

## RESEARCH ARTICLE

# Seasonal Migration Of Birds In The Mountain Ranges Of State Reserve Surkhon: Ecological Features And Habitat Adaptation

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## Abstract

This scientific report summarizes the results of ornithological studies conducted in 2025–2026 in the Kohitang mountain range, including the Surkhon State Reserve. During the study, 137 bird species belonging to 13 orders and 34 families were recorded in the reserve, 11 of which are included in the Red Data Book of the Republic of Uzbekistan. Based on spring and autumn seasonal counts, the abundance, biotope distribution, and population dynamics of rare and predatory bird species, including *Gypaetus barbatus*, *Aquila chrysaetos*, *Aegypius monachus*, *Gyps fulvus*, *Ciconia nigra*, and others, were analyzed. The results provide a scientific and practical basis for improving the conservation and monitoring of the avifauna of the Kohitang Mountains.

**Keywords:** avifauna; seasonal migration; Kohitang Mountains; Surkhon State Reserve; ornithological monitoring; rare birds; population dynamics.

## 1. Introduction

Biodiversity is one of the factors underlying sustainable development and represents an important and potentially valuable resource for meeting the economic, ecological, and cultural-aesthetic needs of humanity. It ensures the formation and functioning of the biosphere as an integrated system in which humans live and develop alongside other biological species. In recent decades, anthropogenic pressure on the natural environment has intensified. Global and local environmental problems, including climate change, accelerated desertification, reduction of forest areas, extinction of certain animal species, and degradation of land resources, pose serious risks to human civilization. Therefore, the study and conservation of

biodiversity have become among the most urgent global priorities.

The Republic of Uzbekistan is characterized by considerable diversity of flora and fauna distributed across different natural complexes. Conservation of the environment, plant and animal life, and natural components remains one of the most important tasks of the present period. Surkhondaryo Region is one of the regions of Uzbekistan with distinctive natural complexes and is particularly notable for the antiquity and diversity of its fauna. Some animal species occurring in the region developed under local conditions, whereas others entered the area through migration from neighboring territories. Distinct faunal complexes have formed across the diverse landscapes of

Surkhandarya, from deserts and oases to mountains and tugai forests. Consequently, studying rare animal and plant species in Uzbekistan, increasing their populations, and implementing restoration measures are important directions for biodiversity conservation.

Birds are an integral component of natural ecosystems and play important ecological roles in nutrient and energy cycling, seed dispersal, and regulation of harmful insect populations. They are also considered bioindicators of environmental conditions. The avifauna of the Kohitang Mountains has not yet been sufficiently studied, and information on species composition, bioecological characteristics, and factors responsible for declines in species listed in the Red Data Book of Uzbekistan remains incomplete. The avifauna of the Kohitang Mountains was initially studied in part by N. A. Zarudny, L. S. Stepanyan, Kh. S. Solikhboyev, O. Bogdanov, M. M. Ostapenko, and other researchers. In particular, O. Bogdanov provided brief ecological descriptions of several species occurring in the area, including *Gypaetus barbatus*, *Aquila chrysaetos*, *Ciconia nigra*, *Aegypius monachus*, and *Gyps fulvus*, in his work "Animals of Uzbekistan". However, the lack of modern, systematic, and long-term monitoring data on the regional avifauna determines the relevance of the present study.

The aim of the study was to determine the species composition of representatives of the class Aves occurring in the Kohitang Mountains, including the Surkhon State Reserve; to study the bioecological characteristics of species included in the Red Data Book of Uzbekistan; and to characterize them from an ecological-monitoring perspective.

The study objectives were to: (1) determine the bird species composition at order, family, and species levels in the Kohitang Mountains and Surkhon State Reserve; (2) conduct spring and autumn seasonal fauna counts along nine designated counting routes and statistically analyze the obtained data; (3) study the distribution, abundance, nesting biotopes, and feeding characteristics of rare bird species included in the Red Data Book of Uzbekistan; (4) assess seasonal population dynamics of rare species; and (5) develop scientific and practical recommendations for the conservation of birds and their habitats.

## **2. Materials and Methods**

### **2.1. Study methods**

During the field studies, anonymous survey data were collected and analyzed from reserve staff and residents of the villages of Xatak, Xo'janqo, Kampirtepa, Shalqon, Sherjon, Qizilolma, and Vandob surrounding the reserve. The results of fauna counts conducted in the Surkhon State Reserve were also analyzed. Counts were conducted using classical ornithological methods: the linear-route (transect) method and observations from fixed (stationary) points. The work was carried out along nine permanent counting routes established in advance within the reserve. Multi-year fauna-count data were processed statistically, including calculation of cumulative species-level indicators and inter-seasonal dynamics.

Long-distance observations and photography were conducted using an AG-60 spotting scope, Nikon binoculars, and camera traps. Scientific literature relevant to the study topic was reviewed and analyzed.

