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# **Seabird censuses on Novaya Zemlya 1994**

**Working report**



**The Joint Norwegian - Russian Commission  
on Environmental Cooperation  
The Seabird Expert Group – Report no. 9:1994**



**Norwegian Ornithological Society**

**Report no. 2-1994**

## **NORWEGIAN - RUSSIAN ENVIRONMENTAL COOPERATION THE SEABIRD EXPERT GROUP**

The Agreement on Environmental Cooperation between Norway and USSR was signed in 1988 and later renegotiated between Norway and Russia in 1992. The Commission - the Joint Norwegian-Russian Commission on Environmental Cooperation - is chaired by the Ministry of Environment of the two parties and has annual meetings.

Working groups on different topics have been established in order to contribute to increased collaboration on environmental problems in general, and carry out programmes and projects on different fields (i.e. air pollution, the marine environment, radioactive pollution). The seabird expert group is part of the working group for the marine environment.

The initial aim of the seabird expert group was to establish contact and collaboration between Norwegian and Russian research and management institutions. The expert group aims at contributing to the harmonisation and development of scientific methodology and data bases. Furthermore, mapping of important seabird colonies and the conditions related to seabird habitats, i.e. environmental pollutants and food resources, are important items for the group. Several projects on joint approaches have been initiated within the expert group during the last years.

Annual meetings in the seabird expert group have been arranged since 1989. The delegations from the two countries involve seabird experts from several institutions. On the Norwegian side, the Directorate for Nature Management has the coordinating role in the collaboration and chair the delegations. On the Russian side, VNII Priroda plays the corresponding role. The expert group is chaired by:

Alexander Golovkin - VNII Priroda, Moscow  
Morten Ekker - Directorate for Nature Management, Trondheim

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*Front cover photo: Parts from the Bezmyannaya South colony. Hallvard Strøm.*

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**REPORT No. 2 -1994**

**Hallvard Strøm, Ingar Jostein Øien, Jon Opheim,  
Eugeny A. Kuznetsov and Gennady V. Khakhin.**

## **SEABIRD CENSUSES ON NOVAYA ZEMLYA 1994**

**Working report**

**2. revised version**

**NORWEGIAN ORNITHOLOGICAL SOCIETY (NOF)  
KLÆBU 1994**

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## PREFACE

The Agreement on Environmental Cooperation between Norway and the Soviet Union was signed in 1988, and later renegotiated in 1992, this time between Norway and Russia. One result of this cooperative agreement was the foundation of an expert group on seabirds. As a link in this environmental joint venture, Bjørn Frantzen from The Norwegian Ornithological Society (NOF) initiated a joint Norwegian - Russian seabird project on Novaya Zemlya.

The collaboration and planning has been carried out by NOF and VNII Priroda, Moscow. The Norwegian Polar Institute held the scientific responsibility. The project is, from the Norwegian side, fully financed by the Directorate for Nature Management (DN). The project is part of the strategy and working plan for the Norwegian - Russian seabird expert group, and the work is also included in the 1994 work plan of the Russian Ministry of Protection of the Environment and Natural Resources of Russia.

The aim of the project is to map selected seabird colonies on the western coast of Novaya Zemlya. The project is planned for three years, with the first field season in the summer of 1994. This report describes the results of this work.

Project leaders on the Norwegian side have been Bjørn Frantzen (until 1 May 1994) and Hallvard Strøm (from 1 May 1994), and the Russian leader has been Gennady V. Khakhin (VNII Priroda). Also participating in the field work were Eugeny A. Kuznetsov (VNII Priroda), Anatoliy R. Fedorov (the Russian Navy), Jon Opheim (NOF) and Ingar Jostein Øien (NOF).

A number of people have contributed to the realization of this project. Special thanks are addressed to Vidar Bakken at the Norwegian Polar Institute, for scientific assistance and aid during all phases of the project, and to Vladimir F. Evseev, from the Russian Navy, for making the visit to Novaya Zemlya possible. We are further indebted to the Russian Navy on Novaya Zemlya for contributions to the good and effective accomplishment of the field work. Special appreciations are also addressed to Anatoliy R. Fedorov (the Russian Navy), Morten Ekker (DN), Elin Kjørsvik (University of Trondheim), Stephen Clayborough and Geoffrey Acklam, for their respective contributions to the project.

Trondheim/Moscow, November 1994

Hallvard Strøm

Gennady V. Khakhin



# CONTENTS

ABSTRACT .....	7
1. INTRODUCTION .....	8
2. THE STUDY AREA .....	10
2.1 Novaya Zemlya .....	10
2.2 Bezymyannaya Bay .....	11
3. COLONY COUNTS .....	13
3.1 Background .....	13
3.2 Methods .....	16
3.3 Results .....	16
3.4 Discussion .....	21
4. MONITORING PLOTS .....	25
5. RINGING .....	26
6. BIOMETRIC MEASUREMENTS .....	27
7. BLOOD SAMPLING .....	28
8. COLLECTION OF TISSUE SAMPLES FROM SEABIRDS .....	28
9. COLLECTION OF ARCTIC PLANTS .....	29
10. COLLECTION OF FOOD ITEMS .....	29
11. OBSERVATIONS OF BIRDS AND MAMMALS .....	30
12. REFERENCES .....	37
13. APPENDIX .....	38





## ABSTRACT

This report contains the results from the joint Norwegian - Russian seabird censusing expedition to Novaya Zemlya 1994. The field work was carried out in Bezymyannaya Bay in the period July 28 to August 16.

The whole Bezymyannaya South colony was counted, and the counts resulted in the following minimum numbers of the five species represented in the colony: 71 pairs of Glaucous Gull *Larus hyperboreus*; 6,000 pairs of Kittiwake *Rissa tridactyla*; 140 ind. of Common Guillemot *Uria aalge*; 141,000 ind. of Brünnich's Guillemot *Uria lomvia* and 40 ind. of Black Guillemot *Cepphus grylle*. Five monitoring plots for Brünnich's Guillemot and one for Kittiwake were established, containing about 1,800 Brünnich's Guillemots and 125 Kittiwakes.

About 2,750 Brünnich's Guillemots were ringed (1,148 adults and 1,602 chicks), 50 Glaucous Gull chicks, 11 adult Kittiwakes and one nestling of Rough-legged Buzzard *Buteo lagopus*. The ringing of Brünnich's Guillemots constitutes a link in an international programme to map the migratory routes and the wintering grounds of the species.

Thirty blood samples were collected from Brünnich's Guillemot for DNA analyses. Biometrical measurements were taken of Brünnich's Guillemot (50 ind.), Kittiwake (15 ind.), Glaucous Gull (5 ind.) and Pomarine Skua *Stercorarius pomarinus* (1 ind.). The biometrical measurements from the Brünnich's Guillemots and the Kittiwakes are presented in the report.

Tissue samples were taken from Glaucous Gulls, Kittiwakes and Brünnich's Guillemots for analyses of contaminants. Specimens of 8 species of arctic plants were collected for botanogeographical and molecular genetic studies. Prey items were collected from adult Brünnich's Guillemots during the feeding of their chicks.

The report also summarises all observations of birds and mammals made during the field work. Thirty four species of birds and four species of mammals were observed during the three week stay in Bezymyannaya Bay.

# 1. INTRODUCTION

The Barents Sea is one of the most densely populated seabird areas in the world. (Norderhaug et al. 1977). The seabirds breed in numerous colonies around the whole sea, and the Barents Sea constitutes a larder for large populations of seabirds both during the summer and the winter seasons. The seabirds play a central part in the arctic ecosystem as the link between the marine and the terrestrial ecosystems, through their supply of nutrients to vegetation on land, particularly in the vicinity of the colonial breeding sites.

The huge seabird populations in the Barents Sea are increasingly exposed to environmental influences by oil-related activity, fisheries and pollution. The need to investigate the seabird population in the Barents Sea has therefore increased during recent decades. The responsibility for the management of the seabird resources in the Barents Sea is shared between Norway and Russia. In recent decades, a considerable effort has been made to map seabird colonies and monitor population trends of certain seabird species. This work has mainly been carried out in the Norwegian territory.

A significant part of the seabird populations in the Barents Sea region breeds on Novaya Zemlya. Some of the largest seabird colonies in the northern hemisphere are situated here (Uspenski 1956). Since the Soviet Navy took control of the area in 1954, and the nuclear test sites were established, no significant seabird work has been undertaken in this area. Thus we have currently very limited knowledge of the status and trends of the seabird populations on Novaya Zemlya. For these reasons, the Norwegian Ornithological Society (NOF) initiated a joint Norwegian - Russian seabird project on Novaya Zemlya in 1992.

The time schedule of the project is three years, and the work will be carried out in 4–6 selected seabird colonies on the west coast of Novaya Zemlya. The project has the following aims:

- to estimate the size of the breeding populations of auks and gulls
- to establish a monitoring program for long term studies of Brünnich's Guillemot *Uria lomvia* and Kittiwake *Rissa tridactyla*
- to map the migration routes and wintering areas of Brünnich's Guillemots breeding on Novaya Zemlya
- to map the genetic characteristics of Brünnich's Guillemot and Kittiwake through blood sampling and biometrical studies
- to identify food preferences of Brünnich's Guillemots and Common Guillemots *Uria aalge*
- to identify the environmental contamination levels in Glaucous Gull *Larus hyperboreus*, Kittiwake and Brünnich's Guillemot
- to map the bird and mammal fauna in the visited regions

The project will also carry out minor tasks for other projects/institutions.

The 1994 expedition was accomplished during the period July 26 to August 19. The field work was carried out in Bezmyannaya Bay during the period July 28 to August 16. Half of the time was planned spent in Gribovaya Bay, north of Bezmyannaya Bay, but for several reasons this was not possible to carry out. The whole field period was therefore spent in Bezmyannaya Bay. Transport was accomplished by commercial aircraft to Belush'ya, the Russian Navy's main base on Novaya Zemlya, thereafter by military helicopter to Bezmyannaya Bay, where the base was established.

During the stay, the weather conditions were very unstable. As a rule the days were rainy, foggy and extremely windy; some days also with hail-storms. The temperature averaged + 8°C, the extremes being + 13°C and + 4°C. The weather conditions delayed and partially increased the difficulties of the work, but can not be said to have affected the accuracy of the collected material significantly.

