



# Management Plan

## For Antarctic Specially Protected Area No. 171 NARĘBSKI POINT, BARTON PENINSULA, KING GEORGE ISLAND

### Introduction

Narębski Point is located on the southeast coast of Barton Peninsula, King George Island. The Area is delimited as latitude 62°13'40"- 62°14'23"S and longitude 58°45'25"- 58°47'00"W and easily distinguished by mountain peaks on the north and the east boundaries and coastline on the southwest boundary.

The unique topography of the Area gives outstanding aesthetic beauty with panoramic views, and the Area provides exceptional opportunities for scientific studies of terrestrial biological communities with high diversity and complexity of ecosystem. In particular, the coverage of mosses and lichens is very extensive.

The Area also includes water-shed systems, such as lakes and creeks, where dense microbial and algal mats with complex species assemblages are frequently found. These freshwater resources are essential to the diverse life forms in this Area. The high biodiversity of terrestrial vegetation with the complexity of habitats enhances the potential values of the Area to be protected.

Through the Korea Antarctic Research Program, scientists have visited the Area regularly since the 1980s in order to study its fauna, flora, and geology. In recent years, however, Narębski Point has been frequented by visitors from the nearby stations with purposes other than scientific research, particularly during the reproductive season, and vulnerability to human interference has been increasing. Some studies note that King George Island has the potential for tourism development (ASOC, 2007 & 2008; Peter *et al.*, 2005) and visitors to the King Sejong Station have increased from less than 20 people a year in the late 1980s to over 110 in recent years.

The primary reason for the designation of the Area as an Antarctic Specially Protected Area is to protect its ecological, scientific, and aesthetic values from human interference. Long-term protection and monitoring of the diverse range of species and assemblages at Narębski Point will contribute to developing appropriate regional and global conservation strategies, and provide comparative information with other locations.

The ASPA was designated in 2009 (Measure 13: ASPA No 171 – Narębski Point, Barton Peninsula, King George Island) and the management plan was revised in 2014 (Measure 11) and 2019 (Measure H).

The Area is described as Domain A (Antarctic Peninsula northern geologic) based on the Environmental Domains Analysis for the Antarctic continent (Resolution 3, 2008), with ASPA No 111, 128, and 151. Moreover, the ASPA sits within the Antarctic Conservation Biogeographic Region (ACBR) 3 – North-west Antarctic Peninsula Regions (Resolution 3, 2017).

### 1. Description of Values to be Protected

The Narębski Point area is designated as an Antarctic Specially Protected Area to protect its outstanding environmental values and to facilitate ongoing and planned scientific research.

The Area provides exceptional opportunities for scientific studies of terrestrial biological communities. Scientific research, including the monitoring of penguin colonies, has been carried out by several countries since the early 1980s. The outcomes of the research revealed the potential value of the Area as a reference site, particularly in relation to climate change and the impacts of human activities.

The most conspicuous vegetal communities are the associations of lichens and the moss turf dominated by *Usnea* spp, *Himantormia lugbris*, and *Chorisodontium aciphyllum*. The present flora includes one Antarctic flowering plant species (only two flowering plant species were found as yet in Antarctica), 57 lichens, 29 mosses, six liverworts, and at least one algal species.

Another noticeable feature in the Area is that over 2,100 pairs of Chinstrap Penguins (*Pygoscelis antarcticus*) and over 2,400 pairs of Gentoo Penguins (*Pygoscelis papua*) inhabit the Area (MOE, 2023). There are also 16 other bird species. Among them, eight breeding birds include the Brown Skua (*Stercorarius antarcticus lonnbergi*), South Polar Skua (*Stercorarius maccormicki*), Kelp Gull (*Larus dominicanus*), Antarctic Tern (*Sterna vittata*), Wilson's Storm Petrel (*Oceanites oceanicus*), Black-bellied Storm Petrel (*Fregatta tropica*), Snowy Sheathbill (*Chionis albus*), and the Southern Giant Petrel (*Macronectes giganteus*).



The unique topography of the Area, together with the abundance and diversity of fauna and flora, gives the Area an exceptional aesthetic value. Among others, the mountain peaks and the southernmost peaks provide breathtaking panoramic views.

For the above reasons, the Area should be protected and subject to minimal disturbance by human activities with the exception of occasional monitoring studies including vegetation, bird populations, and geological and geomorphologic studies.

The total area of the Area is 984,951 m<sup>2</sup>.

## 2. Aims and Objectives

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Management of Narębski Point aims to:

- Avoid degradation of or substantial risk to the values of the Area by preventing unnecessary human disturbance to the Area;
- Allow scientific research on the ecosystem, as well as the continuity of ongoing long-term biological studies established in the Area, while ensuring protection from oversampling or other possible scientific impacts;
- Allow other scientific research, scientific support activities, and visits for educational and outreach purposes (such as documentary reporting (visual, audio, or written) of educational resources or services) provided that such activities are for compelling reasons that cannot be served elsewhere and that will not jeopardize the natural ecological system in that Area;
- Allow visits for management purposes in support of the aims of the management plan;
- Prevent, to the maximum extent practicable, the introduction of non-native species and pathogens that may endanger or alter the ecosystem of the Area;
- Protect the Area's aesthetic and scientific values.

## 3. Management Activities

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

- Personnel accessing the site shall be specifically instructed, by their national program (or competent authority) as to the content of the Management Plan;
- A signboard illustrating the location and boundaries, with clear statements of entry restrictions, shall be placed at appropriate locations at the boundaries of the Area (see Map 2);
- Copies of this Management Plan shall be made available to all vessels and aircraft visiting the Area and/or operating in the vicinity of the adjacent stations, and all pilots and ship captains operating in the region shall be informed of the location, boundaries, and restrictions applying to entry and overflight within the Area;
- All signs as well as scientific equipment and markers erected in the Area will be secured and maintained in proper conditions;
- The biological condition of the Area will be adequately monitored, including a census of penguins and other bird populations;
- Any abandoned equipment or materials shall be removed to the maximum extent possible provided doing so does not adversely impact the environment and the values of the Area;
- 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 that maintenance and management measures are adequate;
- National Antarctic Programs operating in the region are encouraged to consult with each other and exchange information to ensure that activities in the Area are undertaken in a manner consistent with the aims and objectives of this Management Plan.

## 4. Period of Designation

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Designated for an indefinite period.

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## 5. Maps

Maps 1 to 6 are attached at the end of this management plan as Annex II.

- **Map 1:** Location of Narębski Point in relation to King George Island and the existing protected areas (ASMA, ASPAs, and HSMS)
- **Map 2:** Boundary of the ASPA No. 171
- **Map 3:** Distribution of bird colonies and seal haul-out sites within the ASPA No. 171
- **Map 4:** Distribution of the plant communities in the ASPA No. 171
- **Map 5:** Geomorphologic details of the ASPA No. 171
- **Map 6:** Access routes to the ASPA No. 171

## 6. Description of the Area

### 6 (i) Geographical co-ordinates, boundary markers, and natural features

Narębski Point is located on the southeast coast of Barton Peninsula, King George Island, and the Area is delimited as latitude 62°13'40"– 62°14'23"S and longitude 58°45'25"– 58°47'00"W. Boundaries are delimited by mountain peaks on the north and the east and coastline on the southwest. The southwest boundary can be easily recognized due to its distinguished geomorphology. The Area includes only the terrestrial area, excluding the intertidal zone.

