ANTARCTIC SPECIALLY PROTECTED AREA NO. 152
WESTERN BRANSFIELD STRAIT

1. Description of values to be protected

Western Bransfield Strait (between latitudes 63°20'S and 63°35'S and longitudes 61°45'W and 62°30'W, approximately 910 km^2) was originally designated as a Marine Site of Special Scientific Interest through Recommendation XVI-3 (1991, SSSI No. 35) after a proposal by the United States of America. It was designated on the grounds that "the shallow shelf south of Low Island is one of only two known sites in the vicinity of Palmer Station that are suitable for bottom trawling for fish and other benthic organisms. From an ecological standpoint, the Low Island site offers unique opportunities to study the composition, structure, and dynamics of several accessible marine communities. The Site, and in particular, its benthic fauna, is of exceptional scientific interest and requires long-term protection from potential harmful interference".

New bathymetric data compiled for the Area since its original designation show that the original boundary failed to encompass part of the shallow shelf above 200 m depth to the west of Low Island. It also included deep water down to more than 1000 m in the east of the original Area, which is not considered strictly pertinent to the values identified for the Area. The boundaries of the Area have therefore been revised to include all of the shallow shelf down to 200 m depth to the west and south of Low Island, while the deeper water of Bransfield Strait to the east has now been excluded. This has resulted in a shift of the boundaries by approximately nine kilometers to the north and 12 kilometers to the west, although the overall size of the Area has not been significantly altered. The new boundaries of the Area at Western Bransfield Strait are between latitudes 63°15'S and 63°30'S and longitudes 62°00'W and 62°45'W and are defined in the north-east by the shoreline of Low Island, encompassing an area of approximately 900 km^2 (Map 1).

The Area continues to be considered important for studies of the composition, structure and dynamics of the marine communities, and the original reasons for designation are reaffirmed in the current Management Plan with the amended boundaries. In addition, the Area is recognized as an important spawning ground for several fish species, including the rockcod *Notothenia coriiceps* and the icefish *Chaenocephalus aceratus*. Fish have been collected from the Area by scientists from Palmer Station since the early 1970s. The Area is within the research area of the Palmer Long Term Ecological Research (LTER) Program; fish collected from the Area are used in the study of

biochemical and physiological adaptations to low temperatures. Some of the fish collected have been used for comparative studies with the more heavily impacted Arthur Harbour area. Scientific research is also being undertaken on the benthic faunal communities.

2. Aims and objectives

Management at Western Bransfield Strait aims to:

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

3. Management activities

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

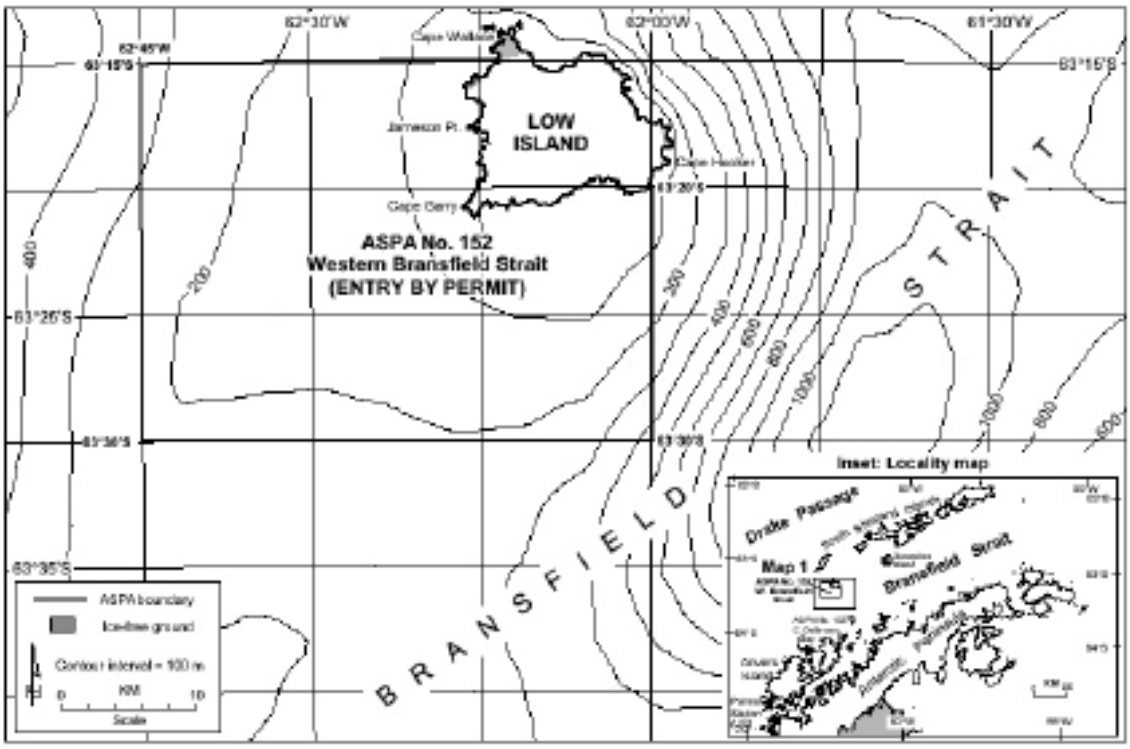
- A map showing the location of the Area (stating the special restrictions that apply) shall be displayed prominently and copies of this Management Plan shall be made available at Palmer Station (USA).
- Copies of this Management Plan shall be made available to vessels traveling in the vicinity of the Area.
- Buoys, or other markers or structures installed within the Area for scientific or management purposes shall be secured and maintained in good condition.
- Visits shall be made as necessary to assess whether the Area continues to serve the purposes for which it was designated and to ensure management and maintenance measures are adequate.

