

# Update on the status of Saker Falcon (*Falco cherrug*) in Armenia

Karen AGHABABYAN<sup>1\*</sup>, Manuk MANUKYAN<sup>2</sup>, Daniel KLEM, JR.<sup>3</sup>,  
Hovik STEPANYAN<sup>4</sup> & Sevak BALOYAN<sup>5</sup>

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**Abstract** The update on the status of Saker Falcon in Armenia suggests breeding of seven to nine pairs in the central and southern regions of the country where the birds occupy semi-deserts and mountain steppes. The breeding area of the species is estimated to be 724 km<sup>2</sup>, and the extent of occurrence is estimated to be 9,056 km<sup>2</sup>. The conservation status of the species in Armenia can be evaluated as Critically Endangered, according to IUCN criteria. The greatest potential threat includes the illegal killing of the species by pigeon breeders. Other threats, such as illegal capture for falconry and illegal killing for trophy do not have a significant influence. The pressure of electrocution requires further investigations. Based on our current results and assessment of the Saker Falcon's conservation status in Armenia, we recommend several conservation suggestions and measures such as the change of the species' conservation status, discovering all the Saker's nests and including them in protected areas, managing the detrimental behavior of the pigeon breeders, training for Environmental Protection and Mining Inspection Body and Armenian Customs Service, raising awareness of hunters, and monitoring raptors' electrocutions.

Keywords: population size, threats, conservation status, poisoning, monitoring

**Összefoglalás** A kerecsensólyom helyzetének legújabb értékelése alapján Örményországban hét-kilenc pár költése feltételezhető az ország középső és déli régióinak félsivatagos és hegyvidéki sztyeppterületein. A faj fészkelőterületét 724 km<sup>2</sup>-re, míg a teljes előfordulási területét 9056 km<sup>2</sup>-re becsülik. A faj természetvédelmi helyzete Örményországban az IUCN kritériumai szerint kritikusan veszélyeztetettként értékelhető. A legnagyobb potenciális fenyegetést a faj galambtenyésztők általi illegális pusztítása jelenti. Egyéb veszélyeknek, mint például a solymászati célra történő illegális befogásnak, valamint az illegális trófeavadászatnak nincs jelentős hatásuk. Az áramütés hatása további vizsgálatokat igényel. Az eredményeink, valamint a kerecsensólyom örményországi természetvédelmi helyzetének értékelése alapján több természetvédelmi ajánlást teszünk és intézkedést javasolunk, például a faj védelmi státuszának megváltoztatását, az összes kerecsensólyom-fészkek felkutatását, és e területek védetté nyilvánítását, a galambtenyésztők káros tevékenységének kezelését, képzések biztosítását a Környezetvédelmi és Bányászati Felügyeleti Hatóság és az Örmény Vámhivatal számára, a vadászok érzékenyítését, valamint a ragadozómadarakat érő áramütések monitorozását.

Kulcsszavak: állományagság, veszélyeztető tényezők, természetvédelmi helyzet, mérgezés, monitoring

<sup>1</sup> BirdLinks Armenia NGO (former TSE NGO: Armenian Bird Census), 87b Dimitrov, apt 14, 0020 Yerevan Armenia

<sup>2</sup> Protection of Endemic and Endangered Species NGO, 141, 2 Karapet Ulnetsi, Yerevan 0014 Armenia

<sup>3</sup> Acopian Center for Ornithology, Muhlenberg College, Allentown, PA 18104-5586 USA

<sup>4</sup> Urartu Falconry Club, 174 Mamikonyan, Goris, Armenia

<sup>5</sup> Department for Licenses, Permits and Compliances, Ministry of Environment (CMS Focal Point for Armenia), Government Building 3, Republic Square, 0010 Yerevan, Armenia

\* corresponding author, e-mail: karen.ghababyan@gmail.com

## **Introduction**

Saker Falcon (*Falco cherrug*) is a globally threatened species, included in IUCN Red List as Endangered (BirdLife International 2017), in Resolution 6 of Bern Convention (European Environmental Agency 2011), in Annex II of Convention for Migratory Species (CMS 2020), in Annex II of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 2023), and in Armenian Red Book (Aghasian & Kalashyan 2010) as Endangered.

The species was recorded in Armenia since 1930s (Dahl 1954), and traditionally was considered a migratory and wintering bird for the country (Adamian & Klem 1999), being replaced by Lanner Falcon (*Falco biarmicus*) as was justified by Dementiev and Gladkov (1951).

In 2018 (Korepov & Aghababyan 2020), the first proof of its breeding was recorded in Armenia, and it encouraged us to conduct field investigations to search for other possible breeding locations and to reassess the conservation status of the species in the country.

