Management Plan

for Antarctic Specially Protected Area No. 145 PORT FOSTER, DECEPTION ISLAND, SOUTH SHETLAND ISLANDS

Introduction

Following the submission of a proposal by Chile in 1987, two Port Foster sites were originally designated as SSSI No. 27 under Recommendation XIV-5. These were intended to protect the benthic values associated with two types of seabed, at depths of between 50 and 150 m (sub-site A), and between 100 and 150 m (sub-site B). The site was re-designated as ASPA No. 145 in Decision 1 (2002). Following two extensions of the original Management Plan, a revised Management Plan was adopted and the Area was incorporated into ASMA No. 4 (Deception Island) in Measure 3 (2005).

The Area was designated in order to protect the exceptional ecological interest of the area, mainly its benthic ecosystem, in order to reduce as much as possible, the risk of any accidental interference that could endanger scientific research and the species present. The designation of the Area aimed at protecting the existing marine biological values, mainly for the development of scientific activities, and preventing unnecessary human disturbance, from shipping activities or introduction of non-native species via scientific stations, tourism or scientific ships.

The Area is of exceptional ecological interest because of its actively volcanic character. However, no geothermal activity has been recorded within the Area.

Furthermore, scientific data obtained by researchers from the Spanish Antarctic Program between 2008 and 2017 indicate that the southern part of Port Foster (Fildes Point, in the Whalers Bay sector) contains the areas with the greatest number of benthic species of the island, and is considered a *biodiversity hotspot* with unique characteristics, corresponding to the new sub-site C of the Area, which considers the seabed between 0 and 50 m deep, as the only known hard substrate in Port Foster.

Scientific research programs are carried out at the three sub-sites of Port Foster, in general, but these are also areas adjacent to sites that receive visits or the influence of ships that enter or leave Deception Island. At present, no monitoring activity in the sub-sites is conducted, but regular ecological research is in place. There is the need to increase the knowledge on the recolonization by in- and epi-faunal organisms in bottoms affected by natural impacts (as volcanic activity or ice scouring), mainly in the present scenario of climate change on the Antarctic Peninsula region, but also is needed to improve the knowledge of the biodiversity inventory in the region.

Tourism is also an established activity near the area and is a potential threat to the values under protection.

Port Foster is a natural laboratory that makes it possible to compare the re-establishment of benthic communities in a deep and shallow marine environment, influenced by its unique volcanic activity in the South Shetland Islands region and in the Southern Ocean; therefore, this ASPA gives an opportunity to continue studies in a unique environment, influenced by volcanic and seismic activity and ensures that current and further research programmes will not be adversely affected by accidental human interference.

Resolution 3 (2008) recommended that the Environmental Domains Analysis for the Antarctic Continent, be used as a dynamic model for the identification of Antarctic Specially Protected Areas within the systematic environmental-geographical framework referred to in Article 3(2) of Annex V of the Protocol. Using this model, although the ASPA No.145 considers a marine area for protection, Deception Island is contained within Environment Domain G, Antarctic Peninsula offshore islands. According to Resolution 6 (2012), Antarctic Conservation Biogeographic Regions, Port Foster is also contained as part of ACBR 3, North-west Antarctic Peninsula.

1. Description of Values to be Protected

Deception Island is an active composite volcano with a basal diameter of 30 km and rising 1,400 m from the seafloor to a maximum height of 540 m above sea level, located in the south western sector of the South Shetland Islands. Its central part is occupied by a sea-flooded volcanic collapse caldera, called Port Foster, which have dimensions of about 6×10km, and a maximum water depth of 190 m and is connected to Bransfield Strait by a collapsed wall in the southeast sector of the volcanic cone. In several localities, this flooded caldera has geothermal activity, but not in the protected Area.

The 1967 volcanic eruption affected the benthic fauna due to the volcanic ash it produced and the high concentration of toxic compounds that were dissolved in the marine environment. The re-colonization of the oceanic bottom in Port Foster was also affected by new eruptions. After them, Echinodermata, Polychaeta, Crustacea, and Mollusca are the more representative groups in the benthic communities of the bay.

The protected values, within the framework of the original designation, correspond to the diversity of benthic fauna in the soft seabed substrates, located at depths of around 50 up to 150 m, in the caldera zone, and the benthic fauna located in hard bottoms from 0 to 50 m depth at the entrance of the bay.

The A and B sub-sites where proposed as representative zones in the caldera area to study the mechanism and lines of re-colonization of the benthic communities more affected by the volcanic eruption, after community studies where carried out to observe changes in the biota for a period of ten years in a Chilean biological monitoring program, assessing the recovery of mobile infaunal and epifaunal organisms in the more naturally impacted zone, to compare its structure with those in other soft bottom sites in Port Foster, mainly those more visited as Fumarole Bay and Whalers Bay, and with other Antarctic sites also affected by natural processes causing rapid, large scale changes to the environment.

By the other hand, sub-site C is a representative zone of hard bottoms with some influence from Bransfield Strait waters. These hard-bottoms are populated by macroalgae and sessile Suspension Feeder Communities (SFC), forming an extremely rich benthic community. These communities are composed by large sponges, ascidians, bryozoans, and macroalgae, which provide three-dimensionality to the ecosystem, and shelter to a myriad of small invertebrates such as amphipods, isopods, polychaetes, mollusks, echinoderms, etc. The species inhabiting the sub-site C are potentially vulnerable to the resuspension of sediments caused by nearby vessel operation.

