidal effects are likely to be pronounced by water ramping onto beaches, and they may prevent the use of inner coast beaches for boat uplift. People may therefore have to be uplifted from the outer coast.
2. If ships are present within Port Foster when an eruption occurs, they should depart the island immediately, ideally after uplifting all people ashore. Masters of vessels should observe extreme caution whilst departing Neptunes Bellows because of tidal rips and surges, which are enhanced at the narrow shallow entrance channel. Masters of vessels should also be aware of Ravn Rock, which is located at Neptunes Bellows, and the possibility of rockfalls from Cathedral Crags.
3. All rescuing vessels and helicopters should avoid passing through or under the eruption clouds because of the damaging effects of gritty ash particles on machinery.
4. Escape routes to the outer coast of the island are shown in Figure 1 of Appendix 6. All escape routes from the inner bay to the outer coast are strenuous, both climbing up onto the caldera rim and (in most cases) descending again on the outside. The caldera wall is steep (impassable cliff in places) and covered in highly mobile scree. It is impossible to use ground vehicles (e.g. ATVs) to transport people out of the caldera. Although exit routes are passable for ATVs at two places, much skill and local knowledge of the routes are required and the routes are impassable to ATVs carrying a passenger.
5. All routes to the outer coast will take hours to complete, ranging from about 2 hours for the easiest route (Whalers Bay to Baily Head) to 3 or 4 hours (or more) if the unnamed bay on the north coast or at Macaroni Point are the only options. These are minima and based on times likely to be taken by young relatively fit persons. The routes are physically arduous as most surfaces are yielding (mainly composed of coarse ash and lapilli). Exhaustion is likely and should be anticipated, even in fit persons. Descending to beaches on the outer coast is also generally difficult because of steep slopes. Apart from routes shown from Goddard Hill to Macaroni Point and the unnamed bay on the north coast (Figure 1), there are no recommended safe routes over snow and ice. Because of important difficulties peculiar to glaciers (e.g. crevasses, whiteout, slippery surfaces), other glacier travel should be avoided unless with trained guides using suitable equipment (e.g. ice axes, ropes, harnesses). Such equipment is unlikely to be readily available in an emergency.

6. Helicopter uplifts may be the best option as most of the outer coast beaches are narrow, bouldery and shelve steeply into deeper water, causing beach surf even on calm days. Some beaches (e.g. north of Punta de la Descubierta) also have a submerged offshore bar hazardous to small boats. If wind conditions are suitable, it may be possible to uplift people by helicopter from the inner coast. The most appropriate action can be judged at the time. Although helicopter uplifts can probably be effected, with variable difficulty, almost anywhere, the best areas are shown in Figure 1 of Appendix 6.

Figure 1. Suggested escape routes on Deception Island during a volcanic crisis corresponding to no more than a code orange alert state.



## Code of Conduct for the Deception Island ASMA 4 Facilities Zone, including Decepción Station (Argentina) and Gabriel de Castilla Station (Spain)

### 1. Introduction

The Deception Island ASMA includes a Facilities Zone within which is located Decepción Station (Argentina) and Gabriel de Castilla Station (Spain). Figure 1 shows the extent of the Facilities Zone, which includes the two stations, the surrounding beach area, and a small unnamed lake to the west of Crater Lake from which freshwater is extracted. Activities within this zone are to be undertaken in line with this Code of Conduct, the aims of which are to:

- encourage the pursuit of scientific investigation on Deception Island, including the establishment and maintenance of appropriate supporting infrastructure;
- preserve the natural, scientific and cultural values of the Facilities Zone;
- safeguard the health and safety of station personnel.

This Code of Conduct summarises existing station procedures, a copy of which is available (Spanish language version only) at Decepción and Gabriel de Castilla stations.

Staff and visitors will be made aware of the contents of this Code of Conduct during pre-deployment training programmes and briefing sessions on board ship prior to arrival at the station.

A copy of the complete Deception Island ASMA Management Package will be kept at Decepción Station and Gabriel de Castilla Station, where relevant maps and information posters about the ASMA will also be displayed.

