



Management Plan

for Antarctic Specially Protected Area No127 “HASWELL ISLAND” (HASWELL ISLAND AND THE ADJACENT FAST ICE FIELD WITH A COLONY OF EMPEROR PENGUINS)

Introduction

Haswell Island was discovered in 1912 by the Australian Antarctic expedition of D. Mawson. It was named in honour of the biologist, Professor W.A. Haswell, who assisted the expedition. This is the largest island of the homonymic group of islands forming an archipelago with the height of up to 93 meters and the area of 0.82 square kilometres, which is located 2.5km from the Russian station Mirny operating since 1956.

The Area includes Haswell Island, its intertidal zone, and the adjacent section of the fast ice, if available. It was originally proposed by the Soviet Union as Site of Special Scientific Interest (SSSI) No 7. Adopted at the VIII ATCM (Oslo, 1975) based on Recommendation VIII-4. Renamed ASPA No. 127 based on Decision 1 (2002). ASPA (Area) Management Plan was revised based on Measure 1 (2006), Measure 5 (2011), and Measure 5 (2016).

1. Description of values to be protected

The Area was described by biologists of the first Soviet Antarctic expeditions, was studied in detail in the 1970s, and continues to be studied today.

To the east and south-east of Haswell Island there is a large colony of emperor penguins *Aptenodytes forsteri* residing on the fast ice. Haswell Island itself is a unique breeding site for almost all species of poultry breeding in East Antarctica (the Antarctic petrel *Talassoica antarctica*, the Southern fulmar *Fulmarus glacioloides*, the pintado petrel *Daption capense*, the snow petrel *Pagodroma nivea*, the Wilson's petrel *Oceanites oceanicus*, the south polar skua *Catharacta maccormicki*, the Lonnberg's skua *Catharacta antarctica lonnbergi*, and the Adelie penguin *Pygoscelis adeliae*).

Five species of pinnipeds occur in the Area, including the protected Ross seal *Ommatophoca rossii*.

The proximity of the oldest Russian research wintering station Mirny is of interest for comparative analysis and monitoring of the long-term impact of the station's activity on the environment.

A general view of the location of the Haswell Islands (excluding Vkhodnoy Island), Mirny station and logistical activity sites is shown on Map 1.

The boundaries of ASPA No. 127 cover Haswell Island (66°31'S, 93°00'E) of 0.82 sq km and an adjacent area of fast ice (if any) of the Davis Sea of about 5 sq km, the location of the emperor penguin colony (see Map 2). It is one of the few emperor penguin colonies that is close to the research station, which offers an advantage for studying the species and its habitat.

2. Aims and Objectives

The main focus of ASPA surveys is to gain a better understanding of how natural and anthropic environmental changes affect the state and dynamics of populations and how such changes affect the interaction of key species in the Antarctic ecosystem.

Management of the Area has the following aims:

- To prevent direct impacts to the Area during logistical operations;
- To establish regulated human access to the Area;
- To prevent changes in the structure and abundance of local populations, in the composition of flora and fauna as a result of anthropogenic activity;
- To create conditions for scientific research of urgent scientific nature that cannot be carried out elsewhere;
- To promote scientific research in the field of ecology in connection with monitoring populations and assessing the impact of human activity on them;
- To contribute to the improvement of knowledge about the Antarctic environment and its protection.



3. Management Measures

The following actions should be taken to protect the values of the Area:

- When approaching to Mirny station by ship and upon arrival at the station, everyone arriving at the station should be informed of the presence and location of the ASPA and the existing provisions of this Management Plan.
- Copies of the Management Plan and the terrain map showing the location of the Area should be kept in all units performing logistical and scientific operations in the Haswell Archipelago area.
- In order to avoid unintentional entry into the Area after the formation of fast ice, which is safe for walking on and movement of vehicles, at the point of intersection of the directions Goreva Island – Fulmar Island and Mabus Point – eastern tip of Haswell Island a signpost shall be installed indicating the directions of the protected area fringes and a marking of restricted access (“No Entry! Antarctic Specially Protected Area”).
- Information signposts shall be installed at the point of descent from Mabus Point and at station activity areas in close proximity to the Area.
- Mark signs and signposts installed at the Area shall be durable, maintained in good condition, and shall have no impact on the environment.
- Aerial flights over the Area may be conducted only under the conditions set forth in Section 7. Terms and conditions of Permit Issue.

This Plan is periodically reviewed in order to properly monitor the process of protecting the values of this Antarctic Specially Protected Area. Any activity in the area must be preceded by an environmental impact assessment.

4. The term for the Area designation as the ASPA

The designation is for an indefinite period.

5. Maps

Map 1. General view of the location of the Haswell Archipelago islands, Mirny station, and logistical activity sites.

Map 2. Boundaries of the Antarctic Specially Protected Area No. 127 Opisthobranch gastropods “Haswell Island”.

Map 3. Location of nesting colonies of sea birds.

Map 4. Haswell Island. Topography.

6. Description of the Area and fringe determination

6(i) Geographic coordinates, special fringe markers, and natural features

The Area covers a field within the ABFEDC polygon (the coordinates are 66°31'10"S, 92° 59'20"E; 66°31'10"S, 93°03'E; 66°32'30"S, 93°03'E; 66°32'30"S, 93°01'E; 66°31'45"S, 93°01'E; 66°31'45"S, 92°59'20"E) (Map 2). The designated fast ice field of the Davis Sea provides coverage of the most likely movements of emperor penguins during their annual breeding season.