Scientific studies have been carried out in the area in order to determine the composition of the benthic communities of the place. After the eruptions that occurred in 1967, 1969 and 1970 this included *in situ* monitoring of the different repopulation stages of the soft sub-coastal sea beds until mid 80's. In the 90's, several scientific programmes? developed marine research in the Area, improving the knowledge of Port Foster and Deception Island about the abundance, vertical migration, biomass and structure of the macrozooplankton and the micronekton. In 2000 monitoring activities were developed by the US Antarctic Program to study the oceanographic conditions influencing the marine life in Port Foster. Today several marine biology studies are conducted, mainly related with distribution, biodiversity, ecology and evolution of the Port Foster species. According to current records, the Area does not correspond to a type locality or only known habitat of any species. However, despite Deception Island being an intensively sampled area in the Southern Ocean, new species are still being recorded, emphasizing the currently incomplete characterization of the biodiversity inventory in the island.

2. Aims and Objectives

The management of Port Foster aims to:

- Avoid degradation or substantial risk to the values of the area by preventing unnecessary human disturbances;
- allow scientific research on the marine environment while ensuring protection from over-sampling;
- prevent or minimise the introduction to the Area of non-native species, and pathogens which may affect native populations within the Area.
- and to allow visits from the National Antarctic Programs for management purposes in support of the aims of this management plan.

3. Management Activities

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

- A map showing the three sub-sites in the Area will be located in highly visible places at Decepción (Argentina) and Gabriel de Castilla (Spain) stations, and copies of this management plan will also be made available.
- Copies of this management plan will be provided by National Antarctic Programs, and in Ushuaia, Punta Arenas and Puerto Williams ports to vessels planning to visit the Area or sailing in the vicinity of it, and they must carry it on board.
- Any signs or structures that must be installed in the Area for scientific or management purposes, as floaters, lines, or buoys, must be kept in good condition, well secured and conspicuously identified.
- Any equipment and materials installed in the Area must be removed as soon as their use is no longer required.
- Visits shall be made as necessary (no less than once every five years) to assess whether the Area continues to serve the purposes for which it was designated and to ensure the management measures are adequate.

4. Period of Designation

Designation is for an indefinite period.

5. Maps and Figures

Map 1: Location of Deception Island in relation to the Antarctic Peninsula and the South Shetland Islands (Extracted from Deception Island Antarctic Specially Managed Area No. 4 Management Plan).

Map 2: Map of Deception Island showing the location of the three sub-sites of ASPA No. 145 in Port Foster (A, B and C), and ASPA No. 140 sub-sites. Cartographic base provided by Centro Geográfico del Ejército de Tierra and Instituto Hidrográfico de la Marina (Spain), with help of MAGIC-BAS (UK).

Map 3: Bathymetric map of Port Foster in Deception Island, showing the general location of the three sub-sites of ASPA No. 145 (demarked in yellow). Image provided by the Instituto Hidrográfico de la Marina, Spain. Bathymetry data compiled from hydrographic surveys carried out in the years 2012 and 2016.

Figure 1: Species richness in the shallow areas of Port Foster, by group. The NEP and WHB stations describe the species richness of sub-site C of ASPA No. 145 (Extracted from Angulo-Preckler et al., 2018).

Figure 2: Representative photography's of the communities presented in the Area. Examples of suspension feeder community: a) massive sponge *Mycale (Oxymycale) acerata* and the soft-coral *Alcyonium haddoni*, and b) the sponges *Dendrilla antarctica, Hemigellius pillosus*, and the tunicate *Cnemidocarpa verrucosa*. Examples mobile deposit feeder community; c) *Ophionotus victoriae, Sterechinus neumayeri*, and *Odontaster validus*, and d) very high densities of *Ophionotus victoriae* (Extracted from Angulo-Preckler et al., 2018).

6. Description of the Area

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

General description

Deception Island is an active volcano located in the southwestern sector of the South Shetland Islands. The island's volcanic activity is attributed to its location at the confluence of two tectonically active features: The southwestern portion of the Bransfield Basin and the extension of the southern intersection of the Hero Fracture Zone. Its caldera, located in the centre of the island, is flooded and connected with Bransfield Strait through a collapsed wall in the south-eastern sector of the volcanic cone called Neptunes Bellows. The caldera has been called Port Foster, which receives a large amount of fresh water during the thaw period (southern spring-summer). This flooded caldera presents geothermal activity in several places, with temperatures in its bottom waters close to 2–3 °C, mainly in the northern and central sectors. The seabed at Port Foster drops steeply from the coast into the caldera, and remains relatively flat at a depth of 150 m. The Neptunes Bellows are approximately 500 m wide at their narrowest point, with minimum depths of 10 m, which minimizes the number of icebergs that can enter Port Foster from the outside, limiting this disturbance factor that affects Antarctic benthic communities in other areas. This narrow exit also increases the retention time of the water in the caldera which can be as high as one year.

The Area is determined by three sub-sites, habitats A, B and C, which present different and contrasting granulometric substrates compositions. The bottom of Habitat A consists of closely spaced volcanic sediments of medium to coarse texture, including slag and lapilli; Habitat B consists of more separated volcanic ash of medium to fine texture; while Habitat C corresponds to hard, rocky substrates located in shallow waters. Soft bottom habitats (in the deepest area) have low dissolved oxygen concentrations.

Boundaries

The Area is wholly marine, compromising the benthic environment in three sub-sites. There are two deeper benthic habitat zones located at the seabed, mainly between 50 and 150 m depth (sub-sites A and B), and a third benthic coastal zone, located in waters from 0 to 50 m (sub-site C). The water column and the water surface above the sub-sites are not part of the Area.

Sub-Sites A and B

The boundaries of the sub-site A are defined in the north as the line of latitude at 62°55'40"S, and in the south at 62°56'23"S; the east boundary is defined as the line of longitude at 60°37'00"W, and in the west at 60°38'00"W.

The boundaries of sub-site B of the Area, the north boundary is defined as the line of latitude at 62°57'13"S, and in the south at 62°57'54"S; the east boundary is defined as the line of longitude at 60°36'20"W, while the west boundary is at the line 60°37'20"W.

The vertical boundary of sub-sites A and B lies at the seabed, below 50 m depth from the surface.