### 2. Buildings and services

*2.1 Buildings*

- An Environmental Impact Assessment (EIA) must be undertaken for the construction of any new permanent station buildings in line with Annex I to the Environmental Protocol.
- An EIA must also be undertaken for the quarrying of rock to maintain existing buildings, in line with Annex I to the Environmental Protocol, as well as with the prior approval of the national authorities of Argentina (Decepción Station) or Spain (Gabriel de Castilla Station).
- Consideration will be given to reusing existing sites when practicable, in order to minimise disturbance.
- Buildings are to be maintained in good condition. Buildings not currently in use are to be routinely checked, and assessed for likely removal.
- Work-sites are to be kept as neat as possible.

*2.2 Power Generation*

- Maintain generators in good condition, and undertake routine inspections, so as to minimise emissions and possible fuel leaks.
- Ensure economy in power consumption and hence fuel usage and emissions.
- The use of renewable energy sources will be encouraged, where appropriate.

*2.3 Water Supply*

- Handling or disposing of wastes, fuel or other chemicals within the stations' water catchment area is prohibited.
- Use of vehicles within the water catchment area will only be for essential purposes.
- Ensure that regular tests of water quality, as well as routine cleaning of water holding tanks, are conducted.
- Regulate water consumption, so as to avoid unnecessary extraction.

**3. Fuel handling**

- The integrity of bulk fuel storage facilities, supply lines, pumps, reels and other fuel handling equipment will be regularly inspected.
- At both stations, fuel storage includes secondary containment. Drummed fuel should be stored inside. Storage areas should, as far as practicable, be properly ventilated, and sited away from electrical services. Storage facilities should also be sited away from accommodation facilities for safety reasons.
- All practicable measures will be undertaken to avoid fuel spills, in particular during fuel transfer (e.g. ship to shore transfer by pipeline or zodiac, refuelling day tanks).
- Any fuel, oil or lubricant spills will be reported immediately to the Station Leader, and subsequently to the National Authority.
- Ensure that adequate and sufficient spill response equipment (e.g. absorbents) is kept in a known location and available to deal with any spills.
- Station personnel will be trained in how to use spill response equipment. Training exercises will be undertaken at the beginning of each season.
- In case of fuel spills, response actions will be undertaken in line with the Oil Spill Contingency Plan held at each station.
- Oily wastes will be packaged in appropriate containers and disposed of according to station procedures.

**4. Fire prevention and fire-fighting**

- Signs indicating no-smoking areas, and flammable substances, will be displayed as appropriate.
- Fire fighting equipment will be available at fuel storage sites and elsewhere. Such equipment will be clearly marked.

**5. Waste Management**

- Waste management, including waste reduction and the provision of equipment and appropriate packaging material, will be considered in the planning and conducting of all activities at Decepción and Gabriel de Castilla stations.
- All station personnel will be instructed on the provisions of Annex III to the Environmental Protocol.

- A waste management co-ordinator will be appointed at each station.
- Wastes will be segregated at source and stored safely on site prior to removal. After each summer season, wastes generated at Decepción and Gabriel de Castilla stations will be removed from the Antarctic Treaty Area.
- Regular tests of water effluents discharged into Port Foster will be undertaken.
- Any substances that may adversely affect the working of effluent treatment plants will not be disposed of through the drainage system (including toilets and wash basins).
- Cleaning up past waste disposal sites on land and abandoned work sites will be considered a priority, except where removal would result in more adverse environmental impacts than leaving the structure or waste material *in situ*.
- Personnel from both stations should periodically participate in clean-up activities within the facilities area, so as to minimise any scattered wastes around the stations.
- At the end of each summer season, activities connected to clean-up and removal of wastes will be reported to the appropriate national authority.

**6. Other Operational Issues**

*6.1 Communications*

- The installation of permanent or temporary aerials is to be carefully considered through the environmental evaluation procedures in place.
- VHF Marine Channel 16 will be monitored.
- All station personnel leaving the Facilities Zone must be equipped with a VHF radio.

