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Article

The fauna and summer population of birds of the Uysky natural biological reserve (Chelyabinsk region)

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Abstract. Based on the results of ornithological studies conducted in the Uysky Nature Biological Reserve in 1986, 1987, 2005, 2018 and 2023, an annotated list of bird species was compiled. The presence of 146 species was identified, of which 129 nest (or nesting is assumed) on its territory and in the immediate vicinity. According to the averaged data of quantitative censuses (1986–1987), the dominant forest bird species in terms of numbers were the Chaffinch (21% of the population), the Willow Tit and the Tree Pipit (15% each). In 2018 and 2023, the most numerous were the Chaffinch, Tree Pipit, Great Tit, Common Chiffchaff and the Willow Tit. The Great Grey Owl was found quite common (0.3 individuals/km²). Changes in the species composition and relative abundance of most bird species in the Uysky pine forest from the 1980s to the 2020s were very insignificant. In recent years, Mute and Whooper Swans have appeared in the nesting fauna. In the open habitats of the reserve, which are fields of agricultural crops and heavily degraded pastures, in 2023, extremely poor species diversity of nesting species and low numbers of most bird species were observed. The drying up of small ponds and strong shallowing of larger ones caused a very noticeable decrease in the diversity (by more than 20%) and abundance of nesting waterfowl and near-water species. A negative impact of illegal logging and disturbance during the nesting period on the nesting group of the Imperial Eagle was revealed.

Keywords: avifauna, nesting, ornithocomplex, dominant, rare species, ecological group, Red Data Book

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Научная статья

Фауна и летнее население птиц Уйского природного биологического заказника (Челябинская область)

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Аннотация. По итогам орнитологических исследований, проводившихся в Уйском природном биологическом заказнике в 1986, 1987, 2005, 2018 и 2023 гг., составлен аннотированный список видов птиц. Выявлено пребывание 146 видов, из которых 129 гнездятся (или гнездование предполагается) на его территории и в ближайших окрестностях. По усредненным данным количественных учетов, проводившихся в 1986 и 1987 гг., доминантами по численности среди

лесных птиц были зяблик (21% от населения), пухляк и лесной конек (по 15%). В 2018 и 2023 гг. наиболее многочисленными оказались зяблик, лесной конёк, большая синица, пеночка-теньковка и пухляк. Вполне обычной найдена бородатая неясыть (0.3 особи/км²). Изменения видового состава и относительного обилия большинства видов птиц Уйского бора с 1980-х по 2020-е гг. были весьма незначительными. В последние годы в гнездовой фауне появились лебеди шипун и кликун. В открытых местообитаниях заказника, представляющих собой поля сельскохозяйственных культур и сильно сбитые пастбища, в 2023 г. наблюдались крайне бедное видовое разнообразие гнездящихся видов и низкая численность большинства видов птиц. Пересыхание мелких и сильное обмеление более крупных прудов привело к весьма ощутимому снижению разнообразия (более чем на 20%) и обилия гнездящихся водоплавающих и околоводных видов. Выявлено негативное влияние незаконных рубок и беспокойства в гнездовой период на гнездовую группировку могильника.

Ключевые слова: авифауна, гнездование, орнитокомплекс, доминант, редкий вид, экологическая группировка, Красная книга

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Introduction

For such an economically developed region as Chelyabinsk Oblast, the regional protected areas – natural monuments and reserves – are extremely important territories for preserving many species of plants, fungi, vertebrates and invertebrates, as well as landscapes and habitats. The level of study of most regional protected areas in the region and timely monitoring of the state of their main natural components in recent decades leave much to be desired. This is due, first of all, to the lack of financial support for natural science research in the region.

The purpose of this work was to study the fauna and summer bird population of the Uysky natural biological reserve.

Materials and methods

Geographical and ecological characteristics of environmental conditions of the surveyed territory

In 1969, by decision of the Executive Committee of the Chelyabinsk Regional Council of People's Deputies, the Uysky island pine forest, located in the southwest of the Uysky district, approximately 10 km southwest of the village of Uyskoye on an area of 5.9 thousand hectares, was declared a natural monument¹. The decision was made in connection with the recognition of the important scientific,

¹ Decision of the Executive Committee of the Chelyabinsk Regional Council of the People's Deputies dated 21.01.1969 No. 29 "On nature monuments protection in Chelyabinsk Oblast".

educational and recreational value of the pine forest. In 1980, in order to preserve the population of Elk, Roe Deer, Black Grouse and Western Capercaillie, by order of the Executive Committee of the Chelyabinsk Regional Council of People's Deputies, the Uysky hunting reserve was organized on an area of 15 thousand hectares, 6 km southwest of the village of Uyskoye². In 2008, by the Decree of the Government of the Chelyabinsk Region, the reserve was awarded the status of a state natural biological reserve³. Currently, its area is 16.4 thousand hectares. The Uysky natural biological reserve (hereinafter referred to as the Uysky reserve) is located on the territory of the Uysky municipal district of the Chelyabinsk region, 6 kilometers southwest of the village of Uyskoye (Fig. 1). In the south, near the village of Petrovpavlovka, it borders on the Karagaysky natural biological reserve, the fauna and summer bird population of which have been described in Gashek et al. (2024).

According to the physical and geographical zoning, the territory of the reserve is located in the forest-steppe zone of the Ural mountain country, in the subzone of the southern forest-steppe of the westernmost part of the Trans-Ural peneplain, near the border of the steppe zone (Andreeva and Markova, 2002; Kolesnikov, 1961).

The relief of the reserve territory is ridgy and hilly. Part of the territory is occupied by the Uysky pine forest, one of the island pine forests typical of the forest-steppe of the Trans-Ural peneplain, associated with a vast granite massif rising in the form of a gentle hill against the background of the surrounding foothill plain (Fig. 2). The highest point of the reserve and pine forest (521.5 m a. s. l.) is located in the center of the Uysky pine forest, while the lowest (318.2 m a. s. l.) on the southeastern border near the village of Petrovpavlovka.

According to departmental materials, the area of forest lands of the reserve is about 7.3 thousand hectares (43.7%), including the forested area of the Uysky pine forest – 5.8 thousand hectares (34.7%). The area of open lands is approximately 9.1 thousand hectares (54.5%), wetlands – 0.3 thousand hectares (1.8%). Open lands are mainly represented by agricultural lands with grain crops and perennial grasses (Fig. 3).

The river network in the territory of the Uysky Reserve is represented by a small section of the Kidys River with tributaries (streams) and the headwaters of small rivers (Borovaya, Kalinovka, Sorokina) flowing into the Uy River. All the rivers are flat, low-flow, some of them dry up in the summer and belong to the Tobol basin (Andreeva and Markova, 2002). The water is mainly fed by snow, the share of rain is 10–12%. There are ponds, the largest of which are Lake Voroninskoye, Glazunovsky Pond (Fig. 4) and an unnamed pond at the northern border of the pine forest on the Borovaya River, located less than 2 km west-southwest of Lake Voroninskoye.

At the abandoned from the 2000s Glazunovsky, Fominsky, Kidyshevsky and Molochny cordons, several small dams on springs and streams still existed until 2018. They completely dried up by 2023 after hot and dry years of 2020–2023. Droughts also led to a significant shallowing of the large ponds listed above, especially Lake Voroninsky, the banks of which were completely devoid of coastal macrophytes in 2023.

According to the geobotanical zoning scheme of the European part of the former USSR (Gribova et al., 1980; Lavrenko and Isachenko, 1976), the territory of the Uysky Reserve and the Uysky Pine Forest is part of the West Siberian forest-steppe province of the Eurasian steppe region.

