Management Plan

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

Introduction

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

In 1997, the management plan was adapted to the requirements of Annex V of the Protocol on Environmental Protection to the Antarctic Treaty and approved by Measure 3 (1997) This is the revised version of the Management Plan approved in conformity with Measure 2 (2005) and is the second revision since Annex V became effective.

The original objectives for the designation of this area remain valid. The Potter Peninsula is designated as an Antarctic Specially Protected Area to protect its outstanding environmental value and to facilitate on-going and future research. Anthropogenic disturbances may pose a risk to long term studies being conducted in the area, especially during breeding season, or alter baseline levels in biotic and/or abiotic matrices of critical chemical pollutants (for example, trace elements and persistent organic compounds)

The main reason for the designation of the Potter Peninsula as an ASPA is that it is a representative sample of sets of species in the Antarctic ecosystem. The coastal areas are host to important bird colonies, sea mammal breeding areas and diverse plant species. These coasts are currently among the most susceptible to climate change and its indirect effects, such as glacial thawing (Hernando et al. 2015), which has been proven to affect biodiversity (Sahade et al. 2015). It is thus of great scientific value, as many studies can be carried out in the area on the impact of climate change on biotic and abiotic factors, as well as its consequences in the food chain (i.e. 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 vital to maintain these scientific activities, such as the monitoring program that has been carried out since 1982, including the CCAMLR Ecosystem Monitoring Program (CEMP), which began in 1995, since it produces invaluable scientific data for this purpose. In addition, knowledge on the dynamics of plankton (Bers et al., Schloss et al. 2014) and krill (Di Fonzo et al. 2014, 2017a, 2017b, Fuentes et al. 2016), which are the food base for the larger organisms in the food web, are highly important.

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

According to recent studies, the environmental situation in the South Shetland Islands shows that the Bransfield Strait, of the South Atlantic Ocean near the Potter Peninsula has been seriously altered, first due to the almost complete extraction of the abundant fur seal colonies (*Arctocephalus* spp.) that feed on fish and krill, followed by the Baleen whale. More recently, the fur seals have begun to recover to a significant extent and the whales are also starting to do so (Ainley *et al.* 2010), but climate change is progressively altering the ecological processes through physical changes in temperature, water circulation and sea ice extension, among others. As a result of the reduction of prey, not only due to climate change and the recovery of competing species, but also due to other currently unknown factors, the penguin populations are decreasing (Ducklow *et al.* 2007, Ainley and Blight 2009, Ainley *et al.* 2010, Trivelpiece *et al.* 2011, Juáres *et al.* 2015). In this aspect, ASPA No. 132 has currently acquired special relevance, as the study on pygoscelis penguins in the area offers answers regarding the environmental changes observed in the Antarctic Peninsula, in particular, especially the lower frequency of cold years associated with the reduction of sea ice extensions and its effects on the abundance of krill. (Garcia et al. 2015). It also contributes to detecting and recording significant changes in the marine ecosystem and aims to differentiate between the changes caused by the commercial collection of species and those caused by environmental variables, both physical and biological.

The Potter Peninsula provides exceptional opportunities for other scientific studies of land and marine biological communities.

The research and monitoring programs currently being carried out in ASPA No. 132 including the following:

- Coastal biomonitoring: effect of global climate change and xenobiotics on the key species of the Antarctic food web.
- The persistent organic pollutants and traces of elements in the biotic and abiotic matrices of the Antarctic environment.
- Energy Acquisition, type of prey and possible reaction of Pinnipeds to climate anomalies and to the extension of sea ice in the Antarctic Peninsula and in the Scotia Arc.
- Reaction of the Antarctic bird population to the interannual variability of prey in areas with clear global warming effects.
- Phylogeography of the *Deschampsia Antarctica,* based on molecular, morphological and karyological studies
- Distribution and nutritional status of the Brown skua and the South polar skua.
- CCAMLR Ecosystem Monitoring Programme - CEMP site since 1995.

