



# Draft Management Plan

## For Antarctic Specially Protected Area (ASPA) No. 000 DANGER ISLANDS ARCHIPELAGO (NORTH-EASTERN ANTARCTIC PENINSULA)

### Introduction

The Danger Islands are located east of the northern tip of the Antarctic Peninsula, about 10 – 25 km east of Joinville Island, in the region of 54°56'– 54°35'W, 63°22'– 63°30'S ("the Area"). The Antarctic Specially Protected Area (ASPA) includes seven islands and has a terrestrial area of approximately 4.48 km<sup>2</sup>.

The primary reason for designation of the Area is its outstanding number and diversity of seabirds, which are representative of the region. The Area hosts large colonies of seabirds, which are of exceptional ecological and scientific interest. This relates above all to Adélie penguins (*Pygoscelis adeliae*). The Area hosts the third and fourth largest Adélie penguin colonies in the world and more Adélie penguins than the rest of the Antarctic Peninsula region combined. In addition, there are breeding sites of nine further species of Antarctic seabirds on the Danger Islands, including a large colony of Antarctic shags (*Phalacrocorax atriceps*). Currently, main activities of ongoing scientific research focus on the seabird population of the area.

The Area is designated because it has been rarely visited and is in almost pristine condition, i.e., it is of great value as a reference site for comparative scientific studies and long-term monitoring. Furthermore, the Area has exceptional aesthetic and wilderness values.

There has been a low level of ship-based tourism in this Area with rare and irregular visits/landings. Visits are rare as there is little bathymetric data available for the waters around the islands and they are relatively remote from other landing sites in an area with generally unfavourable weather and landing conditions. The overall human footprint in the different sites of the Area is considered to be low to medium (Pertierra *et al.*, 2017).

The Area is situated within 'Environment B – Antarctic Peninsula mid-northern latitudes geologic' and 'Environment E – Antarctic Peninsula, Alexander and other islands' based on the Environmental Domains Analysis for Antarctica (Morgan *et al.* 2007). It is included in Antarctic Conservation Biogeographic Region (ACBR) 3: 'North-west Antarctic Peninsula' (Terauds *et al.* 2012 and Terauds and Lee 2016). The Antarctic Important Bird Areas ANT062 (Danger Islands), ANT063 (Brash Island, Danger Islands) and ANT064 (Earle Island, Danger Islands) are identified within the Area (Harris *et al.*, 2015). The waters surrounding the islands of the ASPA No. ? are identified as marine IBA 13 (Handley *et al.*, 2021) and as part of an Area of Ecological Significance (Hindell *et al.*, 2021).

Danger Islands complement the network of ASPAs by protecting a representative sample of the Antarctic ecosystem including some of the largest Adélie Penguin colonies worldwide.

### 1. Description of Values to be Protected

The ASPA No. ? Danger Islands (North-eastern Antarctic Peninsula, 54°56'– 54°35'W / 63°22'– 63°30'S) includes seven islands and has an approximate area of 4.48 km<sup>2</sup>. The primary reasons for designation of the Area are its large colonies of seabirds, which are of exceptional ecological and scientific interest, and its almost pristine condition. The spatial extent of the Area includes all known seabird breeding sites in the Danger Islands group. The feeding grounds of these colonies are not yet known.

The importance of ASPA No. ? for the network of protected areas in Antarctica arises primarily from the number of seabirds breeding in the Area. There are approx. 750,000 breeding pairs of Adélie penguins (*Pygoscelis adeliae*) on the Danger Islands (Borowicz *et al.*, 2018). According to MAPPPD database v 4.2 (Humphries *et al.*, 2017) this is more than the half of the population of the Antarctic Peninsula region in total. The colonies at Heroina and Beagle Island are the second and third largest Adélie penguin colonies in the Antarctic.

At Earle Island (site 6) a colony of 156 breeding pairs of Antarctic shag (*Phalacrocorax atriceps*) was recorded by Borowicz *et al.* (2018). This is equivalent to 1.2 % of the global population of this species (Schrimpf *et al.*, 2018).

In addition, Danger Islands host breeding sites of gentoo penguin (*Pygoscelis papua*), chinstrap penguin (*Pygoscelis antarcticus*), cape petrel (*Daption capense*), snowy sheathbill (*Chionis albus*), kelp gull (*Larus dominicanus*), skua (*Catharacta ssp.*), Wilson's storm-petrel (*Oceanites oceanicus*) and snow petrel (*Pagodroma nivea*) (Borowicz *et al.*, 2018).



A number of studies revealed an impact of climate change on all three pygoscelis penguin species that breed on Danger Island. The impacts are not the same for all penguin species. For example, Adélie penguins are in decline at the western Antarctic Peninsula region while having stable populations at the Weddell Sea region and the southwestern Antarctic Peninsula (Borowicz *et al.*, 2018; Casanovas *et al.*, 2015) and expanding in other Antarctic regions (Che-Castaldo *et al.*, 2017; Southwell *et al.*, 2015). Chinstrap penguins were found to decline generally with a significant exception at the South Sandwich Islands (Lynch *et al.*, 2016; Strycker *et al.*, 2020). In contrast, Antarctic gentoo penguins show increasing populations and expand their ranges southward (Forcada and Trathan, 2009; Herman *et al.*, 2020; Lynch *et al.*, 2012). Further shifts in population of the pygoscelis penguins may occur.

There has been a low level of ship-based tourism in the Area with rare and irregular visits/landings. Scientific activity in the Area and its proximity is low and there is no infrastructure or scientific facility. Therefore, degree of human interference for the most of the Danger Islands can be considered low (Pertierra *et al.*, 2017). Thus, wilderness can be regarded as an additional value of the Area. For those islands where occasional visits occur (Heroína Is., Beagle Is.) human interference can be considered as medium (Pertierra *et al.*, 2017).

A particular aesthetic value is based on the partly spectacular rock formations of steep banded cliffs emerging from the sea at the coast of some of the islands (see Appendix 2, Figure 2).

Past and planned scientific research in the Area is related to penguin and seabird population assessment (Borowicz *et al.*, 2018; Naveen *et al.*, 2000; Woehler, 1993). An investigation of the extensive ornithogenic deposits (Kalvakaalva *et al.*, 2020) revealed its potential for paleoecologic research.

## 2. Aims and Objectives

---

Management of the Danger Islands aims to:

- Avoid degradation of, or substantial risk to, the values of the Area by preventing unnecessary human presence, disturbance and sampling in the Area;
- Allow visits for management purposes in support of the aims of the Management Plan;
- Allow scientific research on the ecosystem and physical environment in the Area that will not compromise the values for which the Area is protected;
- Minimize the possibility of introduction of non-native plants, animals and microbes into the Area;
- Minimize the possibility of the introduction of pathogens that may cause disease in faunal populations within the Area;
- Protect the natural ecosystem of the Area as a reference Area for future comparative scientific studies and for monitoring faunistic and ecological change and population development;
- Preserve the wilderness and aesthetic values of the Area.