The vegetation cover of the reserve and pine forest is mainly composed of Scots pine *Pinus sylvestris* L. with an admixture of Silver birch *Betula pendula* Roth, Aspen *Populus tremula* L., Siberian larch *Larix sibirica* Ledeb.; grass (cereal-forb, bracken-forb, etc.) and grass-green moss forest types predominate. There are also pine forests with cowberry and white moss, and in the driest areas steppe rocky pine forests and small-grass sparse forests with a very depleted grass layer in composition and a significantly developed moss-lichen cover with the participation of species of the genus *Cladina*. In the outlying parts of the reserve's territory, birch forests, steppe meadows, meadow, true (turf-grass-forb) and petrophytic steppes are widespread.

² Order of the Executive Committee of the Chelyabinsk Regional Council of the People's Deputies dated 26.02.1980 No. 228-r "On the Uysky State Hunting Reserve".

³ Decree of the Government of Chelyabinsk Oblast dated 22.05.2008 № 139 "On the Uysky Biosphere Reserve".

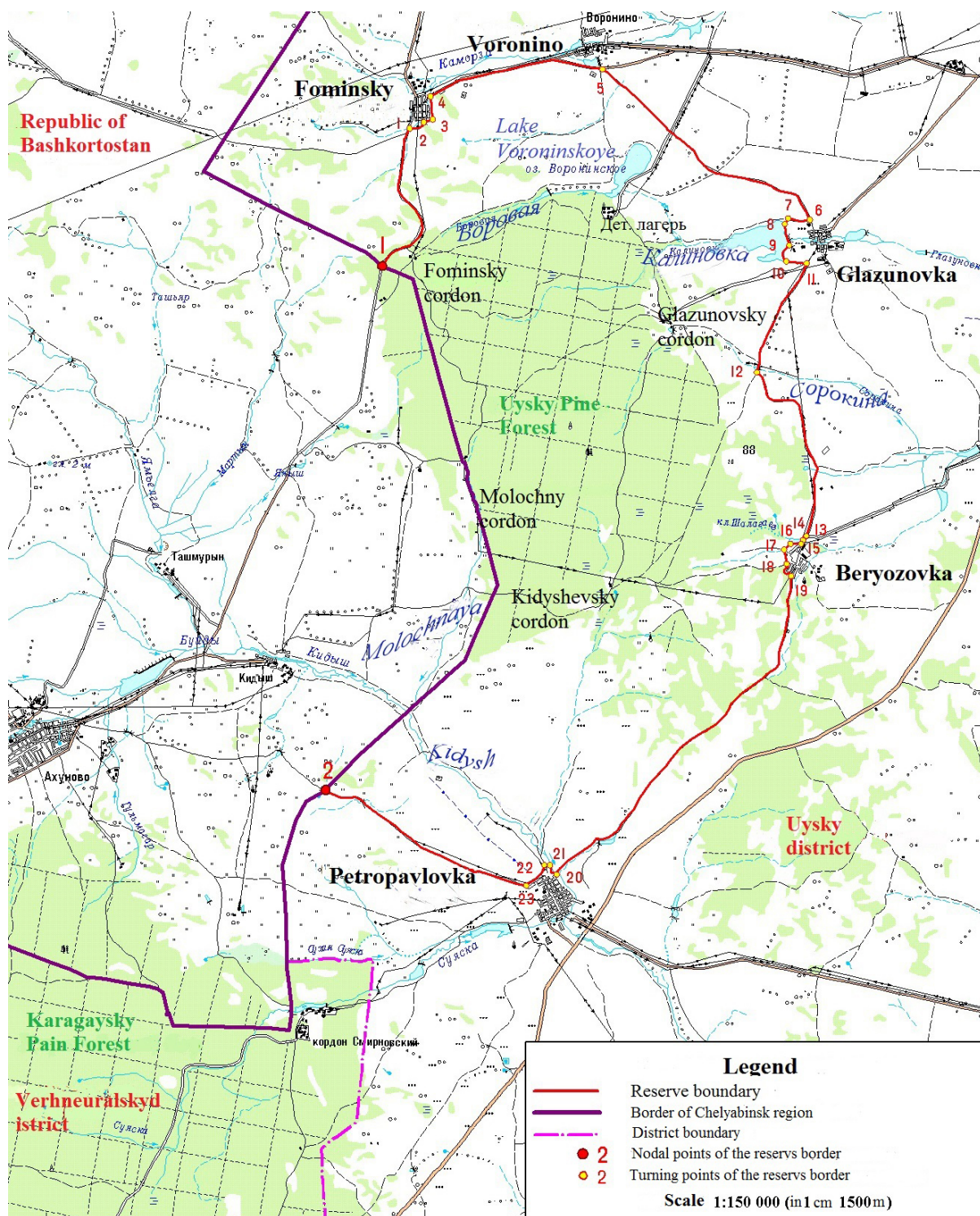


Fig. 1. Uysky Reserve on the map.



Fig. 2. Uysky pine forest, June 2018. Photo by V.A. Gashek.



Fig. 3. Steppe part of Uysky Reserve transformed into agricultural land, July 2023. Photo by V.A. Gashek.



Fig. 4. Glazunovsky pond, Uysky Reserve, July 2023. Photo by V.A. Gashek.

Research volume and methodology

The birds were detected on unfixed walking routes in the main habitats of the reserve visually, using binoculars, as well as by their voices, nests, traces of vital activity and remains. Quantitative counts on the routes (with a total length of about 32 km) were carried out on May 21–22, June 30 – July 1 and July 25–26, 1986, and July 9–10, 1987 only in forest biotopes (in the northern and northeastern parts of the pine forest) without limiting the counting strip according to the method of Yu.S. Ravkin (1967). In 2018 (from June 4 to 9) and in 2023 (from July 9 to 27), quantitative counts were not carried out; on routes with a total length of about 40 km in 2018 and about 200 km in 2023. We registered all individuals of each bird species made it possible to estimate the proportion of species in the population, as well as to distribute them into categories of relative abundance, following the scale of V.P. Belik (2000) in our modification:

- very rare – encountered no more than 5 times over all the years of work;
- rare – encountered 1–2 times per season;
- uncommon – encountered 3–5 times per season;
- few – encountered regularly, but not daily;
- common – encountered 1–10 times per day excursion;
- numerous – encountered more than 10 times per day excursion.

The abundance of birds from the Falconiformes, Galliformes, Columbiformes and Strigiformes orders was determined by the number of encounters with disturbing pairs (or nests) per unit area (using a topographic map with a quarter grid).

In addition, bird observations were conducted during short-term visits to the reserve in the spring and summer seasons from 2005 to 2023. One of the authors (D.A. Yasko), working in the reserve as a state inspector from 2008 to 2022, made faunistic observations, primarily of non-passerine birds (mainly diurnal raptors and owls).

Species with a share of participation of 10% or more of the total population density, were considered dominant (Kuzynkin, 1962), whereas with a 5–9% share-subdominants.

When distributing birds by ecological groups, we followed the classification of birds by V.P. Belik (2000).

The reliability of nesting was determined in accordance with the criteria proposed by the Committee of the European Ornithological Atlas (EOA) (The EBCC Atlas..., 1997). Nesting was considered proven when nests, eggs, broods were found, birds with food for chicks were observed, and presumed when birds were observed demonstrating elements of nesting behavior (lekking, mating, restlessness near nests), as well as when encountered at permanent sites in conditions suitable for nesting during the nesting period. The order of listing and names of species are given according to E.A. Koblik et al. (2006) and V.K. Ryabitsev (2008).

