

## An updated annotated list of birds of the Novaya Zemlya archipelago

Vitaly M. SPITSYN<sup>1\*</sup>, Petr M. GLAZOV<sup>2</sup>, Vladimir V. ANUFRIEV<sup>1</sup> and Sonia B. ROZENFELD<sup>3</sup>

1. N. Laverov Federal Center for Integrated Arctic Research of the Ural Branch of the Russian Academy of Sciences, Arkhangelsk, Russian Federation.

2. Institute of Geography of the Russian Academy of Sciences, Moscow, Russian Federation.

3. A.N. Severtsov Institute of Ecology and Evolution of the Russian Academy of Sciences, Moscow, Russian Federation.

\* Corresponding author, V.M. Spitsyn, E-mail: spitsyn.v.m.91993@yandex.ru

Received: 22. November 2019 / Accepted: 08. May 2020 / Available online: 10. May 2020 / Printed: December 2020

**Abstract.** Here, we present an updated list of bird species of the Novaya Zemlya Archipelago and integrated data on birds' recordings on the archipelago in 2015 and 2017. Our results reveal that Novaya Zemlya is inhabited by 111 bird species, i.e. 46 nesting species, 25 common species that do not breed there or nesting is unconfirmed, 39 vagrant species, and one species (*Aquila chrysaetos*) that was not recorded on the archipelago since the 19th century.

**Key words:** Arctic, biodiversity, zoogeography, arctic tundra, waterfowl.

### Introduction

Novaya Zemlya is the largest insular landmass in the Russian Arctic (length is more than 800 km) that is hard-to-access due to a remote geographic position and the lack of infrastructure. Since the middle of the last century until today most areas of the archipelago were unavailable for field surveys, and the bird fauna of Novaya Zemlya is rather poorly known. The last complete checklists of avifauna from this region were published at the end of the 20th century (Kalyakin 1993, Pokrovskaya & Tertitsky 1993, Strøm et al. 1994, Uspensky 1998). A few recent surveys were focused on local sites (Miskevich et al. 2011, Spitsyn et al. 2018), covered a few target taxa (Gavrilo 2015, Spitsyn 2015, 2018, Spitsyn et al. 2016, Rozenfeld & Spitsyn 2017) or were based on old faunal data (Anker-Nilssen et al. 2000, Tertitsky & Pokrovskaya 2011, Hahin 2000, Pokrovskaya 2017). The majority of those works are in Russian, do not have electronic versions, and are not available via internet resources (Spitsyn et al. 2018).

The study aims to prepare an updated checklist of bird species of the Novaya Zemlya Archipelago and to compile information on the breeding status and abundance of species based on recent data and records at the end of the 20th century.

### Material and Methods

Bird counts were carried out in 2015 and 2017 in 6 terrestrial sites (Table 1, Fig. 1), with a supplement of sea area surveys around Severny and Yuzhny islands from research vessels "Professor Molchanov" and "Mikhail Somov". Additional surveys were conducted from motorboats in three places: Bezymyannaya Bay (18-27 July 2017), Russkaya Gavan' Bay (12 July 2015) and the Oranskiye Islands (11-12 July 2015). Four aerial surveys were conducted from MI-8 heli-



Figure 1. Map of terrestrial sites surveyed on Novaya Zemlya (numbers of localities on the map are correspond to those in Table 1).

copter on the following routes: Malye Karmakuly environs (11 August 2015), Belushya Bay – Bezymyannaya Bay (18, 24, 27 July 2017). Photo fixation method was used during the surveys with the following cameras: a Canon EOS 650D digital SLR camera fitted with Tamron AF 70-300 mm macro zoom lens; a Canon 7D camera fitted with 100-400 mm lens; a Canon EOS 7DD5126251 camera fitted with Canon Zoom Lens EF 100-400 mm 1:4.5-5.6 LISULTRASONIC; and a Ni-

Table 1. Localities of our terrestrial surveys on Novaya Zemlya.

Nº	Locality name	Region	Latitude (N)	Longitude (E)	Year
1	Belushya Bay	Yuzhny Island	71.5°	52.3°	2017
2	Malye Karmakuly	Yuzhny Island	72.3°	52.7°	2015
3	Bezymyannaya Bay	Yuzhny Island	72.8°	52.5°	2017
4	Russkaya Gavan' Bay, Bogaty Island	Severny Island	76.2°	62.7°	2015
5	Oranskiye Islands	Severny Island	77.0°	67.7°	2015
6	Cape Zhelaniya	Severny Island	76.8°	68.5°	2015

kon D80 camera fitted with Tamron lens 18-270 mm 1:3.5-6.3.

