SANDGROUSE

VOLUME 47(1) 2025

OSME

LITTLE BUSTARD SPECIAL ISSUE

OSME

ORNITHOLOGICAL SOCIETY OF THE MIDDLE EAST THE CAUCASUS AND CENTRAL ASIA

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SANDGROUSE VOLUME 47 (I) 2025

Special feature: **The status of the eastern population of Little Bustard *Tetrax tetrax* (Editors: Mimi Kessler, Louis-Philippe Campeau & Nigel J Collar)**

Photo above: Part of a flock of 6500 Little Bustards *Tetrax tetrax* at Dashtobod, Jizzakh, Uzbekistan, January 2025.
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Cover photo: Calling male Little Bustard *Tetrax tetrax*, Georgia, June 2024.
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This issue of *Sandgrouse* contains a special feature on the status of the Little Bustard in the eastern part of its range, most of which falls within the OSME region.

The status of the eastern population of Little Bustard *Tetrax tetrax*: editors' preface

MIMI KESSLER, LOUIS-PHILIPPE CAMPEAU & NIGEL J COLLAR

As western populations of the Little Bustard *Tetrax tetrax* suffered precipitous plunges over the past decade, conservationists and government actors have inquired with increasing anxiety about the health of the 'eastern population', with hope—fuelled very largely by a single report of 150 000 birds wintering in Azerbaijan (Gauger 2007)—that the expanses of Asia might hold sufficient numbers of the species to allay fears and preclude conservation uplistings. The status of this population was the focus of global discussion in 2020 at COP13 of the Convention on Migratory Species (CMS), at which a breakout group gathered some two dozen national representatives to deliberate a proposal from a party to list the Little Bustard on CMS appendices (Convention on Migratory Species 2020).

With less than a day's notice MK, attending the meeting in her capacity as an IUCN delegate, was able to mobilise the IUCN Bustard Specialist Group's network to assemble population estimates and trends from a vast area that stretches from the Black Sea across Central Asia to western China. She endeavoured to convey to the audience, primarily from Europe and Oceania, the paradoxes of the Little Bustard's ecology in Asia, where migratory flocks create spectacles of abundance but also facilitate hunting, and where recent population increases reflected not a stable conservation environment for this steppe and farmland bird, but rather a temporary reprieve resulting from the massive decline in intensive agriculture that followed the dissolution of the Soviet Union.

The evidence mustered in those few hours resulted in the listing of the species on both appendices of the Convention, Appendix I (for migratory species in danger of extinction throughout all or a significant portion of their range) and Appendix II (for migratory species with an unfavourable conservation status requiring international agreements for their conservation and management). This arrangement now protects Little Bustards from hunting within countries that are party to CMS and raises global awareness of the need for their conservation. However, that improvised meeting also highlighted the increasing urgency of conducting a robust review of the status of the eastern population and its conservation needs. Such a review is needed now more urgently than ever, as renewable energy infrastructure developments are expanding across the species' Asian range at a scale and speed unimaginable even just five years ago.

Among these developments, the AZURE project in Azerbaijan (World Bank 2024) plans no less than 700 km of new transmission lines, including sections perpendicular to the Beshbarmag migratory bottleneck, through which the vast majority of the reported 150 000 Little Bustards visiting the country pass each autumn, and encircling the terrestrial boundary of Shirvan National Park, where thousands of birds winter. These developments present significant mortality risks to the Little Bustards breeding across south-western Russia and western Kazakhstan, which visit Azerbaijan to overwinter. Like other species in its family, the Little Bustard is prone to collisions with overhead cabling, for which no flight diverter yet tested has demonstrated meaningful reductions in mortality (Silva *et al* 2023). The establishment of a baseline of information on the status of the Little Bustard is vital to our ability to monitor trends in populations and advocate appropriate measures in the face of mounting developmental threats, of which energy generation and transmission are in the top tier.

Plate 1. Part of a Little Bustard *Tetrax tetrax* flock, Dashtobod, Uzbekistan, 12 January 2025. © *Relisa Granovskaya*

For this reason, we must express our fulsome thanks to all the commissioned authors in this special feature in *Sandgrouse,* who have collaborated so constructively, generously and rapidly to produce the body of evidence assembled here; we thank too the photographers whose images so strongly enhance the papers (eg Plate 1). We must also most gratefully acknowledge Shamil Gareev for his conscientious translations of three of the papers from Russian into English. We are particularly glad that this initiative has provided the occasion

to bring the latest results of certain long-term research projects—representing in some cases up to twenty (Oparin *et al* 2025) or even fifty (Rustamov & Shcherbina 2025) years of labour in the field—to a wider audience. The result is a fine complement to the recent global overview by Morales & Bretagnolle (2022), bringing a sharper contemporary focus on the situation in the eastern portion of the species' range. We hope the information here will prove at once insightful as to the ecology of Asian populations of this species and helpful in advocating for Little Bustards at national and continental scales, in contexts as varied as new energy projects, national and transnational conservation policies and protected areas, changes in land use and agricultural practices, and hunting and poaching controls.