These sub-sites are mainly inhabited by infauna and mobile epifauna organisms, as ophiuroids, worms, crustaceans, sea stars, sea urchins and mollusks, consider a surface of approximately 2.2 km^2 of the bottom, in total, size considered enough to assess the recovery of infaunal and epifaunal organisms in this naturally impacted zone, to be compared with other sites within Port Foster and other Antarctic soft bottoms sites.

Sub-Site C

Sub-site C, corresponds to a benthic habitat located at a depth of 0 to 50 m, which west boundary is defined by the line generated by connecting the north point of coordinates latitude 62°59'22.92"S; longitude 60°33'59.0"W, and the south point in latitude 62°59'06"S; longitude 60°33'20.16"W. This line is perpendicularly connected to the east with the coastal line, at the lowest tide. The site covers the 50 m isobaths to the coast, and includes most known hard-bottoms in Port Foster. The vertical boundary of sub-site C lies at the sea bottom.

Geological and volcanic characteristics

Deception Island constitutes a back-arc stratovolcano with a basal diameter of approximately 30 km. The 15 km diameter island is horse-shoe shaped and displays a flooded caldera (Port Foster) which wall is breached by a 500 m wide passage (Neptunes Bellows). The geodynamics setting of the island is characterized by interactions among small tectonic units, the Drake microplate, the South Shetland Trench and the Bransfield Rift.

The volcanic evolution of the island is marked by a caldera collapse, which took place between 8,300 and ~3,980 years BC. The pre-caldera evolutionary stage was characterized by the formation of multiple coalesced shoaling seamounts and a subaerial volcanic shield. The post-caldera phase, which includes the recent historical eruptions (1829–1970), comprises at least 70 scattered eruptive vents inside the caldera, except one located along the structural borders of the caldera itself. Magma that erupted after the caldera collapse outlines a well-defined evolutionary trend, showing the widest compositional range on the island from basalts to rhyolites. Overall, major and trace element compositions of post-caldera magmas define a tholeiitic trend.

The caldera of Deception Island volcano has been described as a classic example of collapse caldera that formed about a ring fractures following one or more voluminous eruptions of andesitic magma. All historical eruptions have been relatively small in volume (<0.1 km^3) of material, with variable degrees of explosivity according to the water amount and its source (sea, ice melting, aquifer) interacting with the magma, and occurring at locations near the coast of Port Foster, all around the caldera. Evidences for present-day volcanic activity of the island include fumaroles and hydrothermal activity, resurgence of the floor of Port Foster, and seismicity.

Hydrography

The temperatures recorded in the substrate at Port Foster are similar to those measured in the outer area of the island, in Bransfield Strait, with values between -1.4 °C and 2.0 °C. However, these values increase in areas of the bay near fumaroles, where the temperature can rise to 7.5 °C. Therefore, the temperature of the water near benthic habitat A can fluctuate greatly, depending on circulation and the underwater hot springs located in the vicinity.

The salinity values in Port Foster are presented in the range of 33.9‰–34.2‰, although somewhat lower values are recorded in some areas associated with glacial melt.

Current studies indicate pH values recorded for Port Foster of between 7.8 and 8.1. This value is probably due to components derived from the volcanic activity of the island.

Benthic species

The composition of the benthic assemblages has varied greatly since the volcanic eruption of December 1967, when the ashes covered almost all the bay, producing a high mortality of the marine species. The eruptions also produced the alteration of the physical-chemical characteristics of the bay, modifications on the oceanic floor and the high temperature in the surrounding areas. Following eruptions in 1969, 1970 and 1976 also produced the mortality of the marine species inhabiting Port Foster. After those events, the Area was colonized mainly by Polychaeta, Crustacea, Echinodermata and Mollusca, the more representative groups in the benthic communities of the bay. The groups of benthic species are related to the type of sediment: soft beds are dominated by organisms of the infauna and mobile epifauna (sub-sites A and B), while sessile species dominate in hard sediments (sub-site C).

The predominant groups in the soft bed habitat (sub-site B) are polychaetes, bivalves, nemerteans, cumaceae and amphipods. On hard beds the predominant groups are (sub-site A) echinoderms, amphipods and tunicates, while on the hard substrates of sub-site C they are macroalgae, sponges, soft corals, tunicates, and bryozoans.

The most representative assemblages of polychaetes area are represented by *Maldane sarsi antarctica, Tharyx cincinnatus* and *Haploscoloplos kerguelensis*; crustaceans as *Eudorella gracilior, Glyptonotus antarcticus* and *Phoxocephalidae* sp.; nemerteans as *Lineus* sp. and *Paraborlasia corrugatus*; the *isopod Serolis kemp*; bivalves as *Yoldia eightsii* and *Limopsis hirtella*; the echinoderms *Abatus agassizii* and *Sterechinus neumayeri*; the asteroids *Lysasterias perrieri* and *Odontaster validus*; holothurian *Ypsilothuria* sp., and ophiuroids, as *Astrotoma agassizi, Ophionotus victoriae* and *Ophiactis asperula*, being the most abundant group in these sub-sites.

In sub-site C, which has the highest biodiversity in the area, the biocenosis is characterized by an important macroalgal community, with more than 30 species identified, and a rich community of macrofauna, with an important presence of sponges, of which more than 24 species have been identified, highlighting *Dendrilla antarctica, Mycale (Oxymycale) acerata, Sphaerotylus antarcticus* and *Isodictya kerguelenensis*. In this sub-site there are also bryozoans, such as *Beania erecta* and *Camptoplites giganteus*, and the mollusks *Laternula elliptica* and *Limatula hodgson*, the chiton *Nuttallochiton mirandus*, polychaetes and amphipods, among many other species, forming what is known as an "Antarctic Marine Animal Forest". New metabarcoding techniques studies are showing a high value of biodiversity, with more than 32 different phyla and a very high species richness.