4. Period of designation

Designated for an indefinite period.

5. Maps and photographs

Map 1. ASPA No. 152 Western Bransfield Strait: bathymetric map



Map 1: ASPA No. 152 Western Bransfield Strait bathymetric map. Coastline data are derived from the SCAR Antarctic Digital Database Version 2.0. Bathymetry is derived from published and unpublished depth data gridded by Morris (British Antarctic Survey, pers. comm. 2000) to the same specifications described in Schenke *et al*. (1998), which was gridded to cell sizes of between 1 and 4.6 km. Map specifications:

Projection: Lambert Conformal Conic; Standard parallels: 1st 62° 00' S; 2nd 64° 00' S

Central Meridian: 62° 00' W; Latitude of Origin: 63° 00' S; Spheroid: WGS84;

Horizontal accuracy: maximum error of ±300 m.

Vertical contour interval 100 m, vertical accuracy to within ±50 m.

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

6. Description of the Area

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

GENERAL DESCRIPTION

Bransfield Strait is a deep water passage approximately 220 km long and 120 km wide between the Antarctic Peninsula and the numerous islands that comprise the South Shetland Islands. The Drake Passage is to the north and to the west is the Bellingshausen Sea. The Αρεα lies approximately 80 km west of the Antarctic Peninsula, mostly within the 200 m isobath directly south and west of Low Island (Map 1). Low Island is the southern-most of the South Shetland Islands, lying 60 km south-west of Deception Island and 25 km south-east of Smith Island. To the west and south of Low Island, and for approximately 20 km from the shore, the sea floor slopes gently from the intertidal zone to depths of approximately 200 m. The sea floor slopes steeply to the east of Low Island, reaching depths of up to 1200 m in this part of Bransfield Strait. The sea floor in the Area is generally composed of a matrix of soft sand, mud and cobbled-rock.

BOUNDARIES

The revised boundaries of the Area at Western Bransfield Strait are defined in the north as the line of latitude at 63°15'S and in the south at 63°30'S; in the east the boundary is defined as the line of longitude at 62°00'W and in the west 62°45'W (Map 1). The northeastern boundary is defined as the shoreline of Low Island, extending from 62°00'W, 63°20'S in the south-east (approximately two kilometers from Cape Hooker) to 62°13'30"W, 63°15'S in the north-west (Cape Wallace). The coastline boundary on the western and southern shores of Low Island is defined as the high tide level, and the intertidal zone is included within the Area. The Area extends a maximum of 27.6 km north-south and a maximum of 37.15 km east-west, encompassing an area of approximately 900 km^2. Boundary markers have not been installed because in the marine area this is impractical, while at Low Island the coast itself is a clearly defined and visually obvious boundary feature.

