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MARINE MAMMALS OF THE KOLA BAY, BARENTS SEA

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Despite the fact that publications focused on marine mammals of the Barents Sea are quite numerous, relevant data on their habitat in the Kola Bay area are scarce. The latest work detailing this aspect dates back to 1997. At the same time, protected species of marine mammals (listed in the Red Data Book of the Russian Federation) occur in the bay waters. With the progressive implementation of the Integrated Development of the Murmansk Transport Hub project, the anthropogenic load on the Kola Bay water area may increase multifold. Therefore, research on marine mammals occurring in its waters becomes more and more relevant. This paper provides an updated list of marine mammals registered in the Kola Bay, which is compiled on the basis of published data and observations of the authors.

Keywords: Kola Bay, Barents Sea, marine mammals, protected species

In the Kola Bay, Russia's northernmost ice-free seaport is located, as well as the region's largest naval and industrial complexes. The port of Murmansk is the base of the nuclear-powered icebreaker fleet. The Northern Sea Route starts there. However, the intensity of shipping in this area is relatively low [Serova, 2018], but the situation may change over time due to growing interest in the Arctic region. Within the framework of the Integrated Development of the Murmansk Transport Hub project, it is planned to construct a year-round maritime transport hub based on the port of Murmansk. The implementation requires dredging, reconstruction and modernization of the existing port infrastructure on the Kola Bay eastern coast, and construction of an oil terminal and a coal transshipment complex on its western coast [Skufyina, Serova, 2017]. To date, the Lavna coal terminal is under intensive construction, and bored piles for future pouring stations are being installed. A diving study of the seabed is carried out with the removal of foreign objects. Backfilling with rocky soil is underway. The slope has been strengthened with large stones [Chekunkov, 2022]. The center for the construction of large-capacity offshore structures, built in the Belokamenka village, is a key facility for the industry being created in Russia – the production of LNG equipment. This center consists of five main sectors: the site for gravity-based structures, *inter alia* two dry docks; the topsides site; marine infrastructure facilities; engineering support facilities; and a residential complex and administrative facilities [LNG Construction Center, 2022].

All the above suggests as follows: over time, the anthropogenic load on the Kola Bay water area and, accordingly, on its biota will definitely increase. Despite the fact that studies of the bay have more than a century-old history, publications focused on marine mammals occurring in its waters

are scarce [Deryugin, 1915; Pleske, 1887; Smirnov, 1903; Zyryanov, Egorov, 2010]. The only relatively modern work providing a description of the marine mammal species recorded in the Kola Bay is the monograph [Goryaev, 1997]. This situation is mostly due to the lack of fishing for marine mammals in this area and due to the sporadic nature of their occurrence.

The anthropogenic load observed and little research into the issue indicate the need for regular study of marine mammals in the Kola Bay. This is especially true for species listed in the Red Book of the Russian Federation and in the IUCN (International Union for Conservation of Nature) Red List.

MATERIAL AND METHODS

Murmansk Marine Biological Institute of the RAS (MMBI RAS) has at its disposal two biotechnical aquatic complexes located on the Kola Bay coast – in the vicinity of Gadzhievo and Polyarny towns. There, the staff of the institute conducts year-round research on true seals. The availability of motor boats and the access to the bay made it possible to observe wild marine mammals both in nearby and relatively distant sites of the water area. In 2011, we made the first attempts to carry out the research, and in 2018, the observations became systematic. The results presented in this paper were obtained in 2011–2021. The study areas were predominantly the northern and central Kola Bay, where marine mammals are most often recorded. Animals were registered from the shore and during route observations. From the shore, as a rule, marine mammals were noted accidentally – during research unrelated to the surveys. Route observations were carried out in two directions – from Cape Tonya to Toros Island and from Cape Tonya to Salny Island (Fig. 1). Due to weather conditions and limited navigation of small vessels in the Kola Bay during the polar night, the surveys at this time were not strictly periodic.