As well as evaluating population levels and trends, the articles herein highlight a wide variety of phenomena including the impact of de- and re-intensification of agriculture in post-Soviet states, the threat posed by falconry and poaching in general, the effect of climate change on the species' migratory behaviour, the challenge of conducting research on a lekking species across such a vast area, and the unexpected irruption of Little Bustards in winter 2024–25. Thanks to these contributions, this special issue geographically covers almost the entirety of the eastern range of the Little Bustard, reporting on 21 countries and providing unprecedented clarity to our understanding of the status of this population.

We note that the eastern range of the Little Bustard closely matches the OSME region, with the exception of Egypt (for which the last record was in 1922: Goodman & Meininger 1989) and Cyprus (three records in the 21st century, in 2013, 2016 and 2017: Flint & Richardson 2024). Indeed, the very idea of this special feature emerged from a virtual conference on the Little Bustard's status in Central Asia on 15 March 2024, organised in the context of a project funded by OSME's Conservation Fund. *Sandgrouse* is thus the ideal venue for this collection of work, and for this hospitality we thank its editor and the membership and leadership of OSME, particularly Rob Sheldon, who has encouraged us over the past 18 months. OSME and its journal play a unique role in providing essential support and encouragement for collaborative efforts such as this, linking ornithologists, birdwatchers and conservationists across political and linguistic barriers. We hope the collection of papers that follows contributes to this important tradition.

LITERATURE CITED

Convention on Migratory Species. 2020. Proposal for the inclusion of the Little Bustard (*Tetrax tetrax*) in Appendix I and II of the Convention. CMS COP14, Gandhinagar. UNEP/CMS/COP13/Doc. 27.1.6.

Flint, P & C Richardson. 2024. *The Birds of Cyprus. An Annotated Checklist*. BOC Checklist Series 28. British Ornithologists' Club, Tring.

Gauger, K. 2007. Occurrence, ecology and conservation of wintering Little Bustards *Tetrax tetrax* in Azerbaijan. *Archiv für Naturschutz und Landschaftsforschung* 46: 5–27.

Goodman, SM & PL Meininger (Eds). 1989. *The Birds of Egypt*. Oxford University Press, Oxford.

Morales, MB & V Bretagnolle. 2022. An update on the conservation status of the Little Bustard *Tetrax tetrax*: global and local population estimates, trends, and threats. *Bird Conservation International* 32: 337–359.

Oparin, ML, OS Oparina, AA Abushin, VN Fedosov & AA Nefedov. 2025. Status of Little Bustard *Tetrax tetrax* in Russia based on assessments in four key regions. *Sandgrouse* 47: 59–72.

Rustamov, EA & AA Shcherbina. 2025. The Little Bustard *Tetrax tetrax* in Turkmenistan: an analysis of status, 1880–2024. *Sandgrouse* 47: 140–149.

Silva, JP, AT Marques, J Bernardino, T Allinson, Y Andryushchenko, S Dutta, M Kessler, RC Martins, F Moreira, J Pallett, MD Pretorius, AH 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.

World Bank. 2024. Environmental and Social Scoping Report Azerbaijan Scaling-Up Renewable Energy Project (P505208). Washington, World Bank Group. http://documents.worldbank.org/curated/en/099082524135528588

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Recovery at risk: a flyway-level population assessment of the Little Bustard *Tetrax tetrax* in its eastern range

MIMI KESSLER, LOUIS-PHILIPPE CAMPEAU & NIGEL J COLLAR

Summary: National extinctions have divided the Near Threatened Little Bustard *Tetrax tetrax* into a western range focused on Iberia and a much broader eastern range, from Crimea to westernmost Xinjiang, China, where the (almost entirely migratory) population is larger but national status and trends are in varying degrees uncertain. Drawing primarily on the 16 geographically oriented contributions to this special section in *Sandgrouse*, four general flyways in the eastern range can be identified (numbers below refer to breeding individuals). The Black Sea flyway, currently mainly involving Crimea and Türkiye, appears to possess only 100–120, with a long-term downward trend suggesting imminent extirpation, expanding the existing divide between the western and eastern ranges. The Caucasus flyway holds 69 850–128 150 mature individuals (not including young-of-year), to which Russia (North Caucasus, Volga region and Orenburg) contributes 43 850–55 750 and north-west Kazakhstan (west of the Emba river) 26 000–72 400. Populations within this flyway exhibit mixed trends likely owing to the patchy distribution of agricultural re-intensification, but a decline is expected as powerlines proliferate, especially in the wintering grounds of Azerbaijan. The Turkestan flyway presents a problem in which total breeding numbers (to which Russia, Kazakhstan and Kyrgyzstan chiefly contribute) are estimated to be much higher than wintering numbers (spread across Uzbekistan, Tajikistan, Turkmenistan and Iran). Precautionarily, we propose a range of 24 740–50 000 mature breeding birds in this flyway, with mixed trends but a decline expected as powerlines proliferate. The South Asia flyway, known only by its staging (Iran) and wintering (Afghanistan and Pakistan) areas, may retain as few as 10–50 breeding individuals and is feared close to extirpation. The eastern range of the Little Bustard thus consists of an estimated 94 700–178 320 breeding birds, of which Azerbaijan hosts the great majority in winter. Populations within the eastern range now account for 62–65% of an estimated global total of 146 000–288 000 individuals. Key threats are illegal hunting, particularly when targeting large flocks in the wintering grounds (especially in Azerbaijan); increased breeding failure, female mortality and habitat degradation associated with agricultural re-intensification (notably in Kazakhstan and the Volga region of Russia); rapidly proliferating powerlines associated with renewable energy development; the disruptive effects on survival, reproduction and distribution of global warming (albeit there may be some benefit from reduced migration distances); and inadequate investment in scientific research and management resources by which to identify and implement appropriate conservation measures.