The Area is rich in flora and fauna, of which the abundance of some species is exceptional. The cover of mosses and lichens is very extensive. There are large numbers of Chinstrap and Gentoo Penguins and the breeding areas of eight other birds including the nests of the Southern Giant Petrel. The high diversity in relief and coastal forms, due to the presence of different geologies and a prominent system of fractures, in addition to an extensive and varied vegetation cover, provides unusual scenic diversity in the Antarctic environment.

#### Climate

Meteorological data for the Area are confined entirely to observations for the last 20 years at the King Sejong Station (2003–2022), about 2 km northwest of Narębski Point. The climate is humid and relatively mild because of a strong maritime effect. The Area has an annual average temperature of -1.69 °C (maximum 13.9°C, minimum -24.2°C), relative humidity of 86.6%, average total precipitation of 522.4 mm, and cloud cover of 6.8 Octas. The mean wind velocity is 7.9 m/s (51.9 m/s at the greatest), predominantly from the northwest and east throughout the year. The occurrence of blizzards from 2003 to 2022 was 23.1/year on average.

#### Geology

The lowermost lithostratigraphic unit in Barton Peninsula is the Sejong formation (Yoo *et al.*, 2001), formally regarded as a lower volcanic member. The Sejong Formation is distributed in the southern and southeastern cliffs of Barton Peninsula (Lee *et al.*, 2002). It is largely composed of volcanoclastic constituents gently dipping to the south and southwest. Mafic to intermediated volcanic lavas overlying the Sejong Formation are widespread in Barton Peninsula, including the Area. They are mostly plagioclase-phyric or plagioclase- and clinopyroxene-phyric basaltic andesite to andesite with rare massive andesite. Some thick-bedded lapilli tuffs are intercalated with the lava flows. Mafic dikes, Narębski Point being one of them, cut the Sejong formation along the southern coast of the peninsula. Soils of the peninsula are subdivided into four suites based on bedrock type, namely those on granodiorite, basaltic andesite, lapilli tuff, and the Sejong formation (Lee *et al.*, 2004). Soils are generally poor in organic materials and nutrients, except for those near seabird colonies.

#### Penguins

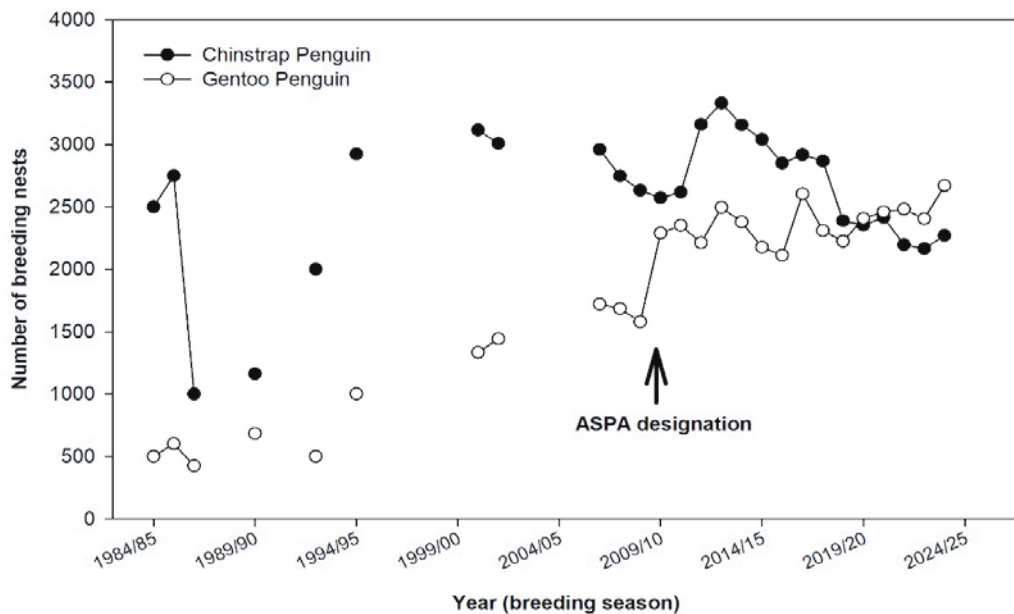
Breeding colonies of the Chinstrap penguin (*Pygoscelis antarcticus*) and Gentoo penguin (*Pygoscelis papua*) are distributed on rocky inclines and hill crests in the Area.

The Chinstrap Penguin was the most abundant breeding species in the Area, but the number of breeding Chinstrap Penguins seems to have declined since its maximum counted number of 3,332 nests in the 2012/13 season (MOE, 2013). A total of 2,271 nests were counted for the Chinstrap Penguin in the 2023/24 season (Figure 1). Chinstrap Penguins start laying eggs in early November and incubate for 32–43 days. The peak seasons for egg laying and hatching are estimated to be mid-November and mid-December, respectively (Kim, 2002).



The Gentoo Penguin has become the most abundant breeding species in the Area since the 2019/20 season, surpassing the number of active nests of the Chinstrap Penguin. The number of breeding nests for Gentoo Penguins has steadily increased from 500 nests since the 1984/85 season, reaching a total of 2,669 nests in 2023/24 (Figure 1). Gentoo Penguins begin laying eggs in mid-October, with the peak season occurring in late October. They incubate for 33-40 days and hatch in early December (Kim, 2002).

**Figure 1. Changes in the breeding populations of Chinstrap penguin and Gentoo penguin at Narębski Point in the Area (Peter et al., 1986; Rauschert et al., 1987; Mönke & Bick, 1988; Yoon, 1990; MOST, 1993; MAF, 1997; Kim, 2002; MOE, 2007; MOE, 2011-2023)**



### Other birds

Along with two penguin species, there are eight other nesting bird species in the Area: Brown Skua (*Stercorarius antarcticus lonnbergi*), South Polar Skua (*Stercorarius maccormicki*), Kelp Gull (*Larus dominicanus*), Antarctic Tern (*Sterna vittata*), Southern Giant Petrel (*Macronectes giganteus*), Wilson's Storm Petrel (*Oceanites oceanicus*), Black-bellied Storm Petrel (*Fregatta tropica*), and Snowy Sheathbill (*Chionis albus*). A summary of the estimated number of nests by species is presented in Table 1. In addition, eight non-breeding bird species have been recorded in the Area, including the Adélie Penguin (*Pygoscelis adeliae*), Macaroni Penguin (*Eudyptes chrysolophus*), Antarctic Shag (*Leucocarbo bransfieldensis*), Arctic Tern (*Sterna paradisaea*), Cape Petrel (*Daption capense*), Antarctic Petrel (*Thalassoica antarctica*), Snow Petrel (*Pagodroma nivea*), and Southern Fulmar (*Fulmarus glacialis*).

Brown Skua and South Polar Skua prey on penguin eggs and chicks, and some pairs of skuas occupy penguin sub-colonies as feeding territory during the breeding season (Trivelpiece et al., 1980; Hagelin and Miller, 1997; Pezzo et al., 2001; Hahn and Peter, 2003). South Polar Skuas nesting in the Area do not rely on penguin eggs and chicks for their own chicks. On the contrary, Brown Skua pairs breeding near the penguin sub-colonies were observed to occupy their own feeding territory for feeding penguin eggs and chicks (Kim et al., 2022).

