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 and Alexander Island main ice fields; and Environment G – Antarctic Peninsula offshore island geologic (Resolution 3 (2008)). Under the Antarctic Conservation Biogeographic Regions (ACBR) classification the Area lies within ACBR 3 – Northwest Antarctic Peninsula (Resolution 6 (2012)).

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 – Poland, Brazil, United States, Peru and Ecuador – 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 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). This revised management plan was prepared with reference to the "Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas" (Resolution 2, CEP XIV – ATCM XXXIV, 2011, Buenos Aires).

1. Description of values to be protected

i. 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, mountainous peninsulas, rocky islets, spurs 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.

ii. 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 60 species of mosses and numerous algae, as well as two species of native vascular plants (*Deschampsia antarctica* and *Colobanthus quitensis*) (Appendix A). 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 (Appendix C, Fig. 5 and 6). 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 (Appendix B). 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.

iii. Scientific values

Admiralty Bay is of outstanding scientific interest, especially for research in biology and geoscience. King George Island was discovered in 1908 year and since that time was 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. Long term monitoring of atmospheric and air temperature records undertaken by Brazilian researchers has revealed an increase in the mean air temperature of 1.1°C from 1956 to 2000. This increase in temperature has been associated with a 12% frontal glacier retreat during the same period. 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. The ice-free areas have enlarged threefold during the last 20 years, 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.

In the last 30 years the number of penguins has decreased in the Area - the Adelie (*Pygoscelis adeliae*) and chinstrap penguins (*Pygoscelis antarctica)* suffered an overall decline by roughly 57%, and the population of gentoo penguin (*Pygoscelis papua*) has increased by about 64% 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 palaeontology, 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 evidences of globally important environmental and climatic transition from greenhouse to icehouse world, that 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 geological map done by Birkenmajker in 2002 year. 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 display 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 galcio-izostatic 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 Read 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 evidences 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 since 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 has been operational at Arctowski since 1977 until 2000, and at Ferraz Station since 1984 to provide basic data and to support logistic operations. Research on upper atmosphere winds have 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, Germany, Russia, The Netherlands, New Zealand, North America, Uruguay, Spain, Italy, Czech Republic, Ukraine, Bulgaria, Peru 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 past 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 Area is under way at Ferraz Station, since 2002, comprising the analysis of a series of biotic and abiotic parameters. Brazil created a National Institute of Science and Technology on Antarctic Environmental Research (INCT-APA, in Portuguese) in 2008, and this has ensured the continuity of a monitoring program and other environmental studies. An environmental and biological database has been set in place to support assessments of atmospheric, oceanic and terrestrial trends. This will contribute to the monitoring of human activities in the Area and for the implementation of environmental management strategies for the ASMA.

iv. 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 the 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.

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.

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 educative 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 2011-2016 - http://www.scar.org/treaty/atcmxxxiv/ATCM34_ip054_e.pdf). 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 (SCAR Strategy for Capacity building, Education and Training, Report 27, 2006).

2. 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.

3. 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 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.
- 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 organization 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 E) and Scientific and Environmental Guidelines (Appendix F) 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 E).
- 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.

4. Period of Designation

Designated for an indefinite period.

5. Maps

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

Figure 2: Admiralty Bay Antarctic Specially Managed Area – ASMA No. 1.

Figure 3: Location of Scientific Zones.

Figure 4: Permanent Environmental Monitoring Area (INCT-APA, Brazil).

Figure 5: Flora (colonized areas) and Birds (occurrence sites).

Figure 6: Main birds breeding sites.

Figure 7: Visitor Zone – Comandante Ferraz Station

Figure 8: Visitor Zone – Henryk Arctowski Station

Figure 9: Facilities Zones – Machu Picchu Station

6. Description of the Area

6(i) Geographical co-ordinates, 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 Shetland 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 km^2 comprising of 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 (62º01'21"S – 62º14'09"S/ 58º 15'05"W– 58º41'02"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.

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 erosional and depositional landforms, fresh and old moraine ridges, flat basal moraines, 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 ecosystems. However, ecological mapping of the area was not performed till now. Particularly rich and diversified terrestrial ecosystems have been developed around penguin rookeries. Paternal profiles of ornithogenic soils of maritime Antarctic formed in the result of the phosphatization considered as a soil forming process were described along 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 -l.8ºC (-2.1 ± 1.0°C, set from Deception Island data and measured at UK Base "G", Bellingshausen and Ferraz, from 1944 to 2010) and an average annual wind speed in the order of 6.5 m s-¹ (6.0 ± 1.2 ms^{-1}, measured at Base G, Bellingshausen and Ferraz Stations,

from 1986 to 2010). Annual average precipitation is 508.5 mm, humidity is 82% and pressure is 991 hPa (991.6 ± 1.3 hPa, set from Deception Island's data, and measured at UK Base "G", Bellingshausen e Ferraz, from 1948 to 2010). The waters of Admiralty Bay have an average annual temperature range of -1.8° to +4°C, being well mixed by tides and strongly influenced by currents from the west of Bransfield Strait. Currently, reconstruction of climate fluctuation in the 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* e *Friesea grisea*) and only two species of Crustacea (*Branchinecta gainii* and *Pseudoboeckella poppei*).

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

Flora

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. 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. The species are listed at Appendix A and B.

Birds

Within the Area, 14 species of birds breed. Three sympatrically breeding Pygoscelid penguins make up 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 *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 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 location for *Stercorarius maccormicki*, where are found 90% of the breeding pairs. For *S. lonnbergi*, areas with high concentration of penguin, 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.

Two species that were classified as sporadic have become frequent: *Aptenodytes patagonicus* and *Eudyptes chrysocome*. *A. patagonicus* is being registered annually at Arctowski Station and there have been two sitings at Keller Peninsula. *E. chrysocome* has been found every year since 2004 at Chabrier Rock, always followed by an *Eudyptes chrysolophus* specimen. The species are listed at Appendix C.

Mammals

Six species of pinnipeds occur in the Area (Appendix C). 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 decreases, it is possible to find lots of crabeater seal 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*) and minke whales (*Balaenoptera bonaerensis*) have also occasionally been seen in the area.

Marine ecology

Seasonal fluctuation in the condition of 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 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 UE projects and results are synchronize 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. The species are listed at Appendix B and D.

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. Krill fishing has taken place in the Area recently. 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, 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 last ten years, number of tour ships has fluctuated between 13 and 25, and number of tourists between 3000 and 5700 per austral summer. 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. In the last 5 years, private yachts began to visit Admiralty Bay (3-4 yachts per season).

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 (CCAMLR 2012a). 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 (CCAMLR-XXXII, Hobart 2013, paragraph 5.83).

6(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).

6(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 (Fig. 2):

- *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 14 residents in winter and up to 25 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 tonnes; hangars for boats and land vehicles etc. The station is equipped with two helicopter pads.
- *Comandante Ferraz Station (Brazil):* 62º05'07" S – 58º23'32"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. Currently there are available two refuges, some isolated laboratories, 10 fuel tanks (capacity for 300,000 liters of arctic diesel), two modules of freshwater capture, and the Antarctic Emergency Modules (MAE, in Portuguese) to give support for Brazilian operations and the construction of the new station. They are composed of 38 modules (capacity to accommodate about 60 people) that include laboratory, dormitories, Sewage Treatment, Solid Waste Storage, diesel generators, etc.
- *Machu Picchu Station (Perú):* 62º05'30" S – 58º28'30" 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):* 62º10'45" S – 58º26'49" 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.
- Refuge at Hennequin Point (Equador): 62º 07' 16" S – 58º 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 is that region.

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

- three Brazilian emergency refuges (Refuge I - 62°05'16" S, 58°23'43" W, Refuge II - 62°04'24" S, 58°25'10" W, Ipanema Refuge - 62°05'10" S, 58°25'3'' W), and Brazilian scientific module on Keller Peninsula (62°05'28'' S, 58°24'15'' 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 summer field camp (62°10'32.3" S, 58°0'49.0" W).

