

A preliminary survey of the range, numbers and conservation needs of Little Bustards *Tetrax tetrax* wintering in Azerbaijan

ZULFU FARAJLI & ELVIN MAMMADSOY

Summary: Azerbaijan hosts the world's largest wintering population of Little Bustards *Tetrax tetrax*, which funnel into the country through the Caucasus from their more northerly Eurasian breeding grounds. Listed as globally Near Threatened, the species is included in the Red Book of Azerbaijan and consequently has national protected status. However, the distribution, numbers and ecology of this population and the threats it faces are poorly known. In January and February 2023 we drove some 3000 km in a rapid preliminary survey to gather basic data on these fundamental factors. In total, 19 221 Little Bustards were counted in 29 different locations. Hunting was judged to be the main threat, with hunted birds found being taken by locals and falconers. Agricultural intensification and land management changes are secondary threats. Some were observed close to human settlements and other infrastructure such as overhead wires, roads *etc.*, raising further concerns. The birds were mostly found in mixtures of winter crops (barley) and fallow–mosaic habitats and the natural steppes. By giving greater publicity to the importance of its huge wintering population of Little Bustards and enforcing the law on its hunting, Azerbaijan has the opportunity to make this country a renowned haven for this threatened species, and meet its international responsibilities for the conservation of the Little Bustard.

INTRODUCTION

Little Bustard *Tetrax tetrax* has a large global range, extending from Portugal in the west to the westernmost part of China in the east, but this is now highly fragmented particularly as a consequence of agricultural intensification in Europe, leaving significant populations only in Iberia, where the species is declining dramatically, and Central Asia, where its numbers, having recovered with post-Soviet agricultural abandonment, could now be facing new challenges (BirdLife International 2023). A striking characteristic of Little Bustard seasonal movements is the way a very large proportion of the global population funnels into the Caucasus to spend the winter in Azerbaijan (Vereschagin 1940, Gauger 2007, Heiss 2013, Heiss *et al* 2020). In recent years these internationally important numbers have been subject to pressure from Arab falconers (Collar & Kessler 2021), even though Little Bustard has the IUCN Red List status Near Threatened and is included in The Red Book of Azerbaijan, which gives it national protected status (MENR 2013).

The main route Little Bustards take to enter Transcaucasia is along the Caspian Sea coast (Vereschagin 1940). While migrating, the birds pass through one of the main migration bottlenecks in the Transcaucasus at Beshbarmag (Heiss *et al* 2020). In the autumn of 2011, the total number of Little Bustards passing Beshbarmag exceeded 100 000, which was then thought to represent 41–44% of the world population (Heiss 2013). During the autumn of 2022 observers counted almost 30 000 Little Bustards migrating through the bottleneck, with 11 569 birds on 6 November and 11 913 individuals on 15 November (<https://www.trektellen.org/site/totals/1533/2022>). Even so, the number of birds wintering in the region must be higher, as birds also migrate through a western (inland) route as well. For example, between 1906 and 1930 a worker from the meteorological station near Zakatala (close to Georgia) observed flocks of hundreds of Little Bustards in both spring and autumn and even caught some (Vereschagin 1940).

The main period of Little Bustard autumn migration starts in October and intensifies in November; in the spring birds move north in March and April. During the winter the species uses various types of habitat in Azerbaijan and faces many threats. To conserve such an important portion of the world population, a better understanding of

the distribution, numbers, ecology and threats is essential. This paper aims to provide a preliminary account of wintering Little Bustards in Azerbaijan and the changes to their habitat that have occurred over recent decades. Owing to limitations of time and resources we focused mostly on previously known wintering sites, such as those mentioned in Gauger (2007) (Figure 1).



Figure 1: Map of main wintering areas of Little Bustards in Azerbaijan, based on Gauger (2007): 1. Shirvan National Park (NP), 2. Qizilgach NP, 3. Mughan Steppes, 4. Agghol NP and surrounding areas, 5. Ajinohur steppes, 6. South of Mingechevir Reservoir, 7. Jeyranchol steppes (overlapping with Georgia).

