Bird Census News 2024, 37/1–2: 16–20

The State and Conservation of Cinereous Vulture, *Aegypius monachus* (Linnaeus, 1766) in Armenia

Karen Aghababyan & Gurgen Khanamirian

BirdLinks Armenia NGO (formerly TSE Towards Sustainable Ecosystems NGO), 87b Dimitrov, apt 14, 0020 Yerevan, Armenia

karen.aghababyan@gmail.com

Abstract. The study of Cinereous Vulture *Aegypius monachus* in Armenia implemented in 2003–2019 showed that the species breeds mainly in the Khosrov Forest State Reserve. Its breeding population was between 12 to 14 breeding pairs, and the number of non-breeding individuals was estimated as 3–7 occurring in the country per year. The Area of Occupancy for the species was 456 km^2, and the Extent of Occurrence was 15,695 km^2. The population trend has shown a moderate increase (*Additive* = 0.0465 ± 0.0164, *Multiplicative* = 1.0476 ± 0.0172, $p < 0.01$). The overall increase of the population was 110% from 2003 to 2019 (16 years), averaging 6.45% per year. The threats for the species are poaching, shortage of food supply, poisoning by heavy metals at municipal dumps, lead poisoning from the bullets, poisoning by non-steroidal anti-inflammatory drugs (NSAIDs) which come from livestock husbandry, and forest fire. The proposed conservation measures include: (1) review of the policy of punishments for poaching the species and strengthening inspection; (2) increasing the network of the citizen scientists, who can advocate against poaching; (3) study of the potential poisoning of the species by heavy metals and NSAIDs; (4) development of sustainable artificial feeding stations; (5) strengthening capacity of Khosrov Reserve by setting up the fire early warning and fighting systems; (6) continuous monitoring of the species and reassessment of its conservation status in 2025.

Introduction

There are four species of Old World Vultures inhabiting Armenia (Adamyan and Klem 1999, Cramp and Perrins 1993). Among them is the Cinereous Vulture *Aegypius monachus*, which is currently listed in the IUCN Red List as Near Threatened. This monotypic species breeds in Spain, Bulgaria, Greece, Turkey, Armenia, Azerbaijan, Georgia, Ukraine, Russia, Uzbekistan, Kazakhstan, Tajikistan, Turkmenistan, Kyrgyzstan, Iran, Afghanistan, north India, northern Pakistan, Mongolia and mainland China, with a small reintroduced population in France (BirdLife International 2018, Cramp and Perrins 1993, Meyburg *et al*. 2020). In Armenia the Cinereous Vulture is a year-round resident, although it conducts some local movements in winter. This largest raptor of Armenia makes its huge nests (1.5–2 meters across) mainly on Juniper *Juniperus* spp. trees (Adamian and Klem 1999). The incubation period begins in late February to March, when the female lays one egg. The nestlings hatch in April to May and stay in the nest throughout the hot summer; that is why the adult often protects the nestling from overheating by creating shade with its open wings. The fledglings leave the nest in late August – early September (Adamian and Klem 1999, Geilikman 1965). The Cinereous Vulture was identified as the most vulnerable vulture species in Armenia, as its breeding population was significantly reduced after collapse of Soviet Union, due to the decline in its food supply and the poaching of adult birds for trophy hunting and nestlings for a wildlife trade (Aghababian *et al*. 2004). Several projects of various State and Non-governmental organizations were aimed at the conservation of the Cinereous Vulture's population in Armenia (IUCN 2013); however, publications on a current state of the species in Armenia are scarce. This paper is aimed at describing the modern conditions of the Cinereous Vulture in the country, including threats and existing and needed conservation measures, which can be a foundation for assessment of its conservation status.

Figure 1. The breeding habitat of the Cinereous Vulture *Aegypius monachus* in the Khosrov Forest State Reserve. Photo by Karen Aghababyan

Materials and methods

The systematic data collection on the species started in 2003. Monitoring was implemented by absolute counts of breeding pairs through locating occupied nests annually over the period from 2003 to 2019. Nests were searched for in the period of late March to early May, when one of the adults is permanently incubating or guarding the downy nestling. After the first inventory, conducted in 2003, 8–12 days per annum were spent monitoring known nests and searching for possible new ones. In addition, road-side vehicular surveys were implemented aimed at identification of number of non-breeding individuals.

