Management Plan

for Antarctic Specially Protected Area (ASPA) No 132 POTTER PENINSULA

Introduction

This area was originally designated as Site of Special Scientific Interest No. 1 (Recommendation XIII-8, ATCM XIII, Brussels, 1985) at the proposal of Argentina, due to its diverse and extensive vegetation and fauna, which constitutes a representative sample of the ecosystem of the Antarctica.

In 1997, the Management Plan was adapted to the requirements of Annex V to the Environment Protocol from the Antarctic Treaty, and approved by Measure 3 (1997). Then in 2005 the revision of the Management Plan was approved in accordance with Measure 2 (2005) and it was the second revision since Annex V became effective. Finally in 2018 the last revision of the Plan was approved through Measure 3 (2018).

The original objectives for the designation of this area remain significant. Potter Peninsula is designated as an Antarctic Specially Protected Area to protect its outstanding environmental values and to facilitate ongoing or planned scientific research. Anthropic disturbances could jeopardise long-term studies carried out in the area, especially during the breeding season, or modify basal levels in biotic and/or abiotic matrices of critical chemical pollutants (eg, trace elements and/or persistent organic composites).

The primary reason for designation as an ASPA is that Potter Peninsula constitutes a representative sample of species assemblages in the Antarctic ecosystem. The coastal areas are home to important bird colonies, breeding grounds for marine mammals and various plant species. Currently these coasts are among the most susceptible to climate change and its indirect effects such as glacial melting (Hernando *et al.*, 2015), which has been shown to affect biodiversity (Sahade *et al.*, 2015). For this reason, it has great scientific value, since various studies can be carried out in the area on the impacts of climate change on biotic and abiotic factors, as well as its consequences on the food chain (eg, Carlini *et al.*, 2009, Carlini *et al.*, 2010, Casaux *et al.*, 2006, Daneri and Carlini 1999, Rombolá *et al.*, 2010, Torres *et al.*, 2012, Quillfeldt *et al.*, 2017, Juáres *et al.*, 2018). It is essential to maintain these scientific activities, such as the monitoring programme that has been carried out since 1982, among them the CCAMLR Ecosystem Monitoring Programme (CEMP, started in 1995), as it produces invaluable scientific data for this purpose. Likewise, knowledge about plankton (Bers *et al.*, 2013; Schloss *et al.*, 2014) and krill dynamics (Di Fonzo *et al.*, 2014, 2017a, 2017b, Fuentes *et al.*, 2016), the basis of the diet of higher organisms in the food web, are of special importance.

Currently, there is a need to increase the volume of studies related to the numbers and reproduction of seabirds and mammals, since they have the potential to be used as ecological indicators of processes on a global scale and of the environmental quality of ecosystems (Costa *et al.*, 2019; Croxall *et al.*, 1998). In this regard, the geographical location of ASPA 132 is crucial for this type of studies and other comparative studies between its fauna and that of other Antarctic areas. Climatic and oceanographic variabilities have been shown to have effects on seabird populations, generally with profound consequences, such as reduced breeding success and alterations in the mating cycles of some species (Chambers *et al.*, 2011; Krüger *et al.*, 2018; Warwick-Evans *et al.*, 2021). The Antarctic Peninsula region is one of the places on the planet where the greatest effects of global climate change have been observed, notably the direct impact on the formation and duration of sea ice and the consequent effects on the entire food chain (Morley *et al.*, 2020; Turner *et al.*, 2009). Recent studies indicate that the drivers of change in ocean ecosystems are causing, in the western region of the Antarctic Peninsula, temperature increases, loss of sea ice and increased potential for invasion by other species, among other impacts (Morley *et al.*, 2020). Some authors point out that the region of Harmony Point has undergone some of the greatest changes. Stability in the positive phase of the SAM (Southern Annular Mode) has had an impact on winds, water movement and the expanse of sea ice (Stammerjohn *et al.*, 2008; Thompson and Solomon, 2002), and has repercussions for Antarctic flora and fauna.

There are several characteristics that make this area particularly susceptible to human interference, such as the configuration of the area, that is, a relatively narrow coastal area, enclosed between the sea and a cliff, where there is no area of movement that does not interfere with breeding colonies. The high concentration of activities, the scientific stations and the easy accessibility to the area by sea and by land, even with small boats, represent a potential threat to biological values and research activities.

According to recent studies, the state of the environment in the South Shetland Islands shows that Bransfield Strait, in the South Atlantic Ocean near the Potter Peninsula, has been severely altered, first by the almost complete extraction of the abundant colony of fur seals (*Arctocephalus* spp.) that feed on fish and krill, followed by baleen whales. More recently, fur seals have largely recovered and whales are beginning to do so (Ainley *et al.*, 2010), but climate change is increasingly affecting ecological processes through physical changes in temperature, water circulation, and sea ice expanse, among others. As a result of prey reductions, not only due to climate change and the recovery of populations of competing species, but also due to other currently unknown factors, penguin populations are declining (Ducklow *et al.*, 2007, Ainley and Blight 2009, Ainley *et al.*, 2010, Trivelpiece *et al.*, 2011, Juáres *et al.*, 2015). With this regard, ASPA 132 has currently acquired special relevance, given that the study of the Pygoscelid penguin colonies present in the area offers answers to the environmental changes observed in the Antarctic Peninsula, especially the lower frequency of cold years associated with the reduction of sea ice expanses and its effects on krill abundance (García *et al.*, 2015). It also contributes to detecting and recording significant changes in the marine ecosystem and seeks to distinguish between the changes caused by the commercial collection of the species and both the physical and biological changes caused by environmental variability.

The Potter Peninsula also offers exceptional opportunities for other scientific studies of terrestrial and marine biological communities.