Bird counts on walking routes, boat and aerial surveys were carried out according to a standard approach with unfixed width of the counting zone (Ravkin 1967). During all surveys, adult birds and chicks were counted, nests with eggs were counted only on walking routes, and they were assigned to corresponding species immediately during survey or later using photographs. The total distance of walking routes was 470 km, boat tracks 79 km, vessel surveys 2350 km, aerial surveys 550 km.

Numerous works were used to prepare the checklist (Antipin 1938, Kalyakin 1993, 1999, 2001, Pokrovskaya & Tertitsky 1993, Strøm et al. 1994, Uspensky 1998, Anker-Nilssen et al. 2000, Hahin 2000, Tihonov 2009, Miskevich et al. 2011, Tertitsky & Pokrovskaya 2011, Redkin 2013, Spitsyn 2015, 2018, Spitsyn et al. 2016, 2018, Pokrovskaya 2017, Rozenfeld & Spitsyn 2017). We did not cite these works separately in the annotated list of species.

Species names and their taxonomic order are given according to the Internet Bird Collection (IBC) web source (Internet Bird... 2020).

We used four species status in the list as follows:

- *vagrant* – accidental visitors having a breeding range beyond Novaya Zemlya;

- *non-breeding visitor* (in Supplementary Table 1 is marked “+”) – species that regularly occur on Novaya Zemlya during migratory or moulting periods;

- *probably breeding* – species that probably breed on Novaya Zemlya, but it is yet to be confirmed;

- *breeding* – species for which nesting on Novaya Zemlya was confirmed by records of nests or non-flying chicks recently or at the end of the 20th century.

Four abundance categories were used as follows:

- *rare* – species that occur on Novaya Zemlya occasionally, not every season or in very small amounts;

- *scarce* – species that regularly occur on the archipelago, but only in small amounts;

- *common* – species that regularly occur on Novaya Zemlya, the density of which is not less than 0.5–1 individuals/km<sup>2</sup> for predatory birds and 1–20 individuals/km<sup>2</sup> for other taxa;

- *abundant* – species that regularly occur on Novaya Zemlya, and the density of which is higher than 20 individuals/km<sup>2</sup>.

## Results

The complete checklist of birds from Novaya Zemlya contains 111 species belonged to 13 orders (Supplementary Table 1). However, only 46 species can be considered breeding on the archipelago, while 25 species are regular visitors of this landmass, but do not breed there or their nesting is unconfirmed, 39 species are vagrant, and one species, i.e. *Aquila chrysaetos* (Linnaeus, 1758), was not recorded since the 19th century. 48 species, including 22 breeding taxa, were found during our studies in 2015 and 2017 (Table 2). Here, we considered species as breeding if their nesting was confirmed in our studies or at the end of the 20th century. However, this approach does not allow obtaining a fully resolved faunal pattern as several species can nest irregularly or can be occasional visitors of the archipelago. We therefore added a table (Appendix 1) that summarizes all available faunal data from the 19th century, the 20th century and recent surveys. Comparison of all these data with Table 2 enables to more appropriately estimate the status of each species. In the present work, we added several species that were not included to earlier bird checklists for the archipelago (Antipin 1938, Kalyakin 1993). Several of these records were published in local

papers (Redkin 2013, Spitsyn 2015, 2018, Spitsyn et al. 2016, 2018, Pokrovskaya 2017, Rozenfeld & Spitsyn 2017). The following species and subspecies were added: *Anser fabalis fabalis* (Latham, 1787), *Cygnus olor* (Gmelin, 1789), *Histrionicus histrionicus* (Linnaeus, 1758), *Larus argentatus* Pontoppidan, 1763, *Motacilla tschutschensis* J. F. Gmelin, 1789, and *Ficedula parva* (Pallas, 1764). *Larus heuglini* Bree, 1876 (Heuglin's gull) was listed as *Larus argentatus* in earlier publications (Kalyakin 1993).

## Discussion

The analysis of avifauna composition indicates the decreasing in species richness from southern to northern latitudes. The total number of species in local faunas is decreased as follows: Yugorsky Peninsula – 114 species, Vaygach Island – 112 species, Novaya Zemlya – 111 species, and Franz Josef Land – 34 species (Kalyakin 1993, our data). Simultaneously, proportion of Charadriiformes is increased, and proportion of Passeriformes is decreased. The ratio of Charadriiformes vs. Passeriformes is as follows: Yugorsky Peninsula – 0.85, Vaygach Island – 1.34, Novaya Zemlya – 1.95, Franz Josef Land – 2.0 (Kalyakin 1993, our data). This ratio reflects the declining of terrestrial ecosystems productivity.