INTRODUCTION

The global range of the Little Bustard *Tetrax tetrax* once stretched almost continuously across the steppes and farmland of Mediterranean North Africa, Europe and Asia, from Portugal and Morocco in the west to Xinjiang, China, in the east. Over the past 130 years, a series of extinctions in range states in central, eastern and south-eastern Europe as well as North Africa (detailed in Morales & Bretagnolle 2022b) have resulted in a rift of approximately 2000 km separating populations in western Europe from others in eastern Europe and Central Asia, with the species consequently assigned the IUCN threat category of Near Threatened (BirdLife International 2018).

To the west, Little Bustards in Iberia, France, and a fragile remnant population in Sardinia, Italy (henceforth 'western range' or 'western population') are estimated to comprise 51 194–109 959 individuals (Morales & Bretagnolle 2022a). Everywhere in this range the species is in serious decline, with the countries with the largest populations exhibiting the largest declines—48% in 11 years in Spain, and 49% in 13 years in Portugal (sources in Morales & Bretagnolle 2022a). The number of birds remaining from Crimea and eastern Türkiye eastwards (henceforth 'eastern range' or 'eastern population'), including an east–west expanse of steppes stretching 4000 km, has proved more challenging to estimate, and the trends more complicated. Using primarily figures from 2017 (Collar *et*

al 2017) along with updates from Russia and Ukraine (*eg* Oparin *et al* 2018), Morales & Bretagnolle (2022a) arrived at a total of 38 000–142 200 individuals in the breeding grounds of the eastern population. Here we take the opportunity to revisit the status of the species in its eastern range by drawing on information from papers published contemporaneously in this *Sandgrouse* special section, using flyway-level analyses to construct a contemporary population estimate.

FLYWAYS WITHIN THE EASTERN RANGE

No satellite telemetry has been undertaken on Little Bustards within their eastern range. However, ornithological observations have been recorded across this region for well over 150 years, beginning with expeditionary work during the Russian and British imperial eras and continuing with research undertaken during the early Soviet period. These studies are important, as they pre-date the large-scale collapse of Little Bustard populations during the second half of the 20th century. Through a review of this literature, as well as the articles within this *Sandgrouse* special feature, we propose four main migratory pathways used by Little Bustards within their eastern range and outline present population figures within each of them. Listed from west to east, these comprise: the Black Sea flyway, the Caucasus flyway, the Turkestan flyway, and the South Asia flyway (Figure 1).