## 3. Management Activities

---

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

- Notices showing the location of the Area (stating the special restrictions that apply) shall be displayed prominently, and a copy of this Management Plan shall be made available, at Base Petrel (Argentina) on Dundee Island, at Base Esperanza (Argentina) and Ruperto Elichiribehety Station (Uruguay) in Hope Bay on the Antarctic Peninsula, at Base Marambio (Argentina) at Seymour Island, at Base General Bernardo O'Higgins Riquelme (Chile) and GARS Station (Germany) at Cape Legoupil on the Antarctic Peninsula and at Johann Gregor Mendel Station (Czech Republic) on James Ross Island.
  - Copies of this management plan and informative material shall be made available to vessels and aircraft visiting the vicinity of the Area, and the appropriate national authority shall inform all personnel operating in the vicinity of, accessing or flying over the Area, of the location, boundaries and restrictions applying to entry and overflight within the Area.
  - National programs shall take steps to ensure the boundaries of the Area and the restrictions that apply within are marked on relevant maps and nautical / aeronautical charts.
  - Markers, signs or other structures should not be installed within the Area except for essential scientific or management purposes. If installed, they shall be recorded, secured and maintained in good condition and removed when no longer required by the responsible National Antarctic program.
  - In accordance with the requirements of Annex III of the Protocol, abandoned equipment or materials shall be removed to the maximum extent possible provided doing so does not adversely impact on the environment and the values of the Area.
  - The Area shall be visited as necessary, and no less than once every five years, to assess whether it continues to serve the purposes for which it was designated and to ensure management and maintenance measures are adequate.
  - Visits shall be permitted as necessary in order to facilitate the study and monitoring of anthropogenic changes that could affect the protected values in the Area. Impact study and monitoring should be conducted, by methods as less invasive as possible.
-



- The current and projected impact of climate change to the protected values of the Area should be assessed as well as its potential for mitigation and adaptation.
- National Antarctic Programmes operating in the Area shall consult together with a view to ensuring the above management activities are implemented.
- The Management Plan shall be reviewed no less than once every five years and revised as required.

## 4. Period of Designation

Designated for an indefinite period.

## 5. Maps

The maps in the appendix show the location of the area in the region, the position of the islands in relation to each other and the topographical information known to date about the individual islands.

- **Map 1**, ASPA No xxx Danger Islands – Regional overview
- **Map 2**, ASPA No xxx Danger Islands – Overview
- **Map 3**, ASPA No xxx Danger Islands (Brash Island)
- **Map 4**, ASPA No xxx Danger Islands (Heroina Island)
- **Map 5**, ASPA No xxx Danger Islands (Comb Island)
- **Map 6**, ASPA No xxx Danger Islands (Beagle Island)
- **Map 7**, ASPA No xxx Danger Islands (Darwin Island)
- **Map 8**, ASPA No xxx Danger Islands (Platter Island)
- **Map 9**, ASPA No xxx Danger Islands (Earle Island)

## 6. Description of the Area

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

#### Boundaries and coordinates

The components of the ASPA are seven islands in the region of 54°56'– 54°35'W, 63°22'– 63°30'S, without the marine part in between. (see maps)

- 1. Beagle Island:** (63°24'52"S, 54°40'2"W, 1.01 km<sup>2</sup>)
- 2. Brash Island:** (63°23'11"S, 54°54'47"W, 0.58 km<sup>2</sup>)
- 3. Heroina Island:** (63°23'39"S, 54°36'20"W, 0.83 km<sup>2</sup>)
- 4. Darwin Island:** (63°26'16"S, 54°43'38"W, 1.59 km<sup>2</sup>)
- 5. Platter Island:** (63°26'2"S, 54°40'26"W, 0.19 km<sup>2</sup>)
- 6. Earle Island:** (63°29'16"S, 54°47'14"W, 0.17 km<sup>2</sup>)
- 7. Comb Island:** (63°24'37"S, 54°43'4"W, 0.11 km<sup>2</sup>)

The ASPA boundaries are the shorelines of these islands at low tide water levels. There are no further boundary markers.

#### Climate

No *in-situ* climatic data are available, but the Danger Islands lie in the track of depressions approaching the Antarctic Peninsula from the west. Climate models (Karger *et al.*, 2021) calculate an annual precipitation of 541 mm and a mean annual temperature of –4.95 °C for the period of 2010 – 2018. The currents of the Weddell Sea often drive sea ice towards the islands, making the occurrence of pack ice common (Borowicz *et al.*, 2018; Comiso and Gordon, 2013).

#### Geology, geomorphology, and soils

The Area is one of the largest areas of basic plutonic rock exposed in the Antarctic Peninsula region. Its petrography ranges from gabbro to alkali-feldspar quartz syenite of Cretaceous origin (Hamer and Hyden, 1984). The topography of the islands ranges from low and flat (Platter Island) to sheer cliff faces (Darwin and Comb Island) steep scree slopes, flat areas, and cliffs.

Ingólfsson *et al.*, (2003) suggests these islands may have been glaciated until around 6,000 b.c.

The oldest recovered ornithogenic soils at Platter Island date to about 600 years before present (Kalvakaalva *et al.*, 2020) which fits to comparable results from other northern Antarctic Peninsula breeding sites (Emslie *et al.*, 2018).



## Terrestrial ecology

The freshwater environment within the Area has yet to be described. Given the limited extent of available ice-free ground, streams and ponds are likely to be relatively few, small and seasonal. For example, several small temporary ponds are evident in satellite imagery which are likely to be enriched by nutrients from local breeding penguins.

## Vegetation

The vegetation of the Danger Islands has yet to be described. Preliminary observations using high resolution satellite remote sensing indicates widespread vegetation cover on Heroína and Beagle Island, particularly on Areas not covered by breeding penguins or snow.

The invertebrate fauna of the Danger Islands has yet to be described.

## Breeding birds and mammals

According to Borowicz *et al.* (2018) at least 10 species of birds breed in the Danger Islands: Adélie penguin (*Pygoscelis adeliae*), chinstrap penguin (*Pygoscelis antarctica*), gentoo penguin (*Pygoscelis papua*), Antarctic shags (*Phalacrocorax atriceps*), skua species (*Catharacta* spp.), cape petrel (*Daption capense*), snow petrel (*Pagodroma nivea*), Wilson's storm petrel (*Oceanites oceanicus*), kelp gull (*Larus dominicanus*) and snowy sheathbill (*Chionis albus*) (Appendix 3, Table 1). Southern giant petrels (*Macronectes giganteus*) are verified as not breeding at six of the seven islands in 2015 and the presence of Antarctic tern (*Sterna vittata*) was observed on two islands only. Available data on seabird population numbers are summarised in Appendix 3, Table 2. No (breeding) birds were detected on nearby Dixey Rock (see Map 2) in December 2015 (Borowicz *et al.*, 2018), which is therefore not included in ASPA No. ?.

Adélie penguins breed on all islands within ASPA No. ? with a total population of 751,527 (95th CI = [710,103–792,443]) breeding pairs in December 2015 (Borowicz *et al.*, 2018). The biggest colonies are on Heroína Island (292,363 breeding pairs) and Beagle Island (284,535 breeding pairs). The study of (Borowicz *et al.*, 2018) suggests that the Area occupied by Adélie penguin colonies has remained stable or has modestly increased over the last 60 years.

Breeding gentoo penguins were found on four islands (>100 nests), particularly at Brash Island (2,270 breeding pairs). The gentoo population at Heroína Island seems to be increased from 1996 till 2015 (Appendix One, Table 2).

Breeding chinstrap penguins were found only on Heroína Island with 27 breeding pairs (Borowicz *et al.*, 2018).

Earl Island is the only island where breeding Antarctic shags were found (156 breeding pairs) (Borowicz *et al.*, 2018). This is equivalent to 1.2% of the global population of this species (Schrimpf *et al.*, 2018).

There is no evidence of breeding seals at the Danger Islands, though the presence of individual Weddell seals (*Leptonychotes weddellii*) have been found at four islands (Appendix One, Table 1). Non-breeding Antarctic fur seals (*Arctocephalus gazella*) inhabit the region especially in the late summer and early autumn (Blix and Nordøy, 2007). However, detailed studies have not been conducted through haulout and pupping season.

## Human activities and impact

Due to the high concentration of seabirds, particularly penguins, the Danger Islands have been subject to occasional tourist visits during the last decades. Data (International Association of Antarctica Tour Operators, 2024) show that numbers of visiting tourists have been relatively constant at some hundred visitors from the 2003-2004 to the 2017-2018 season. Since then, the numbers increased with more than thousand visits per season from the 2018-2019 to 2022-2023 season (see Appendix 2, Figure 3.).