### **2.2. Study area, routes, and equipment**

The fieldwork was planned and initiated at the administrative building of the Surkhon State Reserve. Nine counting routes were established within the reserve, with a combined length of approximately 172.8 km. The counting team departed at 08:00 and then stayed in the mountainous field conditions for 3–4 days while conducting field research along the designated routes.

A Niva 4×4 vehicle was used to reach the designated areas. The field team was equipped with a camera, camera traps, binoculars, a tent, sleeping bags, a GPS device, a night-vision device, and a spotting scope.

### 3. Results

#### 3.1. Species composition of the avifauna

The avifauna of the Surkhon State Reserve differs from the bird fauna of other parts of the region in its distinctive

diversity. Seasonal migrants, resident species, wintering birds, and breeding species occur in the area, including rare species listed in the Red Data Books of Uzbekistan and at the international level. The scientific data collected to date represent an initial stage of research in this direction and provide a foundation for further scientific investigations.

The study established that the bird fauna recorded in the reserve comprises 13 orders, 34 families, and 137 species (Table 1). Passeriformes had the largest number of species, comprising 19 families and 92 species, or 67.2% of the total species composition. Falconiformes ranked second, with 2 families and 17 species (12.4%). The remaining 11 orders were represented by fewer species, although they included numerous large predatory birds and rare species that play important ecological roles in the reserve ecosystem.

*Table 1. Distribution of recorded birds in the Surkhon State Reserve by order*

| Order            | Number of families | Number of species | Share |
|------------------|--------------------|-------------------|-------|
| Passeriformes    | 19                 | 92                | 67.2% |
| Falconiformes    | 2                  | 17                | 12.4% |
| Columbiformes    | 1                  | 7                 | 5.1%  |
| Galliformes      | 1                  | 4                 | 2.9%  |
| Coraciiformes    | 3                  | 4                 | 2.9%  |
| Strigiformes     | 1                  | 4                 | 2.9%  |
| Ciconiiformes    | 1                  | 2                 | 1.5%  |
| Apodiformes      | 1                  | 2                 | 1.5%  |
| Gruiformes       | 1                  | 1                 | 0.7%  |
| Cuculiformes     | 1                  | 1                 | 0.7%  |
| Caprimulgiformes | 1                  | 1                 | 0.7%  |
| Upupiformes      | 1                  | 1                 | 0.7%  |
| Coliiformes      | 1                  | 1                 | 0.7%  |
| Total            | 34                 | 137               | 100%  |

Work aimed at determining the species composition and distribution sites (biotopes) of seasonal and breeding birds in

the reserve is continuing systematically. Beginning with the spring 2025 count, the species known in the source report as “Tog’

zag'chasi'' was separately added to the counting list for targeted study of its habitat and population.

### 3.2. Results of seasonal fauna counts

Three seasonal counts were conducted in 2025–2026 to determine the abundance of common and rare bird species

occurring in the Surkhon State Reserve: 28–30 May 2025 (spring), 18–20 November 2025 (autumn), and 13–15 May 2026 (spring). Each count was conducted simultaneously along all nine routes of the reserve.

Count Record for the Spring Fauna  
Survey Conducted on 28–30 May 2025

| No | Species                                           | No. 1<br>Xo'jak<br>sar<br>26.8<br>km | No. 2<br>Xat<br>ak<br>26.3<br>km | No. 3<br>Xo'ja<br>nqo<br>15 km | No. 4<br>Qizilol<br>ma<br>27.3<br>km | No. 5<br>Shalq<br>on<br>15.6<br>km | No. 6<br>Kampirt<br>epa<br>23.4 km | No. 7<br>Sherj<br>on<br>16.2<br>km | No. 8<br>Vand<br>ob<br>11.2<br>km | No. 9<br>Daroyi<br>g'ul<br>11 km | Tot<br>al |
|----|---------------------------------------------------|--------------------------------------|----------------------------------|--------------------------------|--------------------------------------|------------------------------------|------------------------------------|------------------------------------|-----------------------------------|----------------------------------|-----------|
| 1  | ( <i>Accipiter<br/>nissus</i> )                   | 5                                    | 11                               | 7                              | 5                                    | 9                                  | 4                                  | 8                                  | 9                                 | 3                                | 61        |
| 2  | ( <i>Alectoris<br/>chukar</i> )                   | 193                                  | 338                              | 221                            | 98                                   | 145                                | 275                                | 201                                | 523                               | 65                               | 2049      |
| 3  | ( <i>Gypaetus<br/>barbatus</i> )                  | 4                                    | 7                                | 3                              | 4                                    | 8                                  | 7                                  | 9                                  | 8                                 | 2                                | 52        |
| 4  | ( <i>Ammope<br/>rdix<br/>griseogul<br/>aris</i> ) | 29                                   | 15                               | 14                             | 22                                   | 11                                 | 7                                  | 43                                 | 41                                | 2                                | 184       |
| 5  | ( <i>Neophro<br/>n<br/>percnopte<br/>rus</i> )    | 3                                    | 6                                | 2                              | -                                    | 5                                  | 2                                  | 9                                  | 5                                 | 5                                | 37        |
| 6  | ( <i>Aegypius<br/>monachus</i><br>)               | 4                                    | 4                                | 5                              | 3                                    | 6                                  | 3                                  | 9                                  | 5                                 | 5                                | 44        |
| 7  | ( <i>Gyps<br/>fulvus</i> )                        | 18                                   | 12                               | 18                             | 7                                    | 19                                 | 11                                 | 20                                 | 25                                | 8                                | 138       |
| 8  | ( <i>Aquila<br/>chrysaeto<br/>s</i> )             | 5                                    | 7                                | 5                              | 4                                    | 9                                  | 5                                  | 8                                  | 12                                | 6                                | 61        |
| 9  | ( <i>Ciconia<br/>nigra</i> )                      | 4                                    | 1                                | -                              | -                                    | -                                  | -                                  | -                                  | -                                 | -                                | 5         |
| 10 | ( <i>Falco<br/>naumanni</i><br>)                  | 5                                    | 1                                | 4                              | 3                                    | 4                                  | 3                                  | 1                                  | 7                                 | 1                                | 29        |
| 11 | ( <i>Falco<br/>pelegrinoi<br/>des</i> )           | 2                                    | 4                                | 2                              | -                                    | 2                                  | 2                                  | 4                                  | 3                                 | 1                                | 20        |
| 12 | ( <i>Falco<br/>cherrug</i> )                      | 2                                    | 6                                | 2                              | 2                                    | 2                                  | -                                  | 5                                  | 5                                 | -                                | 24        |

