

Management Plan

for Antarctic Specially Managed Area No.1 ADMIRALTY BAY, KING GEORGE ISLAND

Introduction

Admiralty Bay is located on King George Island, South Shetland Islands, about 125 kilometers from the northern tip of Antarctic Peninsula (Fig. 1). The primary reason for its designation as an Antarctic Specially Managed Area (ASMA) is to protect its outstanding environmental, historical, scientific, and aesthetic values. Admiralty Bay was first visited by sealers and whalers in the 19th and early 20th centuries, and relics from these periods still remain. The area is characterized by magnificent glaciated mountainous landscape, varied geological features, rich sea-bird and mammal breeding grounds, diverse marine communities, and terrestrial plant habitats. For nearly four decades coordinated scientific research has been conducted in Admiralty Bay by five different countries. The studies on penguins have been undertaken continuously since 1976, and is the longest ever done in Antarctica. Admiralty Bay also has one of the longest historical series of meteorological data collected for the Antarctic Peninsula, considered as one of the most sensitive areas of the planet to climate change.

The Area comprises environments laying within three domains defined in the Environmental Domains Analysis for Antarctica: Environment A – Antarctic Peninsula northern geologic; Environment E – Antarctic Peninsula, Alexander and other islands main ice fields and glaciers; and Environment G – Antarctic Peninsula offshore islands (Resolution 3 (2008)). Under the Antarctic Conservation Biogeographic Regions (ACBR) classification the Area lies within ACBR 1 – Northwest Antarctic Peninsula (Resolution 3 (2017)).

The Area, which includes all the marine and terrestrial areas within the glacial drainage basin of Admiralty Bay, is considered to be sufficiently large to provide adequate protection to the values described below.

Admiralty Bay has become a site of increasingly diverse human activities, which are continuously growing, becoming more complex and creating a situation of conflicting uses. During the last 30 years, more stations have settled, visitors increased in numbers per year, from a few hundreds to over 3000 and commercial krill fishing operations have been conducted in the Area in the season 2009/2010. Better planning and coordination of existing and future activities will help to avoid or to reduce the risk of mutual interference and minimize environmental impacts, thus providing more effective mechanisms for the conservation of the valuable features that characterize the Area.

Five Consultative Parties – Brazil, Ecuador, Peru, Poland and the United States – have active research programs in the area. Poland and Brazil operate two all-year round stations (Poland: Henryk Arctowski Station at Thomas Point; and Brazil: Comandante Ferraz Antarctic Station at Keller Peninsula). Peru and the United States operate two summer stations (Peru: Machu Picchu Station at Crepin Point; USA: Copacabana Field Camp south of Llano Point). Ecuador has a refuge, República del Ecuador at Hennequin Point,. There are several small permanent and semi-permanent installations elsewhere.

The Area includes one ASPA (ASPA No. 128 Western Shore of Admiralty Bay – former SSSI No. 8) and one Historic Site and Monument (HSM No. 51: Puchalski Grave) at Arctowski Station. Seven graves at Keller Peninsula are under special protection.

In addition to numerous scientists, supporting personnel and research expeditions, Admiralty Bay is visited by an increasing number of tourists, the latter mainly as organized tourist ship expeditions and private yachts.

A Management Plan for designating Admiralty Bay and its surroundings (herein called the Area) as an Antarctic Specially Managed Area (ASMA), under Annex V of the Protocol to the Antarctic Treaty on Environmental Protection (herein called Protocol), was jointly proposed by Brazil and Poland, in coordination with Ecuador and Peru and voluntarily adopted by the ATCPs at ATCM XX (Utrecht, 1996). In 2006, a revised version of the Management Plan was presented and approved at the Committee for Environmental Protection, which designated the Area as ASMA No 1 (Measure 2, CEP IX – ATCM XXIX, 2006, Edinburgh). In 2014 the latest version of the Management Plan was presented and approved at the Committee for Environmental Protection (Measure 14, CEP XVII – ATCM XXXVII, 2014, Brasilia).

This revised management plan was prepared with reference to the "Guidelines for the preparation of ASMA management plans" (Resolution 1, CEP XX – ATCM XL, 2017, Beijing).



1. Description of values

i. Environmental values

The area of Admiralty Bay is representative of the terrestrial, limnetic, coastal, near-shore, pelagic, and fjord bottom ecosystems of King George Island. Flora is mostly represented by more than 300 species of lichens, around 63 species of mosses and numerous algae, as well as two species of native vascular plants (*Deschampsia antarctica* and *Colobanthus quitensis*). Plant associations are accompanied by a large diversity of soil microorganisms. Twenty-four species of birds and six species of pinnipeds have been registered for the Area, but only fourteen species of birds and three species of pinnipeds actually breed within the Area. The marine ecosystem of the bay largely reflects the general environmental conditions prevailing in the South Shetland Islands. The Admiralty Bay shelf benthic community is characterized by high species richness and high assemblage diversity. Giant algae (specially *Himantothallus* sp.), with a very diverse associated fauna, are found near the coastal zone, between 15 and 30 m depth, in several sites of the bay. An unique site, Napier Rock, situated at the entrance of the bay, supports especially rich and highly diverse benthic invertebrate fauna. Fish are represented by fifteen species of Nototheniidae.

ii. Scientific values

Admiralty Bay is of outstanding scientific interest, especially for research in biology and geoscience. King George Island was discovered in 1819 and since that time has been visited occasionally by whalers, sailors and scientists. More important geological investigation was performed by British scientists from Base G on Keller Peninsula, Admiralty Bay between 1948 – 1960. Several scientific expeditions were carried out also later, However, diverse and continuous scientific activities have been undertaken in the Area since the 1970s supported by the Polish Henryk Arctowski Station, by the Brazilian Comandante Ferraz Station and by the US Antarctic Program at ASPA No. 128 Western Shore of Admiralty Bay. Research activities at the Peruvian Machu Picchu Station (at Crepin Point) and at the Ecuadorian refuge (at Hennequin Point) have occurred intermittently during the Antarctic summer seasons.

The main subjects for field and laboratory research at the Polish and Brazilian stations have been marine and terrestrial biology, including physiology and adaptation of Antarctic fish and krill; taxonomy and ecology of the benthic fauna; vascular plants; mosses and lichens; terrestrial and marine ecology; migration, and dispersion of birds; microbiological studies. A long-term research project on the biology and dynamics of bird populations (mainly Pygoscelid penguins and *Catharacta* skuas) has been carried out by the US Antarctic Program since 1976. This study is relevant to the CCAMLR Ecosystem Monitoring Programme (CEMP). Since 1985 a research program monitoring non-native grass *Poa annua* around Arctowski Station and in ASPA No 128 has been conducted, followed by the program of eradication of *P. annua* from Point Thomas Oasis (IP 150, ATCM XLII - CEP XXII, 2019) Prague, Czech Republic, Galera *et al.* 2017). Since the mid-twentieth century, Antarctica has experienced many of the planet's largest regional temperature trends. For example, over the second half of the twentieth century, West Antarctica and the Antarctic Peninsula warmed more than twice as fast as the global average, but over the first two decades of the twenty-first century, temperature trends there strikingly reversed. Such strong regional changes are often most pronounced in the polar regions due to positive ice-albedo feedbacks that amplify warming, while stratospheric ozone depletion and extreme decadal variability can even induce regional cooling (Clem *et al.* 2020).

In King George Island, a retreat of the valley-type tidewater glaciers front by 1 km has been observed since 1956. Retreat of glaciers in the middle and outer parts of Admiralty Bay has exposed new ice-free coastal areas suitable for breeding grounds of some species of seals and colonization by plants. The ice-free areas have enlarged threefold during the last decades, creating conditions for inhabitation and succession. Phytosociological research and vegetation mapping of the areas successively freed by retreating glaciers are carried out.

Due to warmer temperatures, winter sea-ice duration in the region is shortening, impacting spawning and nursery areas of krill (*Euphausia superba*). The decrease in krill population has been found to coincide with an increase in salps (*Salpa thompsoni*). These changes among key species may have profound implications for the food web of the Area (Plum *et al.* 2020).

Since 2006, the overall number of Adelie (*Pygoscelis adeliae*) and chinstrap penguins (*Pygoscelis antarctica*) has declined by approximately 37%. However, the population of gentoo penguins (*Pygoscelis papua*) has more than doubled since the establishment of the ASMA. The numbers of fur seals change in multi-annual cycles. The abundance of elephant seals has kept stable, whereas those of Weddell and crabeater seals has declined.

Other studies conducted in the Area include geology and paleontology, glaciology and palaeoclimatology of the King George Island ice cap; and glacio-marine sedimentation within Admiralty Bay. Paleogene and Neogene rocks of King George Island preserve evidence of globally important environmental and climatic transition from greenhouse to icehouse world, which culminated at the Eocene-Oligocene boundary. That best record of the first Cenozoic glaciation in the Southern Hemisphere is well documented in stratigraphical, lithological and paleontological investigations on King George Island, which were summarized in a geological map done by Birkenmajker in 2002. The Eocene base of these rock formations build up the bedrock of ASMA 1 area and is continued eastward in younger rocks to the end of the island, proving Oligocene and Miocene glaciations.