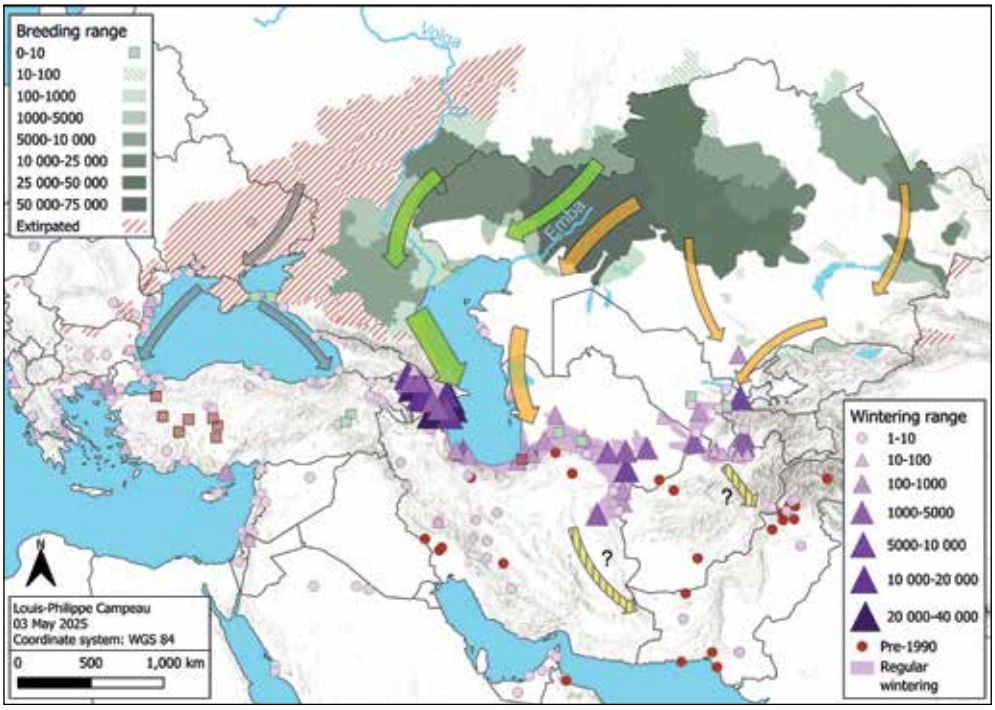

Figure 1. Four major Little Bustard flyways represented by arrows (Black Sea in grey, Caucasus in green, Turkestan in orange and South Asia in hatched yellow; width indicates relative number of birds within the flyway) superimposed on their breeding range (green for extant and hatched indicating extirpated) and wintering sites (purple triangles, sized and shaded in relation to the number of birds using the site). Purple dots indicate single winter records and red dots pre-1990 observations. Sources: population tables from all 16 geographically oriented contributions in *Sandgrouse* 47; for areas of outside of this review: Averin *et al* (1971), Scherbak (1994), Gao *et al* (2008), Papakonstantinou *et al* (2009), Boev (2015), Radišić *et al* (2018).

Black Sea flyway

The widening of the gap between western and eastern populations of Little Bustards has resulted in smaller numbers of birds using this flyway. Although extirpated as a breeding species from continental Ukraine, Moldova, Romania, Bulgaria, Serbia and Greece (Morales & Bretagnolle 2022b), small breeding populations persist in Crimea, eastern Türkiye and the Taman' peninsula of Russia's Krasnodar krai (Andryushchenko 2009, Kostin 2015, Til'ba 2024, Özgencil *et al* 2025). Now extirpated, Little Bustards that bred along the Don river, north of the Azov Sea, and in Russia's Central Black Earth (Chernozem) region, migrated west and south-west to Crimea (Isakov & Flint 1987). From there, further movements could be undertaken along the western shore of the Black Sea (Menzbir 1934), passing through south-western Ukraine (Kandaurov 1992), Romania (Ministry of Environment Water and Forests 2022), and into Greece (Athanasios 2023), where these birds sometimes remain throughout the winter (Dimitris Kokkinidis in litt) or pass onward into Thracian Türkiye (Özgencil *et al* 2025). A second pathway along the eastern Black Sea coast brings Little Bustards through western Georgia (Til'ba 1999, Til'ba & Lokhman 2007) and into eastern Türkiye (Özgencil *et al* 2025). The observation of an individual arriving at Ordu from the sea (Özgencil *et al* 2025), as well as the species' past winter visits to Cyprus (Flint & Richardson 2024; last recorded in 2017), indicate that the Little Bustard is not constrained to overland flights.

Although Türkiye represents the usual southernmost limit of overwintering Little Bustards within this flyway, overshoots and irruptions, particularly of females and juveniles (Campeau & Kessler 2025), irregularly reach further south (and even south-west: Plate 1). In addition to visits to Cyprus, Little Bustards have occasionally reached the Nile delta (Goodman & Meininger 1989; last recorded in 1922). They are intermittently recorded in Iraq and the Levant (Aidek *et al* 2025), Israel (Perlman 2025) and the Arabian peninsula (Campbell & Kessler 2025). Hunting pressure in these areas is high, and hunters' social media photos account for the majority of records.

Plate 1. Little Bustards over İzmir, Türkiye, 5 February 2025. © *Alphan Anak*

Table 1. Numbers of mature Little Bustards estimated at breeding grounds within the Black Sea flyway, ordered north to south. N/A = not applicable. 'Status' refers to the Red List assessment at the geographic unit relevant to the source cited within the table; CR = Critically Endangered; EN = Endangered; EX = Extinct. Quality of assessment was evaluated by the author of the source cited, on a scale from 1 (few data available) to 5 (repeated surveys). ↘ = declining, ↗ = increasing, † = extirpated.

Territory	Min	Max	Quality	Status	Trend 1950–1990	Trend 1990–2020	Trend 2020–2023	Trend 1950–2023	Source
Crimea	10	14	N/A	CR	↘	↘	↘	↘	Lokhman 2017, Til'ba 2024
Krasnodar	6	10	N/A	EN	↘	↗	↘	↘	Andryushchenko 2009, Kostin 2015
Moldova	0	0	N/A	EX	†	†	†	†	Averin *et al* 1971
Romania	0	0	N/A	EX	↘	†	†	†	Min. Environment 2022
Serbia	0	0	N/A	EX	†	†	†	†	Radišić *et al* 2018
Bulgaria	0	0	N/A	EX	†	†	†	†	Boev 2015
Greece	0	0	N/A	EX	↘	†	†	†	Athanasios 2023
Türkiye	10	20	3	CR	↘	↘	↘	↘	Özgencil *et al* 2025
Syria	0	0	3	†	↘	†	†	†	Aidek *at al* 2025
Summary:	**26**	**44**							

Table 2. Minimum number of wintering Little Bustards, and largest flocks of the species recorded at migratory stopover and wintering areas within the Black Sea flyway, ordered north to south. See Table 1 for further explanations. Little Bustards are also observed in the Levant, Iraq and the Arabian peninsula, but irregularly and in low numbers.