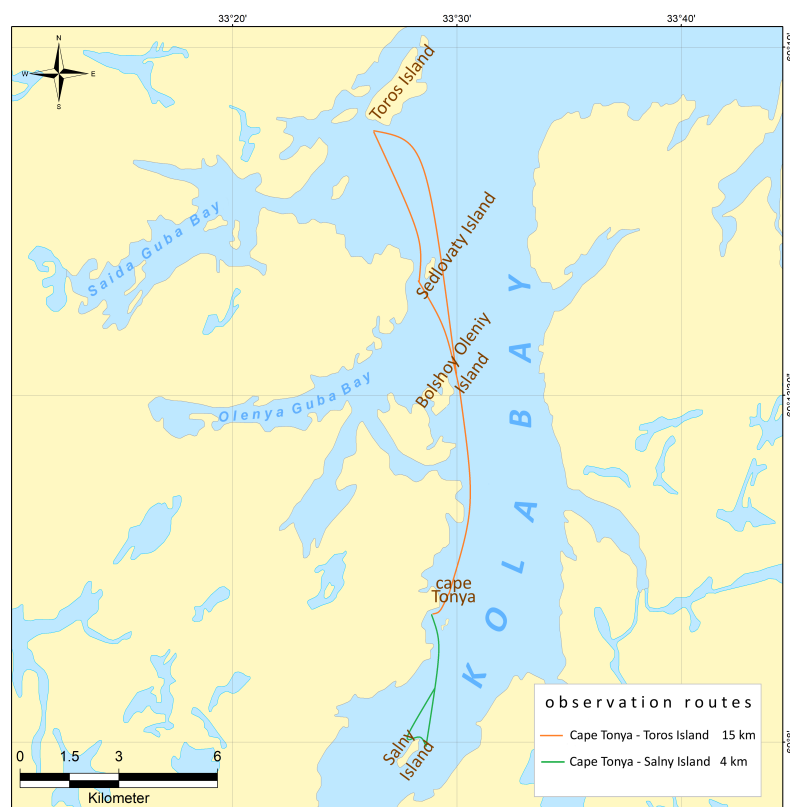


Fig. 1. Scheme of observation routes

RESULTS AND DISCUSSION

Literature data and our observations [Deryugin, 1915; Goryaev, 1997; Pleske, 1887; Smirnov, 1903; Tomilin, 1957, 1962; Zaytsev et al., 2018; Zyryanov, Egorov, 2010] evidence for the following: in the waters of the Kola Bay and the adjacent area, 14 species of marine mammals belonging to five families can be recorded.

1. Oceanic dolphins Delphinidae Gray, 1821 (order Cetacea Brisson, 1762, suborder Odontoceti Flower, 1867). Two species – the white-beaked dolphin *Lagenorhynchus albirostris* (Gray, 1846) and the killer whale *Orcinus orca* (Linnaeus, 1758).
2. Porpoises Phocoenidae Gray, 1825 (order Cetacea, suborder Odontoceti). One species – the harbor porpoise *Phocoena phocoena* (Linnaeus, 1758).
3. Monodontidae Gray, 1821 (order Cetacea, suborder Odontoceti). One species – the beluga whale *Delphinapterus leucas* (Pallas, 1776).
4. Rorquals Balaenopteridae Gray, 1864 (order Cetacea, suborder Mysticeti Flower, 1864). Five species – the humpback whale *Megaptera novaeangliae* (Borowski, 1781), the fin whale *Balaenoptera physalus* (Linnaeus, 1758), the sei whale *Balaenoptera borealis* (Lesson, 1828), the blue whale *Balaenoptera musculus* (Linnaeus, 1758), and the common minke whale *Balaenoptera acutorostrata* (Lacépède, 1804).
5. True seals Phocidae Gray, 1825 (order Carnivora Bowdich, 1821, suborder Caniformia Kretzoi, 1938). Five species – the harbor seal *Phoca vitulina* (Linnaeus, 1758), the grey seal *Halichoerus grypus* (Fabricius, 1791), the harp seal *Pagophilus groenlandicus* (Erxleben, 1777), the ringed seal *Pusa hispida* (Schreber, 1775), and the bearded seal *Erignathus barbatus* (Erxleben, 1777).

Out of the species above, only seven were registered during our surveys.