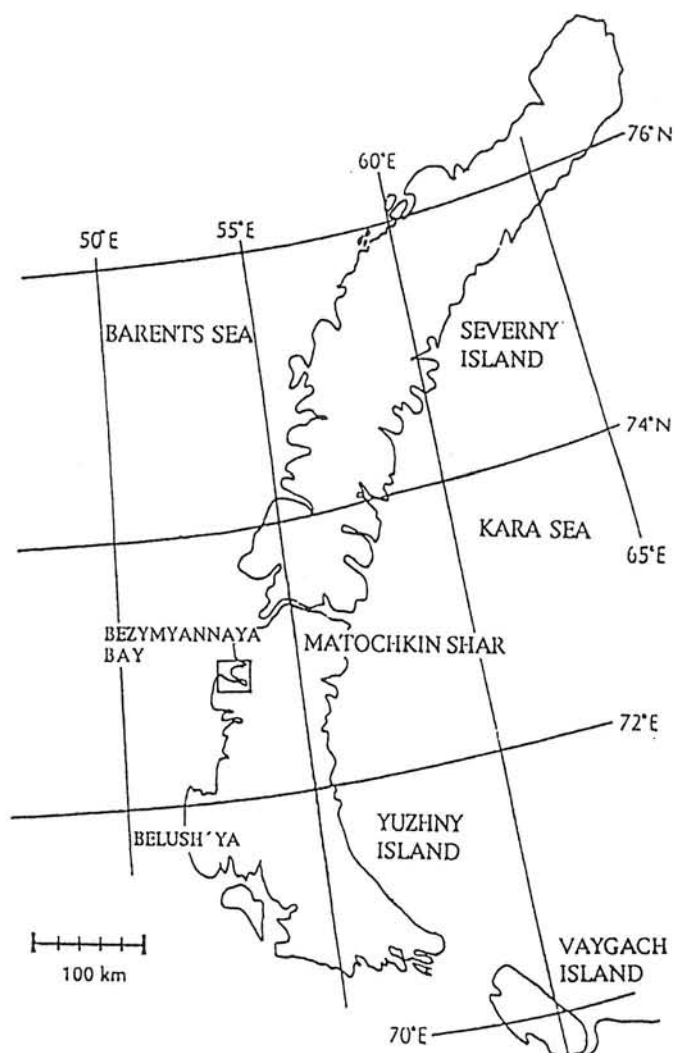


**Figure 1.** The participants of the field work in Bezmyannaya Bay 1994. From right: Anatoliy R. Fedorov, Eugeny A. Kuznetsov, Gennady V. Khakhin, Ingar Jostein Øien, Jon Opheim and Hallvard Strøm. Photo: Hallvard Strøm.

## 2. THE STUDY AREA

### 2.1 NOVAYA ZEMLYA

Novaya Zemlya is a group of islands consisting of two large islands, Severny (northern island) and Yuzhny (southern island), in addition to a number of small islands. The group stretches out in a north - northeasterly direction, from 70°30' N to 77°00' N (Figure 2). The northern and southern islands are separated by the narrow Matochkin Shar strait, which is only 1–2 km wide. The two large islands extend about 900 km, and cover an area of 82,179 square km. In addition, the smaller islands have a total area of 1,000 square km. Novaya Zemlya therefore covers a total area of over 83,000 square km.



*Figure 2. Novaya Zemlya*

Novaya Zemlya separates the Barents Sea from the Kara Sea (Figure 2). In geological terms the group is, together with Vaygach, a northern extension of the Ural Mountains, which separate the European from the Asian land mass. The narrow strait between the northern and southern islands constitutes no natural line of demarcation between the two islands, neither geologically or otherwise.

Novaya Zemlya can therefore be considered as one geographical unit (Holtedahl 1922). The two islands have very different topography. The southern part, and the eastern and western coast of the southern island, are dominated by coastal plains, which cover vast areas, particularly along the coast. This tableland does not normally attain heights over 300 metres. The central parts of the southern island, up to 73°N, are dominated by small mountains that attain heights of about 700 metres. On the northern part of the southern island, the mountains rise, and can attain heights over 1,000 metres. The southern part of the northern island also features large mountain formations, and the highest mountain on Novaya Zemlya is situated here (1547 metres above sea level). Further north, glaciers dominate the landscape, and north of 75°N there is a continual icecap. Some dispersed smaller glaciers occur on the northern part of the southern island.

The climate on Novaya Zemlya is cooler than in the western parts of the Barents Sea, because much of the heating effect of the relatively warm Atlantic water masses brought up along the Norwegian coast by the Gulf Stream is lost in the eastern Barents Sea. However, the remains of it serve to make the western coasts of Novaya Zemlya distinctly warmer than the eastern coast bordering the Kara Sea.

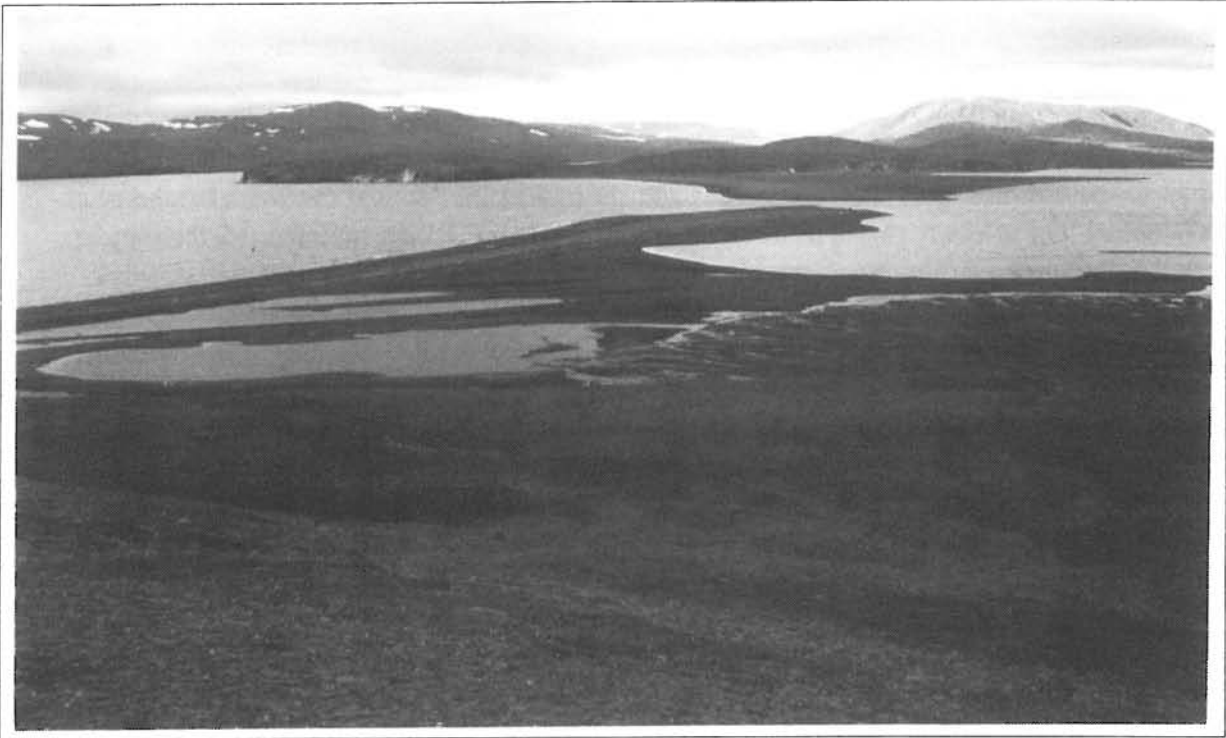
At the weather station of Karmakuly on the western coast of the southern island, the mean air temperature in July-August is 6–7°C and -17°C in February. The annual amount of precipitation is low, around 300–400 mm. Again, due to the effects of the Gulf Stream, the amount of precipitation is higher along the western coast than along the eastern coast and in the inland. Snow constitutes a major part of the precipitation and normally it falls throughout the island between October and May. Strong winds and blizzards occur frequently during the winter (Holtedahl 1928).

The western coast of Novaya Zemlya contains typical areas of convergence (polar fronts), as a branch of the Gulf stream here meets cold streams from the polar areas. This phenomenon causes a strong growth of planctonic algae, which subsequently makes the basis for high occurrences of zooplankton and fish. It is the high biological productivity in the ocean that forms the foundation for the rich birdlife on Novaya Zemlya (Uspenski 1956).

## 2.2 BEZMYANNAYA BAY

The Bezmyannaya Bay lies on the north-western coast of the southern island, about 55 km south of the Matochkin Shar strait (72°55' N) (Figure 2). The bay is about 14 km long and the width is about 3 km. Kutoff Island is situated in the middle of the bay, in the inner part. Several rivers, among them the river Bezmyannaya, meet the sea in the inner part of the bay, where they have built up a major delta, visible at low tides (Figure 3).

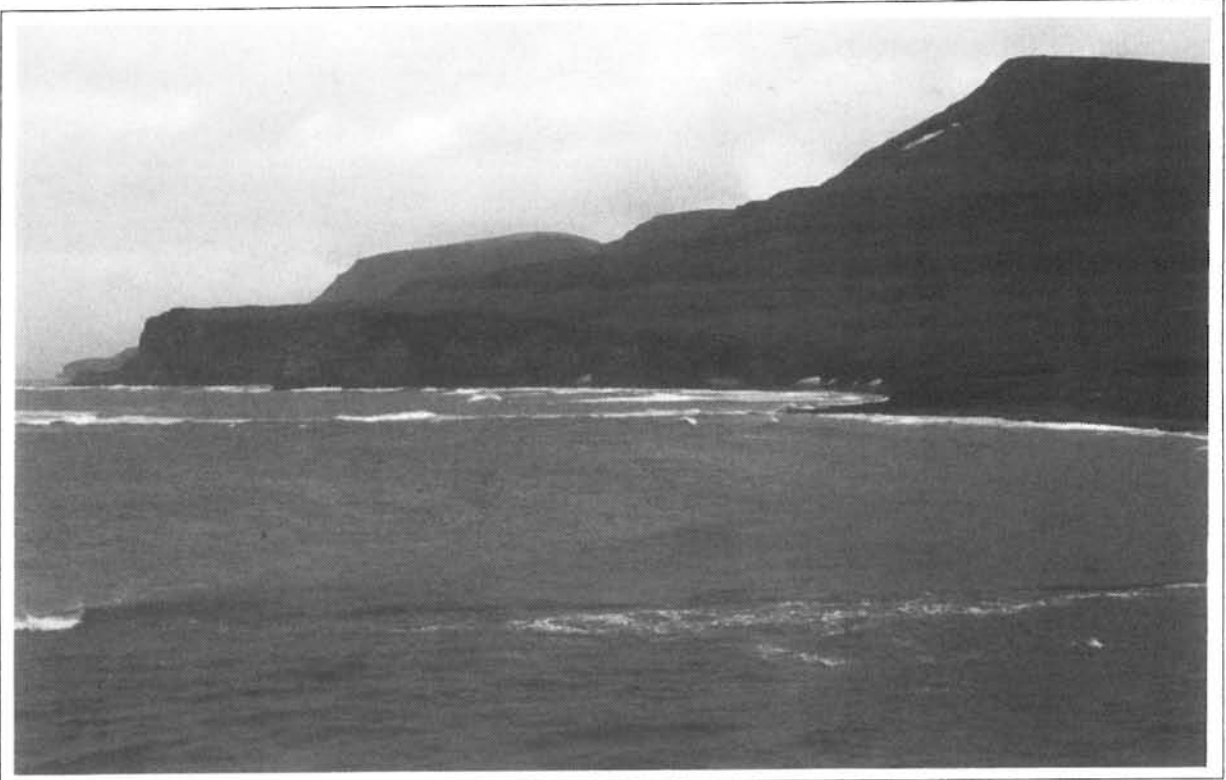
The mountains surrounding the bay reach heights of 400 to 700 metres above sea level. The coastline of both the north and the south side of the bay is characterized by steep cliffs (Figure 4). The cliffs rise up to 70 metres, directly up from the sea. On the south side of the bay they start 500 metres east of Cape Nordenskiöld (Figure 5). The height of the coastal cliffs decreases inwards to the bottom of the bay, disappearing completely when meeting the delta area. For a more detailed description of the seabird colony, see the subsection 3; *Colony counts*.