Additional scientific values to note from the landscape viewpoint including geological and geomorphological attributes, are the following:

- The island displays landforms in ice-free areas resulting from proglacial and aeolian erosion. Sea action led to formation of beach bands along shoreline, several of them raised up to 20 m a.s.l. due to glacial isostatic uplift during the Holocene.
- Presence of early-middle Eocene fossiliferous sites of great scientific importance, at Ulmann and Hennequin Points, Keller Peninsula, Ezcurra Inlet, along the coastal area, behind Arctowski Station, on Błaszczyk moraine and at Red Hill. Fossilized wood of Araucaria, *Nothofagus* and leaf impressions of higher plants and pteridophytes, are common and well-preserved.
- Presence of well-preserved paleosols of ages dating back to 20 MA, with evidence of temperate to subtropical paleoclimates in their formation, with great scientific importance. These features can be found in Punta Plaza, Copacabana and Hennequin Point.
- Permafrost is generally present on northern slopes at altitudes higher than 30 meters, being absent or sporadic below that level. The Admiralty Bay is considered a key area for monitoring permafrost in the Shetlands Archipelago, and for being representative of the well-protected inner bay zones under Maritime Antarctic climate.

A year-round seismic and Earth-magnetism observatory, was functioning at Arctowski Station from 1978 until 1994, and in 2013 a research program aimed at monitoring the structure of Earth's electric field was begun at Arctowski Station. Studies on atmospheric chemistry, geomagnetism, the ionosphere and astrophysics have been conducted at Ferraz Station since 1984. A meteorological station was operational at Arctowski from 1977 until 2000 and a new one has been operational since 2012. At Ferraz Station a meteorological station had been operational from 1984 until 2012 to provide basic data and to support logistic operations. Research on upper atmosphere winds has been developed at Machu Picchu Station with the aid of a MST radar. Since 2006, a long-term research project on marine plankton, macrobenthos biodiversity and quality of the marine environment in Mackellar Inlet has been carried out. Also ozone layer decrease anomalies study has been developed.

Both Arctowski and Ferraz stations have hosted scientists from many countries (Argentina, Belgium, Chile, Colombia, Denmark, Germany, Russia, The Netherlands, New Zealand, North America, Uruguay, Spain, Italy, Czech Republic, Ukraine, Bulgaria, Peru, Turkey and others) There is a strong tradition of co-operation between Polish and Brazilian scientists in matters related to Admiralty Bay and the South Shetland Islands as a whole. Both countries cooperated during the International Polar Year (2007-2008) through the Census of Antarctic Marine Life and comprehensively gathered marine benthic data from the past 30 years.

A comprehensive study of the state of the environment in the ASMA-1 was conducted by Brazilian researchers from 2002 to 2006 comprising the analysis of a series of biotic and abiotic parameters. Brazil created a National Institute of Science and Technology in Antarctic Environmental Research (INCT-APA) in 2008, which ensured the continuity of a monitoring program and other environmental studies until 2011. After the EACF fire (2012), Brazil included soil and vegetation monitoring around Ferraz Station and, for the marine compartment, prioritized the shallow coastal area of Admiralty Bay, contributing to the monitoring of human activities in the Area and for the implementation of environmental management strategies for the ASMA.

iii. Historic values

The presence of sheltered deep harbors and accessible beaches ensured an early start to activities in Admiralty Bay. The bay offered protection for ships in the area during the sealing and whaling periods in the 19th and early 20th centuries, and some remains related to those periods still exist (e.g. old whaling boat on Keller Peninsula, collection of whaling harpoons at Arctowski Station). Whale bones cover the beaches and are part of the landscape, remaining as heritage of those periods.

The Area was visited by the second French Antarctic Expedition Pourquoi Pas, under Dr J B Charcot (1908-10), and by D Ferguson (1913-14), a geologist who took part in a British whaling expedition. Reports on minerals and rocks collected during these expeditions, published between 1910 and 1921, are among the first earth-science publications on Admiralty Bay and the South Shetland Islands. The famous British Discovery voyages of 1934 and 1937 collected more rocks, as well as plants and animals from the Area. Results published from 1948 to 1964 constituted a substantial contribution to knowledge of the geology of Admiralty Bay. Argentina established a refuge hut at Keller Peninsula in 1948 (since dismantled) and the work of Argentinean geologists in Admiralty Bay in 1953 focused on fossil plants from the Tertiary age.

The UK Base "G", on Keller Peninsula, was established in 1947 as a center for meteorological observations, and glaciological and geological research in the Area. In 1961 it was closed and later on dismantled (1995).

A small hut named Campo Bove was built in Ezcurra Inlet in 1975 by the Italian expedition led by Giacomo Bove. It was dismantled in March 1976.

iv. Aesthetic values

Admiralty Bay has basic physiographic and aesthetic values as one of the most typical examples of bay/fjord settings in the South Shetland Islands. The ice-free areas within Admiralty Bay were formed by recent and raised pebble-cobble beaches, recent and sub-recent moraines, eskers, mountainous peninsulas, rocky islets, spurs, arêtes and nunataks. The terrain is heavily shaped by glacial, nival and coastal marine processes. These, together with the geological features of the area, add to the great scenic beauty of the landscape.



v. Educational and touristic values

Admiralty Bay is a place of special attraction to tourists because of its accessibility, biological diversity and presence of several scientific stations. Therefore, its sites of ecological interest and scientific installations in the Area are frequently visited by tourists and participants in non-governmental expeditions, who have thus an opportunity to become familiar with the Antarctic environment and international scientific operations.

Education and outreach of Antarctic science should be widely encouraged in countries that develop scientific research in the Area. Penguins and krill are easily observed and are considered as iconic species of the Antarctic. The capture of images and videos provide a high level of educational potential. Promoting and facilitating the incorporation of Antarctic science at all levels of formal education, and informing the public and the media about the importance of studies in Antarctica are part of the strategy for Antarctic conservation (see Summary of SCAR's Strategic Plan 2017-2022 - https://www.scar.org/scar-library/other-publications/ strategic-plans/774-2017-strategic-plan). Furthermore, as a region that distinctly shows the effects of climate change, the Area is considered an outdoor laboratory and represents a great opportunity to encourage interest and training of early career researchers.

2. Activities to be Managed

2.1 Scientific activities

Intensive and relevant research is conducted at Admiralty Bay, specially at summer season, when many scientists are at field, collecting samples for their scientific research, which cover all areas of knowledge relevant to the Antarctic continent.

2.2. Station operations and science support activities

- Year-round stations are maintained throughout the year, which provide logistical support for scientific research conducted in this area.
- Currently, the Henryk Arctowski Polish Antarctic Station is being renovated.

2.3 Transportation

There are several ways to move around ASMA, used by station staff, scientists, and tourists:

- on foot
- by zodiac boat
- on snowmobiles

2.4 Recreational activities and Tourism

Admiralty Bay is a place willingly and frequently visited by tourists. Both cruise ships and private yachts appear in the bay. Tourists visit all-year-round stations, move within the designated routes around the facilities under the supervision of both Henryk Arctowski and Comandante Ferraz Antarctic Station's staff. Due to construction work being carried out on the Arctowski Station infrastructure, visits by tourists have been suspended until all work is completed.

2.5 Harvesting/fishing

No fishing/harvesting is carried out in the area.

2.6 Environmental management

Environmental monitoring is constantly carried out on the western shore of Admiralty Bay by the staff of the Henryk Arctowski station. The following are monitored:

- flora and fauna
- tourist traffic
- meteorological parameters
- alien species
- pollution

Environmental monitoring is constantly carried out at Keller Peninsula by the staff of the Comandante Ferraz Antarctic Station.

All pollution, rubbish, and alien species are removed in order to preserve the natural values of the area.



3. Aims and Objectives

The aim of this Management Plan is to conserve and protect the unique and outstanding environment of Admiralty Bay by managing and coordinating human activities in the Area in such a way as to provide long-term protection to the values, avoid possible conflict of interest and promote cooperation.

The specific objectives of management in the Area are to:

- Safeguarding the long-term scientific research in the Area while maintaining stewardship of the environment;
- Protecting important physiographic features, and the outstanding biological, ecological, scientific, historical and aesthetic values of the Area;
- Managing potential or actual conflicts of interest between different activities, including science, logistics, commercial fishing and tourism;
- Assisting with the planning and coordination of human activities in the Area;
- Ensuring that any marine harvesting activities are coordinated with scientific research and other activities taking place within the Area and are based on the precautionary approach;
- Avoiding or minimizing the risk of mutual interference and cumulative impacts on the terrestrial and marine environments;
- Improving the level of mutual assistance and co-operation among Parties operating in the Area;
- Encouraging communication and cooperation between users of the Area through dissemination of information on the Area and the provisions that apply;
- Minimizing the possibility of non-native species introduction through human activities and management of any non-native species already established in the Area;
- Managing visitation to the Area and promoting an awareness, through education, of its ecological and scientific significance.

