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"S - 62° 14' 23"S and longitude 58° 45' 25"W - 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 the 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 most conspicuous vegetal communities are the associations of lichens and the moss turf dominated by *Usnea-Himantormia.* The present flora includes one Antarctic flowering plant species (only two flowering plant species were found as yet in the Antarctica), 51 lichen species, 29 moss species, six liverwort species, and one algae species.

Another noticeable feature in the Area is that over 3,000 pairs of Chinstrap Penguins (*Pygoscelis antarcticus*) – the largest number in King George Island – and over 2,300 pairs of Gentoo Penguins (*Pygoscelis papua*) inhabit in the Area (MOE 2013). 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 (*Fregetta tropica*), Snowy Sheathbill (*Chionis albus*), and the Southern Giant Petrel (*Macronectes giganteus*).

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 fresh water resources are essential to the diverse life forms in this Area. The high biodiversity of terrestrial vegetation with complexity of habitats enhance the potential values of the Area to be protected.

Through the Korea Antarctic Research Program, scientists have visited the Area regularly since 1980s in order to study its fauna and 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 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 diverse range of species and assemblages at Narębski Point will contribute to the development of appropriate regional and global conservation strategies for the species and will provide information for comparisons with elsewhere.

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. Outcomes of the research revealed the potential value of the Area as a reference site, particularly in relation to global warming and the impacts from human activities.

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 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, geological and geomorphologic studies.

2. Aims and Objectives

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 that cannot be carried out elsewhere, as well as the continuity of ongoing long term biological studies established in the Area;
- Protect the Area's aesthetic and scientific values.

3. Management Activities

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;
- Signs illustrating the location and boundaries, with clear statements of entry restrictions, shall be placed at appropriate locations at the boundaries of the Area;
- All signs as well as scientific equipments 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 census on penguins and other birds populations;
- 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

Designated for an indefinite period.

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 the 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"S - 62° 14' 23"S and longitude 58° 45' 25" W - 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 total size of the Area is approximately 1 km^2.

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 at the King Sejong Station (1998-2013), 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 -1.8 °C (maximum 9.8°C, minimum -23.1°C), relative humidity of 89%, total precipitation of 597.2 mm, and cloud cover of 6.8 Octas. The mean wind velocity is 7.1 m/s (37.6 m/s at the greatest), predominantly from the northwest and east throughout the year. The occurrence of blizzards from 2007 to 2013 was 30.7 (average total duration time 332 hours).

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 volcaniclastic 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.

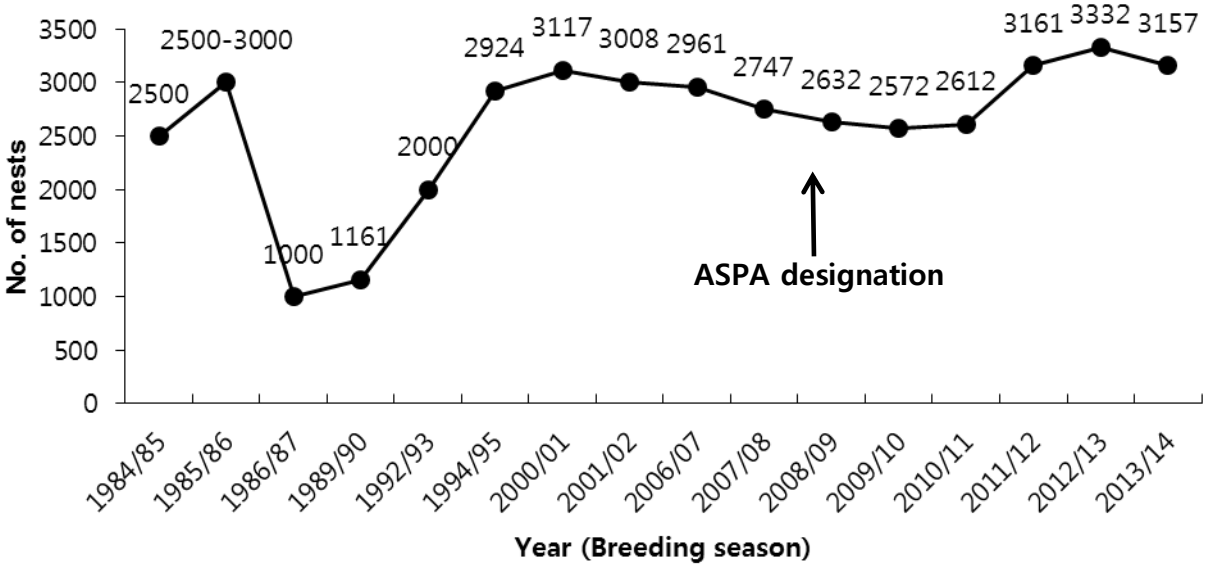
Penguins

Breeding colonies of Chinstrap Penguins (*Pygoscelis antarcticus*) and Gentoo Penguins (*Pygoscelis papua*) are distributed on rocky inclines and hill crests of Narębski Point.