The number of breeding pairs of Snowy Sheathbills near the penguin rookery in the Area increased to six in the 2023/24 season. Snowy Sheathbills are omnivores that scavenge for food around the breeding colonies of seabirds. They feed on penguin feces, eggs, and dead chicks, and also steal krill from penguins at the site.

Intensive monitoring of the migration of Wilson's Storm Petrels was conducted using light-based geolocators between 2021/22 and 2023/24, revealing strong geographic connectivity between ASPA 171 and the Gulf of Maine in the Northern Atlantic.




**Table 1. Estimated number of nests by species (2006/07, 2013/14, 2018/2019, and 2023/24)**

Species		Number of nests			
		2006/07	2013/14	2018/19	2023/24
Chinstrap Penguin	<i>Pygoscelis antarcticus</i>	2,961	3,157	2,388	2,271
Gentoo Penguin	<i>Pygoscelis papua</i>	1,719	2,378	2,224	2,669
Brown Skua	<i>Stercorarius antarcticus lonnbergi</i>	4	7	5	7
South Polar Skua	<i>Stercorarius maccormicki</i>	27	-	7	10
Kelp Gull	<i>Larus dominicanus</i>	6	-	-	2
Antarctic Tern	<i>Sterna vittata</i>	41	-	4	2
Southern Giant Petrel	<i>Macronectes giganteus</i>	9	5	15	35
Wilson's Storm Petrel	<i>Oceanites oceanicus</i>	19	>10	>7	>132
Black-bellied Storm Petrel	<i>Fregetta tropica</i>	-	-	>1	>10
Snowy Sheathbill	<i>Chionis albus</i>	2	1	5	6

### Vegetation

Most of the ice-free areas of Barton Peninsula are covered by relatively rich vegetation, dominated by cryptogamic species. The cover of mosses and lichens is very extensive within the Area. The most conspicuous vegetal communities are the associations of dominant lichens *Usnea-Himantormia* and the moss turf dominated by *Sanionia-Chorisodontium*. The algal community is dominated by the green freshwater alga *Prasiola crispa*, which is established around penguin colonies. The present flora includes one Antarctic flowering plant species, 57 lichens, 29 mosses, six liverworts, and one algal species. In the case of algae, only the species forming macroscopically detectable stands was recorded. No information on cyanobacteria and mycobiota occurring in this Area is available, as studies have not been undertaken. The detailed vegetation list is shown in Annex I.

### Human activities / impacts

Two permanent scientific stations are located at nearby Narębski Point. The King Sejong Station (62°13'S, 58°47'W; Republic of Korea), established in 1988, and the Carlini Station (62°14'S, 58°40'W; Argentina), established in 1953, operate year-round activities.

### 6 (ii) Access to the area

Access to the Area is possible on foot along the coast or by small boat without anchoring. The access routes and the landing site are shown in Map 6. Vehicle traffic of any type is not permitted inside the Area. Access restrictions apply within the Area, the specific conditions for which are set out in Section 7(ii) below.

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

One refuge facility is located at the southeastern coast of the Area. The King Sejong Station (Republic of Korea, 62°13'S, 58°47'W; Map 2), which is located 2 km to the northwest of Narębski Point, is the closest major facility and the Carlini Station (Argentina) is located 5 km to the southeast of Narębski Point.



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

- ASMA No. 1, Admiralty Bay, King George Island, South Shetland Islands lies about 8 km northeast.
- ASPA No. 125, Fildes Peninsula, King George Island, South Shetland Islands lies about 11 km west.
- ASPA No. 128, Western Shore of Admiralty Bay, King George Island, South Shetland Islands lies about 17 km east.
- ASPA No. 132, Potter Peninsula, King George Island, South Shetland Islands lies about 5 km east.
- ASPA No. 133, Harmony Point, Nelson Island, South Shetland Islands lies about 25 km southwest.
- ASPA No. 150, Ardley Island, King George Island, South Shetland Islands lies about 9 km to the west.
- ASPA No. 151, Lions Rump, King George Island, South Shetland Islands lies about 35km northeast.
- HSM No. 36, Replica of a metal plaque erected by Eduard Dallmann at Potter Cove, King George Island, lies about 5 km east.
- HSM No. 50, Plaque to commemorate the research vessel Professor Siedlecki which landed in February 1976, Fildes Peninsula, King George Island lies about 10 km west.
- HSM No. 51, Grave of W. Puchalski, an artist and a producer of documentary films, who died on 19 January 1979, lies about 18 km northeast.
- HSM No. 52, Monolith erected to commemorate the establishment on 20 February 1985 of Great Wall Station (China), Fildes Peninsula, King George Island lies about 10 km west.
- HSM No. 82, Plaque at the foot of the monument commemorating the Signatories to the Antarctic Treaty and successive IPYs, lies about 12 km west.
- HSM No. 86, No.1 Building at Great Wall Station, lies about 10 km west.

## 6 (v) Special zones within the Area

There are no special zones within the Area.

## 7. Terms and Conditions for Entry Permits

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### 7 (i) General permit conditions

Entry into the Area is prohibited except in accordance with a permit issued by appropriate national authorities as designated under Article 7 of Annex V of the Protocol on Environmental Protection to the Antarctic Treaty.

- Conditions for issuing a permit to enter the Area are that:
- It is issued only for scientific study of the ecosystem, or for compelling scientific or educational (such as documentary reporting or the production of educational resources or services) reasons that cannot be served elsewhere, or for reasons essential to the management of the Area;
- The actions permitted will not jeopardize the natural ecological system of the Area;
- The actions permitted are in accordance with this Management Plan;
- Any management activities are in support of the objectives of the Management Plan;
- The permit, or an authorized copy, must be carried within the Area;
- Permits shall be valid for a stated period and identify the competent authority.

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

- Access to the Area is possible on foot along the coast or by small boat without anchoring. The access routes and the landing site are shown in Map 6.
- Pedestrian movements should be kept with caution so as to minimize disturbance to flora and fauna, and should walk on snow or rocky terrain if practical, but taking care not to damage lichens.
- Vehicle traffic of any type is not permitted inside the Area.
- The operation of aircraft over the Area will be carried out, as a minimum requirement, in compliance with Resolution 2 (2004), "Guidelines for the Operation of Aircraft near Concentrations of Birds". As a general rule, no aircraft should fly over the ASPA at less than 610 meters (2000 ft), except in cases of emergency or aircraft security. Overflights, however, should be avoided.
- Overflight of bird colonies within the Area by Remotely Piloted Aircraft Systems (RPAS) shall not be permitted unless for scientific or operational purposes in compliance with Resolution 4 (2018), and in accordance with a permit issued by an appropriate national authority.



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

Activities which may be conducted within the Area shall not jeopardize the ecological, scientific, and aesthetic values of the Area. Activities which may be conducted within the Area include:

- Compelling scientific research which cannot be undertaken elsewhere;
- Essential management activities, including monitoring;
- Constraints may be placed on the use of motor-driven tools and any activity likely to generate noise and thereby cause disturbances to nesting birds during the breeding period (from October 1 to March 31);
- Activities for educational 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;
- Sampling, which should be the minimum required for approved research programmes.