4. Management Activities

The following management activities should be undertaken to achieve the aims of this Management Plan:

- Parties that have active research programs within the Area shall establish an Admiralty Bay Management Group to:
 - review the functioning and implementation of the Management Plan;
 - monitor the Area to investigate possible sources of environmental impact including cumulative impacts;
 - provide forum for facilitating communication among those working or visiting the Area, and for resolving potential conflicts;
 - promote dissemination of information on this Management Plan to those working or visiting the Area;
 - promote and encourage coordination of activities among those working or visiting the Area with the aim of protecting important values of the Area;
 - promote and encourage cooperation among National Antarctic Programs conducting environmental monitoring of the Area with the aim of developing a joint environmental study of the Area;
 - maintain a record of activities taking place in the Area.
- Parties belonging to the Management Group should consult amongst themselves with a view to designate a person to coordinate the implementation of the Management Plan in the Area (ASMA Coordinator). Designation will be for a 5 year period on a rotational basis. Duties of the ASMA Coordinator are:

(i) Coordinate information exchange by Parties about the activities undertaken in the ASMA and analyze them in order to identify possible overlaps and unconformities in relation to the objectives of this Management Plan;

(ii) Report to the Parties and, as appropriate, to the CCAMLR or ATCM Secretariat, any incident that may cause impact to environment or research activities in the Area.

- Parties belonging to the Management Group should convene on an annual basis or when necessary to discuss all matters concerning the management of the Area. Other Parties and organizations active in the Area may be invited to participate in the discussions.
- National Antarctic Programs operating within the Area, as well as all other visitors, should undertake activities in accordance with the General Code of Conduct contained in this Management Plan.
- Wherever feasible, markers delimiting boundaries of already existing protected areas and other zones of ecological or scientific interest identified in this Management Plan with warnings for visitors about their nature should be provided, and removed when no longer necessary.
- Tour operators and other organizations planning activities in the Area should coordinate them with National Antarctic Programs operating in the Area in advance to ensure that they do not pose risks to its important values.

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- National Antarctic Programs that have active research programs in the Area should make arrangements with other Parties that have installations and/or structures now abandoned to consider their value for reuse. Conservation plans should be formulated if any of the installations are assessed to be of historical value. If not, plans should be formulated for their removal in accordance with the provisions of Annex III on Waste Disposal and Waste Management to the Protocol on Environmental Protection.
- Parties operating permanent/seasonal facilities in the Area are encouraged to consult and, as far as practicable, coordinate their contingency plans for oil spills and other possible accidents with the aim of developing a multi-operator plan encompassing the Area.
- National Antarctic Programs, tour operators and other organizations active in the Area should seek to minimize to the maximum extent the risk of introduction of non-native species. Any non-native species present within the Area should be systematically monitored, and policies on its containment or/and eradication should be developed as a priority.
- National Antarctic Programs operating in the Area should ensure that their personnel have been briefed on the requirements of the Management Plan and, in particular, on the Code of Conduct for Visitors (Appendix A) and Scientific and Environmental Guidelines (Appendix B) that apply within the Area.
- 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 the Code of Conduct for Visitors (Appendix A).
- Copies of this management plan and supporting documentation, such as maps and appendices, should be kept in appropriate stations and refuges in the Area, and be made available to all persons in the Area.
- Visits to the Area should be made as necessary (no less than once every five years) to evaluate the effectiveness of the Management Plan, and to ensure that its requirements are being met.

5. Period of Designation

Designated for an indefinite period.

6. Maps

Figure 1: Location of ASMA No. 1 in King George Island, Antarctic Peninsula.

Figure 2: Location of Scientific Zones.

Figure 3: Visitor Zone - Comandante Ferraz Station

Figure 4: Facilities Zones – Machu Picchu Station

7. Description of the Area

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

General description

Admiralty Bay is a large fjord, in the southern coast of King George Island, the biggest island in the South Shetlands Archipelago, off the north-west coast of the Antarctic Peninsula, separated from it by the Bransfield Strait (Fig. 1). The bay is characterized by the extreme bottom heterogeneity. It is surrounded by different kinds of landscapes, such as coastlines with penguin rookeries and seal wallows, big glacier forelands, lichen heaths, swamps, grasslands or barren rocky lands. An area of approximately 360 km² comprising Admiralty Bay and the surrounding area is designated as an Antarctic Specially Managed Area to manage human activities for the protection of scientific, environmental, historical and aesthetic values.

ASMA No. 1: Admiralty Bay, King George Island (62°01′21″S – 62°14′09″S/ 58° 15′05″W– 58°41′02″W) comprises the terrestrial and marine areas immediately within the glacial drainage basin of this bay (Fig. 2). In addition, it includes ASPA No. 128 Western Shore of Admiralty Bay, part of which is outside the drainage basin area. One Historic Site and Monument, HSM No 51 Puchalski Grave, is located within the Area.

The Area is bounded by a line extending from its southern margin at the Telefon Point (62°14' 09.3" S, 58° 28'00.5" W) to The Tower (58°28'48"W, 62°12'55"S), and then toward Jardine Peak (58°29'54"W, 62°10'03"S) intersecting the ice divide of the Warszawa ice-field, thence following this divide to the west of Ezucurra Inlet, north-eastward to enclose Mackellar and Martel inlets, and then southward through Ternyck Needle (62°04'52.6" S, 58°15'24.1" W) to Cape Syrezol (62°11'38.4" S, 58°16'29.6"W) on the eastern shore of Admiralty Bay. The waters of Admiralty Bay and a small part of Bransfield Strait, north of a straight line between Cape Syrezol and Telefon Point, are also included in the ASMA. There are no fixed survey points available at the Area boundaries, but markers indicating the ASMA will be fixed at appropriate arrival points on land. In season 2020/2021 information boards appeared at the Henryk Arctowski Polish Antarctic Station and at the Demay refuge.

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The revised total area of ASMA No. 1 is 360 km², of which 194 km² are ice covered, including 138 km² of Admiralty Bay Waters and an adjoining 7 km² of the Bransfield Strait (Admiralty Chart N° 6258, 1968, London; Polish Chart Admiralty Bay, King George Island, 1:50,000, Battke, S, Warszawa, 1990; ASPA No. 128: Western Shore of Admiralty Bay, King George Island, 1:12 500, ed. Department of Antarctic Biology, Polish Academy of Sciences, Pudełko R., 2002; Brazilian Chart No. 25121, Baía do Almirantado, 1:40,000, 1984, Rio de Janeiro; Braun *et al.* 2001a and b; Arigony-Neto, 2001). Approximately 90% of the land area within the proposed ASMA is ice-covered, the ice-free areas representing about 37 km².

Earth Science features

The glacial drainage basin is formed mainly by the main ice cap of King George Island which flows from north, east and west towards the trough of Admiralty Bay. At the head of the bay, the ice cap spills into three inlets: Ezcurra, Mackellar and Martel inlets. Heavily crevassed outlet glaciers descend towards the sea becoming tidewater glaciers or floating glaciers.

Geomorphology of the area is dominated by glacial erosion and depositional landforms, fresh and old moraine ridges, flat basal moraines, eskers, flutings, striated rock pavement, rocky ice streams, valleys and deposits of sand, pebble to cobble covered forming recent beaches and raised marine terraces. Assemblages of poor tundra vegetation were already described in the coastal area influenced by birds, seals and sea spray fertilization, and in inland ecosystems suffering nutrients poverty. Adequate soil units (in diversified taxonomic modes) were proposed for that ecosystem. However, ecological mapping of the area was not performed till now. Particularly rich and diversified terrestrial ecosystems have been developed around penguin rockeries. Paternal profiles of ornithogenic soils of maritime Antarctic formed in the result of the phosphatization considered as a soil forming process were described along the coast in several sites. Igneous basaltic andesite rocks outcropping around Admiralty Bay intercalated with fossil plant bearing sedimentary, terrestrial and locally glacial deposits record, cryosphere formation and Cenozoic evolution of a volcanic island arc. Volcanic, pyroclastic and sedimentary rock sequences of Eocene provide evidence of environmental changes preceding Oligocene glaciation, first signs of coming cooling were found in tillite from Herve Cove (62°10′44.7″ S, 58°32′00.6″ W) interpreted as alpine Eocene glaciation.

Climate

The climate of the Area is typical of maritime Antarctica. Based on more than 25 years of data obtained at the Polish Arctowski Station and at the Brazilian Comandante Ferraz Station, the local microclimate is characterized by an average annual temperature of around -1.8° C ($-2.1 \pm 1.0^{\circ}$ C, set from Deception Island data and measured at UK Base "G", Bellingshausen and Ferraz, from 1944 to 2010). Average annual temperature in Arctowski Station in years 1977-1998 was -1.6° C while in 2013-2017 it was -1.7° C (Marsz & Stryszyńska 2000, Plenzler *et al.* 2019). An average annual wind speed in the order of 6.5 m s⁻¹ ($6.0 \pm 1.2 \text{ ms}^{-1}$), measured at Base G, Bellingshausen and Ferraz Stations, from 1986 to 2010 and 5.7 m s⁻¹ measured at Arctowski Station in years 2013-2017 (Plenzler *et al.* 2019). Annual average precipitation is 508.5 mm in years 1977-1998 and in 2017 it was 491.2 mm. Humidity is 78.1% and air pressure is 989.9 hPa (Plenzler *et al.* 2019). The waters of Admiralty Bay have an average annual temperature range of -1.8° to $+4^{\circ}$ C, being well mixed by tides and strongly influenced by currents from the west of Bransfield Strait. Currently, reconstruction of climate fluctuation in historical time is the subject of multi proxy investigation performed on the base of sediment cores extracted from Admiralty Bay.