Delphinidae. The white-beaked dolphin is the northernmost representative of its genus [Kinze, 2018] and one out of two species of the genus found in the Barents Sea [Kovacs et al., 2009]. It is the most frequently recorded native cetacean (Fig. 2) [Fall, Skern-Mauritzen, 2014; Goryaev, 2017; Klepikovskiy et al., 2012]. This marine mammal inhabits temperate and subarctic waters of the North Atlantic and is recorded in both shelf and coastal water areas [Kinze, 2018]. It is listed in the Red Data Book of the Russian Federation as a rare, vulnerable species [Perechen' ob"ektov zhivotnogo mira, 2020].

In the Kola Bay, white-beaked dolphins are found irregularly. In 2011–2017, these animals were registered only during the summer–autumn period [Zaytsev et al., 2018]; in 2018–2021, they were not recorded at all. Until 2018, there was no mention of this species in the Kola Bay in the literature.



Fig. 2. White-beaked dolphins in the Kola Bay, 15.09.2011 (photo by I. Gabay)

The population status of the killer whale in the Barents Sea has not been sufficiently studied, which is primarily due to the sporadic nature of its appearance [Aars et al., 2016; Kovacs et al., 2009]. There are references to the fact that the killer whale is a common species in the Kola Bay and can be observed in Kildin Island vicinity [Deryugin, 1915; Goryaev, 1997]. Over the entire period of our research, we were unable to confirm the entry of this marine mammal into the bay waters: all reports that killer whales occur in local areas turned out to be false. Most often, other representatives of this family or common minke whales were mistaken for them.

Phocoenidae. The harbor porpoise is one of the smallest cetacean species in the Barents Sea (Fig. 3), inhabiting mainly coastal waters [Aars et al., 2016; Bjørge, Tolley, 2018; Kovacs et al., 2009]. The geography of its distribution is quite wide and covers waters from the equator to the Arctic [Lockyer, 2003]. The Barents Sea is inhabited by the North Atlantic subspecies *P. p. phocoena* (Linnaeus, 1758).

The harbor porpoise, along with the common minke whale, is the most frequently encountered cetacean in the Kola Bay [Goryaev, 1997]. Its mass entries are often related to abundance of food items (with no pronounced seasonal periodicity) [Deryugin, 1915; Goryaev, 1997; Tomilin, 1957]. Our surveys show a picture similar to that from the literature data: in different years, animals are found in various seasons (Table 1).



Fig. 3. The harbor porpoise in the Kola Bay, 12.07.2018 (photo by A. Troshichev)

Monodontidae. The distribution of the beluga whale in the Barents Sea has a pronounced seasonality closely related to changes in ice conditions throughout the year [Matishov, Ognetrov, 2006; Ognetrov et al., 2003]. In the literature, there is a reference on beluga whales entering the Kola Bay in summer months [Goryaev, 1997]. However, during our observations, we did not register this species in the bay water area.

Balaenopteridae. Representatives of this family tend to occur in the Barents Sea waters during summer feeding. At the same time, some species can stay there for wintering [Aars et al., 2016; Tomilin, 1962]. The most frequently observed species are the common minke whale, the fin whale, and the humpback whale [Aars et al., 2016; Skern-Mauritzen et al., 2011]. The fin whale and the humpback whale prefer open waters and are found in the western, central, and northern Barents Sea, while the common minke whale can usually be observed in coastal areas [Aars et al., 2016; Burdin et al., 2009; Marine Mammals, 2017]. In the Barents Sea, the fin whale is represented by the northern subspecies *B. p. physalus* (Linnaeus, 1758). It is listed in the Red Data Book of the Russian Federation as a species of uncertain status [Perechen' ob"ektov zhivotnogo mira, 2020] and in the IUCN Red List, as vulnerable (VU) [Cooke, 2018a]. The humpback whale is listed in the Red Data Book of the Russian Federation

as recovering [Perechen' ob"ektov zhivotnogo mira, 2020], and in the IUCN Red List, as a species of least concern (LC) [Cooke, 2018b]. The only mention in the literature we have come across on the entry of humpback whales into the Kola Bay is the publication of Yu. Goryaev [1997] with reference to L. Breitfuss (1903). Also, in the work on the Kola Bay fauna and the conditions of its existence, K. Deryugin [1915] highlights the probability of this species entering the water area. Moreover, there are references to the fact as follows: in the Murman coastal area and in the Kola Bay, the sei whale and the blue whale, which are rarer for the Barents Sea, can be encountered [Deryugin, 1915; Goryaev, 1997; Pleske, 1887].