This paper summarizes the results of our field investigations and provides an assessment of the national conservation status of the Saker Falcon in Armenia.

## **Material and Methods**

### **Data collection**

We collected data on occupied nests, and birds observed in territorial behavior. To guide our search, all documented breeding records of the species were identified in the database of National Bird Monitoring, Observation.Org and eBird. We searched for birds showing territorial behavior and the discovery of occupied nests. We used the guide developed for the European Breeding Bird Atlas 2 (hereinafter EBBA 2) (Voříšek *et al.* 2008) to inform about territorial behavior.

During 2019–2023, we recorded 33 Saker Falcon individuals, and one newly occupied nest.

### **Data processing**

Using QGIS 3.30.2 (QGIS.org 2023), we mapped all species records. We used standard European Terrestrial Reference System 1989 (The Digital National Framework 2013) in a scale of 10 × 10 km. Mapped records and breeding codes were used to identify cells with higher probability of breeding (Voříšek *et al.* 2008). The cells we identified were used to extrapolate to similar areas to estimate the overall breeding population of Saker Falcon in Armenia.

Our breeding records were also used to estimate the Area of Occupancy (AOO) and the Extent of Occurrence (EEO) according to IUCN guidelines (IUCN Standards and Petitions Committee 2019) for the species. To compute the AOO, we divided the existing

10 × 10 km<sup>2</sup> cells into 2 × 2 km<sup>2</sup> cells and overlapped the smaller new grid with areas of individual concentrations, including the cells between the birds, which have been recorded within one concentration. This permitted identifying occupied cells at the 2 × 2 km<sup>2</sup> grid level. We then multiplied the number of occupied cells by the area of an individual cell, taking 4 km<sup>2</sup> (2 × 2 km) cells as the reference scale. To compute the EOO, the rule of minimum convex polygons (the smallest polygon in which no internal angle exceeds 180° and which contains all the sites of occurrence) was applied for the species' AOO, excluding discontinuities and disjunctions of all grid cells within the overall distribution inside the borders of Armenia.

The results of this analysis were used for assessment of the conservation status of the species according to the IUCN guidelines (IUCN Standards and Petitions Committee 2019).

### **Threat data collection**

To determine the threats to the species, we interviewed five inspectors of RA Environmental Protection and Mining Inspection Body, heads of seven Hunting Unions, 23 pigeon breeders, who live around the concentration areas of the Sakers' records, and four custom officers of four customs services of the country: one in Zvartnots International Airport, two services at the northern border with Georgia and one service at the southern border with Iran. Additionally, we obtained records from the Department for Licenses, Permits and Compliances of the RA Ministry of Environment on all authorized permissions to export raptors from Armenia.

Interviews with the first three target groups were conducted in an informal but confidential manner. Our questions to the Environmental Protection and Mining Inspection Body were to assess the poaching of medium-sized raptors, as well as determine Saker Falcon knowledge of the inspectors (*Annex 1*). Questions to the heads of Hunting Unions were to determine possible poaching cases, and also their knowledge of Saker Falcon (*Annex 1*). Questions to the pigeon breeders were to assess the harm, they identified with medium-sized raptors, and the hat measures they used to protect their pigeons (*Annex 1*). Our interview with customs officers was semi-structured, aimed at identification of any illegal trade of different raptor species, and an ability of custom officers to differentiate the raptor species (*Annex 1*).

## **Results**

### **Distribution and abundance of Saker Falcon in Armenia**

We found two occupied nests, five concentration areas, and two additional areas with isolated records in the breeding season in Armenia (*Figure 1*) and estimated the Saker Falcon population to be seven to nine pairs in the country. Saker Falcons are mostly distributed in the central and southern regions of the country, occupying semi-deserts and dry mountain steppes (*Figure 2*). Both nests occurred on the cliffs in shallow grottos at the height of 10

