

Fauna and population of non-Passerine birds in the lower reaches of the Bolshaya Rechka River (Altai Territory, Bolsherechensky reserve)

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The purpose of this paper is to provide additional information on the non-Passerine bird fauna and populations in the Bolsherechensky Nature Reserve, specifically within the Bolshaya Rechka River valley. Located in Altai Krai, the reserve occupies a typical territory of the Upper Ob forest massif. Protecting the habitats of rare and endangered bird species is one of the primary goals of the reserve. However, despite previous studies, our understanding of the avifauna and bird populations remains insufficient. To address this, we conducted bird surveys in the reserve during spring and summer of 2012, 2013, 2017, and 2021, specifically within the Bolshaya Rechka River valley. The results revealed that the summer breeding community of non-Passerine birds in the Bolsherechensky reserve consists of 48 species from 18 families and 12 orders. Additionally, we discovered 11 rare and endangered bird species previously unrecorded in the reserve. In particular, seven of these species lack specific distribution information in the latest regional Red Data Books, including the Black stork (*Ciconia nigra*), Oriental honey buzzard (*Pernis ptilorhynchus*), Peregrine falcon (*Falco peregrinus*), Red-footed falcon (*Falco vespertinus*), Common wood pigeon (*Columba palumbus*), Eurasian pygmy owl (*Glaucidium passerinum*), and European bee-eater (*Merops apiaster*). In general, our study significantly improves our knowledge of the non-Passerine bird fauna and population of non-Passerine birds in the lower reaches of the Bolshaya Rechka River within the Bolsherechensky Nature Reserve. The findings are valuable for the improvement of biodiversity protection measures.

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Keywords

Avifauna, bird, population, Altai Krai, Upper Ob forest massif, Bolsherechensky Nature Reserve

Introduction

The increasing development of the Upper Ob forest massif in Altai Krai through forestry, agriculture, and tourism has led to changes in natural complexes and consequent impacts on the avifauna (Poyarintsev et al. 2016; Vazhov et al. 2021; Demidovich et al. 2021). Specially protected natural areas, such as wildlife sanctuaries, are established to conserve pristine areas of nature and therefore necessitate research. Birds play a crucial role in forest ecosystems, as they are highly responsive to environmental changes and can serve as valuable bioindicators of ecosystem health (Vazhov et al. 2021; Kovaleva et al. 2021). However, the avifauna in some specially protected natural areas of Altai Krai, such as the Bolsherechensky State Nature Reserve, has not been adequately studied (Fig. 1). Previous studies have provided limited information, consisting mainly of scattered bird sightings without specific location details or abundance estimates (Chupin, Petrov 2005; Zakaznik 2009; Vazhov 2015). Even the regional Red Data Book lacks sufficient information on rare bird species in the reserve (Red Data Book 2016).



Figure 1. Location of the Bolsherechensky State Nature Reserve.

Given that the distribution, abundance and adaptive abilities of birds are greatly influenced by habitat transformation and changes in food availability (Vazhov 2015; Matsyura Zimoraeva 2016; Vazhov et al. 2022d), it is crucial to conduct further studies on the fauna and bird populations of the Bolsherechensky Reserve. Therefore, the objectives of our study were to clarify the territorial distribution and species composition of birds in the Bolshaya Rechka River valley (within the Bolsherechensky Reserve) during the summer period and to determine the abundance of non-Passerine bird species.

Materials and methods

The Bolsherechensky State Nature Reserve was established in 1973 and is located in the Troitsky District of Altai Krai. Covering an area of 33.6 thousand hectares, its main objectives include preserving the natural complexes of the Upper Ob forest massif, restoring the beaver population, and protecting rare birds such as the black stork and white-tailed eagle (Zakaznik 2009; SV Vazhov, VM Vazhov 2021).

The reserve is situated within the ancient floodplain of the Ob River and its first floodplain terraces. The hydrosystem comprises the right tributaries of the Ob River and floodplain lakes. The Bolshaya Rechka River, which originates in the vicinity of the village of Gornovoye, is the main and largest watercourse. It spans a length of 258 km and has a catchment area of 4000 km². During spring floods, the water level can rise to 3 meters (Bolshaya Rechka 2022).

In terms of vegetation, pine forests dominate high ridges and hillocks, while depressions are covered with birch, aspen, and mixed stands. Forest meadows, grassy and peat bogs, as well as lakes, can also be found in the area. The primary habitats in the reserve consist of mixed pine forests and shrubs, open forest areas with extensive glades, and watering grounds with wooded banks of watercourses and water bodies.