(c) Historical remains in the Area

- HSM No 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);
- the remains of an old whaling boat at Ferraz Station, on Keller Peninsula (62°05'1.0" S, 58°23'30.0" W);
- an assembled whale skeleton at Ferraz Station on Keller Peninsula (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. Four of them are British graves, with crosses erected in memory of members of British expeditions who perished at sea and on ice. Three crosses were erected in honor of deceased members of the Brazilian military, two of them in honor of the Brazilian military that have died in the fire of the Ferraz Station; and
- a wooden cross on top of Flagstaff Hill (62°04'52.8" S, 58°24'14.0" W) on Keller Peninsula.

6(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 6(iii) Structures in the Area (Fig 2).

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.

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. 3, 5 and 6):

A - Fresh water 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 (62º05'30" S, 58º28'30" W): breeding areas for Antarctic stern 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 (62º05'S, 58º26'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 (62º05'07" S, 58º23'32" 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;

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 Nº 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;

S – Long-term Environmental Monitoring (see Fig. 4) - Brazilian monitoring program active since 2002, using remote sampling equipment (mini-box-corer), ROV for imaging, and scuba diving. The sampling stations were chosen taking into account the area of potential impact from Ferraz, and other three or four stations as reference areas. Approximate coordinates:

62º05'03.78"S, 58º23'12.18"W (depth 20-30 m)

62º05'59.94"S, 58º23'34.93"W (depth 20-30 m)

62º05'09.00"S, 58º20'59.20"W (depth 20-30 m)

62º04'26.00"S, 58º25'24.70"W (depth 20-30 m)

62º05'44.76''S, 58º21'48.52''W (depth 100 m)

62º06'03.99''S, 58º25'92.33''W (depth 100 m)

62º06'63.11''S, 58º27'11.33''W (depth 100 m)

62º06'74.74''S, 58º26'21.06''W (depth 300 m)

62º07'69.40''S, 58º24'62.52''W (depth 300 m)

62º08'87.72''S, 58º23'30.66''W (depth 300 m)

62º09'53.22'S, 58º24'27.68''W (depth 500 m)

62º10'15.76''S, 58º23'03.80''W (depth 500 m)

62º10'74.74''S, 58º23'20.08''W (depth 500 m)

Specific guidelines for the conduct within the Scientific Zones are presented in Appendix F (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 Arctowski and Ferraz are presented on Fig. 7 and 8. 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. 9) and Ecuador field camp.

Visits to Arctowski and Ferraz Stations are possible with prior agreement of the appropriate Station Leader.

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

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

6(v)

Location of other protected areas within the Area

The following areas are currently designated within the proposed ASMA :

- *ASPA No. 128 (Western shore of Admiralty Bay):* 62º09´46´´S – 62º14´10´´S – 58º25´15´´W – 58º29´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 artistic impression of fauna seen by the eye of photo camera. It has been done by the famous artist Bronislaw Chromy, close friend of Wlodzimierz Puchalski.

6(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).

7. 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 E and F.

7(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 (Fig. 3 and 4). 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 3;
- 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´34´´S, 58°28´15´´W), Ferraz Station (62º05'07" S, 58º23'32"W), Machu Picchu Station (62º05'30" S, 58º28'30" W). Landing at Copacabana Field Camp which is located inside ASPA No 128 is prohibited except in emergency.
- 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 Arctowski and Ferraz Stations should, whenever possible, follow routes shown in Figures 7 and 8. 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 F. Guidelines regulating access to and movement inside ASPA No 128 are contained in the ASPA Management Plan.

7(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 E and F, and in the Management Plan of ASPA No 128 Western Shore of Admiralty Bay.

7(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.

7(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 ASMA Coordinator.

7(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 ASMA Coordinator.

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.

7(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 6, 2011) 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.

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.

7(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 purpose, with specific permit, because they are used as food by mammals and birds.

7(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 into the sea.

7(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. The ASMA Coordinator should maintain them, and made available to all interested Parties.

8. 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. Copies of the permits issued to authorize entry into a designated protected area within the ASMA shall also be provided to the ASMA Coordinator. The ASMA Coordinator shall maintain a record of notifications and provide information when requested.

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.

9. Supporting Documentation and select bibliography

Non-Native Species Manual. Resolution 6 (2011) – ATCM XXXIV – CEP XIV, Buenos Aires (available at *http://www.ats.aq/documents/atcm34/ww/atcm34_ww004_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*)

COMNAP/SCAR Checklists for supply chain managers of National Antarctic Programmes for the reduction in risk of transfer of non-native species – ATCM XXXIV/CEP XIV, Buenos Aires (available at https://www.comnap.aq/Shared%20Documents/checklistsbrochure.pdf)

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*)

SCAR Code of Conduct for the Use of Animals for Scientific Purposes (available at *http://www.scar.org/treaty/atcmxxxiv/ATCM34_ip053_e.pdf*)

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APPENDIX A

Preliminary plant checklist from adjacent ice-free areas to Admiralty Bay, King George Island

ANGIOSPERMAE

POACEAE

Deschampsia antarctica Desv.

CARYOPHYLLACEAE

Colobanthus quitensis (Kunth) Bartl.

MOSSES

AMBLYSTEGIACEAE

Orthotheciella varia (Hedw.) Ochyra

Sanionia uncinata (Hedw.) Loeske

S. georgico-uncinata (Mull Hal..) Ochyra & Hedenas

Warnstorfia laculosa (Müll. Hal.) Ochyra & Matteri

Warnstorfia sarmentosa (Wahlenb.) Hedenäs

ANDREAEACEAE

Andreaea depressinervis Card.

Andreaea gainii Card.

Andreaea regularis Muell.

BARTRAMIACEAE

Bartramia patens Brid.

Conostomum magellanicum Sull.

BRACHYTHECIACEAE

Brachythecium austrosalebrosum (Müll. Hal.) Kindb.

Brachythecium glaciale B.S.G.

BRYACEAE

Bryum amblyodon Müll. Hal.

Bryum argenteum Hedw.

Bryum orbiculatifolium Card. et Broth.

Bryum pallescens Schleich. ex Schwaegr.

Bryum pseudotriquetrum (Hedw.) Schwaegr.

Pohlia cruda (Hedw.) Lindb.
Pohlia drummondii (Müll. Hal.) A. L. Andrews in Grout
Pohlia nutans (Hedw.) Lindb.
Pohlia wahlenbergii (Web. Et Mohr.) Andrews

DICRANACEAE
Anisothecium cardotii (R. Br. ter.) Ochyra
Chorisodontium aciphyllum (Hook. f. et. Wills.) Broth.
Kiaeria pumila (Mitt. in Hook. f.) Ochyra – very rare.

DITRICHACEAE
Ceratodon purpureus (Hedw.) Brid.
Distichum capillaceum (Hedw.) B.S.G.
Ditrichum hyalinum (Mitt.) Kuntze
Ditrichum lewis-smithii Ochyra

ENCALYPTACEAE
Encalypta rhaptocarpa Schwaegr.

GRIMMIACEAE
Grimmia reflexidens Müll. Hal.
Racomitrium sudeticum (Funck) Bruch & Schimp. in BSG.
Schistidium amblyophyllum (Müll. Hal.) Ochyra & Hertel
Schistidium antactici (Card.) L. I. Savicz & Smirnova
Schistidium cupulare (Müll. Hal.) Ochyra
Schistidium falcatum (Hook. f. at Wils.) B. Bremer
Schistidium halinae Ochyra
Schistidium occultum (Müll. Hal.) Ochyra & Matteri
Schistidium rivulare (Brid.) Pobp.
Schistidium steerei Ochyra
Schistidium urnulaceum (Müll. Hal.) B. G. Bell.

HYPNACEAE
Hypnum revolutum (Mitt.) Lindb.
Platydictya jungermannioides (Brid.) Crum

MEESIACEAE
Meesia uliginosa Hedw.

ORTHOTRICHACEAE
Muelleriella crassifolia (Hook. f. et Wils.) Dus.