*Figure 3. From the inner parts of Bezmyannaya Bay. The picture shows the western parts of the delta area. Photo: Hallvard Strøm.*



*Figure 4. The western parts of the cliffs on the south side of Bezmyannaya Bay. Photo: Hallvard Strøm.*



*Figure 5. Picture taken from Cape Nordenskiöld, showing the outermost parts of Bezymyannaya Bay. Photo: Hallvard Strøm.*

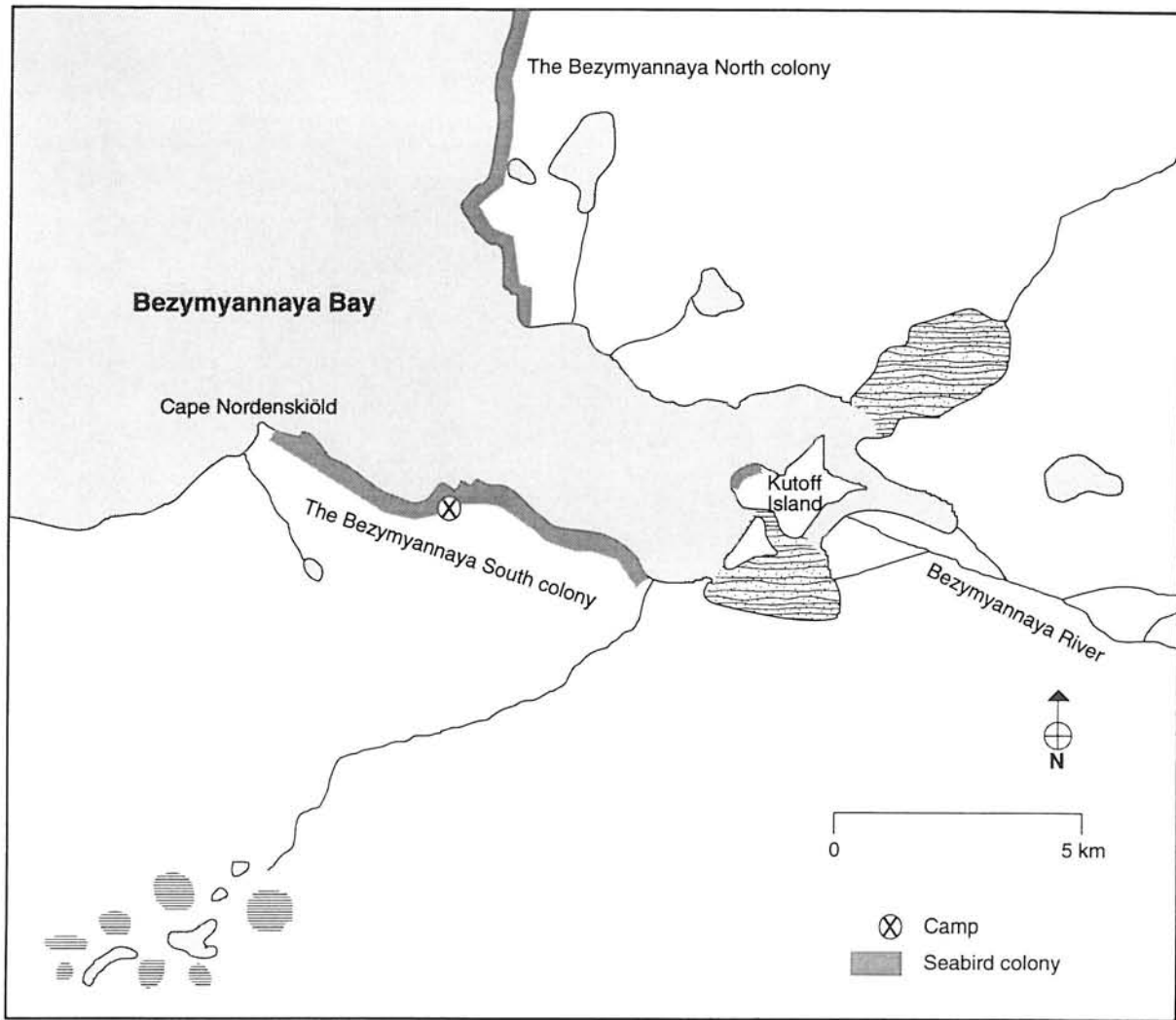
### 3. COLONY COUNTS

#### 3.1 BACKGROUND

A comprehensive description of the Novaya Zemlya seabird colonies is given by Portenko (1931) and Uspenski (1956). Based on his own field work during the years 1941 and 1948-50, answers to questionnaires and previously published data, Uspenski states that a total number of 47 seabird colonies is to be found at Novaya Zemlya. He further suggests the minimum number of Brünnich's Guillemots, the dominant seabird species in the colonies, to be about 2,000,000 birds.

At the beginning of this century, the seabird colonies at Bezymyannaya Bay were considered to be the largest in Novaya Zemlya (Uspenski 1956). Markham (1881), Pearson (1899) and others, assessed the colonies in Bezymyannaya Bay to be the largest in the northern hemisphere. The colonies are situated along the sea coast to the north of Bezymyannaya Bay (the Bezymyannaya North colony) and on the south shore of the bay (the Bezymyannaya South colony). Additionally there is a small colony on Kutoff Island (Figure 6). The total length of the colonies is 24 km (Uspenski 1956).

There has been a long tradition of economic exploitation of the Novaya Zemlya seabird colonies, and the colonies in Bezymyannaya Bay were for a long time the focal point for this



*Figure 6. The seabird colonies in Bezymyannaya Bay.*

industry (Uspenski 1956). The products were eggs and adult birds. The eggs were utilized as food or as raw materials for the soap industry. The adult birds were primarily used for food, although the feathers were also to some extent utilized. Adult birds and eggs were collected by both local worker groups and by larger expeditions, both Russian and foreign.

According to Krasovski (1937), considerable amounts of eggs were collected in Bezymyannaya Bay prior to 1922, and exported to Norway. Between 1922 and 1932 this work mainly covered local needs, although foreign "raids" occasionally occurred. Extensive exploitation of the three colonies commenced in 1928, and in 1933, for example, 342,500 Brünnich's Guillemot eggs and more than 12,000 adult birds were collected (Krasovski 1937). According to Uspenski (1956), the colonies in Bezymyannaya Bay were wiped out that year, and less than 10,000 young reached the water from all the three colonies together. Even more extensive gathering of adult birds commenced in 1934 and the egg-collecting activity and the killing of adult birds continued until 1947, when the colonies in Bezymyannaya Bay and Gribovaya Bay were protected. This protection was abolished in 1951, but no extensive exploitation of the colonies has occurred since then.



The first population estimate from Bezymyannaya Bay was made by Krasovski in 1933–34. Based on his own counts, he calculated the total population of Brünnich's Guillemots to consist of 1,644,503 birds. This number comprised 116,557 birds in Bezymyannaya North, 1,510,946 birds in Bezymyannaya South, and 17,000 birds on Kutoff Island (Krasovski 1937).

L. O. Belopol'skii, made an estimate of the colony in 1942, estimated the total number of Brünnich's Guillemots to 600,000 birds: 100,000 birds in Bezymyannaya North and 500,000 birds in Bezymyannaya South and on Kutoff Island (Uspenski 1956).

When S. M. Uspenski counted the colonies in 1948, he calculated the number of Brünnich's Guillemots to be 80,000 birds in Bezymyannaya North, 200,000 birds in Bezymyannaya South, and 10,000 birds on Kutoff Island. When he re-counted the colonies in 1950, he estimated the breeding population to be 120,000 birds in Bezymyannaya North, 240,000 birds in Bezymyannaya South, and 11,000 birds on Kutoff Island (Uspenski 1956).

In 1992, G. V. Khakhin and S. M. Uspenski carried out censuses in Bezymyannaya South, which gave a population estimate for Brünnich's Guillemot of about 70,000 birds (G. V. Khakhin).

This year's work was carried out in the Bezymyannaya South colony. The entire colony was covered and all the resident species were counted. For different reasons, Bezymyannaya North and Kutoff Island were not possible to visit. The population estimate for Brünnich's Guillemot in Bezymyannaya South, and existing estimates for the other species occurring in the colony, are presented in Table 1.

*Table 1. Counts in the Bezymyannaya South colony, 1933 – 1994.*

Species	1933–34	1942	1948	1950	1992 <sup>4)</sup>	1994 <sup>4)</sup>
Glaucous Gull				60		71 <sup>1)</sup>
Kittiwake	1,800 <sup>3)</sup>			2,810		6,000 <sup>1)</sup>
Common Guillemot				300–400		280 <sup>2)</sup>
Brünnich's Guillemot	1,510,946	500,000	200,000	240,000	140,000	282,000 <sup>2)</sup>
Black Guillemot						80 <sup>2)</sup>

1) Apparently occupied nest sites

2) Individuals at ledges/colony

3) All three colonies in Bezymyannaya Bay combined

4) Calculated after the method of Uspenski (1956)

### 3.2 METHODS

The counting unit used for Common Guillemot and Brünnich's Guillemot was birds present on the breeding ledges. For Black Guillemot *Cephus grylle* the counting unit was birds present at the colony. Apparently occupied nesting sites was used as the counting unit for Kittiwake and Glaucous Gull.

The entire colony was photographed from the land side with polaroid colour prints and with colour slide film. In addition, the colony was photographed with colour slides from the helicopter on the 28 July and the 16 August. The polaroid photographs made up the basis for dividing the colony into smaller sections in order to facilitate the countings. The slides taken from helicopter and from the land side comprises material for control and reference, both for this year's counts and for future work.

In addition to Bezymyannaya South, we also photographed Kutoff Island and Pukhov Island from helicopter (Pukhov Island only on the 28 July). These pictures will constitute the reference material for later surveys of these localities.