Fieldwork was carried out at the Bolsherechensky Wildlife Refuge during the spring and summer seasons 2012, 2013, 2017, and 2021. In 2012, observations were made along automobile and hiking routes from April 24 to July 17, covering the vicinity of Varlamenskoye, Teleutskoye, and Sredneabrashkino lakes, as well as the villages of Listvyanka and Chausovo (Vazhov 2015). Rafting trips were carried out in 2013, 2017, and 2021 along the Bolshaya Rechka River, covering different sections of the river and totaling distances of 59, 80, and 59.3 km, respectively. The areas surveyed during these expeditions ranged from approximately 17.7 km² to 24 km² (Fig. 2).

Birds were counted using the standard route count methodology, with observations made within an unlimited observation band. Binoculars with optical image stabilization were used, and all birds encountered were recorded, including the distance from the observer to the bird at the time of recording (Bibby et al. 1998; Karyakin 2004; Ravkin 2008). The density calculations were based on the average detection range and species abundance was estimated using these densities. The A.P. Kuzyakin point scale of abundance was used for species description (Kuzyakin 1962). Nest sites were recorded using GPS coordinates and analyzed using ArcView software. Radial trips were made to count birds in the river valley and field materials, literature, and information resources were used for data analysis and species identification (Stepanyan 1990; Ryabitsev 2001; Koblik et al. 2006; Ryabitsev 2014a; Ryabitsev 2014b).

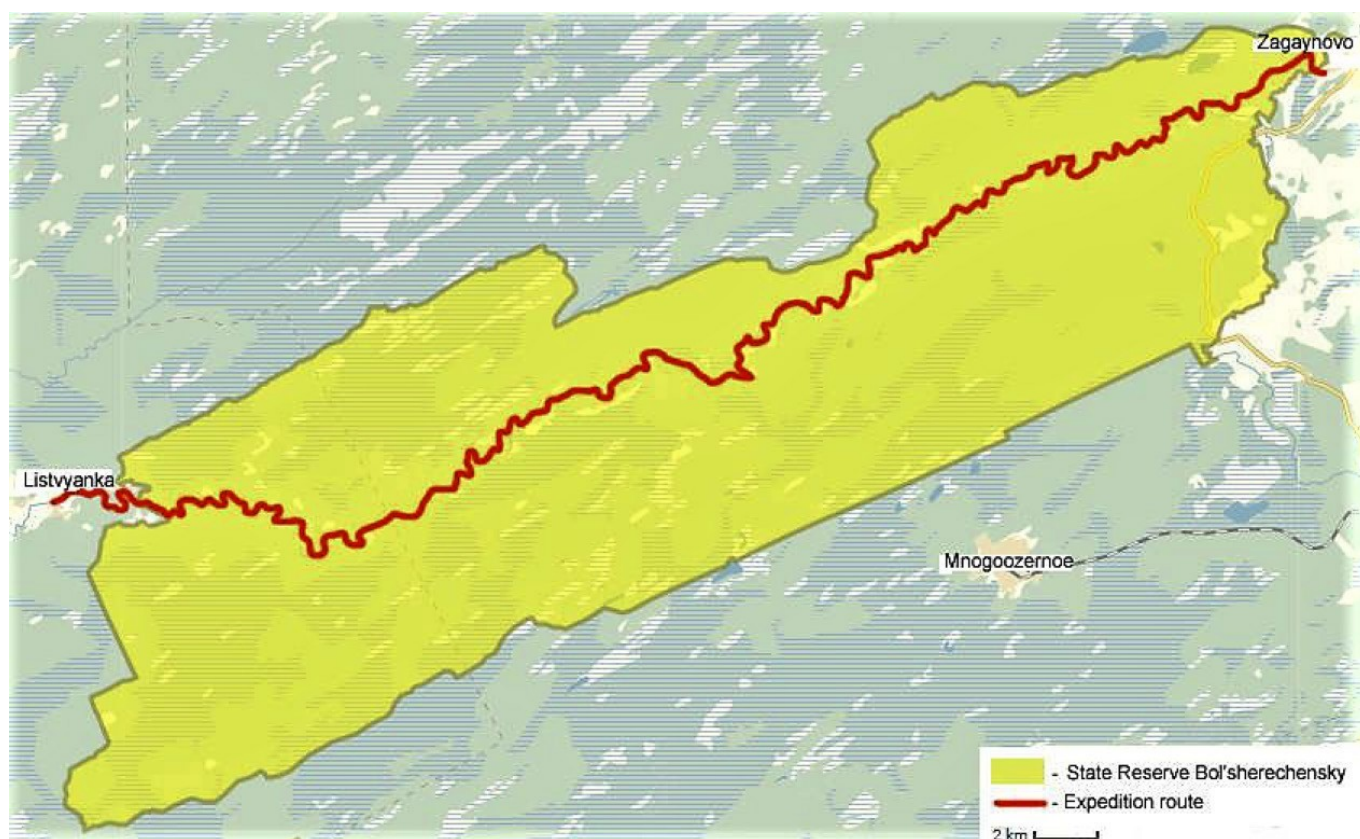


Figure 2. Expedition route scheme.