Territory	Winter minimum	Largest non-breeding	Quality of estimate	Status	Sources	Notes
Crimea	0	23	N/A	CR	Kostin 2015	Largest single flock
Krasnodar	0	0	N/A	EN	Til'ba 2024	Last noted in 1980s to 1990s
Georgia	100	200	3.8	VU	Gov. Georgia 2014, Budagashvili 2025	
Romania	0	20	N/A	EX	Min. Environment 2022, Campeau & Kessler 2025	
Bulgaria	0	10	N/A	EX	Boev 2015	National winter estimate
Greece	0	258	N/A	DD	Athanasios 2023, Campeau & Kessler 2025	Largest flock 258, Thrace
Türkiye	100	400	3	CR	Özgencil *et al* 2025	Largest flock 100–120 individuals, Göksu Delta IBA
Black Sea flyway	**200**					

Black Sea flyway population estimate

Sources from 2015 to 2024 tally only 26–44 Little Bustards on breeding grounds in the Black Sea flyway and register a decreasing trend over past decades (Table 1). However, larger numbers are occasionally observed on migratory stopover and wintering grounds within the flyway (Table 2). To determine whether the largest flocks observed in Greece and western Georgia (maximum of 258 and 200 individuals respectively, Table 2) are consistent with the numbers reported on breeding grounds to their north (16–24 individuals in Crimea and Krasnodar, Table 1), we assume a sex ratio of 1:1 (see 'Caucasus flyway population estimate' for why this might be optimistic) and thus 8–12 females on the breeding grounds. If we presume that each female produces a fully successful clutch of 4 eggs (3–4 eggs were reported as typical clutch sizes in this region: Andryushchenko 2009, Kostin 2015, Savitskii 2024), then theoretically 32–48 young could be produced each year, for a total of 40–60 female-type (females and juveniles) or 48–72 Little Bustards of both sexes by the time of autumn migration. The observation of aggregations of predominantly female-type Little Bustards somewhat larger than this in Greece and Georgia (Table 2; Campeau & Kessler 2025) suggests that either some breeding birds in the northern part of this flyway may be undercounted, some breeding sites are unreported, or some birds breeding to the north-east may occasionally use the Black Sea flyway from unknown causes. Indeed, a movement of some individuals between Azerbaijan's Kura steppe and coastal Georgia (suggested by Isakov & Flint 1987) could account for some 'excess' Little

Bustards in Georgia and Türkiye, but not for the larger flock observed in Greece. For this reason, we estimate the breeding population of Little Bustards at 100–120 individuals, somewhat higher than the sum of the known breeding populations.

Black Sea flyway trends

Population growth, even assuming high annual productivity, is likely to be constrained by mortality along the migratory pathway for young-of-year and females undertaking longer-distance migrations (Campeau & Kessler 2025). A trend towards continued erosion of the western border of the eastern range of Little Bustards, described earlier for eastern European populations by Collar (1978) and Kandaurov (1992), is observed (Figure 1). Breeding populations in Syria were gone by the 1950s (Aidek *et al* 2025), while those in eastern Ukraine declined to the point of total extirpation by the 1990s (Andryushchenko 2009). Populations in western portions of Russia's Krasnodar and Stavropol' krais, Rostov and even Saratov oblast's were extirpated during the 2000s (Khokhlov & Il'yukh 2013, Lokhman 2017, Savitskii 2024, Til'ba 2024).

Caucasus flyway

Populations of Little Bustards breeding along the middle and lower Volga river, as well as the western Caspian lowlands, are known to migrate south into the Caucasus (Bliznyuk 2018). Further east, however, the geographical divide between breeding populations migrating into the Caucasus and those migrating along the eastern Caspian coastline is unknown. A number of distinguished naturalists have surmised the routes of Little Bustards in this region, based on their field observations of migratory flights. Their suppositions include (ordered roughly from west to east, and referring to contemporary political boundaries):

