

**THE YELLOW-BILLED CHOUGH
PYRRHOCORAX GRACULUS LINNAEUS,
1766 IN ARMENIA: UPDATE ON CONSERVATION
STATUS**

Karen Aghababyan

ORCID: 0000-0002-8464-9645

BirdLinks Armenia (former TSE Towards Sustainable Ecosystems) NGO, Yerevan, Armenia

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Abstract

The Yellow-billed Chough *Pyrrhocorax graculus* is one of the least-studied species in Armenia and was surveyed in 2003–2019. Results show that in Armenia the species has four major populations: in the north-eastern, central and south-eastern regions of the country, inhabiting sub-alpine zone at elevations range 1,800–3,000 meters above sea level. The area of occupancy of the species in Armenia is calculated as 186 km² and the population is comprised of at least 68 adult individuals. The primary threat comes from the disturbance of nesting pairs in the breeding season by extreme cave tourism. The species' conservation status should remain the same – Endangered, although the criteria should be modified into B2a and D. The current conservation measures are not sufficient and should include identification of other loose colonies and their inclusion into the protected area network, and minimization of disturbance to the species by extreme tourism. The further monitoring of this species remains essential.

Introduction

The Yellow-billed or Alpine Chough *Pyrrhocorax graculus* is a species that has patchy distribution in alpine regions of Europe, Caucasus, Middle East and Central Asia (CRAMP and Perrins 1994, Madge 2020). It is classified as Least Concern in the IUCN Global Red List having a stable population trend (BirdLife International 2015). Yellow-billed Choughs predominantly inhabit high-elevation mountain pastures with cliffs and crags above tree-line. In general, it is solitary nester, however forming of the

loose colonies is also known, as well as colonial breeding (e.g. up to 20 pairs in Bulgaria), although the latest seems to be exceptional. The species constructs its bulky-structured nests on ledge near roof of cave or rock chimney or rock crevice, especially prefers larger caves with small entrance (MADGE 2020). In Armenia the single records in breeding season exist since 1959. Somewhat bigger numbers 50 birds in Southern and 35 birds in South-eastern Armenia were registered in July of 1995, and although their breeding remained unconfirmed, the species was listed as a breeding bird with low numbers (ADAMIAN and KLEM 1999).

Armenia is a country of South Caucasus, located between the Black and Caspian Seas, and thanks to large variation of elevation (from 375 to 4090 m above sea level), hosts wide variety of landscapes, including semi-desert, juniper woodland, deciduous forest, mountain steppe, and sub-alpine area (AGHABABYAN et al. 2015). The alpine areas with rocky outcrops seem to be the most suitable habitat for Yellow-billed or Alpine Choughs *Pyrrhocorax graculus* (ADAMIAN and KLEM 1999). Armenia is inhabited by the nominate subspecies *P. g. graculus* Linnaeus, 1766 (Adamyan and KLEM 1999, MADGE 2020), which is included in National Red Book as Endangered under category *D* (*The Red Book...* 2010) being known only from rocky areas and their environs in the subalpine and alpine zones of Zangezur mountain ridge in South-eastern Armenia, in low numbers. The current study is aimed at contributing new knowledge on this poorly-studied species in Armenia by providing additional data on its distribution and abundance, evaluating current and potential threats, and proposing a revision of its conservation status for the next edition of Red Book of Animals of Armenia, planned for writing in 2020–2022.

Material and Methods

At the beginning of study, few records of Yellow-billed Choughs from Armenia were known (ADAMIAN and KLEM 1999, *The Red Book...* 2010). In 2003 we have started systematic data collection during a general program on monitoring of breeding birds in Armenia. Monitoring was implemented using the line transects or points. We follow the guidelines of European Breeding Bird Atlas 2 (*A best practice guide...* 2008), and using the standard European Monitoring Grid 10 x 10 km have divided the territory of the republic into 374 squares.

Data on the species was obtained from two different sources: unstandardized observations (so called opportunistic data) and standardized counts (data, collected according to standard methodology). Both data may

be used to create species distribution maps and for estimation of the species population.

Unstandardized observations (opportunistic data) were provided by birdwatchers and contain minimum data requirements: precise identification of species, observation date, geographic coordinates, name of nearest locality (human settlement, mountain, historical site, etc.), breeding code, name of observer and his contacts. The observations have been commented, e.g. time, observation duration, number of people in the group, etc. Most of these data are stored at Biodiversity of Armenia subsite of the online platform Observation.org (<https://observation.org>), being retrieved upon necessity.

Standardized counts (counts conducted within certain time period) were led by both specialists and birdwatchers that have the required skills. Counts were implemented during fixed period of 1 or 2 hours, when an observer walked the route at a slow and constant pace. The best season for Alpine Chough count was considered the period between 1st of May and 30th of June, nevertheless, data collected later until July were used as well. Data collected during each sighting included the number of observed or heard individuals, observation date, geographical coordinates of a beginning and the end of the route, start and end times of the count, breeding code, name and contacts of observer/s. These collected data were entered into standardized protocol and later was inputted into National Database on Birds of Armenia owned by BirdLinks Armenia (former TSE) NGO. Since the breeding behavior of the species varies between solitary nester to loose colonial breeder, we estimated its population size by counting the maximum number of pairs or individuals in the flocks during the breeding season. Mapping was undertaken using ArcGIS 10.0 software and the area of occupancy calculated according to IUCN guidelines (IUCN Standards and Petitions Committee 2019). To estimate the threats, we conducted surveys of local farmers, hunters, rock-climbers, and cavers, as well as conducting interviews with the State Inspectorate for Nature Protection and Mineral Resources.