|    |                                    |    |    |    |    |    |    |   |    |    |     |
|----|------------------------------------|----|----|----|----|----|----|---|----|----|-----|
| 13 | ( <i>Streptopelia turtur</i> )     | 16 | 13 | 16 | 13 | 9  | 14 | 9 | 11 | 5  | 106 |
| 14 | ( <i>Pyrrhoxorax pyrrhoxorax</i> ) | 15 | 13 | 12 | 15 | 21 | 9  | 9 | 14 | 22 | 130 |

Count Record for the Autumn  
Fauna Survey Conducted on 18–20  
November 2025

| No. | Species                          | No. 1<br>Xo'jak<br>sar<br>26.8<br>km | No. 2<br>Xat<br>ak<br>26.3<br>km | No. 3<br>Xo'jan<br>qo<br>15 km | No. 4<br>Qizilol<br>ma<br>27.3<br>km | No. 5<br>Shalq<br>on<br>15.6<br>km | No. 6<br>Kampirt<br>epa<br>23.4 km | No. 7<br>Sherj<br>on<br>16.2<br>km | No. 8<br>Vand<br>ob<br>11.2<br>km | No. 9<br>Daroyi<br>g'ul<br>11 km | Total |
|-----|----------------------------------|--------------------------------------|----------------------------------|--------------------------------|--------------------------------------|------------------------------------|------------------------------------|------------------------------------|-----------------------------------|----------------------------------|-------|
| 1   | ( <i>Accipiter nisus</i> )       | 6                                    | 11                               | 7                              | 4                                    | 10                                 | 5                                  | 7                                  | 10                                | 4                                | 64    |
| 2   | ( <i>Alectoris chukar</i> )      | 213                                  | 304                              | 211                            | 127                                  | 147                                | 280                                | 235                                | 530                               | 114                              | 2161  |
| 3   | ( <i>Gypaetus barbatus</i> )     | 5                                    | 6                                | 4                              | 5                                    | 9                                  | 7                                  | 8                                  | 9                                 | 4                                | 57    |
| 4   | Chil                             | 32                                   | 31                               | 15                             | 29                                   | 13                                 | 27                                 | 39                                 | 33                                | 16                               | 235   |
| 5   | ( <i>Neophron percnopterus</i> ) | 3                                    | 9                                | 1                              | 1                                    | 6                                  | 4                                  | 8                                  | 6                                 | 6                                | 44    |
| 6   | ( <i>Aegypius monachus</i> )     | 5                                    | 2                                | 4                              | 4                                    | 7                                  | 4                                  | 9                                  | 6                                 | 5                                | 46    |
| 7   | ( <i>Gyps fulvus</i> )           | 20                                   | 11                               | 20                             | 8                                    | 18                                 | 6                                  | 21                                 | 26                                | 9                                | 139   |
| 8   | ( <i>Aquila chrysaetos</i> )     | 6                                    | 9                                | 4                              | 6                                    | 6                                  | 6                                  | 9                                  | 13                                | 8                                | 67    |
| 9   | ( <i>Ciconia nigra</i> )         | 3                                    | 3                                | -                              | -                                    | -                                  | -                                  | -                                  | -                                 | -                                | 6     |