METHODS

We selected our main areas to survey based on the literature, which indicated that the main wintering sites are located in the north-west and south-eastern parts of the country (Figure 1). However, because of the short duration of the survey and certain other constraints (weather, lack of permits to enter private areas *etc*), we were unable to visit all previously known wintering grounds. Conversely, information from local people (hunters, shepherds *etc*) identified new sites to be checked during the survey. Similarly, online resources such as eBird and observation.org helped improve our knowledge of the distribution of the species in different areas of the country.

We spent a total of ten days (29 January–3 February and 6–9 February 2023) on the survey and drove altogether around 3000 km. Site visits were made mainly by car, stopping within sight of Little Bustard flocks as well as scanning from viewpoints (small hills, watchpoints *etc*) to detect suitable areas. Each day at 09:00 we drove to a previously identified area while stopping in suitable habitats for further checking. Daily counts continued until sunset (around 18:00). Some sites required more than a day of coverage owing to their large size and the need to check potential sites nearby. When birds were found their GPS location was taken along with notes on the number present, the habitat types being used, potential natural and anthropomorphic threats, and distances to the

nearest human settlement, road and powerlines (see Appendix). Plant height where the birds were settled was estimated by eye and scored as 1 (<10 cm), 2 (10–30 cm), 3 (30–50 cm), and 4 (>50 cm). Similarly, vegetation ground cover was estimated roughly by eye as a percentage of a 1-metre grid in the given habitat away from the flocks in order to not disturb them. Before the survey, we identified the main types of habitats we expected to encounter, such as natural steppe, semi-desert, winter crop and fallow, and assigned sites to these types (see Appendix 1).

The quality of our bird counts was scored between 1 and 5 (from 1, indicating very brief views of distant flocks, to 5, indicating complete and repeated counts of all birds; see Appendix 1). Counts were done with binoculars (10x32) and telescopes (25–60x), but photographs of some flocks were also taken and the birds in them were counted afterward to increase the accuracy of field counts and correct numbers if necessary.

Although males are easily distinguished from females in the breeding season, when they utilise slightly different habitats (Serrano-Davies *et al* 2022), their winter plumage and habitat selection are similar to those of females so we did not attempt sex ratio determination in this survey.

RESULTS

During the survey period, a total of 19 221 Little Bustards in 29 different locations were counted with various quality scores (see Appendix 1). For around half of these locations we managed to achieve the highest certainty level count quality (5) as the birds were on the ground and feeding. Counting larger flocks was naturally more challenging: we had to make counts by tens to get an idea of the size of flocks before they started to flush (thus estimated count quality scores of 3 and 4). We never had to use the lowest quality scores 1 and 2. The habitat types most used by the species during our survey were (a) mosaics of fallows and winter crops, especially barley and wheat, and (b) natural steppes. We did not observe birds in true desert or semi-desert habitats. The highest number of birds at a single location was found in Shirvan National Park (NP) on 6 February 2023 (4400 birds), followed by Qizilagach NP on 8 February 2023 (3800 birds). On both occasions, the birds were in the natural steppe; in Shirvan NP the birds were observed in new sprouting areas with plant cover of 80%. Another high count (around 3000 birds) at a previously unidentified site (found while driving to a new location on 30 January 2023) was made in a mosaic of barley and fallow. Based on anecdotal notes of a local hunter, many more Little Bustards used to winter in the Ajinohur area during Soviet times owing to the production of rapeseed, a practice now abandoned in the area. Based on anecdotal and historical information we suspect the decrease in such locations can be at least partly explained by the species' adaptability in finding new suitable habitats. In total, 13 observations (45% of total observations and 60% of birds observed) occurred in locations with some sort of protected status (Figure 2).

The birds were mostly observed in areas where plant height did not exceed 10–15 cm. Average plant coverage was 69%. On two occasions the birds were found in much taller vegetation (in Ajinohur steppes and Shirvan NP) where the plant height was 50–100 cm (height category 4). In the agricultural areas, vegetation cover almost always reached 80–100%. Although research indicates that Little Bustards largely avoid human structures such as settlements and roads (Traba *et al* 2022), we encountered flocks feeding not far from the road (sometimes as close as 20–30 m in protected areas and 50 m in unprotected areas). Seemingly, the availability of food and ability to avoid predators in dense vegetation are important factors, and thus close encounters with humans occur in crop fields near settlements. Also, the rate of illegal hunting is likely to decrease near settlements due to fear of prosecution.