The research and monitoring programmes currently underway in ASPA 132 include:

- Spatial and temporal dynamics of the prokaryotic and viral communities of Potter Cove.
- Effect of climate change and the presence of xenobiotics on Antarctic organisms.
- Effects of climate change on marine algae and Antarctic benthic fauna.
- Persistent organic pollutants (POPs), trace elements (TE) and microplastics in biotic and abiotic matrices of the Antarctic environment
- Energy intake, type of prey and possible responses of pinnipeds to climatic anomalies and sea ice expanse on the Antarctic Peninsula and the Scotia Arc.
- Response of Antarctic bird populations to the interannual variability of their prey in areas with evident effects of global warming.
- Phylogeography of *Deschampsia antarctica,* based on molecular, morphological and karyological studies
- Distribution and nutritional status of brown skuas and South polar skuas.
- CCAMLR Ecosystem Monitoring Programme-CEMP site since 1995

1. Description of values to be protected

The coastal areas are home to important colonies of birds, breeding colonies of marine mammals and profuse vegetation (large expanses of mosses and lichens, patches of Antarctic grass and air cloves (*Deschampsia antarctica* and *Colobanthus quitensis*) in coastal areas). Scientific research programmes have been developed on the breeding ecology of species of marine mammals and birds since 1982, such as elephant seals (*Mirounga leonina*), the Adelie penguin (*Pygoscelis adeliae*) and gentoo penguins (*Pygoscelis papua*), including the CCAMLR Ecosystem Monitoring Programme, among others. Breeding colonies are located in a particular coastal location. The area consists mainly of raised beaches, largely covered with medium-sized stones, basalt structures, and lateral and terminal moraines. The coast is very irregular and has a series of small bays formed between the rocky promontories where there are usually different species of Antarctic pinnipeds that come to these shores to reproduce or shed their fur. The above reasons give the area an exceptional scientific and aesthetic value.

Although Antarctica is considered one of the few uncontaminated areas on our planet, due to the fact that it is relatively isolated and distant from large industrial and urban centres, there are studies that demonstrate the existence of halos of contamination close to scientific stations, a fact also reported for the nearby Carlini station (Curtosi *et al.*, 2010, Vodopivez *et al.*, 2015), which require extreme precautions in ASPA 132.

According to Morgan *et al.* (2007), ASPA 132 represents the Environmental Domain of the “Antarctic Peninsula offshore islands”. Also, according to Terauds *et al.* (2012), the area represents the “Northwest Antarctic Peninsula” region of the “Antarctic Conservation Biogeographic Regions”. According to “Important Bird Areas in Antarctica 2015” (Harris *et al.*, 2015), Potter Peninsula is area 047.

For more detailed features, please refer to section 6.

2. Aims and Objectives

- Preserve the natural ecosystem and prevent unnecessary human disturbance.
- Conserve the flora of the area as reference organisms, free of human impact.
- Prevent or minimise the introduction into the Area of non-native plants, animals and microbes.
- Minimise the possibility of introduction of pathogens that can cause disease in wildlife populations within the area.
- Prevent the introduction, production or dissemination of chemical pollutants that may affect the area.
- Protect the biodiversity of the Area, avoiding major changes in the structure and composition of the fauna and flora communities.
- Allow the development of scientific research that cannot be carried out elsewhere, and the continuity of ongoing long-term biological studies in the area, as well as the development of any other scientific research, providing it does not compromise the values on account of which the Area is protected.
- Allow the development of studies and monitoring tasks to estimate the direct and indirect effects of the activity of nearby scientific bases.
- Allow visits for management purposes in support of the aims of this Management Plan.

3. Management Activities

- The personnel assigned to Carlini Base (formerly, Jubany Base, the Argentina base close to the ASPA) and in particular, the personnel authorised to enter the ASPA, will be specifically instructed on the terms and conditions of the Management Plan;
- Copies of this Management Plan must be available at the Carlini Base.
- Distances from fauna must be respected, except when the scientific projects require otherwise and providing the significant permits have been issued.
- Collection of samples will be limited to the minimum required for the development of approved scientific research plans.
- All signs and structures erected within the ASPA for scientific or management purposes should be securely attached and maintained in good condition.
- In accordance with the requirements of Annex III to the Environmental Protocol from the Antarctic Treaty, abandoned equipment or materials will be disposed of to the greatest extent possible, provided that this does not have adverse impact on the environment and the values of the Area.
- Given the presence of important colonies of seabirds adjacent to the areas travelled by scientists and support staff, trails leading to research sites may be marked to limit circulation to such trails, preferably those previously travelled or marked.
- Movement will be restricted to sectors without vegetation, avoiding proximity to fauna except when the scientific projects so require and if the corresponding harmful interference permits have been obtained.
- The Management Plan will be reviewed at least once every five years and updated if necessary.
- All pilots operating in the region must be informed of the location, limits and restrictions applicable to entering and overflying the area.
- Preventive measures will be implemented to avoid the introduction of non-native species
- In accordance with Resolution 5 (2019), all researchers visiting the ASPA will be reminded of the prohibition on using personal care products that contain plastic microbeads.
- The necessary visits will be made (at least once every five years) to determine whether the Area continues to serve the purposes for which it was designated and to ensure that management and maintenance measures are adequate.
- National Antarctic programmes operating in the region must consult with each other to ensure the implementation of the above provisions.

4. Period of Designation

Appointed for an indefinite period.

5. Maps

Map 1, included at the end of this Management Plan, shows the location of ASPA 132 (in diagonal lines) in relation to Potter Peninsula, King George (25 de Mayo) Island.

6. Description of the Area

6(i) Geographical co-ordinates, boundaries and natural features

Geographical co-ordinates and boundaries

This area is located on the east coast of the National Guard Bay, southwest of King George (25 de Mayo) Island, between the southern end of Mirounga Point (Northwest of the Potter Peninsula) and the rock exposure known as "Rock 7", on the north-east border of Stranger Point (Cabo Funes). The area extends along the coastal strip towards low tide water levels and to the edge of the cliff, which reaches heights of 15 to 50 metres. The front of the cliff edge is included within the ASPA. This coastal strip has a variable width, extending up to 500 metres from the coast at low tide water levels. The area consists mainly of raised beaches, largely covered with medium-sized pebbles, basaltic structures, and lateral and terminal moraines. The coast is very irregular and has a series of small bays formed between the rocky headlands.

This topography constitutes a natural border for the settlement of breeding colonies of marine mammals and penguins, which justify the extension of the ASPA.

6(ii) Natural features

The area encompasses important scientific values due to the presence of breeding colonies of elephant seals *(Mirounga leonina),* non-breeding groups of Antarctic fur seals *(Arctocephalus gazella)* and occasionally Weddell seals *(Leptonychotes weddelli),* crabeater seals *(Lobodon carcinophagus)* and sea leopards *(Hydrurga leptonyx).* During the breeding season, there are around 400 female southern elephant seals with their respective pups and approximately 60 adult males of that species (Carlini *et al.*, 2006, Negrete, 2011), while during the moulting period, between 200 and up to 800 individuals of southern Elephant seal wash up on the shores of ASPA 132. Non-breeding groups of Antarctic fur seals usually number around 300 individuals, although this number can vary considerably from one year to the next, sometimes exceeding 1 000 individuals (Durante *et al.*, 2017).