Topography

Approximately (on the spot), the nearest to the station fringes of the Area on fast ice can be determined visually as directions: EF (Vkhodnoy Island – Fulmar Island) ED (Mabus Point – eastern tip of Haswell Island). A signpost shall be installed at point E indicating the directions of the protected area boundaries and a marking of restricted access (“No Entry! Antarctic Specially Protected Area”). Information signposts indicating the distance to the Area fringe shall be installed in all places of the station activities, in the immediate vicinity of the Area (at the point of descent from Mabus Point, on Buromsky, Zykov, Fulmar, and Tokarev Islands).

It is virtually impossible to violate the distant seaward fringes of the Area, due to the current absence of any station activity there. They have no visual indications and are determined by map.

There are no trails or roads in the Area.

Ice conditions

The Area includes Haswell Island (the largest of the Haswell Archipelago islands), its intertidal zone, and the adjacent section of the fast ice of the Davis Sea. To the south of the ASPA on the coastal nunataks of the Mirny Peninsula, a Russian observatory (now station) Mirny has been operating since 1956.

For most of the year, the marine part of the Area is covered with fast ice, the width of which reaches 30-40 km by the end of winter. The breakup of the fast ice occurs from 17 December to 9 March, with the average date of 3 February, and the establishment of the fast ice takes place from 18 March to 5 May, with the average date of 6 April. The duration of the ice-free period at the roadstead of Mirny station lasting more than one month is 85%, more than two months – 45% and more than three months – 25%. There are always a lot of icebergs in the Area. In summer, when the sea is free of fast ice, they drift along the coast in the western direction. The seawater is characterised by constant negative temperatures. Tides have an irregular diurnal character.

Analysis of ecological domains

According to the Antarctic Ecological Domain Analysis (Resolution 3 (2008)), Haswell Island belongs to Natural Environment L “Continental Coast Glacial Sheet”.



Biological Features

Benthic fauna of coastal waters is rather rich. Amongst the fish species in the area the most characteristic are various species of *Trematomus*, whilst the Antarctic toothfish *Dissostichus mawsoni* and the Antarctic silverfish *Pleuragramma antarcticum* are less common. An abundant food base and suitable nesting places create favourable conditions for the existence of numerous sea bird populations. A total of 14 bird species were recorded in the vicinity of Mirny station (Table 1).

Typical representatives of the coastal fauna are pinnipeds. The most common is the Weddell seal *Leptonychotes weddelli*, whilst other Antarctic seal species are found in single specimens. Common minke whales *Balaenoptera acutorostrata* and the killer whale *Orcinus orca* often approach the coast in the vicinity of Mirny station.

Table 1. Listing of the avifauna of the Haswell Archipelago (ASPA No 127).

1	Emperor penguin <i>Aptenodytes forsteri</i>	B, H
2	Adelie penguin <i>Pygoscelis adeliae</i>	B, H
3	Chinstrap penguin <i>Pygoscelis antarctica</i>	M
4	Macaroni penguin <i>Eudyptes chrysolophus</i>	M
5	Southern fulmar <i>Fulmarus glacioloides</i>	B
6	Antarctic petrel <i>Thalassoica antarctica</i>	B
7	Pitudo petrel <i>Daption capense</i>	B
8	Snow petrel <i>Pagodroma nivea</i>	B
9	Southern giant petrel <i>Macronectes giganteus</i>	M
10	Wilson's storm petrel <i>Oceanites oceanicus</i>	B
11	Pomarine skua <i>Stercorarius pomarinus</i>	M
12	South polar skua <i>Catharacta maccormicki</i>	B
13	Lonnberg's skua <i>Catharacta Antarctica lonnbergii</i>	B
14	Kelp gull <i>Larus dominicanus</i>	M

Legend: B – a breeding species; H – there are moulting sites near the station; M – a migrant species.

At present, sea birds nest on ten of the seventeen islands of the Haswell Archipelago. Seven species nest directly on the islands, and one of them, the emperor penguin *Aptenodytes forsteri*, breeds on the fast ice. In addition, several species of poultry were occasionally recorded in the study area. In general, the core of the avifauna of the area remains unchanged during the last 60 years and is characterised by the composition of species that is typical for the coastal regions of East Antarctica.

Addition of migrant species to the avifauna list of the Haswell Archipelago testifies to intensification of ornithological sightings. At the same time, the southern giant petrel observed for the first time in 2006 apparently acquires the status of a rare but regularly migrating species, and the traced introduction of the Lonnberg's skua and its recorded breeding on the archipelago most probably indicate a natural expansion of its breeding ground.

Since 2012, cases of nesting of hybrid pairs of Antarctic skuas *Catharacta antarctica* and South Polar skuas *Catharacta maccormicki* has been observed on Haswell Island.

Emperor penguin (*Aptenodytes forsteri*)

The colony of emperor penguins of the Haswell Archipelago resides on fast ice of the Davis Sea 2-3km north east of Mirny station and usually within 1km of Haswell Island. The colony was discovered and described by the Western party of the Australian Antarctic Expedition on 25 November 1912, but its detailed survey was started only after the establishment of Mirny Observatory. Since the establishment of the observatory in 1956, the nesting population has been monitored there on an irregular basis. The first year-round sightings of this colony were carried out in 1956 by E.S. Korotkevich (1958) and continued until 1962 (Makushok, 1959; Korotkevich, 1960; Pryor, 1968); later they were resumed by V.M. Kamenev in the late 1960s and early 1970s (Kamenev, 1977). After a long break, ornithological sightings at the observatory were continued in 1999 – 2015 (Gavrilo and Mizin, 2007, Gavrilo and Mizin, 2011, Neelov et al. 2007, unpublished RAE reports).