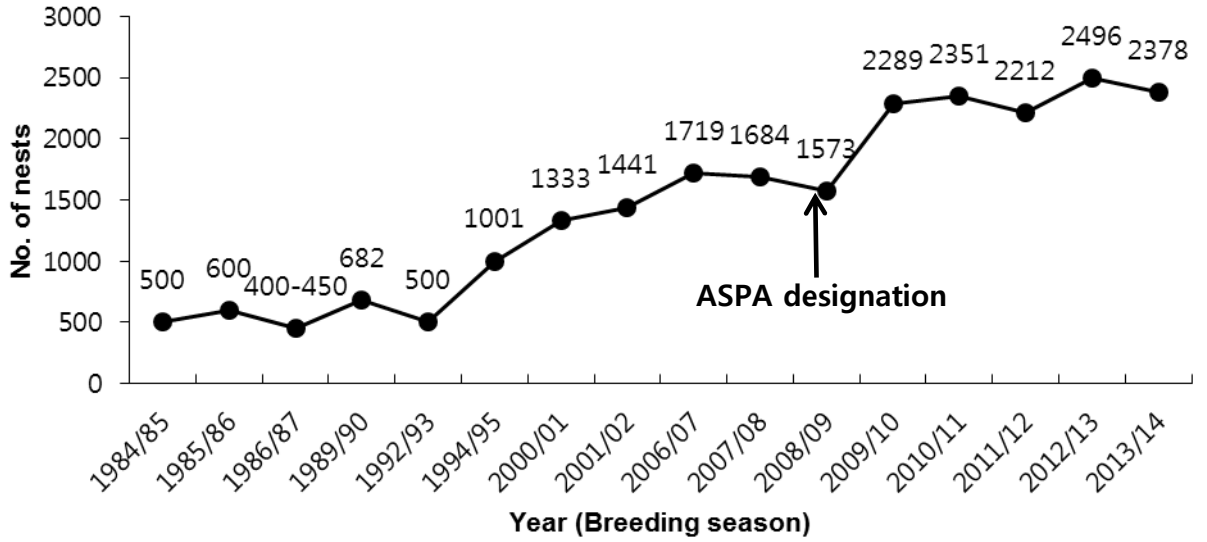
The Chinstrap Penguin is the most abundant breeding species at the site, with a total of 3,157 pairs observed in 2013/14. Chinstrap Penguins begin to lay eggs in early November and incubate for 32-43 days, and the peak seasons of laying and hatching are estimated to be mid-November and mid-December, respectively (Kim, 2002). The maximum number of breeding Chinstrap Penguins was estimated at 3,332 pairs in 2012/13 (MOE, 2013. Since 1989/90, breeding pairs of Chinstrap Penguins have gradually increased and maintained its population between 2,600 and 3,000 pairs from 1994/95 to 2013/14 (see Figure 1).

Breeding pairs of Gentoo Penguins have increased steadily from 500 pairs, since1984/85. A total of 2,378 pairs of Gentoo Penguins were counted in 2013/14 (see Figure 1). Gentoo Penguins start to lay eggs during

mid-October, with the peak season occurring in late October. They incubate for 33-40 days and hatch in early December (Kim, 2002).



(A)



(B)

Figure 1. Breeding populations of (A) Chinstrap Penguins and (B) Gentoo Penguins at the Narębski Point (Peter *et al*., 1986; Rauschert *et al*., 1987; Mönke & Bick, 1988; Yoon, 1990; MOST, 1993; MAF, 1997; Kim, 2002; MOE, 2007; MOE, 2011; MOE, 2012; MOE, 2013)

Other birds

There are eight more nesting bird species in the Area along with two penguin species: the 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 (*Fregetta tropica*), and Snowy Sheathbill (*Chionis albus*). In addition, eight non-breeding bird species have been recorded in the Area, including the Adelie Penguin (*Pygoscelis adelie*), 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 glacialoides*). A summary of the estimated number of nests by species is presented in Table 1.

Brown Skuas and South Polar Skuas prey on penguin eggs and chicks, and some pairs of skuas occupy penguin sub-colonies as feeding territory during 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 depend on penguin eggs and chicks for their chick-rearing. On the contrary, during the 2006/07 season, all Brown Skua pairs (4 pairs) breeding in this Area were observed to occupy their own feeding territory in penguin sub-colonies and defend them.

Two pairs of the Snowy Sheathbill bred near penguin rookery in Narębski Point (in 2006/07 and 2013/14). Snowy Sheathbills are omnivores and forage for food around the breeding colonies of seabirds. They feed on penguin faeces, eggs, and dead chicks, and also steal krill from penguins at the site.

Table 1. Estimated number of nests, by species (2006/07 and 2013/14)

Species		Number of nests	
		2006/2007	2013/2014
Gentoo Penguin	*Pygoscelis papua*	1719	2378
Chinstrap Penguin	*Pygoscelis antarcticus*	2961	3157
Brown Skua	*Stercorarius antarcticus lonnbergi*	4	7
South Polar Skua	*Stercorarius maccormicki*	27	-
Kelp Gull	*Larus dominicanus*	6	-
Antarctic Tern	*Sterna vittata*	41	-
Southern Giant Petrel	*Macronectes giganteus*	9	5
Wilson's Storm Petrel	*Oceanites oceanicus*	19	>10
Snowy Sheathbill	*Chionis albus*	2	2

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 fresh water alga *Prasiola crispa*, which is established around penguin colonies. The present flora includes one Antarctic flowering plant species, 51 lichen species, 29 moss species, six liverwort species, and one algae species. In the case of algae, only the species forming macroscopically detectable stands were 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.