Important colonies of gentoo penguins *(P. papua)* and Adélie penguins *(P.adeliae)* are also present, with 3800 and 3000 pairs, respectively. The population of petrels (mostly *Oceanites oceanicus* and, to a much lesser extent, *Fregetta tropica)* reaches about 200 pairs. Also breeding in the area are kelp gulls (*Larus dominicanus*), American sheathbills *(Chionis alba),* Antarctic Terns *(Sterna vittata),* southern giant petrels *(Macronectes giganteus)* and skuas *(Catharacta sp.)*. Given that some of the nesting sites around the Potter Peninsula change their position over time, population data are considered estimates.

Gentoo and Adélie penguins are distributed around Stranger Point (Cabo Funes), between the Elephant refuge and Rock 7. The concentrations of mammals are distributed along the coast, between Rock 1 and Rock 7, and giant petrel nests are usually distributed around Three Brothers Hill mainly (outside the ASPA) and between Rock 7 and Rock 4 (see Map 1). In the Area there is an abundant development of plant communities dominated by lichens and mosses, on the rocky slopes and on the flat surfaces of the paleobeaches, respectively.

Weather

Due to its location in the South Shetland Islands, we can say that the area has the cold oceanic climate characteristic of maritime Antarctica, with frequent summer rains and a moderate thermal amplitude, and a cold and humid morphoclimatic system of a cryoval nature. These climate parameters facilitate the occurrence of periglacial processes and the presence of an active layer that is usually saturated in summer. It has the same type of climate as Antarctica in general, although a little less rigorous. During the summer the temperature is between -2°C and 3°C, and during the winter the average temperatures are around -10°C and -20°C. In 2007 -26°C were measured. The wind is mostly moderate from the NE with measurements of up to 125 km/h, which is why the thermal sensation can reach -50°C. The precipitations are in the form of snow, although during the summer season there is some drizzle.

Regarding the expected climate change for the area, although there are no specific data, according to Turner *et al.*, (2009) since the 1950s, the air temperature over the Western Antarctic Peninsula has increased at a rate of 0.56°C per decade. Such increase in temperature have caused a rapid retreat of the glaciers and the consequent exposure of the soil. Surface temperature trends show significant warming in the Antarctic Peninsula and, to a lesser extent, in West Antarctica since the early 1950s, with little change in the rest of the continent. The greatest warming trends occur in the western and northern parts of the Antarctic Peninsula, an area that includes the Harmony Point area. Some data indicate a warming of +0.20°C per decade, and also indicate that the warming of the western peninsula has been greater during the winter, with winter temperatures that increased by +1.03°C per decade from 1950 to 2006.

Natural features Flora

The spatial pattern of the vegetation is the combination of related variables: the type of substrate, the exposure, the stability of the slopes and the drainage (water availability). Potter Peninsula covers an area of several square kilometres, free of permanent snow and ice cover. A relatively stable substrate is found around Three Brothers Hill. Moraines close to the glacier are sparsely covered with plants, while plant cover and species richness increase with distance from the moraines. A plateau located to the south-west of Three Brothers Hill is covered by exceptionally rich vegetation. It consists of two layers of plants that can achieve 100% coverage. Several of the moss and lichen species found on the Potter Peninsula are confined to that area. There are the two species of native Antarctic vascular plants *Colobanthus quitensis* and *Deschampsia antarctica* (Dopchiz *et al.*, 2017a, 2017b) near the coast or in places with high nutrient supply.

Pleurocarpic mosses dominate, such as *Sanionia uncinata* and *Calliergon sarmentosum*, while rocks are commonly covered by encrusting lichens *Lecidea sciatrapha*. Higher up the slope, where the soil is more drained and the time with snow cover is shorter, mat-forming mosses like *Andreaea regularis* and *Andreaea gainii*, often along with *Himantormia lugubris*. Associations of bryophilous lichens such as *Psoroma hypnorum* and also some acrocarpic mosses. When the snow cover exceeds 10 cm, which occurs rarely even in winter, a double-mantle foliage of lichens and moss is formed.

The upper mantle is discontinuous and consists of fruticose lichens such as *Usnea aurantiaco-atra*, *U. antarctica* and *Pseudephebe pubescens*. The lower mantle is made up of a set of various species of mosses and liverworts. Tapestry of *U. aurantiaco-atra* and *Himantormia lugubris* is often intertwined (Bubach *et al.*, 2016, Rivera *et al.*, 2018). In the openings there are dicranoid mosses such as *Chorisodontium aciphyllum* and fruticose lichens that form mattresses like *Sphaerophorus globosus*. The most abundant bryophilous lichen is the *Ochrolechia frigida*. (Wiencke *et al.*, 1998).

Natural features Fauna

One of the important aspects of this ASPA is the presence of different bird colonies. For this reason, the area is classified as an Important Bird Area (IBA047) based on the presence of the Antarctic skua colony (*Catharacta maccormicki*), although before the recent declines in local Adélie penguin numbers (*Pygoscelis adeliae*), it also qualified on the basis of the high concentration of seabirds present.

According to Harris *et al.* (2015) Potter Peninsula is home to a diverse range of avifauna, with 14 554 Adélie penguin breeding pairs recorded in 1988/89 (Aguirre 1995), the majority at Stranger Point (Cabo Funes) (ASPA 132). Aguirre (1995) also recorded two 325 gentoo penguin pairs (*Pygoscelis papua*) and 265 chinstrap penguin pairs (*P. antarctica*) breeding in the summer of 1988-89. The Management Plan for ASPA 132 (2013) reported only 3 000 Adélie penguin pairs, although an increase in gentoo penguins to ~3 800 pairs.

South polar skuas breed at the site, with 63 breeding pairs in 2002 (Ritz *et al.*, 2006). In 1998, 46 pairs of southern giant petrels (*Macronectes giganteus*) were registered as breeding on Potter Peninsula (Hahn *et al.*, 1998), while 87 pairs were registered in 2007. In addition, approximately 200 breeding pairs of storm petrels are estimated in the area (mainly *Oceanites oceanicus*) (ASPA Management Plan No. 132, 2013). Other confirmed breeders are Cape petrel (Daption capense), black-bellied storm petrel (*Fregetta tropica*), the blue-eyed cormorant (*Phalacrocorax [atriceps] bransfieldensis*), the American sheathbill (*Chionis albus*), the brown skua (*Catharacta antarctica*), the hybrid skua (*Catharacta sp.*), Kelp gull (*Larus dominicanus*) and Antarctic tern (*sterna vittata*) (Hahn *et al.*, 1998).