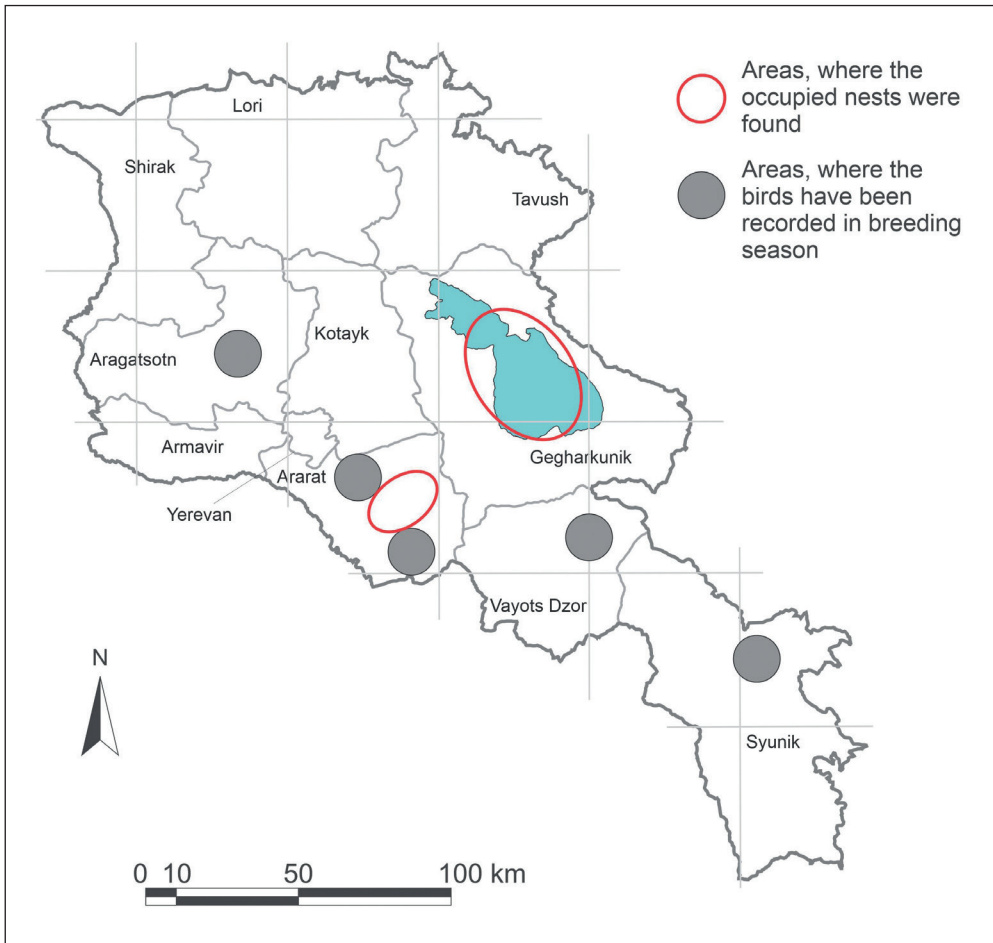


Figure 1. Distribution map of Saker Falcon in Armenia (the geographical details are hidden on purpose, taking the species' sensitivity into consideration)

1. ábra A kerecsensólyom elterjedési térképe Örményországban (a pontos földrajzi adatok szándékosan rejtve maradnak, figyelembe véve a faj érzékenységét)

and 30 meters from the bottom. The length of the cliff face for the first nest was about 70 meters; it was a stick nest constructed by the Egyptian Vulture (*Neophron percnopterus*) and known since 1995. The length of the cliff face for the second nest was about 130 m; it was located on the nude ledge. The area of species occupancy (AOO) is estimated to be 724 km<sup>2</sup>, and the extent of occurrence (EOO) is estimated to be 9,056 km<sup>2</sup>.

### Potential threats for Saker Falcons in Armenia

Our interview with the RA Environmental Protection and Mining Inspection Body (n = 5) revealed that the inspectors do not know the species and its conservation value. During the last 10 years, they documented over 30 cases of poaching of medium-sized raptors



Figure 2. Saker Falcon's habitat in Armenia. Photo by K. Aghababyan  
 2. ábra Kerecsensólyom élőhely Örményországban. Fotó: K. Aghababyan

(Annex 2), which were shot for trophies (over 20 cases in 2013–2018 and less than 10 cases in 2019–2023). In all cases, specialists identified the species, most of which were Long-legged Buzzard (*Buteo rufinus*), Common Buzzard (*Buteo buteo*) and Honey Buzzard (*Pernis apivorus*). During these ten years, only one case recorded a Goshawk (*Accipiter gentilis*). Additionally, the Inspection Body informed us about the increased frequency of electrocution of raptors, among them various eagles, buzzards and goshawks.

Interviews with the heads of Hunting Unions (n = 7) identified the existence of more than 200 specimens of medium-sized raptors in the homes of hunters. Of these, two were Saker Falcons, both shot more than 20 years ago in autumn. Only two heads of Hunting Unions knew about Saker Falcon and its conservation status. According to their opinion, members of the hunting union do not know about the species and its conservation value.

Interviews with the pigeon breeders (n = 23) reveal that most of their experiences with avian predators are negative. From pigeon breeders during the past three years, 4 (17%) reported no predation, although they heard about raptor attacks on the pigeons, 7 (30%) reported 1–2 cases, 8 (35%) reported 2–5 cases, and 5 (22%) reported more than 5 cases. Thirteen (57%) pigeon breeders used a gun to scare raptors, and 3 (13%) used poison – a cheap pigeon smeared with poison and then released to be captured and eaten by the raptor. All pigeon breeders expressed a negative attitude towards raptors. Many knew the Peregrine

Falcon (*Falco peregrinus*), some knew the Eurasian Goshawk, but only one knew the Saker Falcon. None were able to identify raptors on the species level.