Results and discussion

The list of avifauna species of the Uysky Reserve and its immediate environs, indicating the nature of their presence and occurrence, as well as ecological grouping, compiled on the basis of the entire research period, is presented in Table 1.

Thus, during the entire period of research on the territory of the Uysky Reserve and in its immediate vicinity, 146 bird species from 14 orders and 36 families were registered. For 129 species, nesting was proven or assumed, 9 species were encountered during migration, two visited the reserve from the surrounding areas during the nesting period, two, presumably, are found in its reservoirs only in summer, two are encountered during wintering and seasonal migrations, two species – during migration and summering.

The fauna of nesting birds of the Uysky Reserve has significant similarities with that of the Karagay Reserve (Gashek et al., 2024): the Chekanovsky-Sørensen index $ICS = 0.86$. For these protected areas, 107 common species were identified—that is quite natural since these territories are very close in geographical and landscape terms. Differences in the nesting fauna concern mainly groups of waterfowl and near-water birds: out of 23 species nesting in the Uysky Reserve and not found nesting in the Karagay Reserve, 20 are ecologically associated with aquatic and near-water habitats. This can be explained by the greater water content of the Uysky Reserve compared to the Karagay Reserve.

According to the averaged data of quantitative counts conducted in the pine forest in 1986 and 1987, the absolute dominant in numbers among forest birds was the Chaffinch (102 individuals/km²) with a population share of 21%. The dominant group also included the Willow Tit (71 ind./km²) and the Tree Pipit (71 ind./km²) (15% each). The subdominants were the Great Tit (34 ind./km², 7%) and the Common Redstart (28 ind./km², 6%). The total population density of the pine forest birds was 489 ind./km².

In 2018 and 2023, the most numerous birds in the pine forest were the Chaffinch and Tree Pipit (9% of all birds encountered on the routes). The share of the Great Tit, Chiffchaff and Willow Tit was 7, 6 and 5% of all birds encountered, respectively. The abundance of the Common Buzzard and Black Kite was quite high in the northern part of the pine forest, which we studied most in 2023: about 0.6 ind./km² (5 nesting pairs per area of 16 km²). In the island pine forests of the forest-steppe and steppe Trans-Urals, the number of Common Buzzards in the 1980s–2000s was estimated at 0.3–0.8 ind./km², and the Black Kite in forest-steppe and steppe aspen-birch groves – at 0.2–0.7 ind./km² (Zakharov, 2006), which is quite consistent with our data.

The ecological structure of the nesting fauna of birds in the reserve is as follows: 56% (72 species) are dendrophiles, 26% (34 species) are limnophiles, the proportions of campophiles and sclerophiles are 9% each (12 and 11 species, respectively) (Fig. 5). The predominance of dendrophiles over all other groups is explained by both the large area of habitats with woody and shrubby vegetation (more than 43% of the entire area of the reserve) and the complex tiered structure of communities, which provides a large number of bird species with conditions for feeding, nesting, resting, etc. The share of campophiles is only 9%, despite the significant area of open lands (more than half of the entire area of the reserve). This is due to the fact that relatively few species are adapted to the simplified tiered structure of grassy communities: the most numerous among them in the reserve are the Eurasian Skylark, the Booted Warbler, the Whinchat and Common Stonechat. If we take into account that most of the steppe habitats are agrocenoses, then the poverty of the campophile group is quite understandable. The insignificance of the sclerophile group in the structure of the nesting fauna is caused by the specificity of the requirements of these species for nesting conditions. At the same time, the diversity of limnophiles is probably due to the antiquity of the habitats associated with them (Belik, 2000), the area of which is very small (less than 2% of the reserve area).

Table 1. Species composition of birds of the Uysky Reserve. The residency status: ne – nesting; ne? – presumably nesting; mig – transient species; nom – nomadic; win – wintering; vis – visitor during nesting period; sum – summering. Abundance: num – numerous; com – common; few – few; un – uncommon; rare – rare. Ecological grouping: lim – limnophile; dendr – dendrophile; camp – campophile; scler – sclerophile.* – the species has not been found after 1985.

Species	Presence	Abundance	Ecological grouping
Order Podicipediformes			
<i>Podiceps nigricollis</i> C.L. Brehm, 1831	ne?	com	lim
<i>Podiceps auritus</i> (L., 1758)	sum?	rare	lim
<i>Podiceps cristatus</i> (L., 1758)	ne	com	lim
Order Ciconiiformes			
<i>Botaurus stellaris</i> (L., 1758)	ne?	rare	lim
<i>Ardea cinerea</i> L., 1758	ne	com	lim
Order Anseriformes			
<i>Cygnus olor</i> (J.F. Gmelin, 1789)	ne	com	lim
<i>Cygnus cygnus</i> (L., 1758)	ne	un	lim
<i>Tadorna ferruginea</i> (Pallas, 1764)	ne	few	lim
<i>Anas platyrhynchos</i> L., 1758	ne	com	lim
<i>Anas crecca</i> L., 1758	ne?	com	lim
<i>Anas strepera</i> L., 1758	ne	com	lim
<i>Anas querquedula</i> L., 1758	ne	com	lim
<i>Anas clypeata</i> L., 1758	ne?	few	lim
<i>Aythya ferrina</i> (L., 1758)	sum?	com	lim
<i>Aythya fuligula</i> (L., 1758)	ne?	com	lim
<i>Bucephala clangula</i> (L., 1758)	mig, sum	com	lim
Order Falconiformes			
<i>Pernis apivorus</i> (L., 1758)	ne?	few	dendr
<i>Milvus migrans</i> (Boddaert, 1783)	ne	com	dendr
<i>Circus cyaneus</i> (L., 1766)	ne	com	camp
<i>Circus macrourus</i> (S.G. Gmelin, 1771)	ne?	un	camp
<i>Circus pygargus</i> (L., 1758)	ne?	few	camp

Species	Presence	Abundance	Ecological grouping
<i>Circus aeruginosus</i> (L., 1758)	ne?	com	lim
<i>Accipiter gentilis</i> (L., 1758)	ne	few	dendr
<i>Accipiter nisus</i> (L., 1758)	ne	com	dendr
<i>Buteo buteo</i> (L., 1758)	ne	com	dendr
<i>Aquila heliaca</i> Savigny, 1809	ne	few	dendr
<i>Aquila chrysaetos</i> (L., 1758)	mig	rare	dendr
<i>Haliaeetus albicilla</i> (L., 1758)	mig, sum.	few	dendr
<i>Falco peregrinus</i> Tunstall, 1771	mig	rare	scler?
<i>Falco subbuteo</i> L., 1758	ne	few	dendr
<i>Falco columbarius</i> L., 1758	mig	un	dendr
<i>Falco vespertinus</i> L., 1766	mig	rare	dendr
<i>Falco tinnunculus</i> L., 1758	ne	few	scler
Order Galliformes			
<i>Lagopus lagopus major</i> (Lorenz, 1904)	ne?	rare	camp?
<i>Lyrurus tetrix</i> (L., 1758)	ne	com	dendr
<i>Tetrao urogallus</i> L., 1758	ne	com	dendr
<i>Perdix perdix</i> (L., 1758)	ne	com	dendr?
<i>Coturnix coturnix</i> (L., 1758)	ne	com	camp
Order Gruiformes			
<i>Grus grus</i> (L., 1758)	ne	few	lim
<i>Anthropoides virgo</i> (L., 1758)	ne	rare	camp
<i>Crex crex</i> (L., 1758)	ne	few	camp
<i>Fulica atra</i> L., 1758	ne	un	lim
Order Charadriiformes			
<i>Charadrius dubius</i> Scopoli, 1786	ne	com	lim
<i>Vanellus vanellus</i> (L., 1758)	ne	un	lim
<i>Tringa ochropus</i> L., 1758	ne?	un	lim
<i>Tringa glareola</i> L., 1758	mig	un	lim