Other animals

Seals have also been identified in the Area, especially Weddell seals, *Leptonychotes weddellii*, which frequent Port Foster for breeding, feeding and resting. Antarctic fur seals, *Arctocephalus gazella*, are regular visitors during summer, when they can be seen resting on the beaches. Some cetaceans, such as killer whales, *Orcinus orca*, and minke whales, *Balaenoptera acutorostrata*, can also be sighted in the bay. Fur seals and cetaceans also possibly feed in the Area.

6(ii) Access to the Area

Access into the Area is generally by ship or smaller boats.

Vessels may transit above the sub-sites A and B of the Area, although anchoring should be avoided, except in compelling circumstances. Only small boats can access to sub-site C.

In winter, if sea-ice is strong enough to allow the displacement on it, the sub-site C, in particular, could be accessed from land by foot.

There are no specific restrictions on routes of access to, although the transit should be kept to the minimum necessary, consistent with the objectives of any permitted activity.

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

There are no structures known to be within the Area.

The structures located in the vicinity of Port Foster correspond to Decepción (Argentina) and Gabriel de Castilla (Spain) scientific stations. In addition, the remains of Pedro Aguirre Cerda (Chile) and Base B (United Kingdom) stations, along with those of the Hektor whaling station are located in the vicinity of the Area. All these structures are described in detail in the management plan for ASMA No. 4, Deception Island.

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

The Area is located within the ASMA No. 4, Deception Island.

ASPA No. 140 is the nearest protected area, which is also located on Deception Island, compromising eleven small sub-sites. In addition, HSM No. 76 is located in the vicinity of Pendulum Cove, with the remains of the Pedro Aguirre Cerda Station. In Whalers Bay, HSM No. 71 comprises the remains of the Hektor whaling station, other artefacts that predate the whaling station, and the remains of Base B (United Kingdom). All of these areas are part of ASMA No. 4.

In the vicinity of Deception Island, there are also the following protected areas:

- ASPA No. 126, Byers Peninsula, on Livingston Island, about 40 km to the northwest.
- ASPA No. 149, Cape Shirreff and San Telmo Islets, Livingston Island, almost 30 km away to the north.
- ASPA No. 152, West of Bransfield Strait, about 70 km to the southwest.

6(v) Special Zones within the Area

There are no special zones in the Area.

7. Terms and Conditions for Entry Permits

7(i) General permit conditions

Entry to the Area is prohibited except in accordance with a permit issued by an appropriate national authority. Conditions for issuing a permit to enter the Area are the following:

- permits will be issued only for compelling scientific research in the marine environment of the Area that cannot be carried out elsewhere, or for other scientific studies that do not compromise the values for which the Area is protected, or for the development of activities for essential management purposes that are compatible with the objectives of the plan, such as inspections, maintenance or examination activities;
- the actions permitted will not jeopardise the ecological or scientific values of the Area;
- any management activities must observe the aims and objectives of this management plan;
- the permit, or a copy of it, must be carried whilst performing such activities within the Area;
- a report of the visit must be submitted to the authorities indicated in the permit and to the Chair of the Deception Island Management Group;
- permits shall be valid for a stated period; and
- the appropriate authority should be notified of any activities/measures undertaken that were not included in the authorised permit.

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

The Area can only be accessed by sea. There are no specific restrictions on routes of access to, or movement within the Area, although movements should be kept to the minimum necessary, consistent with the objectives of any permitted activity. Every reasonable effort should be made to minimize disturbance.

Ships may transit above sub-sites A and B.

In sub-site C, access should be restricted to small boats, where small boat refers to rigid boats, semi-rigid inflatable boats, rubber boats or any similar small landing craft used for shore interactions. Larger vessels navigation is forbidden.

It is not permitted to anchor in the Area, or to use any other anchoring system (anchored buoys, moorings etc.), except as specified in a permit or in case of emergency.

Visitors to Pendulum Cove and to Whalers Bay must organize their activities to comply with these restrictions.

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

- Scientific research that will not jeopardise the ecosystem of the Area.
- Essential operations of vessels that do not endanger the values of the Area, to facilitate scientific or other activities, including tourism.
- Essential management activities, including monitoring.
- Underwater activities, only for scientific purposes.
- The use of RPAs (remotely piloted aircraft, UAV or drones), to overflight the Area, or the use of submarine ROVs (remote operation vehicles) will not be allowed unless a permit issued by a Competent Authority. During the analysis and authorisation process, all Antarctic Treaty directives in force will be taken into account.

7(iv) Installation, modification or removal of structures

- No structures are to be erected within the Area, except as specified in a permit. Permanent structures or installations are prohibited.
- All structures, scientific equipment or markers installed in the Area must be authorized by permit and clearly identified by country, name of the principal investigator and year of installation. All such items should be made of materials that pose minimal risk of contamination of the Area.
- Installation (including site selection), maintenance, modification or removal of structures shall be undertaken in a manner that minimizes disturbance to marine flora and fauna.
- Mooring is not permitted within the Area, except as specified in a permit or in cases of emergency.
- All structures and installations must be removed from the Area when they are no longer required, or on the expiry of the permit, whichever is the earlier.

7(v) Location of field camps

Not applicable in most cases. In winter the sea- ice could be strong enough to allow an on-ice field camp, but this is rare. In this case the field camp should not allow the discharge of waste of any type either on the ice or into the water beneath.

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

No living animals shall be deliberately introduced into the Area, and all necessary precautions shall be taken to prevent accidental introductions.

To ensure that the wildlife and ecological values of the Area are maintained, special precautions shall be taken against accidentally introducing microorganisms or invertebrates from other Antarctic sites or from regions outside Antarctica. All sampling equipment and markers brought into the area should be cleaned or sterilized as far as possible before being used in the marine environment. Further guidance can be found in the CEP Non-Native Species Manual and COMNAP/SCAR Checklists for supply chain managers of National Antarctic Programmes for the reduction in risk of transfer of non-native species.