1. Description of the values to be protected

The coastal areas are host to important bird colonies, sea mammal breeding colonies and abundant vegetation (great extensions of moss and lichen, patches of Antarctic grass and tillandsia (*Deschampsia antarctica* and *Colobanthus quitensis*) in the coastal areas). Scientific research programmes on the reproductive ecology of birds' species and sea mammals have been conducted since 1982, such as on elephant seals (*Mirounga leonina*), the Adélie penguin (*Pygoscelis adeliae)* and the Gentoo penguin *(Pygoscelis papua*), including the CCAMLR Ecosystem Monitoring Programme, among others. The breeding colonies are located in a specific coastal location. The area is composed mainly of high beaches, covered mostly by medium sized rocks, basaltic structures and lateral and terminal moraines. The coast is highly irregular and has a series of small bays formed between the rocky promontories, where several species of Antarctic pinnipeds are usually found. They usually arrive to this area to breed or moult their fur. Due to the above-mentioned reasons, the area is of exceptional scientific and aesthetic value.

Although it is true that Antarctica is considered one of the few unpolluted areas on our planet, as it is relatively isolated from large industrial and urban centres, there are studies that show the existence of pollution halos near the scientific stations. This has also been reported for the nearby Carlini station (Curtosi et al. 2010, Vodopivez et al. 2015). This makes it necessary to increase precautions in ASPA 132.

According to Morgan *et al.* (2007) ASPA 132 represents the Environmental Domain of the "Islands near the coast of the Antarctic Peninsula". Furthermore, according to Terauds *et al.* (2012) the area represents the "Northeast of the Antarctic Peninsula" of the "Antarctic Conservation Biogeographic Regions" According to the "Important Bird Areas in Antarctica 2015" (Harris et al., 2015), Potter Peninsula is area 047.

For more detailed characteristics, please refer to section 6.

2. Aims and Objectives

- preserve the natural ecosystem and avoid unnecessary human disturbances;
- allow the conduct of any scientific research, provided that it does not pose a risk to the area's values.
- avoid significant changes in the structure and composition of the flora and fauna communities;
- preserve the area's flora as reference organisms, free from anthropogenic impact.
- prevent or minimise the introduction to the Area of non-native plants, animals and microbes;
- reduce to a minimum the possibility of the introduction of pathogens that may cause diseases in fauna populations within the area;
- avoid the introduction, production or dissemination of chemical pollutants that may affect the area.

3. Management activities

- The staff assigned to the Carlini Base (previously Jubany Base, the Argentinian base together with the ASPA), and in particular the personnel authorized to enter the ASPA, will be specifically trained in the terms of the Management Plan;
- Copies of this Management Plan must be available at the Carlini Base.
- Maximum distances from the fauna must be respected, except when otherwise required by scientific projects and provided that the relevant permits have been issued.
- Sample collection will be kept to the minimum required for the implementation of the approved research plans.
- All markers and structures established within the ASPA for scientific or management purposes must be well attached and kept in good conditions.
- In accordance with the requirements of Annex III of the Protocol on Environmental Protection to the Antarctic Treaty, abandoned equipment or materials will be removed to the greatest extent possible, provided that doing so does not adversely impact the environment and the values of the area.
- The Management Plan will be reviewed at least every five years and updated when required.
- All pilots operating within the region will be informed of the location, boundaries and restrictions that apply to entry and overflight in the area.

4. Period of designation

Designated for an indefinite period.

5. Maps and photographs

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 Island.

6. Description of the Area

6 (i) Geographic coordinates, boundaries and natural characteristics. Geographic coordinates and boundaries

This area is located on the coast of Maxwell Bay, southeast of King George Island, between the southernmost part of Mirounga Point (northeast of the Potter Peninsula) and the outcrop known as "Peñón 7" (Rock 7) on the northeast border with Stranger Point. The area extends along the coastal strip towards the low sea water levels and up to the edge of a cliff that reaches heights from 15 to 50 meters. The front part of the edge of the cliff is included within the ASPA. This coastal strip has variable width, extending to up to 500 metres from the coast at low tide water levels. The area is composed mainly of high beaches, covered mostly by medium sized pebbles, basaltic structure and lateral and terminal moraines. The coast is very irregular and has a series of small bays that have formed between the rocky capes.

This topography is a natural border for the settling of breeding colonies of sea mammals and penguins, which justify the extension of the ASPA.