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

- No structures will be built and no equipment installed within the Area, with the exception of scientific or management activities, as specified in the permit.
- Any scientific equipment installed in the Area should be approved by a permit and clearly identify the permitting country, name of the principal investigator, and the year of installation and date of expected removal. All the equipment should pose a minimum risk of pollution to the Area or a minimum risk of causing disturbances to the flora or fauna.
- Signs of investigation should not remain after the permit expires. If a specific project cannot be finished within the allowed time period, an extension should be sought that authorizes the continued presence of any object in the Area.

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

- The use of the refuge facility located on the shore near the eastern boundary of the Area is strongly encouraged in emergency (see Map 2).
- For scientific purposes, temporary camping is permitted within the Area in accordance with a permit. There are no specific restrictions on the precise locality for temporary campsites within the Area, although it is recommended that the initial sites selected should be away from breeding bird nests.

### **7 (vi) Restriction on material and organisms which may be brought into the Area**

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

- No living animals or plant material shall be deliberately introduced into the Area.
- No uncooked poultry products or fresh fruit and vegetables are to be taken into the Area.
- To minimize the risk of microbial or vegetation introductions from soils at other Antarctic sites, including the station, or from regions outside Antarctica, footwear and any equipment (particularly sampling equipment and markers) to be used in the Area shall be thoroughly cleaned before entering the Area.
- No herbicides or pesticides shall be introduced into the Area. Any other chemical product, that shall be introduced with the corresponding permit, shall be removed from the Area upon conclusion of the activity for which the permit was granted. The use and type of chemical products should be documented, as clearly as possible, for the knowledge of other researchers.
- Fuel, food, and other material are not to be stored in the Area, unless required for essential purposes connected with the activity for which the permit has been granted, provided it is securely stored so that wildlife cannot have access to it.
- To ensure that the ecological values of the Area are maintained, special precautions shall be taken against accidentally introducing microbes, invertebrates, or plants from other Antarctic sites, including stations, or from regions outside Antarctica. In the event of a warning regarding HPAI (Highly Pathogenic Avian Influenza), consulting the guidance provided by COMNAP on HPAI is recommended.
- Further guidance can be found in the *CEP Non-native species manual* (Resolution 4, 2016; CEP, 2019) and *SCAR's Environmental Code of Conduct for Terrestrial Scientific Field Research in Antarctica* (Resolution 5, 2018).

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

- Any taking or harmful interference, except in accordance with a permit, is prohibited and should be consistent with the *SCAR Code of Conduct for the use of Animals for Scientific Purposes in Antarctica* (Resolution 4, 2019) as a minimum requirement.
- Information on taking or harmful interference will be exchanged through the System of Information Exchange of the Antarctic Treaty.



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

- Collection or removal of materials from the Area may be only in accordance with a permit and should be limited to the minimum necessary to meet scientific or management needs.
- Anything 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 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.

### 7 (ix) Disposal of waste

All wastes, including all 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:
- carry out biological monitoring and Area inspection activities, which may involve the collection of a small number of samples for scientific analysis or review;
- install or maintain signboards, markers, structures or scientific equipment;
- carry out protective measures.
- Any long-term monitoring sites shall be appropriately marked and the markers or signs maintained.

### 7 (xi) Requirements for reports

- The principal permit holder for each issued permit shall submit a report of activities undertaken in the Area.
- Such reports should include, as appropriate, the information identified in the visit report form contained in the *Revised Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas* (Resolution 2, 2011).
- This report shall be submitted to the authority named in the permit as soon as practicable, but not later than 6 months after the visit has taken place.
- Records of such reports should be stored indefinitely and made accessible to any interested Party, SCAR, CCAMLR, and COMNAP if requested, so as to provide necessary information of human activities in the Area to ensure adequate management 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 authorized permit.

## 8. Supporting Documentation

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## ANNEX I. List of flora in the Site

Taxa
<b>Lichens</b>
<i>Acrospora austroshetlandica</i> (C.W. Dodge) Øvstedal
<i>Bryoria forsteri</i> Olech & Bystrek
<i>Buellia russa</i> (Hue) Darb.
<i>Caloplaca lucens</i> (Nyl.) Zahlbr.
<i>Caloplaca sublobulata</i> (Nyl.) Zahlbr.
<i>Cetraria aculeata</i> (Schreb.) Fr.
<i>Cladonia borealis</i> S. Stenroos
<i>Cladonia chlorophaea</i> (Flörke ex Sommerf.) Spreng.
<i>Cladonia gracilis</i> (L.) Willd.
<i>Cladonia novochlorophaea</i> (Sipman) Brodo & Ahti
<i>Cladonia pleurota</i> (Flörke) Schaer.
<i>Cladonia pyxidata</i> (L.) Hoffm.
<i>Cladonia scabriuscula</i> (Delise) Nyl.
<i>Haematomma erythromma</i> (Nyl.) Zahlbr
<i>Himantormia lugubris</i> (Hue.) I. M. Lamb
<i>Huea coralligera</i> (Hue) C. W. Dodge & G. E. Baker
<i>Lecania brialmontii</i> (Vain.) Zahlbr.
<i>Lecania gerlachei</i> (Vain.) Darb.
<i>Lecanora aspidophora</i> Vain.
<i>Lecanora epibryon</i> (Ach.) Ach
<i>Lecanora melanophthalma</i> (Ram.) Leuckert & Poelt
<i>Lecanora polytropa</i> (Hoffm.) Rabenh.
<i>Lecidea cancriformis</i> C.W. Dodge and G.E. Baker
<i>Lecidella carpathica</i> Körb.
<i>Lepra excudens</i> (Nyl.) Hafellner
<i>Lepraria borealis</i> Loht. & Tønsberg
<i>Massalongia carnosa</i> (Dicks.) Körb.
<i>Megaspora verrucosa</i> (Ach.) Hafellner & V. Wirth
<i>Ochlorella frigida</i> (Sw.) Lynge
<i>Parmelia saxatilis</i> (L.) Ach
<i>Physcia caesia</i> (Hoffm.) Fűrnr.
<i>Physcia dubia</i> (Hoffm.) Lettau
<i>Physconia muscigena</i> (Ach.) Poelt
<i>Placodium regale</i> Vain
<i>Placopsis contourtuplicata</i> I. M. Lamb
<i>Polycauliona candelaria</i> (L.) Frödén, Arup & Sechting
<i>Porpidia austroshetlandica</i> Hertel
<i>Protopannaria austro-orcadensis</i> (Øvstedal) P.M. Jørg
<i>Pseudophebe pubescens</i> (L.) M. Choisy
<i>Psoroma cinnamomeum</i> Malme