Results

Below is information on the fauna and bird population, except for passerines, in the lower reaches of the Bolshaya Rechka River within the Bolsherechensky Reserve. We also summarize the information about bird species listed in the Red Data Books.

CICONIIFORMES

Ardeidae

1. Gray heron *Ardea cinerea* (Linnaeus, 1758). Rare species. In 2013, the density was 0.06 indiv/km². On 1 June 2017, two individuals were observed along the route and a single bird was also observed near the village of Chausovo, moving northward. The density was 0.17 indiv/km². The average density for all years was 0.01 indiv/km². Based on these data, it can be assumed that 1 to 3 individuals of grey herons inhabit the Bolshaya Rechka valley within the reserve.

Ciconiidae

2. Black stork *Ciconia nigra* (Linnaeus, 1758). Rare species. The bird was observed in 2013 on 5 and 9 August in the morning at the overnight site, with a density of 0.11 indiv/km². On 27 May 2017 a stork was seen against the mouth of the Borovlyanka River, on 30 May 30 two birds were seen on the route and one bird on the same day at the overnight stay, on 1 June 01, 2017 a black stork flew from the mouth of the Listvyanka River in the direction of the village of Chausovo. Chausovo village. The density was 0.28 indiv/km². A pair of storks was seen on 17 July 2021 during a route survey. The birds were feeding in shallow water. Black Storks flew into the forest when they saw boats. Density was 0.11 indiv/km². The average density for all years was 0.17 storks/km². Based on these data, the number of black storks in the Bolshaya Rechka valley within the reserve is 2-5

individuals.

ANSERIFORMES

Anatidae

3. Mallard *Anas platyrhynchos* (Linnaeus, 1758). Common species. On 6 August 2013, a flight of one and up to ten individuals was seen several times during the overnight stay in the evening. In 2017, daily sightings of several pairs of mallards were observed from 30 May to 1 June. In 2021, a mallard was observed, leading observers away from a brood on July 15. Similar mallard behavior was observed on 16 July in two other locations. Four small groups of adults and 3–8 individual fledglings were found along the entire route on 17–20 July. The average density for all years was 2.26 indiv/km², and the numbers within the reserve were at least 40 individuals, which increased several times during migration.

4. Eurasian teal *Anas crecca* (Linnaeus, 1758). Rare species. On July 16, 18, and 19, 2021, 2 to 5 individuals were observed daily. The density was 0.59 indiv/km² and the numbers within the reserve were at least 10 individuals.

5. Eurasian wigeon *Anas penelope* (Linnaeus, 1758). Rare species. From 29 May to 1 June 2017, birds on the route were kept daily by several pairs. The density was 0.51 indiv/km². The numbers within the reserve were at least nine individuals.

6. Garganey *Spatula querquedula* (Linnaeus, 1758). Two individuals were seen on 19 the route on July 2021. Density was 0.11 indiv/km². The average density for all years was 0.04 indiv/km². The numbers can be estimated as 1–2 individuals.

7. Northern shoveler *Anas clypeata* (Linnaeus, 1758). Very rare species. On 29 May 2017, a pair of birds was recorded on the route at a density of 0.11 indiv/km². On 17 July 2021, a single individual was also observed. The density was 0.06 indiv/km². The average density for all years was 0.06 indiv/km². Numbers of no more than 2 individuals.

8. Common goldeneye *Bucephala clangula* (Linnaeus, 1758). Common species. In 2017, birds were seen daily from 28 to 31 May 2017, with flock sizes ranging from 5–7 to 10–12 individuals on these days. In 2021, solitary individuals were observed on July 15 and 16, two broods were seen on July 17, and six broods and several adult birds were observed on July 18. Another brood was seen in the evening on the same day, two pairs with broods of 5 and 7 chicks were observed on 19 July, and a brood of birds was also seen in the morning on 20 July. The average density for all years was 2.71 birds/km². Thus, we assumed that there are at least 48 individuals of this species in the Bolshaya Rechka valley within the reserve.