In the case of the gentoo penguin (*Pygoscelis papua*) Juarez *et al.* (2019) mention that the total number of breeding pairs of gentoo penguins present at Stranger Point (Cabo Funes) increased by 74.6% between 2000/2001 (3083 pairs) and 2018/2019 (5383 pairs) at an annual rate of +3.1%. Overall, the breeding population increased by 40.2% (+4.2% per year) between 2000/2001 and 2008/2009, decreased by 26.1% in the 2009/2010 season and increased by 68.6% (+5.8% per year) between 2009/2009/2010 and 2018/2019. The number of breeding pairs counted in the 2000/2001 and 2009/2010 seasons represented the lowest values recorded (ie, 3083 and 3192 nests, respectively).

Regarding marine mammals, a large number of southern elephant seals (*Mirounga leonina*) come out annually to breed on Potter Peninsula. 272 female southern elephant seals were recorded in the 2006 season. Antarctic fur seals (*Arctocephalus gazella*) and occasionally Weddell seals (*Leptonychotes weddellii*), crabeater seals (*Lobodon carcinophagus*) and leopard seals (*Hydrurga leptonyx*) are also present on the beaches of this site.

An important fact is related to the population of Mirounga leonina within ASPA 132. It must be taken into account that, according to Negrete *et al.* (2022), most of the breeding colonies belonging to the South Georgia population are stable; however, the current population status of some other subpopulations of this stock is unknown or needs to be updated. This is the case of one of the southernmost subpopulations located in the Antarctic Specially Protected Area (ASPA) No. 132 "Potter Peninsula", King George (25 de mayo) Island. The first estimate of the population trend for this colony was in the 1980s when it was observed that the intrinsic population growth rate was positive between 1980 and 1988 (Vergani 1985; Vergani *et al.*, 1987; Vergani and Stanganelli 1990). Then, between 1989 and 1994, the maximum number of females on land varied slightly from 559 to 423 individuals (Vergani *et al.*, 2004). From that date to the present, preliminary reports showed a decrease in the number of reproductive females in this colony between 1995 and 2011 (Mennucci *et al.*, 2012).

The current data reported by Negrete *et al.* (2022) establish that the number of adult females that bred on Potter Peninsula between 1995 and 2018 ranged from 204 to 555 individuals. In the study period, the number of adult females decreased by 11.9% at an annual rate of -0.6%. Although this decline was not significant, a breaking point was observed in the 2008 season. From 1995 to the breaking point identified in the population trend (2008), a linear regression of the log-normal transformed number of females vs time showed a significant decline of 46.5% at an annual rate of -4.6% (ie, from 469 to 251 individuals).

In contrast, for the period after the breakpoint (2008-2018), the number of females increased by 64.5% at an annual rate of 5% (ie, from 251 to 413 individuals), although this increase was not statistically significant. Despite the general trend between 1995 and 2018, the number of breeding females fluctuated, showing decreases and increases between years. Then the population increase registered since 2008 is encouraging and significant for the conservation efforts and management strategies that are being carried out in ASPA 132; for this reason the importance of this protected area is highlighted.

6(iii) Access to the Area

Except for authorised exceptions, access to the area will be on foot, from the northern end, near the Carlini base helipad (62°14'17"S; 58°40'42"W), or from behind the northern slope of Three Brothers Hill (see Map 1). Access to the area by sea to the beaches should be avoided when there is fauna present, especially between October and December, since it is concomitant with the periods of greatest activity of egg laying in birds and with lactation in elephant seals.

Supplementary information is found in section 7 (ii).

6(iv) Location of structures within and adjacent to the area

Structures within the area

Shelters: The Argentine Elephant refuge is located about 150 m from the coast, 1000 metres north-east of Stranger Point (Cabo Funes). From March to October it is used by research groups that carry out activities in the ASPA. The shelter accommodates a maximum of 6 people (see section 7(ix) on Waste Disposal).

Signs: Warning signs about entering the protected area are located at: Mirounga Point (near the runway), at the northern base of Three Brothers Hill and in the beach area near Rock I. The signs show information about the existence of the ASPA and about the obligation to carry an access permit.

Structures adjacent to the area

Carlini is a permanent Argentine station located at 62°14' Lat. S and 58°39'W Longitude, in Potter Cove, Potter Peninsula, on the SW part of King George (25 de Mayo) Island. It has several facilities, such as the Argentine-German laboratory *Dallmann* which is a business initiative between the Alfred Wegener Institute (AWI) and the Argentine Antarctic Institute (IAA).

The Albatros is an Argentine shelter located at 62°15'09"S Lat. and 58°39'23"W Long. /-62.2525, -58.65639 at Potter Cove, Potter Peninsula.

Other nearby stations are Rey Sejong, belonging to South Korea (62°13'394"S/58°47'190"W) and Arctowsky belonging to Poland, (62°9'586"S/58°28'399"W)

6(v) Location of other Protected Areas within a very short distance

- ASPA 125, Fildes Peninsula, King George (25 de Mayo) Island, South Shetland Islands, approximately 20 km to the east.
- ASPA No. 128, west coast of Admiralty Bay, King George (25 de Mayo) Island, South Shetland Islands are located about 10 km to the north-east.
- ASPA 171 Narębski Point (southeast coast of Barton Peninsula, King George (25 de Mayo) Island)
- ASPA 133, Harmony Point Nelson Island, is located about 30 kilometres to the west-southwest.

6(vi) Special areas within the Area

No special areas have been designated within the Area.

7. Terms and Conditions for entry permits

7(i) General authorisation conditions

Entry to the Area is prohibited except under a Permit issued by the appropriate national authority.

Conditions for the issuance of an Access Permit to the Area:

- The activity serves a scientific, ASPA management or outreach purpose consistent with the objectives of the Management Plan, and that cannot be carried out elsewhere; or for any management activity (inspection, maintenance or review) in support of the objectives of this Management Plan.
- The permit is carried by the personnel authorised to enter the Area.
- The actions allowed do not harm the natural ecological system of the Area.
- A report subsequent to the visit is sent to the appropriate national authority mentioned in the permit, once the activity is finished, within the terms established by the granting national authorities.
- The appropriate authority should be notified of any activities/measures undertaken that were not included in the permit.

Tourism is not allowed, nor any other recreational activity.