According to (International Association of Antarctica Tour Operators, 2024) the majority of tourist activities near the Danger Islands was small boat cruising, all others small boat landings. The impact of cruising small boats can be regarded small, since they are unlikely to go very close to breeding birds. The impact of small boat landing depends on location and date of the landing and the amount of landed persons.

Only once 'science support' has been reported, including Remotely Piloted Aircraft System (RPAS) activities. Additionally, one commercial RPAS flight has been reported on Heroína Island. Other potentially impactful activities like aircraft landings, camping/overnight stays, helicopter flights, filming or marathon events have not yet been reported for the Area.

There are no permanent human settlements on the Islands, the closest permanent scientific station is Petrel (ARG), about 70 km to the west, which at present is only operated during Antarctic summer, but plans are being made to renovate and extend the station for year-round occupation (Ministry of Foreign Affairs Argentina, 2023).

Past scientific research in the area was primarily focused on the penguin population (Borowicz *et al.*, 2018; Naveen *et al.*, 2000; Woehler, 1993). Occasional geological and paleoecological research has also been carried out (Hamer and Hyden, 1984; Kalvakaalva *et al.*, 2020). During the few scientific visits to date, access has been by landing with small boats.



## 6 (ii) Access to the area

Access to the Area is generally provided by ship and small boat.

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

There are no known permanent human structures in the Area

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

Other protected Areas in the vicinity include:

- ASPA No. 148 Mount Flora, Hope Bay, Antarctic Peninsula, 63°25' S, 57°01' W, ca. 100 km to the East;
- HSM 39 at Hope Bay, 63°24' S, 56°59' W, ca. 100 km to the East;
- HSM 40 at Hope Bay, 63°24' S, 56°59' W, ca. 100 km to the East;
- HSM 41 at Paulet Island, 63°34' S, 55°45' W, ca. 50 km to the Southeast.

## 6 (v) Special zones within the Area

There are no special zones within the Area.

# 7. Terms and Conditions for Entry Permits

## 7 (i) General permit conditions

Access to the Area is prohibited except in accordance with a Permit issued by the national competent authority. Conditions for issuing a Permit to enter the Area are that:

- it is issued in particular for scientific research on the terrestrial ecosystem and fauna in the Area or for reasons essential to the management of the Area;
- the actions permitted are in accordance with this Management Plan;
- the activities permitted will give due consideration via the environmental impact assessment process to the continued protection of the environmental and scientific values of the Area;
- it is issued for compelling educational or outreach reasons which cannot be served elsewhere, and which do not conflict with the objectives of this Management Plan; Activities for educational and / or outreach purposes do not include tourism which is prohibited within the ASPA Nr. ?;
- the Permit shall be issued for a finite period;
- the Permit, or a copy, shall be carried when in the Area;
- during periods of an emerging wildlife disease (e.g. the current highly pathogenic avian influenza), access to the area is only permitted for personnel specially trained in dealing with the disease in question, regardless of previously issued permits.

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

Access to the Area shall be by small boat, or on foot. Vehicles are prohibited within the Area.

### Foot access and movement within the area

All movement on land within the Area shall be on foot. All people in boats are prohibited from moving on foot beyond the immediate vicinity of their landing or access site unless specifically authorised by permit.

Visitors should move carefully to minimize disturbance to flora, fauna, soils, and water bodies. Pedestrians should walk on snow or rocky terrain if practical but taking care not to damage lichens. Pedestrians should walk around the penguin colonies and should not enter sub-groups of nesting penguins unless required for research or management purposes. Pedestrian traffic should be kept to the minimum consistent with the objectives of any permitted activities and every reasonable effort should be made to minimize effects.

### Small boat access

On Heroína Island there are three known landing sites for small boats which are already proven in practice (see map 3). The primary landing site is located in a small harbour which is greatly affected by tides (see Appendix 2, Figure 1). The landing area is small and is only viable when the tide is in. The swell and waves into the site are the primary risks to landing here. Careful consideration of the swell and impacts of moving ice in the bay is recommended.

Alternatively, there is another, much more narrow landing site between rocks. It is located south of the entrance of the natural harbour on the western side of Heroína Island.

The third landing site is located on the eastern side of Heroína Island. It also narrower and rockier than the primary landing site (see map 3).

Visitors landing on other Islands of the Area are encouraged to include the information on further appropriate landing sites in the report to their national competent authority.



### **Aircraft access and overflight**

Restrictions on aircraft operations apply year-round, when pilots shall operate aircraft over the Area according to strict observance of the following conditions:

1. Piloted aircraft landings, including by helicopters, are prohibited.
2. Overflight of the Area by piloted aircraft below 2000 ft (~610 m) is prohibited, except in accordance with a permit issued by an appropriate national authority. Pilots operating within the Area should follow the Guidelines for the Operation of Aircraft near Concentrations of Birds (Resolution 2 (2004)).
3. Overflight below 2000 ft (610 m) and landings within the Area by Remotely Piloted Aircraft Systems (RPAS) are prohibited except in accordance with a permit issued by an appropriate national authority. RPAS use within the Area should follow the Environmental Guidelines for Operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica (Resolution 4 (2018)).

### **7 (iii) Activities that may be conducted within the area**

Activities which may be conducted within the Area include:

- Scientific research or management activities that will not jeopardize the ecosystem or values of the Area;
- Activities for educational and / or outreach purposes (such as documentary reporting (e.g. visual, audio or written) or the production of educational resources or services) that cannot be served elsewhere. Activities for educational and / or outreach purposes do not include tourism;
- Essential management activities, including monitoring and inspection with the aim to assess the effectiveness of the Management Plan and management activities;
- Small boat cruising along the coastline shall avoid blocking exit/entry points of the penguins nesting or moulting on the Islands.

### **7 (iv) Installation, modification, or removal of structures**

- Permanent structures or installations are prohibited.
- All markers, structures or scientific equipment installed in the Area must be authorized by a permit and clearly identified by country, name of the principal investigator, year of installation and date of expected removal. All such items should be free of organisms, propagules (e.g. seeds, eggs) and non-sterile soil, and be made of materials that can withstand the environmental conditions and pose minimal risk of contamination or damage to the values of the Area.
- Installation (including site selection), maintenance, modification or removal of structures and equipment shall be undertaken in a manner that minimizes disturbance to flora and fauna, preferably avoiding the main breeding season (01 October – 31 March).
- Removal of specific structures / equipment for which the permit has expired shall be the responsibility of the authority which granted the original permit, and shall be a condition of the permit.

### **7 (v) Location of field camps**

Temporary camping is allowed within the Area for scientific or management purposes only. Specific camp sites have yet to be identified or designated, although any camp sites should preferably be located on beach gravels, snow surfaces or rocky ground far enough away to avoidance wildlife concentrations. Camping on surfaces with significant vegetation cover is prohibited.

Visitors should however be aware of the potential of being stranded on the islands due to weather and landing conditions; therefore, camping on the islands should only be done if absolutely necessary.

### **7 (vi) Restrictions on materials and organisms that may be brought to the area**

In addition to the requirements of the Protocol, restrictions on materials and organisms that may be brought into the Area are:

- The deliberate introduction of animals, plant material, micro-organisms and non-sterile soil into the Area is prohibited. Precautions shall be taken to prevent the accidental introduction of animals, plant material, micro-organisms and non-sterile soil from other biologically distinct regions within or beyond the Antarctic Treaty Area.
- All sampling equipment or markers brought into the Area shall be cleaned and sterilized. To the maximum extent practicable, footwear and other equipment used or brought into the Area (including bags or backpacks) shall be thoroughly cleaned before entering the Area. Further guidance can be found in the CEP non-native species manual (Resolution 4 (2016)) and the SCAR Environmental code of conduct for terrestrial scientific field research in Antarctica (Resolution 5 (2018)).
- Poultry and all poultry products are prohibited from the Area.
- Herbicides or pesticides are prohibited from the Area.
- Any other chemicals, including radio-nuclides or stable isotopes, which may be introduced for scientific or management purposes specified in the permit, shall be removed from the Area at or before the conclusion of the activity for which the permit was granted.
- Fuel, food, and other materials shall not be stored in the Area, unless required for essential purposes connected with the activity and specifically authorised by permit condition. In general, all materials introduced shall remain for a stated period only and shall be removed at or before the conclusion of that stated period.



