Grey seals on the Murman coast, Russia: status and present knowledge

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ABSTRACT

Grey seals (*Halichoerus grypus*) are distributed along the entire northern Murman coast in Russia. Breeding sites are located mainly on the Ainov and Seven islands, which belong to the Kandalaksha Nature Reserve. The annual pup production was estimated to be around 800 pups in the early 1990s, and the pup mortality has been observed to be relatively high. The population was estimated to be approximately 3,500 individuals in 1994. Grey seals migrate in small numbers into the White Sea during summer. The grey seal is protected and registered in the Red Books of Russia, Murmansk region and Fennoscandia. The main results of grey seals investigations from 1986 to 2000 are briefly reviewed. There are no recent studies on abundance, seasonal distribution, growth, moulting and feeding of the species.

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INTRODUCTION

The grey seal (*Halichoerus grypus*) occurs in coastal waters of northern Murman (Fig. 1). Local hunting for grey seals has been performed on the Murman coast for many years. N. A. Smirnov did his biological identification of the species in the area of Murman just at the beginning of the 20th century (Smirnov 1903). Seals of this species have many names, both local and scientific. The most commonly used names among residents of the Murman coast were "tevyak" and "zhirovets". In literature, both original and translated names of this species are mentioned: long-muzzled, hump-nosed, dog-headed, horse-headed, pig seal, bristly seal, sea wolf and devyatka (distorted name from "tevyak", nine) (Kondakov 1997).

Studies of grey seal in the northern waters of Russia were initiated relatively recently; information on biology of this species was fragmentary until the end of 1989. Before 1986, some isolated studies containing information on the biology of grey seals on the Murman coast had been published. However, the absence of methodology and systematic character in those works did not permit adequate assessment of the status of breeding colonies. Aspects of biology such as breeding season, moulting and behaviour were not covered (Kondakov 1997).

Investigations of the local fauna, including grey seals, were attempted starting in 1938, when a nature reserve was organized in the area of the Seven Islands archipelago (Fig. 1). During the Second World War and in the subsequent period, however, no studies of grey seals were carried out. In 1960-1980, observers of the Kandalaksha State Reserve did some work on grey seals, generally limited to the territory of the reserve only (the archipelagos of Seven Islands and Ainov Islands, Fig. 1). These pilot investigations were the basis for later dedicated expeditions on grey seals in the 1980s, carried out by V.A. Bychkov and T.Yu. Vishnevskaya, specialists from the All-Union Research Institute of Nature and Reserves (Moscow), in cooperation with scientists from the Murmansk Marine Biological Institute (MMBI) and the Kandalaksha Nature Reserve.

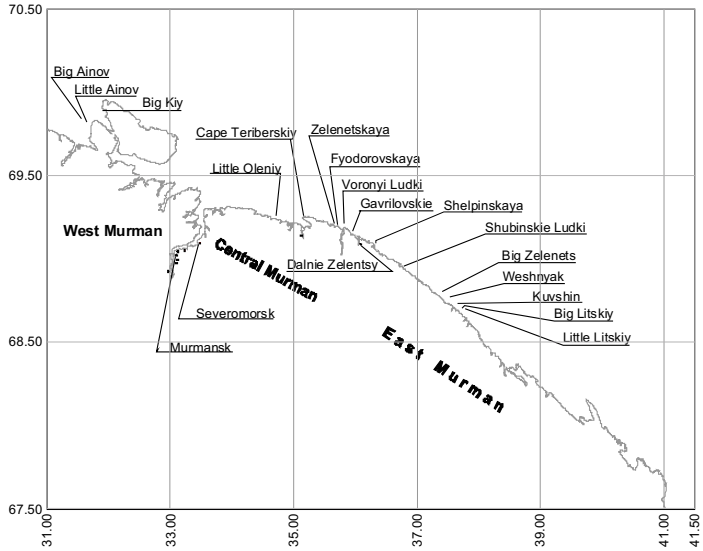

Fig. 1. *Map of the localities mentioned in the text.*

MATERIALS AND METHODS

This brief review is based on published and unpublished data from grey seal studies, conducted at the Murman coast after 1986.