Table 1. The results of the registration of marine mammals when following the route Cape Tonya – Toros Island – Cape Tonya

| Date | Time of the route | <i>Balaenoptera acutorostrata</i> | <i>Phocoena phocoena</i> | <i>Halichoerus grypus</i> |
|------------|-----------------------------|--|---|---|
| 12.07.2018 | 17:00–18:00, 20:30–22:20 | Northwest of Sedlovaty Island, 1 individual | Northwest of Sedlovaty Island, 10–15 individuals | In the water near Sedlovaty Island, 1 individual |
| 21.07.2018 | 20:00–21:00, 22:00–23:00 | – | – | – |
| 16.08.2018 | 17:00–18:00, 18:00–19:00 | – | – | In the water near Bolshoy Oleny Island, 1 individual |
| 08.09.2019 | 13:35–14:55, 15:00–16:00 | North of Bolshoy Oleny Island, 1 individual | Northeast of Cape Tonya, 15 individuals | Northeast of Bolshoy Oleny Island, 1 individual |
| 14.06.2020 | 21:00–22:00, 23:00–00:10 | – | – | Northeast of Sedlovaty Island, 1 individual; Devkina Pozhny Bay, 1 individual |

During our surveys, only two species representing this family were registered – the common minke whale and the humpback whale. Interestingly, the common minke whale is the only species of baleen whales which regularly occurs in the bay (Table 1). As for the humpback whale (Fig. 4), we observed its appearance near Shurinov Island of the Kola Bay in March 2016.



Fig. 4. The humpback whale in the Kola Bay, 01.03.2016 (photo by A. Troshichev)

Phocidae. The harbor seal is one of the most common pinnipeds in coastal waters [Burdin et al., 2009; Teilmann, Galatius, 2018]. In Russia, it is a protected species [Zyryanov, Kavtsevich, 2014]. The Barents Sea is inhabited by the Atlantic subspecies of the harbor seal *P. v. vitulina* (Linnaeus, 1758) [Berta, Churchill, 2012]. On the Kola Peninsula coast, harbor seals are encountered in the area from Varangerfjord in the west to the Ivanovskaya Bay in the east [Zyryanov, Egorov, 2010].

In the Kola Bay, the harbor seal is registered mainly in spring in its northern water area – in the Pala, Olenya, and Sayda bays, as well as in the Ekaterininskaya Harbor [Zyryanov, Egorov, 2010]. During our observations, not a single individual of this species was reliably identified.

The grey seal, the same as the harbor seal, is a coastal species, but it spends more time away from the coast [Aars et al., 2016]. The Barents Sea is inhabited by the Atlantic subspecies of the grey seal *H. g. atlantica* (Nehring, 1866) [Berta, Churchill, 2012; Olsen et al., 2016], listed in the Red Data Book of the Murmansk region as a rare species [Kavtsevich, Erokhina, 2014]. This marine mammal is registered throughout the Barents Sea coast of the Kola Peninsula [Vishnevskaya et al., 1990].

For the Kola Bay, only single cases of this species encounter are described [Goryaev, 1997]. According to the results of our surveys, the grey seal is the most common pinniped for this area. Its massive aggregations were observed on the northern tip of Salny Island and in the northeast of Domashny Island; the abundance of simultaneously registered individuals sometimes exceeds 30. For the first time, the grey seal haulout on Salny Island was recorded in autumn 2011 (Table 2). Mass haulouts are registered only in the autumn–winter period (in the northern and central Kola Bay), and single encounters occur year-round (Fig. 5).



Fig. 5. Grey seals in the Kola Bay (photo by A. Troshichev)

The harp seal, the ringed seal, and the bearded seal are pagophilic species, *i. e.*, these animals prefer to live on ice. That is why their distribution in the Barents Sea has a pronounced seasonality (with a reference to ice conditions) [Ognetov et al., 2003; Svetochev, Svetocheva, 2018].