- All materials shall be stored and handled in a way that minimises the risk of their accidental introduction into the environment.
- If release occurs which 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 *in situ*.

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

Taking of, or harmful interference with, native flora and fauna is prohibited, except in accordance with a permit issued in accordance with Annex II of the Protocol. Where taking or harmful interference of animals is involved, this should, as a minimum standard, be in accordance with the SCAR Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica.

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

- Material may be collected or removed from the Area only in accordance with a permit and should be limited to the minimum necessary to meet scientific or management needs. This includes biological samples and rock or soil specimens;
- Material of human origin likely to compromise the values of the Area, which was not brought into the Area by the permit holder or otherwise authorized, may be removed from any part of the Area, unless the impact of removal is likely to be greater than leaving the material *in situ*. If this is the case the appropriate authority should be notified and approval obtained.
- The appropriate national authority should be notified of any items removed from the Area that were not introduced by the permit holder.

### **7 (ix) Disposal of waste**

All wastes, including human wastes, 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:

1. carry out monitoring and Area inspection activities, which may involve the collection of a small number of samples or data for analysis or review;
2. install or maintain signposts, markers, structures or scientific equipment;
3. carry out protective measures;
4. carry out research or management in a manner that avoids interference with long-term research and monitoring activities or possible duplication of effort. Persons planning new projects within the Area should consult with established programs working within the Area before initiating the work.

Any specific sites of long-term monitoring shall be appropriately marked on site and on maps of the Area. The coordinates of the spatial position should be reported to the appropriate national authority.

To avoid interference with long-term research and monitoring activities or duplication of effort, persons planning new projects within the Area should coordinate with established programs and/or appropriate national authorities.

### **7 (xi) Requirements for reports**

- The principal permit holder for each visit to the Area shall submit a report to the appropriate national authority as soon as practicable after the visit has been completed in accordance with national procedures.
- 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 Parties that proposed the Management Plan, to assist in managing the Area and reviewing the Management Plan.
- Parties should, wherever possible, deposit originals or copies of such 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 that might have been undertaken, and / or of any materials released and not removed, that were not included in the authorized permit.
- Any suspected signs of highly pathogenic avian influenza in the area shall be reported immediately to the appropriate national competent authority, which shall forward this information to the World Organisation for Animal Health (WOAH).



## 8. Supporting Documentation

### Literature

- Blix, A.S., Nordøy, E.S., 2007. Ross seal (*Ommatophoca rossii*) annual distribution, diving behaviour, breeding and moulting, off Queen Maud Land, Antarctica. *Polar Biol.* 30, 1449–1458. <https://doi.org/10.1007/s00300-007-0306-y>
- Borowicz, A., McDowall, P., Youngflesh, C., Sayre-McCord, T., Clucas, G., Herman, R., Forrest, S., Rider, M., Schwaller, M., Hart, T., Jenouvrier, S., Polito, M.J., Singh, H., Lynch, H.J., 2018. Multi-modal survey of Adélie penguin mega-colonies reveals the Danger Islands as a seabird hotspot. *Sci. Rep.* 8, 3926. <https://doi.org/10.1038/s41598-018-22313-w>
- Casanovas, P., Naveen, R., Forrest, S., Poncet, J., Lynch, H.J., 2015. A comprehensive coastal seabird survey maps out the front lines of ecological change on the western Antarctic Peninsula. *Polar Biol.* 38, 927–940. <https://doi.org/10.1007/s00300-015-1651-x>
- Che-Castaldo, C., Jenouvrier, S., Youngflesh, C., Shoemaker, K.T., Humphries, G., McDowall, P., Landrum, L., Holland, M.M., Li, Y., Ji, R., Lynch, H.J., 2017. Pan-Antarctic analysis aggregating spatial estimates of Adélie penguin abundance reveals robust dynamics despite stochastic noise. *Nat. Commun.* 8. <https://doi.org/10.1038/s41467-017-00890-0>
- Comiso, J.C., Gordon, A.L., 2013. Interannual Variability in Summer Sea Ice Minimum, Coastal Polynyas and Bottom Water Formation In the Weddell Sea, in: Jeffries, M.O. (Ed.), *Antarctic Research Series*. American Geophysical Union, Washington, D. C., pp. 293–315. <https://doi.org/10.1029/AR074p0293>
- Emslie, S.D., McKenzie, A., Marti, L.J., Santos, M., 2018. Recent occupation by Adélie Penguins (*Pygoscelis adeliae*) at Hope Bay and Seymour Island and the 'northern enigma' in the Antarctic Peninsula. *Polar Biol.* 41, 71–77. <https://doi.org/10.1007/s00300-017-2170-8>
- Forcada, J., Trathan, P.N., 2009. Penguin responses to climate change in the Southern Ocean. *Glob. Change Biol.* 15, 1618–1630. <https://doi.org/10.1111/j.1365-2486.2009.01909.x>
- Hamer, R.D., Hyden, G., 1984. The geochemistry and age of the Danger Islands pluton, Antarctic Peninsula. *Br. Antarct. Surv. Bull.* 64, 1–19.
- Handley, J., Rouyer, M.-M., Pearmain, E.J., Warwick-Evans, V., Teschke, K., Hinke, J.T., Lynch, H., Emmerson, L., Southwell, C., Griffith, G., Cárdenas, C.A., Franco, A.M.A., Trathan, P., Dias, M.P., 2021. Marine Important Bird and Biodiversity Areas for Penguins in Antarctica, Targets for Conservation Action. *Front. Mar. Sci.* 7, 602972. <https://doi.org/10.3389/fmars.2020.602972>
- Herman, R., Borowicz, A., Lynch, M., Trathan, P., Hart, T., Lynch, H., 2020. Update on the global abundance and distribution of breeding gentoo penguins (*pygoscelis papua*). *Polar Biol.* 43, 1947–1956. <https://doi.org/10.1007/s00300-020-02759-3>
- Humphries, G.R.W., Naveen, R., Schwaller, M., Che-Castaldo, C., McDowall, P., Schrimpf, M., Lynch, H.J., 2017. Mapping Application for Penguin Populations and Projected Dynamics (MAPPPD): data and tools for dynamic management and decision support. *Polar Rec.* 53, 160–166. <https://doi.org/10.1017/S0032247417000055>
- Ingólfsson, Ó., Hjort, C., Humlum, O., 2003. Glacial and Climate History of the Antarctic Peninsula since the Last Glacial Maximum. *Arct. Antarct. Alp. Res.* 35, 175–186. [https://doi.org/10.1657/1523-0430\(2003\)035\[0175:GACHOT\]2.0.CO;2](https://doi.org/10.1657/1523-0430(2003)035[0175:GACHOT]2.0.CO;2)
- International Association of Antarctica Tour Operators, 2024. Tourism Statistics [WWW Document]. *Tour. Stat.* URL <https://iaato.org/information-resources/data-statistics/visitor-statistics/>
- Kalvakaalva, R., Clucas, G., Herman, R.W., Polito, M.J., 2020. Late Holocene variation in the Hard prey remains and stable isotope values of penguin and seal tissues from the Danger Islands, Antarctica. *Polar Biol.* 43, 1571–1582. <https://doi.org/10.1007/s00300-020-02728-w>
- Karger, D.N., Conrad, O., Böhner, J., Kawohl, T., Kreft, H., Soria-Auza, R.W., Zimmermann, N.E., Linder, H.P., Kessler, M., 2021. Climatologies at high resolution for the earth's land surface areas CHELSA V2.1 (current). <https://doi.org/10.16904/ENVIDAT.228.V2.1>
- Lynch, H.J., LaRue, M.A., 2014. First global census of the Adélie Penguin. *The Auk* 131, 457–466. <https://doi.org/10.1642/AUK-14-31.1>
- Lynch, H.J., Naveen, R., Casanovas, P., 2013. Antarctic Site Inventory breeding bird survey data, 1994–2013. *Ecology* 94, 2653–2653.
- Lynch, H.J., Naveen, R., Fagan, W.F., 2008. Censuses of penguin, blue-eyed shag *Phalacrocorax atriceps* and southern giant petrel *Macronectes giganteus* populations on the Antarctic Peninsula, 2001–2007. *Mar. Ornithol.* 36, 83–97.
- Lynch, H.J., Naveen, R., Trathan, P.N., Fagan, W.F., 2012. Spatially integrated assessment reveals widespread changes in penguin populations on the Antarctic Peninsula. *Ecology* 93, 1367–1377.
- Lynch, H.J., Schwaller, M.R., 2014. Mapping the Abundance and Distribution of Adélie Penguins Using Landsat-7: First Steps towards an Integrated Multi-Sensor Pipeline for Tracking Populations at the Continental Scale. *PLoS ONE* 9, e113301. <https://doi.org/10.1371/journal.pone.0113301>
- Lynch, H.J., White, R., Naveen, R., Black, A., Meixler, M.S., Fagan, W.F., 2016. In stark contrast to widespread declines along the Scotia Arc, a survey of the South Sandwich Islands finds a robust seabird community. *Polar Biol.* 39, 1615–1625. <https://doi.org/10.1007/s00300-015-1886-6>
- Ministry of Foreign Affairs Argentina, 2023. Renovation of Petrel Antarctic Base, Dundee Island.