Dedicated investigations of grey seal breeding colonies located on the Murman coast were started in the late 1980s (Vishnevskaya and Bichkov 1987, 1989; Vishnevskaya *et al.* 1988, 1990). In October-December 1986, V.A. Bichkov and T.Yu. Vishnevskaya observed breeding grey seals on the Big Ainov Island. The arrival of animals to the island, their dispersal, behaviour and time on the shore, including the mortality of pups, as well as the duration of lactation were registered. In 1987, an expedition to the grey seal whelping sites on the Murman coast was carried out under the leadership of V.A. Bichkov with the participation of scientists of MMBI, the Kandalaksha Nature Reserve and Murmanrybvod (Murmansk Fish Control and Enforcement Directorate). Descriptions of the breeding colonies were made, and protection measures were proposed.

In the period 1987-1992, grey seal expeditions were carried out annually during whelping or moult by using the MMBI research vessels "Dalnie Zelentsy" and "Pomor", and inflatable motorboats during onshore expeditions. In the breeding periods, pups were counted. In 1991, 1992 and 1994, joint Norwegian-Russian surveys were carried out during the grey seal breeding season (Haug *et al.* 1994, Skavberg 1995). Pups were counted, tagged and staged. Some biological sampling from pups was also carried out. The calculations of number of grey seals in all expeditions were based on total pup counts on the islands. The mortality of pups was determined based on data from long-term observations on Big Ainov and some other islands (Vishnevskaya *et al.* 1990).

In 1995-1998, investigations of grey seals on the Murman coast were more sporadic, generally conducted by MMBI as a part of complex shore expeditions performed mainly during summer on the East Murman coast (Fig. 1). These investigations permitted clarification of some aspects of the summer distribution of the species in the area. The last registrations of grey seals were performed by using an inflatable motorboat along the West Murman coast and part of the East Murman coast in July-August 1998 (Kondakov *et al.* 1998). Subsequently, investigations of grey seals in the Russian areas of the Barents Sea ceased as a result of reduced effort to shore expeditions by MMBI.

RESULTS AND DISCUSSION

Distribution and migrations

In his monograph on the animals of the Kola Peninsula, Pleske (1887) identified grey seals as

inhabitants of the Murman coast, and the White Sea was also included in their habitat. Occurrence of grey seals in the White Sea areas (the Mouth, Mezensky and Kandalaksha Bays) were later confirmed by Vishnevskaya *et al.* (1990) and Kondakov (1997). On 24 September 1993, 5 grey seals were recorded on the Tersky coast of the White Sea, in the Varzuga River estuary (Fig. 2).

At present, grey seals are distributed over the entire northern Murman coast. In the Kola Bay a few grey seals have been observed to occur as far south as the city of Severomorsk. Distribution of grey seals on the Murman coast can be considered as confined to two main areas: the Ainov Islands to the west and the Seven Islands to the east, with the Mouth of the White Sea as the eastern boundary (Haug *et al.* 1994). In summer, the most numerous groups of grey seals were concentrated in the areas of the two mentioned archipelagos. On 29 June 2000, about 100 individual grey seals of different ages were observed during low tide on a haul-out site near Veshnyak Island. In other areas of the coast, both single animals and groups of from 3-5 to 20-40 individuals were observed during summer and autumn. Areas where grey seals were observed to be particularly abundant were islands in the inlets of Shelpinskaya inlet, Zelenetskaya inlet, and the Voronji Ludki islands (Fig. 1).

During the start of the breeding season (November), most grey seals congregate on islands, which serve as breeding sites. On the West Murman coast breeding occurs in the Aynov archipelago (Big and Little Aynov and Big Kiy). The main breeding sites on the East Murman coast are located on islands in the Seven Islands archipelago: Big and Little Litsky and Veshnyak, and to some extent also on the Kuvshin and Big Zelenets islands. Grey seal breeding was also observed on the islands of the Gavrilovsky archipelago, Shubinsky and Voronji Ludki.