Any chemicals, including radio-nucleotides or stable isotopes, which may be introduced for scientific or management purposes specified in a permit, shall be managed properly while are in use to avoid any accidental released, and shall be removed from the Area at the latest upon conclusion of the activity for which the permit was granted.

All materials introduced to the Area shall remain for a stated period only, and must be removed at or before the conclusion of the stated period. These materials must be stored and handled so as to minimise the risk of their introduction into the environment.

If release occurs that is likely to compromise the values of the Area, removal is encouraged only where the impact of removal is not likely to be greater than that of leaving the material on site.

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

Taking of or harmful interference with native flora or fauna is prohibited, except by a permit issued by an appropriate national authority specifically for that objective, in accordance with Article 3 of Annex II to the Protocol on Environmental Protection to the Antarctic Treaty.

Where taking or harmful interference with animals is involved, *SCAR Code of Conduct for Use of Animals for Scientific Purposes in Antarctica* shall be used as a minimum standard.

In sub-sites A and B, dredging and grab sampling are allowed, according to the scientific studies authorized to be developed in it. Sub-site C should be studied by scuba-diving or ROVs only.

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

Material may only be collected or removed from the Area as authorized in a permit and must be limited to the minimum necessary to meet scientific or management needs. Permits shall not be granted if there is reasonable concern that the sampling proposed might take, remove or damage such quantities of sediment, flora or fauna that their distribution or abundance within the Area would be significantly affected.

Material of human origin likely to compromise the values of the Area, and which was not brought into the Area by the permit holder or otherwise authorized, may be removed unless the impact of such removal may be greater than the leaving the material on site. In such a case, the appropriate authority should be notified.

Artefacts found at the seabed within the Area and judged to be of high historic value, which cannot be kept on site, may be removed in accordance with a permit for storage in a controlled environment until such time as they can safely be returned to the Historic Site nearby the Area, unless there is a high risk that return would be likely to damage or destroy the integrity of the artefact(s). National authorities should ensure that any removal of artefacts and assessment is carried out by personnel with appropriate heritage conservation expertise.

A report describing the nature of the material found at or removed from the Area, should be submitted to the Deception Island Antarctic Specially Managed Area (ASMA) Management Group, informing the final destination of it.

7(ix) Disposal of Waste

Dumping waste of any kind into the marine environment is prohibited. All waste generated, liquid and solid, including human waste, shall be removed from the Area.

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

Permits may be granted to enter the Area to carry out biological monitoring and site inspection activities, which may involve the collection of limited samples for analysis or examination, or to take protective measures.

Where feasible, all sites where long-term monitoring activities are taking place, which are vulnerable to unintentional disturbance, should be appropriately marked on the site and on maps of the Area.

To develop the activities on the Area, ships must comply with? the Practical Guidelines for Ballast Water Exchange in the Antarctic Treaty Area.

7(xi) Reporting requirements

The principal permit holder for each visit to the Area shall submit a report to the appropriate national authority as soon as practicable, and no later than six months after the visit has been completed.

Such reports should include, as appropriate, the information identified in the visit report form contained in the Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas (Resolution 2 (2011)). If appropriate, the national authority should also forward a copy of the visit report to the Party that proposed the Management Plan, to assist in managing the Area and reviewing the Management Plan.

Wherever possible, Parties should deposit the original or copies of the original visit reports, in a publicly accessible archive to maintain a record of usage, for the purpose of any review of the Management Plan and in organising the scientific use of the Area.

The appropriate authority should be notified of any activities / measures undertaken, and / or of any materials released and not removed, that were not included in the authorised permit.

The records of permits and post-visit reports related to the Area will be exchanged with the other Consultative Parties, as part of the Information Exchange System, as established in Art. 10.1 of Annex V.

8. Supporting Scientific Documents

Angulo-Preckler, C., Tuya, F. and Avila, C. 2017. Abundance and size patterns of echinoderms in coastal soft-bottoms at Deception Island (South Shetland Islands, Antarctica). Continental Shelf Research 137: 131-141.

Angulo-Preckler, C., Leiva, C., Avila, C. and Taboada, S. 2017. Macroinvertebrate communities from the shallow soft-bottoms of Deception Island (Southern Ocean): a paradise for opportunists. Marine Environmental Research 127: 62-74.

Angulo-Preckler, C., B. Figuerola, L. Núñez-Pons, J. Moles, R. Martín-Martín, J. Rull-Lluch, A. Gómez-Garreta, C. Avila. 2018. Macrobenthic patterns at the shallow marine waters in the caldera of the active volcano of Deception Island, Antarctica. Continental Shelf Research 157: 20-31.

Angulo-Preckler, C. P. Pernet, C. García-Hernández, G. Kereszturi, A.M. Álvarez-Valero, J. Hopfenblatt, M. Gómez-Ballesteros, X.L. Otero, J. Caza, J. Ruiz-Fernández, A. Geyer, C. Avila. 2021. Volcanism and rapid sedimentation affect the benthic communities of Deception Island, Antarctica. Continental Shelf Research 220, 104404. https://doi.org/10.1016/j.csr.2021.104404.

Arcos R., D., M.A. Salamanca O. 1980. Observaciones hidrográficas en bahía Foster y bahía Chile (islas Shetland del Sur), enero 1978. Bolm. Inst. Oceanogr., S. Paulo, 29 (2): 51-55. https://doi.org/10.1590/S0373-55241980000200010.