*6.2 Use of vehicles and small boats*

- Vehicles should only be used around and between the stations when necessary.
- Keep to established tracks within the station area where practicable.
- Refuelling and servicing of vehicles will be carried out at the facilities provided for these purposes. Every effort should be made to avoid spills during refuelling and servicing.
- Do not use vehicles close to sensitive scientific equipment, across flora or near concentrations of fauna, or unnecessarily within the water-catchment area.
- Small boats operating out of Decepción or Gabriel de Castilla Station are only to be used within Port Foster, when weather conditions allow, and principally for scientific and logistic reasons. No small boats will be used outside Port Foster. Avoid the use of small boats close to cliffs and/or glaciers, to avoid rock or ice falls.
- When operating one boat, a second boat will be on stand-by, at the Station, for immediate support in an emergency.
- Small boats will be operated by at least two people. Essential equipment will include boating immersion suits, life jackets and VHF radios.

*6.3 Aircraft Operations*

- Helicopters will generally take off from and land at the helipad at Decepción Station. Occasionally, operational reasons may require them to take off from, or land at, other appropriate locations within the Facilities Zone.

*6.4 Field travel*

- All wastes from field parties, except for human wastes (faeces, urine and grey water) will be returned to the stations for safe disposal.

- The Station Leader and/or the Station Environment Officer will brief field parties on environmental management in the field, the location of protected areas, and the provisions of the ASMA Management Plan.
- No uncooked poultry products will be used by field parties.
- All field parties will be equipped with VHF radios.

**7. Protected Areas**

- Three terrestrial sub-sites of ASPA No. 140 (Site B - Crater Lake, Site C - Unnamed hill, southern end of Fumarole Bay, and Site D - Fumarole Bay), are located close to the Facilities Zone. Station personnel will be made aware of the location of, and restrictions on access to, all protected areas on Deception Island. Information about these protected areas, including a map showing their location, will be prominently displayed at both stations.

**8. Flora and fauna**

- Any activity involving the taking of, or harmful interference with, native flora or fauna (as defined in Annex II to the Protocol) is prohibited unless authorised by a permit issued by the appropriate authority.
- An appropriate distance is to be maintained from birds or seals which is safe and avoids causing them disturbance.
- Staff and visitors are to walk slowly and carefully when near wildlife, in particular avoiding birds which are nesting, moulting, crèching or returning from foraging trips. Give 'right of way' to wildlife at all times.
- Birds are not to be fed on waste food scraps from the stations. Food wastes will be secured to prevent scavenging by birds.
- All reasonable precautions will be taken to avoid the introduction of micro-organisms and any other non-native species, or species from other Antarctic sites.
- The introduction of herbicides, pesticides or other harmful substances is prohibited.
- At the end of each summer season, a report on activities involving the taking of, or harmful interference with, native flora and fauna will be forwarded to the appropriate national authorities.

**9. Tourist visits to the Facilities Zone**

- Any visits to Decepción Station (Argentina) or Gabriel de Castilla Station (Spain) may only be undertaken at the discretion of the respective Station Leader. Contact can be made via VHF Marine Channel 16. Visits will only be allowed if they do not interfere with scientific or logistical work.
- Visits are to be undertaken in line with Recommendation XVIII-1.
- Station Leaders will co-ordinate visits to stations with Expedition Leaders.
- Visitors will be informed about the principles of this Code of Conduct, as well as the ASMA Management Plan.
- The station leader will appoint a guide (English speaking, when appropriate and possible), to escort visitors around the station, in order to ensure compliance with the measures included in this Code of Conduct.
- The national authorities operating Decepción or Gabriel de Castilla Stations will inform IAATO of any increase in the risk of volcanic eruption. The stations shall notify any ships in the area of any immediate danger.

## 10. Co-operation and sharing of resources

- Both stations will co-ordinate and periodically conduct joint emergency evacuation, oil spill response and fire-fighting exercises.

