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Dynamics of the Abundance of Seagulls (Charadriiformes: Laridae) in the Northern Tatar Strait

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Abstract—Field observations on colonies of seagulls (Laridae) were carried out annually on islands of the northern Tatar Strait during 2001–2008. A general tendency towards a reduction in the number of nesting birds was observed on all islands surveyed. The anxiety factor and direct destruction of bird eggs and fledglings caused the whole or the greater part of colony to migrate to “quieter” sites on islands or the continental coast. The replacement of *Larus crassirostris* by *L. schistisagus* was observed in sites where the two species nest in neighborhood. Nesting specimens of *L. schistisagus* were found on islands of Lake Bolshoe Kizi, suggesting that the birds are in search of alternative nesting places that are less accessible to humans and predators.

Keywords: seabirds, colonial nesting birds, Laridae, Tatar Strait, Chikhachev Bay.

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Seagulls, like all marine colonial birds, play a noticeable role in the oceanic biocenoses. They are also important as indicators of productive zones of the sea and as shore scavengers. In the last decade, extensive accounts of seabirds of the Sea of Okhotsk and the Tatar Strait have been published [5, 8]; nevertheless, this region still remains inadequately studied. Thus, some areas of the coastline or some islands have not been visited by ornithologists, or otherwise there is only incomplete and fragmentary information concerning the abundance and species composition of seabirds in such areas. Moreover, observations on the dynamics of abundance of previously known colonies of seabirds are needed to reveal the changes that have been caused by natural processes and human activity.

Starting in the 1930s, the coast of the Tatar Strait was turned into a defense line with a specific regime of secrecy. Only in 2002, small boats of the local people were allowed to sail, without hindrance, over Chikhachev Bay and the Tatar Strait. Until that time, a strict border regime defended the coastal zone against trespassing. In the last decade, economic activity has expanded in the northern Tatar Strait. Here, the laying of gas and oil pipelines from Sakhalin Island and the construction of oil-loading complexes and oil-processing plants are now in progress.

In 2001 these facts stimulated us to survey the previously unvisited Chikhachev Bay and subsequently to perform annual observations on the status of bird colonies, as well as counts of the numbers of larids on the islands in the Chikhachev Bay and on the Glazenap

and Popov islands situated northward [2, 3]. In 2008, we surveyed Ushkanii Island on Lake Bolshoe Kizi (Fig. 1).

BRIEF CHARACTERIZATION OF STUDY AREA

Ustrichnyi Island is situated in Chikhachev Bay. The closest distance to the mainland is 2.3 km, to De-Kastri (urban-type settlement) 4.5 km. The area of the upper terrace is 622137 m². The greatest length is 330 m and the greatest width is 190 m. Almost the whole of the island is covered by a forest massive. Its rock cliffs are up to 100 m high.

Bazaltovyi Island is situated in Chikhachev Bay. The shortest distance to the mainland is 800 m, to De-Kastri 2.1 km. The area of the upper terrace is 101545 m². The greatest length is 470 m and the greatest width is 390 m. The upper terrace is covered by burnt fallen wood. Its rock cliffs are up to 20 m high.

Glazenap Island is situated south of Cape Nevelskoi. The distance to the mainland is 650 m and the distance to the nearest settlement (Vidanovo) is 12.6 km. The strait depth at the lowest low tide is 0.5 m. The area of the upper terrace is 34090 m². The greatest length is 260 m and the greatest width is 170 m. Almost the whole of the island is covered by a forest massive. Its rock cliffs are up to 70 m high.

Popov Island is situated in the southern Nevelskoi Strait. The distance to the shore is 2.8 km and to the nearest settlement (Nigir'), 9.5 km. The area of the

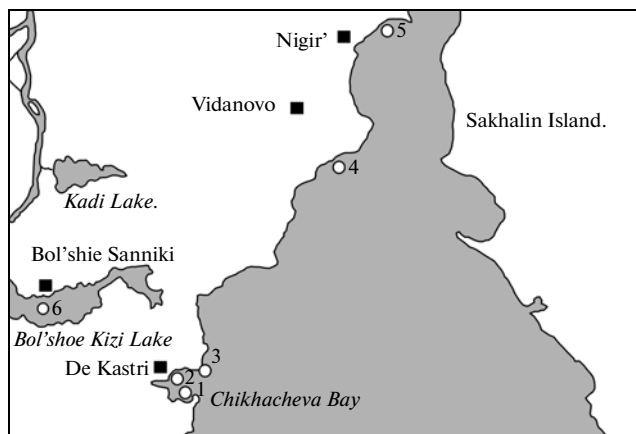


Fig. 1. A schematic map of the study area. 1, Ustrichnyi Island; 2, Bazaltovyi Island; 3, Cape Davydov; 4, Glazenap Island; 5, Popov Island; 6, Ushkanii Island.

upper terrace is 28 305 m². The greatest length is 210 m and its greatest width is 100 m. Its rock cliffs are up to 10 m high. The island is covered by grass and bush vegetation.