The timing of the phenological events onset in the colony of emperor penguins of the Haswell Archipelago area is presented in Table 2.

Table 2. Dates of the phenological events onset in the colony of emperor penguins of the Haswell Island area.

Coming to the colony	Last ten days of March
Mating peak	End of April – first ten days of May
Beginning of egg laying	The first five days of May
Start of chick hatching	5-15 July
Beginning of exiting of chicks from hatching bags	The last ten days of August
Beginning of nursery formation	The first ten days of September
Start of chick moulting	End of October – beginning of November
Start of adult moulting	The last ten days of November – the first five days of December
Start of colony collapse	The last ten days of November – mid-December
Poultry leaves the colony	The last five days of December – the first ten days of January

According to estimates and counts obtained in the period from 1956 to 1966, the total number of emperor penguins in the colony ranged from about 14,000 to 20,000 individuals (Korotkevich, 1958, Makushok, 1959, Pryor, 1964, Kamenev, 1977).

In the 1970s and 1980s, the numbers had declined by about a third, but began to gradually recover in the 2000s.

Counts of the 2010/2011 season made in the period of maximum concentration of adult poultry during egg laying revealed that their numbers in the colony reached nearly 13,000 individuals, and the 2015 nestling counts admitted that the number of adult emperor penguins in the colony could exceed 14,000 individuals (RAE, unpublished data).

The total count of the colony in June 2020 was about 6,000 incubating males.



A comparative analysis of the population dynamics of emperor penguins in the colonies of Haswell Island and Géologie archipelago (Pointe-Géologie Archipelago, Terre Adelie, ASPA 120) located in the same region (80°E - 140°E) of Dumont d'Urville Station had revealed their similarity during the last 50 years (Barbraud et al., 2011). Until the early 1970s, the penguin population was almost stable in the colony at the Géologie Archipelago and might have decreased a little in the Haswell Island area. During the regime climate shear of the 1970s–1980s, the annual population growth rate dropped markedly and colony numbers declined. The amplitude of the decline was also similar, and the numbers of breeding pairs correlated. All of this may suggest that the cause was a general large-scale

ecosystem perturbations associated with the regime shear traced across the Southern Ocean.

Clearly, the same strong negative factor impacted both populations. Such a factor was probably the ice cover, with the state of which the ecology of emperor penguins is strongly related. In particular, reduced ice cover extent and earlier breakup of fast ice had a negative effect on poultry survival and food availability, as well as on breeding bird numbers, as has been shown previously (Barbraud, Weimerskirch, 2001, Jenouvrier et al., 2009). In the last twenty years, both colonies have shown positive population dynamics against the background of an increase in the area of ice coverage in the region and the later timing of fast ice breakup.

Table 3. Factors affecting the population of emperor penguins in the Area and measures to reduce their impact.

Impact factors		Measures to reduce the impact of anthropic factors
Anthropogenic factors	Disturbance when visiting the colony	Strict regulation of the colony visits
	Egg collection	Eggs may only be collected under a scientific survey permit issued by a national body
	Disturbance when aerial work is carried out	Selection of routes and flight heights according to the regulations of the area management plan
Natural factors	Climate change and associated changes in food reserves. Ice conditions affect the availability of food and survival rate of adult poultry and chicks (a decrease in the area of ice cover in April-June has resulted in a decrease in population growth rate and numbers), and early breakup of fast ice has resulted in increased mortality of chicks.	

Data on the dynamics of other species are more fragmentary: we have three more or less complete counts for comparison, with considerable time lag between counts

(Table 4). The long-term changes in abundance for most species may show a negative trend, but regular monitoring studies need to be continued to make valid conclusions.

Table 4. Poultry population dynamics on the islands of the Haswell Archipelago (long-term trend: 1 – positive; 0 – not expressed, -1 – negative, ? – supposed trend)

Species	1960s–1970s, number of adults	1999/2001	2009/10, number of adults	2020/2021, number of adults	2020/2021, number of adults
Adelie penguin	41-44.5 thousand	Around 31 thousand of adult specimens	Around 27 thousand	Around 37 thousand	0
Southern fulmar	9.5-10 thousand	2300 nests with clutches	Around 5000	-	-1
Antarctic petrel	900-1050	150-200 nests with clutches	Around 500	-	-1
Pitudo petrel	750	150 habitable nests with clutches	Around 300	-	-1
Snow petrel	600-700	60-75 habitable nests	No data	-	-1 ?
Wilson's storm petrel	400-500	At least 30 habitable nests	Over 80	-	-1 ?
South polar skua	48 (24 pairs)	Min. 38 (19 pairs)	170 (62 pairs)	Over 208 (104 nests)	1

The available data from the Haswell Island area suggest a long-term negative population trend in several sea bird species, both penguins and flying birds. It is possible that a common cause determining the similar population dynamics of not only emperor penguins, but also other sea bird species of the Haswell Island area are climate changes. However, there are no data on their abundance dynamics

over the last 10–15 years. The exception is the South polar skua, whose population has increased approximately threefold over the entire observation period

In order to make more informed conclusions about the factors affecting the state of the bird populations of the Haswell Island area and related mechanisms, it is necessary to continue monitoring and systematic surveys.



6(ii) Definition of seasons and controlled access zones or prohibited zones

Entry into any part of the Area shall be permitted only on the basis of a specially issued permit.