Usually, the appearance of harp seals near the Murmansk coast occurs during their migration from the White Sea to summer feeding grounds and back [Svetochev, Svetocheva, 2018]. In the literature, there are reports of many harp seals entering the Kola Bay – with the abundance of registered individuals exceeding 500 [Goryaev, 1997]. During our observations, not a single harp seal was reliably identified.

Table 2. Observations of the grey seal haulout on Salny Island

| Year | Date | Time | Abundance of individuals | Note |
|-------|-------|--------------|--|---|
| 2011 | 01.06 | 13:30 | 0 | |
| | 17.11 | 14:10, 15:10 | 11 | Footprints of seals were noted in the snow above the high tide |
| 2018 | 18.04 | 15:00 | 1 | The grey seal lied on a rock in the littoral zone |
| | 02.05 | 15:30 | 2 | One individual in the water, and another one in the littoral |
| | 12.07 | 16:15 | 0 | |
| | 21.07 | 04:10 | 0 | |
| | 16.08 | 14:30 | 0 | |
| | 09.10 | 13:50 | 0 | |
| | 11.10 | 12:50 | 2 | Both animals were in the water |
| | 14.10 | 12:00 | 1 | In the water |
| | 09.11 | 13:00 | 2 | One individual in the water, and another one in the littoral |
| 14.11 | 12:00 | 1 | In the water | |
| 2019 | 27.02 | 11:00 | 10 | Nine individuals on the coast, and one individual in the water |
| | 10.04 | 13:40 | 0 | There were no footprints on fresh snow |
| | 26.04 | 13:40 | 0 | |
| | 24.05 | 19:40 | 0 | |
| | 03.09 | 17:00 | 0 | |
| | 08.09 | 11:00 | 2 | In Pitkov Bay (2 km west of Salny Island), 6–7 grey seals were observed |
| | 24.10 | 11:40 | 10 | All seals were in the water near the coast |
| | 12.11 | 14:30 | 20 | There were 15 seals on the coast and 5 in the littoral zone |
| 22.11 | 11:00 | 40 | About 30 seals were on the coast, in the littoral zone, and a few more seals were in the water | |
| 2020 | 09.02 | 11:20 | 30 | Most of the animals were on the coast |
| | 26.08 | 12:40 | 5 | One seal was seen 1–1.5 km north of Salny Island, and four more were registered in Pitkov Bay |
| | 07.11 | 12:30 | 2 | Two individuals in the water |
| | 11.11 | 11:20 | 4 | In the water |
| 2021 | 18.02 | 13:30 | 20 | All seals were in the water |

Unlike harp seals, bearded seals and ringed seals do not form mass aggregations in the Barents Sea. These marine mammals are recorded throughout the Murmansk coast (mostly single individuals), and they can enter river estuaries and lower reaches [Aars et al., 2016; Ognetrov et al., 2003]. Both species are found in the Kola Bay, but the nature of the encounters is sporadic. There are references to the fact that ringed seals occur at the estuaries of the Tuloma and Kola rivers [Goryaev, 1997].

During our surveys, the bearded seal was encountered twice, both times in summer. Both times, this marine mammal was noted on the outer parts of the cage of MMBI aquatic complex and was at the stage of molting.

We recorded the ringed seal twice in the Sayda Bay. Moreover, according to photographic evidence from eyewitnesses, single individuals lay on the ice at the estuaries of the Tuloma and Kola rivers.

Although the species composition of marine mammals in the Kola Bay is quite diverse [Goryaev, 1997], the species that occur there either regularly or permanently are not as abundant as the species inhabiting the open areas of the Barents Sea. Out of them, there are previously mentioned

animals – the common minke whale, the harbor porpoise, and the grey seal. Most marine mammals enter this water area searching for food; the exception is some pinnipeds which arrange seasonal haulouts there. Comparing the results of our observations and the literature data, we can conclude as follows: over the past two decades, the species composition of marine mammals in the Kola Bay has undergone certain changes, primarily concerning pinnipeds (Table 3). During the entire period of our surveys, the harbor seal, the harp seal, and the beluga whale were not encountered, although in 1996 these species were considered common for the Kola Bay [Goryaev, 1997].