To calculate population trends, we used multi-year data series and processed them using TRIM 3.0 software (Van Strien *et al*. 2004). For the purpose the Collated Index is calculated using log-linear poison regression; then the deviations are calculated and presented as a linear function, showing population growth or decline. Statistically significant change is stated on the $p < 0.05$ level, otherwise the population is considered stable. The mapping was implemented using QGIS 3.30.2 software. The Area of species occupancy (AOO) and the Extent of species occurrence (EOO) for the Cinereous Vulture were computed using the IUCN guidelines (IUCN Standards and Petitions Committee 2024). To calculate the AOO, we applied a national 2×2 km grid (BirdLinks 2019) and summed up all the 2×2 km cells where the adult birds were observed in the breeding season. 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 to the species' AOO, excluding discontinuities and disjunctions within the overall distribution inside the borders of the country. To assess threats, we conducted surveys of hunters, and of main online and offline market places where the mounted specimens of raptors are sold; also, we conducted questionnaires with farmers and veterinarians.

Results

Distribution and some biological peculiarities in Armenia

In Armenia Cinereous Vultures was found breeding mainly in Khosrov Forest State Reserve, occupying mainly juniper woodland (Figure 1 & 2) at an elevation range from 1,000 to about 2,000 m a.s.l. The species was recorded forming loose colonies, where the nests can be located as close to each other as 300–500 metres or even closer. The same nest was observed being used for several