7(ii) Access to and movement within the Area

Whenever possible, movements within the area will be on foot, along existing tracks known to personnel familiar with the area and regular visitors to the area. This is the beach area and the upper limit of the Area, to the north-east of Three Brothers Hill

Vehicles of any kind are prohibited within the area, with the exception of those essential for the maintenance of the shelter, which will only be operated by logistics personnel and in accordance with an access permit. In this case, access to the ASPA will be through a slight slope next to the Albatros refuge and vehicles must be driven avoiding areas with vegetation, as well as concentrations of birds and mammals (see Map 1).

Aircraft operations over the Area will be performed, as a minimum standard, as established in Resolution 2 (2004), "*Guidelines for the Operation of Aircraft near Concentrations of Birds*". As a general rule, no aircraft should fly over the ASPA at less than 610 metres (2 000 feet). A horizontal separation of 460 m (1/4 nautical mile) from the coast should be maintained whenever possible. Aircraft landing operations in the area are prohibited, except in cases of emergency or air safety.

The use of RPAs will not be allowed within the limits of the ASPA, unless previously analysed case by case during the environmental impact assessment process. They may only be used when stated in the entry permit and under the conditions established therein. During the analysis and authorisation process, all Antarctic Treaty directives in force will be taken into account.

7(iii) Activities which may be conducted within the Area

- Scientific research activities that cannot be carried out in other places and that do not endanger the Area's ecosystem;
- Essential management activities, including visits to assess the effectiveness of the management plan and management activities;
- Activities with educational or dissemination purposes, which contribute to publicise scientific activities, under the National Antarctic Programmes.
- The maintenance of the Elephant refuge, except between October and December. During this period, shelter maintenance should be avoided or, where appropriate, reduced to the extent possible and tasks should always be performed in compliance with a Permit. This period is considered especially sensitive, since it is concomitant with the moments of greatest activity of egg laying and lactation of elephant seals.

7(iv) Installation, modification or removal of structures/equipment

No structure will be erected within the Area, nor will scientific equipment be installed, except for compelling scientific or management reasons and subject to the appropriate permit.

Any scientific equipment installed in the Area, as well as any research marking, must be approved by permit and clearly labelled, indicating the country, name of the principal investigator, and year of installation. All these materials must be of such a nature that they pose a minimum risk of contamination of the Area, risk of interference with the fauna or damage to vegetation.

Structures and facilities must be removed when they are no longer needed or on the expiry date of the permit, whichever occurs first. Research markings must not remain after the Permit has expired. If a specific project cannot be completed within the term specified in the Permit, this circumstance must be informed in the report after the visit and an extension of the validity of the Permit will be requested, authorising any material to remain in the Area. Tents for the sole purpose of storing scientific instruments or equipment or for use as an observation post will be permitted.

7(v) Location of field camps

To avoid significant disturbances to the fauna, and taking into account that there are alternative places to lodge, camping is not allowed in ASPA 132. Projects authorised to work in the ASPA may request accommodation at the Carlini Base, subject to availability. When necessary for scientific reasons, the Elephant refuge (located within the area) or the Albatros refuge (outside the area, although very close) can be used. The use of the Elephant refuge for scientific purposes, by personnel other than the personnel of the Argentine Antarctic Programme, will be agreed in advance with said Programme.

The location of camps in the vicinity of the ASPA is the responsibility of the corresponding National Antarctic Programme, but for security reasons, it is recommended to inform the head of the Carlini Base.

7(vi) Restrictions on materials and organisms that may be brought into the Area

- No live animal or plant material may be deliberately introduced into the ASPA. All reasonable precautions must be taken against the unintentional introduction of foreign species into the area. It should be noted that foreign species are most often and most effectively introduced by humans. Clothing (pockets, boots, Velcro fasteners on clothing) and personal equipment (bags, backpacks, camera bags, tripods), as well as scientific instruments and work tools can carry insect larvae, seeds, propagules, etc. For more information, see the Non-native Species Manual. Revision 2019-CPA2011.
- Raw poultry products shall not be introduced into the Area;
- Herbicides or pesticides shall not be introduced into the Area; any other chemical product which is to be introduced with the corresponding Permit, must be removed from the Area when the activity for which the Permit was granted is completed. The purpose and type of chemicals should be documented in as much detail as possible to obtain information from other scientists.
- Fuel, food or any other material must not be stored in the Area, unless it is necessary for essential purposes related to the activity for which the Permit has been issued, provided that they are stored inside the Elephant refuge or near it, for disposal at the end of the activity. Any fuel used in the Elephant refuge will be managed in accordance with the Contingency plan established by the Argentine Antarctic Programme for the Carlini Station.

7(vii) Collection of or harmful interference with native flora and fauna

Harvesting or harmful interference with native flora and fauna is prohibited, except in accordance with a Permit.

Distances from fauna must be respected, except when the scientific projects require otherwise and providing the significant permits have been issued.

The recommended distance from penguins is 10 m during breeding and moulting periods and 5 m for young. It is recommended to maintain a distance of 100 m from the nests of southern giant petrels, while a minimum distance of 10 m should be maintained for Antarctic fur seals, Weddell seals, leopard seals and crabeater seals. It is important to take into account that the purpose of these distances is indicative and they may vary and be greater if the response to human proximity clearly stresses the animal.

Where an activity involves taking of or harmful interference, it should be carried out in accordance with the SCAR Code of Conduct for Use of Animals for Scientific Purposes in Antarctica, as a minimum standard, in its latest available version.

Information on the taking of and harmful interference with flora and fauna will be duly exchanged through the Antarctic Treaty Information Exchange System and its record must be incorporated, at least, in the Antarctic Master Directory (AMD) or, in Argentina, in the National Antarctic Data Centre.

Scientists taking samples of any type will mention them in the EIES (Electronic Information Exchange System) and/or contact the appropriate National Antarctic Programmes in order to minimise the risk of possible duplication.

7(viii) The collection or transfer of anything that has not been brought to the Area by the permit holder

Material may be collected or removed from the Area only pursuant to a Permit. The collection of dead specimens for scientific purposes will be analysed on a case-by-case basis in order not to exceed levels that may lead to the deterioration of the nutritional base of local scavengers. This will depend on the species to be collected and, if necessary, specialist advice should be required before the granting of the Permit.

Any material in the Area may be collected or removed only with an appropriate permit that allows doing so. In the conditions of the permit, the applicant must provide detailed information on the methodology and logistics to be used for the removal and the way it will be transported. In particular, they must ensure that no material remains loose on the ground and may be transported to other sites by the wind.

The collection of dead specimens for scientific purposes must not exceed a level such that it deteriorates the nutritional base of local scavenger species. The latter depends on the species to be collected and, if necessary, expert advice will be requested prior to granting of the permit.