Currently, 52 bird species of 9 orders breed or probably breed on Novaya Zemlya. Most of these taxa belong to the Arctic species complex (83%), 7% are widely distributed species, and 4% are European species. Furthermore, there are one species per Siberian, Mediterranean and China species complexes (Shtegman 1938). Additionally, 59 species are vagrant or migratory visitors on the archipelago.

Novaya Zemlya is one of the most important breeding and moulting sites for multiple Arctic bird species, especially for seabirds (Uspenskiy 1998, CAFF 2018). Seashore colonies of seabirds are the essential natural complexes of the Novaya Zemlya Archipelago. The largest seabird colonies in the Barents Sea are located on the western coast of Novaya Zemlya. Nowadays, 58 seabird colonies are known for Novaya Zemlya (Tertitsky & Pokrovskaya 2011), with approximately 1 million breeding pairs of Brünnich's guillemot (Krasnov & Barrett 2000). The bird populations on Novaya Zemlya makes a significant contribution to the total bird assemblage of the Barents Sea Region. A great numbers of nesting birds in the colonies reveal that Novaya Zemlya is a key breeding area for seabirds in the Barents Sea Region. However, Novaya Zemlya currently remains one of the most poorly studied archipelagos in the world. The lack of monitoring data on abundance of bird species and the state of populations makes it impossible to propose conservation action plans and to ensure sustainable management of biological resources in this region.

**Acknowledgement.** This study was partially supported by the Ministry of Science and Higher Education of Russia (project no. AAAA-A17-117122990042-2 and Change to AAAA-A19-119021990093-8) and Russian Foundation for Basic Research (grants 19-34-90012, 19-34-50016, 18-05-60057, and 18-44-292001).

Table 2. List of species and breeding status of birds observed in sites surveyed in 2015 – 2017. I – Belushya Bay; II – Malye Karmakuly; III – Bezmyannaya Bay; IV – sea waters around Yuzhny Island; V – Russkaya Gavan', Bogaty Island; VI – Oranskiye Islands; VII – Cape Zhelaniya; VIII – sea area around Northern Island; A – birds observed during nesting period in their breeding habitats; B – probably breeding birds (demonstrating nesting behavior); C – confirmed nesting (nest with eggs or with chicks, broods or fledglings); «+» – birds observed in sea areas, vagrant species or molting birds.