9. Common merganser *Mergus merganser* (Linnaeus, 1758). Very rare species. Four individuals were recorded on 19 July 2021. The density was 0.23 animals/km². The average density for all years was 0.08 indiv/km² and the number of individuals was 1–4.

FALCONIFORMES

Accipitridae

10. Honey buzzard *Pernis apivorus* (Linnaeus, 1758). A rare species. In 2013 we counted 16 Common Sandpipers, including 7 individuals that were fledglings of this year (Vazhov 2015). The density was 1.35 indiv/1 km² of area or 2.71 indiv/10 km of river valley length. Five breeding sites were identified, four of which were occupied by pairs of adult birds with juvenile broods, and one by an adult bird that disturbed a Greater Spotted Eagle (*Aquila clanga*). In 2013, the density of breeding pairs was 2.8 per 10 km² of area, or 0.85 pairs per 10 km of river valley length. The

distance between neighboring breeding sites ranged from 2.8 to 12.4 km, averaging 5.68 km. Based on these data, it can be assumed that 10–11 pairs of these birds breed in the Bolshaya Rechka valley within the Reserve. However, it should be noted that the concentration of sedge breeding sites is in the less waterlogged part of the valley adjacent to the Lesnoy settlement and the Zagainovo village. Zagainovo village. The observed broods had 1–2 fledglings each, with an average of 1.75 fledglings per brood ($n=4$). In 2017, a bird was observed on 28 May on the route from the mouth of the Borovlyanka River and on 29 May a bird moulted. On the same day, a bird was seen in flight. The density was 0.17 sedge/km². In 2021, a single bird was seen on the route daily from 16–20 July and three breeding sites were established on 18 July. The density was 0.56 sedge/km². The average density for all years was 0.69 indiv/km².

11. Oriental honey buzzard *Pernis ptilorhynchus* (Tetnminck, 1821). Very rare species. An individual was recorded in 2017: on 27 May during an overnight stay at the mouth of the Borovlyanka River and on 29 May on the route. Density was 0.11 indiv/km². The average density for all years was 0.04 indiv/km². These data suggest that 1–2 individuals of Tufted Sandpipers inhabit the Bolshaya Rechka valley within the reserve.

12. Black kite *Milvus migrans* (Boddaert, 1783). Common species (Literak et al. 2022). Forty-three individuals were counted on the 2013 routes, half of them (22 indiv) were fledglings of this year. The following density indices were obtained: 3.64 indiv/1 km² of area or 7.29 indiv/10 km of river valley length. Earlier, on 4–7 May 2004, Chupin and Petrov (2005) showed a lower abundance of this bird along the Bolshaya Rechka (5.4 indiv/10 km of the route). We explain this by the absence of fledglings in May, because in Altai Krai young kites begin to leave nests in early July (Vazhov 2015). In 2013, we found 17 black kite nesting sites along the route, most of which were occupied by unbrooded broods. The distance between neighboring breeding sites ranged from 1 to 4 km, with an average distance of 2.17 km. On this basis, the abundance of black kites in the Bolshaya Rechka valley within the reserve can be estimated at approximately 27–28 breeding pairs. The distribution of nesting sites along the Bolshaya Rechka is almost uniform, except for a denser concentration near the village of Zagainovo. Zagainovo village. The counted broods contained 1 to 3 young, with an average of 1.69 fledglings per brood ($n=13$). On 28–31 May and 1 June 2017, the Kite was observed daily in flight and 39 nesting sites were found. The density was 4.41 indiv/km². In 2021, a kite was also observed every day from 15 to 20 July in numbers of one to nine birds at a time, and a total of 14 nesting sites were established on 15, 18 and 19 July at forest edges near open spaces. Density was 1.86 indiv/km². The average density for all years was 3.30 indiv/km².

13. Hen harrier *Circus cyaneus* (Linnaeus, 1766). A very rare species. We recorded the finding of two male harriers on 28 the route on May 2017 and found two nesting sites. Density was 0.11 indiv/km². The average density for all years is 0.04 indiv/km². Numbers in the Bolshaya-Rechka valley within the reserve – no more than 4 individuals.

14. Montagu's harrier *Circus pygargus* (Linnaeus, 1758). A very rare bird. A male harrier was seen on 29 the route on May 2017. The density was 0.06 indiv/km². The average density for all years was 0.02 indiv/km². An estimate of abundance is not possible on such data.

15. Goshawk *Accipiter gentilis* (Linnaeus, 1758). Very rare species. Inhabits unevenly different forest types (Vazhov et al. 2022b). Only one adult of this species was seen on the route in 2012. In 2013, from 04 to 05 August, we also counted a grouse at the overnight stay, which does not allow us to estimate its abundance. The density was 0.06 indiv/km². The average density for all years was 0.02 indiv/km².