Species	Presence	Abundance	Ecological grouping
<i>Tringa totanus</i> (L., 1758)	ne	un	lim
<i>Tringa stagnatilis</i> (Bechstein, 1803)	ne	un	lim
<i>Actitis hypoleucos</i> (L., 1758)	ne	few	lim
<i>Scolopax rusticola</i> L., 1758	ne	com	dendr
<i>Limosa limosa</i> (L., 1758)	ne	rare	lim
<i>Larus ichthyaetus</i> Pallas, 1773	vis	un	lim
<i>Larus minutus</i> Pallas, 1766	mig	com	lim
<i>Larus ridibundus</i> L., 1766	ne?	un	lim
<i>Larus barabensis</i> H. Johansen, 1960	ne?	com	lim
<i>Larus canus</i> L., 1758	ne?	un	lim
<i>Sterna hirundo</i> L., 1758	vis	rare	lim
Order Columbiformes			
<i>Columba palumbus</i> L., 1758	ne	com	dendr
<i>Columba oenas</i> L., 1758	ne?	un	dendr
<i>Columba livia</i> J.F. Gmelin, 1789	ne (on the adjacent territory)	com	scler
<i>Streptopelia turtur</i> (L., 1758)	ne*	com*	dendr
<i>Streptopelia orientalis</i> (Latham, 1790)	ne	com	dendr
Order Cuculiformes			
<i>Cuculus canorus</i> L., 1758	ne	com	dendr
<i>Cuculus (saturatus) optatus</i> Gould, 1845	ne	un	dendr
Order Strigiformes			
<i>Nyctea scandiaca</i> (L., 1758)	win	un	camp
<i>Bubo bubo</i> (L., 1758)	ne?	rare	scler
<i>Asio otus</i> (L., 1758)	ne	rare	dendr
<i>Asio flammeus</i> (Pontoppidan, 1763)	ne	com	camp
<i>Surnia ulula</i> (L., 1758)	nom	rare	dendr
<i>Strix uralensis</i> Pallas, 1771	ne	few	dendr
<i>Strix nebulosa</i> Forster, 1772	ne	com	dendr

Species	Presence	Abundance	Ecological grouping
Order Caprimulgiformes			
<i>Caprimulgus europaeus</i> L., 1758	ne	com	dendr
Order Apodiformes			
<i>Apus apus</i> (L., 1758)	ne	com	scler
Order Piciformes			
<i>Jynx torquilla</i> L., 1758	ne	rare	dendr
<i>Dryocopus martius</i> (L., 1758)	ne?	few	dendr
<i>Dendrocopos major</i> (L., 1758)	ne	com	dendr
<i>Dendrocopos leucotos</i> (Bechstein, 1803)	ne?	rare	dendr
Order Passeriformes			
<i>Riparia riparia</i> (L., 1758)	ne (on the adjacent territory)	com	scler
<i>Hirundo rustica</i> L., 1758	ne	com	scler
<i>Alauda arvensis</i> L., 1758	ne	com	camp
<i>Anthus trivialis</i> (L., 1758)	ne	num	dendr
<i>Motacilla flava</i> L., 1758	ne	com	camp
<i>Motacilla (citreola) werae</i> Buturlin, 1908	ne?	un	lim?
<i>Motacilla alba</i> L., 1758	ne	com	lim
<i>Lanius collurio</i> L., 1758	ne	com	dendr
<i>Oriolus oriolus</i> (L., 1758)	ne	few	dendr
<i>Sturnus vulgaris</i> L., 1758	ne (on the adjacent territory)	few	scler
<i>Garrulus glandarius</i> (L., 1758)	ne	few	dendr
<i>Pica pica</i> (L., 1758)	ne	com	dendr
<i>Corvus frugilegus</i> L., 1758	ne	few	dendr
<i>Corvus (corone) cornix</i> L., 1758	ne	com	dendr
<i>Corvus corax</i> L., 1758	ne	com	dendr
<i>Cettia cetti</i> (Temminck, 1820)	ne?	un	lim
<i>Locustella fluviatilis</i> (Wolf, 1810)	ne	few	lim

Species	Presence	Abundance	Ecological grouping
<i>Acrocephalus agricola</i> (Jerdon, 1845)	ne	un	lim
<i>Acrocephalus dumetorum</i> Blyth, 1849	ne	com	dendr?
<i>Acrocephalus palustris</i> (Bechstein, 1798)	ne?	un	lim
<i>Hippolais icterina</i> (Vieillot, 1817)	ne	com	dendr
<i>Hippolais caligata</i> (M.N.K. Lichtenstein, 1823)	ne	com	dendr?
<i>Sylvia atricapilla</i> (L., 1758)	ne?	rare	dendr
<i>Sylvia borin</i> (Boddaert, 1783)	ne	com	dendr
<i>Sylvia communis</i> Latham, 1787	ne	com	dendr
<i>Sylvia curruca</i> (L., 1758)	ne	com	dendr
<i>Phylloscopus trochilus</i> (L., 1758)	ne	few	dendr
<i>Phylloscopus collybita</i> (Vieillot, 1817)	ne	num	dendr
<i>Phylloscopus sibilatrix</i> (Bechstein, 1793)	mig	rare	dendr
<i>Phylloscopus trochiloides</i> (Sundevall, 1837)	ne	com	dendr
<i>Ficedula hypoleuca</i> (Pallas, 1764)	ne	com	dendr
<i>Ficedula (parva) parva</i> (Bechstein, 1794)	mig	rare	dendr
<i>Muscicapa striata</i> (Pallas, 1764)	ne	com	dendr
<i>Saxicola rubetra</i> (L., 1758)	ne	com	camp
<i>Saxicola torquata</i> (L., 1766)	ne	com	camp
<i>Oenanthe oenanthe</i> (L., 1758)	ne (on the adjacent territory)	com	scler
<i>Phoenicurus phoenicurus</i> (L., 1758)	ne	com	dendr
<i>Phoenicurus ochruros</i> (S.G. Gmelin, 1774)	ne	un	scler
<i>Erithacus rubecula</i> (L., 1758)	ne	com	dendr
<i>Luscinia luscinia</i> (L., 1758)	ne	few	dendr
<i>Luscinia svecica</i> (L., 1758)	ne	com	lim?
<i>Turdus pilaris</i> L., 1758	ne	com	dendr
<i>Turdus merula</i> (L., 1758)	ne?	un	dendr
<i>Turdus iliacus</i> L., 1766	ne	com	dendr