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

Only one refuge facility is located at the southeastern coast in the Area. The King Sejong Station (Republic of Korea), which is located 2 km to the northwest of Narębski Point, is the closest major facility.

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.

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

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 purposes that cannot be met elsewhere;
- 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;
- A report regarding the visit shall be submitted to the competent national authority named in the permit.

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, except in cases of emergency or aircraft security. Over flights, however, should be avoided.

7(iii) Activities which may be conducted within the Area Scientific research activities that cannot be conducted elsewhere and that do not jeopardize the ecosystem of the Area;

- 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).

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 to the 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

- Camping is prohibited within the Area except in an emergency, but if necessary, the use of the refuge facility located on the shore near the eastern boundary of the Area is strongly encouraged (see Map 2).

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

- 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 (any terrestrial activity should be consistent with the 'Environmental code of conduct for terrestrial scientific field research in Antarctica').
- No herbicides or pesticides shall be introduced into the Area. Any other chemical product, which 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.

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 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 not brought into the Area by the permit holder shall only be 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 were 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. Human waste may be disposed of into the sea in accordance with Article 5 of Annex III of the Protocol on Environmental Protection to the Antarctic Treaty.

7(x) Measures that may be necessary to continue to meet the aims and objectives 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 a small number of samples for scientific analysis, to erect or maintain signboards, or to carry out protective measures.

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 the information identified in the Visit Report form suggested by SCAR. 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.

8. Supporting documentation

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ANNEX I. List of flora in the Site

Taxa

Lichens
Acrospora austroshetlandica (C.W. Dodge) Øvstedal
Bryoria sp.
Buellia anisomera Vain.
Buellia russa (Hue)Darb.
Caloplaca lucens (Nyl.) Zahlbr.
Caloplaca sublobulata (Nyl.) Zahlbr.
Cetraria aculeata (Schreb.) Fr.
Cladonia borealis S. Stenroos
Cladonia chlorophaea (Flörke ex Sommerf.) Spreng.
Cladonia furcata (Huds.) Schaer.
Cladonia gracilis (L.) Willd.
Cladonia merochlorophaea var *novochlorophaea* Sipman
Cladonia pleurota (Flörke) Schaer.
Cladonia pyxidata (L.) Hoffm.
Cladonia scabriuscula (Delise) Nyl.
Haematomma erythromma (Nyl.) Zahlbr
Himantormia lugubris (Hue.) I. M. Lamb
Huea coralligera (Hue) C. W. Dodge & G. E. Baker
Lecania brialmontii (Vain.) Zahlbr.
Lecania gerlachei (Vain.) Darb.
Lecanora polytropa (Hoffm.) Rabenh.
Lecidea cancriformis C.W. Dodge and G.E. Baker
Lecidella carpathica Körb.
Massalongia carnosa (Dicks.) Körb.
Ochlorechia frigida (Sw.) Lynge
Pannaria austro-orcadensis Øvstedal
Pertusaria excudens Nyl.
Physcia caesia (Hoffm.) Fürnr.
Physcia dubia (Hoffm.) Lettau
Physconia muscigena (Ach.) Poelt
Placopsis contourtuplicata I. M. Lamb
Porpidia austrosheltandica Hertel
Pseudophebe pubescens (L.) M. Choisy
Psoroma cinnamomeum Malme
Psoroma hypnorum (Vahl) Gray
Ramalina terebrata Hook f, & Taylor
Rhizocarpon geographicum (L.) DC.
Rhizoplaca aspidophora (Vain.) Redón
Rhizoplaca melanophthalma (Ram.) Leuckert & Poelt
Rinodina olivaceobrunnea C.W. Dodge & G. B. Baker
Sphaerophorus globosus (Huds.) Vain.
Stereocaulon alpinum Laurer
Tephromela atra (Huds.) Hafellmer ex Kalb
Tremolecia atrata (Ach.) Hertel
Turgidosculum complicatulum (Nyl.) J. Kohlm. & E. Kohlm
Umbilicaria antarctica Frey & I. M. Lamb
Umbilicaria decussata (Vill.) Zahlbr.
Usnea antarctica Du Rietz
Usnea aurantiaco-atra (Jacq.) Bory

Xanthoria candelaria (L.) Th. Fr.
Xanthoria elegans (Link) Th. Fr.