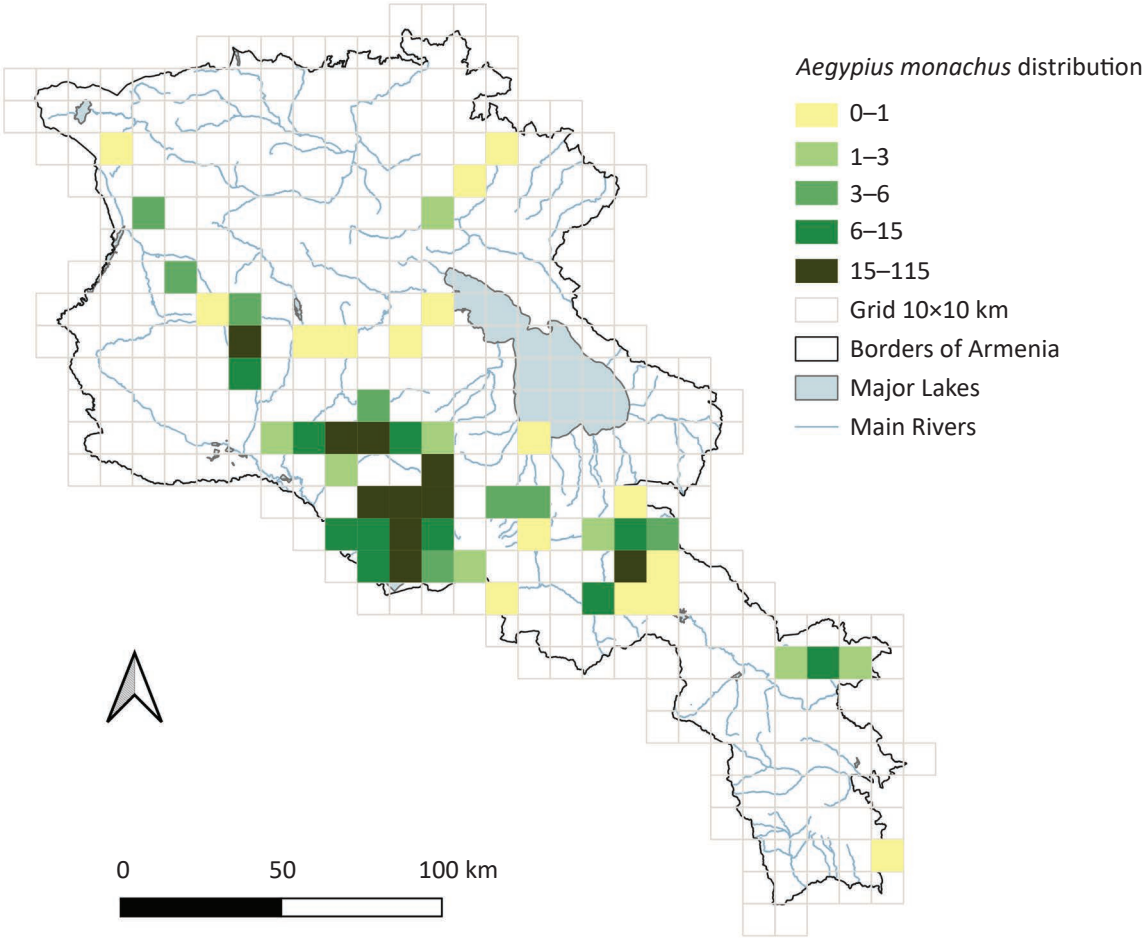

Figure 2. Breeding distribution of the Cinereous Vulture *Aegypius monachus* in Armenia. The standard European grid of 10×10 km (outlined with pale grey) is applied to Armenia. The filled squares indicate the records of the species summed from counts throughout the period of 2003–2019; darker colours indicate higher summed counts.

years in the absence of disturbance. In Armenia Cinereous Vultures were observed feeding on large-size carrion; also, the adult vultures were observed flying from Khosrov Reserve to Turkey in the morning, apparently searching for food. The AOO for the species was 456 km^2, and the EOO was 15,695 km^2.

Population dynamics

According to the most recent counts, the population of the species is between 12 to 14 breeding pairs; the number of non-breeding individuals observed in Armenia is 3–7 birds per year. The population trend during 2003–2019 demonstrated a moderate increase (*Additive* = 0.0465 ± 0.0164, *Multiplicative* = 1.0476 ± 0.0172, $p < 0.01$). The overall increase of the population computed from a linear trend (Figure 3) was 110% in 16 years, averaging 6.45% per year. In 2003–2005, there were 2–5 nestlings stolen from nests for sale per year, but no such cases were reported in 2016–2018. The recorded cases of poaching were 0–2 birds per year during 2016–2019.

Present conservation measures

At current the only breeding sites of the species that are covered by the National special protected area network are located in Khosrov Forest State Reserve, which is also a candidate Emerald Site. The species is included in IUCN Red List as Near Threatened (BirdLife International 2018), in Red Book of Animals of Armenia (Aghasyan & Kalashyan 2010) as Endangered (EN D), and in Annex II of the Bern Convention. The species is included in the Multi-species Action Plan to Conserve African-Eurasian Vultures, prepared under Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia of Convention on Migratory Species (Botha *et al*. 2017), and Armenia is a range state of that MoU.