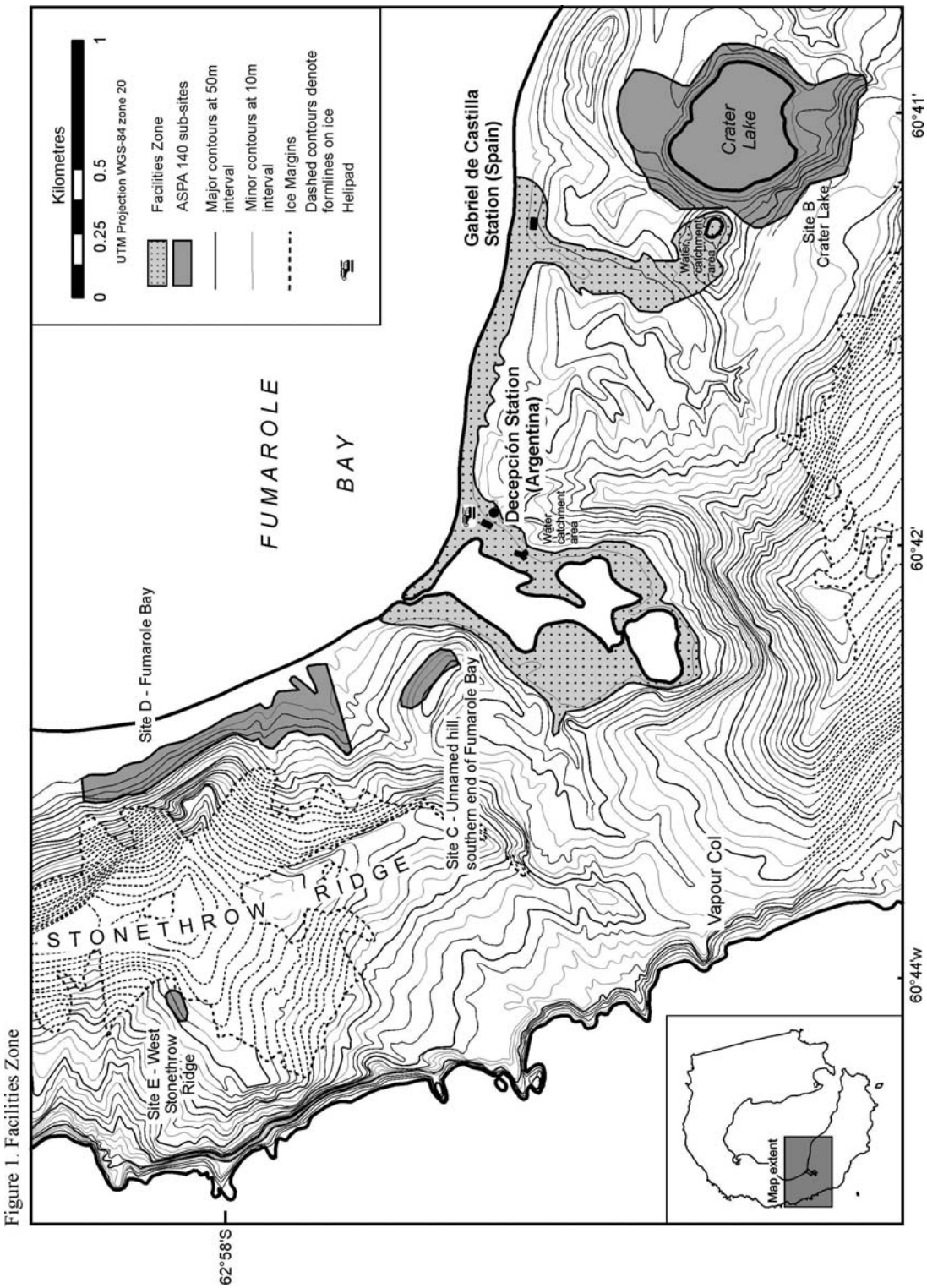



Figure 1. Facilities Zone