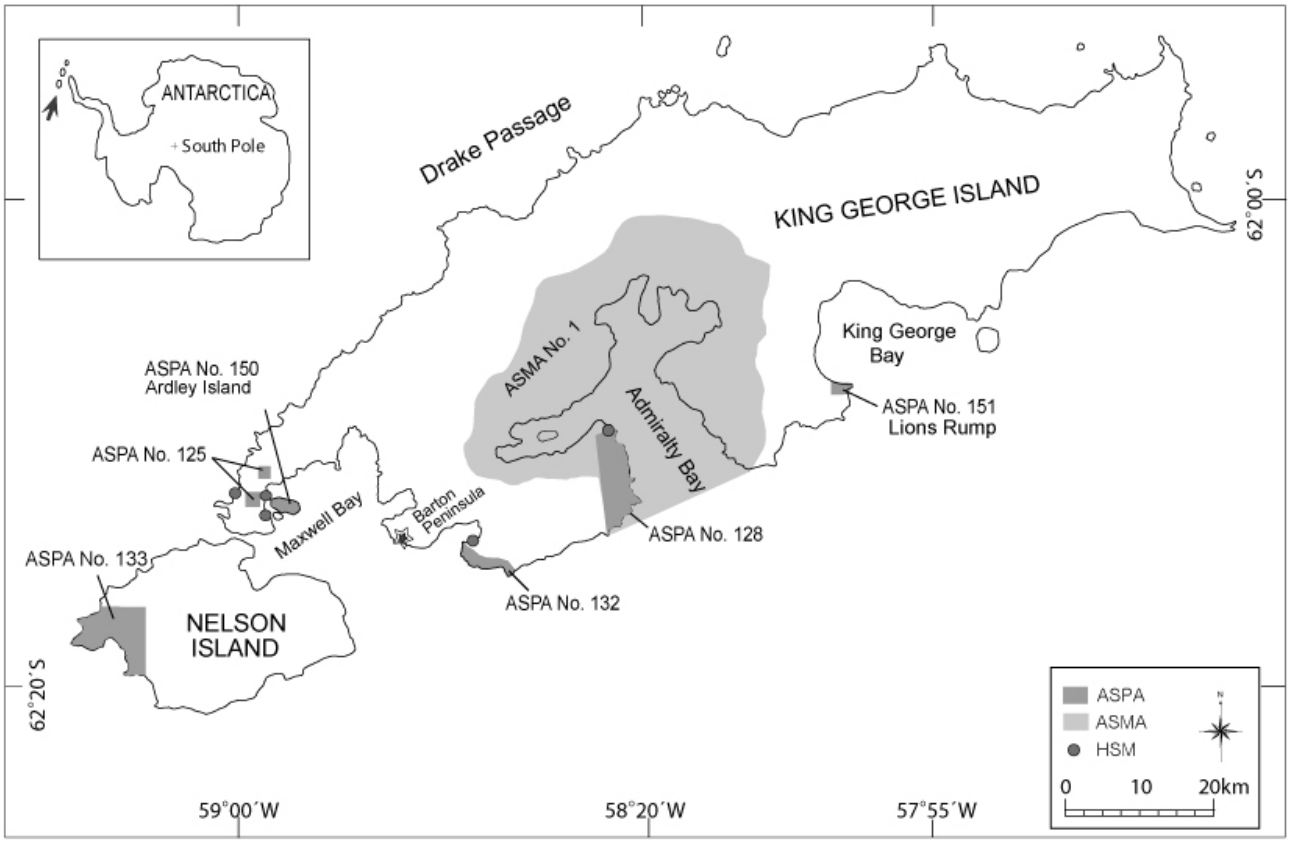
Mosses
Andreaea depressinervis Cardot
Andreaea gainii Cardot
Andreaea regularis Müll. Hal.
Bartramia patens Brid.
Bryum argenteum Hedw.
Bryum orbiculatifolium Cardot & Broth.
Bryum pseudotriquetrum (Hedw.) C.F. Gaertn. et al.
Ceratodon purpureus (Hedw.) Brid.
Chorisodontium aciphyllum (Hook. f. & Wils.)
Dicranoweisia brevipes (Müll. Hal.) Cardot
Dicranoweisia crispula (Hedw.) Lindb. Ex Milde
Ditrichum hyalinum (Mitt.) Kuntze
Ditrichum lewis-smithii Ochyra
Encalypta rhaptocarpa Schwägr.
Hennediella antarctica (Ångstr.) Ochyra & Matteri
Notoligotrichum trichodon (Hook. f. Wils.) G. L. Sm.
Pohlia drummondii (Müll. Hal.) A. K. Andrews
Pohlia nutans (Hedw.) Lindb.
Pohlia wahlenbergii (Web. & Mohr) A. L. Andrews
Polytrichastrum alpinum (Hedw.) G. L. Sm.
Polytrichum strictum Brid.
Racomitrium sudeticum (Funck) Bruch & Schimp.
Sanionia georgico-uncinata (Müll. Hal.) Ochyra & Hedenäs
Sanionia uncinata (Hedw.) Loeske
Schistidium antarctici (Card.) L. I. Savicz & Smirnova
Syntrichia filaris (Müll. Hal.) Zand.
Syntrichia princeps (De Not.) Mitt.
Syntrichia saxicola (Card.) Zand.
Warnstorfia sarmentosa (Wahlenb.) Hedenäs

Liverworts
Barbilophozia hatcheri (A. Evans) Loeske
Cephalozia badia (Gottsche) Steph.
Cephaloziella varians (Gottsche) Steph.
Herzogobryum teres (Carrington & Pearson) Grolle
Lophozia excisa (Dicks.) Dumort.
Pachyglossa disstifidolia Herzog & Grolle