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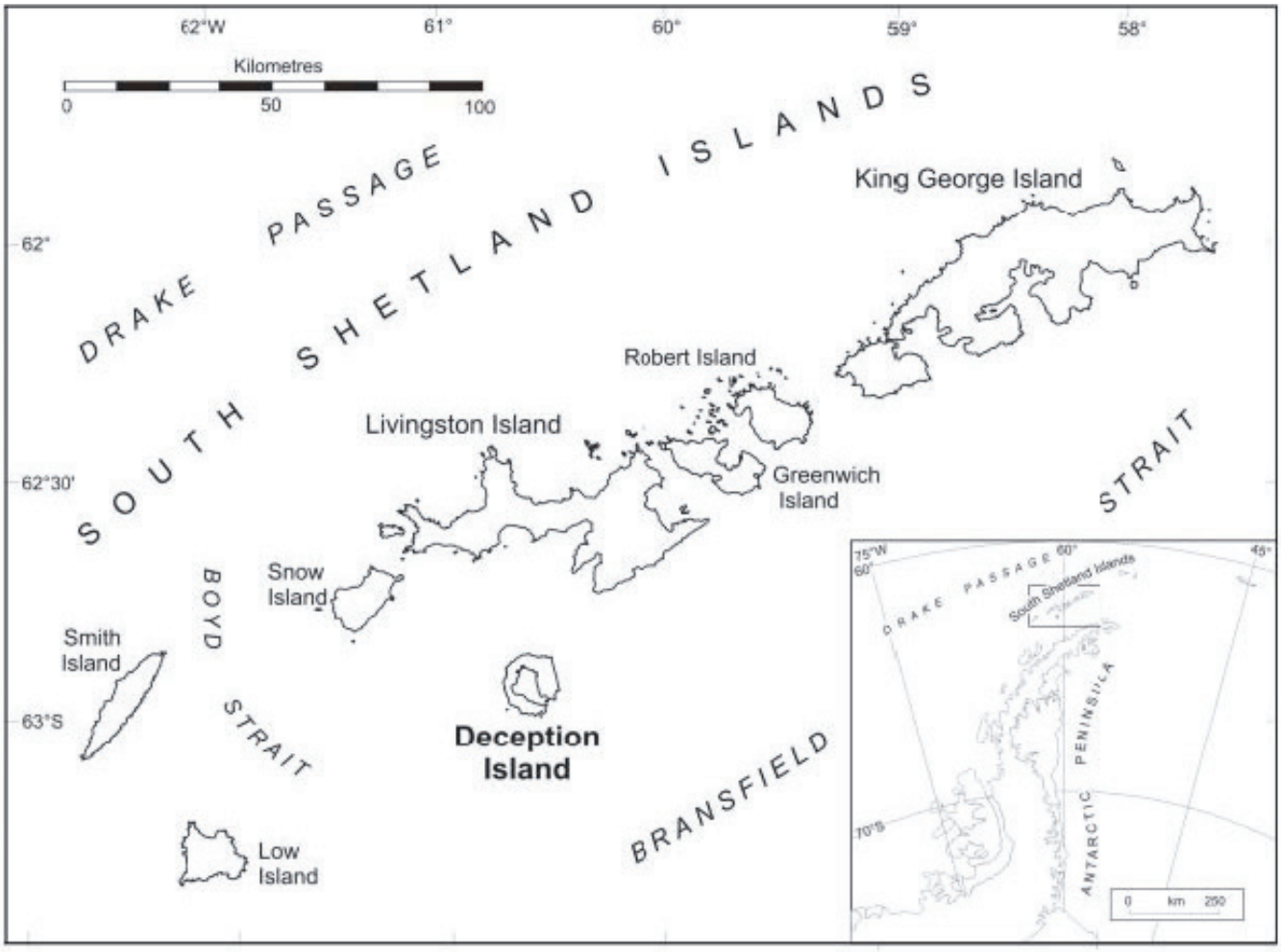
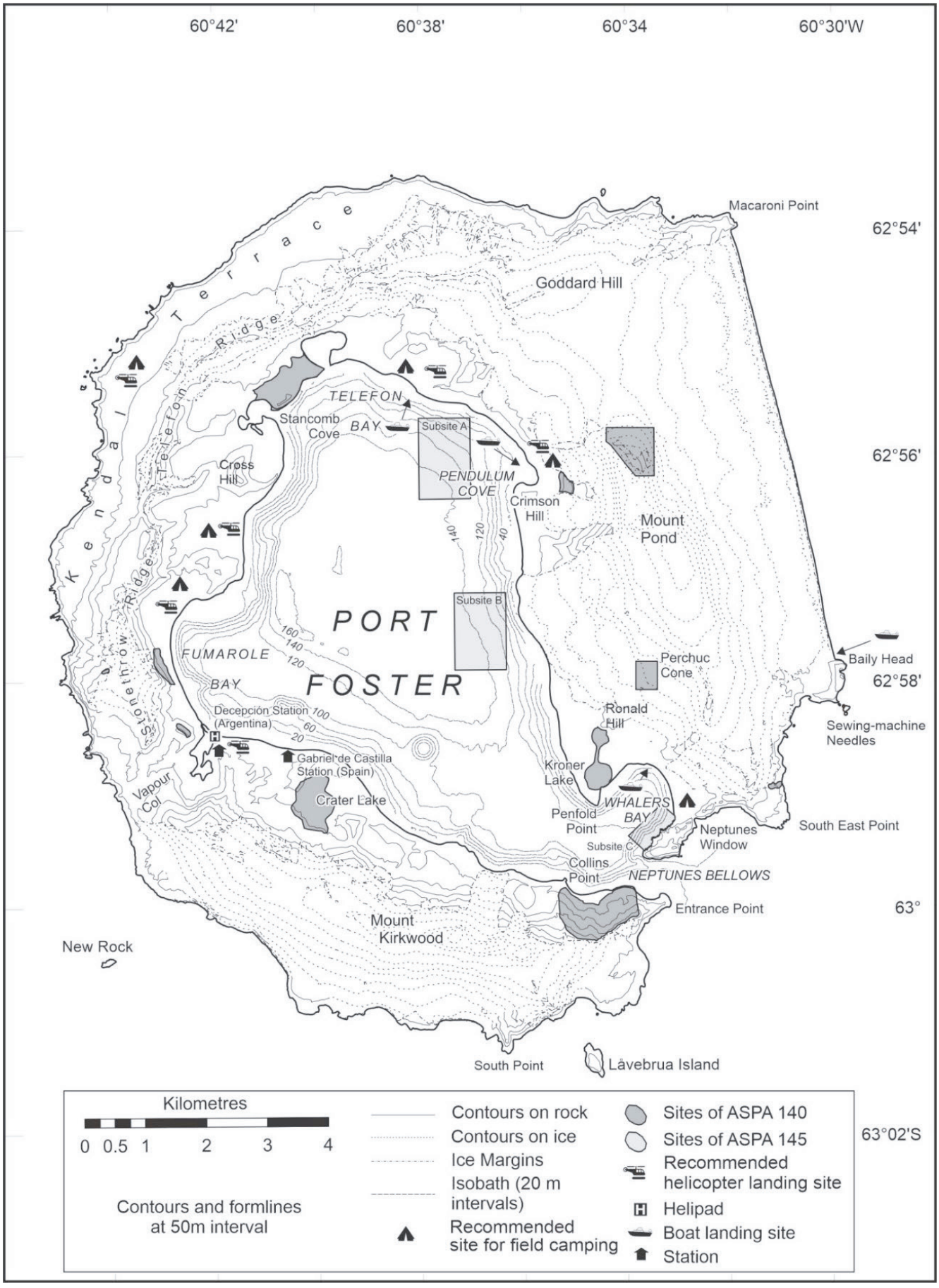
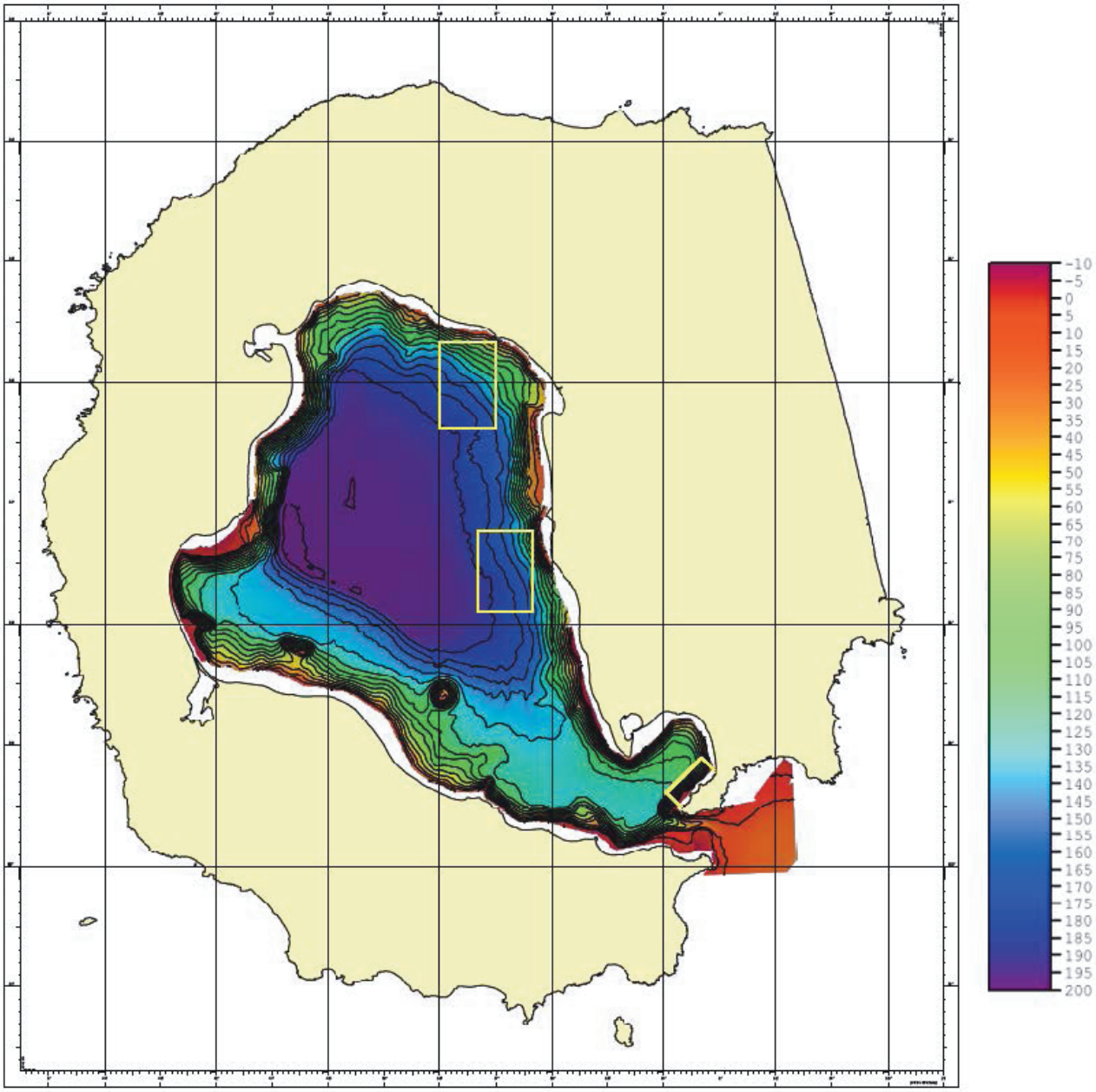
Map 1. Location of Deception Island in relation to the Antarctic Peninsula and the South Shetland Islands (Extracted from Deception Island Antarctic Specially Managed Area No. 4 Management Plan).