Special regulation of activities in the area is carried out during the breeding period of poultry:

- From mid-April to December in the emperor penguin colony area and
- From October to March in the Haswell Island breeding areas

Locations of breeding colonies are shown on Map 3. Particularly disturbance-sensitive emperor penguins must also be protected outside the area identified as the breeding sites, as the colony may change location.

6(iii) Buildings in the Area

On Haswell Island there is a geodetic signpost in the form of a metal mast, the buttress of which is reinforced with stones; there are no other buildings on the island.

A heated small frame hut with emergency food supplies may be placed on one of the nearby islands (excluding Haswell).

6(iv) Presence of other protected territories in the immediate vicinity of the Area

200m from the fringe of the Area there is historical site and artefact No 9 "Cemetery on Buromsky Island".

7. Conditions of Permits Issue

7(i) Conditions of authorisation

Access to the Area is possible only with a Permit issued by the national competent body. Conditions of issuing Permits to visit the Area:

- Permits can be issued only for the purposes set forth in p. 2 of the Plan.
- Permits are issued for a strictly defined period of time.
- Only activities that do not pose a risk to the ecosystems of the Area and conducted scientific activities are permitted in the Area.
- Visits to the Area may be made only on the basis of a Permit and accompanied by an authorised person, with an appropriate note in the register of visits to the Area stating the date, the purpose of the visit, and the list of visitors. The register of visits is kept by the head of Mirny station.
- The authorised person shall be appointed in accordance with national procedures.
- A report of the visit to the Area shall be submitted to the national competent body specified in the Permit at the end of the Permit validity, but at least once a year.

Permits are issued for certain scientific surveys, monitoring or inspections that do not require withdrawal of biological material or fauna specimens or require their withdrawal in small quantities. For visits and stays in the Area, a programme of work shall be prepared specifying the scope of the tasks, the period of their execution and the maximum number of personnel entitled to visit the Area.

7(ii) Access to and movement along the Area

Access to and movement within the Area by land vehicles (except snowmobiles) is prohibited.

Care must always be taken when entering and moving along the Area so as not to disturb poultry and seals, especially during the breeding season. Under no circumstances should the condition of poultry nests, seal hauling grounds or approaches to them be allowed to deteriorate.

Haswell Island. The most convenient ascent is from the west or south west side of the island (Map 4). Only walking is permitted.

The fast ice area. During the period of fast ice formation providing safe walking and movement of vehicles the entrance to the site shall be performed from the side of Mirny Observatory, in a convenient place. During the brooding period (May-July) movement of any vehicles in the Area is prohibited. It is forbidden to approach the colony of Emperor penguins closer than 500 m (regardless of its location) when riding a snowmobile.

Aviation flights over the Area are prohibited during the most vulnerable period of the emperor penguin breeding period: from 15 April to 31 August

At other times, the following restrictions are established for aircraft flights in the Area (Table 5). At that, flights directly over poultry breeding sites should always be avoided if possible.

Table 5. Minimum flight altitude over the Area, depending on the type of aircraft.

Type of aircraft	Number of engines	Minimum height above ground	
		Feet	Meters
Helicopter	1	2460	750
Helicopter	2	3300	1000
Aeroplane	1 or 2	2460	750
Aeroplane	4	3300	1000

7(iii) Activities carried out or permitted in the Area, including time or location restrictions:

- Ornithological and other environmental surveys that cannot be conducted elsewhere;
- Management activities, including monitoring;
- Educational visits to the colony of emperor penguins, except for the first half of the nesting period (from May to July).

7(iv) Installation, modification or demolition of buildings

Erection of buildings and scientific equipment is possible in the Area only to perform urgently needed scientific tasks or management measures permitted by the competent body in accordance with applicable regulations.



7(v) Location of field camps

Laying out of camps is permitted only for safety reasons, provided all precautions are taken to avoid damage to the local ecosystem and disturbance to local fauna.

7(vi) Restrictions on bringing materials and organisms into the Area

It is prohibited to bring any living organisms into the Area, as well as chemicals other than chemicals necessary for the scientific purposes specified in the Permit (the latter must be removed from the Area before the Permit expires).

Storage of fuel within the ASPA is prohibited except for important purposes related to the activity for which the Permit was issued. All materials brought into the Area must be stored within the stated period, used with minimal risk to the ecosystem, and removed from the Area at the end of the period specified in the Permit. The establishment of permanent storage facilities is prohibited.

7(vii) Removal or harmful interference with native flora and fauna

Removal or harmful interference with representatives of native flora and fauna is possible only on the basis of a Permit. If the activity is determined to have less than minor or time-limited impacts, it should be conducted in accordance with SCAR's Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica, which are the minimum standard.

7(viii) Collection and removal of materials that were not brought into the Area by the Permit holder

Collection and removal of objects that have not been brought into the Area by the Permit holder is permitted only for scientific tasks or management measures listed in the Permit.

Dead or pathological specimens of fauna and flora may be withdrawn for laboratory study.

7(ix) Waste disposal

All waste shall be removed from the Area.

7(x) Measures necessary to ensure the possibility to further achieve the goals and objectives of the Management Plan

Permits to enter the Area may be issued for scientific observations, monitoring, site inspections, including the collection of a limited number of specimens of animals, eggs, and other biological objects for scientific purposes.

In order to maintain the conservation and scientific values of the Area, all possible precautions must be taken against the inadvertent introduction of foreign materials and alien organisms.