Freshwater habitat

In the area of ASMA No 1 there are no significant lakes, although there are numerous small ponds and streams, situated mostly on the southern and south-western coast of Admiralty Bay. The streams support some mosses as well as a diverse algae and cyanobacteria. Freshwater fauna, found in small ponds, moss banks and streams consists of Protozoa, Rotifera, Nematoda, Tardigrada, Collembolla (*Cryptopygus antarticus* and *Friesea grisea*) and only two species of Crustacea (*Branchinecta gainii* and *Pseudoboeckella poppei*).

Special attention has been lately paid to the laguna that has been forming at the front of the retreating Ecology Glacier (62°11'00.0" S, 58°28'00.0" W) during the last 30 years. The laguna permitted a large spectrum of environments: from freshwater glacier stream to marine waters. Several similar lagunas have been developed along the coast of Admiralty Bay during the late Holocene during intense retreat of glaciers. New lagoons are adjacent to the bay at the front of the retreating Windy, Wanda and Znosco glaciers.

Flora

The Admiralty Bay area houses all three angiosperms that occur in Antarctica, two native: *Deschampsia antarctica* E. Desv. (Antarctic Hairgrass) and *Colobanthus quitensis* (Kunth) Bartl. (Antarctic pearlwort) and the invasive *Poa annua* L.

Poa annua has historically been introduced in many areas around the globe and it is not easy to distinguish any longer the introduced range from the native range, it has a cosmopolitan distribution throughout temperate regions of both hemispheres; is an early colonizer of bare ground, and common on lawn grass and one of the world's worst weeds. It was first reported in Antarctica more than 30 years ago, and for being an invasive species, eradication measures have already taken place and are currently undergoing.

Deschampsia antarctica is an Antarctic native (but not endemic) it also occurs in Tierra del Fuego and Patagonia. *Colobanthus quitensis* is also native (but not endemic) being common in the Andes region from Ecuador all the way south to Patagonia.

There are eight species of Marchantiophyta (Liverworts) divided in six families and seven genera, all have wide distribution in Antarctica, but are very difficult to find for the untrained eye, as they grow in small populations associated with the moss vegetation.



Other than that, vegetation is composed largely by Bryophyta (mosses), with a total of 63 species divided among 34 genera and 17 families present in ASMA 1. Considering the total number of species of mosses in Antarctica as 116, the Bay area houses about 53% of all Antarctic moss species, a highly significant number, especially considering the size of the Bay. Many groups of Antarctic mosses have not yet been properly revised taxonomically and phylogenetically. Actually few studies using molecular tools focusing on Antarctic moss diversity have suggested that much is still to be known about the local diversity. Moss species in the region are subject to harsh environmental conditions that can affect its morphology, so the use of molecular data in Antarctica is a very important but still underused tool.

In the adjoining ice-free areas of Admiralty Bay, the distribution of plant communities is closely related to geoforms, and to the presence of birds and soil. Wherever edaphic conditions are favorable, mosses form strands (which also contain lichen and fungi formations). The lichenized mycobiota is restricted to the rock fragments and rock outcrops, sometimes associated with bird colonies. The coastal areas are the most densely covered, with flora being represented mostly by moss carpet formations.

Near the Brazilian Ferraz Station two of these areas occur, both of which are almost 300 m long, however due to the reconstruction of the new Brazilian station, some moss carpets needed to be transplanted and such areas are currently under monitoring. Hennequin Point has large moss carpet areas as well. As elevations rise, showing rocky outcrops, crustose lichens and mosses which grow directly on rock predominate. The green algae *Prasiola crispa* occupies high nutrient concentrated areas, near bird breeding locations, and it has a large associated fauna.

Even though moss carpets ate the most conspicuous vegetation form, there are several small patches of mosses distributed everywhere on ice free areas across the bay, such small patches usually house the less common species whereas the big carpets are usually monoclonal formations of a single species (e.g. the widespread *Sanionia uncinata*).

Plant formations have a large number of species with their dispersal center found in the South Shetlands, apart from mixed formations, those centers are characterized by:

- Tufts of mosses, where large tufts are rarely found and species of the genus Polytrichum Hedw. are dominant;
- Carpets of mosses, mainly composed by *Sanionia uncinata* (Hedw.) Loeske, *Warnstorfia sarmentosa* (Wahlenb.) Hedenäs and *W. Iaculosa* (Müll. Hal.) Ochyra & Matteri; that are found.
- Aquatic mosses, with *Bryum pseudotriquetrum* (Hedw.) Schwaegr. And *Warnstorfia sarmentosa* (Wahlenb.) Hedenäs, which are found mostly in lakes, on the bay.

Mosses can randomly colonize on rocky outcrops, in areas that accompany drainage basins, lakes and along the coast. Regarding the distribution pattern of the moss species in the bay, it seems that no dispersal pattern exists, with species having a broad distribution everywhere in the Bay. In the ice-free areas, the distribution of plant communities is closely related to stable landforms and nesting birds and also depend mainly on light incidence. The rocky outcrops may host dense moss and algae communities, characteristic of the early stages of plant successions (Barbara *et al.* 2022).

Birds

Within the Area, 14 species of birds breed. Three sympatrically breeding Pygoscelid penguins makeup 91% of the number and up to 95% of the biomass of the breeding bird communities. Other seabirds breeding in the Area are: Southern giant petrel (*Macronectes giganteus*); Antarctic shag (*Phalacrocorax atriceps bransfieldensis*); Brown skua and south polar skua (*Stercorarius antarcticus, Stercorarius maccormicki*) and Chilean skua *Catharacta chilensis*); Wilson's storm petrel (*Oceanites oceanicus*); Black-bellied storm petrel (*Fregeta tropica*); Cape petrel (*Daption capense*); Kelp gull (*Larus dominicanus*); Antarctic tern (*Sterna vittata*) and Pale-faced sheathbill (*Chionis albus*). The areas of ASPA No. 128 Western Shore of Admiralty Bay, Cape Vauréal, Chabrier Island, Shag Island and surroundings, are the most important bird breeding locations in Admiralty Bay. In Cape Vauréal are found 50% of the giant petrel population of the Area, and in Shag Island are found all nests of Antarctic shag, which share territory with chinstrap penguins (*Pygoscelis antarcticus*). Hennequin Point and Keller Peninsula are the most important breeding locations for *Stercorarius maccormicki*, where 90% of the breeding pairs are found. For *S. lonnbergi*, areas with high concentrations of penguins, like ASPA No 128, are the most important. There is a register of a hybrid breeding pair of *C. chilensis* and *Stercorarius maccormicki* at Hennequin Point.

Eudyptes chrysocome has been found every year since 2004 at Chabrier Rock, always followed by an *Eudyptes chrysolophus* specimen. *Aptenodytes patagonicus* had been registered at the Point Thomas colony several times and there have also been at least two sightings at Keller Peninsula.

Two Important Bird Areas (IBAs) were identified within ASMA No. 1, given the importance of maintaining ecosystems for the continued protection of bird species present at Point Hennequin and at ASPA No. 128.

Mammals

Six species of pinnipeds occur in the Area. The most frequent mammal during winter is the crabeater seal (*Lobodon carcinophagus*). During summer, elephant seals (*Mirounga leonina*) and fur seals (*Arctocephalus gazella*) are the most frequent and abundant species. In periods when the ice covered areas decrease, it is possible to find lots of crabeater seals in the Area, especially at Ezcurra region. Fur seals, once relatively rare, have increased in number in recent years. Elephant seals and Weddell seals (*Leptonychotes weddelli*) breed in the area. Leopard seals (*Hydrurga leptonyx*) are found throughout the year in varying numbers. Ross seals (*Ommatophoca rossi*) rarely occur in the Area. Humpback whale (*Megaptera novaeangliae*) is the most frequent cetacean during summer, though killer (*Orcinus orca*), minke whales (*Balaenoptera bonaerensis*), and Sei whales (*Balaenoptera borealis*) have also occasionally been seen in the area.



Marine Ecosystem

Seasonal fluctuation in the condition of the marine ecosystem is driven by marine current, tidal currents, and seasonal biological changes. During last years attention was focused on unusually high early summer blooming (dominated by diatoms) followed by melting of winter fast ice covering Admiralty Bay all the winter (rare case because usually the bay is not perennially frozen during winter). Detailed environmental and phytoplankton investigation was performed in the frame of international ClicOPEN IPY and IMCOAST EU projects and results are synchronized for the whole region.

Usually, multicellular algae, predominantly Heterokontophyta, Chrophophyta and Rhodophyta, characterize the shallow water bottom community down to 50-60 m depth. With the exception of the limpet (*Nacella concinna*), epifauna is practically absent in the intertidal zone. The vagile benthos is abundant with a high variety and density of Amphipoda. Below 4-5 m, substrata are typically sandy and dominated by Isopoda, particularly the genus *Serolis*. With the increasing depth, vagile species such as *Sterechinus, Neobuccinum* and *Parborlasia* dominate. In deeper waters, on a muddy and more stable substrata, sessile forms include sponges, anemones, the bivalve *Laternula elliptica* and tunicates, besides high-density concentrations of echinoderms such as *Amphioplus acutus, Ophionotus victoriae* and *Odontaster validus*. Invertebrate scavengers include *Labidiaster annulatus, Gliptonotus antarcticus, Parborlasia corrugatus, Odontaster validus* and *Neobuccinum eatoni*. In total, almost 1300 benthic species, including diatoms (157), foraminiferans (135), macroalgae (55), invertebrates (>400 species) and demersal fish (30) have been recognized in Admiralty Bay. The species found in the area are largely the same as those observed on similar substrata at other sites in the region, indicating homogeneity in the benthic fauna of the Antarctic Peninsula and related areas. Fishes are represented by fifteen Nototheniidae, mainly *Notothenia rossii, N. neglecta, N. gibberifrons, N. coriiceps, Nototheniops nudifrons, Trematodus newnesi, T. borchgrewincki* and *Pleuragramma antarcticum*, two Channichthydae species, Hapagiferidae and Zoarcidae.