Count Record for the Spring Fauna  
Survey Conducted on 13–15 May 2026

| No. | Species | No. 1<br>Xo'jak<br>sar | No. 2<br>Xat<br>ak | No. 3<br>Xo'jan<br>qo<br>15 km | No. 4<br>Qizilol<br>ma | No. 5<br>Shalq<br>on | No. 6<br>Kampirt<br>epa<br>23.4 km | No. 7<br>Sherj<br>on | No. 8<br>Vand<br>ob | No. 9<br>Daroyi<br>g'ul<br>11 km | Total |
|-----|---------|------------------------|--------------------|--------------------------------|------------------------|----------------------|------------------------------------|----------------------|---------------------|----------------------------------|-------|
|-----|---------|------------------------|--------------------|--------------------------------|------------------------|----------------------|------------------------------------|----------------------|---------------------|----------------------------------|-------|

|        |                                                   | 26.8<br>km | 26.3<br>km |     | 27.3<br>km | 15.6<br>km |     | 16.2<br>km | 11.2<br>km |    |          |
|--------|---------------------------------------------------|------------|------------|-----|------------|------------|-----|------------|------------|----|----------|
| 1      | ( <i>Accipiter<br/>nissus</i> )                   | 10         | 10         | 7   | 6          | 5          | 5   | 9          | 8          | 5  | 65       |
| 2      | ( <i>Alectoris<br/>chukar</i> )                   | 202        | 342        | 222 | 185        | 152        | 312 | 206        | 494        | 70 | 218<br>5 |
| 3      | ( <i>Gypaetus<br/>barbatus</i> )                  | 5          | 6          | 4   | 6          | 8          | 7   | 10         | 9          | 3  | 58       |
| 4      | ( <i>Ammope<br/>rdix<br/>griseogul<br/>aris</i> ) | 30         | 37         | 15  | 25         | -          | 10  | 45         | 44         | 27 | 229      |
| 5      | ( <i>Neophro<br/>n<br/>percnopte<br/>rus</i> )    | 4          | 4          | 2   | 6          | 4          | 3   | 10         | 5          | 6  | 44       |
| 6      | ( <i>Aegyptius<br/>monachus<br/>)</i>             | 5          | 6          | 5   | 7          | 2          | 4   | 9          | 5          | 4  | 47       |
| 7      | ( <i>Gyps<br/>fulvus</i> )                        | 19         | 13         | 19  | 8          | 12         | 12  | 20         | 26         | 11 | 140      |
| 8      | ( <i>Aquila<br/>chrysaeto<br/>s</i> )             | 8          | 7          | 5   | 10         | 6          | 6   | 8          | 12         | 6  | 68       |
| 9      | ( <i>Ciconia<br/>nigra</i> )                      | 6          | -          | -   | -          | -          | -   | -          | -          | -  | 6        |
| 1<br>0 | ( <i>Falco<br/>naumanni<br/>)</i>                 | 6          | 3          | 5   | 3          | 2          | 4   | 2          | 6          | 2  | 33       |
| 1<br>1 | ( <i>Falco<br/>pelegrinoi<br/>des</i> )           | 5          | 3          | 3   | -          | -          | 3   | 3          | 2          | 3  | 22       |
| 1<br>2 | ( <i>Falco<br/>cherrug</i> )                      | 3          | 4          | -   | 2          | -          | 2   | 4          | 2          | 6  | 23       |
| 1<br>3 | ( <i>Streptope<br/>lia turtur</i> )               | 17         | 12         | 14  | 15         | -          | 16  | 8          | 12         | 15 | 109      |
| 1<br>4 | ( <i>Pyrrhoco<br/>rax<br/>pyrrhoco<br/>rax</i> )  | 16         | 15         | 14  | 14         | 33         | 11  | 10         | 20         | 24 | 157      |

### 3.3 Comparative analysis of count dynamics

Comparison of the three seasonal counts indicates an increasing trend in the total numbers of all major observed species

from spring 2025 to spring 2026 (Table 2). In particular, the number of *Alectoris chukar* increased from 2,049 to 2,185 individuals; *Gypaetus barbatus* from 52 to 58; *Aquila chrysaetos* from 61 to 68; and

*Aegypius monachus* from 44 to 47. The most pronounced increases were recorded for *Neophron percnopterus* and *Ciconia nigra*, which may be associated with adaptation to local conditions or improvements in search and observation

methods. The number of *Gyps fulvus* remained relatively stable (138–140 individuals), which may indicate stabilization of this species' population within the reserve.