Naveen, R., Forrest, S.C., Dagit, R.G., Blight, L.K., Trivelpiece, W.Z., Trivelpiece, S.G., 2000. Censuses of penguin, blue-eyed shag, and southern giant petrel populations in the Antarctic Peninsula region, 1994–2000. *Polar Rec.* 36, 323.

<https://doi.org/10.1017/S0032247400016818>

Pertierra, L.R., Hughes, K.A., Vega, G.C., Olalla-Tárraga, M.Á., 2017. High Resolution Spatial Mapping of Human Footprint across Antarctica and Its Implications for the Strategic Conservation of Avifauna. *PLOS ONE* 12, e0168280.

<https://doi.org/10.1371/journal.pone.0168280>

Schrimpf, M., Naveen, R., Lynch, H.J., 2018. Population status of the Antarctic shag *Phalacrocorax (atriceps) bransfieldensis*. *Antarct. Sci.* 30, 151–159. <https://doi.org/10.1017/S0954102017000530>

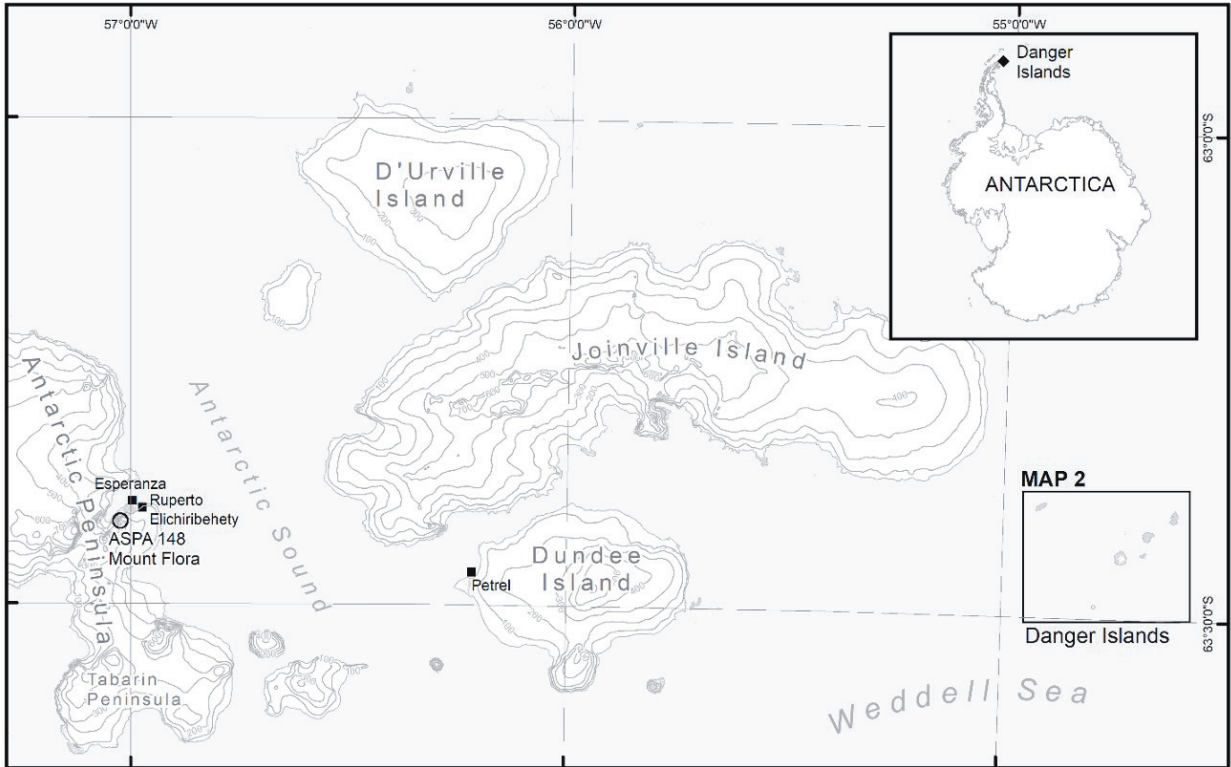
Southwell, C., Emmerson, L., McKinlay, J., Newbery, K., Takahashi, A., Kato, A., Barbraud, C., DeLord, K., Weimerskirch, H., 2015. Spatially Extensive Standardized Surveys Reveal Widespread, Multi-Decadal Increase in East Antarctic Adélie Penguin Populations. *PLOS ONE* 10, e0139877. <https://doi.org/10.1371/journal.pone.0139877>

Strycker, N., Wethington, M., Borowicz, A., Forrest, S., Witharana, C., Hart, T., Lynch, H.J., 2020. A global population assessment of the Chinstrap penguin (*Pygoscelis antarctica*). *Sci. Rep.* 10, 19474. <https://doi.org/10.1038/s41598-020-76479-3>

Woehler, E.J., 1993. *The Distribution and Abundance of Antarctic and Subantarctic Penguins*. Scientific Committee on Antarctic Research, Scott Polar Research Institute, Cambridge.