Map 2. Map of Deception Island showing the location of the three sub-sites of ASPA No. 145 in Port Foster (A, B and C), and ASPA No. 140 sub-sites. Cartographic base provided by Centro Geográfico del Ejército de Tierra and Instituto Hidrográfico de la Marina (Spain), with help of MAGIC-BAS (UK).



Map 3. Bathymetric map of Port Foster in Deception Island, showing the general location of the three sub-sites of ASPA No. 145 (demarked in yellow). Image provided by the Instituto Hidrográfico de la Marina, Spain. Bathymetry data compiled from hydrographic surveys carried out in the years 2012 and 2016.



PARTE DEL PARCELARIO 700B

ANTÁRTIDA

Isla Decepción

Islas Shetland del Sur, estrecho Bransfield.

LEVANTADO POR EL BIO HESPERIDES

Año 2012 Multihaz EM-1002, EM 120

Año 2016 Multihaz EM-1002, EM 120

Año 2016 Interferométrico GS-250

Proyección de Mercator

DATUM WGS-84

Reducción de Sondas al LAT de la "Estación de Mareas de Cala Jonhson".

Escala 1: 20 000 (62°57'S)

Veriles representados: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

110, 120, 130, 140, 150, 160

Figure 1: Species richness in the shallow areas of Port Foster, by group. The NEP and WHB stations describe the species richness of sub-site C of ASPA No. 145 (Extracted from Angulo-Preckler *et al.*, 2018).

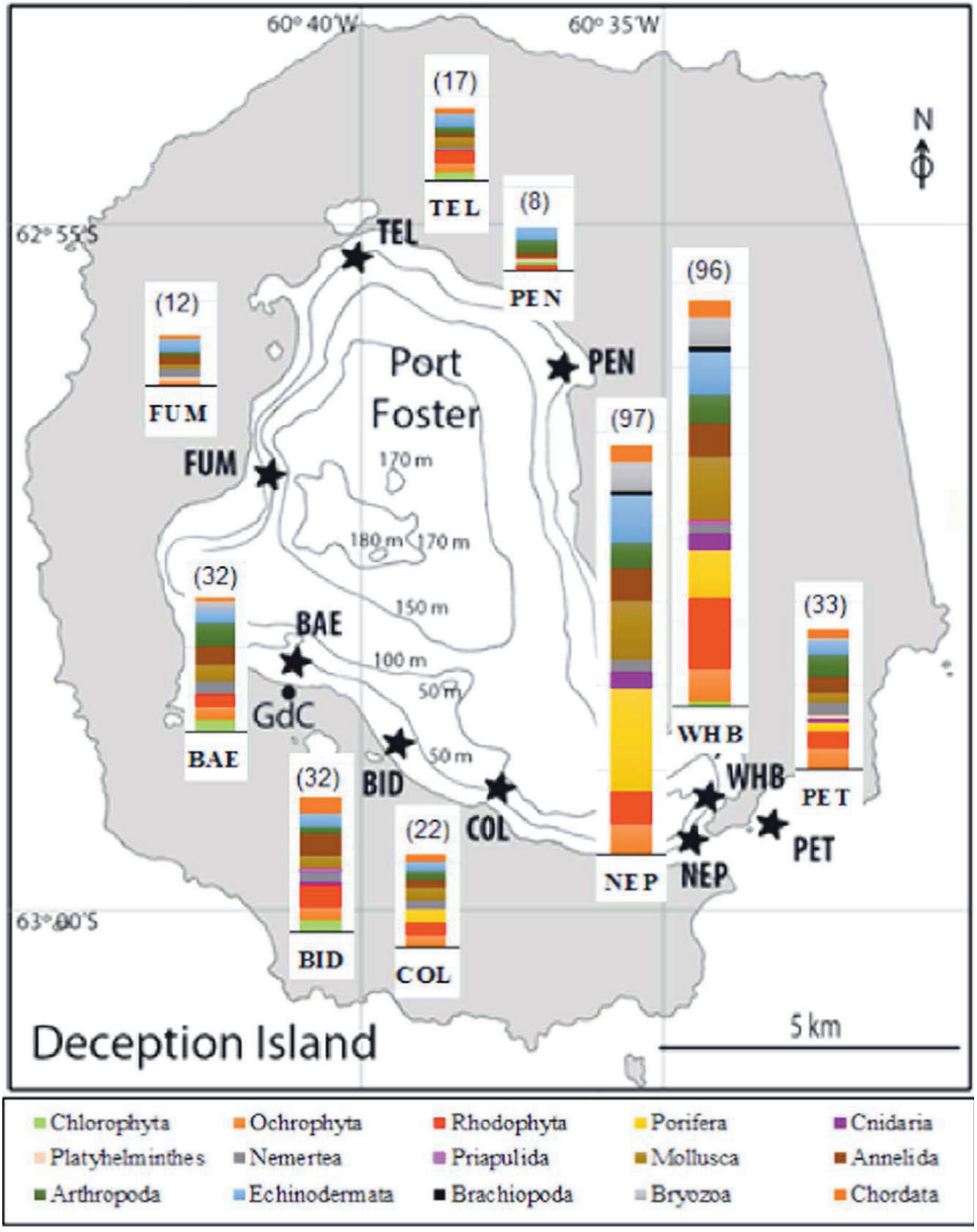


Figure 2. Representative photography's of the communities presented in the Area. Examples of suspension feeder community: a) massive sponge *Mycale (Oxymycale) acerata* and the soft-coral *Alcyonium haddoni*, and b) the sponges *Dendrilla antarctica, Hemigellius pillosus*, and the tunicate *Cnemidocarpa verrucosa*. Examples of mobile deposit feeder community; c) the echinoderms *Ophionotus victoriae, Sterechinus neumayeri*, and *Odontaster validus*, and d) very high densities of *Ophionotus victoriae* (Extracted from Angulo-Preckler *et al.*, 2018).