Table 2. Population dynamics of large predatory and rare bird species in 2025–2026

| Species                             | Spring 2025 | Autumn 2025 | Spring 2026 | Change (2025 spring → 2026 spring) |
|-------------------------------------|-------------|-------------|-------------|------------------------------------|
| ( <i>Accipiter nisus</i> )          | 61          | 64          | 65          | +6.6%                              |
| ( <i>Alectoris chukar</i> )         | 2049        | 2161        | 2185        | +6.6%                              |
| ( <i>Gypaetus barbatus</i> )        | 52          | 57          | 58          | +11.5%                             |
| ( <i>Ammoperdix griseogularis</i> ) | 184         | 235         | 229         | +24.5%                             |
| ( <i>Neophron percnopterus</i> )    | 37          | 44          | 44          | +18.9%                             |
| ( <i>Aegypius monachus</i> )        | 44          | 46          | 47          | +6.8%                              |
| ( <i>Gyps fulvus</i> )              | 138         | 139         | 140         | +1.4%                              |
| ( <i>Aquila chrysaetos</i> )        | 61          | 67          | 68          | +11.5%                             |
| ( <i>Ciconia nigra</i> )            | 5           | 6           | 6           | +20.0%                             |

### 3.4. Seasonal distribution and habitat observations

It should be emphasized that increases in count indices do not necessarily represent actual population growth. They may partly reflect improvements in observation methodology, accumulated experience along the routes, and changes in weather conditions. Therefore, the observed trends should not be regarded as final conclusions, but rather as preliminary results that require confirmation through monitoring in subsequent years.

During the studies conducted throughout the reserve, greater concentrations of birds during winter were observed in Quruqqo'l Gorge, the western part of Qoplon Gorge, Qo'ldaroz Gorge, Bog'lidara, Shomuroddara, Zaravutsoy, and

the southern and eastern parts of the Vandob section. In January–February 2026, precipitation was greater and air temperatures were lower than during the same period in 2025. On some days, daytime temperatures fell to  $-10$  to  $-13$  °C and nighttime temperatures reached  $-20$  °C; snow cover persisted for 5–10 days. Such sharp temperature changes created considerable difficulties for some bird species in finding food.

Differences were also observed in the timing of arrival of seasonal migratory birds in the reserve. In the first quarter of 2025, this process was mainly observed at the beginning of March, whereas in the corresponding period of 2026, arrival began toward the end of March. For example, swallows were first recorded in the city of Termez, Surkhandarya Region, on 25 March, while they began to be encountered

in the reserve on 13–14 March. The passage of cranes was first recorded on 27 March and continued until 10 April. In the middle part of the mountains, species such as the grey thrush, black thrush, spotted rock thrush, pied thrush, carrion crow, hooded crow, and raven were more frequently encountered, whereas at higher elevations the scavenging birds *Gyps fulvus*, *Gypaetus barbatus*, and *Aegypius monachus* were observed in flight.

Among the large predatory birds, *Gyps fulvus*, *Gypaetus barbatus*, and *Aegypius monachus* were regularly encountered throughout the reserve, particularly in the Xatak and Xo'janqo sections. White storks listed in the Red Data Books of Uzbekistan and at the international level were not recorded in the reserve during this season; this requires particular attention during subsequent monitoring periods.

### 3.5. Resident birds and their bioecology

Observations conducted during 2025–2026 established that resident birds occurring in the reserve currently comprise 5 orders, 16 families, and 44 species. Some of these species are unevenly distributed across the Kohitang range and the Surkhon State Reserve and differ in population density, habitat dependence, and other bioecological characteristics. Resident species include *Accipiter nisus*, *Alectoris chukar*, *Falco cherrug*, *Streptopelia turtur*, *Neophron percnopterus*, and *Falco peregrinoides*, each of which is described below.

A total of 11 bird species included in the Red Data Book of the Republic of Uzbekistan were recorded in the reserve. During the first half of 2026, these rare species were directly recorded in the Kohitang Mountains, particularly in seven

sections of the Surkhon State Reserve. The following are brief eco-monitoring descriptions of selected Red Data Book species studied during the first half of 2026.

#### ***Ciconia nigra* (Linnaeus, 1758)**

Uzbekistan Red Data Book category: 2 (VU:R) — Vulnerable, naturally rare, with a declining population; a breeding and passage species.

International conservation status (MSOP/IUCN): LC (Least Concern), but considered vulnerable in Central Asia and at the regional level.

CITES: Appendix II.

Resident in the Kohitang Mountains. For nesting, it selects steep rocky sites in the Oroltog', Tangidevoldara, Shalqon, Sariqamishsoy, and Boyqo'nish massifs. During the spring 2026 count, a total of 6 Black Storks were recorded on the Xo'jaksar route.

Unlike the White Stork, it nests away from human settlements, near shady forests, mountain rivers, quiet lakes, and wetlands. It feeds mainly on fish, amphibians (frogs), aquatic invertebrates, and occasionally small rodents and reptiles. It builds large nests in trees and on steep cliffs and lays 2–5 eggs. Habitat loss, human disturbance, and drying of water bodies are limiting factors.

#### ***Gypaetus barbatus* (Linnaeus, 1758)**

Uzbekistan Red Data Book category: 2 (VU:R) — Vulnerable, naturally rare.

International conservation status (MSOP/IUCN): NT (Near Threatened). The national classification of Uzbekistan records category 4.

CITES: Appendix II.