<i>Psoroma hypnorum</i> (Vahl) Gray
<i>Psoroma tenue</i> Henssen
<i>Ramalina terebrata</i> Hook f. & Taylor
<i>Rhizocarpon geographicum</i> (L.) DC.
<i>Rinodina olivaceobrunnea</i> C.W. Dodge & G. B. Baker
<i>Sphaerophorus globosus</i> (Huds.) Vain.
<i>Stereocaulon alpinum</i> Laurer
<i>Tephromela atra</i> (Huds.) Hafellmer ex Kalb
<i>Tetramelas anisomerus</i> (Vain.) Elix
<i>Tetramelas darbishirei</i> (I.M. Lamb) Elix
<i>Tremolecia atrata</i> (Ach.) Hertel
<i>Turgidosculum complicatum</i> (Nyl.) J. Kohlm. & E. Kohlm
<i>Umbilicaria antarctica</i> Frey & I. M. Lamb
<i>Umbilicaria decussata</i> (Vill.) Zahlbr.
<i>Usnea antarctica</i> Du Rietz
<i>Usnea aurantiaco-atra</i> (Jacq.) Bory
<i>Xanthoria elegans</i> (Link) Th. Fr.
<b>Mosses</b>
<i>Andreaea depressinervis</i> Cardot
<i>Andreaea gainii</i> Cardot
<i>Andreaea regularis</i> Müll. Hal.
<i>Bartramia patens</i> Brid.
<i>Bryum argenteum</i> Hedw.
<i>Bryum orbiculatifolium</i> Cardot & Broth.
<i>Bryum pseudotriquetrum</i> (Hedw.) C.F. Gaertn. <i>et al.</i>
<i>Ceratodon purpureus</i> (Hedw.) Brid.
<i>Chorisodontium aciphyllum</i> (Hook. f. & Wils.)
<i>Dicranoweisia brevipes</i> (Müll. Hal.) Cardot
<i>Dicranoweisia crispula</i> (Hedw.) Lindb. ex Milde
<i>Ditrichum hyalinum</i> (Mitt.) Kuntze
<i>Ditrichum lewis-smithii</i> Ochyra
<i>Encalypta rhamnocarpha</i> Schwägr.
<i>Hennediella antarctica</i> (Ångstr.) Ochyra & Matteri
<i>Notoligotrichum trichodon</i> (Hook. f. Wils.) G. L. Sm.
<i>Pohlia drummondii</i> (Müll. Hal.) A. K. Andrews
<i>Pohlia nutans</i> (Hedw.) Lindb.
<i>Pohlia wahlenbergii</i> (Web. & Mohr) A. L. Andrews
<i>Polytrichastrum alpinum</i> (Hedw.) G. L. Sm.
<i>Polytrichum strictum</i> Brid.
<i>Racomitrium sudeticum</i> (Funck) Bruch & Schimp.
<i>Sanionia georgico-uncinata</i> (Müll. Hal.) Ochyra & Hedenäs
<i>Sanionia uncinata</i> (Hedw.) Loeske
<i>Schistidium antarctici</i> (Card.) L. I. Savicz & Smirnova
<i>Syntrichia filaris</i> (Müll. Hal.) Zand.

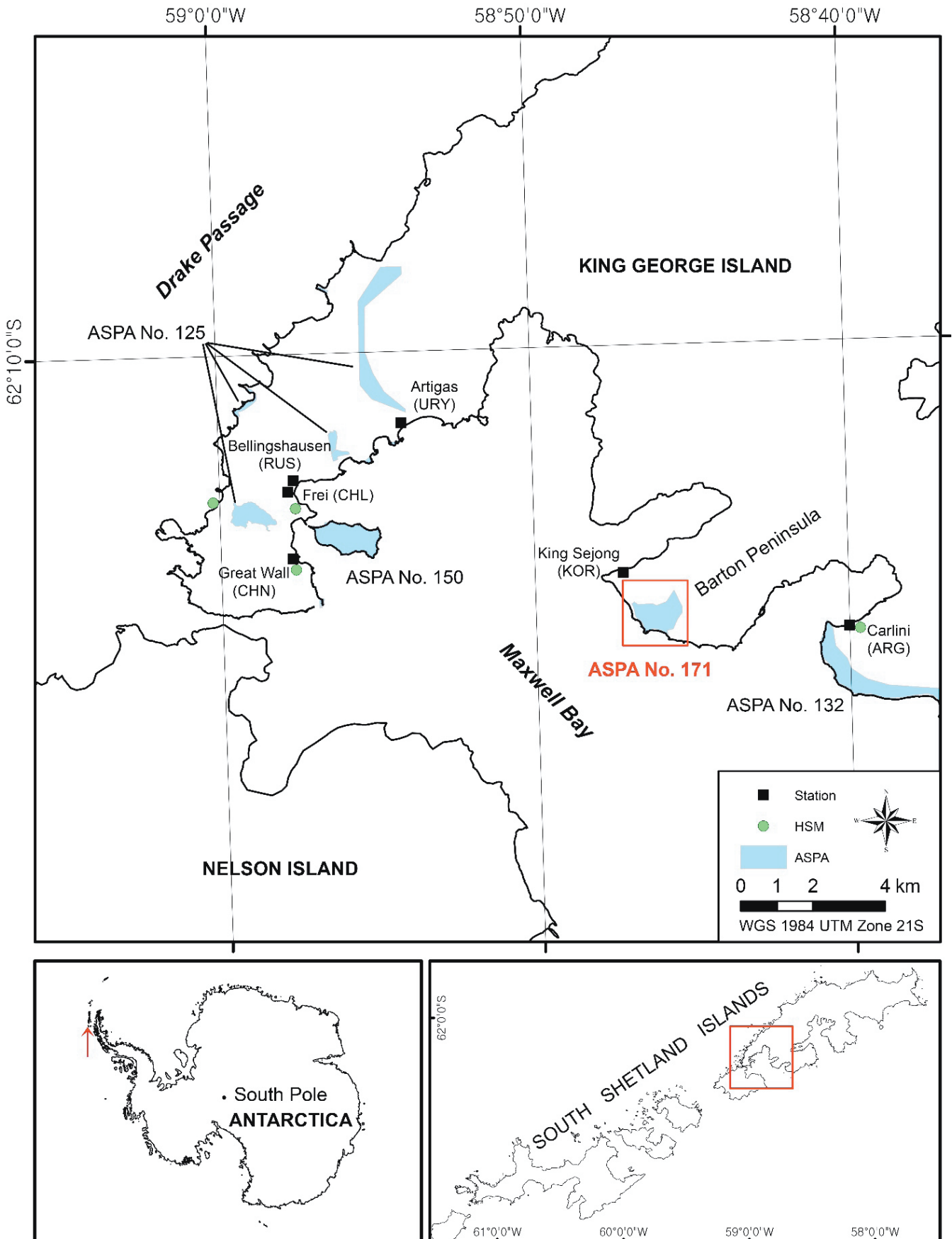


<i>Syntrichia princeps</i> (De Not.) Mitt.
<i>Syntrichia saxicola</i> (Card.) Zand.
<i>Warnstorfia sarmentosa</i> (Wahlenb.) Hedenäs
<b>Liverworts</b>
<i>Barbilophozia hatcheri</i> (A. Evans) Loeske
<i>Cephalozia badia</i> (Gottsche) Steph.
<i>Cephaloziella varians</i> (Gottsche) Steph.
<i>Herzogobryum teres</i> (Carrington & Pearson) Grolle
<i>Lophozia excisa</i> (Dicks.) Dumort.
<i>Pachyglossa disstifidolia</i> Herzog & Grolle
<b>Algae</b>
<i>Prasiola crista</i> (Ligtf.) Menegh.
<b>Flowering plant</b>
<i>Deschampsia antarctica</i> Desv.