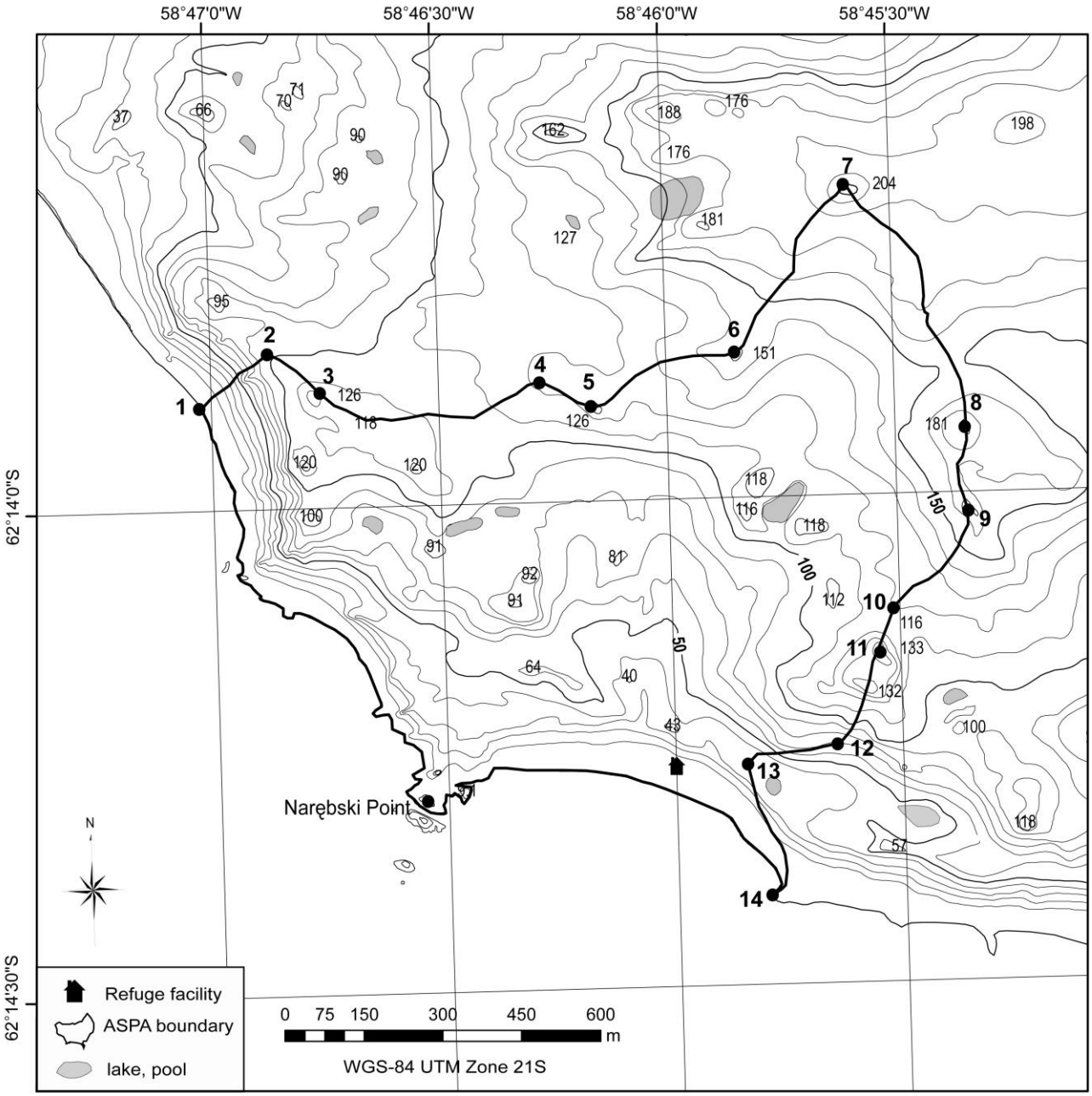
Algae
Prasiola crispa (Ligtf.) Menegh.

Flowering plant
Deschampsia antarctica Desv.