Human activities and impact

Since the establishment of the ASMA, human activities in the Area have been related to scientific research, science-related logistic activities and tourism. Scientific and logistic support are received from ships belonging to or chartered by National Parties.

Base G, the first permanent station on King George Island, was constructed by Great Britain in 1947 at Keller Peninsula. In 1948, a refuge hut was set up by Argentina in the same area. Base G was closed in 1961 and later dismantled in 1995, as was also the case with Argentinian hut. In the summer 1975-1976 Italian alpinist expedition built a small hut (Campo Bove) on the shores of the Ezcurra Inlet at Italia Valley. The camp was dismantled in March 1976.

During the summer of 2019-2020 the number of passengers visiting the area reached 17.046 persons. The majority of passengers did not leave the vessel to land ashore, only cruising either on the ship or in small boats. Tourists typically land at Arctowski or Ferraz Stations for a tour of facilities, go for a walk along the coast, and sometimes make short cruises in Zodiac boats.

One alien species of grass (*Poa annua*) was recorded in summer 1985-1986 at Arctowski Station. Since then, small populations were observed in several places around the station, and, in 2008/2009, on the deglaciated moraines of the Ecology Glacier (approximate location 62°10'7"S, 58°27'54"W). In 2009/2010 soil seed bank of *P. annua* was found near the Arctowski Station. High genetic variability suggests several separate immigration events from different sources including Europe and South America. In 2009 propagules and pollen of the non-native rush *Juncus bufonius* were found in one location on the north-west boundary of ASPA No 128. In 2007-2010 extensive research (part of the international "Aliens in Antarctica" project) was conducted on the Arctowski Station to assess pathways by which non-native species can reach the station.

All fin-fishing is currently prohibited in the western Antarctic Peninsula region (CCAMLR Statistical Subarea 48.1) under CCAMLR Conservation Measure 32–02. Krill fishing occurred within Admiralty Bay during the 2009–2010 season, when the reported total krill catch was 11,500 tonnes (CCAMLR 2012b). In 2013 CCAMLR decided that any proposal to undertake commercial harvesting within an ASMA should be submitted to CCAMLR for its consideration and that the activities outlined in that proposal should only be taken with the prior approval of CCAMLR (Final Report CCAMLR-XXXII, paragraph 5.83)

7(ii) Access to the Area

Access to the Area is generally by ship or yacht, or less frequently by helicopter. Specific conditions of access are in Section 7(i).

7(iii) Structures within the Area

There are currently two permanent year-round research stations (Henryk Arctowski Station and Comandante Ferraz Station), three seasonal research stations/facilities (Machu Picchu Station, Copacabana Field Camp and Hannequin Point Refuge) and several minor structures (historical remains, emergency refugees, permanent field camps) in the Area.

(a) Main permanent structures and field camps in the Area

• Henryk Arctowski Station (Poland): 62°09′34′′S – 58°28′15′′W

The station was established at Thomas Point in 1977 as a facility for scientific research and associated logistic operations of the Polish Antarctic Programme, and has been in year-round operation since then. It has dormitories for 16 residents in winter and up to 40 in summer; biological, meteorological and geophysical laboratories; storage facilities; a small hospital unit; double-walled fuel tanks with total capacity of more than 1,000 tons; hangars for boats and land vehicles etc. Due to ongoing redevelopment of the station infrastructure, a temporary heliport is in operation.



• Comandante Ferraz Station (Brazil): 62°05′07″ S – 58°23′32″W

The station was established in 1984 on the eastern coast of Keller Peninsula as the base for scientific research and associated logistic operations conducted by the Brazilian Antarctic Programme. It started year-round operations in 1986. In the summer of 2012, an accident destroyed 70% of Ferraz Station. After 3 years of reconstruction, in January 2020 the new Ferraz Station was officially opened. Using renewable energy sources - wind, solar and cogeneration, in addition to diesel generators - the station can accommodate 64 people; it has 14 internal and 3 external laboratories; storage facilities; a range of amenities including medical and laundry facilities, a library and a gym. The station is equipped with a helicopter pad. Fuel is stored in 16 tanks with double steel walls, with total capacity for 480,000 liters of arctic diesel. The EACF today has a system for the reuse of water served with savings of up to 39%, through the reuse of water discarded by showers and faucets of the bathrooms and in the laundry, which, after treatment, are used to flush toilets and to wash vehicles. The final effluents are treated using the technique with UV radiation. The incineration of organic waste takes place at a temperature of 750°C in which the gasses resulting from the incineration go through filtering processes, being released into the environment free of pollutants.

- Machu Picchu Station (Peru): 62°05'30" S 58°28'30" W
 The station was built in 1988 at Crepin Point, Mackellar Inlet. At present, it is used for summer operations only. The station consists of eight metallic modules including 2 dormitories, 1 kitchen and canteen, 1 generator room, 1 scientific laboratory, 1 waste treatment building, 1 emergency and 1 maintenance room. The station is equipped with one portable helicopter pad.
- Copacabana Field Camp (United States of America): 62°10′45″ S 58°26′49″ W
 The summer station, consisting of three wooden huts for 4–6 people, is located in the south of Llano Point. It has been used
 every summer since its construction in 1977 as a field base for the Seabird Research Program (USA), in close cooperation with
 Arctowski station.
- República del Ecuador Refuge at Hennequin Point (Ecuador): 62° 07′ 16″ S 58° 23′ 42″ W
 The refuge was built in 1989, and has occasionally been used since then during summer seasons. It is a very important logistical support point for researchers with activities in that region.

(b) Emergency refuges in the Area (Fig. 2)

- three Brazilian emergency refuges (Refuge I 62°05'15.8" S, 58°23'43.2" W, Refuge II 62°04'23.4" S, 58°25'10.1" W, Ipanema Refuge 62°05'09.8" S, 58°25'02.6" W), and Brazilian scientific module on Keller Peninsula (62°05'24.4" S, 58°24'11.3" W);
- Polish refuge at Demay Point functioning as summer field camp (62°13'2.9" S, 58°26'32.27" W);
- Polish refuge (an Apple type hut) at Italia Valley functioning as a summer field camp (62°10'32.3" S, 58°0'49.0" W).

(c) Historical remains in the Area

- HSM N° 51 Puchalski Grave near Arctowski Station (62°13' S 58°28' W) (Fig. 2)
- the remains of Italian hut Campo Bove at Italia Valley, Ezcurra Inlet (62°10'32.3" S, 58°30'49.0" W);
- a whale skeleton assembled by the oceanographer Jacques Cousteau, on the Keller peninsula, near Ferraz Station (62°04'55.0" S, 58°23'32.0" W);
- wooden barrels from whaling period at Barrel Point (62°10'00.0" S, 58°35'00.0" W), Ezcurra Inlet;
- a collection of whaling harpoons assembled on the shores of Admiralty Bay, exhibited at Arctowski Station;
- A group of seven crosses and graves on Keller Peninsula, above Ferraz Station, three of which in honor of Brazilian military personnel that lost their lives in Antarctica: Navy 1st Sergeant Alberto Poppinger (1995); Lieutenant Carlos Alberto Figueiredo and Lieutenant Roberto Lopes dos Santos who died during the fire that destroyed the EACF in 2012. The remaining four crosses are in memory of British Falkland Islands Dependencies Survey (FIDS) members who lost their lives while serving at Base G: Eric Platt, (1948); Ronald Gordon Napier (1956); Alan Sharman (1959); and Dennis Ronald Bell (1959); and
- a wooden cross on top of Flagstaff Hill (62°04'52.8" S, 58°24'14.0" W) on Keller Peninsula.

7(iv) Restricted and managed zones within the Area

Three types of management zones (Facilities, Scientific, Visitor) are designated within the Area.

a. Facilities Zones

Facilities Zones are established to ensure that permanent and semi-permanent facilities in the Area are concentrated in defined locations with the aim of minimizing human impact on the important values of the Area. The existing Facilities Zones in the Area are listed in 7(iii) Structures in the Area.

The designation of new Facilities Zones should be done sparingly and after careful consideration of scientific and/or logistical justification. New installations should, as far as practicable, be located inside existing Facilities Zones. Parties active in the Area are encouraged to practice the cooperative use of infrastructure.

b. Scientific Zones

Scientific Zones are established to protect the important scientific and ecological values of the Area from human disturbance. They have considerable scientific/ecological interest as breeding sites and/or concentrations of birds and/or mammals, feeding sites for birds and marine mammals, sites of typical vegetation cover, and varied marine habitats. Some of these zones, such as Chabrier Rock - Vaureal Cape, on the eastern shore of Admiralty Bay are of great relevance, as the only breeding sites for the Antarctic blue-eyed shag, penguins and southern giant petrel outside ASPA 128 Western Shore of Admiralty Bay.