In spring, moulting seals were observed on the same breeding islands, as well as on many other small islands along the coast, in particular on the Shubinskie Ludki. On 3 May 1993, about 50 moulting grey seals were registered on the Shubinskie Ludki islands, whereas on 9 May only 3 seals remained in that area. On 4 June 1992, more than 50 grey and harbour

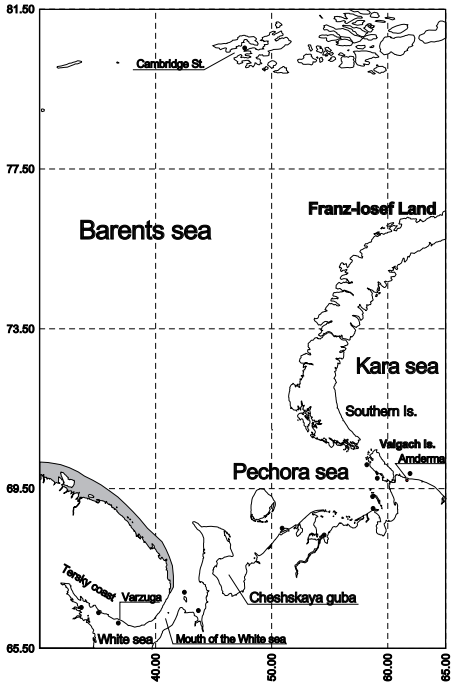

Fig. 2. *Distribution of grey seals in the Russian part of Barents sea and adjacent waters. Shaded area – normal distribution area; dots – single summer observations.*

seals (*Phoca vitulina*) were counted on islands at the entrance of Fedorovskaya inlet.

In 1838, on the expedition of K.M. Bär to the western coast of the Novaya Zemlya archipelago a grey seal cranium was found. Subsequently, speculations on possible habitation of grey seals on the Novaya Zemlya coast (Fig. 2) was expressed in the scientific literature (Simashko 1851, Brandt 1856). At present, there are no new, reliable data on the presence of this species on the Novaya Zemlya, but grey seal occurrence in warm years at the western coast of the Yuzhny Island of the Novaya Zemlya archipelago cannot be excluded. In August 1934, a large grey seal male was shot in the southern part of the Cambridge Strait in the Franz Josef Land archipelago (Tsalkin 1936). This is the only observation of this species so far to the north (Kondakov 1997).

The summer of 1976 was unusually warm, and grey seals were observed in the Pechora Sea, in the Kara Sea nearby the Amderma settlement, and, based on unconfirmed information, in the Cheshskaya Guba in the southeast-

ern Barents Sea (Kondakov 1997). In August 1988, grey seals were registered nearby Vaigach Island (Kalyakin and Muzhchinkin 1990). There is also some information on rare observations of grey seals in the southeastern Barents Sea and in the Pechora Sea after this, and it appears that some occurrence of grey seals in these areas is possible in warm summers.

According to the available data from northern Russia, grey seals do not migrate in any special direction and they seem to return to the islands where they were born for breeding (Vishnevskaya and Bichkov 1989). It was also pointed out that young animals tend to migrate long distances. When comparing data on summer and winter occurrence of grey seals on the Murman coast, some migration to the west was suggested during spring and summer.

Recent Abundance

Presumably, the numbers of grey seals have always been rather small on the Murman coast. The hunting level was low until protection was introduced. In the 1980s, when data on this species became more available, it was suggested that the population was slightly increasing (Vishnevskaya *et al.* 1988).

In 1961, scientists of the Kandalaksha Nature Reserve did the first count of animals during the breeding season on the Seven Islands archipelago. Based on 76 recorded pups, a total production of 90-100 pups was estimated for this archipelago (Karpovich *et al.* 1967). In 1963, 93 pups were counted on the Big Aynov island, whereas about 10-20 females were apparently breeding on the Little Aynov island. The number of breeding females on the entire Murman coast was suggested to be about 500-800 individuals (Karpovich *et al.* 1967, Geptner *et al.* 1976). Data from long-term (1963-1983) observations of grey seal breeding on the Big Aynov island indicated a total population of more than 1,500 seals (pups and 1+ animals) on the West Murman coast (Chemyakin and Tatarinkova 1990). Results from expeditions carried out in October-November 1986 indicated a total of 700-800 seals on the Big Aynov island alone (Vishnevskaya and Bichkov 1987).