Species	Presence	Abundance	Ecological grouping
<i>Turdus philomelos</i> C.L. Brehm, 1831	ne	com	dendr
<i>Turdus viscivorus</i> L., 1758	ne	com	dendr
<i>Aegithalos caudatus</i> (L., 1758)	ne	com	dendr
<i>Parus montanus</i> Baldenstein, 1827	ne	com	dendr
<i>Parus ater</i> L., 1758	ne	com	dendr
<i>Parus caeruleus</i> L., 1758	ne	com	dendr
<i>Parus major</i> L., 1758	ne	com	dendr
<i>Sitta europaea</i> L., 1758	ne	com	dendr
<i>Certhia familiaris</i> L., 1758	ne?	rare	dendr
<i>Passer domesticus</i> (L., 1758)	ne (on the adjacent territory)	com	scler
<i>Passer montanus</i> (L., 1758)	ne	com	scler
<i>Fringilla coelebs</i> L., 1758	ne	num	dendr
<i>Fringilla montifringilla</i> L., 1758	ne?	rare	dendr
<i>Chloris chloris</i> (L., 1758)	ne	com	dendr
<i>Spinus spinus</i> (L., 1758)	ne?	com	dendr
<i>Carduelis carduelis</i> (L., 1758)	ne	com	dendr
<i>Acanthis cannabina</i> (L., 1758)	ne?	un	dendr
<i>Carpodacus erythrinus</i> (Pallas, 1770)	ne	com	dendr
<i>Uragus sibiricus</i> (Pallas, 1773)	ne	few	dendr
<i>Loxia curvirostra</i> L., 1758	ne?	un	dendr
<i>Pyrrhula pyrrhula</i> (L., 1758)	ne	com	dendr
<i>Emberiza citrinella</i> L., 1758	ne	com	dendr
<i>Emberiza hortulana</i> L., 1758	ne	com	dendr
<i>Schoeniclus schoniclus</i> (L., 1758)	ne?	few	lim
<i>Plectrophenax nivalis</i> (L., 1758)	mig	com	camp
Total number of species		146	

Ecological structure of nesting fauna

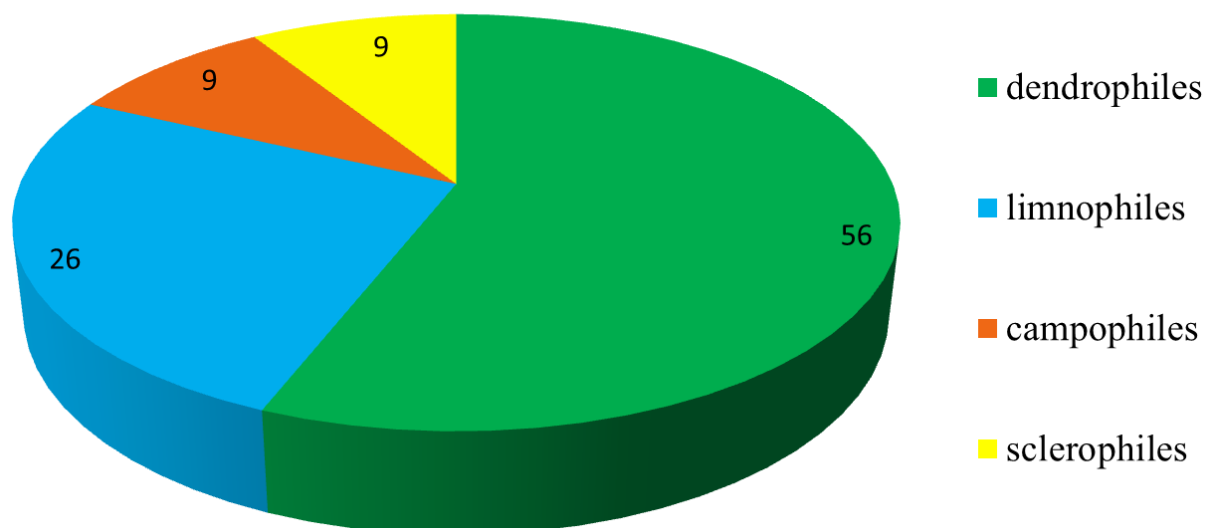


Fig. 5. Ecological structure of breeding avifauna of Uysky Reserve.

Below we provide the information on the rarest species of the reserve, included or deserving, in our opinion, to be included in the Red Data Books of the Russian Federation (Krasnaya kniga..., 2021) and the Chelyabinsk region (Krasnaya kniga..., 2017), as well as those found on the outskirts of their ranges.

Birds of the Uysky Reserve that deserve special attention

Slavonian Grebe. Listed in the Red Data Book of the Russian Federation (category II – a species declining in numbers and distribution). In the Chelyabinsk Region, the species population has decreased threefold over the past 15–20 years (Tarasov, 2017). A single bird was noted on June 8, 2018, in a small pond at the Glazunovsky cordon near the eastern border of the reserve. In 2023, this pond turned out to be dry; the species was not found in other reservoirs of the reserve.

Grey Heron. There are reports of four colonies in the Chelyabinsk Region: 47 nests in the Chebarkul pine forest (Zakharov and Migun, 1996); 14 nests in the vicinity of the village of Rymniksky, Bredinsky District (Gashek, 1999); from 10 to 37 nests on the bank of the Ufa River within the city of Nyazepetrovsk (Chukhareva et al., 2015; Gashek et al., 2018) and in the Uysky Nature Reserve (Gashek et al., 2019). The first two disappeared long ago – destroyed by fire (in the Chebarkul pine forest) and presumably by an Eurasian Eagle Owl (in the Bredinsky District). We found the colony in the Uysky Nature Reserve in early June 2018 at the northern end of the pine forest, half a kilometer south of Lake Voroninsky. It consisted of 3 nests located in pine and larch trees; on June 5, the squeak of small nestlings was heard from the ground. In 2023, this colony included 4 nests located in pine and larch trees. In one of them, on July 10, a fledgling was sitting. The chicks from the others had probably already flown out by that time.

Mute swan. Listed in the Red Data Book of the Chelyabinsk Region (category V – recovering species). In 2018, the species nested on several ponds in the reserve. One pair – on a pond along the Borovaya River in the northern part of the reserve: on June 6, we found a nest with a clutch of 5 hatched eggs, built in a clump of reeds a few meters from a country road; 3 days later, 3 eggs remained in it (their dimensions: 118.3×73.6; 110.7×72.3; 121.0×71.1 mm), which the female periodically incubated, and the two hatched chicks were mainly looked after by the male; 2–3 nesting pairs on Lake Voroninskoye; one pair each on the ponds near the village of Berezovka and along the Sorokina River in the eastern part of the reserve (Gashek et al., 2019).

On July 18, 2023, the only pair of Mute Swans with a brood of 4 chicks was noted only on a pond along the Kalinovka River near the village of Glazunovka.

Whooper Swan. Listed in the Red Data Book of the Chelyabinsk Region (category III – rare species). A pair of birds feeding in an unharvested corn field near Lake Voroninskoye in the northern part of the reserve were noted on June 7, 2018 (Gashek et al., 2019). In 2023, a pair with a brood of 5 chicks was observed throughout the entire study period at a pond along the Borovaya River in the northern part of the reserve, where Mute Swans nested in 2018.

Ruddy Shelduck. Listed in the Red Data Book of the Chelyabinsk Region (category III – rare species). A pair with a brood of 9 downy-cubs was staying on June 7, 2018 on a small dam in the Plyukhino tract near the eastern border of the reserve. According to state inspector P.V. Lukyanov, Ruddy Shelducks have nested here every year since 2015. In 2023, most of the small ponds in the reserve dried up, and Ruddy Shelducks did not breed. On Lake Voroninskoye, on different days of the research period, there were from 3 to 11 single individuals.

European Honey-buzzard. Listed in the Red Data Book of the Chelyabinsk Region (category III – rare species). A single bird flying over the northern part of the reserve was noted on June 6, 2018 (Gashek et al., 2019). In 2023, pairs and single birds (hovering over the pine forest and looking for insects from young pines) were repeatedly recorded in different parts of the reserve. We assume nesting of two to three pairs.

Pallid Harrier. It is listed in the Red Data Books of the Russian Federation (category III – rare species) and the Chelyabinsk Region (category V – recovering species). A single bird was noted in the north-eastern part of the reserve on May 22, 1986. A male circling with a rodent in its claws over a pond along the Borovaya River in the northern part of the reserve was observed on July 10, 2023. We assume that single pairs nest in years with a high number of rodents.