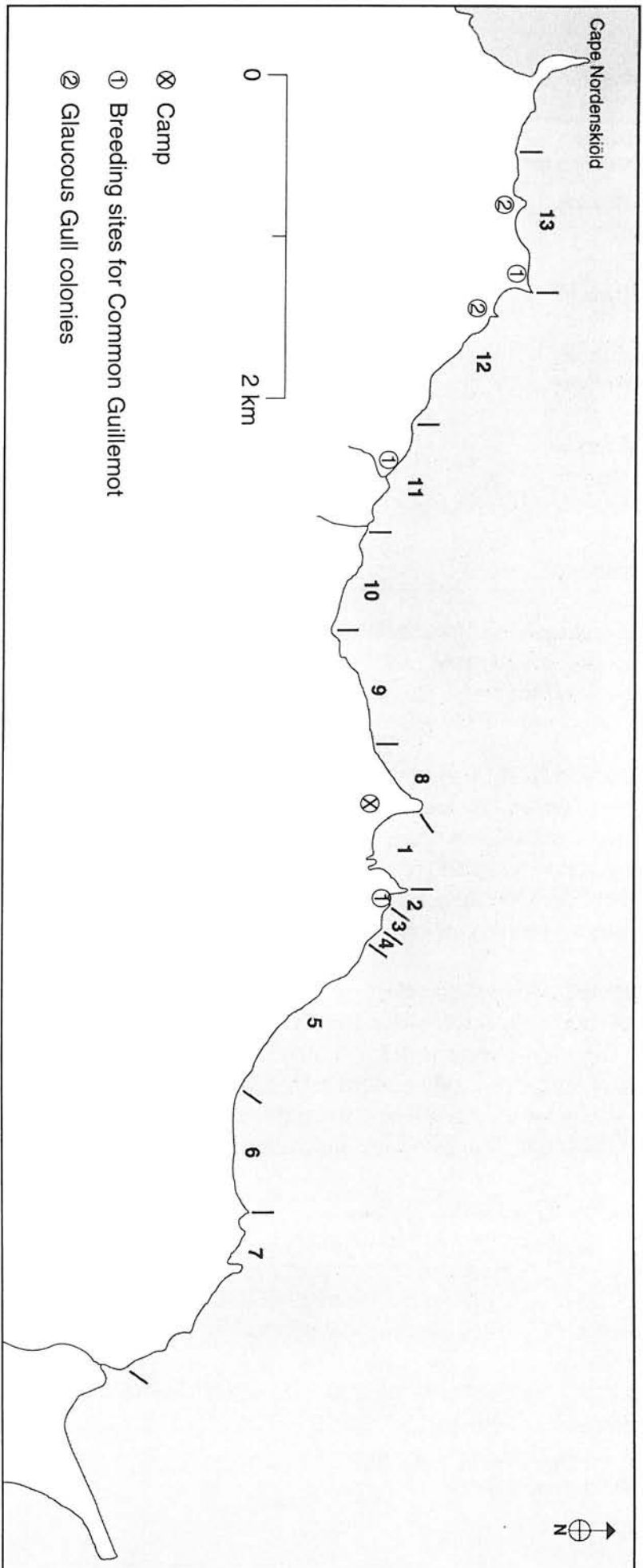
The counts were undertaken from the land side, mainly from a point above the colony, but in certain cases also from below. Usually, binoculars were used, but where the distances were extremely short, the countings were carried out without binoculars. The counting units were registered in groups of 10 on hand tally counters, which we used in order to facilitate and ensure the accuracy of the countings. All species occurring in the colony were counted this way.

As an attempt to show possible changes in the breeding population of Brünnich's Guillemot in Bezymyannaya South, a comparison was made with two older photographs from Uspenski (1956). These two pictures show parts of the colony in the period 1948–50. Pictures were taken of the same parts of the colony during this year's field work (Figure 11–14).

### 3.3 RESULTS

The counts were completed in 11 days during the period 29 July – 11 August, with a few days break due to extreme weather conditions. Four people participated simultaneously in the counts.

We divided the colony into 13 main sections and 89 sub-sections (Figure 7). The numbers of registered birds in the main sections are presented in Table 2 (Appendix). The result from the counts of the five registered species is presented in Table 3. The population numbers are minimum numbers. The species are presented on the below.



**Figure 7.** The Bezymyannaya South colony. The map shows the counting sections used during the field work and the breeding sites of Common Guillemots and Glaucous Gulls.

**Table 3.** Colony counts in the Bezymyannaya South colony, 1994.

Species	Counts	Addition <sup>4)</sup>	Final number
Glaucous Gull <sup>1)</sup>	71	0	71
Kittiwake <sup>1)</sup>	5,892	100	6,000
Common Guillemot <sup>2)</sup>	138	0	140
Brünnich's Guillemot <sup>2)</sup>	138,535	3,300	141,000
Black Guillemot <sup>2)</sup>	39	0	40

1) Apparently occupied nest sites

2) Individuals at ledges

3) Birds at the colony

4) Parts of the cliff not seen from the top of the colony. Estimated from aerial photos.

#### **Glaucous Gull** *Larus hyperboreus*:

Breds scattered throughout the colony, the counts resulted in 71 occupied nests. Two smaller colonies, containing 5 and 15 pairs respectively, included in the above numbers, were registered at the western end of the colony (Figure 7). All the nesting sites were located in close association with the seabird colony. The young of the Glaucous Gull were about 2–3 weeks of age at the start of the field period.

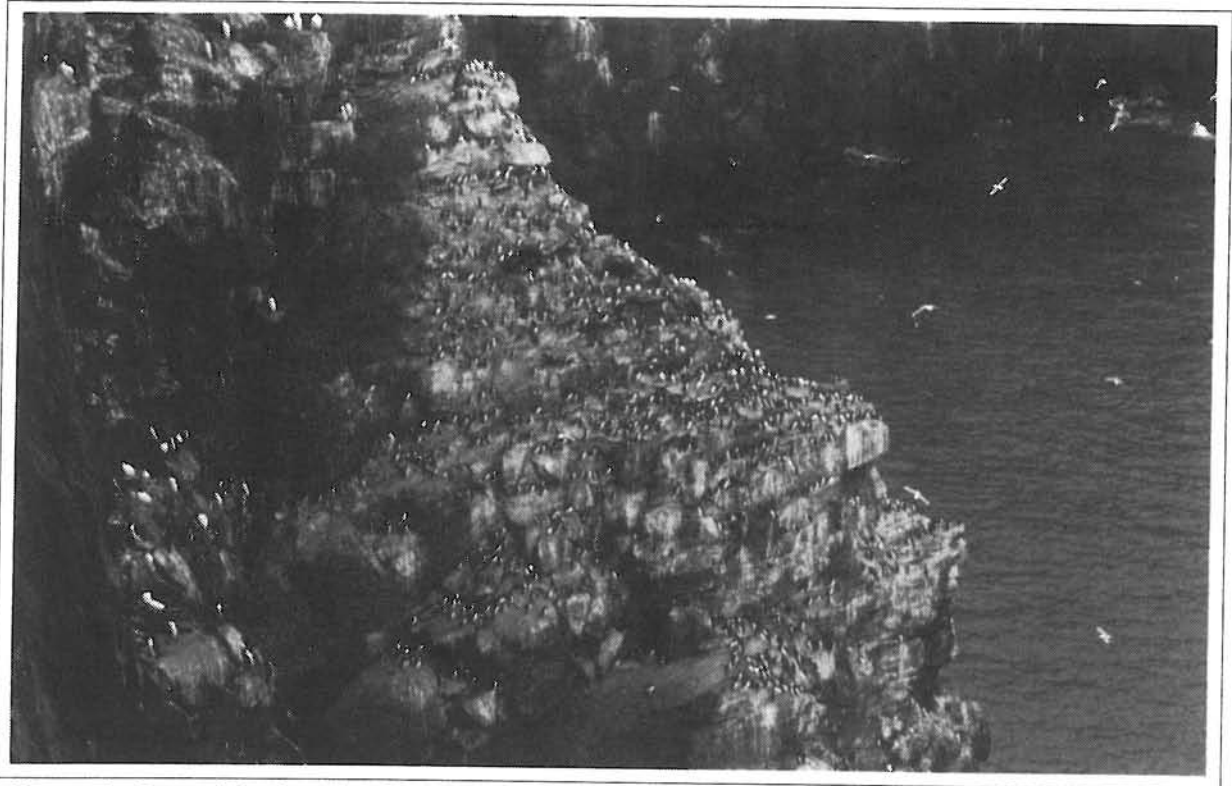
#### **Kittiwake** *Rissa tridactyla*:

Breds in small colonies in the steepest walls throughout the whole colony, but in smaller numbers towards the eastern end. A total of 6,000 occupied nests was registered. The nests of the Kittiwakes were mostly situated in the lower parts of the colony, close to the sea surface. When we arrived, most of the Kittiwakes were still incubating, but some nests already contained newly hatched chicks. The first flying juvenile was observed on 11 August.

#### **Common Guillemot** *Uria aalge*:

The species occurred in small numbers, and the counts gave 140 birds on nesting ledges. Common Guillemots were registered at only three sites within the colony (Figure 8). These were low, flat, rock arches leading into the sea. All four localities were dominated by Brünnich's Guillemots, but with sporadic occurrences of Common Guillemots.

The Common Guillemot's nest site preferences within the colony correspond well with earlier descriptions of the species' nest site preferences at this locality (Krasovski 1937, Uspenski 1956). The bridled form, having white eye-ring and post-ocular stripe, also occurred, but in smaller numbers than the normal form.



**Figure 8.** One of the breeding sites of Common Guillemot. The species used low flat, rock arches leading into the sea. Photo: Hallvard Strøm.

**Brünnich's Guillemot** *Uria lomvia*:

This is the dominant species in the colony. The counts gave 141,000 birds on breeding ledges. The species bred throughout the whole colony, but the density varied considerably. The density was highest in the central and western parts of the colony (Figure 9). In the eastern parts, the occupied ledges were more scattered, which is probably associated with the suitability of the rock as a nesting site (Figure 10). The Brünnich's Guillemots bred mainly on relatively narrow ledges, where there was space for one row of birds only. When we arrived the chicks were just hatched, but some nests already contained chicks up to one week of age at the start of the counting period.

Chicks leaving the ledges by jumping and gliding to the sea, were first registered in the evening of 12 August. The leaving of young continued during the evenings and nights of the following days, but there were still considerable numbers of chicks left on the ledges when the field period ceased on 16 August.

**Black Guillemot** *Cephus grylle*:

The Black Guillemots were few in numbers, scattered throughout the colony. The number of birds counted totalled 40. Counting the breeding population is difficult because the nests are situated in cracks and gullies, generally hidden from the observers. Additionally the species generally nests at low density. Thus our number is probably too low.



*Figure 9. The central parts of the Bezmyannaya South colony. These parts of the colony had high breeding density of Brünnich's Guillemot. Photo: Hallvard Strøm.*



*Figure 10. The eastern parts of the Bezmyannaya South colony. In this part of the colony the Brünnich's Guillemots were breeding more scattered, which was probably associated with the suitability of the rock as nesting sites. Photo: Hallvard Strøm.*

### 3.4 DISCUSSION

This year's counts were carried out thoroughly, and probably give a reliable estimate of the population sizes of the species represented in the colony.