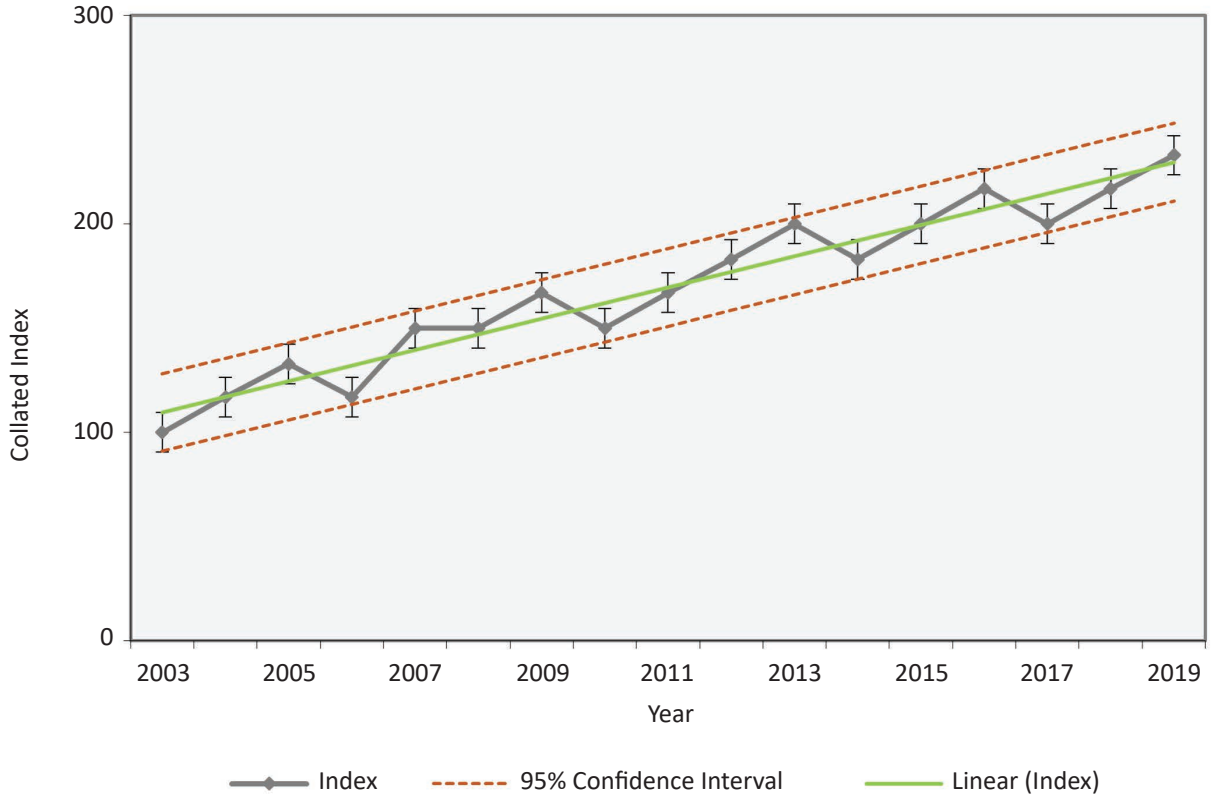

Figure 3. Population trend of the Cinereous Vulture *Aegypius monachus* in 2003–2019. The grey lines indicate observed population index throughout the years. The green line indicates a linear population trend. The orange dotted lines indicate a 95% confidence interval.

Discussions

Causes of observed population trend

The increasing population trend could be driven by several factors such as supplemental feeding by several conservation organizations and cessation of illegal nestling harvesting.

One of the most significant threats of early 2000s — the theft of nestlings from the nest for selling (Aghababian *et al.* 2004) — is over, mainly due to strengthening of protection regime in Khosrov Forest State Reserve. However, at present, the breeding and non-breeding individuals are still affected by direct persecution for trophies. The shortage of food was a critical issue and apparently affected the population of the species throughout 1980s to early 2000s. The species is known for its long-distance foraging areas (Moreno-Opo *et al*. 2010); thus, during breeding seasons of 2010–2019 the birds of Khosrov Reserve were observed flying to Turkey, most probably to search for food. This is likely to have caused the major population decline from about 50 pairs down to 7–8. Currently, the supplemental food that was coming from slaughter houses is still not available. There is a positive dynamic in population of some wild ungulates, e.g. the Bezoar Goat *Capra aegagrus aegagrus* (WWF Armenia, personal communication), and time to time the conservation organizations provide additional feeding, with the result that the food supply is improving.

Other possible threats come from potential poisoning by (1) heavy metals at municipal dumps, where batteries, mobile phones and other devises are disposed together with the food remains; (2) lead poisoning from the bullets; (3) poisoning by non-steroidal anti-inflammatory drugs (NSAIDs) which come from livestock husbandry. Recently, a new threat emerged — forest fire, which has not occurred in the Khosrov Reserve in past, happened in 2017 and destroyed over 3,000 hectares of habitats, including juniper woodland. Since the nestlings of the Cinereous Vulture fledge in August (the most dangerous period for fire), large-scale fires can affect the breeding success of the entire population.