POLYTRICHACEAE
Polytrichastrum alpinum (Hedw.) G. L. Smith
Polytrichum strictum Brid.
Polytrichum juniperinum Hedw.
Polytrichum piliferum Hedw.

POTTIACEAE
Dydimodon gelidus Card.
Hennediella antarctica (Angstr.) Ochyra & Matteri
Hennediella heimii (Hedw.) Zand.
Stegonia latifolia (Schwaegr. in Schult.) Vent in Broth.
Syntrichia filaris (Müll. Hal.) Zand.
Syntrichia princeps (De Not.) Mitt.
Syntrichia saxicola (Card.) Zand.

SELIGERACEAE
Dicranoweisia brevipes (Müll. Hal.) Card..
Dicranoweisia crispula (Hredw.) Milde
Dicranoweisia grimmiaceae (Müll. Hal.) Broth.

ALGAE
MACROSCOPIC CONTINENTAL ALGAE
Prasiola crispa (Lightfoot) Menegh

MICROSCOPIC CONTINENTAL ALGAE
Bacillariophyceae

Coscinodiscales
Orthoseira cf. *dendroteres* (Ehrenberg) Crawford

Naviculales
Amphora veneta Kützing
Achnanthes lanceolata (Brébisson) Grunow
Achnanthes marginulata Grunow
Caloneis cf. *silicula* (Ehrenberg) Cleve
Caloneis cf. *schumanniana* (Grunov) Cleve

Cocconeis sp.,
Fragilaria bidens Heiberg
Fragilaria capucina Desmazieres
Fragilaria construens f. *binodis* (Ehrenberg) Hustedt
Fragilaria pinnata Ehrenberg
Gomphonema parvulum (Kützing) Kützing
Hantzschia amphioxys (Ehrenberg) Grunow
Luticola muticopsis (Van Heurck) D. G. Mann
Luticola mutica var. *ventricosa (*Kützing) Cleve et Grunow
Navicula cf. *bryophila* Petersen
Navicula elginensis (Gregory) Ralfs
Navicula glaciei Van Heurck,
Navicula phyllepta Kützing
Nitzschia agnita Hustedt
Nitzschia cf. *fontifuga* Cholnoky
Nitzschia frustulum (Kützing) Grunow
Nitzschia gracilis Hantzsch
Nitzschia homburgiensis Lange-Bertalot
Nitzschia cf. *hybrida* Grunow
Nitzschia inconspicua Grunow
Nitzschia perminuta (Grunow) M. Pergallo
Opephora olsenii Moeller
Pinnularia borealis Ehrenberg
Pinnularia ignobilis (Krasske) Cleve-Euler
Pinnularia microstauron (Ehrenberg) Cleve
Stauroneis cf. *anceps* Ehrenberg
Stauroneis cf. *simulans* (Donkin) R. Ross.

MACROSCOPIC FUNGI
Omphalina antarctica Sing.
Galerina moelleri Bas.

LICHENS AND LICHENICOLOUS FUNGI
Acarospora macrocyclos Vain.
Alectoria minuscula – Lindsay
Arthopyrenia maritima Øvstedal
Arthrorhaphis citrinella (Ach.) Poelt
Austrolecia antarctica Hertel
Bacidia stipata Lamb

Biatorella antarctica Murray
Bryonora castanea (Hepp) Poelt
Bryoria chalybeiformis (L.) Brodo et D. Hawksw.
Buellia anisomera Vain.
Buellia augusta Vain.
Buellia cladocarpiza Lamb
Buellia coniops (Wahlenb. in Ach.) Th. Fr.
Buellia granulosa (Darb.) Dodge
Buellia latemarginata Darb.
Buellia papillata (Sommerf.) Tuck.
Buellia perlata (Hue) Darb.
Buellia pycnogonoides Darb.
Buellia russa (Hue) Darb.
Buellia subpedicillata (Hue) Darb.
Caloplaca amniospila
Caloplaca athallina Darb.
Caloplaca buelliae Olech & Søchting
Caloplaca cirrochrooides (Vain.) Zahlbr.
Caloplaca citrina (Hoffm.) Th. Fr.
Caloplaca iomma Olech & Søchting
Caloplaca millegrana
Caloplaca psoromatis Olech & Søchting
Caloplaca regalis (Vain.) Zahlbr.
Caloplaca siphonospora Olech & Søchting
Caloplaca sublobulata (Vain.) Zahlbr.
Caloplaca tetraspora (Nyl.) H. Oliv.
Caloplaca tiroliensis Zahlbr.
Candelaria murrayi (Dodge) Poelt
Candelariella hallettensis (Murray) Øvstedal
Candelariella vitellina (Hoffm.) Müll. Arg.
Carbonea vorticosa (Flörke) Hertel
Catapyrenium daedaleum (Kremp.) Stein
Catapyrenium lachneum (Ach.) R. Sant.
Catillaria corymbosa (Hue) Lamb
Cladonia cariosa (Ach.) Spreng.
Cladonia furcata (Huds.) Schrader
Cladonia phyllophora Ehrh. ex Hoffm.
Cladonia pyxidata (L.) Hoffm.
Coelocaulon aculeatum (Schreber) Link

Coelocaulon epiphorellum (Nyl. in Crombie) Kärnef.

Cystocoleus ebeneus (Dillwyn) Thwaites

Dermatocarpon intestiniforme (Körb.) Hasse

Haematomma erythroma (Nyl.) Zahlbr.

Himantormia lugubris (Hue) Lamb

Hypogymnia lugubris (Pers.) Krog

Hypogymnia lububris (Pers.) Krog f. *compactior* (Zahlbr.) D. C. Linds.

Japewia tornoensis (Nyl.) Tønsberg

Lecania brialmontii (Vain.) Zahlbr.

Lecania gerlachei (Vain.) Zahlbr.

Lecanora dispersa (Pers.) Sommerf.

Lecanora expectans Darb.

Lecanora physciella (Darb.) Hertel

Lecanora polytropa (Hoffm.) Rabenh.

Lecidea assimilata Nyl.

Lecidea atrobrunnea (Ramond ex Lam. et DC.) Schaer.

Lecidea lapicida (Ach.) Ach.

Lecidea sarcogynoides Körb.

Lecidea sciatrapha Hue

Lecidella aff. *carpathica* Körb.

Lecidella stigmatea (Ach.) Hertel and Leuckert

Lecidella wulfenii (Hepp) Körb.

Leptogium puberulum Hue

Massalongia carnosa (Dicks.) Körb.

Mastodia tesselata Auct.

Megaspora verrucosa (Ach.) Hafellner

Microglaena antarctica Lamb

Ochrolechia frigida (Sw.) Lynge

Ochrolechia parella (L.) A. Massal.

Pannaria hookeri (Borrer ex Sm.) Nyl.

Parmelia saxatilis (L.) Ach.

Physcia caesia (Hoffm.) Fürnr.

Physcia dubia (Hoffm.) Lettau

Physcia cf. *wainioi* Räs.

Physconia muscigena (Ach.) Poelt

Placopsis contortuplicata Lamb

Poeltidea perusta (Nyl.) Hertel et Hafellner

Polyblastia gothica Th. Fr.