## ANNEX II. Maps

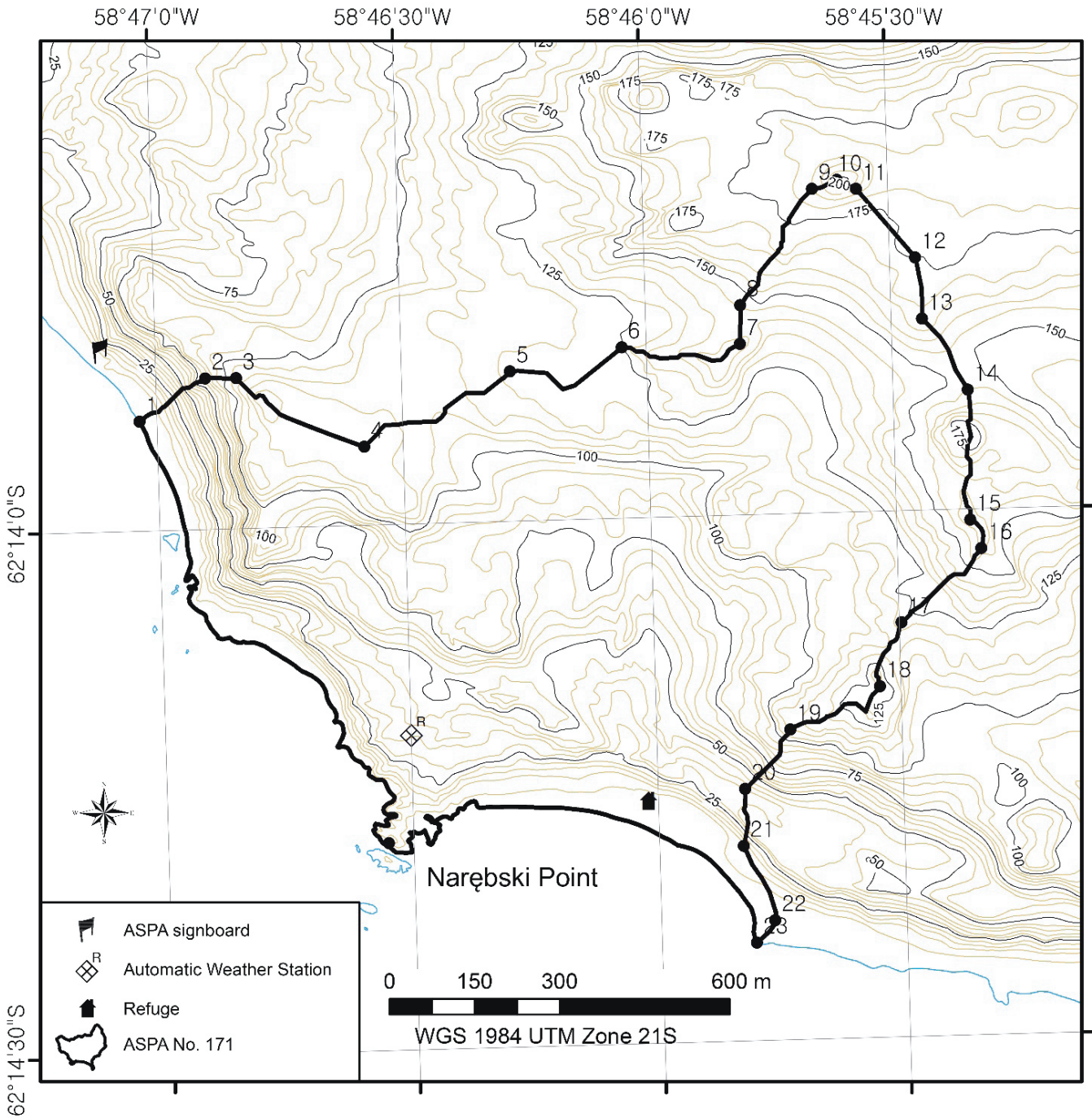
**Map 1. Location of Narebski Point (ASPA No. 171) in relation to King George Island and the existing protected areas (ASMA, ASPAs, and HSMs)**