7(ix) Waste disposal

All non-physiological waste will be removed from the Area. Waste water and liquid domestic waste may be discharged into the sea in accordance with the provisions of Article 5 of Annex III to the Madrid Protocol.

Waste from research activities carried out in the Area can be temporarily stored next to the Elephant refuge pending removal, under conditions that ensure that they do not disperse or be accessible to the fauna. This waste will be moved as frequently as possible to the Carlini Base or collected by the Antarctic Programme that generates it, to be disposed of in accordance with Annex III to the Madrid Protocol.

7(x) Measures that may be necessary to continue to meet the objectives of the Management Plan

Permits for access to the Area may be granted in order to carry out biological monitoring and inspection of the sites, including the collection of plant material and animal samples for scientific purposes, the building or maintenance of signs, and other management measures.

7(xi) Reporting requirements

The Parties granting entry permits to ASPA 132 must ensure that the principal holder of each permit issued submits a report describing the activities carried out to the relevant authority. These reports must be submitted as soon as possible, within the deadlines established by the corresponding competent authorities. The reports should include the information indicated in the Visit Report Form, as provided in the stipulations of Resolution 2 (2011).

The Parties granting entry permits to ASPA 132 must keep a record of said activities, and submit summary descriptions of the activities carried out by the persons under their jurisdiction in the annual exchange of information. Wherever possible, the local authority should also forward a copy of the visit report to the proponent Parties, to assist in the administration of the Area and the revision of the Management Plan.

The Parties shall, whenever possible, deposit originals or copies of such original reports in a publicly accessible archive to maintain a record of usage, to be used both for review of the Management Plan and in organising the scientific use of the Area.

The information from the reports will be used for the purposes of revisions to the Management Plan and in the organisation of the scientific use of the Area.

ASPA permit records and post-visit reports will be exchanged with the other Consultative Parties, under the Information Exchange System, as specified in Article 10.1 of Annex V.

These reports should be stored and made available for inspection by all interested Parties, SCAR, CCAMLR and COMNAP, as well as to provide information on human activities in the area necessary to ensure proper management.

8. Support documentation

Abele, D., Vazquez, S., Buma, A.G., Hernandez, E., Quiroga, C., Held, C.,... & Mac Cormack, W.P. (2017). Pelagic and benthic communities of the Antarctic ecosystem of Potter Cove: Genomics and ecological implications. *Marine genomics*, *33*, 1-11.

Aguirre, C.A. 1995. Distribution and abundance of birds at Potter Peninsula, King George (25 de Mayo) Island, South Shetland Islands, Antarctica. Marine Ornithology 23: 23-31.

Ainley, D.G., Ballard,G., Blight, L.K., Ackley, S., Emslie, S.D., Lescroël, A., Olmastroni, S., Townsend, S.E., Tynan, C.T., Wilson, P., Woehler, E. 2010. Impacts of cetaceans on the structure of southern ocean food webs. *Mar. Mam. Sci.* 26: 482-489.

Ainley, D.G., Blight, L.K. 2009. Ecological repercussions of historical fish extraction from the Southern Ocean. *Fish Fisheries* 10: 13-38.

Atkinson, A., Siegel, V., Pakhomov, E., Rothery, P. 2004. Long-term decline in krill stock and increase in salps within the Southern Ocean. *Nature* 432:100–103.

Bers, V., Momo, F., Schloss, I.R., Abele, D. (2013) Analysis of trends and sudden changes in environmental long-term data from King George Island (Antarctica): Relationships between global climatic oscillations and local system response. Climatic Change, online first August 11th 2012. doi:10.1007/s10584-012-0523-4.

Bubach D, Perez Catán S, Di Fonzo C, Dopchiz L, Arribere M & Ansaldo M., 2016. Elemental composition of *Usnea sp* lichen from Potter Peninsula, King George (25 de Mayo) Island, Antarctica. Environmental Pollution 210: 238-245. ISSN: 0269-7491

Carlini A.R., Coria N.R., Santos M.M., Negrete J., Juares M.A., Daneri G.A. 2009. Responses of *Pygoscelis adeliae* and *P. papua* populations to environmental changes at Isla 25 de Mayo (King George Island). *Polar Biology* 32:1427–1433.

Carlini A.R., Daneri G.A., Márquez M.E.I., Negrete J., Mennucci J., Juares M. 2010. Food consumption estimates of southern elephant seal females at King George (25 de Mayo) Island, Antarctica. XXXI Scientific Committee on Antarctic Research and Open Science Conference. Buenos Aires, Argentina.

Carlini A.R., Poljak S., Daneri G.A., Márquez M.E.I., Negrete J. (2006). The dynamics of male harem dominance in southern elephant seals (*Mirounga leonina*) at the South Shetland Islands. Polar Biology Vol. 29 (10) 796-805.

Casaux, R.J., Barrera-Oro, E.R. 2006. Shags in Antarctica: their feeding behaviour and ecological role in the marine food web. *Antarctic Science* 18: 3-14.

Curtosi, A., Pelletier, E., Vodopivez, C., St Louis, R., Mac Cormack, W. Presence and Distribution of Persistent Toxic Substances in Sediments and Marine Organisms of Potter Cove, Antarctica. *Arch Environ Contam Toxicol* (2010) 59:582–592. DOI 10.1007/s00244-010-9509-2

Daneri G.A., Carlini A.R. 1999. Spring and summer predation on fish by Antarctic fur seal, *Arctocephalus gazella*, at King George Island, South Shetland Islands. *Canadian J. of Zoology* 77: 1165-1170.

Di Fonzo C, Bubach D, Dopchiz L, Arribere M, Ansaldo M, Perez Catan S., 2017b. Plumas de pingüino como bioindicadores de riesgo a elementos tóxicos en ambientes marinos costeros de la isla 25 de Mayo, Antártida. [Penguin feathers as bioindicators of risk to toxic elements in coastal marine environments of 25 de Mayo/King George Island, Antarctica] Abstract Book of 12th Meeting of the Society for Environmental Toxicology and Chemistry (SETAC- Latin America), page 71.