ANNEX II. Maps

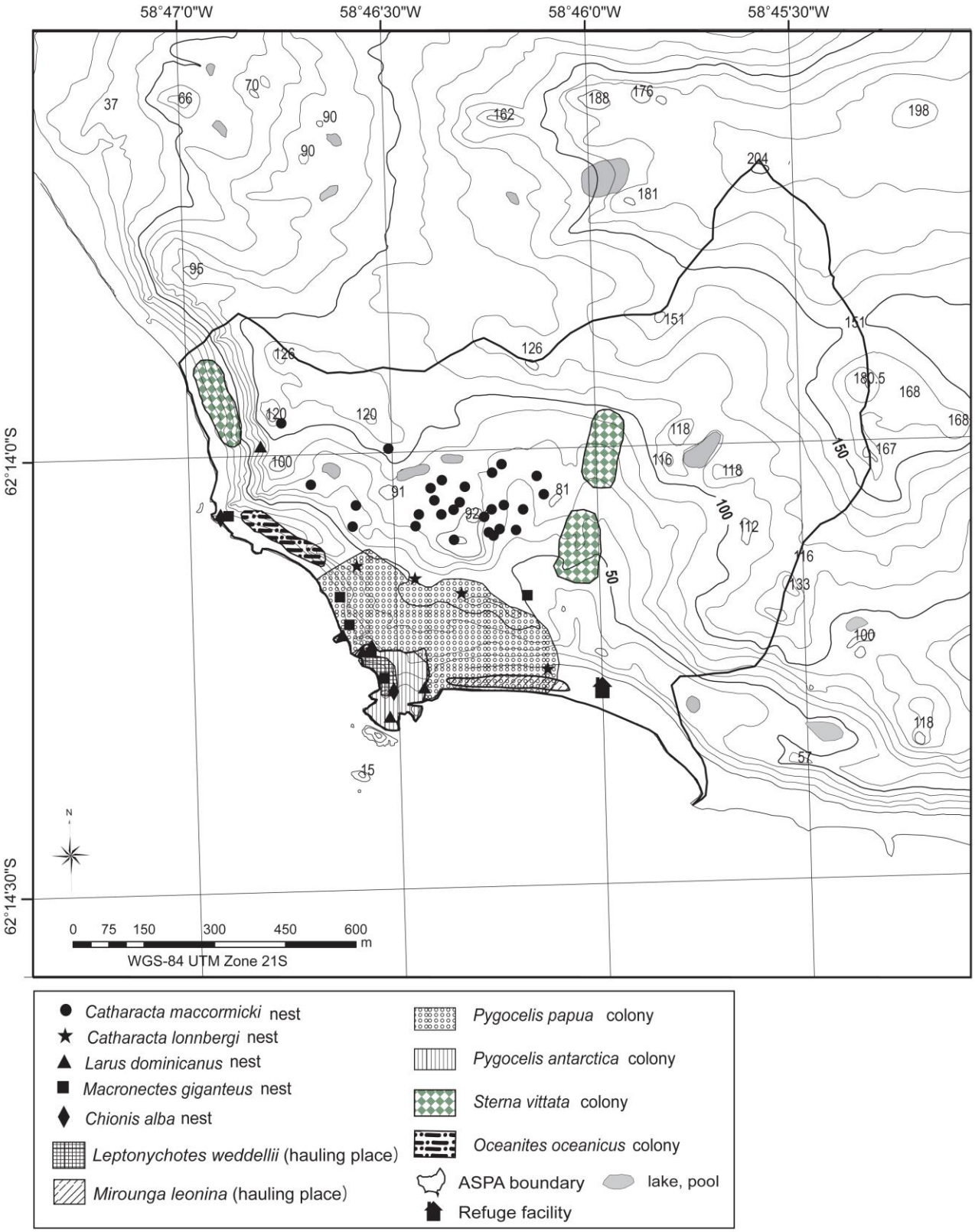


Map 1. Location of Narębski Point (✦) in relation to King George Island and the existing protected areas (ASMA, ASPAs, and HSMs)