OCEANOGRAPHY AND CLIMATE

There is considerable year-to-year variation in sea-ice coverage within the Bransfield Strait region, although sea ice coverage appears to be less than 100 days per year (Parkinson, 1998). Rates of sea ice advance and retreat along the northwestern Antarctic Peninsula are also variable. Sea ice advance is for approximately five months followed by approximately seven months of retreat. Ice growth is fastest in June and July and the fastest decay is in December and January (Stammerjohn and Smith, 1996).

Water temperatures were recorded in the Area monthly from December 1986 to March 1987 and ranged between -0.6°C in December to 0.9°C in February and March (Niiler *et*

al. 1991). Salinity averaged 33.8 ‰ to 33.9 ‰ within the top 20 m of the water column over the same time period.

Wind is predominantly from the NNW direction, resulting in a southward oceanic flow along the western Antarctic Peninsula. Coupled with the northward flow of the Antarctic Circumpolar Current, this results in a predominantly clockwise circulation in Bransfield Strait (Hofmann *et al.* 1996). However, there is weak counter-clockwise motion around Low Island (Niiler *et al.*, 1991; Hofmann *et al.*, 1996). Local circulation is also influenced by tides, with tide records obtained at Low Island during a six week period in December 1992 to January 1993 recording a maximum level variation of 1.70 m (López *et al.* 1994).

MARINE BIOLOGY

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

Fish species commonly collected near Low Island include *Chaenocephalus aceratus, Harpagifer bispinis, Notothenia coriiceps, N. gibberifrons, Parachaenichthys charcoti* and *Trematomus newnesi*. Species rarely found at Low Island include *Champsocephalus gunnari, Chionodraco rastrospinosus* and *Pseudochaenichthys georgianus*. In addition, the Low Island shelf appears to be a spawning ground for several fish species, for example the ice fish *Chaenocephalus aceratus* and *N. coriiceps*. The Area is a mating ground for Yellowbelly rockcod (*Notothenia coriiceps*) (indicated by eggs) (Kellermann, 1996). The fish spawn in May/June. The large eggs, around 4.5 mm in diameter, are pelagic after fertilization and ascend to the surface waters where they incubate during the winter. Larval species recorded in the Area include *Bathylagus antarcticus*, *Electrona antarctica*, *Gymnodraco acuticeps*, *Nototheniops larseni*, *Notothenia kempi* and *Pleuragramma antarcticum* (Sinque *et al*., 1986; Loeb *et al.*, 1993; Morales-Nin *et al.*, 1995).

The following benthic amphipod species have been recorded within the Area: *Ampelisca barnardi, A. bouvieri, Byblis subantarctica, Epimeria inermis, E. oxicarinata, E. walkeri, Eusirus antarcticus, E. perdentatus, Gitanopsis squamosa, Gnathiphimedia sexdentata, Jassa* spp., *Leucothoe spinicarpa, Liljeborgia georgiana, Melphidippa antarctica,*

Oediceroides calmani, O. lahillei, Orchomenella zschaui, Parharpinia obliqua, Parepimeria bidentata, Podocerus septemcarinatus, *Prostebbingia longicornis, Shackeltonia robusta, Torometopa perlata, Uristes georgianus* and *Waldeckia obesa* (Wakabara *et al.*, 1995).

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

BIRDS

In 1987 approximately 295,000 pairs of chinstrap penguins (*Pygoscelis antarctica*) were breeding at five locations on Low Island. The largest colonies were at Cape Wallace (approximately 150,000 pairs) and Cape Garry (approximately 110,000 pairs) (Woehler, 1993). It is expected that the chinstrap penguins influence the Area, particularly near Cape Garry.