Di Fonzo C, Zappala C, Cebuhar J and Ansaldo M., 2014. Stress levels in *Pygoscelis papua*: a comparison between nesting and molting stages. III APECS-Brazil, September 22 – 26. Book of Abstracts of the III APECS Brazil. Pages 56-58. Link: http://www.apecsbrasil.com/news/livro-de-resumos-do-iii-simposio-da-apecsbrasil-integrando-a-comunidade-cientifica-de-polo-a-polo/

Di Fonzo, C.I., Dopchiz, L.P. and M. Ansaldo, 2017a. Bioquímica sanguínea de tres poblaciones antárticas de *Pygoselis papua*. [Blood biochemistry of three Antarctic populations of *Pygoselis papua*]. Guaiquil, I., Leppe, M., Rojas, P., and R. Canales, Eds. Visions of Antarctic Science, Book of Abstracts, 9th Latin American Congress of Antarctic Sciences, Punta Arenas-Chile. Publication of the Instituto Antártico Chileno. Pages 282-285.

Dopchiz LP, Di Fonzo CI, Ansaldo M., 2017b. Mitotic activity biomarkers in *Deschampsia antarctica* from different polluted and unpolluted sites. Abstract Book of 12th Meeting of the Society for Environmental Toxicology and Chemistry (SETAC- Latin America), page 28.

Dopchiz, L.P., Di Fonzo C.I. and M. Ansaldo, 2017a. Density and index of stomata in *Deschampsia antarctica* exposed to anthropic impact. Guaiquil, I., Leppe, M., Rojas, P., and R. Canales, Eds. Visions of Antarctic Science, Book of Abstracts, 9th Latin American Congress of Antarctic Sciences, Punta Arenas-Chile. Publication of the Instituto Antártico Chileno. Pages 294-296.

Ducklow, H.W., Baker, K., Martinson, D.G., Quetin, L.B., Ross, R.M., Smith, R.C., Stammerjohn, S.E., Vernet, M., Fraser. W. 2007. Marine pelagic ecosystems: the west Antarctic Peninsula. Phil. *Trans. Roy. Soc. London. Ser. B.* 362: 67–94

During Martín R., Rossi J.A, Ciai D.N., Daneri G., Pfoh M.1, and Javier Negrete. Abundancia de lobo fino antártico (Arctocephalus gazella) durante la época post reproductiva en la isla 25 de Mayo, Islas Shetland del Sur, Antártida. [Antarctic fur seal (Arctocephalus gazella) abundance during the post-breeding season on 25 de Mayo/King George Island, South Shetland Islands, Antarctica] 7th Conference of Young Researchers and Extension Agents, 30 August and 1 September 2017, La Plata, Argentina.

Fuentes, V., Alurralde, G., Meyer, B. Aguirre, G., Canepa, A., Wölfl, A.C., Hass, H.C., Williams, G.N. and Schloss, I.R. (2016) Glacial melting: an overlooked threat to Antarctic krill. Scientific Reports 6, 27234; doi: 10.1038/srep27234 (2016).

Garcia, M.D., Hoffmeyer, M.S., López Abbate, M.C., Barría de Cao, M.S., Pettigrosso, R.E., Almandoz, G.O., Hernando, M.P., Schloss, I.R. (2015) Micro- and mesozooplankton responses during two contrasting summers in coastal Antarctic environment. Polar Biology. DOI 10.1007/s00300-015-1678-z

González, O., Moreau, S., Bers, V., Demers, S. (2012) Response of Potter Cove phytoplankton dynamics to long term climate trends. Journal of Marine Systems, 92: 53-66.

Guidelines for the Operation of Aircrafts. Resolution 2. 2004 – ATCM XXVII-CEP VII, Cape

Hahn, S., Peter, H.-U., Quillfeldt, P. & Reinhardt, K. 1998. The birds of the Potter Peninsula, King George Island, South Shetland Islands, Antarctica, 1965-1998. Marine Ornithology 26: 1-6.

Harris, C.M., Lorenz, K., Fishpool, L.D.C., Lascelles, B., Cooper, J., Coria, N.R., Croxall, J.P., Emmerson, L.M., Fijn, R.C., Fraser, W.L., Jouventin, P., LaRue, M.A., Le Maho, Y., Lynch, H.J., Naveen, R., Patterson-Fraser, D.L., Peter, H.-U., Poncet, S., Phillips, R.A., Southwell, C.J., van Franeker, J.A., Weimerskirch, H., Wienecke, B., & Woehler, E.J. 2015. Important Bird Areas in Antarctica 2015. BirdLife International and Environmental Research & Assessment Ltd., Cambridge.

Hernando, M.P., Schloss, I.R., Malanga, G.F., Almandoz, G.O., Ferreyra, G.A., Aguiar, M.B., Puntarulo, S. (2015) Effects of salinity changes on coastal Antarctic phytoplankton physiology and assemblage composition. Journal of Experimental Marine Biology and Ecology, 466: 110-119.

Juáres, M.A., Casaux, R., Negrete, J., Rios, A., Castillo, M., Coria, N.R., & Santos, M.M. (2020). Update of the population size and breeding performance of gentoo penguins (*Pygoscelis papua*) at Stranger Point/Cabo Funes, South Shetland Islands. Polar Biology, 43, 123-129.

Marschoff, E.R., Barrera-Oro, E.R., Alescio, N.S., Ainley, D.G. 2012. Slow recovery of previously depleted demersal fish at the South Shetland Islands, 1983-2010. *Fisheries Research.*, 125–126, dp: 206–213.

Mennucci JA, Negrete J, Juáres MA, Santos MM, Coria NR, Márquez ME (2012) Seasonal variation in the number of breeding females of Southern Elephant Seal, at 25 de Mayo/King George Island. Poster presented at XXXII SCAR and Open Science Conference. July 16–19, Portland, USA.

Montes-Hugo, M., Doney, S.C., Ducklow, H.W., Fraser, W., Martinson, D., Stammerjohn, S.E., Schofield, O. 2009. Recent changes in phytoplankton communities associated with rapid regional climate change along the western Antarctic Peninsula. *Science* 323: 1470–1473.

Morgan, F., Barker, G., Briggs, C., Price, R. and Keys H. 2007. Environmental Domains of Antarctica version 2.0 Final Report, Manaaki Whenua Landcare Research New Zealand Ltd, pp. 89.

Negrete Javier (2011) Estructura, dinámica, mediaciones y consecuencias de las interacciones agonísticas entre machos de elefante marino del sur (*Mirounga leonina*) en la isla 25 de Mayo, Antártida [Negrete Javier (2011) Structure, dynamics, mediations and consequences of agonistic interactions between southern elephant seals (*mirounga leonina*) on 25 de Mayo Island, Antarctica.] 201pp. PhD Thesis. PREBI-SEDICI http://hdl.handle.net/10915/5319

Negrete, J., Juáres, M., Mennucci, J.A., & Daneri, G. (2022). Population status of southern elephant seals (*Mirounga leonina*) at Peninsula Potter breeding colony, Antarctica. Polar Biology, 45(6), 987-997.