- Birds follow the middle and lower stretches of Kazakhstan's Ural river and continue southwards through Kazakhstan and Turkmenistan along the eastern coast of the Caspian Sea (Sushkin 1908).
- Conversely, individuals flying south along the Ural river continue along the western Caspian coast towards the Caucasus (Isakov & Flint 1987).
- Birds move to the south-east between the Uil and Emba rivers on the eastern border of Atyrau province, Kazakhstan (A Nechaev, as referenced in Fedosov 2019).
- Birds from Orenburg oblast' (Russia) and West Kazakhstan province (Kazakhstan) move south-west to reach Russia's Astrakhan' oblast' (Bliznyuk 2018).
- Birds migrate south-west along the Or' river to the Emba (Aktobe to Atyrau province, Kazakhstan) and then southwards along the eastern Caspian (Sushkin 1908).
- Birds follow the Irgyz (eastern Aktobe province, Kazakhstan) and Turgai (southern Kostanay province, Kazakhstan) rivers, and then move southwards to reach the Syr Darya, south-west Kazakhstan (Sushkin 1908).
- Birds breeding in western Kazakhstan, and some breeding in northern Kazakhstan, reach the eastern coast of the Caspian and follow it southwards to the Atrek valley; others breeding in northern Kazakhstan fly along the Sarysu or cross the central Kazakhstan hill country, well east of the Aral Sea (Isakov & Flint 1987).
- Birds breeding in northern Kazakhstan primarily fly south-west, passing to the north of the Aral Sea and across the Ustyurt plateau (western Kazakhstan/Uzbekistan) to reach the eastern coast of the Caspian, then turn southwards to Turkmenistan (Dement'ev 1951).
- Birds breeding in northern Kazakhstan fly to the south-west; some round the north Caspian to fly south along its western shore, others fly through the Ustyurt plateau (Gavrin 1962).

- North–south migrations in Kazakhstan are noted in the provinces of Mangystau and Atyrau, Turkistan and Aqmola (Gubin 2010, 2020), as well as Kostanay (Ryabov 1949).
- On spring migration, birds move north-eastwards across the Kyzylkum desert (stretching between Uzbekistan and Kazakhstan: Gubin 2020).

Some of these routes contradict each other and telemetry studies will be necessary to establish the true movement patterns of Little Bustards between the Caucasus and Turkestan flyways. Nevertheless, a few conclusions can be drawn from these statements. First, across Kazakhstan the species exhibits a general tendency towards south-westwards autumn migration. Second, east of Aktobe province a greater number of subpopulations are described as moving along the eastern Caspian coastline than along the western. With these general observations, we propose a migratory divide roughly along the course of the Emba river, from the north-west Caspian through Aktobe province to the southern end of the Ural mountains. This hypothesised migratory divide results in approximately 21% of the northern distribution of Little Bustards within Kazakhstan (132 611 km^2, measured in the Albers Equal Area Conic projection for North Asia), as described by Koshkin *et al* (2025), belonging to the Caucasus flyway.

Caucasus flyway population estimate

Using the density estimates in Koshkin *et al* (2025), Little Bustards breeding in Kazakhstan and using the Caucasus flyway are estimated to be in the range of 26 000–72 400 individuals (Table 3). Combined with breeding numbers in the Russian North Caucasus, Volga region and Orenburg, the total population of Little Bustards breeding within the Caucasus flyway reaches 69 850–128 150. Sex ratios on these breeding grounds have been hazarded as 1:0.4 for Kazakhstan (*ie* 2.5 males per female; Koshkin *et al* 2025) and 1:0.8 for the Russian Federation (Oparin *et al* 2025); thus we expect approximately 26 900–45 500 females, a significant proportion of which would not produce successful clutches owing to the same factors that probably depress the sex ratio: the destruction of nests and sometimes also females by agricultural harvesting machinery.

The minimum total number of wintering birds within this flyway is estimated at 81 995, which is approximately 17% more than the minimum breeding population within the flyway, and 56% less than the maximum breeding population (Table 4). Within the Caucasus, Little Bustards are observed to cross international borders frequently (*eg* between Georgia and Azerbaijan: Budagashvili 2025, Farajli 2025), and to move in response to weather, resource availability and disturbance, rather than remaining on the same wintering grounds throughout the season. The resulting possibility of double-counting renders it inappropriate to sum the maximum wintering values for each country. Conversely, some wintering flocks may be missed due to nocturnal migration through the Beshbarmag bottleneck, or incomplete monitoring. However, it is of considerable interest that, following intensive surveys in January–February of 2024 and 2025, Farajli's (2025) estimate of 175 296 individuals in Azerbaijan, long known to host far larger numbers than Georgia, is 37% higher than our estimated maximum breeding population. Winter flocks will, of course, include young-of-year not counted within breeding population surveys, and which may not survive to return to the breeding grounds. The maximum winter estimate from Azerbaijan would be consistent with conditions of modest reproductive success within the posited breeding population: an average fledging of 1–2 chicks per female, or the hatching of a full clutch of four young for about half the breeding females. Thus, using a migratory divide along the Emba river to the southern Ural mountains, we propose a breeding population of 69 850–128 150 mature Little Bustards within the Caucasus flyway. This number does not include young-of-year, which would of course be included in winter counts in Azerbaijan.

Table 3. Numbers of mature Little Bustards estimated at breeding grounds within the Caucasus flyway, ordered north to south. See Table 1 for further explanations. VU = Vulnerable; EN = Endangered. *Estimate excludes birds in the Taman' peninsula of Krasnodar krai, which are counted in the Black Sea flyway (Table 1). **For provincial level Red List assessments within North Caucasus and Volga regions, see Oparin *et al* (2025). ***The status is VU both at the Russian national and Orenburg oblast' level of assessment.