Table 3. Comparison of the species composition of marine mammals recorded during observations and indicated in the literature

| Species | Mentioned in the literature | Recorded during observations in 1996. [Goryaev, 1997] | Recorded during observations in 2011–2021 |
|--|-----------------------------|---|---|
| White-beaked dolphin <i>L. albirostris</i> | – | – | + |
| Killer whale <i>O. orca</i> | + | – | – |
| Harbor porpoise <i>P. phocoena</i> | + | + | + |
| Beluga whale <i>D. leucas</i> | + | + | – |
| Humpback whale <i>M. novaeangliae</i> | + | – | + |
| Fin whale <i>B. physalus</i> | + | – | – |
| Sei whale <i>B. borealis</i> | + | – | – |
| Blue whale <i>B. musculus</i> | + | – | – |
| Common minke whale <i>B. acutorostrata</i> | + | + | + |
| Harbor seal <i>P. vitulina</i> | + | + | – |
| Grey seal <i>H. grypus</i> | + | + | + |
| Harp seal <i>P. groenlandicus</i> | + | + | – |
| Ringed seal <i>P. hispida</i> | + | – | + |
| Bearded seal <i>E. barbatus</i> | + | + | + |

The Kola Bay ichthyofauna includes species that serve as food items for many marine mammals. Out of them, there are juveniles of the Atlantic cod *Gadus morhua* Linnaeus, 1758, the haddock *Melanogrammus aeglefinus* (Linnaeus, 1758), and the Atlantic herring *Clupea harengus* Linnaeus, 1758 which sometimes occurs en masse [Karamushko, 2009]. As noted, during periods of a mass herring migration, there is an increase in encounters of marine mammals. An example is the observation of white-beaked dolphins in the bay waters in 2011: the occurrence of these animals coincided with reports of a mass herring migration. During that period, common minke whales were also observed several times [Zaytsev et al., 2018].

The occurrence of various marine mammals in the Kola Bay waters depends not only on changes in their food supply, but also on environmental processes in other areas of the Barents Sea. Specifically, the regularity of white-beaked dolphins entering the bay in 2011–2017 could result from changes in the distribution of their food items and their pursuit of alternative prey species [Aars et al., 2016]. An increase in the number of observations of the grey seal and its regular seasonal haulouts on Salny Island indicate the restoration of its population in the Barents Sea. This assumption can be supported by the highlights in the work of K. Deryugin [1915] that rich seal haulouts were recorded on Salny Island earlier.

Conclusion. Despite the increasing anthropogenic load, marine mammals continue to enter the Kola Bay waters, *inter alia* during their feeding. Over the past two decades, the occurrence and species composition of coastal marine mammal (primarily pinnipeds) have obviously changed. An increase in the abundance of a predator, the grey seal whose diet may include birds and mammals, can result in serious faunal changes in the coastal areas of the Kola Bay and the entire Barents Sea. In this regard, the relevance of research aimed at monitoring the state of coastal populations of marine mammals on the Barents Sea coast of the Kola Peninsula increases.

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МОРСКИЕ МЛЕКОПИТАЮЩИЕ КОЛЬСКОГО ЗАЛИВА БАРЕНЦЕВА МОРЯ

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Несмотря на то, что публикации, посвящённые морским млекопитающим Баренцева моря, встречаются достаточно часто, актуальные данные об их численности в прибрежных водах Кольского залива довольно скудны. Последняя работа, подробно описывающая этот аспект, датирована 1997 г. В то же время в воды залива заходят в том числе и охраняемые (занесённые

в Красную книгу России) виды морских млекопитающих. Учитывая то, что по мере осуществления проекта «Комплексное развитие Мурманского транспортного узла» антропогенная нагрузка на акваторию Кольского залива и всего мурманского побережья может многократно возрасти, исследования морских млекопитающих, встречающихся в местных водах, приобретают большую актуальность. В работе представлены данные о видовом составе и частоте встречаемости различных видов морских млекопитающих в Кольском заливе, собранные на основе литературных источников и наблюдений авторов.

Ключевые слова: Кольский залив, Баренцево море, морские млекопитающие, охраняемые виды