Any long-term sightings areas should be mapped and marked on the ground. A map showing the boundaries of the ASPA and a copy of the Management Plan must be provided and freely available at Mirny Station.

Visits to the Area are limited to scientific, educational, and management purposes.

7(xi) Requirements for reporting visits to the Area

For each visit to the Area, the Permit holder shall submit a report to the competent national body as soon as possible, but not later than six months after the completion of the visit. Those visit reports should contain, as appropriate, the information specified in the recommended visit report form given in Annex 2 to the Revised Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas attached to Resolution 2 (2011), which is available on the Secretariat of the Antarctic Treaty website (www.ats.aq).

If necessary, the national body is encouraged to send a copy of the visit report also to the Party that have prepared the Management Plan as a reference material for management of the Area and revision of the Management Plan.

8. Bibliography

Antarctic Treaty 1998. Final Report of the Twenty-Second Antarctic Treaty Consultative Meeting (Tromsø, Norway, 25 May – 5 June 1998). [Oslo, Royal Ministry of Foreign Affairs], P. 93 – 130.

Averintsev V.G. Seasonal changes in the sublittoral fauna of polychaete worms (Polychaeta) of the Davis Sea // Studies of fauna of seas. – Leningrad, 1982. Vol. 28 (36).– P. 4-70.

Averintsev V.G. Ecology of sublittoral fauna of polychaete worms of the Davis Sea // Morphology, systematics and evolution of animals. – Leningrad, 1978. – P.41-42.

Androsova E.I. Bryozans (Bryozoa) of the Antarctic and Sub-Antarctic // Information Bulletin of the Soviet Antarctic Expedition – 1973. – No 87. – P.65-69.

Budylenko G.A., Pervushin A.S. On migration of fin whales, sardin whales and minke whales in southern hemisphere // Marine mammals: Materials of the VI All-Union Council – Kiev, 1975. – Ch.1. – P.57-59

Bushuyeva I.V. Some features of distribution of shelf fauna Amphipoda, Gammaridea of the Davis Sea (East Antarctica) // Hydrobiology and biogeography of shelves of cold and temperate waters of the World Ocean: Scientific conference abstracts – Leningrad, 1974. – P.48-49.

Bushuyeva I.V. Some peculiarities of the ecology of the amphipod Paramolra Walkeri in the Davis Sea (East Antarctica) // Shelf Biology: Abstracts. of the All-Union Conference – Vladivostok, 1975. P. 21-22.

Bushuyeva I.V. New species of the genus Acanthonotozommella from the Davis Sea (East Antarctica) // Zoological magazine – 1978 – Vol.57, Edition 3. – P.450-453.

Bushuyeva I.V. New species of the genus Pseudharpinia (Amphipoda) from the Davis Sea (Antarctica) // Zoological magazine – 1982 – Vol.61, Edition 8. – P.1262-1265.

Gavrilov M. V., Mizin I.A. Modern zoological research in the vicinity of Mirny station. Russian polar research. Edition 3. AARI, 2011.

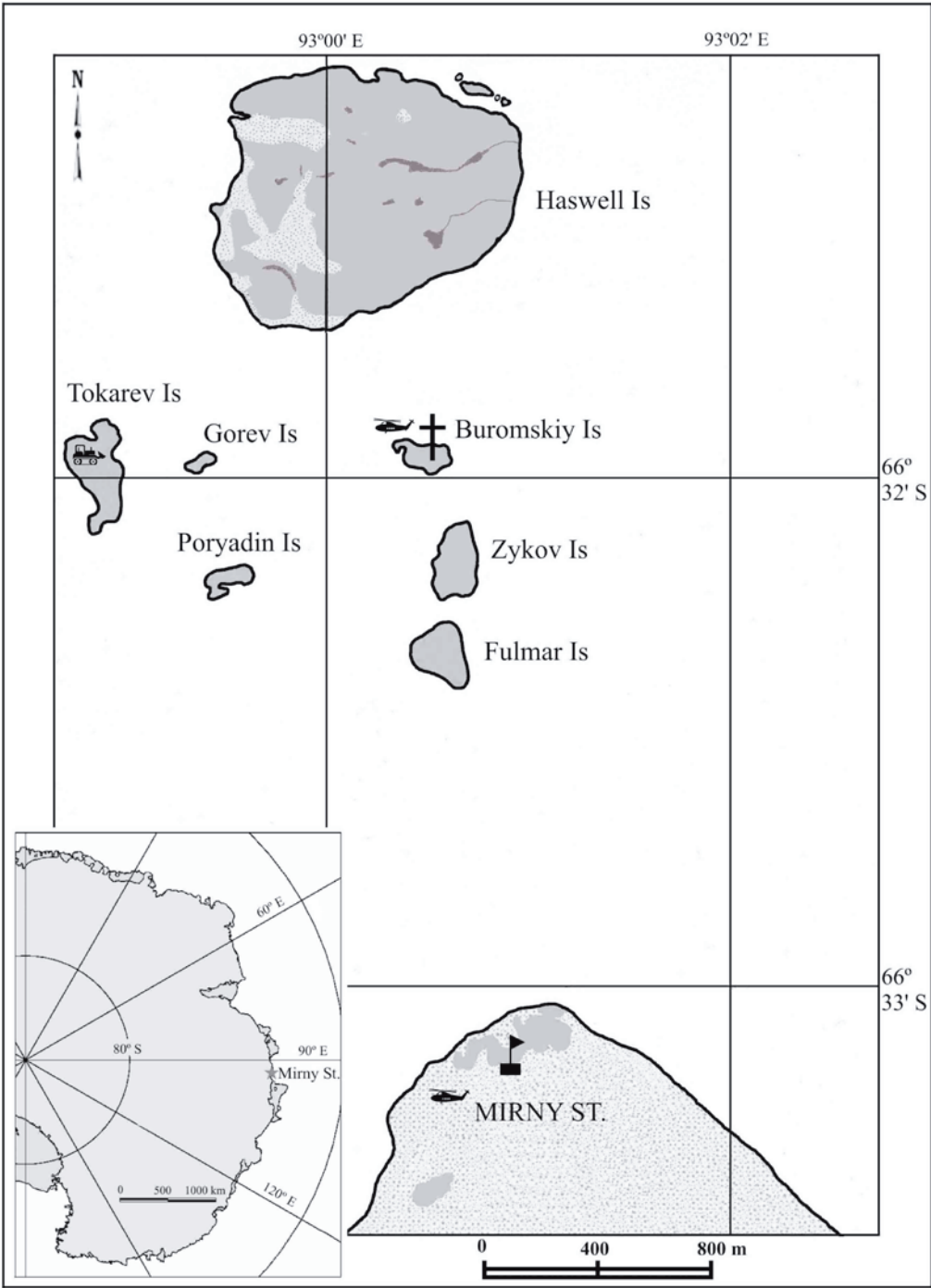
Gavrilov M. V., Chupin I.I., Mizin Yu.A., Chernov A.S. Biodiversity study of sea birds and mammals of the Antarctic. – Report on the research work "Study and research of the Antarctic" of the Federal Target Programme "World Ocean" SPb: AARI, 2002 (unpublished report).