6 (ii) Natural characteristics

The area contains significant 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 leopard seals *(Hydrurga leptonyx).* During breeding season, about 400 female southern elephant seals arrive to this area with their respective offspring and approximately 60 adult males of this species (Carlini et al. 2006, Negrete 2011), while during moulting season, 200 to 800 specimens of southern elephant seals arrive to the ASPA 132 coast. The non-breeding groups of Antarctic fur seals usually include about 300 specimens, although this number may change drastically from one year to the next and sometimes exceeds 1000 (Durante et al 2007)

There are also important colonies of Gentoo penguins (*P. Papua)* and Adélie penguins (*P. Adeliae)*, of which there are about 3800 and 3000 pairs respectively. The petrel population (mostly *Oceanites oceanicus* and to a much lesser extent, *Fregetta tropica*) is approximately 200 pairs. The area is also a reproduction site for kelp gulls (*Larus dominicanus*), greater sheathbills (*Chionis alba*), Antarctic terns *(Sterna vittata),* Southern giant petrels *(Macronectes giganteus)* and skuas *(Catharacta sp.).* As the location of some of the nesting sites around the Potter Peninsula change with time, the population data are considered estimates.

Gentoo and Adélie penguins are distributed around Stranger Point, between the Elefante shelter and Rock 7. Mammal concentrations are distributed along the coastal strip, between Rock 1 and Rock 7, and giant petrel nests are usually distributed around the Three Brothers Hill (outside of the ASPA) and between Rock 7 and Rock 4 (see map 1). There is an abundant development of plant communities in the Area, mostly composed of lichens and moss, on the rocky hillsides and on the flat surfaces of fossil beaches, respectively.

Natural flora characteristics

The spatial pattern of vegetation is the combination of related variables: the type of substrate, exposure, slope stability and drainage (water availability). The Potter Peninsula is composed of various square kilometres, free of snow and fast ice cover. A relatively stable substrate is found around Three Brothers Hill. The moraines near the glacier have a sparse plant cover, while the plant cover and the richness of species increase with distance from the moraines. A plateau located southwest of the Three Brothers Hill is covered with rich and exceptional vegetation. It consists of two layers of plants that provide up to 100% cover. Several moss and lichen species that are found in the Potter Peninsula are exclusively located in this area. The two species of native vascular Antarctic plants *Colobanthus quitensis* and *Deschampsia antarctica* are found in this area (Dopchiz et al. 2017A, 2017b) near the coast or in places with high nutrient supply.

Pleurocarpous mosses, such as the *Sanionia uncinata* and the *Calliergon sarmentosum*, are predominant, while the rocks are commonly covered with *Lecidea sciatrapha* encrusting lichens. Higher up the mountainside, where the soil has greater drainage and the snow cover time is shorter, mosses that form cushions, such as *Andreaea regularis* and *Andreaea gainii* are predominant and often found with *Himantormia lugubris.* Associations of bryophile lichens, such as the *Psoroma hypnorum*, and some acrocarpous mosses area also frequently found. When the snow cover is thicker than 10 cm, which rarely occurs, even in winter, a two-layer foliage of lichen and moss is formed.

The top layer is uneven and is made up of fruticose lichen, such as the *Usnea aurantiaco-atra*, *U. antarctica* and *Pseudephebe pubescens*. The bottom layer is composed of a set of several moss and epilithic species. Tapestries of *U. aurantiaco-atra* and *Himantormia lugubris* are often intertwined. (Bubach et al., 2016, Rivera et al. 2018). In the openings, there are dicranum mosses such as *Chorisodontium aciphyllum* and fruticose lichen that form mattresses, such as *Sphaerophorus globosus*. The most abundant bryophile lichen is the *Ochrolechia frigida*. (Wiencke *et al.* 1998)

6 (iii) Access to the Area

Except in the event of authorized exceptions, access to the area will be on foot, from the northern point, near the heliport of the Carlini base (62° 14' 17" S; 58° 40' 42" W), or from behind the northern side of Three Brothers Hill (see map 1). Access to the area by sea to the beaches must be avoided when there is fauna present, especially between October and December, since this is the period of greatest activity in relation to bird egg-laying and elephant seal lactation.

Additional information is found in section 7 (ii).

6(iii) Location of structures within and adjacent to the Area

Structures within the Area

Shelters: The Argentinian Elefante Shelter is located about 150 metres from the coast, 1,000 meters northwest of Stranger Point. From March to October it is used by research teams that conduct activities within the ASPA. The shelter has a capacity for a maximum of 6 people (refer to section 7 (ix) on Waste Disposal).