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Activities in all these zones should be carried out with particular care to avoid or minimize disturbance of wildlife, trampling of vegetation and interference with on-going research.

Designated Scientific Zones in the Area (see Fig. 2).

Specific guidelines for the conduct within the Scientific Zones are presented in Appendix B (Scientific and Environmental Guidelines).

c. Visitor Zones

Visitor Zones are established to manage the activities of tourists, non-governmental expeditions and National Antarctic Programs' scientists and staff when undertaking recreational visits to the Area.

Existing tour routes for visitors in the vicinity of Ferraz station are presented on Fig. 3. These routes give the opportunity to observe wildlife and the station installations, while minimizing disturbance to the station activities and the environment, and avoiding habitat degradation. In future, routes for tourists may be established at Machu Picchu Station (Fig. 4) and Ecuador field camp.

Visits to Ferraz Station are possible with prior agreement of the Station Leader.

Isolated laboratory modules, refuges and the area behind Ferraz Station: visits should be only by small groups accompanied by station personnel.

Due to the ongoing renovation of Station facilities, the Arctowski Station is closed to tourist traffic. This decision remains valid until further notice.

Specific guidelines for the conduct within the Visitor Zones are presented in Appendix A (Code of Conduct for Visitors).

7(v) Location of other protected areas within the Area

The following areas are currently designated within the ASMA No 1:

- ASPA No. 128 (Western shore of Admiralty Bay): 62°09′46′′S 62°14′10′′S 58°25′15′′W 58°29′58′′W
 This area is the site of long-term studies on bird biology performed by the US Antarctic Program, as well as intensive biological
 research of the Polish Academy of Sciences. It is entirely contained within ASMA No 1. Part of the Area western boundary (from
 Telefon Point to Warszawa Icefield 62°12′S, 58°29′W) is shared with ASPA No 128.
- Historic Site No. 51, at Arctowski Station: 62° 10'S 58° 28'W: The grave of Wlodzimierz Puchalski, a photographer and a producer of documentary nature films, who died on 19 January 1979. Bronze cross is located on a hill to the south of Arctowski Station, near the last working place of the late photographer. The cross is in fact a monumental sculpture with an artistic impression of fauna seen by the eye of a photo camera. It has been done by the famous artist Bronislaw Chromy, close friend of Wlodzimierz Puchalski.

7(vi). Location of other protected areas in the vicinity of the Area

- ASPA No 125 Fildes Peninsula, King George Island (25 de Mayo) and ASPA No 150 Ardley Island, Maxwell Bay, King George Island (25 de Mayo) lie ~27 km west of the Area.
- ASPA No 132, Potter Peninsula, King George Island (25 de Mayo), lies ~15 km to the west.
- ASPA No 151, Lion's Rump, King George Island, lies ~20 km to the east of the Area (see Fig. 1).

8. Supporting Documentation

- Code of Conduct for Visitors (Appendix A)
- Scientific and Environmental Guidelines (Appendix B)
- Management plan for Antarctic Specially Protected Area No 128 (Appendix C)
- Overview of HSM No 51, Puchalski Grave (Appendix C)
- Manual of Regulations and Guidelines Relevant to Tourism and Non-Governmental Activities in the Antarctic Treaty Area (Appendix D)
- Scientific Committee on Antarctic Research's Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica (Appendix D)
- Environmental Guidelines for operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica. (Appendix D)
- Scientific Committee on Antarctic Research's Environmental Code of Conduct for Terrestrial Scientific Field Research in Antarctica (Appendix D)
- Guidelines for the preparation of ASMA management plans (Appendix D)
- Non-Native Species Manual (Appendix D)
- General Guidelines and Site Guidelines Checklist for Visitors to the Antarctic (Appendix D)
- Practical Guidelines for Ballast Water Exchange in the Antarctic Treaty Area.
- Guidelines for the Operation of Aircrafts near Concentrations of Birds in Antarctica. (Appendix D)



9. General Code of Conduct

The General Code of Conduct is proposed as an instrument for the management of activities in the Area, and as a guide for ongoing and future research and logistic operations of the Parties, tour operators and other organizations active in the Area. A Code of Conduct for Visitors and Scientific and Environmental Guidelines are presented in Appendix A and B.

9(i) Access to and movement within or over the Area

Access to the Area is generally by ship or yacht, or less frequently by helicopter. There are no landing sites for fixed-wing aircraft in the Area.

- There are no special restrictions on the transit of ships through the Area, but anchoring should avoid marine components of Scientific Zones, and areas of environmental monitoring. If anchoring near Ferraz Station is unavoidable, it should be done in front of the station at 62°05.111 S, 58°22.565 S (depth 50-60 m) or between Botany Point and Ullman Spur at 62°05.735 S, 58°20.968 W (approximate location);
- There are no restrictions on small boats landing on any beaches outside ASPA No 128. During boat landings care should be taken to avoid disturbing birds and seals. Extreme caution should be exercised when attempting to land in places where submerged rocks occur. Recommended landing sites for those visiting the stations located in Admiralty Bay are shown in Fig 2;
- Overflight operations by fixed-wing aircraft and helicopters should be carried out in accordance with the "Guidelines for the Operation of Aircraft near Concentrations of Birds" contained in Resolution 2 (2004), as a minimum requirement. Overflight of wildlife colonies should be avoided throughout the Area. Specific airflight restrictions apply to ASPA 128, and are contained in the Management Plan.
- Recommended helicopter landing sites are: Arctowski Station (62°09′32.198′′S, 58°28′12.5′′W), Ferraz Station (62°5.1283′S, 58°23.9233′W), Machu Picchu Station (62°05′30″ S, 58°28′30″ W). Landing at Copacabana Field Camp which is located inside ASPA No 128 is prohibited except in emergencies.
- Except in emergencies, or in the course of carrying out inspections under Article VII of the Antarctic Treaty, helicopters ferrying scientists and visitors to and from Arctowski, Ferraz and Machu Picchu Stations and the Ecuador field camp should notify the relevant station/camp leader well in advance of the estimated time of arrival. They should land only on helicopter pads/landing sites indicated at each of the stations. There are no refueling facilities at the stations;
- Movement on land within the Area should be preferably on foot, although land vehicles may be used for scientific or logistical purposes inside some Facilities Zones (Arctowski Station from Thomas point to the Shag Point, Ferraz Station from the main station compound to the refuges on Keller Peninsula, and to the isolated modular laboratories around the main compound, Machu Picchu Station inside main station compound).
- Snowmobiles may be used for scientific and logistical purposes in the glaciated parts of the Area, and in winter throughout the whole Area.
- The use of land vehicles is regulated by Leaders of the Stations, and should be done in a manner minimizing disturbance to wildlife, soil and vegetated areas. As far as practicable existing tracks should be used.
- Movement inside Scientific Zones should be, as far as possible, restricted to those conducting scientific research and essential logistic support. All movement should be undertaken carefully to minimize disturbance to animals, soil and vegetated areas.
- Movement inside Visitor Zones by tourists and other visitors to Ferraz Station should, whenever possible, follow routes shown in Figure 3. These routes allow the observation of fauna and flora, while minimizing environmental impacts.
- Special guidelines regulating access and movement inside Scientific Zones are contained in Appendix B. Guidelines regulating access to and movement inside ASPA No 128 are contained in the ASPA Management Plan.

9(ii) Activities which may be conducted in the Area, which will not jeopardize the values of the area, and which are consistent with the Code of Conduct:

- Scientific research, or the logistical support of scientific research which will not jeopardize the values of the Area;
- Tourist or private expedition visits consistent with the provisions of this Management Plan, Scientific and Environmental Guidelines and Code of Conduct for Visitors;
- Management activities, including maintenance or removal of facilities, clean-up of abandoned sites and monitoring the implementation of this Management Plan;
- Media, arts, education or other official national program visitors.
- Commercial harvesting of marine living resources, which should be conducted in coordination with research and other activities taking place, and could include development of a plan and guidelines that will help to ensure that harvesting activities did not pose a significant risk to the other important values of the Area.

All activities in the Area should be conducted in such a manner so as to minimize environmental impacts. Specific guidelines on the conduct of activities within the Area, including within Scientific Zones, can be found in the Appendices A and B, and in the Management Plan of ASPA No 128 Western Shore of Admiralty Bay.

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9(iii) Installation, modification or removal of structures

Installation of new stations/refuges and modifications, or removal of already existing installations or other facilities in the Area, should be done only after consultation with the Parties that have active research programs in the Area, and in conformity with provisions of Article 8 and Annex 1 of the Environment Protocol and this Management Plan; in a manner that does not compromise the values of the Area. Existing installations and installation sites should be re-used as far as possible, and sharing of installations among National Antarctic Programs is encouraged.

As far as possible, permanent or semi-permanent structures should not be installed outside Facilities Zones, unless they are small in size and pose no significant threats to the important 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 free of organisms, propagules (e.g. seeds, eggs) and non-sterile soil, and be made of materials that can withstand the environmental conditions, and pose minimal risk of contamination or damage to the values of the Area. All equipment and associated materials should be removed when no longer in use.

Before construction of new installations in the Area National Antarctic Programs should exchange information through the ASMA Coordinator with the aim of sharing existing installations and minimizing the erection of new ones.

9(iv) Location of field camps

Field camps should be located as far as possible 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 and breeding location of mammals and birds. Previously occupied campsites should be re-used where appropriate.