Montagu's Harrier. Listed in the Red Data Book of the Chelyabinsk Region (category III – rare species). Two single birds were encountered in the north-eastern and northern parts of the reserve, in late May and late June 1986, respectively. In 2018, a single male was noted on June 8 at the Glazunovsky cordon in the north-eastern part of the reserve (Gashek et al., 2019). In 2023, a hunting female (possibly the same one) was observed twice – on July 14 and 20 – in the vicinity of the Fominsky cordon in the north-western part of the reserve. We assume nesting in small numbers.

Northern Goshawk. It is listed in Appendix 3 of the Red Data Book of the Chelyabinsk Region as a species requiring special attention to its condition in the natural environment. According to one of the authors, one or two pairs nest in the reserve.

Imperial Eagle. It is listed in the Red Data Books of the Russian Federation (category II – a species decreasing in numbers and/or distribution) and the Chelyabinsk Region (category III – a rare species). According to our data, the nesting population of the species is quite high in the Uysky District (Gashek and Zakharov, 2010; Zakharov, 2013; Zakharov et al., 2018).

In 1986, an inhabited nest existed at the western edge of the settlement of Glazunovka, near a pond along the Kalinovka River in a clump of poplars at a height of at least 10 m. The nest was not found 5 years later.

Another nest was found on June 24, 2007, in the northwestern part of the reserve on the edge of a small birch grove at a distance of about 2 km northeast of the settlement of Fominsky (Zakharov, 2007). The nest was located on a birch at a height of 5–7 m and inhabited until 2018. In May 2023, it was found unoccupied.

A pair of perched eagles were observed at the nest on the edge of an aspen-poplar grove in the middle of a cornfield, 1.5 km southwest of the village of Voronino on June 7, 2018. It was located on a lateral branch of a poplar tree at a height of about 15 m (Gashek et al., 2019). In May 2023, the female was sitting tightly on a nest built on another tree in the same poplar forest. About a third of the old poplars and aspens in the nesting grove (including the poplar on which the Imperial Eagle nest was built in 2018) were cut down by local residents last winter. On July 15 of the same year, the nest was found abandoned. We did not notice any adult birds in the vicinity of the nest until the end of that month. In addition, in July 2023, we discovered paths made through the grove by cattle, and nearby, in the vicinity of the village of Voronino, about 400 heads of cattle grazed daily.

The distance between the nests in the vicinity of the villages of Fominsky and Voronino is about 2 km, and between the nests on poplars nearby Voronino and Glazunovka villages – just over 2 km. Thus, all 3 nests probably belonged to one pair, occupying one or the other in different years.

Another nest was found in 2018, 2 km southwest of the village of Uyskoye and 6 km northeast of the reserve border. It was located on the edge of a birch grove on a birch tree at a height of about 7 m, where 2 chicks were visible on July 11 (Zakharov et al., 2018). During a visit to the nest on May 7, 2023, the female flew off.

Golden Eagle. It is listed in the Red Data Books of the Russian Federation and the Chelyabinsk Region (category III – rare species). In the reserve and its environs, migratory birds are occasionally observed in the autumn-winter period.

White-tailed Sea-eagle. It is listed in the Red Data Books of the Russian Federation (category V – a recovering species) and the Chelyabinsk Region (category III – a rare species). During migration periods, it is not numerous in the reserve and its environs. An adult bird was observed on July 18 and 24, 2023, at a pond along the Kalinovka River near the village of Glazunovka.

Peregrine Falcon. Listed in the Red Data Books of the Russian Federation and the Chelyabinsk Region (category III – rare species).

On a rocky cliff in the northern part of the reserve on July 12, 2023, the remains of pigeons and other birds with the characteristic «signature» of a Peregrine Falcon were discovered, probably hunting them during the spring migration.

Willow Grouse. It is listed in the Red Data Book of the Russian Federation (category II – a species decreasing in numbers and/or distribution) and the Chelyabinsk Region (as the species *Lagopus lagopus*) (category III – a rare species).

In the period from 2008 to 2022, small flocks were occasionally noted in the reserve in the winter.

Western Capercaillie. In the Southern Urals, it is distributed from the northern borders of the region to the southern border of the forest. It is found mainly in pine forests. The southernmost points of distribution in the Chelyabinsk region are the Karagai and Sanarsky pine forests (Zakharov, 2006).

In the Uysky Reserve, the number of Western Capercaillie was quite high during all periods of research. According to quantitative surveys in May 1986 and 1987, it was 1.2 ind./km²; in 2023, over an area of about 14 km² in the northern part of the pine forest, the abundance was about 1.0 ind./km². In July 2023, several adult males were regularly encountered on routes in the northern part of the reserve, as well as broods of 3–6 young.

Demoiselle Crane. It is listed in the Red Data Books of the Russian Federation (category II – a species decreasing in numbers and distribution) and the Chelyabinsk Region (category III – a rare species). The northern boundary of the species' range passes through the Chelyabinsk Region (Zakharov, 2019). In the last 2–3 decades, the Demoiselle Crane range has been expanding to the north (Ilyashenko, 2018; Korovin, 2009; Popov and Rassomakhina, 2019; Zakharov, 2018, 2019). A pair circling over the northeastern edge of the pine forest was observed on July 16, 2023. Presumably, 1–2 pairs nest in the steppe part of the reserve; in 2008–2022, disturbance of individual pairs and broods was noted. The Uysky Reserve is one of the northern points of nesting registration of the species in the region.

Stock Pigeon. It is listed in the Red Data Books of most regions of the European part of the Russian Federation (with status categories II–V), in Appendix 2 of the Red Data Book of the Sverdlovsk Region (2018) as a species requiring special attention to its condition in the natural environment.

According to our research, the Stock Pigeon should be listed in Appendix 3 of the regional Red Data Book as a species requiring special attention to its condition in the natural environment (Gashek and Krasutsky, 2021).

In the Uysky Reserve, it was noted during surveys in the northern part of the pine forest at the end of May 1986. It was not recorded later.

European Turtle dove. Listed in the Red Data Books of the Russian Federation (category II – a species declining in numbers and/or distribution) and the Chelyabinsk Region (category II – a species with declining numbers). Noted by voice during surveys in the northern part of the reserve at the end of May 1986. The species was not recorded later.

Oriental Cuckoo. The distribution of the species in the Southern Urals is mainly associated with coniferous forests (Zakharov, 2006). Following A.M. Sudilovskaya (1952), we believe that the finds of the Oriental Cuckoo in places where it had not been previously found are explained by a more detailed study of the country's avifauna, and not by the expansion of its range. In the southern forest-steppe of the Trans-Urals, encounters with the Oriental Cuckoo were recorded in the Etkulsky pine forest, in the vicinity of the villages of Priozerny, Groznetsky of the Etkulsky district, the village of Stepnoye of the

Troitsky district, at the southern border of the Dzhabyk-Karagaysky pine forest, in the vicinity of the village of Sistema of the Kartalinsky district, in the northeastern part of the Karagaysky nature reserve (Gashek, 2016; Gashek et al., 2024; Tarasov et al., 2014).

In the Uysky Reserve, the Oriental Cuckoo was heard on June 6 and 8, 2018 in the northern part of the pine forest (Gashek et al., 2019) and on July 12, 2023. This point, along with the above, is one of the southern registrations of possible nesting of the species in the region.

Eurasian Eagle-owl. Listed in the Red Data Books of the Russian Federation and the Chelyabinsk Region (category III – rare species). Mating calls were heard in early April 2017 and 2018 near a Western Capercaillie mating ground in the southern part of the pine forest with numerous granite outcrops (Gashek et al., 2019).