Country	Region	Min	Max	Quality of estimate	National status	Trend 1950–1990	Trend 1990–2020	Trend 2020–2023	Trend 1950–2023	Source
Russia	North Caucasus*	11 100	13 100	3.8	VU**	↘	↗	no data	↗	Oparin *et al* 2025
Russia	Volga region	22 750	32 650	3.6	VU**	↘	↗	↘	↘	Oparin *et al* 2025
Russia	Orenburg	10 000	10 000	3.3	VU***	↘	↗	no data	↘	Oparin *et al* 2025
Kazakhstan	West of Emba river	26 000	72 400	3	EN	↘	↗	↗	?	Koshkin *et al* 2025
Summary:	**Caucasus flyway**	**69 850**	**128 150**	**Ave: 3.4**						

Table 4. Numbers of Little Bustards estimated at wintering grounds within the Caucasus flyway, ordered north to south. See Table 1 for further explanations. VU = Vulnerable; NT = Near Threatened. *These are recent data for non-breeding birds. **For provincial level Red List assessments within North Caucasus and Volga regions, see Oparin *et al* (2025).

Country	Region	Winter minimum	Largest numbers	Quality of estimate	National status	Source	Notes
Russia	North Caucasus	300	300	3.8	VU**	Oparin *et al* 2025	
Russia	Volga region	10	10	3.6	VU**	Oparin *et al* 2025	
Georgia	Entire country	1000	70 000	4	VU	Budagashvili 2025	Wintering population maximum estimate
Armenia	Entire country	10	100	3	VU	Aghababyan 2025	Migratory stopover, none in winter
Azerbaijan	Entire country	65 650	175 296	4.2	NT	Farajli 2025	Largest number is from intense country-wide survey
Iran	North-west	15 025	35 080	2.5	Protected	Ashoori *et al* 2025	Wintering population maximum estimate
Summary:	**Caucasus flyway**	**81 995**		**Ave: 3.5**			

Caucasus flyway trends

Trends in both breeding and wintering populations of the Caucasus flyway during recent decades are mixed, with some regions experiencing increases and others decreases. Adverse breeding conditions associated with agricultural transition, both in terms of cultivation and numbers of livestock, have significantly constrained breeding populations west and south of the Volga river (Oparin *et al* 2025), but seem to have limited impact for now in western Kazakhstan, where the agricultural economy has been slower to revive. Threats noted within this flyway include the destruction of eggs, young and females by farm machinery on the breeding grounds (Koshkin *et al* 2025, Oparin *et al* 2025), and poaching in Azerbaijan (Collar & Kessler 2021, Farajli 2025) and Iran (Yousefi *et al* 2017, Ashoori *et al* 2025). In Georgia, habitat loss through afforestation is associated with degradation of remaining steppelands through overgrazing (Budagashvili 2025), and fragmentation from urbanisation and agriculture reduces habitats for this species in Armenia (Aghababyan 2025). Significantly increased mortality rates can be expected with the dramatic current expansion of powerline networks, *eg* the World Bank's AZURE investment (World Bank 2024). This project proposes over 700 km of new transmission lines, including lines perpendicular to major Little Bustard migratory movements, planned south of the Beshbarmag bottleneck, adjacent to the Mingechevir reservoir, and encircling the terrestrial boundaries of the important wintering site of Shirvan National Park (Plate 2). As a consequence, a decreasing percentage of the wintering population can be expected to return to breeding grounds in coming years.

Plate 2. Little Bustards at Shirvan National Park, Salyan, Azerbaijan, in the Caucasus flyway, 7 March 2023.
© *Attila Steiner*

Turkestan flyway

As discussed under 'Caucasus flyway', Little Bustard migration through the east Caspian coastlands has long been recognised, with the birds going to winter in Turkmenistan's

Atrek river delta and Iran's eastern Caspian lowlands. Further east, Little Bustards breeding across western Siberia and northern Kazakhstan are observed to fly south, and then south-west once reaching the northern extent of the Tian Shan, passing through Uzbekistan to overwinter there or in Turkmenistan, Iran, Tajikistan and possibly Afghanistan north of the Hindu Kush (Gavrin 1962, Gubin 2007). This flyway would have formerly encompassed the most eastern reaches of the eastern range of Little Bustards in western China, the species now being noted only during some autumns in western Xinjiang's Tacheng prefecture (Xu & Ma 2016). Determining the proportion, and breeding sites, of birds within the Turkestan flyway that use the eastern Caspian pathway as opposed to migrating towards the foothills of the Tian Shan will require further research.