No	Species	I	II	III	IV	V	VI	VII	VIII
1	<i>Lagopus lagopus</i> (Linnaeus, 1758)		?						
2	<i>Lagopus muta</i> (Montin, 1776)		?						
3	<i>Branta leucopsis</i> (Bechstein, 1803)	A	C	C					
4	<i>Anser albifrons</i> (Scopoli, 1769)	C	C	A					
5a	<i>Anser fabalis rossicus</i> Buturlin, 1933	B	C	C					
5b	<i>Anser fabalis fabalis</i> (Latham, 1787)			+					
6	<i>Cygnus olor</i> (Gmelin, 1789)							+	
7	<i>Cygnus columbianus bewickii</i> (Yarrell, 1830)	A	A	C					
8	<i>Histrionicus histrionicus</i> (Linnaeus, 1758)		+						
9	<i>Clangula hyemalis</i> (Linnaeus, 1758)	A	C	A					
10	<i>Somateria mollissima</i> (Linnaeus, 1758)	A	C	A	+	A	C	C	+
11	<i>Somateria spectabilis</i> (Linnaeus, 1758)	A	C	C				+	
12	<i>Polysticta stelleri</i> (Pallas, 1769)			A					
13	<i>Mergus merganser</i> Linnaeus, 1758		+	+				+	+
14	<i>Gavia stellata</i> (Pontoppidan, 1763)		?						+
15	<i>Gavia arctica</i> (Linnaeus, 1758)		A	A					
16	<i>Fulmarus glacialis</i> (Linnaeus, 1761)		+		+		A		+
17	<i>Pluvialis apricaria</i> (Linnaeus, 1758)	B							
18	<i>Charadrius hiaticula</i> Linnaeus, 1758	C	B	C					
19	<i>Eudromias morinellus</i> (Linnaeus, 1758)			C					
20	<i>Arenaria interpres</i> (Linnaeus, 1758)	B	B	A					
21	<i>Phalaropus fulicarius</i> (Linnaeus, 1758)	B							
22	<i>Phalaropus lobatus</i> (Linnaeus, 1758)	A	+						
23	<i>Calidris minuta</i> (Leisler, 1812)	B	C	C					
24	<i>Calidris alpina</i> (Linnaeus, 1758)	B	A	B					
25	<i>Calidris maritima</i> (Brünnich, 1764)		B			A		B	
26	<i>Catharacta skua</i> Brünnich, 1764	A	A	A			A		
27	<i>Stercorarius pomarinus</i> (Temminck, 1815)		B		+				+
28	<i>Stercorarius parasiticus</i> (Linnaeus, 1758)		A	A	+				+
29	<i>Stercorarius longicaudus</i> Vieillot, 1819	C	B	A	+				+
30	<i>Larus argentatus</i> Pontoppidan, 1763					+			
31	<i>Larus heuglini</i> Bree, 1876								+
32	<i>Larus hyperboreus</i> Gunnerus, 1767	B	C	C	+	C	C	C	+
33	<i>Larus marinus</i> Linnaeus, 1758	A	A	A	+			A	
34	<i>Rissa tridactyla</i> (Linnaeus, 1758)		C	C	+	C	C	C	+
35	<i>Sterna paradisaea</i> Pontoppidan, 1763					C	C	C	+
36	<i>Alle alle</i> (Linnaeus, 1758)								+
37	<i>Uria lomvia</i> (Linnaeus, 1758)		C	C	+	C	C	C	+
38	<i>Cephus grille</i> (Linnaeus, 1758)		C	C	+	C	C	C	+
39	<i>Fratercula arctica</i> (Linnaeus, 1758)		C	C					
40	<i>Bubo scandiacus</i> (Linnaeus, 1758)		A						
41	<i>Buteo lagopus</i> (Pontoppidan, 1763)		C	C					
42	<i>Haliaeetus albicilla</i> (Linnaeus, 1758)		+						
43	<i>Falco peregrinus</i> Tunstall, 1771			B					
44	<i>Eremophila alpestris</i> (Linnaeus, 1758)	A	C	C					
45	<i>Motacilla alba</i> Linnaeus, 1758	C	A	C					
46	<i>Oenanthe oenanthe</i> (Linnaeus, 1758)			C					
47	<i>Calcarius lapponicus</i> (Linnaeus, 1758)	B	A	A					
48	<i>Plectrophenax nivalis</i> (Linnaeus, 1758)	C	C	C		A	C	B	

## References

- Anker-Nilssen, T., Bakken, V., Strøm, H., Golovkin, A., Bianki, V., Tatrinkova, I. (2000): The status of marine birds breeding in the Barents Sea Region. Rapport serien №. 113, Norsk Polar Institutt. Tromsø.
- Antipin, V.M. (1938): Fauna of vertebrates in the north-eastern Novaya Zemlya. Problems of the Arctic 2: 153-171.
- CAFF (2018): A Global audit of the status and trends of Arctic and Northern Hemisphere goose population (Component 2. Population accounts). Conservation of Arctic Flora and Fauna International Secretariat. Akureyri, Iceland.
- Gavrilo, M.V. (2015): Distribution of the common eider (*Somateria mollissima*) in coastal waters of northern Novaya Zemlya, Russia, in autumn 2014. Waterfowl of Northern Eurasia: 129-129.