Based on the result from an expedition in 1987 (Vishnevskaya *et al.* 1990), it was suggested that 400-500 grey seals pups were born annually in the area of the Seven Islands archipelago and that 300-350 pups were born on the Aynov islands. The total grey seal population on the Murman coast was estimated to be approximately 3,000 – 3,500 individuals. Later pup counts during the breeding season (Table 1) seem in general to confirm this. At present, 3,500 grey seals on the Murman coast are most likely a minimum estimate.

Table 1. Maximum counts of grey seal pups on the Murman coast, Russia, based on ship-board surveys in the breeding seasons in 1987, 1990, 1991 and 1994 (from: Vishnevskaya *et al.* 1988, Haug *et al.* 1994, Skavberg 1995).

Region	Islands	1987 13 Nov.-15 Dec.	1990 20 Nov.-13 Dec.	1991 15 Nov.-4 Dec.	1994 18-24 Nov.
W Murman	Big Aynov			125	110
	Little Aynov			118	115
	Big Kiy			43	33
	Little Kiy			0	
E Murman	Gavriovskiy archipelago	2			
	Shubinskie Ludki	1			
	Voronji Ludki				3
	Big Zelenets	4		2	
	Veshnyak	30		45	31
	Kuwshin			2	1
	Big Litskiy	195	197	23	147
	Little Litskiy		5		

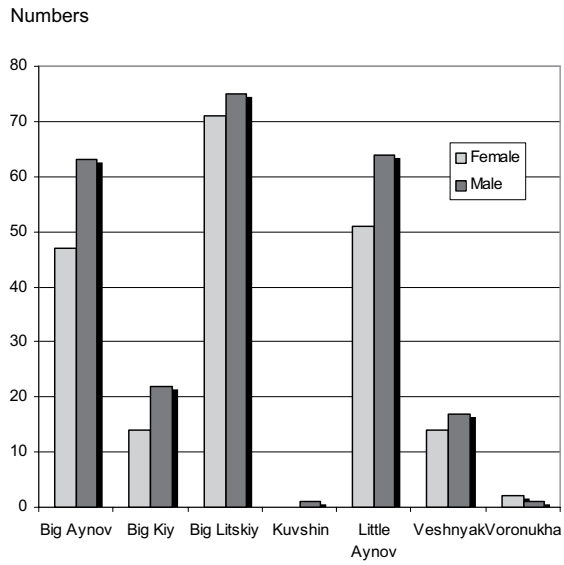

Fig. 3. *Sex distribution of grey seal pups on islands on the Murman coast, 18-24 November 1994 (data from Skavberg 1995).*

Counts of grey seals along the Murman coast during summer (June-August) have been carried out sporadically, and generally covered only small areas of the coast. In 1998, grey seal registrations were carried out by using an inflatable motorboat along an extended area of the Murman coast, and the results demonstrated that grey seals were distributed more or less along the entire coast (Kondakov *et al.* 1998).

According to Kondakov (1997), the grey seal population on the Murman coast has the potential to increase the breeding colonies, but this process can be restrained by anthropogenic factors.

Biology and breeding behavior

Grey seals are characterized by considerable biological plasticity. Many aspects of the species' biology are variable: the breeding period of each subpopulation lasts for 40-50 days, but for the entire species breeding is extended from September to May. Both ice, land and coastal islands are used as breeding sites. Along with the expressed polygamy, cases of monogamy were registered, especially for seals breeding on the ice (Vishnevskaya *et al.* 1988).

The annual cycle for grey seals consists of 5 periods (Vishnevskaya and Bichkov 1989):

- pre-breeding period, which takes place close to breeding sites;
- breeding period (parturition and copulation); on the Murman coast grey seals breed only on the islands;
- post-breeding period, when seals are dispersed close to moulting sites;
- moulting period (spring concentrations), animals keep close to islands and go onshore for moulting;
- a period of summer migrations.