HUMAN ACTIVITIES / IMPACTS

No data are available on the numbers of ship movements through the Area, although the South Shetland Islands and northwestern Antarctic Peninsula are popular destinations for tourist ships. Numerous research cruises along the western Antarctic Peninsula have included sampling stations within the Area. Fish collected within the Area have been used to study the biochemical adaptations that enable proteins to function at low temperatures, and the physiological adaptations of muscle and energy metabolism to low temperatures (e.g. Detrich, 1987; Detrich and Parker, 1991; Detrich and Parker, 1993). Fish collected from the Area have also been used for comparative studies with fish collected from Arthur Harbor (McDonald *et al.*, 1992). Concentrations of polynuclear aromatic hydrocarbons (PAH's) were higher than expected in fish collected from the Area: while levels of exposure in fish sampled from the Area were considerably lower than those sampled from the vicinity of the *Bahia Paraiso* wreck, levels were similar to those in fish sampled from old Palmer Station (McDonald *et al.*, 1992).

6(ii) Restricted and managed zones within the Area

None.

6(iii) Structures within and near the Area

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

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

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

7. Permit conditions

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

- it is issued for at least one of the following purposes:
    - for scientific study of the marine environment in the Area, or for other scientific study which will not compromise the values for which the Area is protected; and/or
    - for essential management purposes consistent with plan objectives such as inspection, maintenance or review;
- the actions permitted will not jeopardize the values of the Area;
- any management activities are in support of the objectives of the Management Plan;
- the actions permitted are in accordance with the Management Plan;
- the Permit, or an authorized copy, shall be carried within the Area;
- a visit report shall be supplied to the authority named in the Permit;
- permits shall be issued for a stated period;
- the appropriate authority should be notified of any activities/measures undertaken that were not included in the authorised Permit.

7(i) Access to and movement within the Area

Access into the Area shall be by sea, over sea ice or by air. There are no specific restrictions on routes of access to or movement within the Area, although movements should be kept to the minimum necessary consistent with the objectives of any permitted activity. Every reasonable effort should be made to minimize disturbance. Anchoring should be avoided within the Area. There are no special overflight restrictions and aircraft may land by Permit when sea ice conditions allow.

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

- Scientific research that will not jeopardize the values of the Area;

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

7(iii) Installation, modification or removal of structures

Structures or scientific equipment shall not be installed within the Area except as specified in a Permit. All markers, structures or scientific equipment installed in the Area shall be clearly identified by country, name of the principal investigator and year of installation. All such items should be made of materials that pose minimal risk of contamination of the Area. Removal of specific equipment for which the Permit has expired shall be a condition of the Permit. Permanent installations are prohibited.

7(iv) Location of field camps

None.

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

No living animals, plant material, pathogens or microorganisms shall be deliberately introduced into the Area. No herbicides or pesticides shall be introduced into the Area. Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes specified in the Permit, shall be used in the minimum quantities necessary to achieve the purpose of the activity for which the Permit was granted. Anything introduced shall be for a stated period only, shall be removed to the maximum extent practicable at or before the conclusion of that stated period, and shall be stored and handled so that risk of any introduction into the environment is minimized. If release occurs which is likely to compromise the values of the Area, removal or remediation is encouraged only where the impact of removal or remediation is not likely to be greater than that of leaving the material *in situ*. The appropriate authority should be notified of any materials released that were not included in the authorized Permit.

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

Taking or harmful interference with native flora or fauna is prohibited, except by Permit issued in accordance with Annex II to the Protocol on Environmental Protection to the Antarctic Treaty. Where taking or harmful interference with animals is involved, the

SCAR Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica should be used as a minimum standard.

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

Collection or removal of anything not brought into the Area by the Permit holder shall only be in accordance with a Permit and should be limited to the minimum necessary to meet scientific or management needs. Permits shall not be granted if there is a reasonable concern that the sampling proposed would take, remove or damage such quantities of substrate, native flora or fauna that their distribution or abundance within the Area would be significantly affected. Anything of human origin likely to compromise the values of the Area, which was not brought into the Area by the Permit Holder or otherwise authorized, may be removed unless the impact of removal is likely to be greater than leaving the material *in situ*: if this is the case the appropriate authority should be notified.

7(viii) Disposal of waste

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

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

1. Permits may be granted to enter the Area to carry out biological monitoring and site inspection activities, which may involve the collection of limited samples for analysis or review, or for protective measures.
2. Any specific sites of long-term monitoring that are vulnerable to inadvertent disturbance should, where practical, be appropriately marked on site and on maps of the Area.

7(x) Requirements for reports

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

record of usage, to be used both in any review of the management plan and in organizing the scientific use of the Area.

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