Porpidia albocaerulescens (Wulfen) Hertel et Knoph

Porpidia crustulata (Ach.) Hertel et knoph
Pseudephebe minuscula (Nyl. ex Arnold) Brodo et D. Hawksw.
Pseudephebe pubescens (L.) Choisy
Pseudevernia pubescens
Psoroma hypnorum (Vahl) Gray
Ramalina terebrata Hook et Tayl.
Rhizocarpon geminatum Körb.
Rhizocarpon geographicum (L.) DC.
Rhizocarpon polycarpon (Hepp) Th. Fr.
Rhizoplaca aspidophora (Vain.) Redón
Rhizoplaca melanophthalma (DC. in Lam. et DC.) Leuck. et Poelt
Rinodina deceptionis Lamb
Rinodina mniaraea (Ach.) Körb.
Rinodina petermanii (Hue) Darb.
Rinodina turfacea (Wahlenb.) Körb.
Sphaeorophorus fragilis (L.) Pers.
Sphaeorophorus globosus (Hudson) Vain.
Sphaeorophorus cfr. *melanocarpus* (Sw.) DC.
Staurothele gelida (Hook & Tayl.) Lamb
Stereocaulon alpinum Laurer ex Funck
Stereocaulon glabrum (Müll. Arg.) Vain.
Tephromela atra (Hudson) Hafellner
Thelocarpon cyaneum Olech et Alstrup
Tremolecia atrata (Ach.) Hertel
Umbilicaria aprina Nyl.
Umbilicaria cfr. *cristata* Dodge et Baker
Umbilicaria decussata (Vill.) Zahlbr. –
Umbilicaria propagulifera (Vain.) Llano
Umbilicaria rufidula (Hue) Filson
Usnea acromelana Stirton
Usnea antarctica Du Rietz
Usnea aurantiaco-atra (Jacq.) Bory
Verrucaria ceuthocarpa Wahlenb.
Verrucaria cylindrophora Vain.
Verrucaria dispartita Vain.
Verrucaria elaeoplaca Vain.
Verrucaria psycrophila Lamb
Verrucaria tesselatula Nyl.
Xanthoria candelaria (L.) Th. Fr.

Xanthoria elegans (Link.) Th. Fr.

APPENDIX B

Macroalgae checklist from

Admiralty Bay, King George Island

RHODOPHYTA

Bangiales

Bangiaceae

Porphyra plocamiestris R.W. Ricker

Pyropia endiviifolia (A.Gepp & E.Gepp) H.G. Choi & M.S. Hwang

Hildenbrandiales

Hildenbrandiaceae

Hildenbrandia lecannellieri Hariot

Bonnemaisoniales

Bonnemaisoniaceae

Delisea pulchra (Greville) Montagne

Palmariales

Palmariaceae

Palmaria decipiens (Reinsch) R.W. Ricker

Palmaria georgica (Reinsch) R.W. Ricker

Ceramiales

Wrangeliaceae

Georgiella confluens (Reinsch) Kylin

Delesseriaceae

Delesseria lancifolia J. Agardh

Delesseria salicifolia Reisch

Microrhinus carnosus (Reinsch) Skottsberg

Myriogramme manginii (Gain) Skottsberg

Neuroglossum delesseriae (Reinsch) M.J. Wynne

Phycodrys antartica (Skottsberg) Skottsberg

Phycodrys austrogeorgica Skottsberg

Phycodrys quercifolia (Bory) Skottsberg

Rhodomelaceae

Picconiella plumosa (Kylin) J. De Toni

Gigartinales

Cystocloniaceae

Acanthococcus antarcticus J.D. Hooker et Harvey

Gigartinaceae

Gigartina skottsbergii Setchell & N.L. Gardner

Iridaea cordata (Turner) Bory de Saint-Vincent

Sarcothalia papillosa (Bory) Leister

Kallymeniaceae

Callophyllis atrosanguinea (J.D.Hooker & Harvey) Hario

Callophylis pinnata Setchell & Swezy

Phyllophoraceae

Gymnogongrus antarcticus Skottsberg

Gymnogongrus turquetii Hariot

Gracilariales

Gracilariaceae

Curdiea racovitzae Hariot

Halymeniales

Halymeniaceae

Pachymenia orbicularis (Zanardini) Setchell & N.L. Gardner

Plocamiales

Plocamiaceae

Plocamium cartilagineum (L) P.S. Dixon

Plocamium hookeri Harvey

Rhodymeniales

Rhodymeniaceae

Rhodymenia coccocarpa (Montagne) M.J.Wynne

CHLOROPHYTA

Chaetophorales

Chaetophoraceae

Endophyton atroviride O´Kelly

Ulotrichales

Gomontiaceae

Monostroma hariotii Gain

Ulotrichaceae
Protomonostroma undulatum (Wittrock) K.L.Vinogradova
Ulothrix australis Gain
Ulothrix flacca (Dillwyn) Thuret

Ulvales
Kornmanniaceae
Blidingia minima (Nägeli ex Kützing) Kylin
Ulvaceae
Ulva bulbosa (Suhr) Hariot
Ulva compressa Linnaeus
Ulva intestinalis Linnaeus

Prasiolales
Prasiolaceae
Prasiola crispa (Lightfoot) Kützing
Prasiola sp.

Acrosiphoniales
Acrosiphoniaceae
Acrosiphonia arcta (Dillwyn) J. Agardh
Urospora penicilliformis (Roth) Areschoug

Cladophorales
Cladophoraceae
Chaetomorpha sp

HETEROKONTHOPHYTA
Syringodermatales
Syringodermataceae
Syringoderma australe Levring

Fucales
Seirococcaceae
Cystosphaera jacquinotii (Montagne) Skottsberg

Ectocarpales
Chordariaceae
Haplogloia moniliformis Ricker

Haplogloia andersonii (Farlow) Levring
Elachista antarctica Skottsberg
Acinetosporaceae
Geminocarpus austrogeorgiae Skottsberg
Geminocarpus geminatus (Hooker & Harvey) Skottsberg
Pylaiella littoralis (L.) Kjellman
Adenocystaceae
Adenocystis utricularis (Bory) Skottsberg
Scytosiphonaceae
Petalonia fascia (O. F. Müller) Kuntze

Desmarestiales
Desmarestiaceae
Desmarestia anceps Montagne
Desmarestia antarctica R.L. Moe & P.C. Silva
Desmarestia confervoides (Bory) M.E. Ramírez & A.F. Peters
Desmarestia menziesii J Agardh
Himantothallus grandifolius (A and E Gepp) Zinova
Phaeurus antarcticus Skottsberg

Ascoseirales
Ascoseiraceae
Ascoseira mirabilis Skottsberg

APPENDIX C

Fauna recorded at Admiralty Bay, King George Island

Birds recorded at Admiralty Bay

Breeding species:

Pygoscelis adeliae

Pygoscelis papua

Pygoscelis antarctica

Macronectes giganteus

Daption capense

Oceanites oceanicus

Fregetta tropica

Phalacrocorax bransfieldensis

Chionis alba

Catharacta maccormicki

Catharacta lonnbergi

Catharacta chilensis

Larus dominicanus

Sterna vittata

Non-breeding

Frequent:

Aptenodytes patagonicus

Eudyptes chrysolophus

Edyptes chrysocome

Fulmarus glacialoides

Pagodroma nivea

Sterna paradisaea

Sporadic:

Aptenodytes forsteri

Spheniscus magellanicus

Talassarche melanophris

Phoebetria fusca

Phoebetria palpebrata

Thalassoica Antarctica

Halobaena caerulea

Pachyptila desolata
Bubulcus ibis
Cygnus melanocoryphus
Anas sibilatrix
Anas georgica
Calidris fuscicollis
Steganopus tricolor
Hirundo rustica

Pinnipeds recorded at Admiralty Bay:

Breeding species:
Mirounga leonina
Leptonychotes weddelli
Arctocephalus gazelle (only two cases)

Non-breeding
Frequent:
Arctocephalus gazella
Hydrurga leptonyx
Lobodon carcinophagus

Sporadic:
Ommatophoca rossi (two visits)

Cetacea recorded at Admiralty Bay:

Megaptera novaeangliae
Balaenoptera bonaerensis
Orcinus orca

APPENDIX D

Marine invertebrates, benthic marine foraminifers and ostracods recorded at Admiralty Bay, King George Island

An updated list of antarctic marine invertebrates can be found on the website ABBED —Admiralty Bay Benthos Diversity Database (www.abbed.uni.lodz.pl/). This database was created by Poland, Belgian and Brazil, in the International Polar Year (2007-2009).

The list of benthic marine foraminifers (Majewski 2005, Majewski et al. 2007, Majewski and Tatur 2009) and ostracods (Majewski and Olempska 2005) can be accessed on-line in the listed papers.

APPENDIX E

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 General Guidelines for Visitors to the Antarctic (Resolution 3 (2011).