It inhabits steep cliffs, deep gorges, and alpine mountain meadows at elevations of more than 2,000–4,000 m above sea

level. It is a large and widely distributed predatory bird in the Kohitang Mountains. Nests have mainly been recorded in the Oltikunlik, Tangidevol, Quruqqo'l, Qo'ldaroz, Daroyig'ul, Sovuqbuloq, Daracha, Toshliuyurtsoy, and Boyqo'nish gorges. It selects steep, partly shaded cliff sites inaccessible to people and other animals. It feeds mainly on small birds and carrion and occasionally on young urials. It is more common in Quruqqo'l Gorge. During the spring 2026 count, 10 individuals were recorded on the Sherjon route, 8 on the Shalqon route, and 9 on the Vandob route, for a total of 58.

An unusual characteristic among predatory birds is that bones constitute 70–90% of its diet. It drops large bones from a height onto rocks to break them and consumes the marrow and fragments. It nests in caves and ledges of steep cliffs and lays 1–2 eggs.

***Aquila chrysaetos* (Linnaeus, 1758)**

Uzbekistan Red Data Book category: 2 (VU:R) — Vulnerable, naturally rare.

International conservation status (MSOP/IUCN): LC (Least Concern), with a declining trend. The national protection category of Uzbekistan is recorded as level 3.

One of the largest predatory birds in the Kohitang Mountains. Nests occur in Oltikunlikdara, Tangidevoldara, Daroyig'ul, Kattatog, and Zaravutsoy. Like the Bearded Vulture, it builds nests in difficult-to-access locations. It mainly feeds on *Alectoris chukar*, “Chil”, some predatory mammals, and young urials. Golden Eagles were encountered in almost all parts of the reserve during 2026, and 68 individuals were recorded during the spring count.

Wingspan is 1.8–2.3 m and body mass is 3–6.3 kg, with females larger than males. It inhabits open mountain slopes, high-altitude alpine meadows, gorges, and sparsely visited areas of deserts and residual mountains. It feeds mainly on hares, marmots, *Alectoris chukar*, reptiles, and young small ungulates. It builds large nests on steep cliffs and tall trees. It lays 1–3 eggs in February–March and incubates them for 40–45 days.

***Aegypius monachus* (Linnaeus, 1766)**

Uzbekistan Red Data Book category: 3 (NT) — Near Threatened, naturally rare and vulnerable.

International conservation status (MSOP/IUCN): NT (Near Threatened). It is included in category 4 of the national protection list of Uzbekistan.

CITES: Appendix II.

It is the largest bird in the Kohitang Mountains. It nests on steep cliffs in areas bordering Turkmenistan; confirmed nests were recorded in the Vandob, Xatak, and Kampirtepa sections. According to the spring count conducted on 13–15 May 2026, 9 individuals were recorded on the Sherjon route and 7 on the Qizilolma route, for a total of 47.

It is the largest representative among the species described here, with a body mass of up to 14 kg and a wingspan of up to 3.1 m. It inhabits mountain slopes at 1,000–3,000 m, open alpine meadows, and areas with juniper forests and is primarily a scavenger. It feeds on carrion and carcasses of large wild and domestic animals and helps prevent the spread of various diseases. It builds a large nest on the tops of large trees, mainly junipers, or on ledges of steep cliffs. It lays one egg, rarely two, in February–March, incubated alternately by both sexes.

**Gyps fulvus (Hablizl, 1783)**

Uzbekistan Red Data Book category: 3 (NT) — Near Threatened, naturally rare and vulnerable.

International conservation status (MSOP/IUCN): LC (Least Concern). At the regional level, however, it is considered to require protection.

CITES: Appendix II.

A predatory bird that is poorly studied and relatively uncommon in the Kohitang Mountains. According to the spring count conducted on 13–15 May 2026, 26 individuals were recorded on the Vandob route, 20 on the Sherjon route, and 19 each on the Xo'janqo and Xo'jaksar routes, for a total of 140.

It inhabits steep cliffs, deep gorges, and mountainous areas adjoining pastures and alpine meadows at elevations of 1,000–3,500 m. It is relatively scarce and scattered in the mountains of Central Asia, which is why it is included in the Red Data Book of Uzbekistan. Wingspan is 2.3–2.8 m and body mass is 6–13 kg. It nests colonially and is a natural sanitary scavenger feeding exclusively on carrion. Nests are built in caves and on ledges of steep cliffs, often in colonies. It lays one, rarely two, eggs in February–March, incubated alternately by both parents.

**Falco naumanni Fleischer, 1818**

Uzbekistan Red Data Book category: 3 (NT) — Near Threatened, with declining abundance and range.

International conservation status (MSOP/IUCN): LC (Least Concern). In earlier assessments it was classified as VU (Vulnerable), but its status improved following global population recovery.

CITES: Appendix II.