- Golubev S.V. 2012 Report on the programme of ecological and environmental studies in Mirny Observatory during the 57th RAE – SPb: AARI, unpublished report.
- Golubev S.V. 2016 Report on the programme of ecological and environmental studies in Mirny Observatory during the 60th RAE – SPb: AARI, unpublished report.
- Gruzov E.N. Echinoderms in coastal biocenoses of the Davis Sea (Antarctica) // Systematics, evolution, biology and distribution of modern and extinct echinoderms. – Leningrad, 1977. – P.21-23.
- Doroshenko N.V. On the distribution of the minke whale (*Balaenoptera acutorostrata* Lac) in the southern hemisphere // V All-Union Conference on the Study of Marine Mammals: Abstracts. – Makhachkala, 1972. – Part 1. – P.181-185.
- Egorova E.N. Biogeographic composition of gastropod and bivalve fauna of the Davis Sea and possible ways of its formation // Information Bulletin of the Soviet Antarctic Expedition – 1972. – No 83. – P.70-76.
- Egorova E.N. Zoogeographic composition of malacofauna of the Davis Sea (East Antarctica) // Molluscs. The main results of their studies: VI All-Union Conference on the Study of Molluscs. – Leningrad, 1979. Collected volume 6. – P.78-79.
- Egorova E.N. Molluscs of the Davis Sea (East Antarctica) – Leningrad: Nauka, 1982. – 144 p. (Researches of fauna of the seas; N26 (34)).
- Kamenev V.M. Adaptive features of the breeding cycle of some Antarctic poultry. – Adaptation of organisms to the conditions of the Far North: Abstracts. All-Union Conference. Tallinn, 1984. P. 72-76.
- Kamenev V.M. Antarctic petrels of Haswell Island // Information Bulletin of the Soviet Antarctic Expedition. 1979. N 99. P. 78-84.
- Kamenev V.M. Protected Antarctica. – To aid the lecturer. Leningrad: "Znanie RSFSR" Society, 1986. P. 1-17.
- Kamenev V.M. Southern fulmar (*Fulmarus glacialis*) of the Haswell Archipelago // Information Bulletin of the Soviet Antarctic Expedition. 1978. N 98. P. 76-82.
- Kamenev V.M. Ecology of emperor penguins of the Haswell Archipelago area. – Penguin Adaptation. Moscow, 1977. P. 141-156.
- Kamenev V.M. Ecology of pitado petrel and snow petrel. – Information Bulletin of the Soviet Antarctic Expedition. 1988. N 110. P. 117-129.
- Kamenev V.M. Ecology of Wilson's storm petrel (*Oceanites oceanicus* Kuhl) on the Haswell Islands // Information Bulletin of the Soviet Antarctic Expedition. 1977. N 94. P. 49-57.
- Kamenev V.M. Ecology of Adelie penguins of the Haswell Islands // Information Bulletin of the Soviet Antarctic Expedition. 1971. N 82. P. 67-71.
- Korotkevich E.S. 1959 Poultry of East Antarctica. – Problems of the Arctic and Antarctica. – Edition 1.
- Korotkevich E.S. 1960 On the radio from Antarctica. – Information Bulletin of the Soviet Antarctic Expedition – No 20-24.
- Krylov V.I., Medvedev L.P. Distribution of cetaceans in the Atlantic and Southern Oceans // Information Bulletin of the Soviet Antarctic Expedition – 1971. – No 82. – P.64-66.
- Makushok V.M. 1959 On biological collections and observations in Mirny Observatory in 1958. – Information Bulletin of the Soviet Antarctic Expedition – No 6.
- Mizin Yu.V. 2004 Report on the programme of ecological and environmental studies in Mirny Observatory during the 48th RAE – SPb.: AARI, unpublished report.
- Minichev Yu.S. Opisthobranch gastropods (Gastropoda, Opisthobranchia) of the Davis Sea // Studies of the sea fauna. – Leningrad, 1972. – Vol. 11(19). – P.358-382.
- Neelov A.V., Smirnov I.S., Gavrilov M.V. 2007 50-year anniversary of the domestic studies of Antarctic ecosystems. – Problems of the Arctic and Antarctica. – No 76. – P.113 – 130.
- Popov L.A., Studenetskaya I.S. Ice forms of Antarctic seals // Fisheries use of the World Ocean resources. Review of Information of the Central Research Institute for Information and Technical and Economic Research in Fisheries. Series 1. – Moscow, 1971. – Edition 5. – P.3-42.
- Pryor M.E. 1964 Observations of emperor penguins (*Aptenodytes forsteri* Gray) in the vicinity of Mirny in 1962. Bulletin of the Soviet Antarctic Expedition – No 47.
- Pushkin A.F. Some ecological and zoogeographical features of Pantopoda fauna of the Davis Sea // Hydrobiology and biogeography of shelves of cold and temperate waters of the World Ocean: Scientific conference abstracts – Leningrad, 1974. – P.43-45.
- Stepanyants S.D. Hydroids of coastal waters of the Davis Sea (based on materials of the 11th Soviet Antarctic Expedition 1965/66) // Studies of the sea fauna. – Leningrad, 1972. – Vol. 11(19). – P.56-79.
- Chernov A., Mizin Yu. 2001 Ornithological observations at Mirny station during the work of the 44th RAE (1999-2000) – The state of Antarctic environment based on the operational data of Russian Antarctic stations. – SPb: AARI.
- Barboud C., Weimerskirch H. 2001 Emperor Penguins and climate change. *Nature*, 411: 183 – 185.
- Barboud C., Gavrilov M., Mizin Yu., Weimerskirch H. Comparison of emperor penguin declines between Pointe Géologie and Haswell Island over the past 50 years. *Antarctic Science*. V. 23. P. 461–468 doi:10.1017/S0954102011000356
- Gavrilov M., Mizin Yu. 2007. Penguin population dynamics in Haswell Archipelago area, ASPA No 127, East Antarctica. – p. 92 in Wohler E.J. (ed.) 2007. Abstracts of oral and poster presentations, 6th International Penguin Conference. Hobart, Australia, 3-7 September 2007
- Splettstoesser J.F., Maria Gavrilov, Carmen Field, Conrad Field, Peter Harrison, M. Messic, P. Oxford, F. Todd 2000 Notes on Antarctic wildlife: Ross seals *Ommatophoca rossii* and emperor penguins *Aptenodytes forsteri*. *New Zealand Journal of Zoology*, 27: 137-142.