- Tour operator 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 Arctowski and Ferraz Stations 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 Recommendation XVIII-1, Measure 15 (2009) "Landing of Persons from Passenger vessels", Resolution 7 (2009) "General Principles of Antarctic Tourism", Resolution 7 (2009) "General Principles of Antarctic Tourism" and Resolution 3 (2011) "General Guidelines for Visitors to Antarctic). Visitors should be informed about the principles of this Code of Conduct, as well as the ASMA 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 Arctowski and Ferraz stations should use the routes shown in Fig. 7 and 8. 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 Section 6(iv) (Fig. 3, 5 and 6) should not take place, except in emergencies.

- All movement on land should be undertaken carefully to minimize disturbance to animals, soil and vegetated areas, or disturb scientific equipment. The visitor should:

  - avoid 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 metres. 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.

  - not leave any litter.

  - not take biological or geological souvenirs or disturb artefacts.

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

  - not touch or disturb scientific instruments or markers.

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

APPENDIX F

Scientific and Environmental Guidelines

In the last 60 years 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.
- 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 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 ASMA Coordinator.
- 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 ASMA Coordinator;
- 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 ASMA Coordinator.

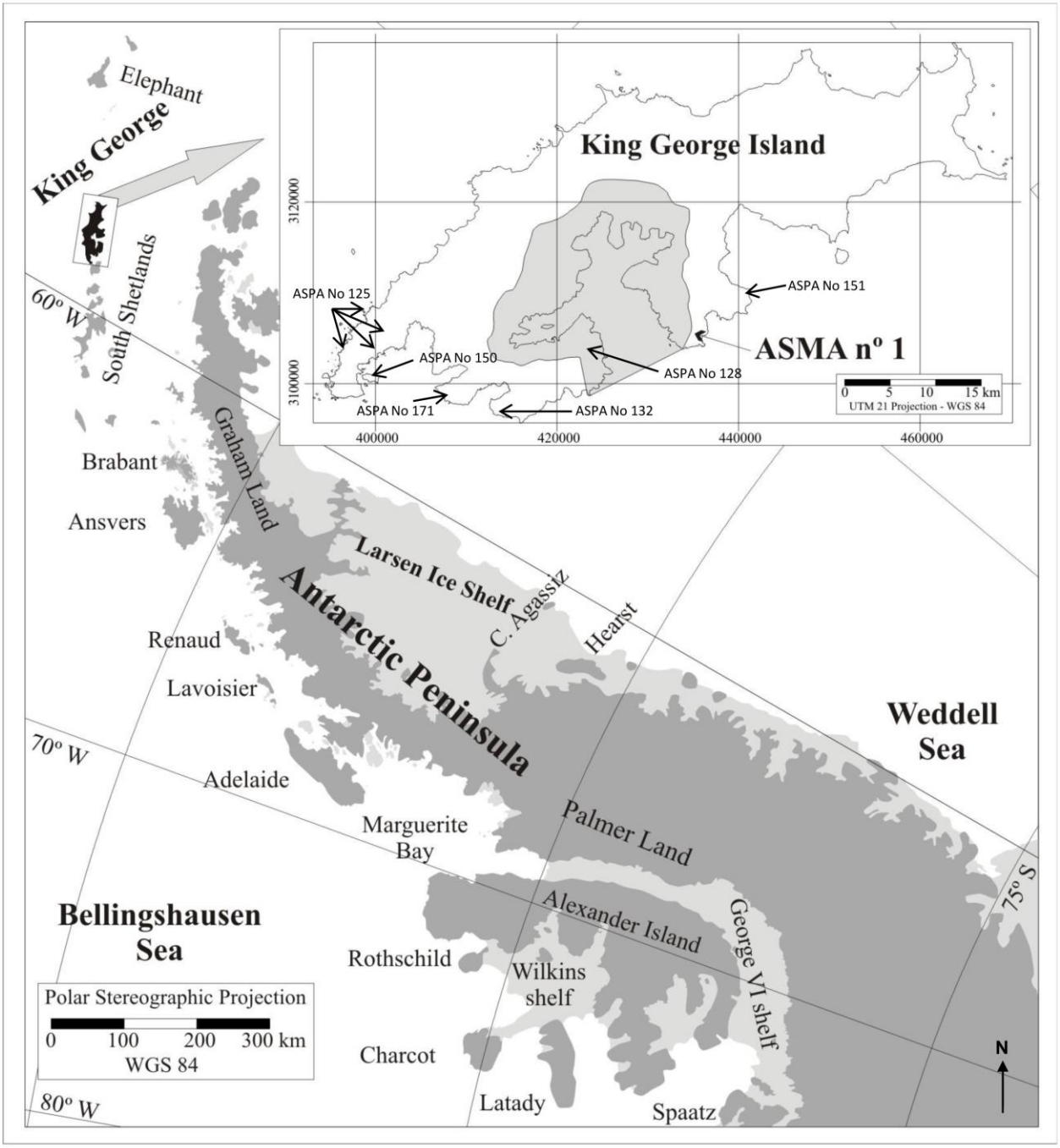


Fig. 1. Location of ASMA No 1 on King George Island, Antarctic Peninsula

Fig. 2. Admiralty Bay Antarctic Specially Protected Area – ASMA No 1

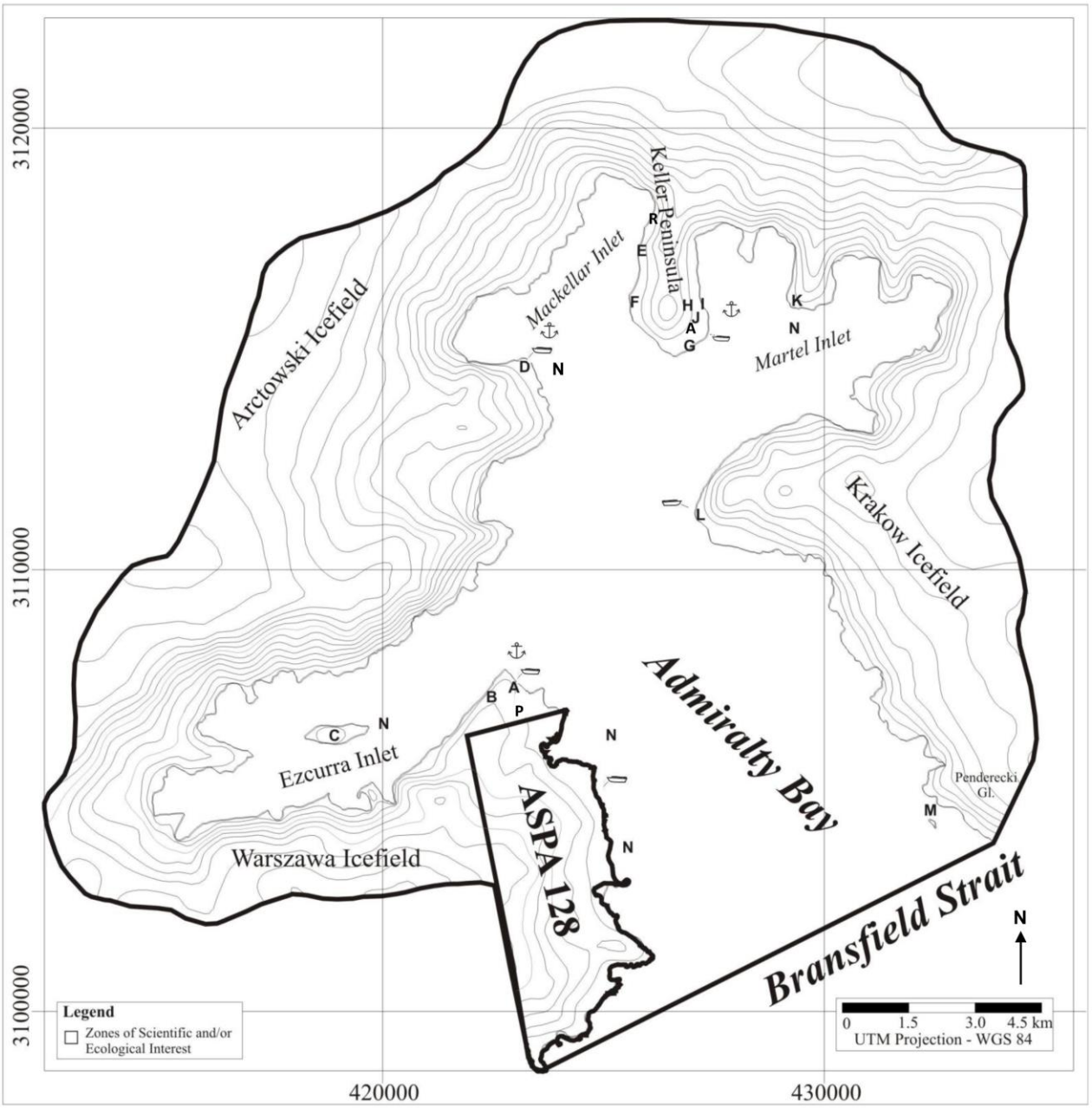


Fig. 3. Location of Scientific Zones (see 6(iv) Restricted and managed zones in the Area)