16. Sparrowhawk *Accipiter nisus* (Linnaeus, 1758). Rare species (Vazhov et al. 2022c). In 2013, four individuals were recorded on the routes, two of them were fledglings of this year. Two unsuccessful hunts of these hawks were observed on common sandpipers (*Actitis hypoleucos*) were observed; in both cases, the quail tried to catch prey in the air above the river. The density of quail was 1.36 indiv/1 km² of area or 0.68 indiv/10 km of river valley length. Chupin and Petrov (2005)

also cite similar figures (0.8 individuals per 10 km of route). In 2013, we identified 5 nesting sites of species, one of which was a nest in an aspen tree abandoned by young. All nesting sites were found in the most waterlogged part of the valley that borders the village of Listvyanka. The distance between neighboring plots varied from 1.6 to 5.5 km and was averaged to 3.08 km. Therefore, it can be assumed that approximately 19–20 pairs of species nested in the Bolshaya Rechka valley within the reserve. An individual was counted in 28 of the route on May 2017. The density was 0.06 ind/km². In 2021, an individual was recorded daily from July 15–20 and a dilapidated nest was found in a birch tree. The density was 0.34 ind/km². The average density for all years was 0.59 ind/km².

17. Common buzzard *Buteo buteo* (Linnaeus, 1758). A rare species. In 2013, 4 birds of this species were recorded, with a density of 0.34 indiv/1 km² of area or 0.68 indiv/10 km of river valley length. Similar data (0.7 indiv/10 km of route) are given by Chupin and Petrov (2005). We identified four buzzard breeding sites within the route, all of them based on observations of disturbed adults. Distances between neighboring plots ranged from 3.3 to 7.0 km, on average 4.6 km. Therefore, the abundance of Buzzards along the Bolshaya Rechka River within the reserve can be estimated at approximately 12–13 breeding pairs. Birds were observed on 28 the route on 28 and 29 May 2017 in numbers of two and one individual, respectively, and on 1 June this year in the vicinity of the village of Chauxovo. Two buzzard nesting sites were found in the vicinity of Chauxovo village. The density amounted to 0.40 indiv/km². In 2021 a pair of buzzards with a brood was recorded on July 15, single individuals were observed on July 16–20, and a nesting site was found on July 18. The density was 0.45 indiv/km². The average density for all years was 0.40 indiv/km².

18. Greater spotted eagle *Aquila clanga* (Pallas, 1811). Rare species (Vazhov et al. 2022 a). In 2013, 3 adult birds were recorded along the route, the density was 0.17 indiv/1 km² of area or 0.51 indiv/10 km of the Bolshaya Rechka River. Two breeding territories were identified on the survey route (both of them – by disturbed adult birds); one more breeding site was found in 2012 in the vicinity of Varlamenskoye Lake in the southern part of the reserve. The distance between the neighboring plots was 4.1 and 5.9 km. Based on the data obtained, the abundance of birds in the valley within the reserve can be estimated to be 10–14 breeding pairs. On 6 August 2013, in the morning, a bird with prey was counted about 2 km downstream from the overnight site. On August 7 of the same year, also in the morning, a pair of Great spotted eagles were observed at the overnight site. In 2017, the density was 0.06 indiv/km². In 2021, an individual was counted on 17 July, and two nesting sites were found the next day. The density was 0.34 indiv/km². The average density for all years was 0.19 indiv/km².

19. White-tailed eagle *Haliaeetus albicilla* (Linnaeus, 1758). Very rare species (Vazhov et al. 2022e). Two adult eagles were seen on the route in 2013, and the density was 0.11 indiv/1 km² of area or 0.34 indiv/10 km of river valley length (Vazhov 2015). Chupin and Petrov (2005) give similar data (0.3 indiv/10 km of route). It should be noted that no nesting sites for the eagle were found within the survey route, but the observed adults were likely breeding, so the distance between neighboring sites was approximately 7.7 km. Approximately 7–8 pairs of white-tailed eagles nest in the Bolshaya Rechka valley within the reserve. The average density for all years was 0.04 indiv/km².

Falconidae

20. Peregrine falcon *Falco peregrinus* (Tunstall, 1771). Very rare species (Red Book 2016; Vazhov 2020). On the morning of 20 July 2021 a female was seen flying over the river; the bird was restless and screaming strongly, suggesting nesting. The density was 0.06 indiv/km². The average density for all years was 0.02 indiv/km². An estimate of abundance is not possible on the basis of these data.