- Hahin, G.V. (2000): Fauna (vertebrates) of the northern Novaya Zemlya archipelago. pp 64-66. In: Boyarsky, P.V. (eds.), Novaya Zemlya. Nature. History. Archaeology. Culture. Proceedings of the Marine Arctic Complex Expedition 2(2).
- The Internet Bird Collection (IBC) (2020): <[www.hbw.com/ibc](http://www.hbw.com/ibc)>, accessed at: 2020.03.10.
- Kalyakin, V.N. (1993): The fauna of birds and mammals in the Novaya Zemlya region and assessment of its status. In: Boyarsky P.V. (eds.), Study of the environment of Novaya Zemlya. Proceedings of the Marine Arctic Complex Expedition 2(3): 23-90.
- Kalyakin, V.N. (1995): To specification of distribution of some Anseriformes species in the Barents Sea region and in the north of Western Siberia. Bulletin of Geese Study Group of Eastern Europe and Northern Asia 1: 150-157.
- Kalyakin, V.N. (1999): Birds of Novaya Zemlya region and Franz Josef Land. Materials to distribution of birds in the Urals, Cisurals and Western Siberia. Collection of articles and short notes: 109-137.
- Kalyakin, V.N. (2001): New data on birds of Novaya Zemlya archipelago and Franz-Josef Land. Ornithology 29: 8-28.
- Krasnov, Yu.V., Barrett, R.T. (2000): Seabirds monitoring in the Barents Sea. Proposal of Program. Russian Ornithological Journal 113: 3-22.
- Miskevich, I.V., Moseev, D.S., Samokhin, L.A. (2011): Islands of the Petuhovskiy Archipelago on Novaya Zemlya in the Karskie Vorota Strait: History, Nature, and Ecology. The "Following the coast-dwellers" Integrated Expedition. Arkhangelsk.
- Pokrovskaya, I.V. (2017): Long-term changes in the avifauna of Polar deserts (on the example of the north of Novaya Zemlya Archipelago). Bird Numbers Dynamics in Terrestrial Landscapes 2017: 92-98.
- Pokrovskaya, I.V., Tertitsky, G.M. (1993): The current status of commercial avifauna of Novaya Zemlya. In: Boyarsky, P.V. (eds.), Study of the environment of Novaya Zemlya. Proceedings of the Marine Arctic Complex Expedition 2(3): 91-97.
- Ravkin, Y.S. (1967): Towards methodology of bird censuses in forest areas. Nature of Tick-Borne Encephalitis Hotbeds in Altai 1967: 66-75.
- Redkin, Y.A. (2013): Arctic redpoll. Pp.278-279. In: Kalyakin M.V. (eds.), The complete guide of birds of European part of Russia. Third part. Fiton XXI.
- Rozenfeld, S.B., Spitsyn, V.M. (2017): The results of reconnaissance ornithological observations within the expedition «Arctic Floating University 2015» on the research ship «Professor Molchanov». Russian Journal of Ornithology 26(1443): 1901-1909.
- Shtegman, B.K. (1938): Principles of ornithogeographical division of Palearctic. Fauna of USSR. The Birds 1(2). Moscow, Leningrad.
- Spitsyn, V.M. (2015): The Anseriform fauna in the environs of Maliye Karmauly (Yuzhnyi Island, Novaya Zemlya). Waterfowl of Northern Eurasia: 182-183.
- Spitsyn, V.M. (2016): Taiga Bean Goose (*Anser f. fabalis*) sighting on Yuzhnyi Island of the Novaya Zemlya Archipelago. Casarca 20: 125-126.
- Spitsyn, V.M., Rozenfeld, S.B., Bolotov, N.I. (2017): Annotated list of bird species of the Malye Karmakuly Polar Station, Yuzhny Island of Novaya Zemlya. Biharean Biologist 12(1): 21-26.
- Spitsyn, V.M., Rozenfeld, S.B., Kogut, Y.E. (2016): The abundance and distribution of Anseriformes in the environs of the Polar station Maliye Karmakuly (Yuzny Island, Novaya Zemlya) in summer 2015. Casarca 19(1): 28-43.
- Strøm, H., Øien, I.J., Opheim, J., Kuznetsov, E.A., Khakhin, G.V. (1994): Seabird Censuses on Novaya Zemlya 1994. Norwegian Ornithological Society Report 2: 1-38.
- Strøm, H., Øien, I.J., Opheim, J., Kuznetsov, E.A., Khakhin, G.V. (1995): Seabird censuses on Novaya Zemlya 1995. NOF Report Series. Klaebu 3: 1-26.
- Tertitsky, G.M., Pokrovskaya, I.V. (2011): On avifauna and bird population of Novaya Zemlya. The Russian Journal of Ornithology 20(688): 1827-1836.
- Uspenskiy, S.M. (1998): Fish, birds and mammals. In: Boyarsky P.V. (eds.), Novaya Zemlya, Nature, History, Archeology, Culture. Proceedings of the Marine Arctic Complex Expedition 1998: 194-227.

Appendix 1. List of bird species of the Novaya Zemlya archipelago including information on presence of the species on the archipelago in last three centuries, their breeding status and abundance.