Ushkanii Island is situated in Lake Bolshoe Kizi. The distance to the shore is 280 m; the distance to the nearest settlement (Bolshie Sanniki) is 2.7 km. The island is mentioned in a work of Babenko [1]; according to this author, the island in 1983 measured 250 × 70 m. Because of a decrease in the depth of the Amur River, the island increased in area to 61 904 m². Its greatest length is 650 m, width 160 m. The island is stony; it rises above the lake level by 5 m. In the center of the island is a forest (250 × 70 m) of alder and willow.

Westward, at 840 m from Ushkanii Island, there is a pebbly sand islet with an area of 23 809 m². Its greatest length is 430 m and its greatest width is 60 m.

RESULTS AND DISCUSSION

Black-headed gull *Larus ridibundus*. On Lake Bolshoe Kizi, the density of birds during the nesting period was 1.7 to 8.2 specimens per 10 kilometers of the boat route. The nearest known colony of black-headed gull numbering 50 pairs was located in the vicinity of Sofiisk [1].

On June 10–11, 2008, a colony of 50 pairs was observed on Ushkanii Island, Lake Bolshoe Kizi. Out of 47 nests that we found, 6 were empty, 14 nests had 1 egg (in each), 19 nests had 2, and 8 nests had 3 eggs. On a nearby islet, there was a numerous colony of 260 pairs. Out of 260 nests recorded, 31 nests had 1 egg (in each), 67 nests contained 2 eggs, 161 nests had 3 eggs, and one nest had 4 eggs. In two cases, eggs of the common tern were found in the nest of black-headed gull.

Slaty-backed gull *Larus schistisagus*. This bird nests on Ustrichnyi and Bazaltovyi islands in Chikhachev Bay, as well as on Glazenap and Popov islands.

A colony of slaty-backed gulls on Ustrichnyi island was found in 2002. It displaced the black-tailed gull colony and occupied the dominant raised areas of the island and rocky ledges of the southeastern and north-western shores [2, 4]. The number of slaty-backed gulls was 650–700 pairs in 2002; this was reduced to 400 pairs in 2008 (Fig. 2A).

On Bazaltovyi Island, in 2001, the slaty-backed gull colony was located in the southern part of the island and numbered up to 300 pairs [2]. By 2006, the abundance of slaty-backed gull had decreased to 110 pairs, and the colony occupied two sites with 100 pairs in the southern and 10 pairs at 120 m from them in the southeastern part of the island. In 2007, one more colony of 20 pairs appeared on the eastern side, 320 m away from the southeastern colony. The number of nesting birds in the two neighboring colonies was 80 pairs (60 pairs in the southern part and 20 pairs in the southeastern part).

During a survey of the island on June 12, 2008, all three colonies were recorded: the southern colony with 40 pairs, the southeastern one with 90 pairs, and the eastern with 25 pairs (Fig. 2B).

Numerous colonies of slaty-backed gull existed on rocky ledges at Cape Davydov (Chikhachev Bay) and on stone shore taluses to the north of the cape. The colony of 700–800 pairs, known since 2001, disappeared because of explosive work in a quarry on Mount Davydov in 2005. An attempt to reneest in this location in 2006 (30 pairs) was unsuccessful. In 2007 and 2008, no nests of slaty-backed gull were found. The formation and disappearance of the colony of 100 pairs to the north of Cape Davydov in 2002 can be considered as an unsuccessful attempt at searching for quieter sites to nest.

On Glazenap Island, in 2001–2003 the number of nesting pairs of slaty-backed gull reached 3000. In 2006 and 2008, the number of pairs decreased to 150 and 150–200, respectively. One of the main reasons for the reduction in the abundance of the slaty-backed gull may be predation by a bear, which came to the island at great low tides and lived there for weeks, eating egg clutches and fledglings of nesting birds. Its traces on the island were noticed in 2006 and 2008.