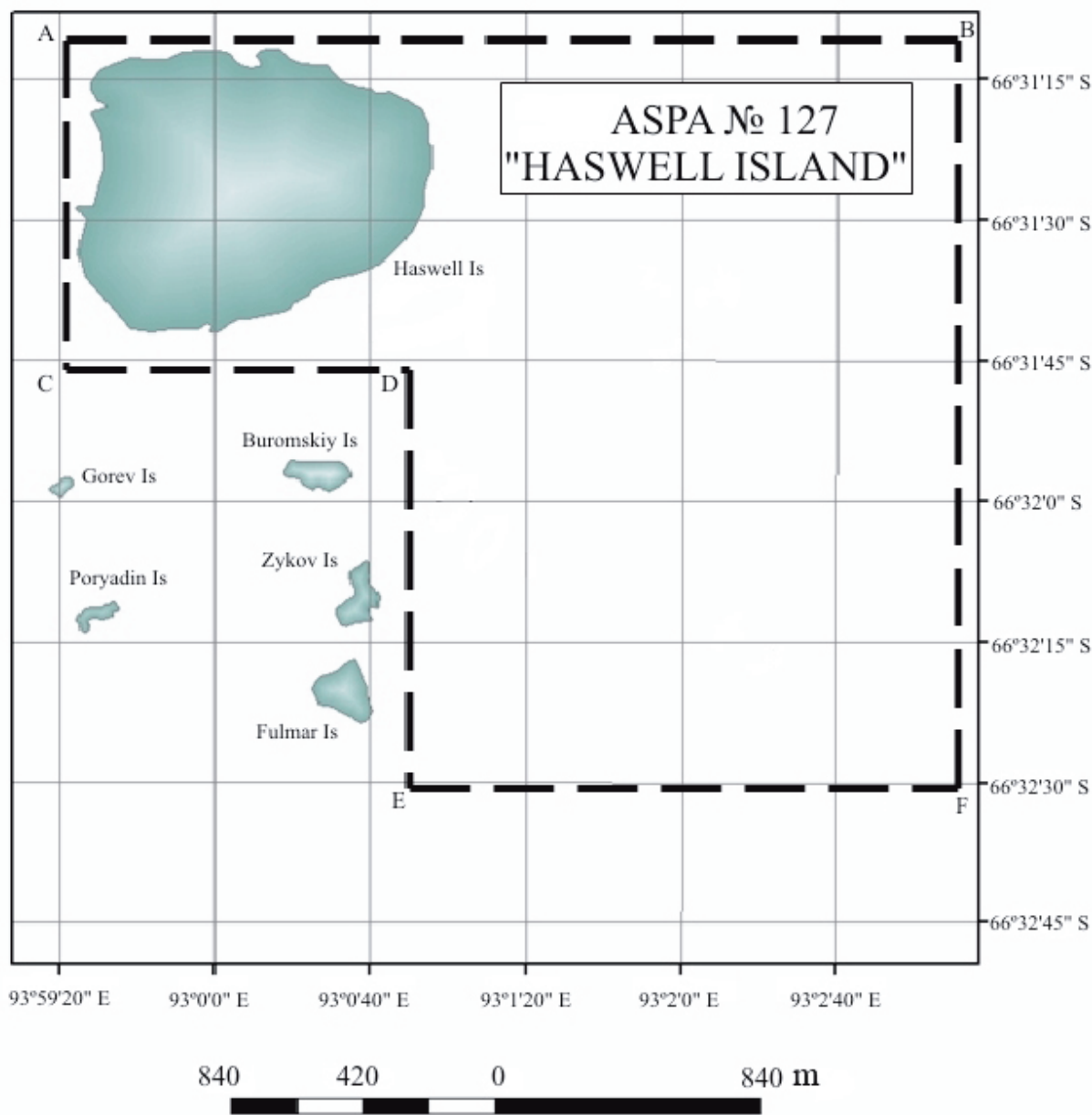
Map 1. General view of the location of the Haswell Archipelago islands, Mirny station, and logistical activity sites.