№	Species	19th century	20th century	2015-2017	Abundance
Order Galliformes Temminck, 1820					
Family Phasianidae Horsfield, 1821					
1	<i>Lagopus lagopus</i> (Linnaeus, 1758)	no data	probably breeding	?	rare
2	<i>Lagopus muta</i> (Montin, 1776)	no data	breeding	?	rare
Order Anseriformes Wagler, 1831					
Family Anatidae Vigors, 1825					
3	<i>Branta canadensis</i> (Linnaeus, 1758)	-	vagrant	-	-
4	<i>Branta leucopsis</i> (Bechstein, 1803)	no data	breeding	breeding	abundant, reaches the high density on Yuzhny Island
5a	<i>Branta bernicla hrota</i> (O. F. Müller, 1776)	+	probably breeding	-	rare
5b	<i>Branta bernicla bernicla</i> (Linnaeus, 1758)	no data	breeding	-	scarce
6	<i>Branta ruficollis</i> (Pallas, 1769)	vagrant	vagrant	-	-
7	<i>Anser albifrons</i> (Scopoli, 1769)	no data	breeding	breeding	the density is low in areas studied by us
8	<i>Anser erythropus</i> (Linnaeus, 1758)	-	vagrant*	-	-
9a	<i>Anser fabalis rossicus</i> Buturlin, 1933	no data	breeding	breeding	abundant, reaches the high density on Yuzhny Island
9b	<i>Anser fabalis fabalis</i> (Latham, 1787)	no data	-	+	rare
10	<i>Anser caerulescens</i> (Linnaeus, 1758)	-	vagrant*	-	-
11	<i>Anser brachyrhynchus</i> Baillon, 1834	-	vagrant*	-	-
12	<i>Cygnus olor</i> (Gmelin, 1789)	-	-	vagrant	-
13	<i>Cygnus cygnus</i> (Linnaeus, 1758)	+	+	-	rare
14	<i>Cygnus columbianus bewickii</i> (Yarrell, 1830)	no data	breeding	breeding	scarce
15	<i>Anas crecca</i> Linnaeus, 1758	no data	+	-	rare
16	<i>Anas penelope</i> Linnaeus, 1758	no data	+	-	rare
17	<i>Aythya marila</i> (Linnaeus, 1761)	no data	+	-	rare
18	<i>Histrionicus histrionicus</i> (Linnaeus, 1758)	-	-	vagrant	-
19	<i>Clangula hyemalis</i> (Linnaeus, 1758)	no data	breeding	breeding	common, population shares the high levels of annual density changes
20	<i>Bucephala islandica</i> (Gmelin, 1789)	-	vagrant	-	-
21	<i>Somateria mollissima</i> (Linnaeus, 1758)	no data	breeding	breeding	common, reaches the high density in several habitats
22	<i>Somateria spectabilis</i> (Linnaeus, 1758)	no data	breeding	breeding	scarce
23	<i>Polysticta stelleri</i> (Pallas, 1769)	no data	+	+	scarce
24	<i>Melanitta nigra</i> (Linnaeus, 1758)	+	probably breeding	-	scarce
25	<i>Melanitta fusca</i> (Linnaeus, 1758)	+	+	-	scarce
26	<i>Mergus serrator</i> Linnaeus, 1758	no data	+	-	scarce
27	<i>Mergus merganser</i> Linnaeus, 1758	no data	+	+	scarce
Order Caprimulgiformes Ridgway, 1881					
Family Apodidae Hartert, 1897					
28	<i>Apus apus</i> (Linnaeus, 1758)	-	vagrant	-	-
Order Gruiformes Bonaparte, 1854					
Family Gruidae Vigors, 1825					
29	<i>Grus grus</i> (Linnaeus, 1758)	-	vagrant	-	-
Order Gaviiformes Wetmore & Miller, 1926					
Family Gaviidae Forster, 1788					
30	<i>Gavia stellata</i> (Pontoppidan, 1763)	no data	breeding	+	scarce
31	<i>Gavia arctica</i> (Linnaeus, 1758)	no data	breeding	+	scarce
32	<i>Gavia immer</i> (Brünnich, 1764)	no data	+	-	rare
33	<i>Gavia adamsii</i> (J.E. Gray, 1859)	+	breeding	-	rare
Order Procellariiformes Fürbringer, 1888					
Family Procellariidae Leach, 1820					
34	<i>Fulmarus glacialis</i> (Linnaeus, 1761)	no data	breeding	+	common in sea areas
Order Suliformes Sharpe, 1891					
Family Sulidae Reichenbach, 1849					
35	<i>Morus bassanus</i> (Linnaeus, 1758)	-	vagrant	-	-
Family Phalacrocoracidae Reichenbach, 1849					
36	<i>Phalacrocorax carbo</i> (Linnaeus, 1758)	-	vagrant	-	-
Order Charadriiformes Huxley, 1867					