21. Hobby *Falco subbuteo* (Linnaeus, 1758). Common species. In 2013, 18 hobbies were observed on the routes, 12 of which were hatchlings this year. The density was 2.03 indiv/1 km² of area or

3.05 indiv/10 km of river valley length. According to Chupin and Petrov (2005), the abundance of hobby in early May 2004 in this area was only 0.3 individuals per 10 km. This was due to the absence of fledglings and the low visibility of adult birds, which were just beginning to lay eggs during this period. Six nesting sites were identified along the route; in one of them, a nest of a black kite abandoned by fledglings was observed on a poplar tree. In other plots, we observed unbanded broods and/or observed adult birds. The distribution of the nesting sites for rough-legged Buzzards in the valley was fairly uniform in 2013. The distance between the neighboring plots varied from 2.0 to 9.7 km, which was on average 6.0 km. Based on these data, the number of nesting pairs in the Bolshaya Rechka valley within the reserve can be estimated at 9–10 breeding pairs. The observed broods had 1–3 fledglings, with an average of 2.40 fledglings per brood ($n=5$). In 2017, a bird find was recorded on 28 May, the density was 0.06 indiv/km². In 2021, on 15 July, a hobby was recorded flying over a clearing in a forest floodplain, where it was chasing a black kite and hunting sand martin (*Riparia riparia*) over the river. On July 16 and 18 we found six nesting sites, and single individuals were recorded on July 17, 19 and 20. The density was 0.85 indiv/km². The average density for all years was 0.98 indiv/km².

22. Red-footed falcon *Falco vespertinus* (Linnaeus, 1766). A species declining in abundance (Red Book 2016). In 2013, 2017 and 2021, we did not find a passerine on the survey routes, but an adult male of this species was found on July 16, 2012 on the shore of Lake Teleutskoye, 2 km from the southwestern border of the reserve (Vazhov 2015). This suggests the presence of this species in the protected area within the limits of the Bolshaya Rechka valley.

GALLIFORMES

Tetraonidae

23. Hazel grouse *Tetrastes bonasia* (Linnaeus, 1758). Very rare species. Two individuals were seen on 19 and 20, 2021 along the left bank of the river toward Listvyanka village. Density was 0.11 indiv/km². The average density for all years was 0.04 indiv/km². Based on these data, it can be assumed that there are 1–2 individuals in the Bolshaya Rechka valley within the Reserve.

Phasianidae

24. Common quail *Coturnix coturnix* (Linnaeus, 1758). A rare species. A single bird was seen in 2021 on 16 July. Vocalizations of four individuals were heard on 17 July during an overnight stay near a channel. They stayed here until daylight on 18 July. The density was 0.28 indiv/km². The average density for all years was 0.09 indiv/km². Based on these data, the numbers in the Bolshaya Rechka valley within the reserve range from 2 to 5 individuals.

GRUIFORMES

Gruidae

25. Common crane *Grus grus* (Linnaeus, 1758). Rare species. A pair of birds was found on July 15 and 18, and on July 19 another individual was identified by voice at the overnight site. The density was 0.28 indiv/km². The average density for all years was 0.09 indiv/km². The numbers in the study area were 2–5 individuals.

Rallidae

26. Corncrake *Crex crex* (Linnaeus, 1758). Very rare species. An individual was observed on the route on May 30 and 31, 2017. Density was 0.11 indiv/km². The average density for all years was 0.04 indiv/km². The numbers can be estimated as 1–2 individuals.

27. Common moorhen *Gallinula chloropus* (Linnaeus, 1758). Rare species. A bird with a brood of six

chicks was seen twice on July 19 and 20, 2021 on the left bank in the direction of Listvyanka village. The density was 0.40 indiv/km². The average density for all years was 0.13 indiv/km². Based on these data, the numbers in the Bolshaya Rechka valley within the Reserve range from 2 to 7 individuals.

CHARADRIIFORMES

Scolopacidae

28. Green sandpiper *Tringa ochropus* (Linnaeus, 1758). Rare species. On 30 May 2017, 3 breeding sites were found along the route. The density was 0.34 indiv/km². In 2021, four birds were observed on 18 July. A bird was recorded during overnight stays on 18 and 19 July on the right bank, ten birds were seen on 4 breeding plots on 19 July, and two birds were recorded on the left bank towards Listvyanka village during overnight stays on 19–20 July. Two individuals were recorded during the overnight stay on 19–20 July along the left bank towards Listvyanka village. The density was 0.90 indiv/km². The average density for all years was 0.30 indiv/km² and the abundance was estimated at 5–16 individuals.