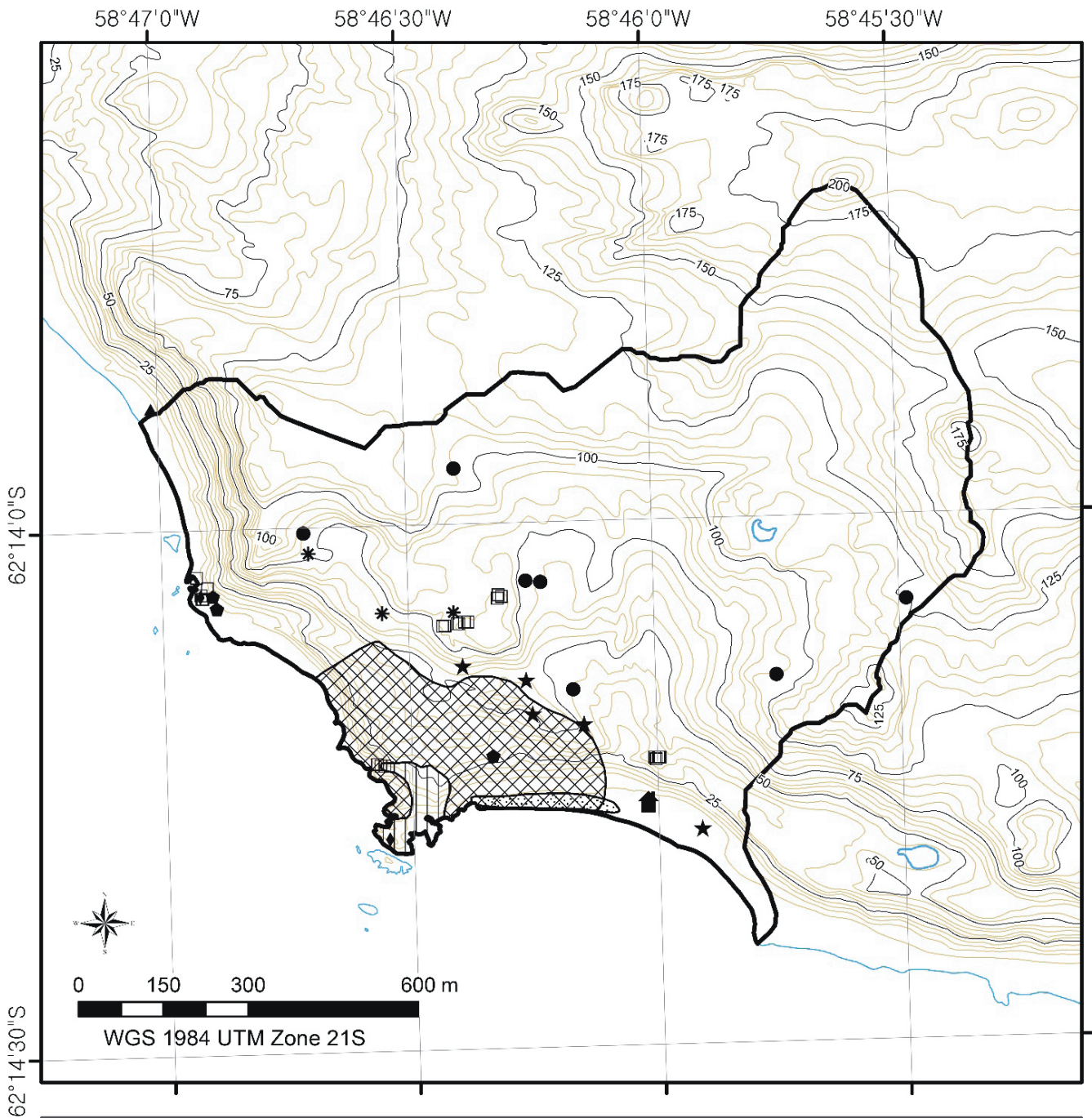
Map 2. Boundary of the ASPA No. 171



	Latitude	Longitude		Latitude	Longitude
1	62° 13' 53.757" S	58° 47' 02.093" W	13	62° 13' 49.089" S	58° 45' 26.162" W
2	62° 13' 51.395" S	58° 46' 53.906" W	14	62° 13' 53.212" S	58° 45' 20.781" W
3	62° 13' 51.419" S	58° 46' 50.136" W	15	62° 14' 00.629" S	58° 45' 20.934" W
4	62° 13' 55.537" S	58° 46' 34.700" W	16	62° 14' 02.277" S	58° 45' 19.645" W
5	62° 13' 51.459" S	58° 46' 16.650" W	17	62° 14' 06.378" S	58° 45' 29.655" W
6	62° 13' 50.273" S	58° 46' 02.924" W	18	62° 14' 09.993" S	58° 45' 32.489" W
7	62° 13' 50.256" S	58° 45' 48.464" W	19	62° 14' 12.312" S	58° 45' 43.585" W
8	62° 13' 48.041" S	58° 45' 48.312" W	20	62° 14' 15.627" S	58° 45' 49.304" W
9	62° 13' 41.529" S	58° 45' 39.156" W	21	62° 14' 18.883" S	58° 45' 49.666" W
10	62° 13' 41.050" S	58° 45' 36.106" W	22	62° 14' 23.167" S	58° 45' 46.055" W
11	62° 13' 41.592" S	58° 45' 33.772" W	23	62° 14' 24.421" S	58° 45' 48.379" W
12	62° 13' 45.599" S	58° 45' 26.777" W	NP	62° 14' 18.170" S	58° 46' 32.990" W



Map 3. Distribution of bird colonies and seal haul-out sites within the ASPA No. 171

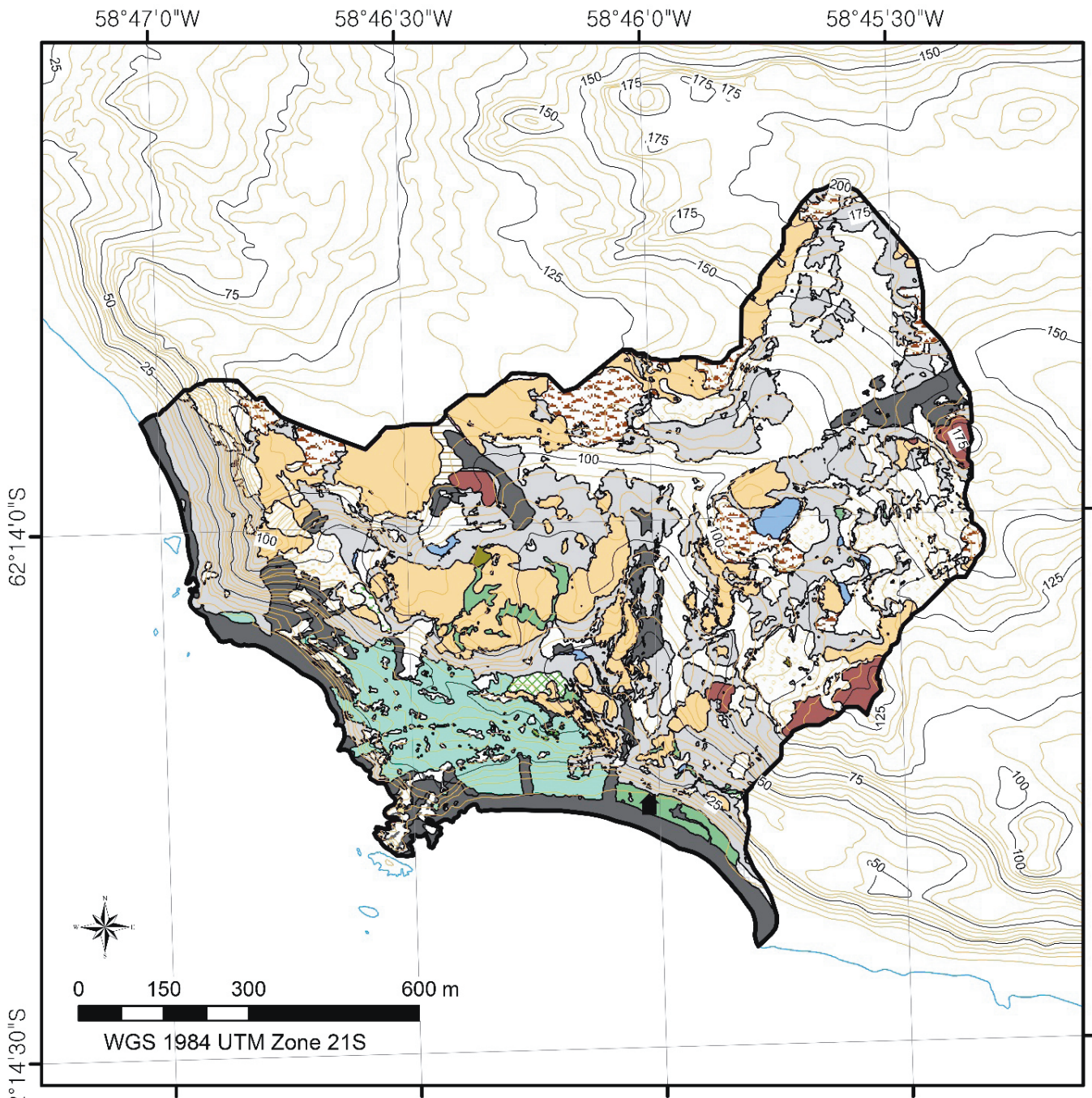


<b>Flying bird nest</b>		<b>Penguin colony</b>		Refuge
◆ <i>Chionis albus</i>	<i>Pygoscelis antarctica</i>	<i>Pygoscelis papua</i>	ASPA No. 171	Lake
□ <i>Macronectes giganteus</i>				
◆ <i>Oceanites oceanicus</i>				
★ <i>Stercorarius antarcticus</i>				
● <i>Stercorarius maccormicki</i>				
* <i>S. maccormicki</i> × <i>S. antarcticus</i>				
▲ <i>Sterna vittata</i>				
	<b>Seal hauling place</b>			
	<i>Mirounga leonina</i>			





Map 4. Distribution of plant communities in the ASPA No. 171



	Cr		Us-H		War
	Cr-An		An		Pr
	Cr-S		An-Cr		Pr-Chr
	H		An-Us		UV
	H-Us		Chr		Colony
	R		Sa		Pond
	Us		S-A		Snow
	Us-An		S-Cr		Refuge
	Us-Cr		S-Us		ASPA No. 171