Northern Hawk Owl. Listed in the Red Data Book of the Chelyabinsk Region (category III – rare species). In the Chelyabinsk Region, it is most often recorded during autumn-winter migrations (Red Data Book, 2017). In the reserve, it is also occasionally noted during autumn-winter migrations.

Ural Owl. The number of this species in the Chelyabinsk region has been decreasing in recent years. Judging by the findings (including nesting) in the urbanized landscape, there is a tendency towards its synanthropization (Gashek et al., 2018, 2019; Polyakov et al., 2017).

In the northern part of the Uysky Reserve, an adult bird was noted in May 1986 and at the end of June of the same year; an adult with three young in the mesoptile was encountered in the same area. In the same northern part, on July 17, 2023, a young Ural Owl was observed in the mesoptile.

Great Grey Owl. Listed in the Red Data Book of the Chelyabinsk Region (2017) with the V category of rarity status (recovering species). Two flightless chicks, that had recently left the nest and were being fed by adult birds, were found on June 5, 2018 in the northern part of the Uysky pine forest (Gashek et al., 2019). In 2023, two chicks were repeatedly observed in the same area of the pine forest in the mesoptile. In addition, adult tawny owls and the voices of young birds begging for food were noted in the area of the pine forest at a distance of about 2 km from the previous brood. The population size of the species in the northern part of the pine forest, according to the results of research in 2023, was about 0.3 ind./km².

Marsh Warbler. A European species that ranges east to Central Siberia (Ryabitsev, 2008). Relatively rare in the forest-steppe Trans-Urals (Korovin, 2004; Zakharov, 2006). According to O.V. Muradov and A.F. Mamatov (2011), in the floodplain of the Uy River in the vicinity of the village of Uyskoye, the abundance of this reed warbler was 7 ind./km².

In the Uysky Nature Reserve, a pair of birds with nesting behavior was observed on June 7, 2018 in willows near a small dam in the eastern part of the pine forest (Gashek et al., 2019). The species was not noted later.

Blackcap. In the Urals, the Cis-Urals and Western Siberia, it is a rare or uncommon bird; in places, a common bird of the forest-steppe and the southern half of the forest zone with poorly studied distribution boundaries (Ryabitsev, 2008). In the forest-steppe Trans-Urals, it is relatively rare (Zakharov, 2006).

In the Uysky Reserve, one singing male was heard in the northern part of the pine forest on June 8, 2018 (Gashek et al., 2019) and July 10, 2023. The species undoubtedly nests in small numbers.

Wood Warbler. A European species. In the Urals and Western Siberia, it is a rare nesting bird (Ryabitsev, 2008).

In the Uysky Reserve, the singing of the Wood Warbler was noted during the counts in May 1986 in the northern part of the pine forest. It was probably a migrating male. The species was not noted later.

Red-breasted Flycatcher. In the Urals, the Cis-Urals and Western Siberia, it is a species with an uneven distribution. In most areas it is not numerous and rare, in some places it is common (Ryabitsev, 2008). In the Trans-Ural forest-steppe it is extremely rare; singing males are noted in aspen-birch groves only in the northwest of the forest-steppe (Zakharov, 2006).

In the Uysky Nature Reserve, the singing of the Red-breasted Flycatcher was heard at the end of May 2005. It was probably a migratory bird.

Black Redstart. A species actively spreading in the north-eastern direction, nesting cases of which have been increasingly recorded in recent years in the Urals, the Cis-Urals and Western Siberia (Gashek and Zakharov, 2020; Ryabitsev, 2008). A pair of the European subspecies *Ph. o. gibraltariensis* (J.F. Gmelin, 1789), showing nesting restlessness, was recorded in July 2011 in the village of Uyskoye (Muradov and Mamatov, 2011). A nesting pair of Black Redstarts was discovered in 2022 in an inactive children's camp on the north-eastern border of the Karagai Nature Reserve, which borders the Uysky Nature Reserve in the north-east (Gashek et al., 2024).

In the Uysky Reserve, birds of the same subspecies were observed on July 16 and 19 at the abandoned Fominsky and Glazunovsky cordons on the northwestern and eastern outskirts of the pine forest, respectively. At the first, a female with a fledgling was staying near dilapidated wooden buildings, and at the second, a brood: the male was singing, the female with food was worried near the fledgling, fluttering in the yard of a dilapidated wooden house. Under its roof, where adult birds flew in with food, there was obviously a nest and other chicks were hiding. These findings confirm the tendency that has emerged in recent years for the Black Redstarts to reproduce in abandoned wooden buildings of rural settlements (Gashek and Zakharov, 2020; Mosolova and Tabachishin, 2016).

Common Blackbird. A European species, gradually spreading north and east (Ryabitsev, 2008). In the Southern Urals, it is found mainly in the western parts of the region. The easternmost nesting finds in the Chelyabinsk Region were recorded in the Ilmensky Reserve (Zakharov, 2006). Nesting is assumed in the Karagaisky Reserve adjacent to the Uysky Reserve (Gashek et al., 2024).

Disturbing adult birds were repeatedly noted in 2023 in the northern part of the Uysky pine forest in the floodplains of rivers and streams with thickets of bushes and bird cherry; on July 16 of the same year, a male was observed restless with food in the bird cherry thickets at the Glazunov cordon. We assume nesting in small numbers.

Brambling. In the Trans-Ural forest-steppe, it is observed mainly during migration; encounters during the nesting period are extremely rare (Zakharov, 2006). The closest place of supposed nesting to the Uysky Reserve is the Karagaysky Reserve (Gashek et al., 2024).

In the northern part of the Uysky pine forest, in the last days of May 2005 and on June 6, 2018, we heard the singing of the Brambling. We assume that single pairs are nesting.

Long-tailed Rosefinch. The species is distributed west to the Urals and extends its range further west (Ryabitsev, 2008).

In the Uysky Reserve, pairs and single birds were repeatedly noted in June 2018 and July 2023 in the floodplains of rivers and streams in the northern part of the pine forest; on June 7, 2018, a singing male was observed in the willows near a small dam in the southeastern part of the pine forest. It undoubtedly nests in the reserve. This supposed nesting site is one of the westernmost for the Chelyabinsk Region.

Red Crossbill. In the Trans-Ural forest-steppe, during the nesting season, it was found only in island pine forests (Zakharov, 2006). Nesting is assumed to occur in the Karagaisky Reserve adjacent to Uysky (Gashek et al., 2024).

Pairs and small flocks of Red Crossbills were noted in the Uysky pine forest during all study periods. We assume that small numbers of crossbills nest.

Common Bullfinch. Relatively common nesting in pine and pine-birch forests of the eastern foothills of the Southern Urals. In the forest-steppe Trans-Urals, during the nesting period, it was noted in island pine forests (Zakharov, 2006). In the steppe and forest-steppe zones, it was found nesting in the Kartubaisky and Kashtaksky pine forests (Gashek, 2002; Tarasov et al., 2018), presumably nests in the Sanarsky, Chelyabinsk (city) and Karagaysky pine forests (Gashek, 2016; Gashek et al., 2018, 2019).

In the Uysky Nature Reserve, the species is not numerous; it was noted during all periods of research mainly in the floodplain areas of the pine forest. Two young, being fed by their parents, were observed on 14 July 2023 in the northern part of the pine forest, which undoubtedly indicates nesting of the species.