All counts were carried out from land, which implies that certain sections of the colony were out of sight of the observers. This problem arose merely a few times. Facilitated by aerial photographs, the numbers of birds in these sections were estimated and included in the final population numbers. As mentioned in chapter 1, the weather conditions during the stay were severe and extremely variable. However, the weather conditions probably had no significant effects on the reliability of the censuses, as the countings were stopped if the weather conditions became too harsh. Considering the above mentioned potential sources of error, it is unlikely that the margin of error for our censuses exceeds 10%.

#### **Glaucous Gull**

For this species only a population estimate from 1950 is available. The population in Bezymyannaya South was then set at 60 pairs (Uspenski 1956). Our counts gave a minimum of 71 pairs. These numbers suggest that the population has been relatively stable in the period.

#### **Kittiwake**

Uspenski (1956) describes the species as a relatively new breeding species in the Novaya Zemlya seabird colonies. Based on observations from the end of the 19th century and the beginning of the 20th, Uspenski claims with certainty that the Kittiwake became established in the colonies during the 1930s. The establishment of this species is seen in relation to the large decrease in the numbers of Brünnich's Guillemots during the same period, which was brought about by the extensive exploitation of eggs and adults.

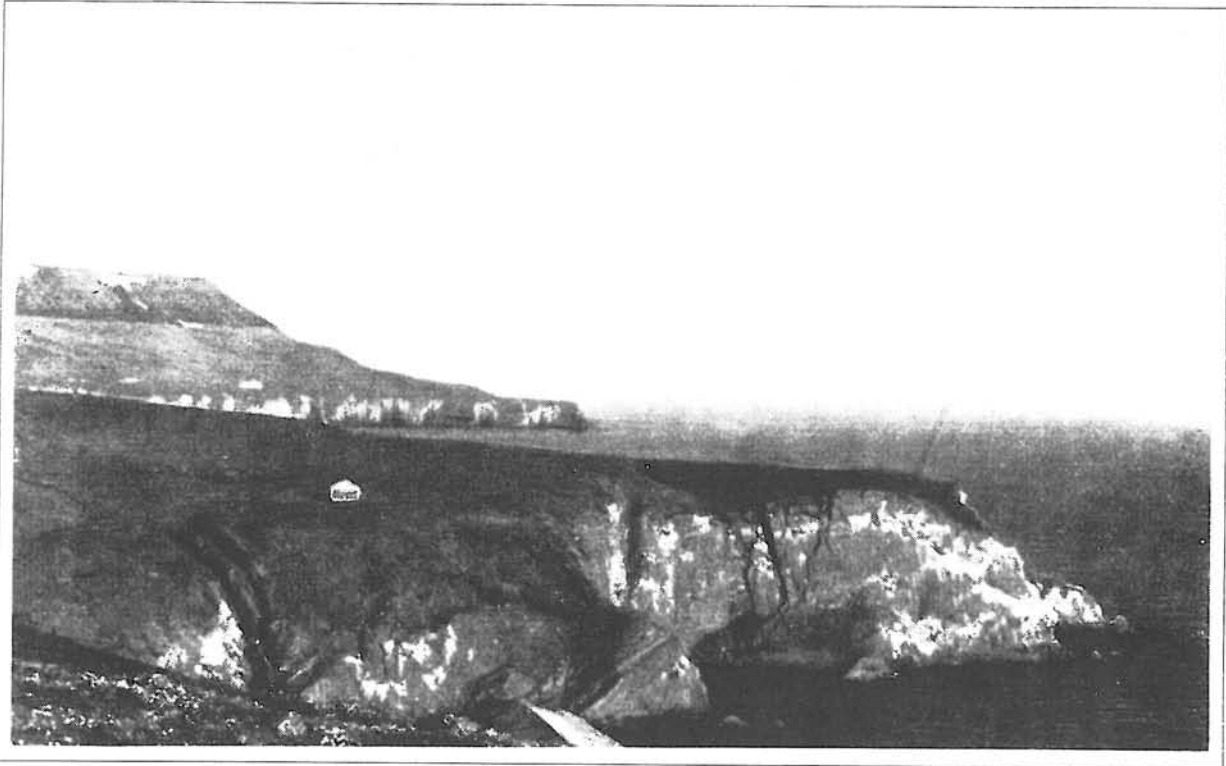
Our counts gave a minimum of 6,000 occupied nests, which is an evident increase since 1950, when the population was assessed to 2,410 pairs in Bezymyannaya South.

#### **Common Guillemot**

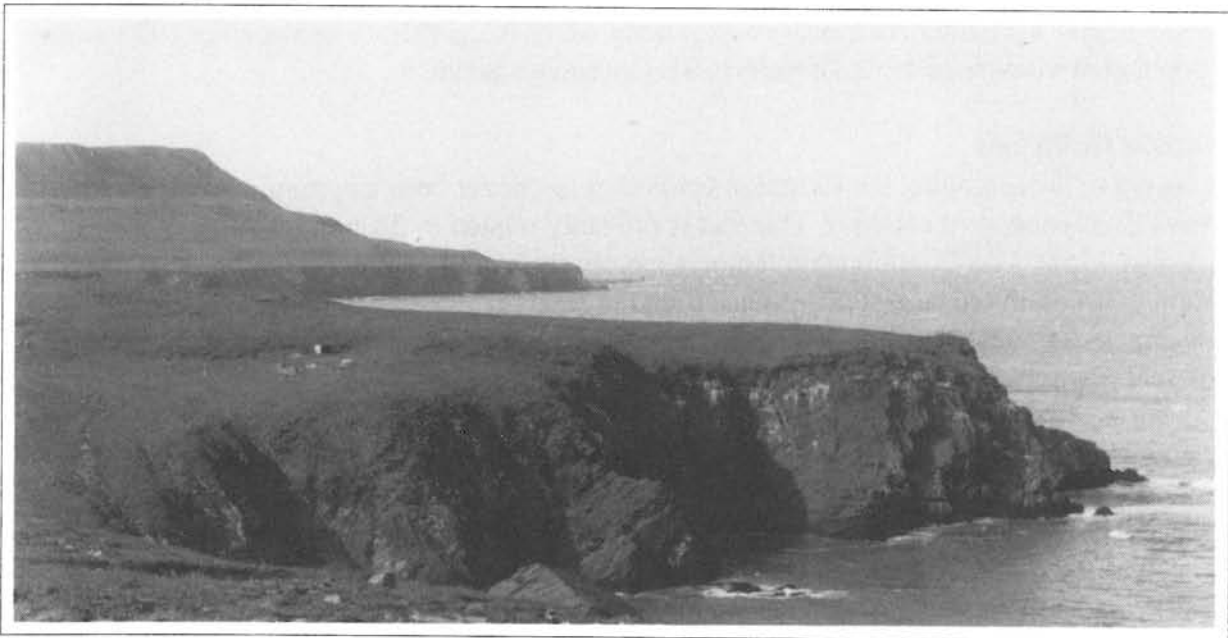
According to the literature, the Common Guillemot has never been a common species in the Novaya Zemlya seabird colonies. This fact is probably related to the biology of the species (Uspenski 1956). The Common Guillemot is merely registered in a few colonies along the western coast, with the largest occurrence found in Bezymyannaya South. In 1950 the population was estimated to 300–400 birds. The total population estimate for Novaya Zemlya the same year was set to about 1,000 birds (Uspenski 1956).

Our counts gave a minimum of 140 birds. By using Uspenski's calculation method (see below), the number is 280 birds (Table 1). This number is very close to Uspenski's, which suggests that the Common Guillemot population has remained small and stable since 1950.

The descriptions of the nesting sites for Common Guillemots in Bezymyannaya South in 1933–34 (Krasovski 1937) and in 1950 (Uspenski 1956), suggest that the nesting sites of the Common Guillemots in 1994 are found in the same sections of the colony as in the 1930's and 1950's (Figure 7). The Common Guillemot's nest site preferences within the colony also correspond well with observations of the species at other localities, e.g. Bjørnøya (c.f. Bakken and Mehlum 1988).



*Figure 11.* From the Bezymyannaya South colony (Photo published by Uspenski [1956]). The picture is taken in the period 1948–50, and shows the central parts of the Bezymyannaya South colony.



*Figure 12.* Picture taken in 1994 from the same parts of the colony as the previous picture. Photo: Hallvard Strøm.





*Figure 13. From the Bezmyannaya South colony (photo published by Uspenski [1956]). The picture is taken in the period 1948–50.*



*Figure 14. Picture taken in 1994 from the same parts of the colony as the previous picture. Photo: Hallvard Strøm.*

### **Brünnich's Guillemot**

As shown in Table 1, the population of Brünnich's Guillemot suffered a dramatic decline between the 1933-34 and the 1948 counts. Uspenski (1956) explains this decline with the immense exploitation of eggs and adults that was carried out during this period. This activity was most intensive in Bezymyannaya South, and the population decrease was also largest here, from about 1.5 million birds in 1933-34, to 200,000 birds in 1948, a decrease of about 87%.

The seabird colony in Bezymyannaya South became protected in 1947, but in practice the protection also covered the 1946 season (Uspenski 1956). The population numbers increased rapidly following protection, from 200,000 birds in 1948, to 240,000 in 1950. This is a 10% growth per year (Uspenski 1956).

In order to compare this year's population numbers with Uspenski's numbers from 1950, it is necessary to take into consideration the different methods used in the two investigations. Uspenski's counts were carried out from a boat, and groups of birds containing about 100 birds were used as the counting units. By visually estimating groups of 100 birds, a final estimate was calculated for each section. This method was used for Brünnich's Guillemots. For Kittiwakes and for Glaucous Gulls, the number of nests constituted the counting unit.

Large colonies were often counted several times, or by several observers simultaneously. The difference between these counts never exceeded 8%, which led Uspenski to set his margin for error at a maximum of 10%. The difference in accuracy between the method used by Uspenski and the method used by us, has not yet been examined.

All the birds are not present in the colony all the time. In order to estimate the absolute number of birds associated with the colony, Uspenski carried out a supplementary survey in 1949, in order to estimate the number of birds present in the colony at any given time (Uspenski 1956). He then assumed 50% of the breeding birds to be present in the colony at any time during the hatching and rearing periods. Thus the number of birds visibly observed was multiplied by two, and presented as a total estimate for the entire colony. If we use the same calculation method for our 1994 numbers, the total estimate for Brünnich's Guillemot reaches 282.000 birds, which is 42.000 more than Uspenski registered in 1950 (Table 1).