small boat landing site

anchorage

ASMA boundary

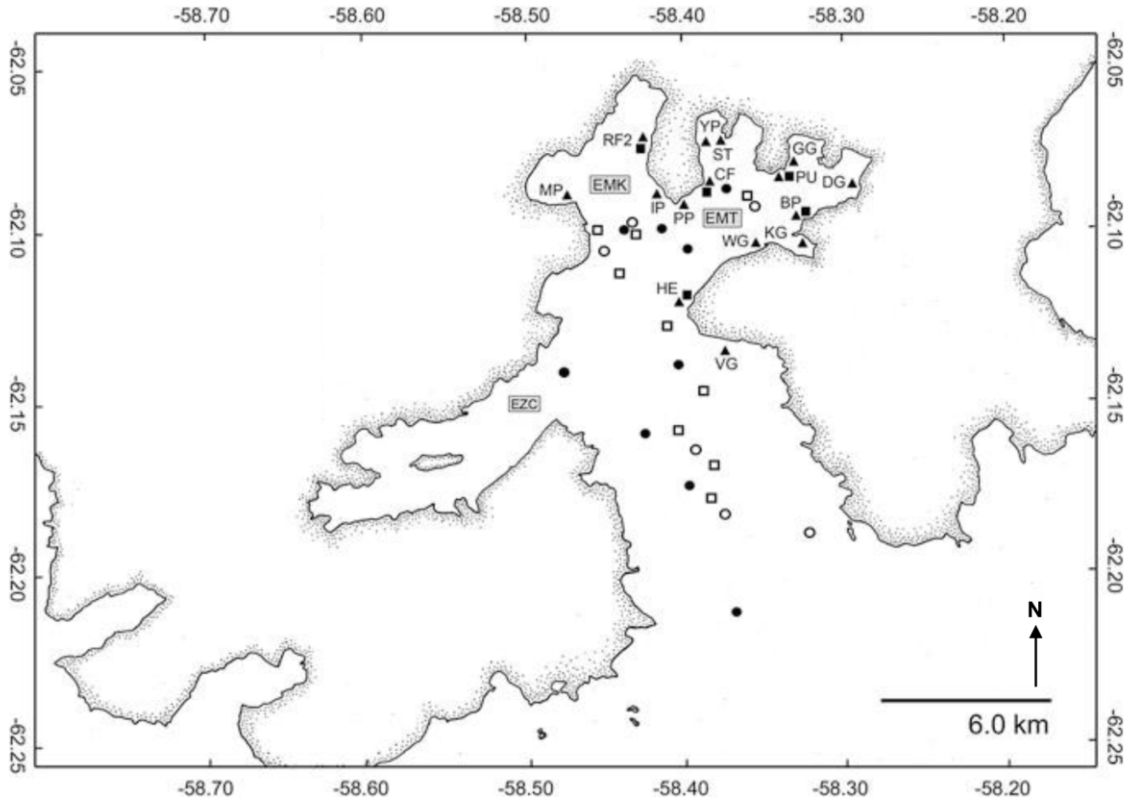


Fig. 4. Long-term Environmental Monitoring (INCT-APA, Brazil)

- ▲ Imaging stations
- ● Stations sampled with a box-corer (2008-2009)
- ○ Stations sampled with a box-corer (2009-2010)
- ■ Stations sampled with dredge (2008-2009)
- □ Stations sampled with dredge (2009-2010)

EFC – Ezcurra Inlet, EMK – Mackellar Inlet, EMT – Martel Inlet

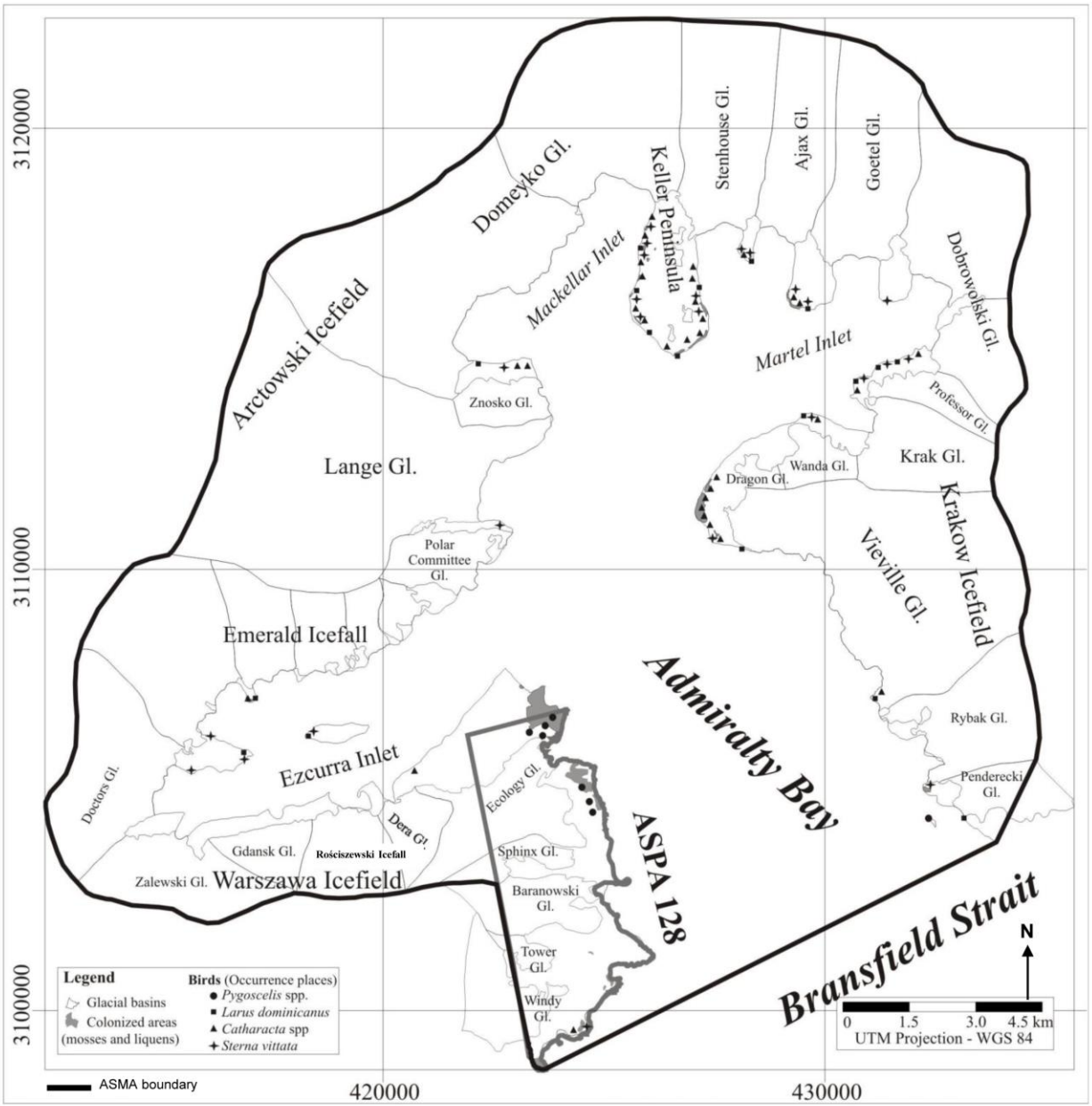


Fig. 5. Flora (colonized areas) and Birds (occurence sites)