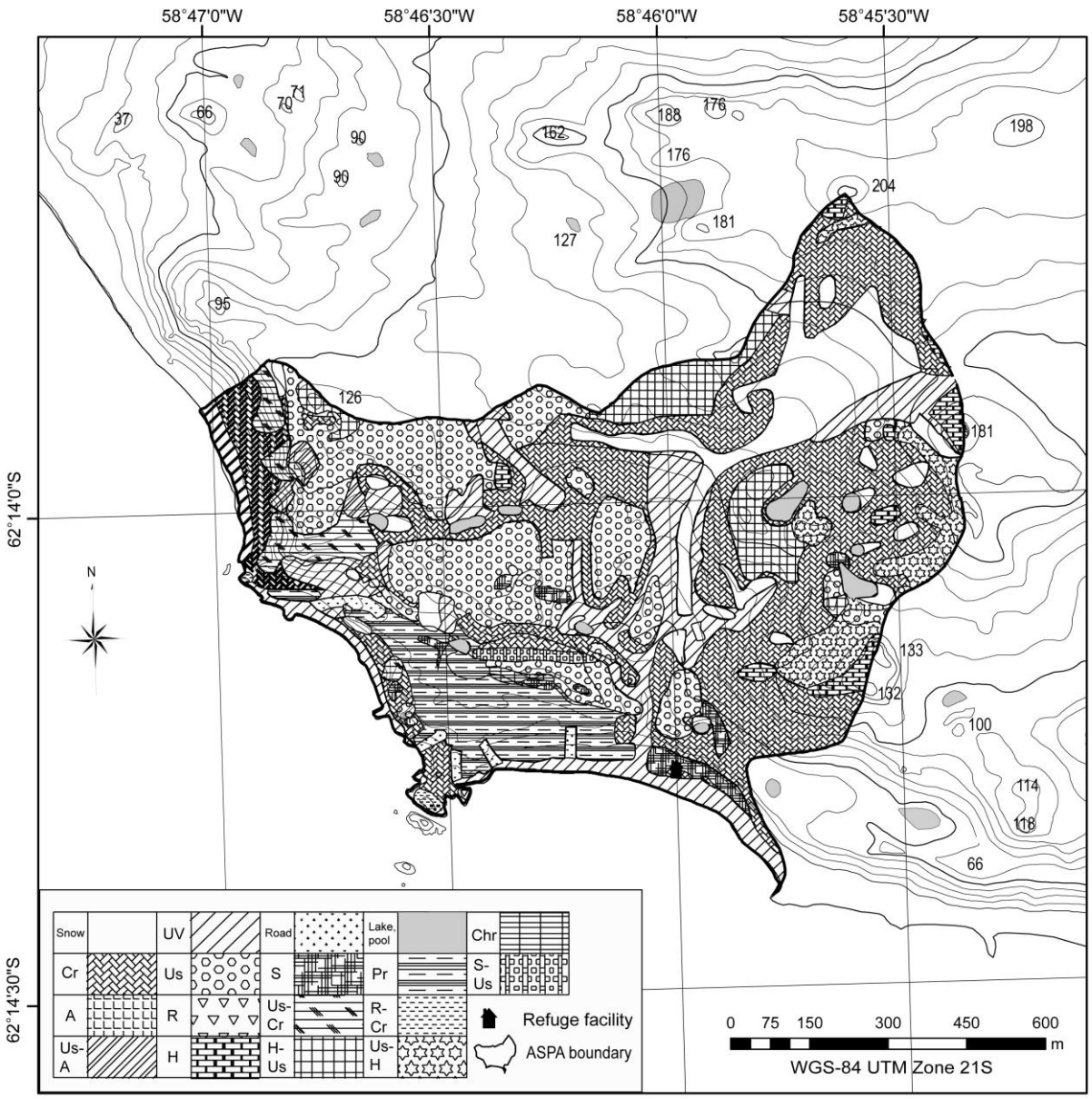


	Latitude	Longitude		Latitude	Longitude
1	62°13′53.69″S	58°47′01.31″W	9	62°14′00.86″S	58°45′20.85″W
2	62°13′50.48″S	58°46′52.37″W	10	62°14′06.96″S	58°45′30.62″W
3	62°13′52.85″S	58°46′45.84″W	11	62°14′09.73″S	58°45′33.08″W
4	62°13′52.53″S	58°46′16.62″W	12	62°14′15.30″S	58°45′38.87″W
5	62°13′54.18″S	58°46′09.53″W	13	62°14′16.43″S	58°45′50.37″W
6	62°13′51.11″S	58°45′50.64″W	14	62°14′24.55″S	58°45′48.00″W
7	62°13′40.97″S	58°45′35.60″W	NP	62°14′18.17″S	58°46′32.99″W
8	62°13′55.95″S	58°45′20.71″W			

Map 2. Boundary of the ASPA No. 171



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



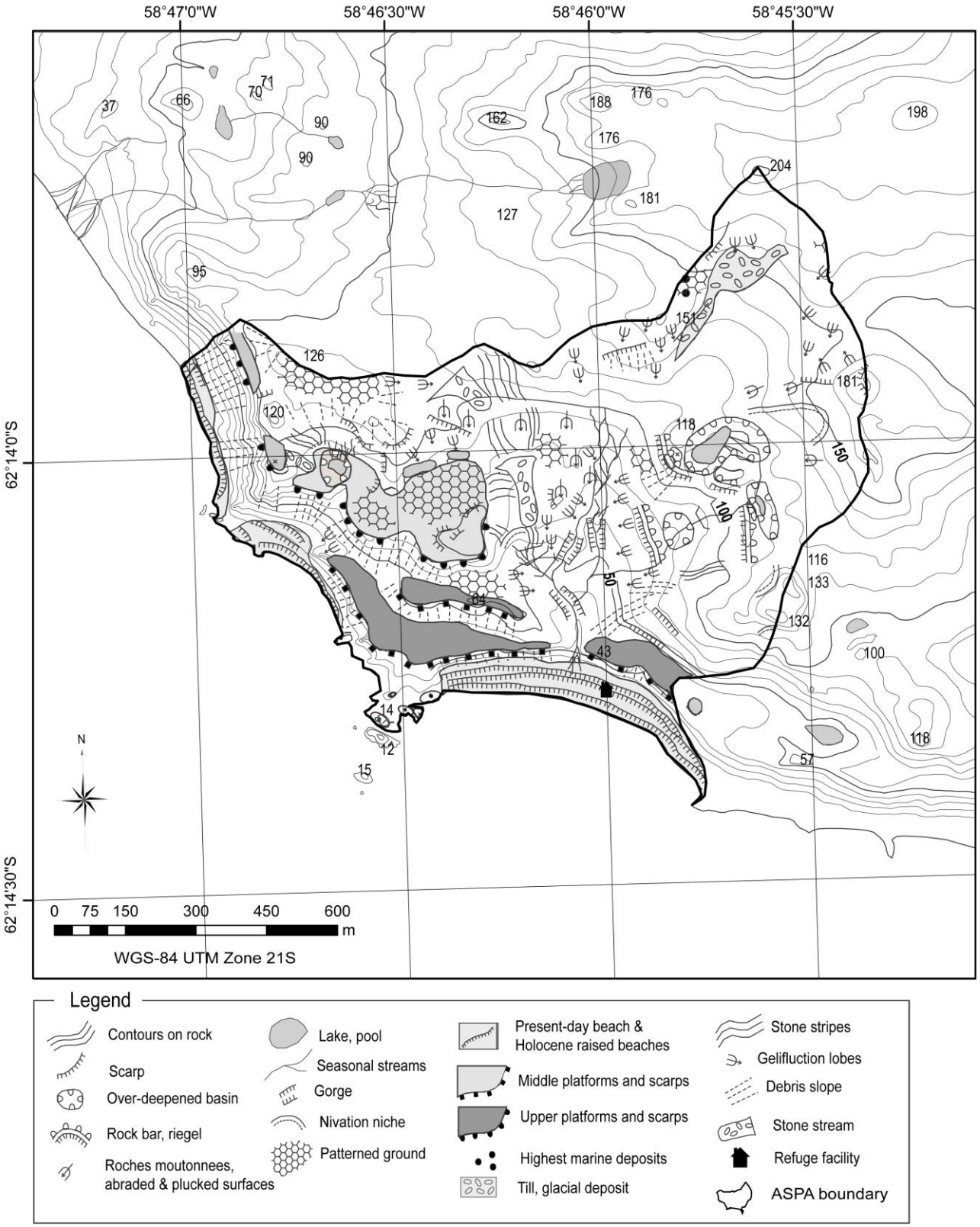
Map 4. Distribution of plant communities in the ASPA No. 171