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)

Ritz, M.S., Hahn, S., Janicke, T. & Peter, H.-U. 2006. Hybridisation between South polar skua (*Catharacta maccormicki)* and Brown skua (*C. antarctica lonnbergi*) in the Antarctic Peninsula region. Polar Biology 29: 153-59. doi:10.1007/s00300-005-0034-0

Rivera M.S., Perez Catán S., Di Fonzo C., Dopchiz L., Arribere M.A., Ansaldo M., Messuti M.I. and Bubach D.F. 2018. Lichenized fungi as biomonitor of atmospheric elemental composition from Potter Peninsula, King George (25 de Mayo) Island, Antarctica. Atmospheric Pollution Research. Accepted, reviewed and in the correction stage.

Rombolá, E.F., Marschoff, E., Coria, N. 2010. Inter-annual variability in Chinstrap penguin diet at South Shetland and South Orkneys Islands. *Polar biology*. 33 (6), 799-806

Russell, J.L., Dixon, K.W., Gnanadesikan, A., Stouffer, R.J., Toggweiler, D.J.R., 2006. The Southern Hemisphere westerlies in a warming world: propping open the door to the deep ocean. *J.Clim*. 19: 6382–6390. Stammerjohn, S.E., Martinson, D.G., Smith, R.C., Yuan, X., Rind, D., 2008. Trends in Antarctic annual sea ice retreat and advance and their relation to El Niño–Southern Oscillation and Southern Annular Mode variability. *J. Geophys. Res.*, 113:C03S90.

Sahade, R., Lagger, C., Torre, L., Momo, F., Monien, P., Schloss, I., Barnes, DKA, Servetto, N., Tarantelli, S., Tatián, M., Zamboni, N., Abele, D. (2015) Climate change and glacier retreat drive shifts in an Antarctic benthic ecosystem. Science Advances 2015;1:e1500050

Saravia, M. Rzepecki, P. Monien, D. Monien, E.E. Kopczyńska, V. Bers, G.A. Ferreyra (2014). On the phytoplankton bloom in coastal waters of southern King George Island (Antarctica) in January 2010: An exceptional feature? Limnology & Oceanography 59 (1): 195-210.

Schloss, I.R., A. Wasilowska, D. Dumont, G.O. Almandoz, M.P. Hernando, C.-A. Michaud-Tremblay, L.

Schloss, I.R., Abele, D., Ferreyra, G.A.

Speinger, Berlin Vergani DF, Lewis MN, Stanganelli ZB (1987) Observation on haulout patterns and trends of the breeding populations of southern elephant seal at Peninsula Valdés (Patagonia) and Cabo Funes/Stranger Point (25 Mayo-King George Island). VI Meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources. Document number SC-CAMLR-VI/BG/36. 26 October/3 November, Hobart, Australia

Strelin, J., Heredia, P., Martini, M.A., Kaplan, M.M., & Kuhn, G. (2014). The age of the first Holocene marine transgression in Potter Cove, Isla 25 de Mayo (King George Island), South Shetland Islands.

Terauds, A., Chown, S., Morgan, F., Peat, H., Watts, D., Keys, H., Convey, P. and Bergstrom, D. 2012. Conservation biogeography of the Antarctic. *Diversity and Distributions*, 22 20 May12, DOI:

Thompson, D.W.J., Solomon, S., 2008. Interpretation of recent Southern Hemisphere climate change. *Science* 296: 895-899.

Torre, L., Servetto, N., Eöry, L.M., Momo, F., Abele, D., Sahade, R. 2012. Respiratory responses of three Antarctic ascidians and a sea pen to increased sediment concentrations. *Polar biology* 35(11): 1743-1748.

Town (available at http://www.ats.aq/documents/recatt/Att224_e.pdf)

Trivelpiece, W.Z., Hinke, J.T. Miller, A.K. Reiss, C.S. Trivelpiece, S.G., Watters, G.M., 2010. Variability in krill biomass links harvesting and climate warming to penguin population changes in Antarctica. *Proc. Natl. Acad. Sci*., doi/10.1073/pnas.1016560108.

Turner, J., Bindschadler, R.A., Convey, P., Di Prisco, G., Fahrbach, E., Gutt, J., Hodgson, D.A., Mayewski, P.A. & Summerhayes, C.P. (2009). Antarctic climate change and the environment. Cambridge, Scientific Committee on Antarctic Research (SCAR). 526 pp. ISBN978 0 948277 22 1.

Vergani DF (1985) Estudio comparativo de las poblaciones de Antártida y Patagonia del elefante marino del sur Mirounga leonina (Linné, 1758) y su metodología. (Comparative study of Antarctica and Patagonia populations of southern elephant seal Mirounga leonina (Linnaeus, 1758) and its methodology] PhD Thesis, National University of La Plata

Vergani DF, Labraga JC, Stanganelli ZB, Dunn M (2008) The effects of El Niño–La Niña on reproductive parameters of elephant seals feeding in the Bellingshausen Sea. J Biogeorg 35:248–256

Vergani DF, Stanganelli ZB (1990) Fluctuations in breeding populations of Elephant seals *mirounga leonina* at Cabo Funes/ Stranger Point, King George Island 1980–1988. In: Kerry KR, Hempel G (eds) Antarctic Ecosystem. Ecological Change and Conservation, pp 241–245.

Vergani DF, Stanganelli ZB, Bilenca D (2001) Weaning mass variation of southern elephant seals at King George Island and its possible relationship with “El Niño” and “La Niña” events. Antarct Sci 13:37–40

Vodopivez, C., Curtosi, A., Villaamil, E., Smichowski, P., Pelletier, E., Mac Cormack, W. Heavy metals in sediments and soft tissues of the Antarctic clam *Laternula elliptica*: More evidence as a possible biomonitor of coastal marine pollution at high latitudes? *Science of the Total Environment* 502 (2015) 375– 384. http://dx.doi.org/10.1016/j.scitotenv.2014.09.031

Wiencke, C., Ferreyra, C., Arntz, W. and Rinaldi, C. 1998. The Potter Cove coastal ecosystem, Antarctica. Synopsis of research performed within the frame of the Argentinean - German Cooperation at the Dallmann Laboratory and Jubany Station (King George Island, Antarctica, 1991-1997). *Ber. Polarforsch,* 299, pp: 342.

Map 1: Antarctic Specially Protected Area No. 132, Potter Peninsula.