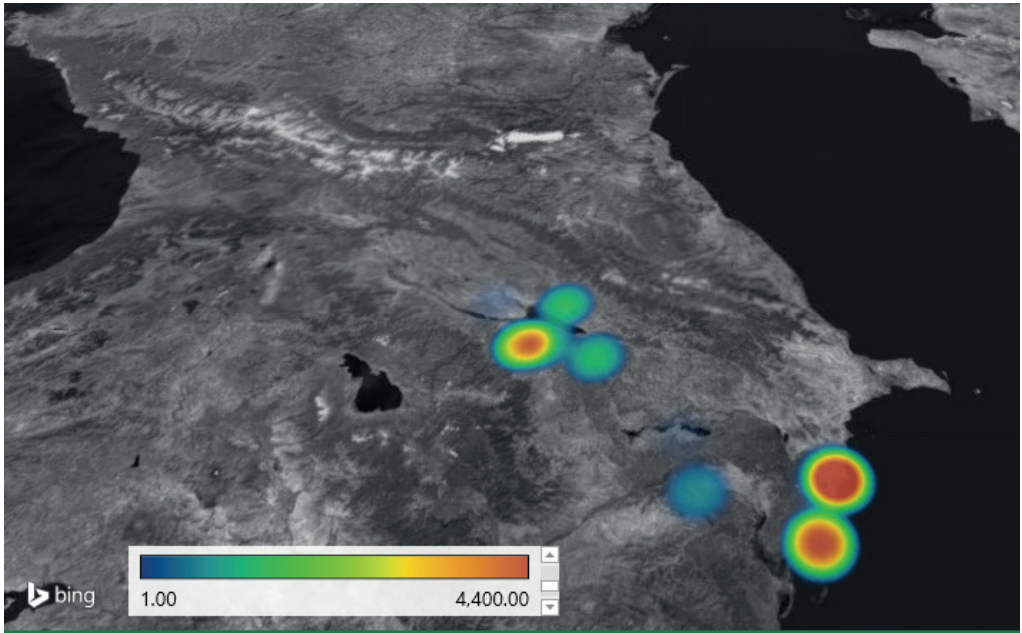


Figure 2: Heatmap of the survey results created by MS Excel's 3D Map function. The highest number of birds was observed in two protected areas in the south-east (Shirvan and Qizilagach NPs, containing 60% of the birds).

We found in some locations that locals hunt and catch Little Bustards (and other ‘game’ species – usually ducks, coots and hares) to sell on the roadside for just 15–20 AZN (EUR 8–11) per bird (Plates 1, 2). While expressing interest in how and where the locals hunt, we were offered two badly injured Little Bustards caught by snares. However, as locals are reluctant to share such information (presumably they know it is illegal) they gave us no details. Some of the hunters were offering Little Bustards as ‘turac’, the name for Black Francolin *Francolinus francolinus* in Azeri (another Red Book species), apparently to pique customers’ interest, as Black Francolin is a much better-known ‘game’ species (but still illegal to hunt). We also encountered a 12-car hunting party of Gulf falconers in the Jeyranchol steppes and identified the fresh remains of at least three falcon-killed Little Bustards there. Two days later, locals saw the same group of falconers hunting in this location again. Similarly, in two other locations including arable lands, we received information from some locals that such falconers had been looking for Little Bustards in previous months.



Plate 1: Simple snares are used to catch Little Bustards alive for sale in many places, here Salyan district in February 2017. ©Abdin Abbasov



Plate 2. Roadside 'markets' for poached animals are a common sight in rural areas of the country. Here (main highway near Kurdamir district, 30.01.2023) two Little Bustards are on sale flanked by 2 Mallards *Anas platyrhynchos* and other waterfowl. © Anar Mammadov

On nine occasions we saw sheep and shepherds with dogs as close as 20–30 m to the flocks, and we once saw a feral dog in Shirvan NP, showing that such animals can pose a threat to the Little Bustard and wildlife in general even in protected areas. Of greater

concern, we found that some recent wintering sites had been turned into very large areas of pivot agriculture, specifically by government-owned or subsidised companies. These areas can be as long as 27 km, as in the Jeyranchol steppes (Figure 3).