Community abbreviations

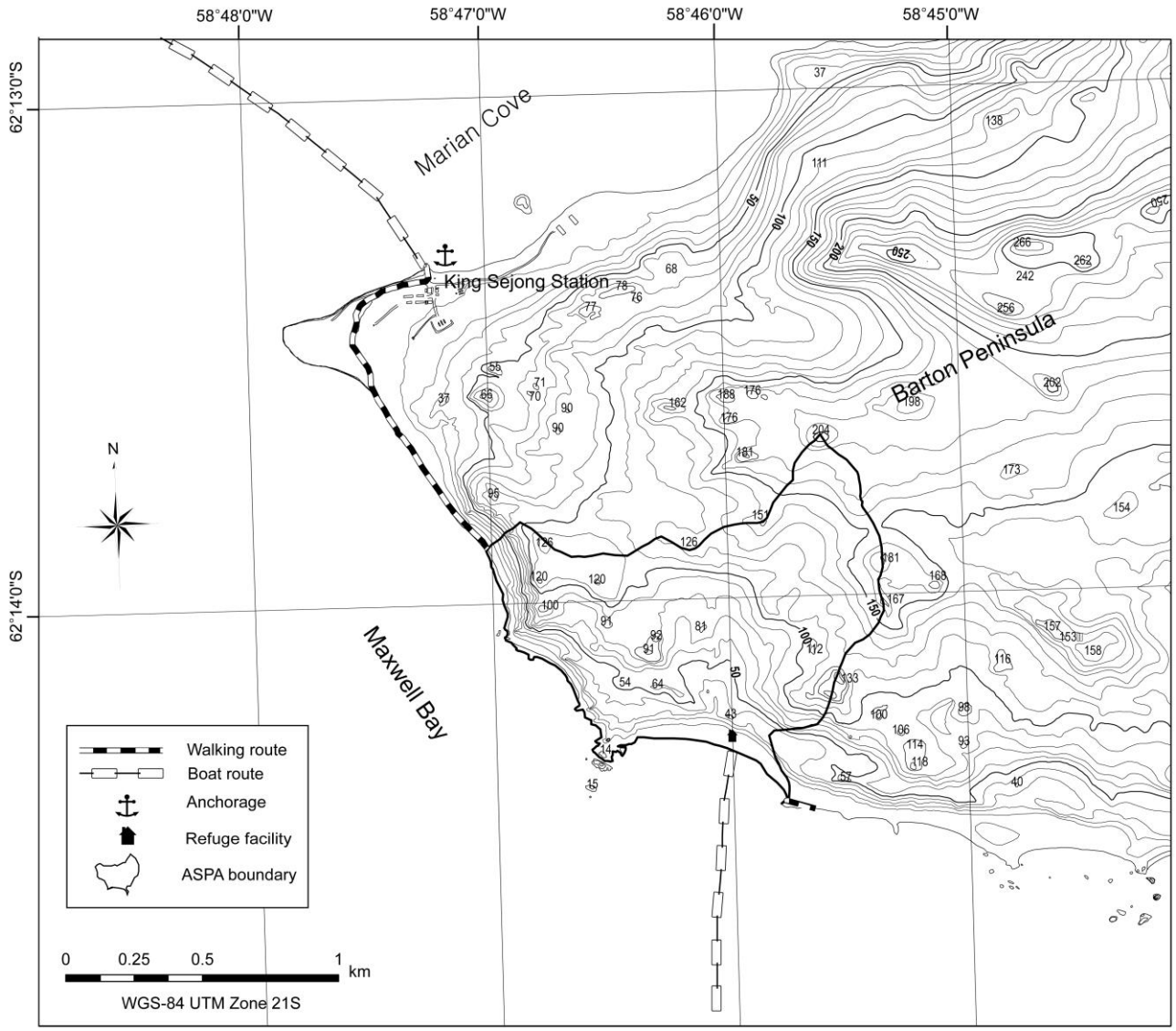
UV: unvegetated area
Cr: Crustose lichens
S: *Sanionia* spp., Pr: *Prasiola*
Chr: *Chorisodontium aciphyllum*
A*: Andreaea*, Us: *Usnea* spp.
R: *Ramalina terebrata*
Us-Cr: *Usnea*-Crustose lichens
R-Cr: *Ramalina*-Crustose lichens
S-Us*: Sanionia-Usnea* spp.
Us-A: *Usnea-Andreaea*
H: *Himantormia lugubris*
H-Us: *Himantormia-Usnea*
Us-H: *Usnea-Himantormia*

Total coverage of each community (%)

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



Map 5. Geomorphologic details of the ASPA No. 171



Map 6. Access routes to the ASPA No. 171