Because different methods of counting and calculating the population size have been used, there is a fair degree of uncertainty concerning the earlier population estimates from the colony in Bezymyannaya South. None of the original counts are available, which makes comparison difficult. Even so, the numbers presented in Table 1 indicate that the number of Brünnich's Guillemots probably declined considerably before protection in 1947, and that a moderate increase in the breeding population has taken place. The big difference between the results from the counts undertaken in 1992, and our counts from this year, is hard to explain. The difference may have arisen because different methods were used, or because of seasonal variation in the number of breeding birds.

A comparison of the two photographs taken in the years 1948-50 and the pictures taken during this year's field work (Figure 11-14), show no evidence that major population changes have occurred the last 40 years. Comparing the pictures, we are given an impression that principally the same sites on the cliff wall were occupied. Some changes have occurred, but these are largely because of changes in the cliff structures. The pictures taken in 1994 were probably taken under different light conditions, and in damp weather. This is probably the reason why the bright guano is less conspicuous in these pictures. It should also be added that it is not known at what time of day or at which stage in the breeding season the old photographs were taken. These factors would also affect the number of birds on the ledges.

## 4. MONITORING PLOTS

Six monitoring plots were established in the colony. These are well defined areas where the number of birds (Brünnich's Guillemot) and the number of apparently occupied nest sites (Kittiwake) were counted with high accuracy several times throughout the breeding season. The purpose of these plots is to detect possible population changes by regular countings over a period of several years. This years counts will make a reference point for the population size in Bezymyannaya Bay.

The plots were put in section 1, 2, 3, and 5 (Figure 7). They were photographed with polaroid colour prints, colour slides and black and white film. The plots were accurately marked on the polaroid prints, and the counting points were indicated by metal rods. The counting points were also photographed.

For Brünnich's Guillemots five plots were established and one plot was established for Kittiwakes/Brünnich's Guillemots. Two of the Brünnich's Guillemot plots also contained some Kittiwakes. The six plots contained a mean total of 1,807 Brünnich's Guillemots, which gives an average of 301 birds per plot. The three plots where Kittiwakes were represented contained a mean total of 123 Kittiwakes. The results of the monitoring plot counts are given in Table 4.

The monitoring plots should be randomly distributed throughout a colony in order to be representative for the entire colony (Bibby et al. 1992). However, this is often difficult to achieve. Considering future work in the colony, and the limited time available during this year's field work, the monitoring plots in Bezymyannaya South were located in the central parts of the colony, relatively close to the established camp. This simplified the work and ensured easy access to the plots from the sea, through the bay east of the camp. It is possible to come safely ashore with a small boat at this place. This is not the case for other parts of the colony. More monitoring plots will hopefully be established here during future field work on Novaya Zemlya.

Table 4. Monitoring plots.

Mon. plot no.	Species	No. of counts	Mean	Min.	Max.
1	Kittiwake <sup>1)</sup>	5	2	1	2
	Br. Guillemot <sup>2)</sup>	5	210	167	245
2	Br. Guillemot <sup>2)</sup>	5	314	289	339
3	Br. Guillemot <sup>2)</sup>	5	538	475	604
4	Br. Guillemot <sup>2)</sup>	5	240	187	282
5	Kittiwake <sup>1)</sup>	5	7	5	8
	Br. Guillemot <sup>2)</sup>	5	324	162	525
6	Kittiwake <sup>1)</sup>	3	114	94	127
	Br. Guillemot <sup>2)</sup>	3	181	113	231
<b>Sum</b>	<b>Kittiwake</b>		<b>123</b>		
	<b>Br. Guillemot</b>		<b>1,807</b>		

1) Apparently occupied nest site

2) Individuals at ledges

## 5. RINGING

A total of 2,750 Brünnich's Guillemots (1,148 adults and 1,602 young) were ringed during the stay. The ringing of adult birds was undertaken in the period 29 July–07 August. The ringing of chicks occurred during the period 08 August–15 August. In addition 50 chicks of Glaucous Gull, 11 adult Kittiwakes, and one nestling of Rough-legged Buzzard were ringed. The ringing of Brünnich's Guillemots was carried out mainly in the upper portions of sections 1–9 (Figure 7). The chicks of Glaucous Gull were ringed at different locations throughout the colony, and also at two smaller, separate Glaucous Gull colonies at the western end. The Kittiwakes were ringed in section 1 (Figure 7). The ringing of Brünnich's Guillemots is a part of an international programme for mapping the migratory routes and wintering grounds for this species.

There is a huge variation in the accessibility of the seabird colony in Bezmyannaya Bay. Steep cliffs descending straight into the sea, where ringing is impossible, dominate. However it is possible to ring birds on the upper ledges in some of these cliffs. Other cliffs are more easily accessible, and there are some smaller, lower ridges which stretch into the sea, where it is possible to reach chicks by hand.

The ringing of adult Brünnich's Guillemots and Kittiwakes was accomplished through the use of a telescopic glass fibre rod (fishing rod), with a snare or a metal hook at the end. The metal hook proved to be the quickest and most efficient way to catch adult birds. This method of catching birds has long traditions in Russia. The same equipment was used for catching the chicks. The metal hook, however, was unsuitable for this purpose and we therefore used only the neck snare. At particularly easily accessible sites in the colony, the chicks could also be caught by hand.

Ringing of Brünnich's Guillemots in the seabird colonies in Bezymyannaya Bay has also been performed previously. Krasovski (1937) and Uspenski (1956), among others, carried out large scale ringing in 1933–34 and 1947–50 respectively. A total of more than 50,000 Brünnich's Guillemots were ringed in Gribovaya and Bezymyannaya Bays during the course of these seasons. According to Uspenski (1956), no recoveries have been made as a result of this comprehensive ringing, which suggests to him that the winter residences for Brünnich's Guillemots breeding at Novaya Zemlya are to be found not far from the breeding grounds, but that this to a large extent is under the influence of the ice conditions. It should be mentioned, however, that most of this mass ringing was carried out with the use of aluminium rings which are vulnerable to wear and tear, thus giving a low percentage of recoveries.

About 100 Brünnich's Guillemots were ringed at Bezymyannaya South in 1992 (G. V. Khakhin). Six of these birds were controlled during this year's field work.

## 6. BIOMETRIC MEASUREMENTS

Biometric measurements were taken from 50 Brünnich's Guillemots, 15 Kittiwakes, 5 Glaucous Gulls and one Pomarine Skua *Stercorarius pomarinus*. Standard methods were used (Svensson 1992), and the following measurements were taken: length of bill, depth of bill, nostrils to tip of bill, head + bill, tarsus, wing-length and weight. All the measurements were taken by the same person in order to avoid biased measurements. The results of the measurements from Brünnich's Guillemots and Kittiwakes are presented in Table 5 and 6.

Five of the Brünnich's Guillemots, five of the Kittiwakes, all five of the Glaucous Gulls and the

**Table 5.** Biometric measurements of Brünnich's Guillemot (lengths in mm, weight in gram).

	n	Mean	Std. D.	Min.	Max.
Length of bill	50	37.5	2.118	32.6	43.5
Depth of bill	50	14.3	0.531	12.7	15.4
Nostrils to tip of bill	50	30.1	1.859	25.5	34.3
Head + bill	50	107.6	3.481	97.4	115.6
Tarsus	49	37.9	1.363	35.2	41.1
Wing-length	50	217.6	5.210	208.0	232.0
Weight	49	962.0	0.58	810.0	1110.0

*Table 6. Biometric measurements of Kittiwakes (lengths in mm, weight in gram).*

	<b>n</b>	<b>Mean</b>	<b>Std. D.</b>	<b>Min.</b>	<b>Max.</b>
Lenght of bill	15	35.5	1.352	32.7	37.7
Depth of bill	15	11.1	0.406	10.2	11.9
Nostrils to tip of bill	15	18.4	0.711	17.3	19.8
Head + bill	15	90.6	1.966	86.6	93.6
Tarsus	15	34.9	1.183	32.8	36.5
Wing-length	15	320.9	5.320	31.2	32.7
Weight	15	386.0	0.33	325.0	420.0

Pomarine Skua were dead birds shot in order to provide tissue samples for contamination analyses (see chapter 8).

The biometric measurements will be incorporated in comprehensive systematic studies on biometry of seabird species in the Barents Sea region.

## 7. BLOOD SAMPLING

We collected blood samples from 30 Brünnich's Guillemots for genetic analysis. Standard methods were used, and the blood was obtained from the main vein in the wing. Two samples were taken from each bird.

The blood sampling is part of a comprehensive project run by the Norwegian Polar Institute, where the aim is to identify genetic differences among populations in different geographical regions. Attempts will be made to quantify the genetic exchange between different populations, and to estimate the possibilities for recolonizing areas where the populations have gone extinct. The collected material will be analysed in the course of the winter 1994–95.

## 8. COLLECTION OF TISSUE SAMPLES FROM SEABIRDS

Since 1991, a major joint project has been run between Norwegian and Russian scientists attempting to map the occurrence of enviromental toxins in the Barents Sea region. Tissue samples from several species of seabirds have been collected in Northern Norway, Svalbard, and Franz Josef Land. Until now, samples from Novaya Zemlya were lacking in this venture, despite the large seabird populations on these islands. On this background, tissue samples from birds were collected for enviromental analysis during this year's field work in Bezmyannaya South.

Five individuals from each of the following species were collected: Brünnich's Guillemot, Kittiwake, and Glaucous Gull. Additionally, samples from one individual of Pomarine Skua were collected. Tissue samples from the brain, breast muscle, liver and body fat were taken. The birds were sexually determined and standard biometrical measurements were taken. The samples were kept cool, and frozen until the departure for Norway.

The samples will be analysed at the Norwegian Polar Institute in Tromsø, and the results of the analysis will most likely be available during the course of the winter 1994-95.

## 9. COLLECTION OF ARCTIC PLANTS

During the field work, plants were gathered for botanogeographical and molecular genetic studies, as part of a larger research project run by the University of Oslo.

We have currently scarce knowledge about the genetic structure of arctic plants. By the help of various enzymes and DNA-techniques, the aim is to reveal patterns of genetic variation within and among populations of some common arctic plant species. The main scientific purpose is to test some basic hypotheses concerning plant migration and evolution in the Arctic, which has a unique and turbulent climatic history with frequent glaciations and deglaciations.

Five specimens from each of the following species were collected: *Cerastium alpinum*, *Silene acaulis*, *Salix polaris*, *Saxifraga cernua*, *S. cespitosa*, *S. oppositifolia*, *S. hieracifolia*, and *Dryas octopetala*. In addition, one specimen of each species was dried and pressed, and will be used as control material.

## 10. COLLECTION OF FOOD ITEMS

In connection with other work carried out in the colony, observation and sampling of food items given by Brünnich's Guillemots to their young, was undertaken. Examinations of the food preferences of Brünnich's Guillemots have been carried out earlier on Novaya Zemlya, among others by Gorbunoff (1925), Krasovski (1937), Belopolski (1942, in Uspenski 1956) and Uspenski (1956). Based on all available data, Uspenski compiled a species list containing 96 species registered as food animals for Brünnich's Guillemot. The dominant fish species were Polar Cod *Boreogadus saida*, Cod *Gadus morhua*, Haddock *Melanogrammus aeglefinus*, Capelin *Mallotus villosus* and Herring *Clupea harengus*.