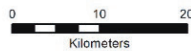


## Appendix 1 - Maps

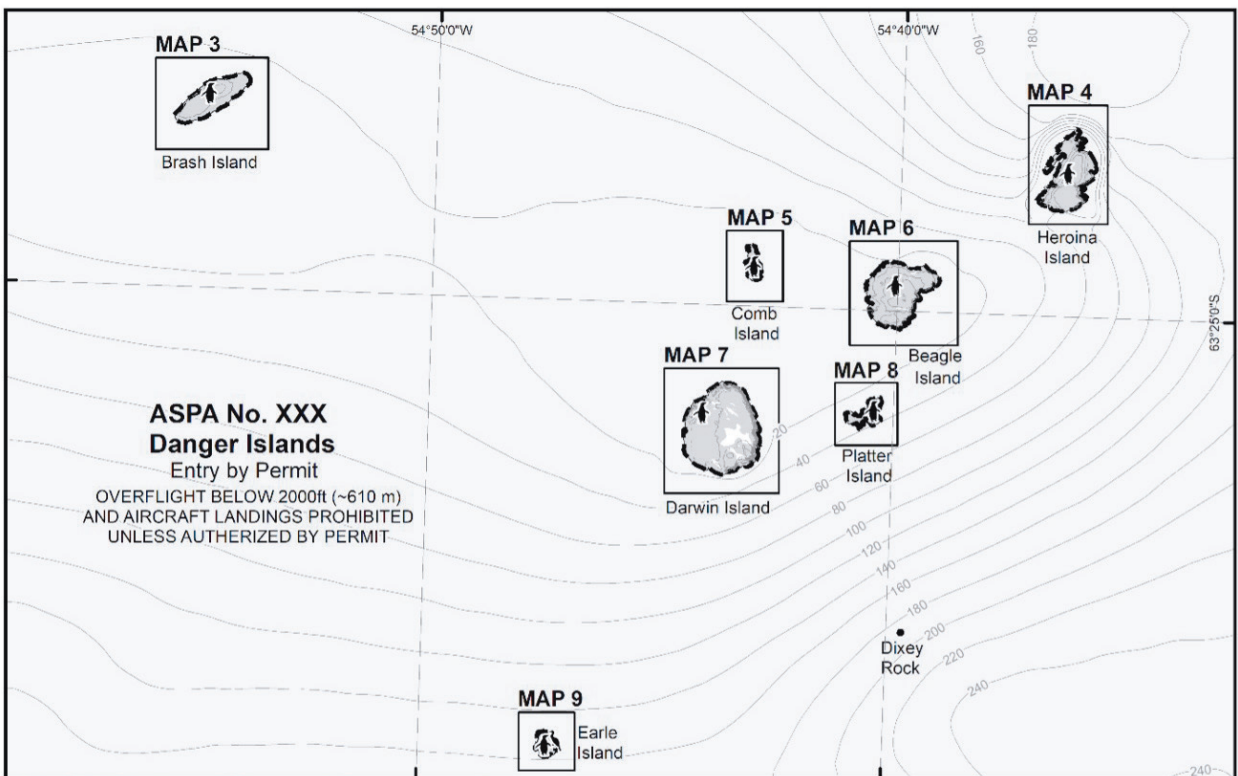


MAP 1: ASPA No. XXX Danger Islands - Regional overview

- Ice
- Ocean
- Rock outcrop
- Contour (100 m)
- Station
- ASPA

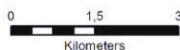


Projection: UTM Zone 21E; Spheroid and Datum: WGS 1984  
 Data sources: SCAR Antarctic Digital Database, 2023  
 Produced by Thuringian Institute of Sustainability and Climate Protection, January 2024

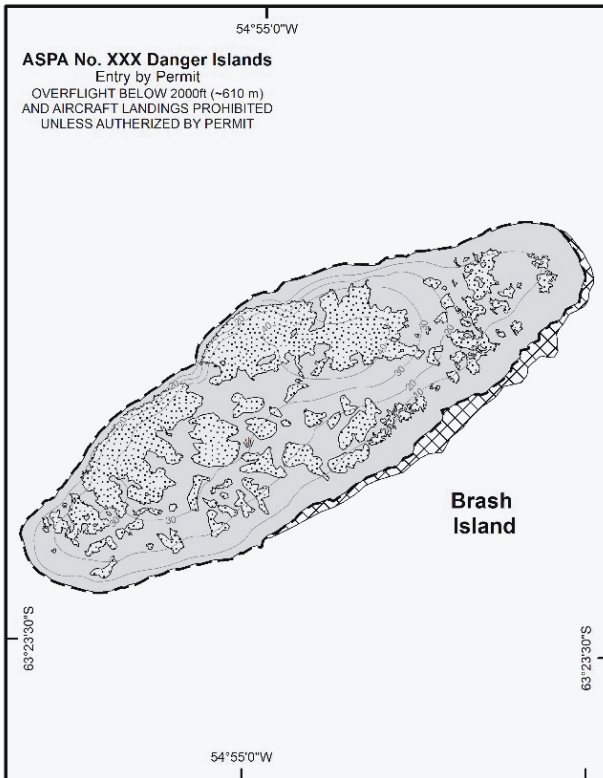


MAP 2: ASPA No. XXX Danger Islands - Overview

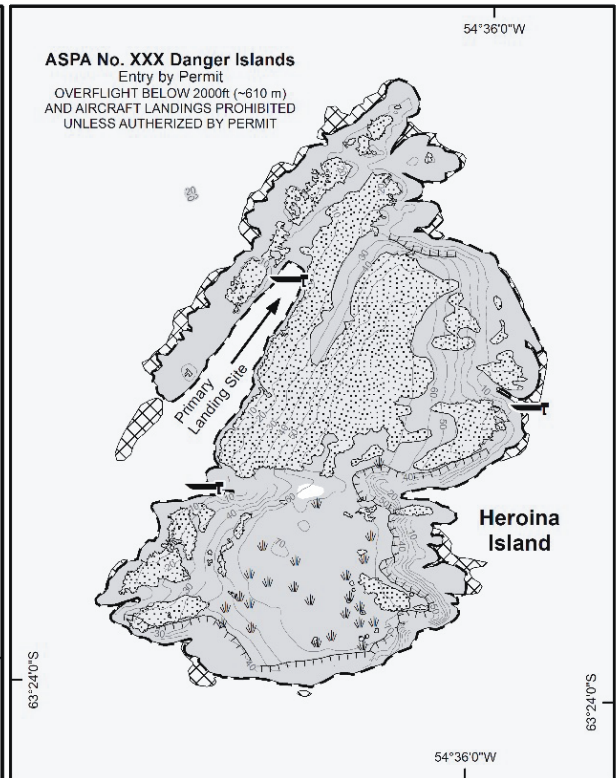
- Coastline
- Contour (20m)
- Isobath (20m)
- Permanent ice
- Ice free ground
- Ocean
- Penguin colony
- Antarctic shag colony
- ASPA boundary



Projection: UTM Zone 21E; Spheroid and Datum: WGS 1984  
 Data sources:  
 Coastline, Penguin breeding area, Vegetation:  
 WorldView2 image (30Dec2020);  
 Permanent ice: Sentinel2 image (13Feb2021);  
 Contour: REMA; Bathymetry: IBCSOv2  
 Produced by Thuringian Institute of Sustainability and Climate Protection, January 2024



MAP 3: ASPA No. XXX Danger Islands (Brash Island)

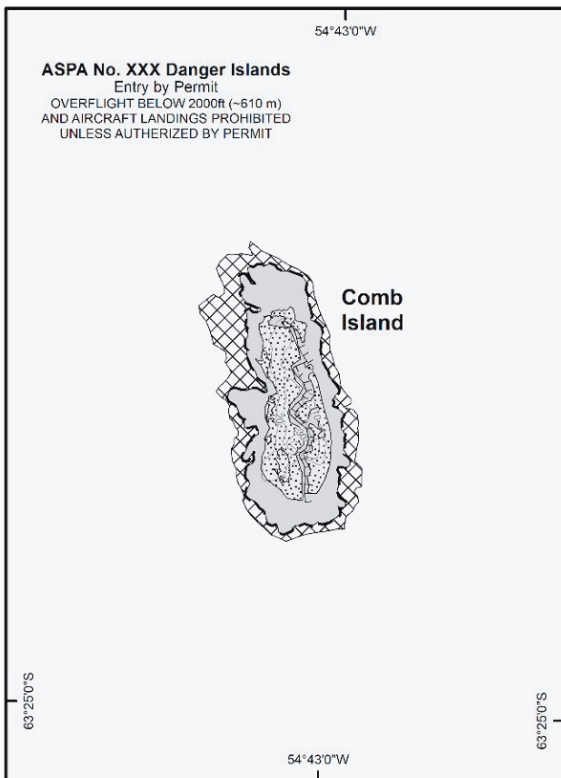


MAP 4: ASPA No. XXX Danger Islands (Heroina Island)