On the Murman coast, grey seals breed in November-December. Available data (Karpovich *et al.* 1967, Geptner *et al.* 1976) seems to indicate a commencement of the breeding period on the Seven Islands archipelago during the first 10 days, and in some cases in the second 10 days, of November. The breeding period terminated by 10-15 December. Similar terms of breeding were observed for seals in the Aynov archipelago. The pupping peak occurred by the end of November. The duration of the grey seal breeding season on the Murman coast constitutes 30-49 days.

In 1988, the breeding season was observed to last from 4 November - 4 December, and the peak of pupping occurred around 28-30 November (Vishnevskaya *et al.* 1988). In another survey in 1994 (Skavberg 1995) it was noted that the number of newborn males was higher than females (Fig. 3), and that two pupping peaks occurred within an interval of two weeks (Figs. 4 and 5).

In the breeding season, grey seals on the Murman coast were observed both in pairs of males-females and males with several females. Harems

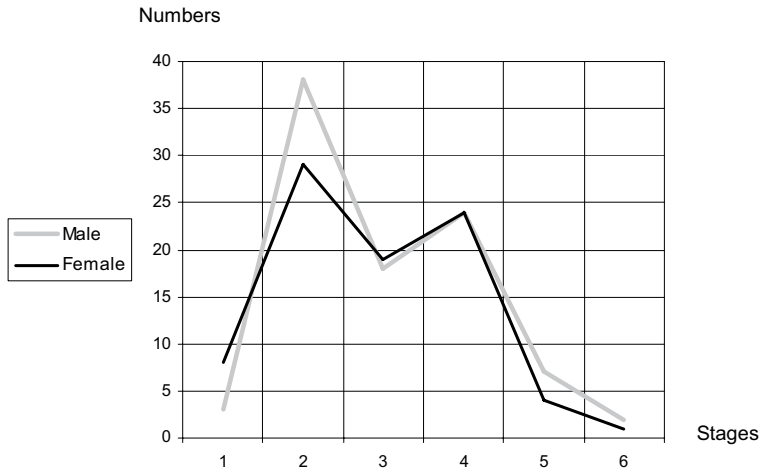

Fig. 4. *Age stages (for definitions, see Kovacs and Lavigne 1986) of grey seal pups on the Big Litskiy and Veshnyak islands 19-21 November 1994 (data from Skavberg 1995).*

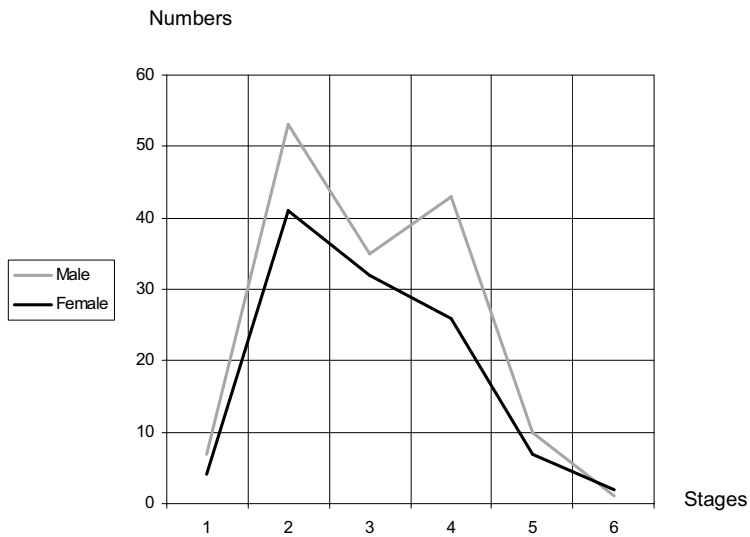

Fig. 5. *Age stages (for definitions, see Kovacs and Lavigne 1986) of grey seal pups on the Big Ainov, Little Ainov and Big Kiy islands 22-27 November 1994 (data from Skavberg 1995).*