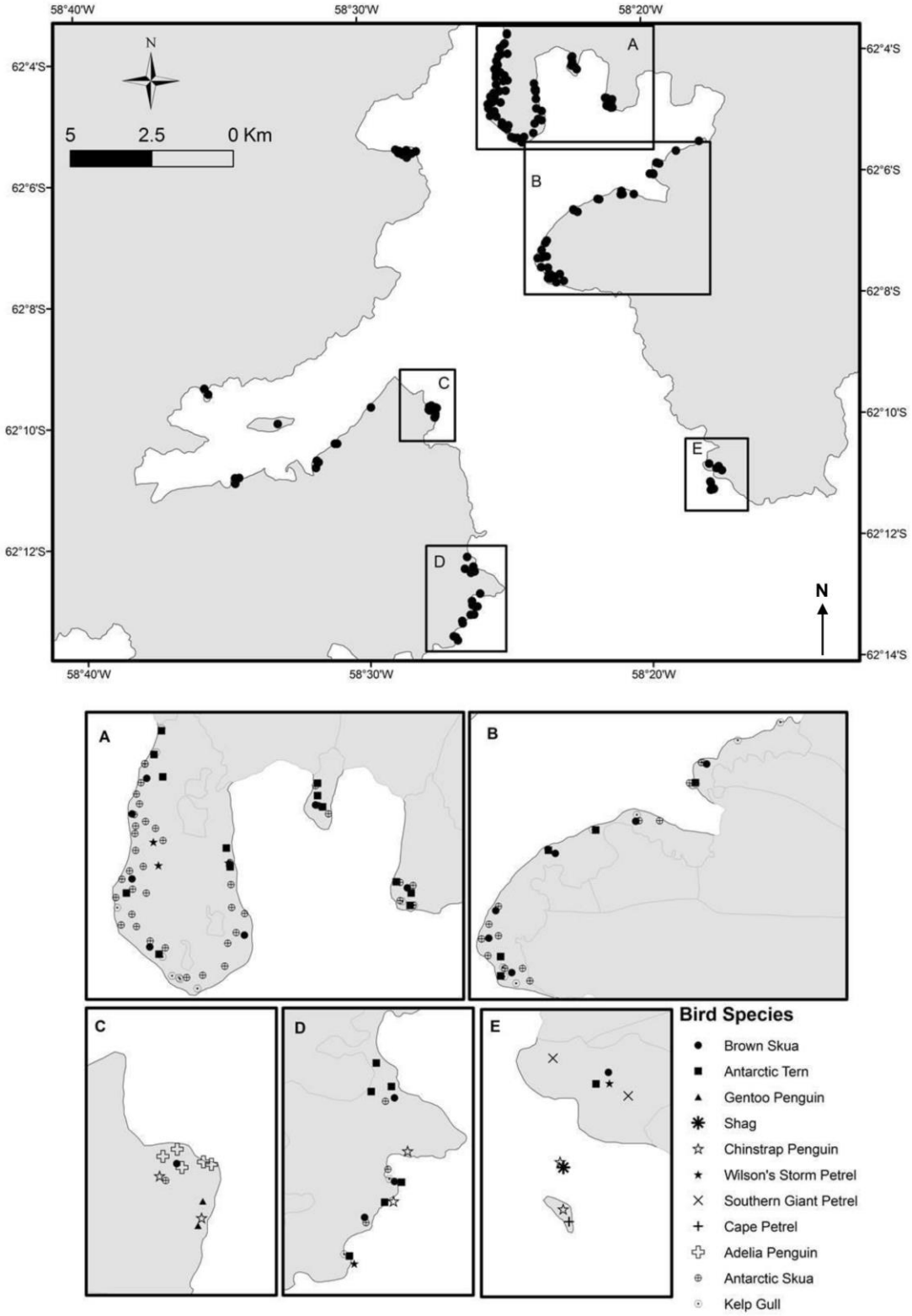


Fig. 6. Main birds breeding sites

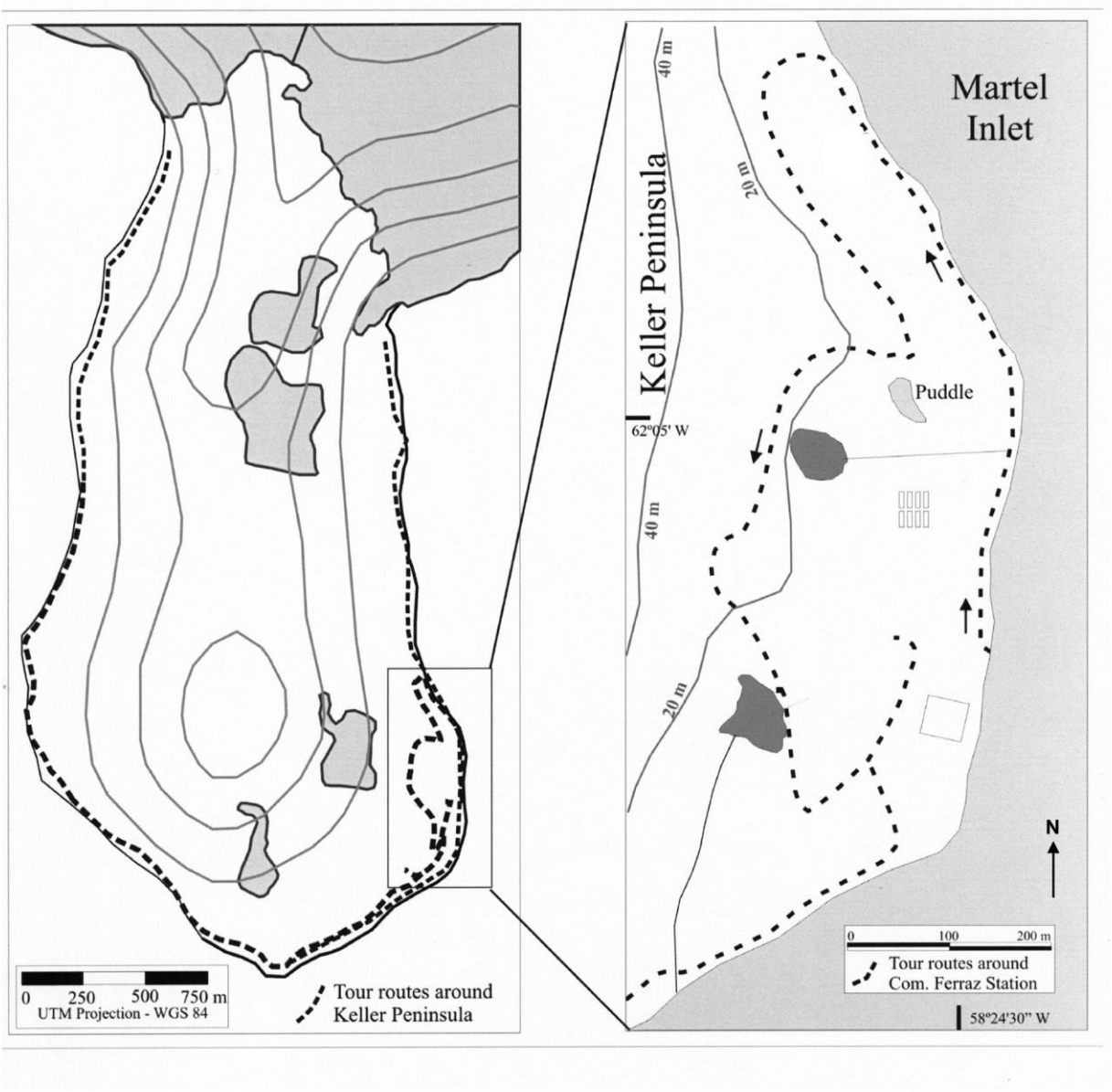


Fig. 7. Visitor Zone – Comandante Ferraz Station

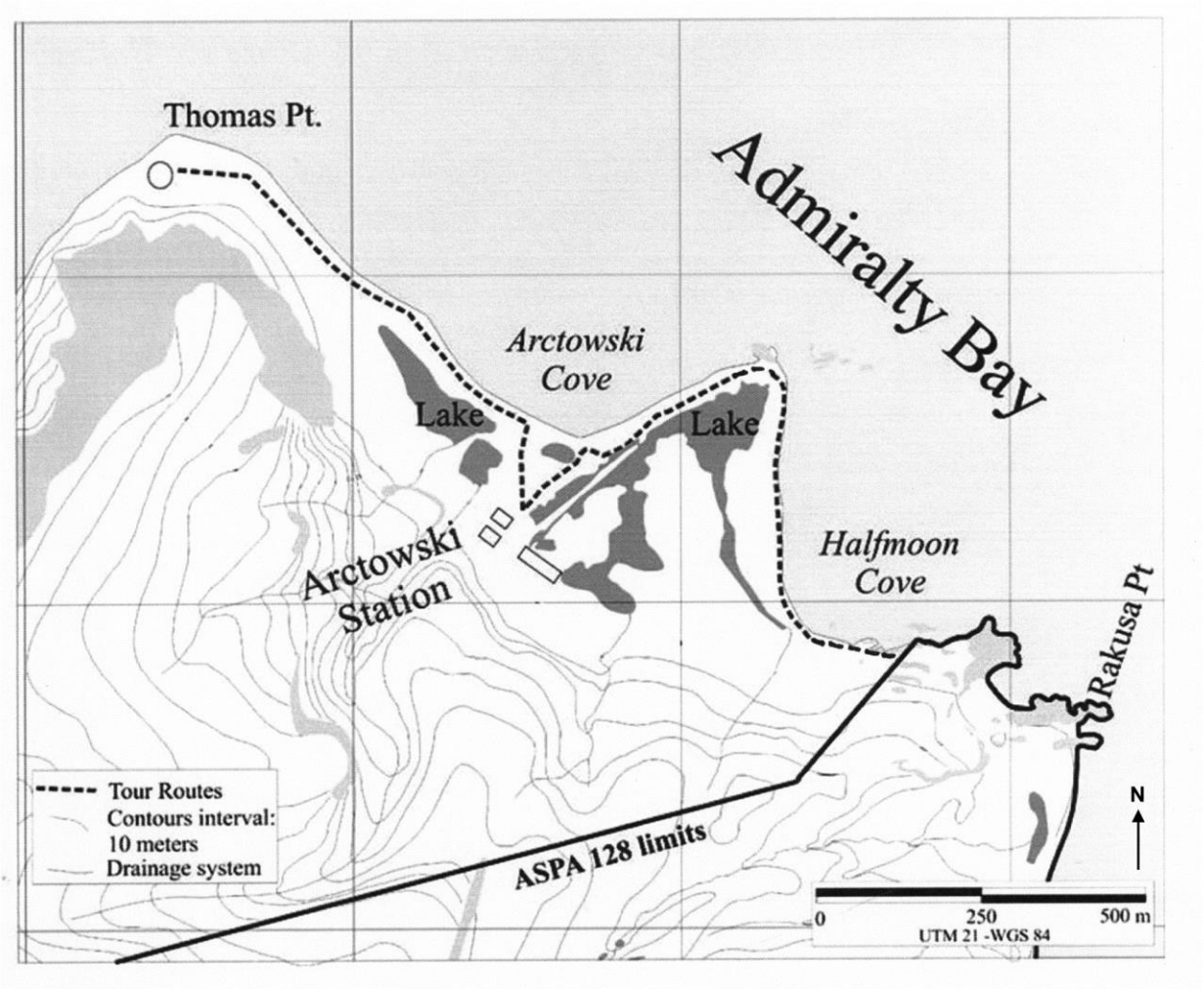