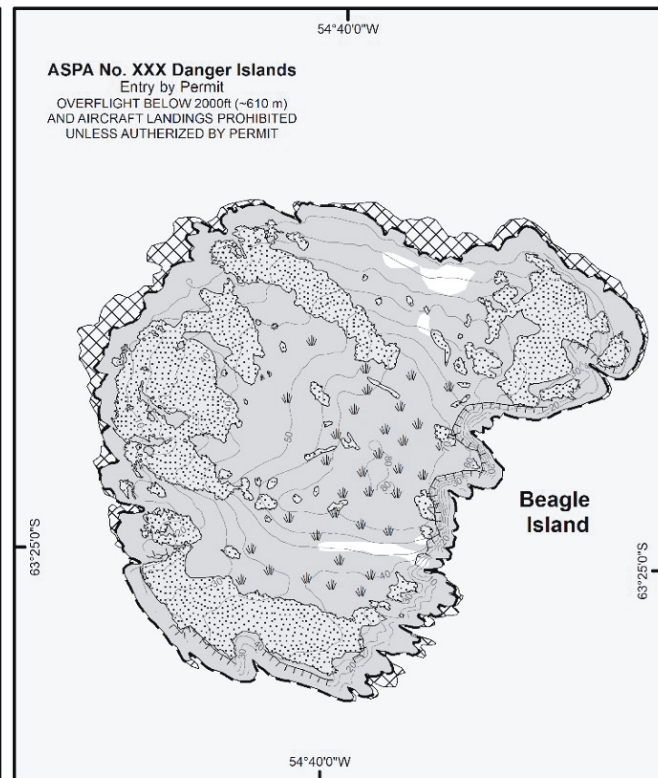
- Coastline
- Contour (10m)
- Cliffs
- ⊠ Shallow water
- Ice free ground
- Permanent ice
- Ocean
- ▨ Penguin breeding area
- 🌿 Vegetation
- ➔ Boat landing site
- ▭ ASPA boundary

0 250 500  
Meters

Projection: UTM Zone 21E; Spheroid and Datum: WGS 1984  
Data sources:  
Coastline, Penguin breeding area, Vegetation, Shallow water: WorldView2 image (30Dec2020);  
Permanent ice: Sentinel2 image (13Feb2021);  
Contour: REMA (WV02 08Feb2017)  
Produced by Thuringian Institute for Sustainability and Climate Protection, January 2024



MAP 5: ASPA No. XXX Danger Islands (Comb Island)

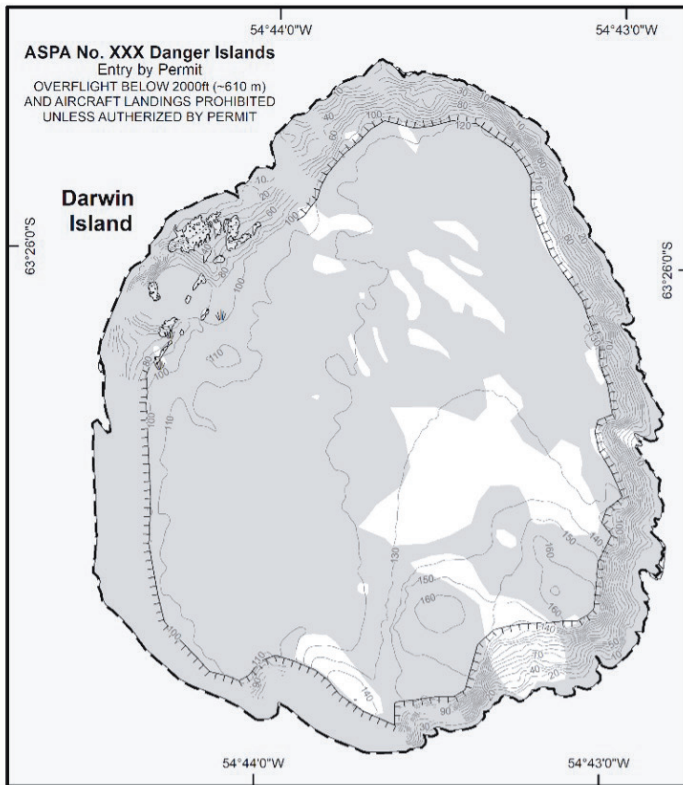


MAP 6: ASPA No. XXX Danger Islands (Beagle Island)

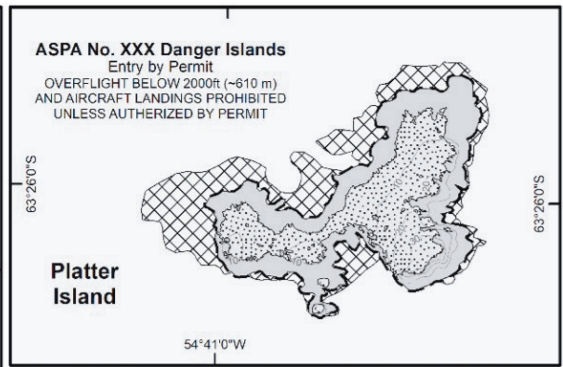
- Coastline
- Contour (10m)
- Cliff
- ⊠ Shallow water
- Ice free ground
- Permanent ice
- Ocean
- ▨ Penguin breeding area
- 🌿 Vegetation
- ➔ Boat landing site
- ▭ ASPA boundary

0 250 500  
Meters

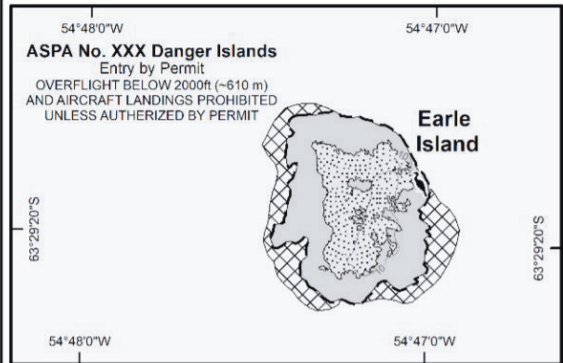
Projection: UTM Zone 21E; Spheroid and Datum: WGS 1984  
Data sources:  
Coastline, Penguin breeding area, Vegetation, Shallow water: WorldView2 image (30Dec2020);  
Permanent ice: Sentinel2 image (13Feb2021);  
Contour: REMA (WV02 08Feb2017)  
Produced by Thuringian Institute of Sustainability and Climate Protection, January 2024



**MAP 7: ASPA No. XXX Danger Islands (Darwin Island)**

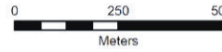


**MAP 8: ASPA No. XXX Danger Islands (Platter Island)**



**MAP 9: ASPA No. XXX Danger Islands (Earle Island)**

- Coastline
- Contour (10m)
- Cliff
- ⊗ Shallow water
- Permanent ice
- Ice free ground
- Ocean
- 🌿 Vegetation
- 🐧 Antarctic shag colony
- ▭ ASPA boundary



Projection: UTM Zone 21E; Spheroid and Datum: WGS 1984  
 Data sources:  
 Coastline, Penguin breeding area, Vegetation,  
 Shallow water: WorldView2 image (30Dec2020);  
 Permanent ice: Sentinel2 image (13Feb2021);  
 Contour: REMA (VV02 08Feb2017);  
 Antarctic shags: Borowicz et al. (2020)  
 Produced by Thuringian Institute for Sustainability and Climate  
 Protection, January 2024





## Appendix 2 – Figures



Figure 1 Primary landing site at Heroina Island, Danger Islands Expedition 2015: Credit: Tom Hart, © Oxford University/Penguinwatch



Figure 2 Adélie penguins on sea ice next to Comb Island, Danger Islands Expedition 2015: Credit: Michael Polito, © Louisiana State University