29. Common sandpiper *Actitis hypoleucos* (Linnaeus, 1758). One of the most common species. From 28 to 31 May and 01 June 2017 it was widely represented on a daily basis on the route from the mouth of the Borovlyanka River to the village of Chausovo. During this time, 61 breeding sites were found. The density amounted to 3.45 indiv/km². In 2021 flocks of 3 to 20 individuals were observed in the Bolshaya Rechka valley every day from 15–20 July. The density was 5.99 indiv/km². The average density for all years was 4.72 indiv/km². Based on these data, the abundance in the Bolshaya Rechka valley within the reserve ranges from 62 to 108 individuals.

30. Eurasian woodcock *Scolopax rusticola* (Linnaeus, 1758). A very rare species. Each bird was recorded by voice on 27 and 31, 2017 on the route and during the overnight stay. Density was 0.11 indiv/km². The average density for all years was 0.04 indiv/km². The numbers in the study area can be estimated at 1–2 individuals.

Laridae

31. Black-headed gull *Larus ridibundus* (Linnaeus, 1766). A very species. The gull was found on 31 May 2017 on the route sitting on the shore near the water. The density was 0.06 indiv/km². The average density for all years was 0.02 indiv/km², and it is not possible to estimate the numbers from such data.

32. Common tern *Sterna hirundo* (Linnaeus, 1758). A very rare species. The tern was found to fly only once, during an overnight stay on July 19, 2021 along the left bank towards Listvyanka village. The density was 0.06 indiv/km². The average density for all years was 0.02 indiv/km², which does not allow for an adequate assessment of its abundance.

COLUMBIFORMES

Columbidae

33. Common wood pigeon *Columba palumbus* (Linnaeus, 1758). A very rare species. A pair of birds was counted on 16 July 2021. Density was 0.11 indiv/km². The average density for all years was 0.04 indiv/km². The numbers in the study area can be estimated at 1–2 individuals.

34. Stock pigeon *Columba oenas* (Linnaeus, 1758). Rare species. In 2017, we recorded this species twice: on 29 May and 30. Density was 0.11 indiv/km². In 2021, the bird was seen for the first time on the route during the day on July 19, then heard on July 19 and 20 at night on the right bank. The density was 0.17 indiv/km². The average density for all years was 0.09 indiv/km². The numbers in

the Bolshaya Rechka valley within the reserve were 2–3 individuals.

35. Oriental turtle dove *Streptopelia orientalis* (Latham, 1790). Rare bird. In 2017 it was recorded by voice on 29 May during the overnight stay. The density was 0.06 indiv/km². Approximately, 1–4 birds were heard in 2021 on the route on July 16, 17, 18 and 20, and a single bird was seen on the morning of July 18 and 19 at the breeding site. The density was 0.68 indiv/km². The average density for all years was 0.25 indiv/km². The numbers in the study area can be estimated at 1–12 individuals.

CUCULIFORMES

Cuculidae

36. Common cuckoo *Cuculus canorus* (Linnaeus, 1758). Common species. In 2017, 10 to 20 individuals were seen and heard daily on the route and overnight stays on 29 and 30. The density was 1.69 indiv/km² and the number of individuals was about 30.

37. Oriental cuckoo *Cuculus optatus* (Gould, 1845). Common species. Multiple birds were detected on 29 and 30 May 2017 along the route, and 12 individuals were still established by voice on 29 May during an overnight stay. The density was 0.84 indiv/km² and the abundance is 15 individuals.

STRIGIFORMES

Strigidae

38. Eurasian eagle-owl *Bubo bubo* (Linnaeus, 1758). A species declining in numbers in the Altai Krai (Red Data Book 2016). The species was not found on the survey route in 2013, but its breeding site was identified on the shore of the Sredneabrashkino wetland lake, only 0.5 km north of the reserve, where it was heard toking on April 25, 2012 (Vazhov 2015). On the same day, an owl feather was found on the Varlamenskoye wetland lake on the southern border of the reserve. Therefore, the nesting of this owl on the territory of the reserve in the Bolshaya Rechka valley is very likely.

39. Long-eared owl *Asio otus* (Linnaeus, 1758). Rare species. In 2013, a breeding site for this owl was identified in the Bolshaya Rechka valley and a pair of birds was seen in flight (Vazhov 2015), which does not allow any assessment of the abundance of this species. Obviously, more than one pair of long-eared owls nested within the Bolshaya Rechka valley, but we were unable to detect most of them due to the peculiarities of our bird counting methodology, which was not optimal for owl detection, as it focused mainly on birds with daytime activity. The density was 0.11 indiv/km². The average density for all years was 0.04 indiv/km².