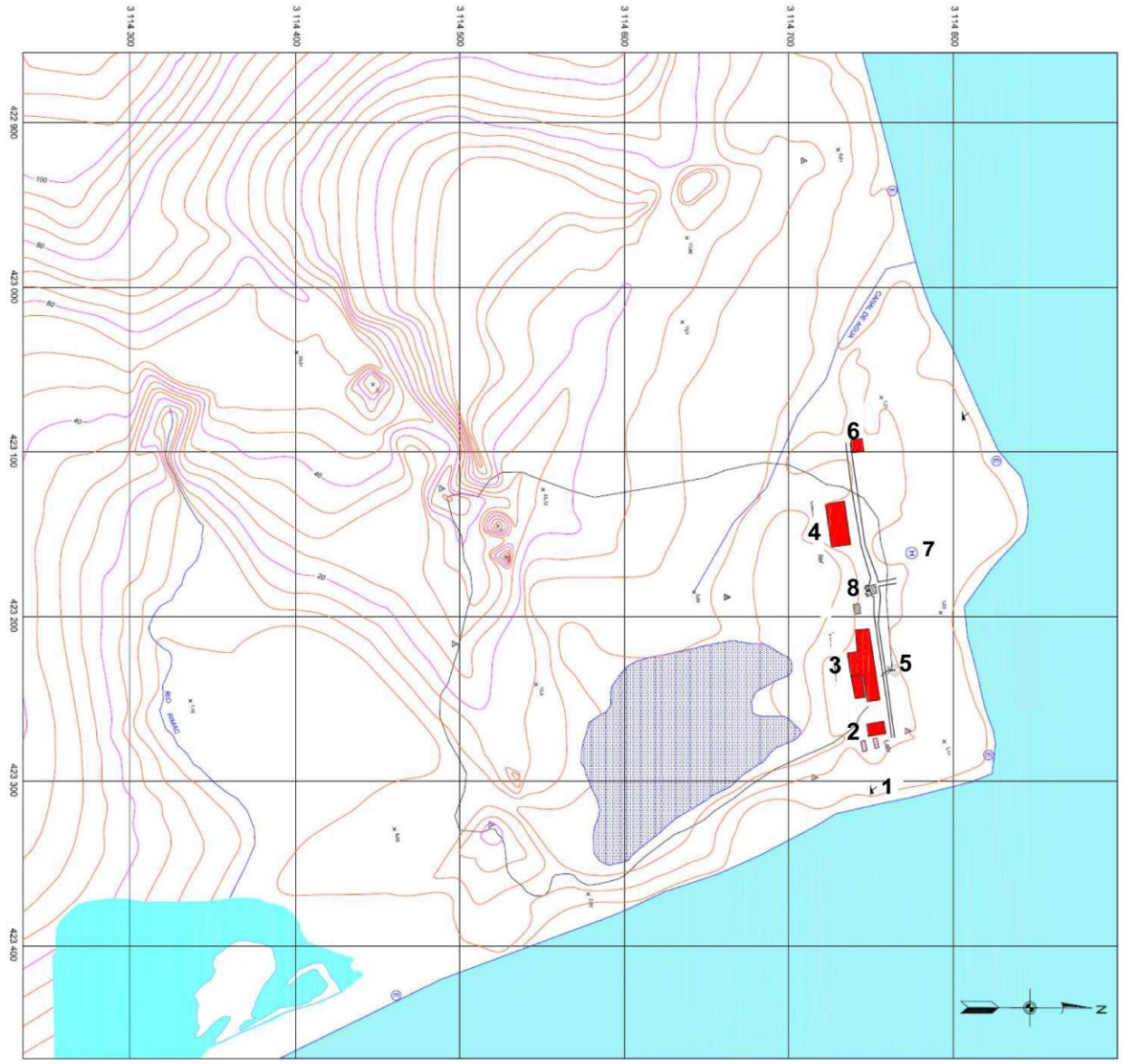


Fig. 8. Visitor Zone – Henryk Arctowski Station



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

Fig. 9. Facilities Zone – Machu Picchu Station