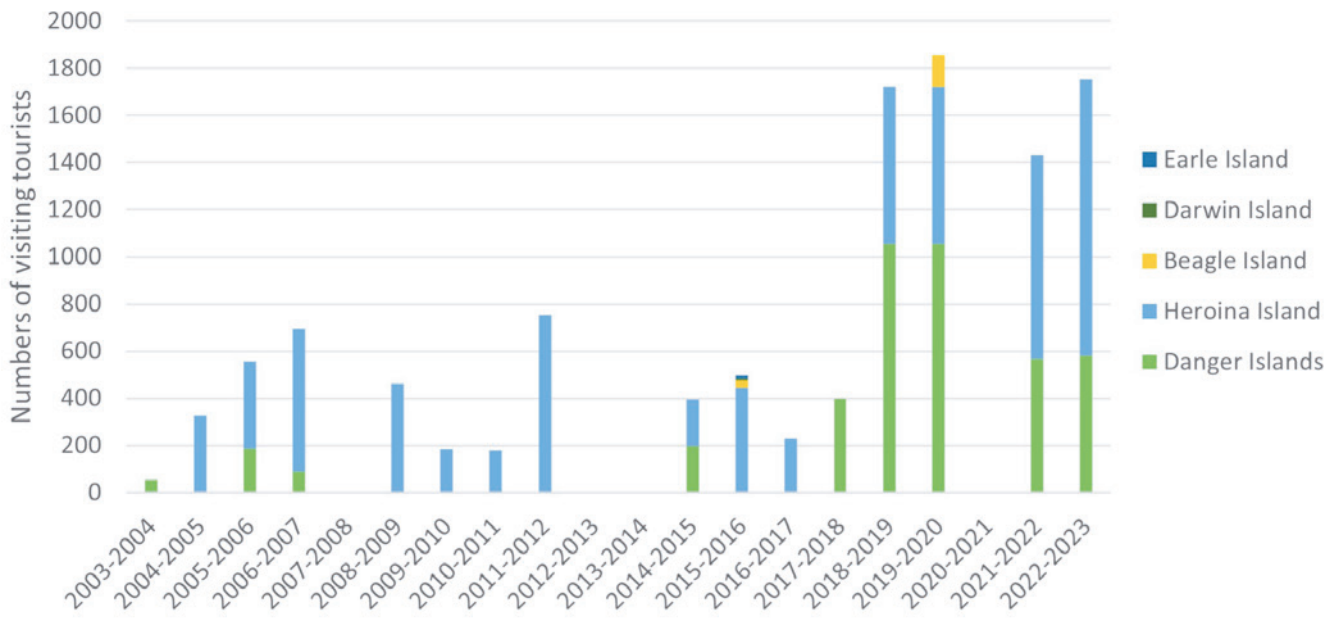


Figure 3 History of touristic visits to the Danger Islands. Data: IAATO Jan 2024.



## Appendix 3 Tables

**Table 1: List of species present in the Danger Islands (Borowicz et al. 2018, suppl. Tab. 1). B = Verified as breeding, I = Individuals present, NB = Verified as not breeding, -- = Not observed or No data**

Species	Beagle	Brash	Comb	Darwin	Dixey Rock	Earle	Heroina	Platter	Scud Rock
<b>Birds</b>									
Adélie penguins ( <i>Pygoscelis adeliae</i> )	B	B	B	B	NB	B	B	B	NB
Gentoo penguin ( <i>Pygoscelis papua</i> )	NB	B	B	-	NB	B	B	B	NB
Chinstrap penguin ( <i>Pygoscelis antarcticus</i> )	NB	NB	NB	-	NB	NB	B	NB	NB
Antarctic shag ( <i>Phalacrocorax atriceps</i> )	NB	NB	-	-	NB	B	I	B	NB
Skua species ( <i>Stercorarius spp.</i> )	-	I	I	B	-	B	B	I	-
Southern giant petrel ( <i>Macronectes giganteus</i> )	NB	I/NB	NB	-	-	NB	I/NB	I/NB	-
Cape (pintado) petrel ( <i>Daption capense</i> )	-	-	-	-	-	-	B	B	-
Snow petrel ( <i>Pagodroma nivea</i> )	-	-	B	-	-	I	I	-	-
Wilson's storm petrel ( <i>Oceanites oceanicus</i> )	-	B	-	-	-	-	I	I	-
Kelp gull ( <i>Larus dominicanus</i> )	-	B	I	-	-	I	I	I	-
Snowy sheathbill ( <i>Chionis albus</i> )	-	B	B	I	-	B	B	B	-
Antarctic tern ( <i>Sterna vittata</i> )	-	-	I	-	-	-	I	-	-
<b>Seals</b>									
Weddell seal ( <i>Leptonychotes weddelli</i> )	-	-	I	-	-	I	I	I	-



**Table 2: Available data on seabird population numbers. Counts are given including the count accuracy using the scale of (Ainley, 1993; Croxall and Kirkwood, 1979): N1 and C1 = nests or chicks dividually counted, accurate to better than  $\pm 5\%$ ; N2: Nests counted in known Area then extrapolated over total site Area, accurate to 5–10 %; N3: Accurate estimate of nests, accurate to 10–15 %; N4: Rough estimate of nests, accurate to 25–50 %; N5: Estimate of nests to nearest order of magnitude. Where an accuracy was not indicated, it is indicated as "UNK". The source of the counts are indicated by superscripted letters: a (Borowicz et al., 2018), b (Lynch et al., 2008), c (Lynch et al., 2013), d (Lynch and LaRue, 2014), e (Naveen et al., 2000), for more recent updates please see <https://www.penguinmap.com/mapppd/>**

Location	Date	Adelie p. [PB]	Gentoo p. [PB]	Chinstrap p. [PB]	Antarctic shag. [PB]	Source
Beagle Island	January 1999	20,000 – >100,000 (UKN)				(Naveen <i>et al.</i> , 2000)
	22.01.2011	96,892 (N5)				(Lynch and LaRue, 2014)
	December 2015	284,535 (N2)	0 (N1)	0 (N1)		(Borowicz <i>et al.</i> , 2018)
Brash Island	2000-02-23	123,666 – 228,268 (95th percentile CI)				(Lynch and Schwaller, 2014)
	December 2015	94,951 (N2)	2,270 (N1)	0 (N1)		(Borowicz <i>et al.</i> , 2018)
Comb Island	January 1999	100 – 7,499 (UKN)				(Naveen <i>et al.</i> , 2000)
	22.01.2011	3,311 (N5)				(Lynch and LaRue, 2014)
	December 2015	12,000 (N4)	186 (N1)	0 (N1)		(Borowicz <i>et al.</i> , 2018)
Darwin Island	January 1999	20,000 – >100,000 (UKN)				(Naveen <i>et al.</i> , 2000)
	2000-02-23	5,384 – 9,931 (95th percentile CI)				(Lynch and Schwaller, 2014)
	December 2015	5,804 (N1)	0 (N1)	0 (N1)		(Borowicz <i>et al.</i> , 2018)
Earle Island	2000-02-23	17,361 – 32,163 (95th percentile CI)				(Lynch and Schwaller, 2014)
	December 2015	21,071 (N2)	847 (N1)	0 (N1)	156 (N1)	(Borowicz <i>et al.</i> , 2018)
Heroína Island	December 1996	285,115 – 305,165 (N2)	215 (N1)			(Naveen <i>et al.</i> , 2000)
	3 February 2006		142 chicks (C1)			(Lynch <i>et al.</i> , 2008)
	21 January 2008		173 chicks (C1)			(Lynch <i>et al.</i> , 2013)
	22.01.2011	51,358 (N5)				(Lynch and LaRue, 2014)
	December. 2015	292,363 (N2)	999 (N2)	27 (N1)		Borowicz <i>et al.</i> , 2018)
Platter Island	January 1999	7,500 to 19,999 (UKN)				(Naveen <i>et al.</i> , 2000)
	22.01.2011	27,902 (N5)				(Lynch and LaRue, 2014)
	December 2015	40,803 (N1)	223 (N1)	0 (N1)		(Borowicz <i>et al.</i> , 2018)