Figure 3. Satellite imagery showing the scale of conversion in recent years of some vast areas of Little Bustard wintering habitat (Jeyranchol steppes, site 7 in Figure 1) into pivot field agriculture stretching for many kilometres (Google Earth Engine open sources).

DISCUSSION

Azerbaijan holds the largest known wintering population of Little Bustards in the world: Gauger's (2007) largest single site count included some 30 000 birds, while Patrikeev (2004) noted that in the winter of 1971 as many as 62 300 birds were recorded in the Qizilagach NP alone. However, the annual number of birds wintering in the country fluctuates with weather conditions elsewhere along their migratory pathway (Gauger 2007).

Owing to the time limit of our survey we tried to be as efficient as possible in visiting as many planned areas as possible. A rapid country-wide survey is less likely to inadvertently double-count birds which may move in response to winter weather conditions, but this method of survey also faces logistical challenges. Little Bustards move between feeding places during the daytime, thus covering larger areas than one might expect. As the

birds occupy large areas it was hard to spot them, especially while driving, unless the flock took flight. Despite these limitations, this survey sheds light on the challenges and conservation issues of the species in Azerbaijan.

Future surveys would benefit from more time in the field, preferably with multiple visits to occupied sites, and a greater number of surveyors sufficient to undertake simultaneous counts. For instance, even though we spent two days in Shirvan NP and observed around 6200 birds in total, a few days later (11 February) another local birder observed at least 22 000 bustards within the park (Abdin Abbasov pers comm). Such major fluctuations can be explained by changes in weather, as there was snowfall prior to this record, and created an aggregation effect. On 10 March a group of international birders in Shirvan NP, while waiting to see the last Siberian Crane *Leucogeranus leucogeranus* of the western population, observed over 100 000 Little Bustards flying high overhead to the north (Plate 3). The passage of this massive flock took around two minutes, and most likely included migrating birds which overwintered in Iran as well (Sam Viles, pers comm).



Plate 3. Part of a large flock of an estimated 100 000 Little Bustards migrating north over Shirvan NP, 10 March 2023. © Peter Alfrey

The most obvious threat to Little Bustards in Azerbaijan is illegal hunting. Even though the species is listed in the Red Book of the country, hunted birds are a common sight during winter. Radde (1884) saw Little Bustards hanging in front of almost every household in Molokan (Russian Christian Sect) villages in 1866, noting that nomadic shepherds also hunted them or caught them alive with snares—a practice still used today (Plate 1). Vereschagin (1940) reported that motor cars, which Little Bustards allowed to approach much closer than men on foot, made hunting birds in Transcaucasia much easier, so that on some days as many as 150–200 birds could be killed from a single car. He estimated that in Azerbaijan 40 000–50 000 Little Bustards were hunted each winter in the

1930s, and 20 000 in 1940s (Vereschagin 1940). In the winter of 1960/61 poachers killed 2500 Little Bustards in Qizilagach Reserve alone (Patrikeev 2004). Perhaps as a consequence of such sustained persecution, the species was duly listed in the Red Books of the USSR and both editions of the Red Book of Azerbaijan, thereby making its hunting illegal (Red Book of USSR 1984, Red Book of Azerbaijan 1989, 2013). Despite this, Little Bustards are still hunted both by locals and in recent years by Gulf State falconers, whose numbers are increasing at an alarming rate. Although the number of birds these falconers take appears to be modest by comparison with the figures from the past (though the secrecy surrounding their activities makes it difficult to assess their offtake), persistent hunting pressure must disturb wintering Little Bustards in suitable habitats and force them to escape to new locations.