The location of field camps should be recorded, and the information exchanged through the Electronic Information Exchange System (EIES).

9(v) Taking or harmful interference with native flora and fauna

Taking or harmful interference with native flora or fauna is prohibited, except by Permit issued under the provisions of Article 3 of Annex V 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.

Taking of marine organisms for scientific purposes should be limited to that restrictedly necessary to meet the purpose of the research. Invasive methods involving dredging, grabbing, trawling, etc. should be undertaken sparingly and with greatest care possible.

Seismic operations should be avoided, particularly with the use of explosives. Geological sampling of bottom sediments, particularly in shallow waters, should be carried out with extreme care so as to minimize adverse impact on the environment, or interference with other scientific research under way on benthic ecology.

The coordinates of sites where invasive methods were used should be recorded, and the information should be exchanged through the Electronic Information Exchange System (EIES).

Harvesting of marine living resources should be conducted in accordance with the provisions of this Management Plan and with due recognition of the important scientific and environmental values of the Area. All those planning to conduct marine commercial harvesting in the Area should first submit their proposal to CCAMLR. The activities outlined in the proposal should only be taken with the prior approval of CCAMLR.

9(vi) Restrictions on materials and organisms which can be brought into the Area

All activities in the Area should be planned in a way minimizing risk of introduction of non-native species, including the transfer among different localities in Antarctica.

No living animals, plant material or microorganisms shall be deliberately introduced into the Area, except by permit issued in accordance with Annex II to the Protocol on Environmental Protection to the Antarctic Treaty.

"Non-native Species Manual" (Resolution 4, 2016) should be used to minimize the risk of unintentional introductions.

National Antarctic Programs, tour operators and organizations active in the Area should educate all visitors (scientists, station personnel, ship crews, tour operators' staff, tourists etc.) about the risks of non-native species' accidental introduction, and the methods used to minimize the probability of such an introduction.

National Antarctic Programs, tour operators and organizations active in the Area should, as far as practicable, minimize the importation of untreated wood, sand, aggregate and gravel to the Area.

National Antarctic Programs, tour operators and organizations active in the Area should, as far as is practicable, monitor all cargo, food and equipment unloaded in the Area for the presence of non-native species and propagules. National Antarctic Programs should also undertake periodic inspections of their facilities in the Area.

Visitors to the Area shall take special precautions against non-native species introduction. To the maximum extent practicable, footwear, outer clothing, backpacks and other equipment, including scientific samplers or markers, used or brought into the Area shall be thoroughly cleaned before entering the Area. Special care should be taken by persons visiting locations where non-native grass *Poa anuua* is present.

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Considering the high level of endemic marine benthos in Antarctica, National Antarctic Programs, tour operators and organizations active in the Area should, as far as is practicable, take precautions minimizing the possibility of the introduction of marine invertebrate larvae in ballast water. Practical Guidelines for Ballast Water (Resolution 3, 2006) should be used for guidance.

In view of the presence of numerous breeding bird colonies within the Area dressed poultry should be free of disease or infection before shipment to the Area, and if introduced to the Area for food, all parts and wastes of poultry shall be completely removed from the Area or incinerated or boiled long enough to kill potentially infective bacteria or viruses. Care should be taken to prevent food or food wastes being accessed by wildlife.

Potential non-native species spotted in the Area should be reported to the appropriate authorities, and the reports should be made available to the ASMA Coordinator and the ASMA Management Group.

ASMA Management Group and other Parties or organizations, as appropriate, should exchange information about the discovery and distribution of any non-native species in the Area, results of the monitoring programs, and methods applied to minimize the risk of their accidental introduction. Policies on containment or eradication of non-native species should be discussed and developed as soon as possible.

9(vii) The collection or removal of materials not imported into the Area

Materials should only be collected and removed from the Area for scientific, management or educational purposes, and should be limited to the minimum necessary for those needs.

Souvenirs, specifically rocks, minerals, fossils, eggs, flora and fauna, or any other material not brought into the area by the visitor, should not be collected in, or removed from the Area.

It may be permissible to remove from the site materials such as beach litter or abandoned relics and artifacts of no historic value from previous activities. Historical relics and artifacts should be removed only for a compelling scientific purpose. Dead or pathological fauna or flora should be removed only for scientific purposes, with specific permit, because they are used as food by mammals and birds.

9(viii) Disposal of waste

Disposal of waste generated by scientific research programs, tourism and all other governmental or nongovernmental activities in the ASMA should be carried out in compliance with the provisions of Annex III to the Protocol on Environmental Protection to the Antarctic Treaty.

All wastes, other than human and domestic liquid waste, should be removed from the Area. Human waste and domestic liquid waste may be removed from the Area or disposed of into the sea.

9(ix) Requirements for Reports

Reports of activities within the Area, which are not already covered under existing reporting requirements, should be, to the maximum extent practicable, made available to the ASMA Coordinator.

10. Advance exchange of information

Parties operating in the Area should, as far as practicable, exchange information on their activities through the ASMA Coordinator with the aim of enabling greater coordination between their research programs, enhanced cooperation and minimization of possible cumulative impacts.

Parties proposing to conduct, support, or authorize research or other activities in the Area are encouraged to inform the ASMA Coordinator, as far in advance as possible, of their planned activities. The Coordinator should make the information available to the Management Group and other interested Parties.

All NGO and tourist expeditions planning to conduct activities with the Area (both IAATO members and those not affiliated with IAATO) should, as far as practicable, provide the ASMA Coordinator in advance with details of planned visits.

All those planning to conduct marine harvesting within the Area should, as far as practicable, notify the ASMA Coordinator in advance of their location, duration and character. The commercial harvesting specified in the proposal shall only be undertaken after following review procedures designated by CCAMLR.

11. Figures



Figure 1: ASMA No 1 - Admiralty Bay, King George Island



Figure 2: Scientific Zones



- A Freshwater lakes around Arctowski and Ferraz Station: example of freshwater environment;
- B Italia Valley (62°10'32.3" S, 58°30'49.0" W): concentration of seals;
- C Dufayel Island/Ezcurra inlet (62°09'59.4" S, 58°33'29.5" W): concentration of seals;
- D Machu Picchu Station (62°05′30″ S, 58°28′30″ W): breeding areas for Antarctic tern and skuas;
- D Crépin Point (62°05'28.6" S, 58°28'09.5" W): concentration of seals and breeding location of Sterna vittata;
- E Area north-west of Ferraz Station: concentration of seals;
- F Area west of Ferraz Station: concentration of seals;
- G Coastal area from Refuge No. 1 (Ferraz Station) to Plaza Point (southern tip of Keller Peninsula, 62°05′27.4″ S, 58°24′18.9″ W): concentration of seals and penguins, breeding location for *Larus dominicanus* ;
- H Ipanema, south-west coast of Keller Peninsula, approximate location (62°05'S, 58°26'W): breeding location for *Larus dominicanus*, presence of vegetation banks;
- I Coastal area up to 7 m in shore, north of Base "G" hill, above Ferraz Station: presence of vegetation banks;
- J Crosses Hill on northern flank of Ferraz Station, on Keller Peninsula (62°05′07″ S, 58°23′32″ W): concentrations of terns.
- K Ullman Spur (Martel Inlet) (62°04'39.4" S, 58°20'34.5" W): concentration of seals;
- L Hennequin Point (62°07'24.9" S, 58°23'52.3" W): concentration of seals and plant fossil localities; Main breeding area for *Catharacta maccormicki* and breeding *Larus dominicanus* and *Sterna vittata*; (Petry *et al.* 2016);
- M Cape Vaureal (62°10'49" S, 58°17'19.5" W) Chabrier Rock (62°11'00" S, 58°19'00" W): breeding area for penguins, southern giant petrels and blue-eyed shags.;
- N Shallow marine waters down to 100 m in front of: ASPA No. 128, Martel, Mackellar and Ezcurra Inlets; Napier Rock (62°10′00.9″ S, 58°26′22.7″ W) and Monsimet Cove (62°10′49.2″ S, 58°33′07.8″ W): diverse benthic communities and scientific experiments and concentrations of different species of adult and juvenile fish;
- P area between Arctowski Station and ASPA N° 128: presence of vegetation banks;
- R Costal area from Refuge N° 2 (south-west coast of Keller Peninsula, approximate location 62°04′20.0″ S, 58°25′30.0″ W) to south-east part of Domeyco Glacier (62°04′00.0″ S, 58°25′00.0″ W): the most important breeding location for *Larus dominicanus* at Keller Peninsula, concentration of *Sterna vittata*, presence of vegetation banks;

Keller Peninsula – Long-term Environmental Monitoring – Brazilian environmental monitoring of Admiralty Bay with emphasis on area of direct influence of the Comandante Ferraz Antarctic Station (EACF) through chemical and biological indicators, as well as monitoring the input of contaminants derived from fossil fuels, burning by-products, flame retardants, metals and sewage discharge to the region. Figure 3: Visitor Zone – Comandante Ferraz Antarctic Station



Figure 3: Visitor Zone - Comandante Ferraz Antarctic Station









- 1.Disembarkation point
- 2.Scientific Laboratory
- 3.Dining room/Kitchen
- 4.Generator room/ Maintenance room/Wate treatment building
- **5.Living quarters**
- 6.Emergency refuge
- 7.Portable helicopter pad
- 8.Flag