Results

Our investigations show that in Armenia the species forms four distinct population clusters in the north-eastern, central and south-eastern regions of the country (see the map on Figure 1). In all the regions the species was observed regularly during the breeding season, showing territorial behavior, i.e. staying at the same area throughout the breeding

season, demonstrating courtship behavior, having recently fledged young, and visiting the probable nesting places. Areas where breeding was most likely to occur are located in the subalpine zone at the elevation range 1,800–3,000 meters above sea level (Figure 2). In all those areas there are high cliffs with numerous small caves, niches, chimneys, and grottos; in some of the territories the potential nest sites could be large underground caves.

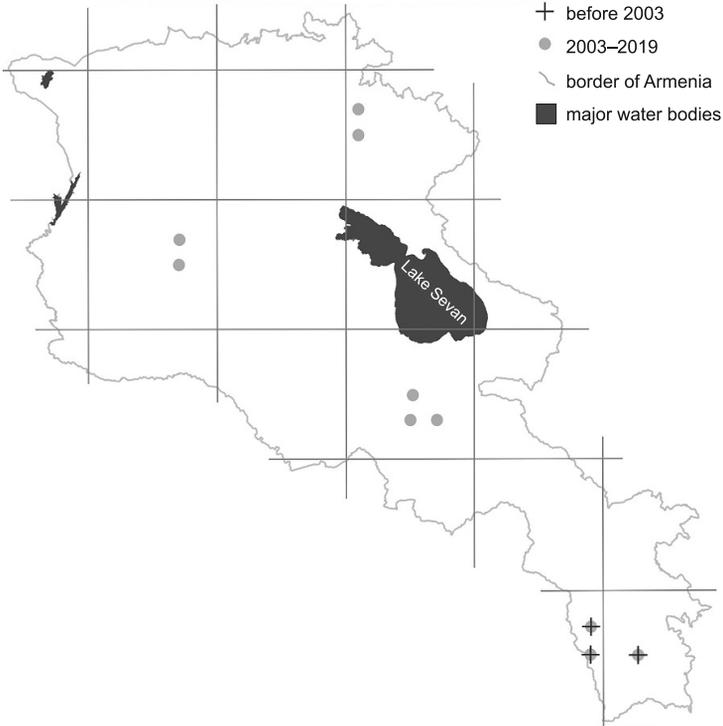


Fig. 1. Distribution of yellow-billed chough in Armenia



Fig 2. Typical habitat of Yellow-billed Chough in North-Eastern Armenia (photo by author)

The area of occupancy of the species in Armenia was calculated as 186 km².

According to our last count there are at least 68 adult individuals in the country. Unfortunately, the data is not sufficient for analyses of population trends. Our survey of 200 hunters shows that none of those have any interest towards the species neither as food item nor as a trophy. The survey of 50 farmers who use pasturelands at the areas where the Yellow-billed Choughs occur, mentioned that they often have seen these medium sized black birds and do not consider them as harmful ones, therefore they have never shot those. Among 50 surveyed rock-climbers, all mentioned that they have seen some black birds at the rocks but cannot say for sure whether those belong to Red-billed or Yellow-billed Choughs. Among 30 questioned cavers, seven mentioned that they have been climbing in a cave in north-eastern Armenia, where some medium-sized crow-like birds are nesting (by their opinion and not by direct evidence). They also mentioned that the cave is included now in the extreme tourism routes. The interview with the State Inspectorate for Nature Protection and Mineral Resources, shows that they have no information about the species, its rarity level, its conservation status, and have no existing information about necessary measures for its protection, except the point stated in the governmental decree (Parliament of RA 2017) about punishment for illegal shooting or trapping of Yellow-billed Chough.

Discussion

The new records expand the known distribution range of the species to the central and northern regions of Armenia. The population of the species in Armenia is estimated as a minimum of 68 adult individuals, although it appears that this number might be increased with further investigations of the North-eastern regions of Armenia, which contain a number of such underground caves and cliffs with the niches, caves and grottos. At the current level of species' understanding, the species appears to be less disturbed. Based on the obtained knowledge the species' conservation status should remain the same – Endangered, although the criteria should be modified into B2a – area of occupancy is less than 500 km² and number of locations is not more than five and D – number of mature individuals is less than 500 (IUCN Standards and Petitions Committee 2019). The current information is not enough to compute the population trend, so the criteria on decline are not applicable.

The Yellow-billed Choughs' distribution overlaps with the Zangezur Biosphere Complex and Yeghegis State Sanctuary, as well as with Zan-

gezur, Aragats Alpine, and Idjevan Emerald Sites protected under Bern Convention (FAYVUSH et al. 2016); however, some populations remain outside the national and international protected areas. Therefore, the section regarding conservation measures in the current Red Book of the Animals of Armenia (*The Red Book...* 2010), which states that there is no need for special protection measures also should be revised.

Taking the aforementioned into consideration, for further protection of the species, it is necessary to:

- a) identify all other colonies of the species in Armenia;
- b) include all colonies into Emerald Network;
- c) develop a targeted educational program for rock-climbers and cavers aimed at temporal modification of their climbing and caving routs, in order to minimize disturbance to the species' in nesting season. These conservation measures should be supported by continuous monitoring of the species with two purposes: (i) to identify its population trend, and (ii) to indicate the efficiency of undertaken conservation measures.

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