No	Species	19th century	20th century	2015-2017	Abundance
Family Charadriidae Vigors, 1825					
37	<i>Pluvialis squatarola</i> (Linnaeus, 1758)	no data	+	-	rare
38	<i>Pluvialis fulva</i> (Gmelin, 1789)	-	vagrant	-	-
39	<i>Pluvialis apricaria</i> (Linnaeus, 1758)	+	+	+	scarce
40	<i>Charadrius hiaticula</i> Linnaeus, 1758	no data	breeding	breeding	abundant
41	<i>Eudromias morinellus</i> (Linnaeus, 1758)	no data	breeding	breeding	scarce
Family Haematopodidae Bonaparte, 1838					
42	<i>Haematopus ostralegus</i> Linnaeus, 1758	-	vagrant	-	-
Family Scolopacidae Vigors, 1825					
43	<i>Arenaria interpres</i> (Linnaeus, 1758)	no data	breeding	+	common
44	<i>Tringa erythropus</i> (Pallas, 1764)	-	vagrant	-	-
45	<i>Phalaropus fulicarius</i> (Linnaeus, 1758)	no data	breeding	+	scarce, common in several habitats
46	<i>Phalaropus lobatus</i> (Linnaeus, 1758)	no data	sporadic breeding	+	scarce
47	<i>Calidris pugnax</i> (Linnaeus, 1758)	+	probably breeding	-	scarce
48	<i>Calidris minuta</i> (Leisler, 1812)	breeding	breeding	breeding	common
49	<i>Calidris temminckii</i> (Leisler, 1812)	no data	breeding	-	scarce
50	<i>Calidris ferruginea</i> (Pontoppidan, 1763)	no data	+	-	rare
51	<i>Calidris alpina</i> (Linnaeus, 1758)	no data	breeding	+	common in the southern part of the archipelago
52	<i>Calidris maritima</i> (Brünnich, 1764)	no data	breeding	+	common
53	<i>Calidris canutus</i> (Linnaeus, 1758)	-	vagrant	-	-
54	<i>Calidris alba</i> (Pallas, 1764)	no data	+	-	rare
55	<i>Calidris falcinellus</i> (Pontoppidan, 1763)	-	vagrant	-	-
56	<i>Gallinago gallinago</i> (Linnaeus, 1758)	-	vagrant	-	-
57	<i>Numenius phaeopus</i> (Linnaeus, 1758)	-	vagrant	-	-
58	<i>Limosa lapponica</i> (Linnaeus, 1758)	-	vagrant	-	-
Family Stercorariidae Gray, 1871					
59	<i>Catharacta skua</i> (Brünnich, 1764)	+	breeding	+	scarce
60	<i>Stercorarius pomarinus</i> (Temminck, 1815)	no data	breeding	+	common, abundant in several areas
61	<i>Stercorarius parasiticus</i> (Linnaeus, 1758)	no data	breeding	+	common, population shares the high levels of annual density changes
62	<i>Stercorarius longicaudus</i> Vieillot, 1819	no data	breeding	breeding	common, abundant in several areas
Family Laridae Rafinesque, 1815					
63	<i>Larus fuscus</i> Linnaeus, 1758	-	vagrant	-	-
64	<i>Larus argentatus</i> Pontoppidan, 1763	no data	-	+	rare
65	<i>Larus heuglini</i> Bree, 1876	no data	+	+	scarce
66	<i>Larus glaucoides</i> Meyer, 1822	no data	breeding	-	rare
67	<i>Larus hyperboreus</i> Gunnerus, 1767	breeding	breeding	breeding	common, abundant in several areas
68	<i>Larus marinus</i> Linnaeus, 1758	no data	breeding	+	scarce
69	<i>Larus canus</i> Linnaeus, 1758	vagrant	-	-	-
70	<i>Rissa tridactyla</i> (Linnaeus, 1758)	no data	breeding	breeding	abundant
71	<i>Rhodostethia rosea</i> (MacGillivray, 1824)	-	vagrant	-	-
72	<i>Pagophila eburnea</i> (Phipps, 1774)	no data	breeding	-	rare
73	<i>Sterna paradisaea</i> Pontoppidan, 1763	breeding	breeding	breeding	common, abundant in several areas
Family Alcidae Leach, 1820					
74	<i>Alle alle</i> (Linnaeus, 1758)	no data	breeding	+	common in several areas
75	<i>Alca torda</i> Linnaeus, 1758	+	+	-	rare
76	<i>Uria aalge</i> (Pontoppidan, 1763)	no data	breeding	-	rare
77	<i>Uria lomvia</i> (Linnaeus, 1758)	no data	breeding	breeding	abundant
78	<i>Cephus grylle</i> (Linnaeus, 1758)	no data	breeding	breeding	common, abundant in several areas
79	<i>Fratercula arctica</i> (Linnaeus, 1758)	breeding	breeding	breeding	scarce
Order Strigiformes Wagler, 1830					
Family Strigidae Leach, 1820					
80	<i>Bubo scandiacus</i> (Linnaeus, 1758)	no data	breeding	+	common, population shares the high levels of annual density changes