The customs officers (n = 4) interviewed revealed that they never recorded any illegal trade of raptors. They had heard about such cases 10 years ago. They were not able to identify the different raptor species. Custom officers also informed us about the lack of procedures to identify exported species. Consequently, although they are required to inspect for authorized legal certificates, they do not check whether the species listed in the certificate is the same as those of the specimens being exported.

The materials obtained from the Department for Licenses, Permits and Compliances reveal that during the last 10 years, there were no cases of issuing a CITES certificate for exporting the wild caught Saker Falcon, but there were six CITES certificates issued for Saker Falcons reared in captivity in 2021. There was no DNA test made to see if young Sakers' DNA matched the DNA of their parents, to exclude the possibility of taking the young birds from the natural nests and selling them as „captive-bred” ones; however, the young Sakers were reported to the Department for Licenses, Permits and Compliances throughout the whole period of their growth as nestlings.

## **Discussion**

We present the most current evidence about the breeding population of Saker Falcon in Armenia. There may be a natural expansion of their breeding range in the country, which may be the result of increased pressure addressing illegal trapping, following such action in neighboring Turkey (Dixon 2007) and Georgia (Kovács *et al.* 2014). Alternatively, breeders may originate from falconry, as escapees from northern Arabic countries may travel to and settle in Armenia as a good breeding destination. It is possible that from the 1990s, some breeding pairs of Saker Falcon occurred in Armenia, but were overlooked, even though extensive surveys were conducted in 1995 during the “Birds of Armenia Project” (Adamian & Klem 1999). Based on the current data, the number of breeding pairs should be estimated at seven to nine, and not three or four, as suggested earlier (Korepov & Aghababayan 2020). There is currently not enough data to estimate a population trend for this species. The conservation status of the species can be based on three criteria (IUCN Standards and Petitions Committee 2019): (1) According to criteria D1 the species qualifies as Critically Endangered having 25 pairs or less; (2) According to criteria B1 the species is Vulnerable, having an EOO of < 20,000 km<sup>2</sup>; and (3) According to criteria B2 the species is Vulnerable, having the AOO < 2,000 km<sup>2</sup>, although its accompanying point ‘a’ – qualifies as Endangered, having the number of locations = 5. Considering that this is a species with a large range, its EOO could be misleading; therefore, a more reasonable assessment is to consider the species status in Armenia as Critically Endangered under criteria D1 (IUCN Standards and Petitions Committee 2019) until additional information is available.

Among the threats, illegal trapping for falconry is considered low, although it should not be neglected, as the species becomes more numerous and widespread. To control illegal

trapping, the lack of appropriate knowledge and skills of customs inspectors increases this risk for the species.

A greater, even alarming, threat is the attitude of the pigeon-breeders. If guns are used to scare raptors, they are also available to purposefully kill them. The new “poisoned pigeon” technique used by pigeon breeders was also reported for Booted Eagle (*Hieraetus pennatus*), (Aghababyan & Stepanyan 2020), and is even more alarming. The questioned pigeon breeders (n = 23) make up only 1.2% of Armenian pigeon breeders. Therefore, the figure cannot be considered representative. However, 13% of pigeon breeders that applied this technique indicate that it is likely that pigeon breeders may use poison in this way throughout Armenia. Consequently, the scope and severity of the use of poison should be considered as „high” as a precautionary measure.

The threat of poaching for trophy is believed to be a modest threat to raptor populations. However, the low number of poaching cases can also be resulted by low determination of poaching, and therefore, additional investigation should be conducted.

Losses due to electrocution are unclear and require further investigations.

In sum, we offer the following conservation suggestions: (1) change the conservation status of the species in the upcoming edition of the Red Book of Animals of Armenia; (2) search and discover all other nests of Saker Falcon in the country; (3) include all breeding areas into existing Emerald Sites, protected under Bern Convention; (4) develop a strategy up-listing those areas with the intention of considering them as Nationally Protected Areas; (5) develop a program to manage the detrimental behavior of the pigeon breeders, e.g. alternative methods of scaring avian predators; (6) develop and implement training programs for Environmental Protection and Mining Inspection Body and Armenian Customs Service; (7) develop awareness programs for hunting unions of Armenia; and (8) design and implement a program to monitor raptors electrocutions.

Additionally, we recommend conducting genetic studies to identify the origin of Armenian Saker Falcons, and by so doing determine what, if any, exchanges occur between other border-country populations and their respective vulnerability.

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