soil, rocks	glacier	lakes	station	cemetery	helicopter landing site	unloading place of transport equipment

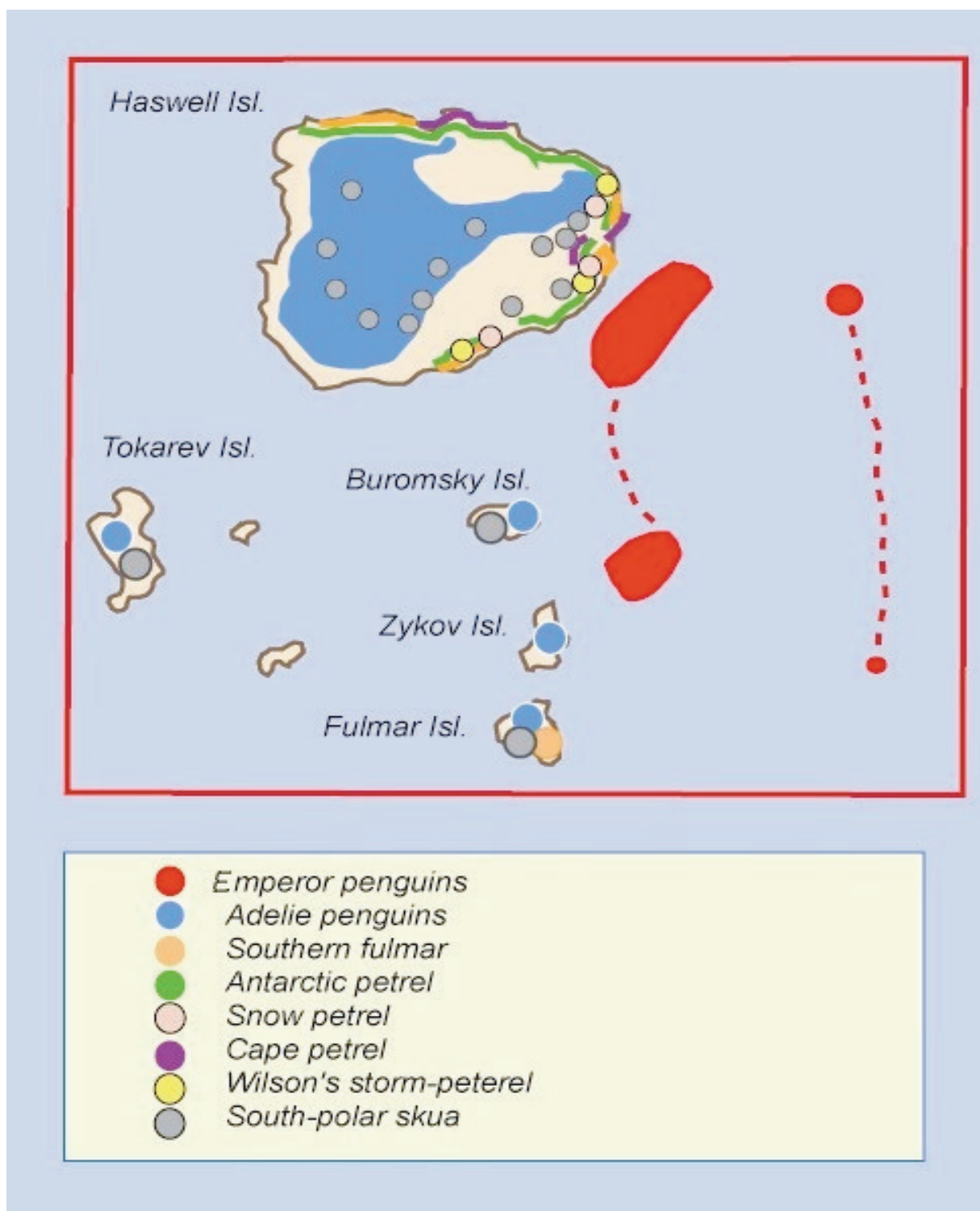


Map 2. Boundaries of the Antarctic Specially Protected Area No. 127 Opisthobranch gastropods "Haswell Island".





Map 3. Location of nesting colonies of sea birds.





Map 4. Haswell Island. Topography. Map 4: Topographic map of Haswell Island.