Conclusion

In the territory of the Uysky Reserve and its immediate vicinity, 146 bird species were recorded, for 129 of which nesting was proven or assumed. Among forest birds, according to the averaged data of the 1986 and 1987 counts, the most numerous were the Chaffinch (21%), the Willow Tit and the Tree Pipit (15% each). The subdominants were the Great Tit (7%) and the Common Redstart (6%). In 2018 and 2023, the most numerous were the Chaffinch and the Tree Pipit (9% each of all birds encountered on the routes). The share of the Great Tit, the Common Chiffchaff and the Willow Tit was 7, 6 and 5% of all birds encountered, respectively.

The nesting avifaunas of the Uysky and Karagaysky reserves show significant similarity: the Chekanovsky-Sørensen index $I_{cs} = 0.86$. A total of 107 common species have been identified for these protected areas.

More than half of the nesting bird fauna of the Uysky reserve (56%) are dendrophiles. The share of limnophiles is 26%, campophiles and sclerophiles – 9% each.

Speaking about the dynamics of ornithocenoses of different types of habitats of the Uysky Reserve and the state of individual bird species, we can report the following. The ornithocenosis of the Uysky pine forest, if considered as a whole, without breaking it down into smaller communities based on their association with certain phytocenoses, is in a much better state and is characterized by greater stability compared to ornithocenoses of open and aquatic habitats. Changes in the species composition and relative abundance of most bird species in the pine forest from the 1980s to the 2020s were very insignificant. This is explained by the relatively favorable condition of the pine forest itself as a habitat for the birds inhabiting it (there were no large-scale fires, logging or other types of negative impact on the community). High numbers were noted for the Black Kite, Common Buzzard, Western Capercaillie, Common Wood-pigeon, Great Spotted Woodpecker, many species of passerines: Tree Pipit, Chaffinch, Common Chiffchaff, European Robin, Common Redstart, Spotted Flycatcher, Song Thrush, Mistle Thrush, several species of tits, Eurasian Nuthatch. The Great Grey Owl turned out to be quite common.

The situation is different with regard to ornithocenoses of steppe and steppe-meadow communities and bird species associated with these communities. Most of the open habitats, which make up over half of the reserve's area, are grain crops and perennial grasses, as well as pastures where horses and cattle graze. The situation has been aggravated by more frequent droughts in recent years against the background of abnormally high summer temperatures. Here, according to the results of our research in 2023, low species richness and numbers of insects were noted. These are, primarily, the main groups of the chortobiont complex that dominate in little-disturbed meadow biocenoses: orthoptera, homoptera, hemiptera, and many lepidoptera (this is partially reflected in our work on diurnal butterflies of the Uysky Reserve (Krasutsky and Gashek, 2023)). As a result, the diversity of bird species inhabiting them is extremely poor (12). Monocultures and areas of steppe and meadow vegetation, where grazing occurs with a significant excess of the pasture load (more than 1.0 conventional head of cattle/hectare with an acceptable pasture load on steppe landscapes of 0.2–0.4 (Yunusbayev, 2001)), are characterized by a very poor species composition and low abundance of most bird species compared to intact steppe and meadow communities. The degradation of these communities makes nesting difficult for both common (Eurasian Skylark, Booted Warbler, Whinchat and Stonechat) and rare species (Pallid and Montagu's Harriers, Grey Partridge and Willow Grouse, Common and demoiselles Cranes).

Severe cattle slaughter is observed not only in open areas, but also in birch groves throughout the northern part of the reserve, which leads to extreme depletion of the ornithocomplexes inhabiting them. Very low numbers of even such species common to the southern forest-steppe as the Tree Pipit, Chaffinch, Common Whitethroat, Blyth's Reed-warbler, etc. are noted here. Cattle grazing combined with human disturbance forces the Imperial Eagle (a globally rare species) to abandon its nests, and illegal logging leads to the direct destruction of its nests.

In the 1980–2020s, the aquatic ecosystems of the reserve have undergone significant transformation. Noted in recent years more frequent droughts and abnormally high temperatures from May to the end of August, responsible for the complete drying up of small ponds and a significant shallowing of larger ones, could not but affect the ornithocomplexes state. Many species of waterfowl and near-water birds have stopped nesting (Black-necked Grebe, Eurasian Bittern, Ruddy Shelduck, Northern Shoveler, Tufted Duck, Common Coot, Marsh Sandpiper, Black-tailed Godwit, Common Black-headed Gull, Heuglin's Gull and Common Gull), the number of others (Gadwall, Garganey, Northern Lapwing, Common Redshank) has greatly decreased. However, the abundance of these species is probably also affected by other factors (extermination in wintering areas and migration routes, epizootics, etc.). In 2023, on Lake Voroninskoye, which had become very shallow and lost its protective reed beds, no waterfowl nested at all; only flocks of single birds remained: Great Crested Grebe, Black-necked Grebe, Ruddy Shelduck, Common Pochard, Tufted Duck, and Common Goldeneye. Of the near-water species, only a pair of Northern Lapwings and two pairs of Little Ringed Plover remained. At the same time, new nesting species appeared in the ornithocomplexes of water bodies: Mute Swans and Whooper Swans. For these species, range expansion and population growth are observed in many regions of Russia (Avilova, 2011; Fetisov, 2014; Gashek, 2016; Golovatin and Sokolov, 2019; Lupinos, 2014; Morozov, 2022; Piminov et al., 2022; Popov and Rassomakhina, 2019; Skalon and Skalon, 2022; Tarasov, 2009; Tarasov and Grachev, 2016; Yakovlev, 2009; Zainagutdinova et al., 2020). Both swan species in the reserve exhibit the anthropotolerant behavior: the pond, where Mute Swans nested in 2018 and Whooper Swans in 2023, is small in size and is intensively visited by people – fishermen and vacationers. Despite

this, the birds successfully incubated clutches and hatched chicks. Synanthropization of the Mute Swan is a phenomenon that has long been common in most regions of Russia. For the Whooper Swan, it has only been observed in recent years (Avilova, 2011; Berezovikov, 2015; Fridman et al., 2016; Popova, 2014; Zakharov and Brusyanin, 2019).

Intensive economic activity carried out in the open habitat areas of the Uysky Nature Reserve contradicts the purpose of its establishment: the conservation, reproduction and restoration of living and non-living nature resources, as well as rare and endangered species of plants and animals⁴. Total plowing and overgrazing of livestock hinder and even make impossible the fulfillment of the main tasks of this protected area, i.e. the conservation, reproduction and restoration of natural ecosystems, habitat areas of rare and endangered species of plants, animals and fungi; the conservation and restoration of disturbed landscapes, natural complexes and objects (ibid.).

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⁴ Decree of the Government of Chelyabinsk Oblast dated 22.05.2008 № 139 "On the Uysky Biosphere Reserve".

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APPENDIX. Photographs of some bird species in the Uysky Nature Biological Reserve.



Fig. S1. Mute Swan male. Uysky Reserve, June 2018. All photos are made by V.A. Gashek.



Fig. S2. Mute Swan nest. Uysky Reserve, June 2018.



Fig. S3. Whooper Swan brood. Uysky Reserve, July 2023.



Fig. S4. Black Kite. Uysky Reserve, July 2023.



Fig. S5. Common Buzzard nesting chicks. Uysky Reserve, June 2018.



Fig. S6. Imperial Eagle female at the nest. Uysky Reserve, June 2018.



Fig. S7. Little Ringed Plover. Uysky Reserve, July 2023.



Fig. S8. Great Grey Owl. Uysky Reserve, July 2023.



Fig. S9. Great Grey Owl chick in mesoptile. Uysky Reserve, June 2018.



Fig. S10. Mistle Thrush nesting chicks. Uysky Reserve, July 2023.