During this field season only few samples were collected. Fifteen items were collected, and five direct observations of feeding were made. In two of the direct observations it was not possible to identify the food items to the species level. All the registered food items were fish. The dominant species were Polar Cod (7 obs.) and Capelin (4 obs.). Also represented were Sand Eel *Ammodytes tobianus* (2 obs.), Spotted Snake Blenny *Leptoclinus maculatus* (2 obs.) and

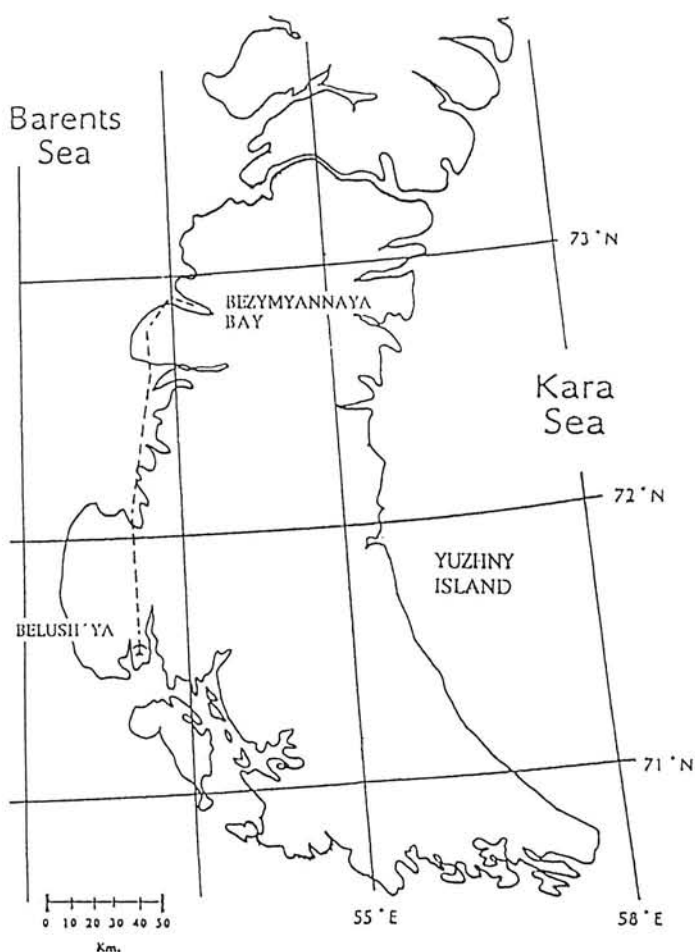
Atlantic Herring (1 obs.). One individual of Two-horn Sculpin *Icelus bicornis* was also registered. Polar Cod was also observed as food item for Black Guillemot (1 obs.).

The material from this year's field work is too limited to make general conclusions concerning food preferences of the Brünnich's Guillemot.

## 11. OBSERVATIONS OF BIRDS AND MAMMALS

Throughout the entire stay in the field, we made observations of species not connected with the seabird colony. Walking trips were also undertaken to the areas outside the colony, in order to map other elements of the fauna. Observations were also made during the helicopter transport to and from the Bezymyannaya Bay. All of these observations are summarised below.

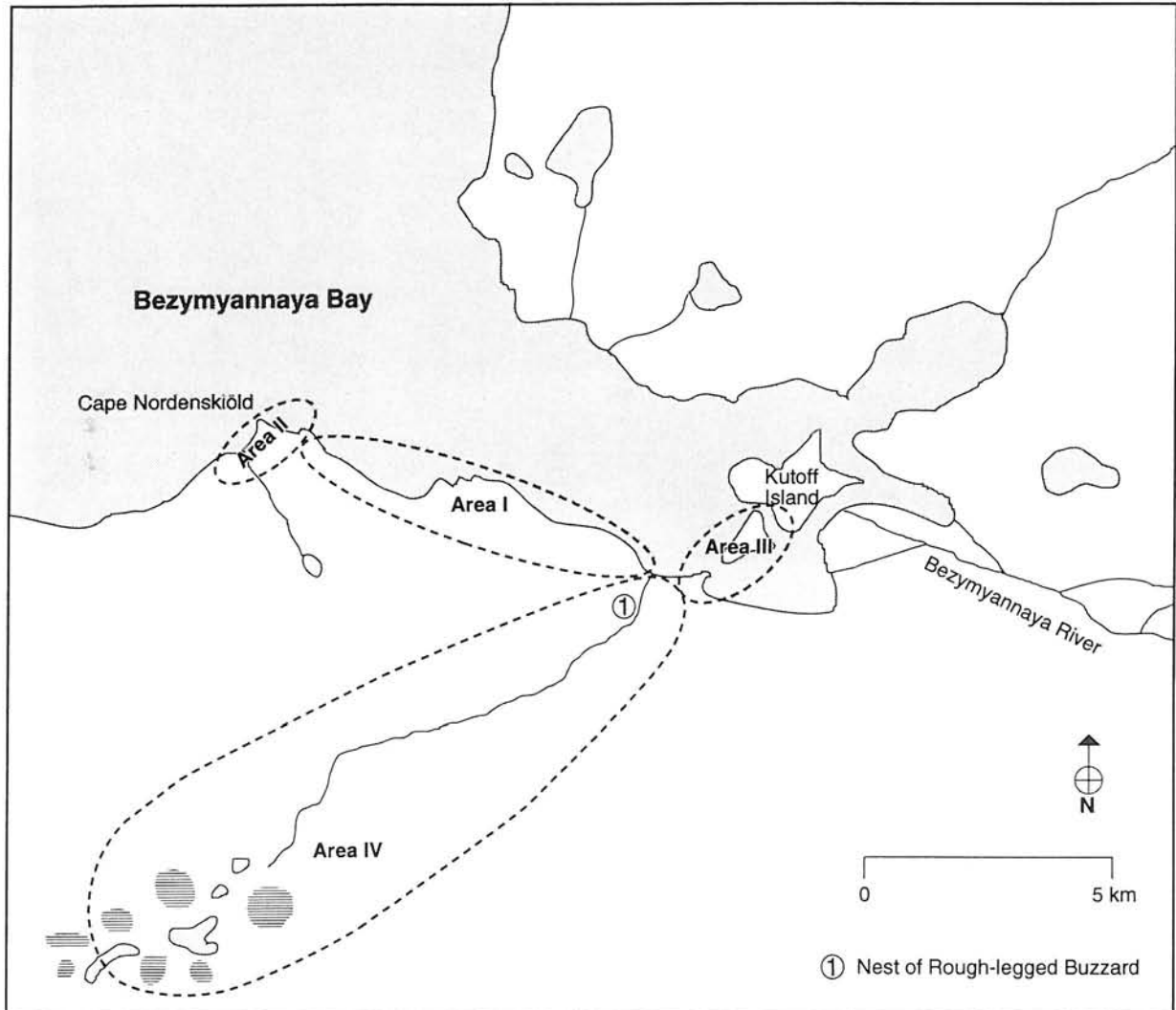
The helicopter flight on 28 July, from Belushaya Bay to Bezymyannaya Bay, was in a nearly straight line between these two places (Figure 15), yet following the coastline. The return flight on 16.08, went somewhat further east over the inland. Both flights lasted about 50 minutes.



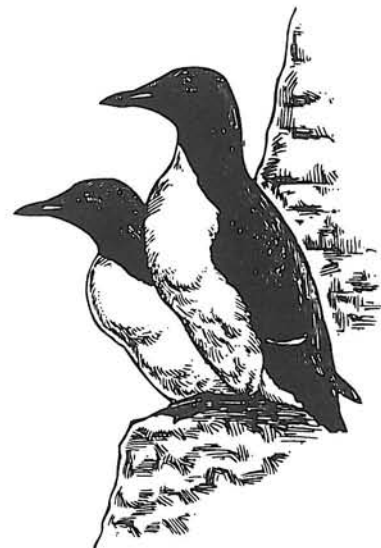
**Figure 15.** The Yuzhny Island (the southern island), Novaya Zemlya. The dashed line shows the helicopter flights on 28 July and 16 August.



The visited area is divided into four smaller areas (Figure 16). These are: the area surrounding the seabird colony (Area I), the area around Cape Nordenskiöld (Area II), the inner parts of Bezymyannaya Bay (Area III), and the valley south of the Bezymyannaya Bay (Area IV). If not otherwise specified, all observations are from area I.



**Figure 16.** Bezymyannaya Bay. The map shows the areas (I-IV) visited during the field work in 1994.





**Figure 17.** The picture shows the valley south of Bezmyannaya Bay (Area IV). Photo: Ingar Jostein Øien.

A total of 34 species of birds and 4 species of mammals were observed. In addition, footprints and faeces were found of one mammal species (Polar Bear *Ursus maritimus*) and signs indicating one species of bird (Peregrine Falcon *Falco peregrinus*).

#### LIST OF SPECIES WITH COMMENTS:

##### BIRDS:

##### **Red-throated Diver** *Gavia stellata*

Only one observation. 1 bird was observed 05 August, on the sea in the inner parts of Bezmyannaya Bay (Area III).

##### **Fulmar** *Fulmarus glacialis*

Not registered in the seabird colony, and only single observations were made. Two birds were observed flying in Area II, 11. August, and 2 birds were observed in Area I, 12 August. One bird was found dead in the sea 13 August, and two birds were found dead in the sea 14 August. The cause of death is unknown.

##### **Bewick's Swan** *Cygnus columbianus*

One pair was observed on a small lake near the settlements at Belush'ya 28 July. About 15 pairs, a flock of 7 birds, and 3 single birds were observed from the helicopter during the transport from Belush'ya to Bezmyannaya Bay 28 July. 3 birds were observed west of the camp the same day. Two pairs without offspring were observed 13 August in one of the lakes in Area IV. One of the birds was in moult. One pair was observed at the same location 14 August. The birds seen from the

helicopter cannot with certainty be said to have been Bewick's Swans, but taking into account the known distribution of this species and that of the Whooper Swan, one must conclude that the swans observed during the flight were Bewick's Swans.

#### **Bean Goose** *Anser fabalis*

Several flocks of "grey geese", totalling 250–300 birds, were observed from the helicopter during the transport from Belushaya to Bezymyannaya Bay 28 July. They may have belonged to this species, but could also have been White-fronted Geese. Possible observations of the species occurred in Area II 11 August, when 20 "grey geese" were observed. 11 "grey geese" were also observed in Area II 13 August. Two pairs, with 3 and 4 offspring respectively, were observed in the vicinity of the lakes in Area IV 13 August. The first mentioned brood was capable of flight. A total of 25 adults was observed in flight over the same area the same day. Two flocks of totally 29 birds were observed in the vicinity of the lakes in area IV on 14 August.