Proposed conservation measures

The proposed conservation measures include: (1) reviewing the policy of punishments for poaching the species and strengthening inspection; (2) increasing the network of citizen scientists, who can advocate against poaching; (3) studying the potential poisoning of the species by heavy metals and NSAIDs; (4) development of sustainable artificial feeding stations; (5) strengthening the capacity of Khosrov Reserve with the establishment of fire early warning and fighting systems; and (6) continuous monitoring of the species for reassessment of its conservation status in 2025.

Acknowledgements

The inventory and monitoring of Cinereous Vultures in Armenia is supported by the Khosrov Forest State Reserve. A significant help was provided by the members of Armenian Ornithological Society (former Armenian Birdwatching Association).

Several agencies provided financial support for the study. The inventory and monitoring of Cinereous Vultures in Armenia, as well as the study of their biological peculiarities in 2003–2005, is supported by CRDF Global and NFSAT Foundations (grant number 12025/BI 06802), Natural Research Ltd., and International Avian Research; in 2003–2006 by Hawk Mountain Sanctuary. In 2015–2019 the monitoring was supported by the European Bird Census Council through a grant from the MAVA Foundation for the European Breeding Bird Atlas — EBBA2 (the grant agreements have not been provided with numbers). The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH supported Environmental Programme contributed to the data analysis (grant number 83318294).

References

Adamian, M. and Klem, D. 1999. Handbook of the Birds of Armenia. American University of Armenia, California.

Aghababian, K., Bildstein, K., Ghasabyan, M. 2004. “Vultures of Armenia” Environment of Caucasus. Tbilisi, 2004, 2 (7): 4–6.

Aghasyan, A. and Kalashyan, M., eds. 2010. The Red Book of Animals of the Republic of Armenia. Yerevan, Ministry of Nature Protection.

BirdLife International. 2017. *Aegypius monachus* (amended version of assessment). The IUCN Red List of Threatened Species 2017: e.T22695231A118573298.

http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T22695231A118573298.en. Downloaded on 25 January 2018.

Cramp, S. and Perrins, C. M. 1993. Handbook of the birds of Europe, the Middle East and Africa. The birds of the western Palearctic, vol VII: flycatchers to shrikes. Oxford University Press, Oxford.

Fayvush, G., Arakelyan, M., Aghababyan, K., Aleksanyan, A., Aslanyan, A., Ghazaryan, A., Oganesyan, M., Kalashyan, M., Nahapetyan, S. 2016. In Baloyan, S. (ed.) The “Emerald” Network in the Republic of Armenia. Yerevan. Ministry of Nature Protection.

Geilikman, B.O. 1965. To the ecology of Accipitridae of Armenian SSR. Dissertation on PhD in Biology. AS of Arm SSR, Division of Biological Sciences, Zoology — 03.00.08. Yerevan.

IUCN Standards and Petitions Committee. 2024. Guidelines for Using the IUCN Red List Categories and Criteria. Version 16. — https://www.iucnredlist.org/resources/redlistguidelines (Downloaded on 7th May 2024)

Meyburg, B.-U., Christie, D. A. , Kirwan, G.M. , Marks, J.S. 2020. Cinereous Vulture (*Aegypius monachus*), version 1.0. In Birds of the World (J. del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.cinvul1.01

Moreno-Opo, R., Arredondo, A., Guil, F. 2010. Foraging range and diet of cinereous vulture *Aegypius monachus* using livestock resources in central Spain. Ardeola, 57 (1): 111–119.

Van Strien, A., Pannekoek, J., Hagelmeijer, W., Verstrael T. 2004. A loglinear Poisson regression method to analyse bird monitoring data. In: Anselin, A. (ed.) Bird Numbers 1995, Proceedings of the International Conference and 13th Meeting of the European Bird Census Council, Pärnu, Estonia. Bird Census News, 13 (2000): 33–39.