Signage: the warning signs for entrance to the protected area are located at: Mirounga Point (near the landing strip), at the north base of Three Brothers Hill and on the beach area near Rock 1. The signs contain information on the existence of the ASPA and the mandatory Access Permit.

Structures adjacent to the area

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

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

Other nearby stations are Korea's King Sejong (62° 13′ 394″ S / 58° 47′ 190″ W) and Poland's Arctowski, (62° 9′ 586″ S / 58° 28′ 399″ W)

6 (iv) Location of other protected Areas in the vicinity

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

6 (v) Special Zones within the Area

There are no special zones within the Area.

7. Permit Conditions

7(i) General permit conditions

Access to the Area is prohibited except in conformity with a Permit issued by the national competent authority.

Conditions for issuing a permit to enter the Area:

- The activity serves a scientific purpose, an ASPA management plan purpose or a dissemination purpose in accordance with Management Plan objectives, which cannot be fulfilled in any other place and all the management activities (inspection, maintenance or revision) are in accordance with the Management Plan. The permit is carried by personnel authorized to access the area.
- Once the activity has been completed, a report is submitted to the national competent authorities mentioned in the Permit after the visit, under the terms established by the national authorities that issued the Permit.

Tourism is prohibited, as well as any recreational activities.

7 (ii) Access to, and movement within or over, the Area

Whenever possible, movement within the Area will be on foot, along the existing trails known to personnel that is familiar with the area, as well as regular visitors. This includes the beach and the upper limit of the Area, to the northeast of Three Brothers Hill.

Vehicles of any kind are prohibited within the area, with the exception of those that are essential for maintenance of the shelter, which will only be operated by logistics staff members and in conformity with the access Permit. In this case, access to the ASPA will be through a slight slope next to the Albatros shelter and vehicles must be driven avoiding the areas of vegetation, as well as bird and mammal groups (refer to map 1).

Aircraft operations over the Area will be carried out in compliance with the provisions of Resolution 2 (2004), "Guidelines for the Operation of Aircraft near Concentrations of Birds in Antarctica," as a minimum requirement. As a general rule, no aircraft will fly over the ASPA at an altitude lower than 610 metres (2,000 feet). A horizontal separation of 460 metres (1/4 nautical mile) from the coast must be maintained to the extent possible. Aircraft landing operations in the area are prohibited, except in cases of emergency or air safety.

The use of RPAs is not allowed within the ASPA boundaries, except if it is previously studied, on a case by case basis, during the environmental impact evaluation process. They may only be used when indicated on the entry permit and under the condition thereby established. During the analysis and authorization process, applicable Antarctic Treaty directives will be considered.

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

- Scientific research that cannot be carried out elsewhere and that does not endanger the Area's ecosystem.
- Essential management activities, including visits to evaluate the efficacy of the management plan and management activities.
- Activities for educational or dissemination purposes, which contribute to promoting scientific activities, under the National Antarctic Programmes.
- Maintenance of the Elefante shelter, except between October and December. During this period, maintenance of the shelter must be avoided, or in any case, reduced to the extent possible and tasks must always be performed in conformity with a Permit. This period is considered especially sensitive, as it is the period with the highest activity in relation to egg-laying and elephant seal lactation.

7 (iv) Installation, modification or removal of structures:

No structure will be assembled with the Area and no scientific equipment will be installed, except for essential scientific or management reasons and subject to the relevant Permit.

Any scientific equipment installed in the Area, as well as any research marker, must be approved by a Permit and clearly labelled, indicating the country, name of the principal investigator and year of installation. The nature of all of these materials must be such as to pose a minimal risk of pollution in the Area and of interference with the fauna or damage to vegetation.

Structures and facilities must be removed when they are no longer required, or on the expiration date of the permit, whichever occurs first. Research markers must be removed after the Permit has expired. If a specific project cannot be concluded within the time frame established in the Permit, such circumstance must be indicated in the report after the visit, and an extension of the effective term of the Permit will be requested for authorization of the continued presence of any material in the Area.

Tents will be allowed for the sole purpose of storing scientific equipment and instruments or for use as an observation post.