During a survey of Popov Island on June 15, 2003, a slaty-backed gull colony consisting of 2000 pairs was recorded. Nine hundred and twenty nests were found, of which 829 were without clutches, 63 nests with 1 egg (in each), 26 nests with 2, and 2 nests with 3 eggs. In 2007, the total number of nesting pairs decreased to 1000 pairs. On June 16, 2008, 600 nesting pairs were found on the island; 50 nests contained only 1 fresh egg (in each). Evidently, empty nests and nests with 1–2 eggs were the result of regular visits of egg collectors, because by this date the slaty-backed gull should incu-

bate complete clutches (3 eggs in 70% of nests) [7]. The main reason for the sharp reduction in bird abundance is the active, practically everyday, collection of eggs by the local people, which begins on the first dates of June and does not allow the nesting birds to successfully hatch eggs and raise offspring. Nests containing 1–2 eggs are ravaged by egg collectors, and only the birds that have laid 3 eggs (during storms or owing to concealment of the nest) have a chance to reproduce. Clutches of two eggs are believed to be incomplete and hence the egg collectors gather 1 or 2 eggs from such nests. If the nest contains 3 eggs, they are thought to be unsuitable as food because of the developing embryos.

During a survey of Ushkanii Island and a neighboring islet (Lake Bolshoe Kizi) on June 10–11, 2008, three nests of slaty-backed gull with clutches of respectively 2, 3, and 3 eggs were found. The distance to the nearest slaty-backed gull colony in Chikhachev Bay is 35 km.

Black-tailed gull *Larus crassirostris*. This species nests on Ustrichnyi, Bazaltovyi, and Glazenap islands.

In August 2001, a 300-pair colony of black-tailed gulls was found in the northeastern part of Ustrichnyi Island. The total number of birds in the colony in this season was estimated as 400–500 pairs [2]. In May 2002, this colony was forced out by slaty-backed gulls into the grass-overgrown southwestern slope of the island; it consisted of 380 nests. In June, there were 520 nests. In 2003 (20 June), 415 nests were recorded, of which 234 nests were without clutches; 74 nests with 1 egg in each, 98 nests with 2, 7 nests with 3 eggs, and 2 nests with nestlings were found. During a survey of the island on June 12, 2008, 114 nests were found: 110 nests without clutches and 4 nests with 1 egg (in each). This area of the island is a permanent nesting site of the black-tailed gull, although the number of breeding pairs markedly decreased (to 100–150 pairs) over these years (Fig. 2A). The more than 2-fold decrease in the number of nesting pairs of black-tailed gull can be attributable to frequent visits of the egg collectors.

On Bazaltovyi Island, the number of nesting seagulls in 2001 was 20 pairs. In 2002–2006, no nests of black-tailed gull were found on this island. Colonization of the northeastern part of the island by black-tailed gull was observed in 2007 and 2008: 7 and 50–60 pairs, respectively (Fig. 2B).

On Glazenap Island, the black-tailed gull did not nest in 2001–2003. A survey of the island in 2006 revealed 830 nesting pairs, and in 2008 there were 450–500 pairs. Nesting grounds on the upper terrace, where the bear grazed, were abandoned by the slaty-backed gull and occupied by black-tailed gulls, which were forced out of Popov Island at about the same period of time. The slaty-backed gulls migrated to cliffs, ledges, and kekurs inaccessible to predators.

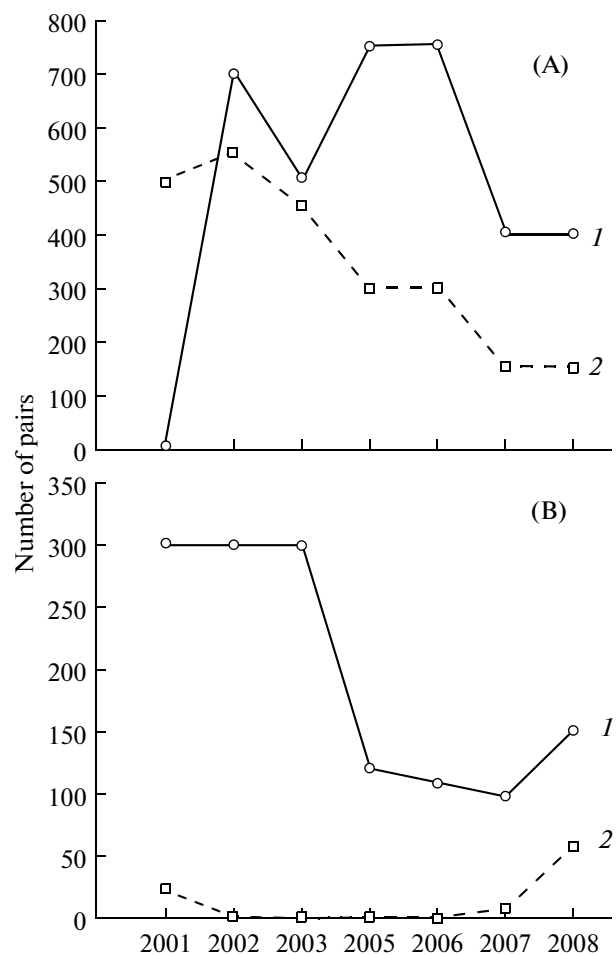


Fig. 2. Dynamics of abundance of slaty-backed (1) and black-tailed (2) gulls on Ustrichnyi (A) and Bazaltovyi (B) islands.