Its distribution and population in the Kohitang Mountains are currently poorly studied. According to data from the 1960s

(Kh. S. Solikhboyev and M. M. Ostapenko), it was recorded in the foothills of the Kohitang range. During the spring 2025 count (28–30 May), it was recorded on 26 March; 7 individuals were observed on the Vandob route and 5 on the Xo'jaksar route. It was also encountered in Bog'lidara and Shomuroddara.

Unlike other falcons, it nests colonially. It is a small-bodied migratory falcon that uses cracks in cliffs, walls of mud fortresses and ruins, old buildings, and sometimes tree cavities for nesting. It lays 3–5 reddish-spotted eggs in May and incubates them for 28 days. It occurs in steppe regions from the Mediterranean to Mongolia and China and winters in Africa. Its numbers declined sharply at the end of the twentieth century because of agricultural intensification and loss of nesting sites, and it was previously classified as Vulnerable.

**Falco pelegrinoides Temminck, 1829**

Uzbekistan Red Data Book category: 2 (VU:R) — Vulnerable, with a restricted distribution. Its abundance and habitat range are naturally limited and require special protection.

IUCN Red List: LC (Least Concern). It is often treated as a subspecies of the Peregrine Falcon (*Falco peregrinus peregrinus* / *Falco peregrinus pelegrinoides* in the source wording), and therefore is not assessed separately as threatened.

CITES: Appendix I — species at very high risk of extinction for which international trade is strictly prohibited.

A vulnerable, naturally rare, semi-resident subspecies; within the reserve it is considered resident. According to the spring count of 13–15 May 2026, a total of 22 individuals were recorded, with the highest number on the Xo'jaksar route; it

was not recorded on the Qizilolma and Shalqon routes.

It inhabits deserts, semi-deserts, and rocky mountain areas and mainly captures other birds in flight. Its range extends from North Africa through Western and Central Asia to mountainous areas of the Arabian Peninsula. The main causes of decline are illegal capture for falconry and disturbance of nesting sites.

**Alectoris chukar (J.E.Gray, 1830)**

A medium-sized bird with gray plumage with a reddish-pink tone on the head, neck, anterior back, shoulder, and upper wing coverts. Body mass is approximately 350–650 g. It is resident in the reserve. According to the spring count of 13–15 May 2026, 2,185 individuals were recorded; the highest numbers were on the Vandob route (494) and Xatak route (342).

It is widely distributed in mountainous and foothill areas of Western, Central, and South Asia and has a stable population. In the reserve avifauna, it is one of the most numerous species and forms an important link in the food chain, being a major prey species for predatory birds.

**Accipiter nisus (Linnaeus, 1758)**

A small predatory bird distinguished by short, broad wings and a long tail, enabling agile flight among trees. Adult males have a body length of 29–34 cm, a wingspan of 59–64 cm, a total length of 35–41 cm, and a body mass of approximately 186–345 g. The upperparts are grayish-blue, while the chest and abdomen have yellowish-rufous streaks; the lower surface is marked with dark brown streaks. It is resident in the reserve. According to the spring count of 13–15 May 2026, 65 individuals were recorded; 10 each were recorded on the Xatak and Xo'jaksar routes and 9 on the Sherjon route.

It mainly feeds on small and medium-sized birds, including sparrows, starlings, larks, finches, and pigeons. Females are larger and can capture somewhat larger prey. It mainly builds compact nests from twigs in trees and lays 4–6 whitish eggs with dark spots in spring, incubating them for approximately 33–35 days.

**Falco cherrug J.E.Gray, 1834**

Uzbekistan Red Data Book category: 3 (NT) — Near Threatened; abundance and range are steadily declining.

IUCN Red List: EN (Endangered) — a threatened species. It is classified internationally in a higher-risk category because of a sharp global population decline.

CITES: Appendix II — international trade and transport are strictly controlled.

It belongs to the falcon family. Wingspan is 35–43 cm; female body mass is 820–980 g and male body mass is approximately 970–1,130 g. It occurs in mountainous and lowland areas of Uzbekistan, nests in trees and on rocks, and mainly feeds on birds and rodents. It is resident in the reserve. According to the spring count of 13–15 May 2026, 23 individuals were recorded; the highest number was on the Daroyig'ul route (6), followed by Xatak and Sherjon (4 each).

The upperparts are brown to dark brown with lighter feather edges. It feeds mainly on small and medium-sized rodents and birds. It stalks prey in low flight and pursues it rapidly near the ground. The head and neck are pale with dark streaks; the underparts are whitish with dark brown spots and streaks. It nests in cavities in cliffs, mud and stone ravines, sometimes on power pylons or in abandoned nests of larger birds such as crows and the species called “Jo'rchi” in the source. It lays 3–5

reddish-brown spotted eggs in March–April, incubated mainly by the female for 30–33 days. Because of its sharp decline, it has been elevated internationally to the Endangered (EN) category, making its conservation particularly important for range states such as Uzbekistan.

***Streptopelia turtur* (Linnaeus, 1758)**

Uzbekistan Red Data Book status: 2 (VU:D) — Vulnerable, with a declining population. It was included in the national Red Data Book because its population in Uzbekistan has decreased substantially in recent years owing to habitat change and reduced food resources.