№	Species	19th century	20th century	2015-2017	Abundance
81	<i>Asio flammeus</i> (Pontoppidan, 1763)	-	vagrant*	-	-
Order Accipitriformes Vieillot, 1816					
Family Accipitridae Vieillot, 1816					
82	<i>Accipiter gentilis</i> (Linnaeus, 1758)	-	vagrant	-	-
83	<i>Buteo lagopus</i> (Pontoppidan, 1763)	no data	breeding	breeding	common
84	<i>Aquila chrysaetos</i> (Linnaeus, 1758)	+	-	-	-
85	<i>Haliaeetus albicilla</i> (Linnaeus, 1758)	+	+	+	rare
Order Coraciiformes Forbes, 1884					
Family Coraciidae Rafinesque, 1815					
86	<i>Coracias garrulus</i> Linnaeus, 1758	-	vagrant	-	-
Order Falconiformes Leach, 1820					
Family Falconidae Vigors, 1824					
87	<i>Falco rusticolus</i> Linnaeus, 1758	+	+	-	-
88	<i>Falco peregrinus</i> Tunstall, 1771	no data	breeding	+	rare
89	<i>Falco columbarius</i> Linnaeus, 1758	+	+	-	rare
Order Passeriformes Linnaeus, 1758					
Family Hirundinidae Rafinesque, 1815					
90	<i>Hirundo rustica</i> Linnaeus, 1758	vagrant	vagrant	-	-
Family Alaudidae Vigors, 1825					
91	<i>Eremophila alpestris</i> (Linnaeus, 1758)	+	breeding	breeding	abundant
Family Motacillidae Horsfield, 1821					
92	<i>Anthus pratensis</i> (Linnaeus, 1758)	no data	probably breeding	-	rare
93	<i>Anthus cervinus</i> (Pallas, 1811)	no data	probably breeding	-	scarce
94	<i>Motacilla tschutschensis</i> J. F. Gmelin, 1789	-	-	vagrant	-
95	<i>Motacilla citreola</i> Pallas, 1776	-	vagrant	-	-
96	<i>Motacilla alba</i> Linnaeus, 1758	no data	breeding	breeding	scarce, common in several areas of Yuzhny Island
Family Sturnidae Rafinesque, 1815					
97	<i>Sturnus vulgaris</i> Linnaeus, 1758	-	vagrant	-	-
Family Corvidae Leach, 1820					
98	<i>Garrulus glandarius</i> (Linnaeus, 1758)	-	vagrant	-	-
99	<i>Pica pica</i> (Linnaeus, 1758)	-	vagrant	-	-
100	<i>Corvus frugilegus</i> Linnaeus, 1758	-	vagrant	-	-
101	<i>Corvus cornix</i> Linnaeus, 1758	vagrant	vagrant	-	-
102	<i>Corvus corax</i> Linnaeus, 1758	vagrant	vagrant	-	-
Family Muscipidae Fleming J., 1822					
103	<i>Ficedula parva</i> (Pallas, 1764)	-	-	vagrant	-
104	<i>Saxicola rubetra</i> (Linnaeus, 1758)	-	vagrant	-	-
105	<i>Oenanthe oenanthe</i> (Linnaeus, 1758)	no data	breeding	breeding	scarce
Family Turdidae Rafinesque, 1815					
106	<i>Turdus iliacus</i> Linnaeus, 1766	-	vagrant	-	-
Family Passeridae Rafinesque, 1815					
107	<i>Passer domesticus</i> (Linnaeus, 1758)	vagrant	vagrant	-	-
Family Fringillidae Leach, 1820					
108	<i>Acanthis flamma</i> (Linnaeus, 1758)	-	probably breeding	-	rare
109	<i>Acanthis hornemanni</i> (Holbøll, 1843)	no data	breeding	-	rare
Family Calcariidae Ridgway, 1901					
110	<i>Calcarius lapponicus</i> (Linnaeus, 1758)	no data	breeding	+	common
111	<i>Plectrophenax nivalis</i> (Linnaeus, 1758)	no data	breeding	breeding	abundant

«+» - non-breeding visitors of Novaya Zemlya;

«\*» - a single instance of breeding of the species was recorded;

«-» - species was not observed.