The second most pressing issue the Little Bustards face in Azerbaijan, according to our data, is changing land management across the country, including intensive grazing. This affects birds in various ways such as reducing food availability, decreasing the cover needed to hide from predators, and directly disturbing them. Patrikeev (2004) reported the negative impact of cattle and sheep grazing on wintering Little Bustards in Qizilagach NP. Gauger (2007) also expressed concern about grazing, finding it to be common in three-quarters of all the areas where the birds are observed. Collar *et al* (2020) identified the loss of ground cover to overgrazing as one of the major drivers of Little Bustard population decline. This is especially important in some pastures where grazing occurs year round and pressure on plants is high. However, it is important to note that sustainable grazing practices are beneficial to the species as the birds prefer plant cover that allows long-distance vigilance. Although shepherds and feral dogs can be a threat to breeding birds, especially incubating females or chicks, Little Bustards seem to avoid attacks in winter, at least in daylight.

Vereschagin (1940) expressed his concern over the conversion of natural steppes into winter agriculture, especially in the Kur-Araz lowland, and argued that birds might adapt by changing their diet to winter crops. Little Bustards certainly respond negatively to the intensification of agriculture (Traba *et al* 2022). We had no access to intensively farmed agricultural areas, which are usually fenced to avoid grazing, but the number of Little Bustards utilising such fields was seemingly lower compared to natural steppes or small-scale mosaic cultivation (Gauger 2007). Interestingly, we found many (sometimes thousands) Ruddy Shelducks *Tadorna ferruginea* using the larger agricultural fields, suggesting that there might be other as yet unidentified reasons why Little Bustards avoid them.

Similarly, other farming activities are a direct disturbance to the wintering bustards. We witnessed at least one occasion when birds were flushed by a tractor ploughing the land. Another threat large flocks of Little Bustards face is collision with powerlines, which are proliferating in many open areas where wind and solar power is generated and where local communities are being connected to national electricity grids. Due to aspects of their visual system and flight mechanics, bustards are particularly prone to collisions with overhead cabling (Martin & Shaw 2010). As early as the nineteenth century, Radde found large numbers of dead Little Bustards under telegraph wires (Patrikeev 2004). Thus it is important to increase the safety standards for powerlines, and take care to place new powerlines away from Little Bustard migratory routes, to reduce bustard collisions (Silva *et al* 2023).

As Azerbaijan is the most important wintering area for Little Bustards in the world and protects the species by law, the country has an international obligation both to monitor and to increase conservation efforts for the population to ensure its wellbeing. Even though Azerbaijan is not a party to the Convention on the Conservation of Migratory

Species of Wild Animals (CMS), it bears a responsibility to protect globally threatened migratory species listed in the appendices of the CMS such as Little Bustards.

To tackle the most obvious threat—poaching—close work with the Ministry of Environment and Natural Resources (MENR) is of utmost importance. Additionally, increasing monitoring, tightening legislation and increasing the penalties for illegal hunting should be considered. The advertising of commercial bustard hunting by some companies in Azerbaijan, which seems mainly to be targeting Arab clients (Collar & Kessler 2021), should be prohibited by law. There is an urgent need to reform legislation so that MENR can fine people based on social media posts indicating poaching, not merely, as now, issue fines if the poachers are found in possession of dead birds. A campaign to disseminate information on the protection status of the species among local people, especially in rural areas, is needed as some may have little awareness that hunting it is illegal. To counter the impression that fines for poaching can be inappropriately lenient and their imposition procedurally flawed, MENR should make all documents relating to punishments for poaching accessible to the public. Another approach to reduce poaching could be to deny entry to foreign falconers, as it is known that they target mainly Little Bustards even though their paperwork says otherwise (at the end of February we found falconers in the Ajinohur steppe with licences to hunt duck and coots—six birds per person—but their social media posts revealed they were targeting Little Bustards). This might possibly reduce pressure on Azerbaijan's wild falcon populations, as while traveling, some falconers will release an older falcon and export a younger one using the same falcon passport.

To tackle other threats, especially the scale of grazing pressure, complex measures involving working with farmers and other local stakeholders are required. Overgrazing has been one of the main factors driving habitat destruction in different parts of the country for decades, but is widely neglected as an environmental issue (Aliyev 2019). Research is also needed to better understand how the conversion of natural steppes into arable lands affects the Little Bustard's ecology. Moreover, to obtain more accurate estimates of the numbers of birds utilising transborder areas and habitats, census and survey work needs to be coordinated with neighbouring countries, given that (eg) Vashlovani and Chachuna protected areas in Georgia and the Mughan steppes in Iran are known to be important wintering grounds for the species (Nika Budagashvili pers comm, Sehhatiasabet *et al* 2012). Considering all these factors we strongly recommend a higher-effort survey in the near future to better understand the population trends and conservation problems of the Little Bustard in Azerbaijan in particular and the wider Caucasus in general.