7(v) Location of field camps.

To avoid significant disturbances to the fauna, and considering that there are alternative lodging areas, camping in ASPA 132 is prohibited. Projects authorized to work in the ASPA may request accommodation at the Carlini Base, subject to availability. When required for scientific purposes, the Elefante shelter (located within the area) or the Albatros shelter (outside of the area, but very nearby) may be used. Use of the Elefante shelter for scientific purposes by personnel other than that of the Argentinian Antarctic Programme will be agreed beforehand with such Programme.

The establishment of camp sites near the ASAP is the responsibility of the relevant National Antarctic Programme, but for safety reasons, it is recommended that the head of the Carlini Base be informed.

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

- No living animal or plant material may be deliberately introduced in the ASPA. All reasonable precautions against the unintentional introduction of foreign species in the area will be taken. It should be noted that foreign species are most often and effectively introduced by human beings. Clothing (pockets, boots, Velcro strips on clothing) and personal equipment (bags, backpacks, camera bags, tripods) as well as scientific instruments and work tools may carry insect larvae, seeds, propagules, etc. For more information, please refer to the "Non-native Species Manual - CEP 2016".
- Raw poultry products may not be introduced in the Area.
- No herbicides or pesticides may be introduced in the Area. Any other chemical product introduced with the relevant permit will be removed from the Area once the activity for which the Permit was granted has been completed. The purpose and type of chemical products must be recorded in as much detail as possible, in order to obtain information from other scientists.
- No fuel, food or any other material must be stored in the Area, unless it is necessary for essential purposes related to the activity for which the Permit was issued, provided that it is stored in the Elefante shelter or near it, for its disposal once the activity has been completed. Any fuel used in the Elefante shelter will be handled according to the contingency plan established by the Argentine Antarctic Programme for the Carlini Station.

7 (vii) Taking of, or harmful interference with, native flora or fauna

The collection of or harmful interference with native flora and fauna are prohibited, except in conformity with a Permit.

Maximum distances from the fauna must be respected, except when otherwise required by scientific projects and provided that the relevant permits have been issued.

The recommended distance from penguins is 10 metres during breeding and moulting periods and 5 metres for young penguins. It is recommended that a distance of 100 metres be maintained from giant petrels' nests, while for Antarctic fur seals, Weddell seals, leopard seals and Crabeater seals, a minimum distance of 10 metres must be maintained. It is important to note that these distances are established as general guidelines and may vary and increase if the proximity of human beings is clearly stressful to the animals.

When an activity involves collection or harmful interference, it must be carried out in conformity with the SCAR Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica, as a minimum requirement, according to its last available version.

Information on collection and harmful interference will be duly exchanged through the Antarctic Treaty Information Exchange system and it will be recorded, at least, in the Antarctic Master Directory, or in Argentina at the National Antarctic Data Centre.

Scientists taking any kind of samples will indicate this in the EIES (Electronic Information Exchange System) and/or will contact the relevant National Antarctic Programmes in order to minimize the risk of possible duplication.

7 (viii) The collection or removal of materials not brought into the Area by the permit holder

Materials will only be collected or removed from the Area in accordance with a Permit. Collection of dead specimens for scientific purposes will be analysed on a case by case basis, to ensure that it does not reach 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, specialists must be consulted before the Permit is issued.

7(ix) Disposal of waste

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

Waste from research activities carried out in the Area may temporarily be stored next to the Elefante shelter until its removal, under conditions ensuring that it is not spread and cannot be accessed by fauna. This waste will be transferred as often as possible to the Carlini Base or removed by the Antarctic Programme by which it is generated, to be disposed of in conformity with Annex III of the Madrid Protocol.

7(x) Measures that may be necessary to continue meeting the aims of the Management Plan

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

7(xi) Requirements for reports

The main permit holder of each issued permit will submit a report on the activities conducted in the Area, once the activity has been completed. This report must comply with the previously established form and must be submitted, along with the Permit, to the authority that issued the Permit.

The information provided in the reports will be used for Management Plan revisions and organization of the scientific use of the Area.

ASPA permit records and the reports issued after visits will be exchanged with other Consultative Parties, within the Information Exchange System, as established in article 10.1 of Annex V.

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

8. Supporting documentation

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