were observed to be the main structural unit on Big Litskiy Island on 10 November 1992. Two males had harems of up to 6 females, three males had two females each, as well as male-female pairs being present. Young males (subdominants) usually stayed near the harems and made attempts to approach the females. The dominant male, however, protected the females and did not permit younger males access to the females. Dominant males were observed to chase younger males up to 100 m. Dominant males attempted to approach the females for copulation during more or less the entire breeding season, however with mixed success. On Big Litskiy Island in 1992, it was also observed that females might initiate the mating process. Copulation took place on the shore and usually lasted for 3-4 minutes. If pupping took place in the littoral zone during low tide, pups were observed to be able to crawl further up shore, escaping from the rising tide even a few hours after the birth (Vishnevskaya *et al.* 1990). Females were observed to be very aggressive to other females and pups. Some females were observed to leave the pup and go into the sea, presumably for feeding purposes, sometimes being absent for rather extended periods. If pups tried to follow their mothers into the water, it was observed that the mothers attempted to stop them by flapping one flipper against the side of the belly. Most females, however, stayed on the shore close to their pups during most of the nursing period, and only went into the water for shorter periods (Vishnevskaya *et al.* 1990).

The suckling period was 12-18 days (Vishnevskaya *et al.* 1990). After suckling is completed, the females leave their pups. Usually, the weaned pups would stay for some time on shore during the final stages of moult, but they might also leave the whelping ground before they have completed moulting. Normally, moulting is completed at a pup age of 25-30 days, but moulting has been observed to be delayed in underfed pups (Vishnevskaya *et al.* 1990). On Little Litsky island, one moulting pup was observed as late as 19 March 1992.

During the breeding season, adult seals usually stay within the 50-100 m depth coastal zone. Both adult seals and older pups have been observed to move up to the top of the islands, sometimes crossing the islands entirely.

The mortality rate of grey seal pups has been observed to be high during the breeding season on the Murman coast. On Big Aynov island in October-December 1986, Vishnevskaya and Bichkov (1987) observed a pup mortality in the beginning of the whelping period of 30%, in the period from 7 to 18 November the mortality was 8.2%, and during the peak of whelping (the second half of November) it was more than 20%. The total pup mortality during the entire breeding season was calculated to be 17.2%. This high mortality was mainly due to bad weather (storms) during the early whelping season. Pups were washed down to the sea from unsuitable whelping places. The mortality rate of pups on the rocky whelping sites was much higher than on flat and snowy ground. Pup mortality due to aggressive attacks from other females with pups was also observed.

Grey seal feeding on the Murman coast is poorly studied. During the period 4-6 weeks after birth, the seal pups start to hunt on their own. In this period (December-January), there are no mass concentrations of fish in the coastal zone of Murman. The main food in this period is probably invertebrates and bottom fish species such as Cottidae, Zoarcidae and Liparidae (Vishnevskaya *et al.* 1990). During spring-summer, grey seals have been observed to hunt lumpsucker (*Cyclopterus lumpus*).

Management

Grey seals on the Kola Peninsula is one of the more poorly studied species of Pinnipedia in Russia. The species has been included in the Red Books of the USSR and the Russian Republic. In 1970, a ban was introduced against game hunting, and in 1975 the commercial hunting was stopped (Sokolov 1986, Kondakov 1997). In the Murmansk Region the species is entirely protected and listed in the Red Book of the Murmansk Region (Kavtsevich 2003). The prohibition of hunting for grey seals in the territory of the Kandalaksha Reserve has played an important role in the protection of grey seals in Russian waters. For a period of approximately 25 years (1965-1990), their numbers may have increased to a level as much as 3 times higher than at the start of this period (Kondakov 1997). This has led to a rapid increase in grey seal abundance in colonies close to the settlements that used to hunt the seals on the East Murman coast during the 1960s. The last hunting of grey seals on the Aynov Islands was in 1970-1973. On the East Murman coast, only a few seals have been taken by hunters. Grey seal investigations on the Murman coast were significantly decreased after 2000, and no new data on seal abundance and biology are available.

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