ACKNOWLEDGEMENTS

We would like to thank OSME for supporting our pilot survey to understand the population of wintering Little Bustards in Azerbaijan. We are grateful to Dr Rob Sheldon, Professor Nigel Collar and Dr Mimi Kessler for their immense help and useful comments from the very start of the survey; without their help this work would not have been implemented. We also thank our friends Huseyn Yunisov and Anar Mammadov (our driver) who helped us to undertake the project, and Abdin Abbasov and others for sharing their previous observations and photos with us.

APPENDIX I: Summary of the survey

Quality of estimate: (1: very brief view of distant flocks; 2: somewhat better view, but birds either distant or moving; 3: close flocks, but birds flushed and moving; 4: single counts for the flock without certainty due to distant or hidden birds; 5: complete and repeated counts of all birds.

Date	Location (GPS), DMS format	Type of record (flock, corpse)	Number of birds	Quality of estimate (1-5)	Habitat type	Protection status of area
29.01.23	40 35 45.8 N 47 15 16.3 E	flock	210	4	WC	–
29.01.23	40 35 58.7 N 47 15 17.7 E	flock	1100	3	WC/F	–
30.01.23	41 03 12.2 N 46 13 26.9 E	flock	135	5	NS	–
30.01.23	41 09 28.1 N 46 15 10.6 E	flock	65	4	WC	–
30.01.23	40 42 39.0 N 46 34 43.4 E	flock	3000	3	WC/F	–
31.01.23	41 03 08.6 N 46 53 37.7 E	flock	1400	4	NS	Sanctuary
01.02.23	40 39 37.2 N 46 39 08.9 E	flock	526	4	WC/F	–
01.02.23	41 09 05.6 N 45 49 05.9 E	fresh kill	1	5	NS	–
01.02.23	41 09 9.24 N 45 49 12.13 E	fresh kill	1	5	NS	–
02.02.23	40 43 03.2 N 46 48 40.6 E	flock	500	3	WC/F	–
02.02.23	40 42 39.8 N 46 46 56.9 E	flock	293	5	WC/F	–
02.02.23	40 42 46.1 N 46 47 08.6 E	flock	100	3	NS	–
02.02.23	40 42 35.5 N 46 46 09.7 E	flock	191	5	WC/F	–
02.02.23	40 39 27.3 N 46 41 58.0 E	flock	10	5	WC/F	–

Habitat types: natural steppe (NS), semi-desert (SD), winter crop (W), fallow (F)

Plant height categories: estimated by eye and scored as 1 (<10 cm), 2 (10–30 cm), 3 (30–50 cm), or 4 (>50 cm).

Scientific names: Red Fox *Vulpes vulpes*, Golden Jackal *Canis aureus*, Eastern Imperial Eagle *Aquila heliaca*, Hen Harrier *Circus cyaneus*, White-tailed Eagle *Haliaeetus albicilla*, Merlin *Falco columbarius*.

Plant height categories	Plant cover %	Human disturbance (falconry, hunting)	Natural predators seen	Other threats (dogs, grazing, powerline, fences)	Distance to roads, settlements, and other infrastructure	Other info (locals)
1	80%	Agriculture /tractor	Hen Harrier (male)	Shepherd dogs	–	–
1	60%	Agriculture /tractor	Golden Jackal	Powerlines	300 m	–
4	70%	Shepherd	Eastern Imperial Eagle, <i>Buteo</i> sp.	Shepherd dogs	100 m	–
1	80%	–	–	Fence/powerlines	50 m	Falconers (27/12/2022)
1	70%	Shepherd	–	Powerlines	120 m	–
3	50%	–	Red Fox, Eastern Imperial Eagle	Shepherd dogs /grazing	–	Falconers (12/2022)
1	80%	–	Hen Harrier (male)	Shepherd dogs /grazing	400 m	–
1	50%	Falconers	–	Shepherd dogs /grazing	–	–
1	50%	Falconers	–	Shepherd dogs /grazing	–	–
1	80%	–	<i>Buteo</i> sp.	Shepherd dogs /grazing	50 m	–
1	80%	–	–	–	50 m	–
3	60%	–	–	–	50 m	–
1	80%	–	–	Shepherd dogs /grazing	50 m	–
1	80%	Agriculture /tractor	–	–	80 m	–