40. Eurasian pigmy owl *Glaucidium passerinum* (Linnaeus, 1758). Rare species. In 2017, the bird was counted by voice on 29 May during an overnight stay. The density was 0.06 indiv/km². In 2021, on 16 July, also at the rookery site, we heard restless crying of adult birds and brood; on 17 July in the evening we recorded mocking of one individual, in the afternoon of the same day 2 birds were crying and restless. On the morning of 18 July we observed an owl with anxious, possibly nesting behavior. A bird was heard screaming at night on July 19 and was seen on July 20 about 200 m from the roosting site. Density was 0.56 indiv/km². The average density for all years was 0.21 indiv/km². The numbers in the Bolshaya Rechka valley within the reserve can be estimated to be 1–10 individuals.

41. Ural owl *Strix uralensis* (Pallas, 1771). Very rare species. A nesting site was found on July 2012 (a pair of birds was seen) in the vicinity of the village of Chazovo, 1.44 km from the reserve, so its nesting in the protected area is very likely. The species was not found on the survey route in 2013 (Vazhov 2015). However, in 2017 on 29 May 29, a mocking bird was heard at the roosting site. The

density was 0.06 indiv/km². The average density for all years was 0.02 owls/km², which does not allow us to adequately estimate its abundance.

42. Great grey owl *Strix nebulosa* (J.R. Forster, 1772). An adult bird of this species and a probable breeding site were recorded on 16 July 2012 in a damp pineaspen forest directly on the southwestern border of the Reserve (Vazhov 2015). A residential nest in an old building of a hawk was found on April 24, 2012 in the vicinity of the village of Tyumen, which is 8 km away northeast of the reserve. These data suggest its nesting in the Bolshaya Rechka valley within the protected area.

APODIFORMES

Apodidae

43. Common swift *Apus apus* (Linnaeus, 1758). Numerous species. In 2017, from 27 May to June 01, birds were observed on the route from Zagainovo village to Chausovov village in flight in the number of more than 10 indiv/km². In 2021, large numbers of swifts were occasionally seen on 18 and 19 July. The numbers were at least 180 individuals.

CORACIIFORMES

Alcedinidae

44. Common kingfisher *Alcedo atthis* (Linnaeus, 1758). Common species. In 2017 from 28 to 31 May and 1 June birds were sighted almost daily. On the same days 21 nesting sites were found. The density was 2.37 indiv/km². In 2021, 2 to 7 individuals were seen daily from July 16 to 20, and 7 nesting sites were found. The density was 1.81 indiv/km². The average density for all years was 2.09 indiv/km². The numbers were estimated at 33–43 individuals or 15–20 breeding pairs.

Meropidae

45. European bee-eater *Merops apiaster* (Linnaeus, 1758). Several birds were seen once on 16 July 2021 near the village of Zagainovo. The numbers could not be estimated on the basis of such data.

PICIFORMES

Picidae

46. Black woodpecker *Dryocopus martius* (Linnaeus, 1758). Rare species. On 6–7 August 2013, one individual was counted in the morning at the place of overnight stay. The density was 0.11 indiv/km². We also counted this species at the roosting site on 29 May 2017. The density was 0.06 indiv/km². The numbers can be estimated at 1–2 breeding pairs.

47. Great spotted woodpecker *Dendrocopos major* (Linnaeus, 1758). Rare species. On 29–30 May 2017, the density was 0.11 indiv/km². Woodpecker was also observed on July 17, 2021. The density was 0.17 indiv/km². The average density for all years was 0.09 indiv/km². The numbers are 1–2 breeding pairs.

48. White-backed woodpecker *Dendrocopos leucotos* (Bechstein, 1803). A very rare species. A woodpecker was seen on July 19, 2021. Density was 0.06 indiv/km². The average density for all years was 0.02 indiv/km², and the number of 1–2 individuals, i.e., no more than one breeding pair.

Conclusions

The Bolsherechensky Nature Reserve in the valley of the Bolshya Rechka River is home to a diverse summer bird population. Excluding passerines, there are 48 bird species in the reserve, belonging to 12 orders and 18 families. Of these, 45 species have been identified as breeding, while the status of three species requires further clarification.

The reserve is also important for the conservation of rare and endangered bird species, with a total of 11 such species recorded. Among these, seven species - the Black stork, Oriental honey buzzard, Peregrine falcon, Red-footed falcon, Common wood pigeon, Eurasian pygmy owl, and European bee-eater - have been observed within the reserve for the first time, which is not noted in the most recent edition of the regional Red Data Book.

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