#### **White-fronted Goose** *Anser albifrons*

Several flocks of "grey geese", totalling 250–300 birds, were observed from the helicopter during the transport from Belush'ya to Bezymyannaya 28 July. These were possibly White-fronted Geese, but they could also have been Bean Geese. A possible observation was made in Area II, where 20 ind. were observed 11 August. One ind. was also observed 13 August, as well as 20 "grey geese", in Area II.

#### **Barnacle Goose** *Branta leucopsis*

A flock of about 100 birds was observed from the helicopter during the transport from Belush'ya to Bezymyannaya Bay 28 July. Six adults and 7 young were observed near the camp 28 July. One pair with two offspring nested east of the camp, and was first seen 29 July. The species also nested here in 1992 (G. V. Khakhin). 150 birds were observed flying in a southerly direction 31 July. 11 adults with a minimum of 6 young were observed in Area III 1 August. 61 adults were observed at sea 01 August. Six adults and 4 young were seen near the camp 3 August. 67 birds were observed in Area III 05 August. 6 adults with 6 young were observed 10 August. A flock of 120 birds and a flock of 10–15 birds, with 10 young, were observed in Area II 11 August. 2 adults with 4 young were observed 12 August. 50–60 birds were observed in Area II 13 August. A flock of 39 adults was observed 13 August near the lakes in area IV. 130 birds were seen in area III 14.08. A flock of about 100 birds was observed from the helicopter during the flight from Bezymyannaya to Belush'ya 16.08.

#### **Eider** *Somateria mollissima*

Seven birds with female colouring were observed on the sea 29 July. Eight young were observed on the sea 29 July. The same date, 8 females were observed in flight heading towards Bezymyannaya Bay, and 6 females were observed on the sea in the bay near the camp. A flock of 113 birds, and several flocks, totalling 11 adults and 13 young were observed on the sea 30 July. A flock of 70 birds was seen on the sea 31 July. A female with 5 young, was observed in Area III, and a flock of 25 birds was seen 01 August. 20 birds were observed 08 August. 25 birds were observed 09 August. 1 bird was observed 10 August. About 500 Eiders/King Eiders were seen in Area III 13 August.

#### **King Eider** *Somateria spectabilis*

One female observed 31 July. A flock of 940 birds, and one flock of 5 birds observed 01 August. 350–400 birds were observed on the sea 03 August. Two flocks of totally 31 birds were observed

04 August. 31 birds were seen in Area II 04 August. 20–30 birds were observed in Area II 11 August. See also above under Eider.

**Steller's Eider** *Polysticta stelleri*

45 birds observed on the sea 28 July. 7 birds on the sea 29 July (4 females and 3 males). 110 birds on the sea 30 July. A flock of 21 birds and a flock of 40–50 birds were observed 31 July. 36 birds were observed on the sea 01 August. 35 birds were observed 02 August. Five birds were observed 04 August in Area II. 78 birds were observed 06 August. 18 birds were observed 07 August. Two flocks totalling 155 birds were observed 08 August. Ten birds observed 09 August. 200–300 birds were observed in Area II 11 August. 20 birds observed 13 August.

**Long-tailed Duck** *Clangula hyemalis*

14 birds observed on the sea 31 July. A flock of 16 birds, and one of 8 birds, observed 01 August. One female with 6 young observed 14 August, by the lakes in Area IV.

**Red-breasted Merganser** *Mergus serrator*

Two females observed in Area II 13 August. Two females observed in Area III on the 14 August.

**Goosander** *Mergus merganser*

One female observed 04 August. in Area II. Three females observed in Area III on the 05 August. One female observed in Area II on the 13 August.

**Rough-legged Buzzard** *Buteo lagopus*

First observed 28 July near the camp. Observed regularly throughout the field season. Was found nesting on the 29 July in a river canyon south of Bezymyannaya (Figure 16). Four young in the nest, the smallest of which was ringed 05 July. The three other young were capable of flight. The nest contained prey remains from lemming sp., Barnacle Goose, Snow Bunting and wader sp.

**Peregrine Falcon** *Falco peregrinus*

The species was not observed during the field work, but two Kittiwake carcasses were found plucked in such a way suggesting the Peregrine Falcon as predator.

**Ptarmigan** *Lagopus mutus*

1 bird was observed 04 August. Several observations from the two helicopter flights suggest this species.

**Ringed Plover** *Charadrius hiaticula*

Along with Purple Sandpiper the most common species of wader. One bird observed 31 July. One pair observed 01 August. Min. 5 pairs, in addition to 1 pair with 3 young, were observed in Area III 01 August. About 5 pairs were observed along the stretch from the camp to Area II on the 04 August. 10–12 pairs were observed 05 August (Area I). Two young were observed 05 August in Area II, and 10–12 pairs were observed in Area III the same day. 5–6 birds observed 07 August. 5–6 birds observed 08 August. 15–20 birds observed in Area II, 11 August. 30–35 birds observed 13 August.

**Sanderling** *Calidris alba*

1 bird was observed at the camp 06.08, when it landed here during a storm. One uncertain observation is also submitted from Area IV on the 14.08.

**Little Stint** *Calidris minuta*

1 pair observed 01 August. 1 single bird, and 1 bird with one young in Area III on the 01 August. 1 bird observed 05. August (warning call). 2 birds observed 13 August in Area II.

**Purple Sandpiper** *Calidris maritima*

Along with Ringed Plover the most common species of wader.

11 birds observed 30 July. 2 birds observed 31 July. 1 pair observed and also a flock of 15 birds by the river mouth east in Area I on the 01 August. About 3 pairs in Area III 01 August, and 6 birds observed sporadically the same day. 9 birds observed 02 August. About 3 pairs were observed along the stretch between the camp and Area II on 04 August. 20 birds observed in Area III on 05 August. 2–3 birds observed 10 August. 150–200 birds observed in Area II 11 August. 15–20 birds were observed 13 August. 10–15 birds were observed in Area IV on the 14 August.

**Dunlin** *Calidris alpina*

1 bird observed in Area III 01 August. One uncertain observation from Area IV, 14 August.

**Turnstone** *Arenaria interpres*

A flock of over 10 birds was observed in Area II on 05 August. 1 bird observed in Area II on 11 August. 10 birds observed in Area II on 13 August.

**Pomarine Skua** *Stercorarius pomarinus*

3 birds observed on 11 August. 1 bird shot near the camp the same day.

**Long-tailed Skua** *Stercorarius longicaudus*

2 birds were observed in Area III, and 2 birds observed in Area IV 01 August. 1 bird observed 05 August in Area IV. 8 birds were migrating westwards from Area III on the 05 August. 2 pairs observed 13 August in Areas I and IV respectively. 1 pair observed in Area IV on 14 August.

**Great Skua** *Stercorarius skua*

First observed 28 July, when 1 bird was observed near the camp. Also on the 29 July and the 02 August. 2 birds observed 04 August. 1 bird observed in Area III on the 11. and 12 August. 1 bird observed 13 August.

**Glaucous Gull** *Larus hyperboreus*

See population counts (Chapter 3).

**Great Black-backed Gull** *Larus marinus*

2 birds observed 04 August in Area II.

**Kittiwake** *Rissa tridactyla*

See population counts (Chapter 3).

**Arctic Tern** *Sterna paradisaea*

3 birds observed near the camp 31 July. 3 birds observed in Area II on the 11 August.

**Common Guillemot** *Uria aalge*

See colony counts (Chapter 3).

**Brünnich's Guillemot** *Uria lomvia*

See colony counts (Chapter 3).

**Black Guillemot** *Cepphus grylle*

See colony counts (Chapter 3).

**Snowy Owl** *Nyctea scandiaca*

1 dead bird found east of the camp on 29 July. 1 female observed 13. and 14 August in Area IV. 1 bird observed from the helicopter 16 August, during the transport between Bezymyannaya and Belush'ya.

**Shore Lark** *Eremophila alpestris*

1 bird observed 05 August east of the camp, and 20 birds observed in Area II the same day. 1 pair with fledged young observed 07 August. Totally 13 birds observed 11 August along the stretch between the camp and Area II.

**Lapland Bunting** *Calcarius lapponicus*

2 birds observed in Area II on the 05 August. 1 bird observed in Area IV on the 13 August.

**Snow Bunting** *Plectrophenax nivalis*

Common in all visited areas. Began appearing in flocks towards the end of the field period (14 August).

**MAMMALS:****Reindeer** *Rangifer tarandus*

3 animals observed from the helicopter 28 July. A flock of 15 animals observed in Area IV 29 July. 14 animals observed 13 August in Area IV.

**Arctic Fox** *Alopex lagopus*

First observed 28 July, in association with the colony. A total of 25 observations were made of at least three different individuals during the field period. One of these three was a cub, which was observed in Area II on the 13 August.

**Polar Bear** *Ursus maritimus*

Footprints and faeces of the species were found on three different occasions. According to a group of geologists who worked in the area, Polar Bears were in 1992 first seen in September (female with two cubs).

**Bearded Seal** *Erignathus barbatus*

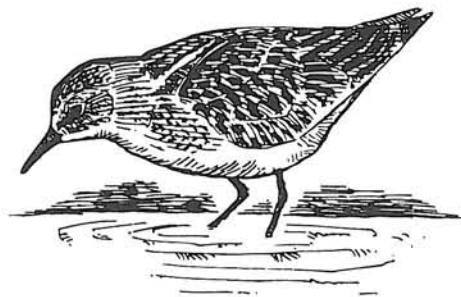
2 ind. observed 05 August in Area III. Also observed at the same location 14 August.

**Arctic Lemming** *Dicrostonyx torquatus*

First observed 29 July. 2 ind. observed on the 14 August, one of which was captured.

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## 13. APPENDIX.

*Table 2. Colony counts, the Bezymyannaya South colony, 1994.*

Section	Brünnich's Guillemot <sup>1)</sup>	Common Guillemot <sup>1)</sup>	Black Guillemot <sup>3)</sup>	Kittiwake <sup>2)</sup>	Glaucous Gull <sup>2)</sup>
1 (A-G)	16,061		7	985	5
2 (A-F)	9,486	67		960	4
3 (A-H)	4,167		3	272	3
4 (A-B)	2,141			19	2
5 (A-G)	5,527		1	50	3
6 (A-G)	3,839				
7 (A-G)	2,310		9	1	3
8 (A-G)	12,682		1	322	3
9 (A-K)	20,962		6	464	7
10 (A-F)	14,650			742	8
11 (A-G)	19,195	57	5	709	5
12 (A-G)	13,989		7	298	23
13 (A-G)	13,526	14		1,070	5
<b>Sum</b>	<b>138.535</b>	<b>138</b>	<b>39</b>	<b>5.892</b>	<b>71</b>

1) Individuals at breeding ledges

2) Apparently occupied nest site

3) Individuals at the colony