Date	Location (GPS), DMS format	Type of record (flock, corpse)	Number of birds	Quality of estimate (1-5)	Habitat type	Protection status of area
03.02.23	39 59 54 N 48 03 56.3 E	flock	130	5	WC/F	–
06.02.23	39 44 48 N 49 09 08 E	flock	2	5	NS	National Park
06.02.23	39 42 35 N 49 14 19 E	flock	5	5	NS	National Park
06.02.23	39 42 69 N 49 15 12 E	flock	184	5	NS	National Park
06.02.23	39 44 08 N 49 17 33 E	flock	850	3	NS	National Park
06.02.23	39 41 33 N 49 18 34 E	flock	545	4	NS	National Park
06.02.23	39 41 02 N 49 19 35 E	flock	4400	4	NS	National Park
07.02.23	39 44 18 N 49 08 34 E	flock	6	5	NS	National Park
07.02.23	39 44 18 N 49 09 10 E	flock	5	5	NS	National Park
07.02.23	39 38 53 N 49 10 89 E	flock	197	4	NS	National Park
07.02.23	39 39 00 N 49 10 29 E	flock	5	5	NS	National Park
07.02.23	39 38 10 N 49 11 47 E	flock	40	5	NS	National Park
08.02.23	39 16 45 N 49 09 10 E	flock	3800	3	NS	National Park
08.02.23	39 19 27 N 49 09 18 E	flock	800	4	W	–
09.02.23	39 36 43 N 48 12 59 E	flock	720	5	W	–
Total			19 221			
Average			662.8			

Plant height categories	Plant cover %	Human disturbance (falconry, hunting)	Natural predators seen	Other threats (dogs, grazing, powerline, fences)	Distance to roads, settlements, and other infrastructure	Other info (locals)
1	80%	Agriculture /tractor	–	–	80 m	Falconers (01/2023)
3	60%	–	Hen Harrier	Shepherd dog	140 m	–
4	80%	–	–	–	50 m	–
1	70%	–	–	–	15–20 m	–
2	70%	–	White-tailed Eagle	–	2000 m	–
2	70%	–	–	–	800 m	–
2	80%	–	White-tailed Eagle	–	500–600 m	–
1	90%	–	–	–	80–100 m	–
2	70%	–	Eastern Imperial Eagle	–	120–150 m	–
3	80%	–	–	–	1500 m	–
2	60%	–	–	–	20–30 m	–
2	40%	–	–	–	100–150 m	–
3	40%	–	–	–	2500 m	–
3	90%	Agriculture /tractor	Eastern Imperial Eagle, Merlin	–	1000 m	–
2	90%	–	–	–	100 m	–
	69%					