Previously, the largest colony of black-tailed gulls, consisting of 600–700 pairs, existed on Popov Island [8]. During a survey of the island, we found 20–40 nesting pairs in 2003, 1 pair in 2007, and no one nesting pair of black-tailed gulls in 2008. Very likely, it was replaced by slaty-backed gulls; the disappearance of the black-tailed gulls may also be due to the anxiety factor and egg collection.

Common tern *Sterna hirundo*. On Ushkanii Island, the colony of common tern in 1983 numbered 15 pairs [1].

During survey of this island on June 10–11, 2008, a tern colony consisting of 550–600 pairs was found. Out of 482 nests we recorded, 18 nests lacked egg clutches, 62 nests had 1 egg (in each), 139 nests had 2, 260 nests had 3, and 3 nests had 4 eggs. On a neighboring islet a colony of 140–150 pairs was found. A total of 132 nests were found, of which 27 nests had 1 egg (in each), 31 nests had 2, and 74 nests had 3 eggs.

Little tern *Sterna albifrons*. On Ushkanii Island (Lake Bolshoe Kizi), in 1996 and 1999, the colony consisted of 4–5 pairs [1].

During survey of Lake Bolshoe Kizi and Ushkanii Island on June 10–11, 2008, a little tern colony of 13 pairs was found. Two nests out of the 13 nests found had clutches of 1 egg, 3 nests had 2, and 8 nests had 3 eggs (in each). Another eight pairs were found nesting on a neighboring islet. Two nests had clutches of 1 egg, one nest had 2, and 5 nests had 3 eggs (in each). Data on the egg size of the Far Eastern little tern are lacking; therefore, we find it necessary to provide them. The egg measurements ($n = 44$) were $29.85\text{--}33.97 \times 22.97\text{--}24.06$ mm, with an average 31.63×23.55 ; the masses of eggs from one clutch (g) were 8.3, 9.1, and 9.3; the ratio of incubated eggs was about 25%.

Thus, there was a tendency towards a reduction in the number of nesting larids on all islands surveyed along the seacoast of the northern Tatar Strait.

The redistribution of slaty-backed and black-tailed gulls between the islands of Chikhachev Bay, as well as between Glazenap and Popov islands is, in our opinion, attributable to two causes. A part of the birds (probably, young) are periodically crowded out of colony as the number of birds in the colony reaches a particular level. (2) The anxiety factor and direct destruction the egg clutches and/or fledglings (by egg collectors or through explosive work, or in some cases, predation by bear) force the whole or a considerable part of the colony migrate to quieter islands or places on the mainland. However, despite the marked decline of bird abundance, larid colonies on islands of the northern Tatar Strait continue to exist. All known seagull populations on the coast of the Tatar Strait (Davydov, Lobasty, etc.) disappeared within a short time period.

Our studies showed a competition for nesting sites between the slaty-backed and black-tailed gull. When these species nest in a neighborhood (Ustrichnyi, Bazaltovy, Glazenap, and Popov islands), the slaty-backed gull forces out the black-tailed gull into areas that are less convenient for breeding. We note that the Nevelskoi Strait is the northern limit of the breeding range of black-tailed gull and its center is found on islands and the coast of the Sea of Japan. The center of abundance for the slaty-backed gull during the reproductive period is the Sea of Okhotsk [8]. Such competitive relationships have been observed in cooccurring colonies, e.g., on Moneron Island [6]. In addition,

eggs and nestlings of black-tailed gull are food items of the slaty-backed gull [7, 9].

The discovery of breeding slaty-backed gulls on the islands of Lake Bolshoe Kizi is indicative of the search for new nesting areas that are less accessible to human and predators. This fact may also suggest the beginning of a possible expansion of the range of large seagulls into the valley of the Amur River. Colonization of unusual breeding sites on spits of land and islands of the northeastern coast of Sakhalin Island has been reported. Here, over the last 25 years large seagulls colonized a 150-km stretch of the seacoast [4].

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