**Community abbreviations**

Cr: Crustose lichens, Cr-An: Crustose lichens-*Andreeaea* spp., Cr-S: Crustose lichens-*Sanionia* spp., H: *Himantormia lugubris*, H-Us: *H. lugubris*-*Usnea* spp., R: *Ramalina terebrata*, Us: *Usnea* spp., Us-An: *Usnea* spp.-*Andreeaea* spp., Us-H: *Usnea* spp.-*H. lugubris*, Us-Cr: *Usnea* spp.-Crustose lichens, An: *Andreeaea* spp., An-Cr: *Andreeaea* spp.-Crustose lichens, An-Us: *Andreeaea* spp.-*Usnea* spp., Chr: *Chorisodontium aciphyllum*, Sa: *Sanionia* spp., S-A: *Sanionia* spp.-*Andreeaea* spp., S-Cr: *Sanionia* spp.-Crustose lichens, S-Us: *Sanionia* spp.-*Usnea* spp., War: *Warnstorfia* spp., Pr: *Prasiola crispa*, Pr-Chr: *P. crispa*-*C. aciphyllum*, UV: Unvegetated area, Colony: Penguin colony, Pond: Pond, Snow: Snow

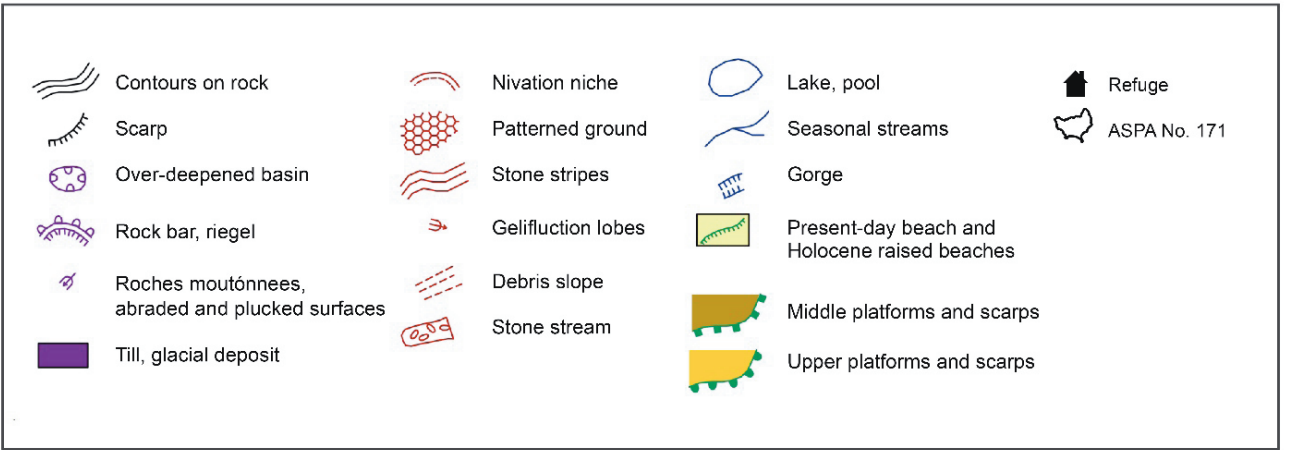
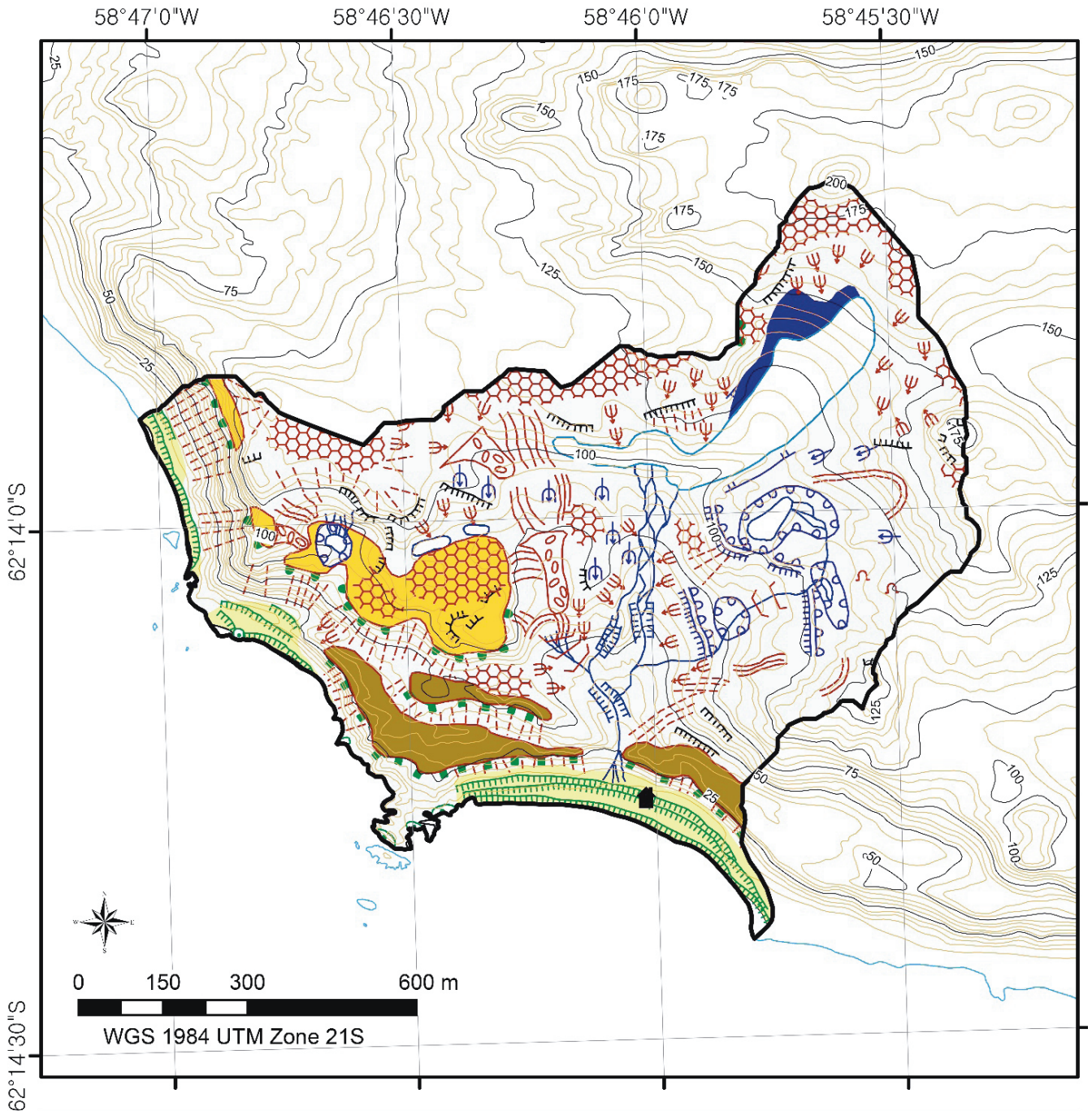
**Total coverage of each community (%)**

Cr: 75.2, H: 100, H-Us: 99.6, R: 100, Us: 95.4, Us-An: 98, Us-Cr: 93.1, Us-H: 98.8, An: 93.8, Sa: 99.9, S-Us: 98.2, Chr: 100, Pr: 86.8





Map 5. Geomorphologic details of the ASPA No. 171





Map 6. Access routes to the ASPA No. 171