IUCN (MSOP) Red List: VU (Vulnerable). According to the international assessment conducted in 2015, its global status declined and it was moved from LC (Least Concern) to VU (Vulnerable).

Slightly smaller than a pigeon, with a bluish-gray upper head and neck, a light brown back, and black legs. Body length is 270–315 mm and body mass is approximately 100–130 g. It is resident in the reserve. According to the spring count of 13–15 May 2026, 109 individuals were recorded; the highest numbers were on the Xo'jaksar route (17), Kampirtepa (16), and Daroyig'ul (15).

The back has a rusty-brown and black-spotted pattern, with a distinctive black-and-white striped collar on both sides of the neck. It is a passage and breeding bird. It arrives in Uzbekistan in spring (late April–May) and leaves in autumn (August–September) to winter in sub-Saharan and Central Africa. It inhabits foothills, riverine tugai forests, gardens, orchards, and shelterbelts. It feeds mainly on seeds of wild and cultivated plants and cereal crops.

***Neophron percnopterus* (Linnaeus, 1758)**

Uzbekistan Red Data Book status: 2 (VU:D) — Vulnerable, with a declining population trend. Its distribution in the country is restricted and its numbers are decreasing.

CITES: Appendix II — international trade is strictly controlled.

A predatory bird of the Accipitridae family, 60–70 cm in length and weighing up to 2.5 kg. During the breeding period it inhabits mountains, hills, and ravines and nests on cliffs and in ravines. It is resident in the reserve. According to the spring count of 13–15 May 2026, 44 individuals were recorded; the highest numbers were on the Sherjon route (10) and Qizilolma route (6).

Adults have whitish-yellowish plumage with distinctly black wing tips. The head and throat are featherless and covered with bare yellow or orange skin. The bill is relatively slender and hooked. It is a sanitary scavenger and feeds mainly on carrion, waste, and small bones, and sometimes on lizards, tortoises, and bird eggs.

#### 4. Discussion

The results show that the Surkhon State Reserve supports a diverse avifauna comprising 137 species in 34 families and 13 orders. The dominance of Passeriformes, which account for 67.2% of the recorded species, is consistent with the broad ecological diversity of the reserve. At the same time, the occurrence of large predatory and scavenging birds is particularly important for ecosystem functioning.

The seasonal counts showed increases in the observed numbers of several principal species between spring 2025 and spring 2026. However, the study

itself emphasizes that these changes cannot automatically be interpreted as true population growth because observation efficiency, accumulated field experience, and weather conditions may affect count indices. Consequently, the trends should be treated as preliminary until supported by longer-term monitoring.

The spatial concentration of birds in particular gorges and sections during winter, together with differences in seasonal arrival timing, indicates that habitat conditions and weather can influence bird distribution and detectability. The cold conditions recorded in January–February 2026, including temperatures down to  $-20^{\circ}\text{C}$  at night and persistent snow cover, likely increased food-searching difficulties for some species. The absence of White Stork records during the observed season also indicates the need for continued monitoring.

The study further indicates that several rare species remain insufficiently studied in the Kohitang Mountains, particularly *Falco naumanni* and *Falco pelegrinoides*. Their restricted or poorly documented distribution supports the need for targeted research. The recorded nesting sites of large raptors should likewise receive special protection, while local communities should be more actively involved in biodiversity awareness and conservation.

## 5. Conclusion and Scientific-Practical Recommendations

The results of studies conducted in the Kohitang Mountains and analysis of data collected in recent years in the Surkhon State Reserve indicate that nature conservation activities within the reserve and surrounding areas are generally

established at an adequate level, and consequently the conservation status of birds, including rare species, is relatively favorable. At the same time, the need for more detailed study of these species and stronger protection regimes in their distribution areas remains.

Analysis of data collected through studies of the ecology of rare bird species indicates that anthropogenic factors have a negative influence on population growth. Overall, the species composition of birds occurring in the Kohitang Mountains, particularly the ecology and biology of rare resident species, remains insufficiently studied. Therefore, research should be continued systematically.

- Maintain the nine established counting routes and continue seasonal (spring and autumn) monitoring regularly at least twice a year.

- Place identified nesting sites of large predatory birds such as *Gypaetus barbatus*, *Aquila chrysaetos*, *Aegypius monachus*, and *Gyps fulvus* under a special protection regime.

- Develop a dedicated scientific research program for poorly studied species such as *Falco naumanni* and *Falco pelegrinoides*.

- Expand environmental education and biodiversity-conservation awareness activities among residents of the surrounding villages (Xatak, Xo'janqo, Kampirtepa, Shalqon, Sherjon, Qizilolma, and Vandob).

- Maintain count data in a unified electronic database and regularly analyze annual population dynamics.

- Regularly publish research results in international and local scientific journals and expand scientific cooperation with higher-education institutions.

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