APPENDIX A

Code of Conduct for Visitors

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

- All visitors should get acquainted with and follow the precepts of the Manual of Regulations and Guidelines Relevant to Tourism and Non-Governmental Activities in the Antarctic Treaty area. Decision 6 (2021).
- Tour operators should provide their visit schedules to the ASMA Coordinator in advance of their visits to the Area. ASMA Management Group should circulate this information among National Antarctic Programs active in the Area.
- Visits to Ferraz Station are possible with prior agreement of the appropriate Station Leader. Visits to isolated laboratory modules, refuges and the area behind Ferraz Station should be made only in small groups accompanied by station personnel with prior agreement of the Station Leader.
- Visits should be undertaken in line with *Manual of Regulations and Guidelines Relevant to Tourism and Non-Governmental Activities in the Antarctic Treaty area. Decision 6 (2021).* Visitors should be informed about the principles of this Code of Conduct, as well as the ASMA No. 1 Management Plan.
- Tour operators are encouraged to exchange itineraries with National Antarctic Programs using support vessels in the Area in order to avoid two ships unintentionally converging on a site simultaneously.
- Commercial cruise operators are encouraged to take care that no more than 100 passengers are ashore at a site at any time, accompanied by a minimum of one member of the expedition staff for every 20 passengers.
- Members of non-governmental and tourist expeditions, as well as National Antarctic Program staff during recreational visits to Ferraz station should use the routes shown in Fig. 3. These routes provide the opportunity to observe wildlife and the station installations, while minimizing disturbance to station activities and the environment, and avoiding habitat degradation.
- In order to avoid environmental impact, disturbance of wildlife and interference with on-going scientific research, landing at or entering Scientific Zones listed in Fig. 2 should not take place, except in emergencies.
- Due to the ongoing renovation of station facilities, Arctowski Station is closed to tourist traffic. This decision remains valid until further notice.
- All movement on land should be undertaken carefully to minimize disturbance to animals, soil and vegetated areas, or disturb scientific equipment. The visitor should:
 - Use marked walking paths instead of free walking on vegetation such as moss or lichen.
 - 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 meters. Where practicable, keep at least 15 meters away from fur seals.
 - wash boots and clean clothes, bags, tripods and walking sticks before landing, in order to prevent biological introductions.
 - do not leave any litter.
 - do not take biological or geological souvenirs or disturb artifacts.
 - do not write or draw graffiti on any man-made structure or natural surface.
 - do not touch or disturb scientific instruments or markers.
 - do not touch or disturb field depots or other equipment stored by National Antarctic Programs.



APPENDIX B

Scientific and Environmental Guidelines

Admiralty Bay and its coastal areas have become an important site for scientific research, with many research teams of different specialties working there every year.

These guidelines suggest a code of conduct formulated with the aim to protect the environmental, scientific, historical and aesthetic values of the area for the future generations.

- All scientific and logistical activities in the Area should be planned with the aim to minimize human impact on the values of the Area;
- Scientific research which can potentially disturb breeding birds or sea mammals should be conducted with a special care and only for compelling scientific reasons; where taking of or harmful interference with animals is involved, the SCAR Code of Conduct for Use of Animals for Scientific Purposes in Antarctica should be used as a minimum standard.
- The use of Remotely Piloted Aircraft Systems (RPAS) for scientific purposes should adopt the precautionary principle in order to help minimize impacts and to assist users in meeting their obligations under the Protocol. *Environmental Guidelines for operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica* should be used as a minimum standard.
- In order to protect the diversity of terrestrial environments, which include intrinsic and scientific values, acknowledging that these environments may be at risk from impacts associated with research activities, including through the introduction of non-native species, transfer of native species between locations, or the accidental release of contaminants, *Scientific Committee on Antarctic Research's Environmental Code of Conduct for Terrestrial Scientific Field Research in Antarctica* and *Non-Native Species Manual* should be used as a minimum standard.
- Collecting any specimen (e.g. stones, fossils, historical objects etc.) except for approved scientific or educational purposes with appropriate permits should be prohibited;
- Sample size of biological or non-biological material should be, as far as possible, limited to the minimum;
- Long-term monitoring or experimental sites should be, as far as practicable, clearly identified, and the information should be exchanged through the ASMA Coordinator;
- Stringent measures to avoid the introduction or spread of non-native species should be taken;
- Human traffic should be undertaken carefully to minimize disturbance to animals, soil and vegetated areas.; as far as possible existing tracks should be used;
- Use of helicopters and land vehicles should be kept to an absolute minimum, and never except in emergency in places where near birds or sea mammals breed or congregate;
- Field camps should be located as far as possible on non-vegetated sites, and should also avoid concentrations and breeding locations of mammals and birds. Previously occupied campsites should be re-used where appropriate. The location of field camps should be recorded, and the information exchanged through the Electronic Information Exchange System (EIES);
- Scientific research in the Scientific Zones should be conducted with a special care, avoiding or minimizing environmental impact;
- Visits and activities conducted in the Scientific Zones should be recorded (especially type and quantity of all samples), and the information should be exchanged through the Electronic Information Exchange System (EIES);
- Access to Scientific Zones designated for the presence of breeding birds should be restricted between 1 October to 15 April to those conducting essential scientific research, monitoring or maintenance;
- Access to Scientific Zones designated for the presence of vegetation banks should be restricted during the summer season to those conducting essential scientific research, monitoring or maintenance;
- Access to Scientific Zone designated on Crosses Hill on northern flank of Ferraz Station because of concentration of terns should be restricted between 1 October to 31 December to those conducting scientific research, monitoring or essential station operations;
- Research in Scientific Zones designated in shallow marine waters should, as far as possible, avoid or minimize the use of invasive methods (dredging, grabbing, trawling etc.). The coordinates of sites where invasive methods were used should be recorded, and the information should be exchanged through the Electronic Information Exchange System (EIES).

APPENDIX C

Protected Areas within ASMA 01

Antarctic Specially Protected Areas No 128, Western Shore of Admiralty Bay

Currently valid management plan is available at https://documents.ats.aq/recatt/att648_e.pdf

Antarctic Historic Sites and Monuments No. 51, Puchalski Grave

Information about HSM No. 51 can be found at https://www.ats.aq/devph/en/apa-database/4

APPENDIX D

Relevant and Supporting Documents

Manual of Regulations and Guidelines Relevant to Tourism and Non-Governmental Activities in the Antarctic Treaty area. Decision 6 (2021) - ATCM XLIII - CEP XXIII, Paris (*https://www.ats.aq/devAS/Meetings/Measure/738*).

General Guidelines and Site Guidelines Checklist for Visitors to the Antarctic. Resolution 4 (2021) – ATCM XLIII – CEP XXIII, Paris (available at *https://www.ats.aq/devAS/Meetings/Measure?lang=e&id=743*).

Scientific Committee on Antarctic Research's Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica. Resolution 4 (2019) - ATCM XLII - CEP XXII, Prague (available at *https://ats.aq/devAS/Meetings/Measure/704*).

Environmental Guidelines for operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica. Resolution 4 (2018) – ATCM XLI – CEP XXI, Buenos Aires (available at https://ats.aq/devAS/Meetings/Measure/679).

Scientific Committee on Antarctic Research's Environmental Code of Conduct for Terrestrial Scientific Field Research in Antarctica. Resolution 5 (2018) - ATCM XLI - CEP XXI, Buenos Aires (available at https://ats.aq/devAS/Meetings/Measure/680).

Guidelines for the preparation of ASMA management plans. Resolution 1 (2017) Annex B - ATCM XL - CEP XX, Beijing (available at *https://www.ats.aq/devAS/Meetings/Measure/659*).

Revised Antarctic Conservation Biogeographic Regions. Resolution 3 (2017) - ATCM XL - CEP XX, Beijing (available at *https://www.ats.aq/devAS/Meetings/Measure?lang=e&id=661*).

Non-Native Species Manual. Resolution 4 (2016) – ATCM XXXIX – CEP XIX Santiago (avaiable at *https://ats.aq/devAS/Meetings/Measure/640*).

Important Bird Areas in Antarctica (2015) appended to ATCM XXXVIII - IP 27 (available at *Important_Bird_Areas_in_ Antarctica_2015_v5.pdf (era.gs)*.

Environmental Domains Analysis for the Antarctic continent as a dynamic model for a systematic environmental geographic framework. Resolution 3 (2008) - ATCM XXXI - CEP XI, Kyiv (available at *https://www.ats.aq/devAS/Meetings/Measure/412*).

Practical Guidelines for Ballast Water Exchange in the Antarctic Treaty Area. Resolution 3 (2006) – ATCM XXIX – CEP IX, Edinburgh (available at *http://www.ats.aq/documents/recatt%5Catt345 e.pdf*).

Guidelines for the Operation of Aircrafts near Concentrations of Birds in Antarctica. Resolution 2 (2004) – ATCM XXVII – CEP VII, Cape Town (available at *http://www.ats.aq/documents/recatt/Att224_e.pdf*).

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Marsz A.A. and Stryszyńska A. (eds.) 2000. The main features of the climate region the Polish Antarctic Station H. Arctowski (West Antarctica, South Shetland Islands, King George Island). Wyższa Szkoła Morska, Gdynia: 1–264 (in Polish).

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