LITERATURE CITED

- Aliyev ZH. 2019. Winter pasture lands of Azerbaijan and their agroecological features. *World J Agri & Soil Sci.* 2(2): WJASS. MS.ID.000531.
- BirdLife International. 2023. Species factsheet: *Tetrax tetrax*. Downloaded from <http://www.birdlife.org> on 06/03/2023.
- Butyev, VT, AV Mikheev, AB Kostin, & EA Lebedeva. 1989. [Notes on rare bird species of the Caucasian coast of the Caspian.] In: *Ornithological resources of Northern Caucasus*, Stavrapol pp137-152. [In Russian]
- Collar, N, EFJ Garcia & E de Juana. 2020. Little Bustard (*Tetrax tetrax*), version 1.0. In *Birds of the World* (J del Hoyo, A Elliott, J Sargatal, DA Christie & E de Juana, editors). Cornell Lab of Ornithology, Ithaca, NY, USA: <https://doi.org/10.2173/bow.litbus1.01>.
- Collar, NJ & M Kessler. 2021. Hunting of Little Bustards *Tetrax tetrax* in Azerbaijan: the global conservation perspective. *Sandgrouse* 43: 281–285.
- Dzhamirzoev, GS & SA Bukreev. 2008. [Action Plans For Conservation Of Globally Threatened Bird Species In Caucasus Eco-Region]. Moscow–Makhachkala: Russian Bird Conservation Union, Institute of Biogeography and Landscape Ecology at Daghestan State Pedagogical University. [In Russian]
- Gauger, K. 2007. *Occurrence, Ecology and Conservation of wintering Little Bustards Tetrax tetrax in Azerbaijan*. Institute of Botany und Landscape Ecology, Greifswald University, Germany.
- Heiss, M, K Gauger, C Himmel, P Fetting, TA Haraldsson, G Caucal, Z Farajli & E Sultanov. 2020. The development of the Besh Barmag Bird Migration Count in Azerbaijan and its importance for the monitoring of Eurasian migrant birds. *Sandgrouse* 42: 29–45.
- Heiss, M. 2013. The importance of the Besh Barmag bottleneck (Azerbaijan) for Eurasian migrant birds. *Acta Ornithol* 48: 151–164.
- Martin, GR & JM Shaw. 2010. Bird collisions with power lines: failing to see the way ahead? *Biological Conservation* 143: 2695–2702.
- Ministry of Ecology and Natural Resources of Azerbaijan, Institute of Zoology, National Academy of Science. 2013. *AZƏRBAYCAN RESPUBLİKASININ QIRMIZI KİTABI Fauna* [RED BOOK of the REPUBLIC of AZERBAIJAN Fauna] II edition.
- Sehhatisabet, ME, A Fazel, A Ashoori, A Khaleghizadeh, A Khani, K Rabiei & M Shakiba. 2012. Preliminary assessment of distribution and population size of wintering Little Bustards *Tetrax tetrax* in Iran. *Bird Conservation International* 22: 279287.
- Patrikeev, M. 2004. *The Birds of Azerbaijan*. Pensoft Publishers, Sofia & Moscow (Pensoft Series Faunistica 38).
- Radde, G. 1884. *Ornis Caucasicca: die Vogelwelt des Kaukasus*. Verlag von Theodor Fischer, Kassel.
- Serrano-Davies E, J Traba, B Arroyo, F Mougeot, F Cuscó, S Mañosa, G Bota, N Faria, A Villers, F Casas, C Attie, P Devoucoux, V Bretagnolle & MB Morales. 2022. Biased adult sex ratios in Western Europe populations of Little Bustard *Tetrax tetrax* as a potential warning signal of unbalanced mortalities. *Bird Conservation International*: <https://doi.org/10.1017/S0959270922000430>.
- Silva JP, AT Marques, T Allinson, Y Andryushchenko, J Bernardino, S Dutta, M Kessler, R Martins, F Moreira, M Pretorius, A Scott, M Scott, JM Shaw & NJ Collar. 2023. The effects of powerlines on bustards: how best to mitigate, how best to monitor? *Bird Conservation International* 33 e30: 1–14.
- State Nature Protection Committee of the Azerbaijan SSR. 1989. [The Red Book of the Azerbaijan SSR: rare and endangered species of animals and plants] ed. Ch M Adigozalov, UK Alekbarov, MA Musayev and others. [in Azerbaijani and Russian]
- Talibov, TH. 2006. [Red Book of Nakhchivan Autonomous Republic, Volume 1]. [in Azerbaijani]
- Traba, J, MB Morales, JP Silva, V Bretagnolle & P Devoucoux. 2022. Habitat selection and space use. Little Bustard: Ecology and Conservation. *Wildlife Research Monographs* 5. Springer: https://doi.org/10.1007/978-3-030-84902-3_6.
- Vereshchagin, NK. 1940. [On Little Bustards and Great Bustards wintering in eastern Transcaucasia]. *Reports of the Azerbaijan Branch of Academy of Science* 5: 57–65. [In Russian]
- Zulfu Farajli & Elvin Mammadsoy, *Birdwatching Azerbaijan*. fzulfu@gmail.com