Turkestan flyway population estimate

Breeding population estimates within this flyway produce a total of 104 094–277 139 individuals, with northern Kazakhstan accounting for over 90% of this number (Table 5). However, the sum of known wintering populations, which is likely to be an overestimate (due to double-counting of mobile winter flocks), yields 16 225–24 740 Little Bustards (Table 6). This number reflects only 9–16% of the estimated breeding population, with *c*88 000–252 000 breeding birds unaccounted for on the wintering grounds, a number that does not yet take into consideration young-of-year birds undertaking their first autumn migration. We suggest several likely overlapping explanations for this discrepancy between breeding and wintering grounds, relating to (1) method of estimation, (2) possibility of uncounted winter flocks, and (3) our choice of a migratory divide at the Emba river.

Owing to a lack of survey information in northern Kazakhstan, the Little Bustard breeding population there had to be extrapolated from density calculations at well-surveyed sites in central Kazakhstan to an area of suitable habitat over 620 000 km² (Koshkin 2011, Koshkin *et al* 2025). A combination of factors might explain why such extrapolation would produce an overestimate. Little Bustard densities are uneven across this region (*eg* Shevchenko *et al* 1993), perhaps owing to variation in climatic suitability, productivity, wildfire regimes, predator densities or other natural factors. Moreover, farmland reclamation has proceeded unevenly after the mass agricultural abandonment of the post-Soviet economic transition, with higher-yielding farmland closer to transportation networks reclaimed earlier than lower-producing farmland, some of which is not viable in the free-market economy (Dara *et al* 2018, Baumann *et al* 2020). Finally, in areas of northern Kazakhstan where post-1950 declines took the species to the point of extirpation (Zuban *et al* 2025), some Little Bustard populations may still not have recovered the full extent of their available ecological niche.

In contrast, on wintering grounds in Iran, Tajikistan and Turkmenistan, estimates have been obtained through standard annual large-scale surveys over long time-frames (Ashoori *et al* 2025, Muratov 2025, Rustamov & Shcherbina 2025), which would seem less likely consistently to miss large numbers of wintering birds. Nevertheless, the Turkestan flyway differs from the others above in lacking a bottleneck at which birds can more readily be censused. Furthermore, survey effort has been low in areas of Uzbekistan and northern Afghanistan. The calculation presented above compares estimates on breeding and wintering grounds by subtracting the aggregated winter survey results from the extrapolated prediction for the breeding population in northern Kazakhstan, resulting in a striking disparity that challenges the plausibility of the breeding estimates. However, we also tested the plausibility of the winter survey results by deriving from them the highest possible breeding numbers, using two extreme assumptions. The first is that no chicks from northern Kazakhstan survive to fledging. This is because any numerical allowance for juveniles in the wintering population subtracts from the number of adults that

constitute the breeding pool. The second is that no other breeding sites contribute birds to the wintering grounds. This is because any wintering adult attributed to a different breeding range again lowers the number of adults attributable to northern Kazakhstan. The resulting summed total of winter maxima is 24 740 (Table 6). However, this artificially inflated number is still lower than the 32 000 breeding individuals estimated for the higher-intensity survey conducted over a 96 000 km^2 area of Central Kazakhstan (Koshkin *et al* 2025), let alone for the full breeding extent of this flyway within northern Kazakhstan. Clearly this suggests there are limitations to the relatively rigorous and exhaustive winter surveys and underscores the need for increased spatial and temporal coverage of the target areas—ideally synchronised to avoid double-counts or missed flocks—as well as expanded surveys in northern Kazakhstan to identify regions of greater and lesser breeding densities.

We also consider it possible that the migratory divide between the Caucasus and Turkestan flyways lies further east than we have proposed at the Emba river. Alternatively, there may be no static dividing line, with Little Bustards rather moving through one or the other flyway depending on weather, resources or other factors. These scenarios would have the effect of increasing the number of breeding birds in the Caucasus flyway, thus implying a deficit of uncounted Little Bustards on that flyway's wintering grounds. This would also lessen, but not eliminate, the deficit of Little Bustards in the wintering grounds of the Turkestan flyway.

Given the available data, there will necessarily be large uncertainties associated with any estimation of the population of Little Bustards within the Turkestan flyway. As a precautionary measure, we elect to use the maximum sum of known wintering populations—24 740 mature individuals—as a minimum estimate for the breeding population. To sum wintering counts risks overestimation due to double-counting, but we consider that the number chosen compensates for the likelihood of unknown and unsurveyed wintering sites. As a maximum estimate for the breeding population, we double this figure to obtain approximately 50 000 mature individuals, a number that logic suggests is more plausible in light of our analysis above.

Turkestan flyway trends

Recent population trends on breeding grounds within the Turkestan flyway are mixed, with both increases and decreases recorded over the past decade. Numbers wintering in Iran were increasing in the 2010s, but seem to have reached a plateau (Yousefi *et al* 2017, Ashoori *et al* 2025). In Turkmenistan, large-scale irrigated farmland in inland river deltas and along foothills, combined with the replacement of cotton by cultures more friendly to Little Bustards such as cereals and alfalfa, supports larger wintering populations (Rustamov & Shcherbina 2025). Trends on the wintering grounds also appear to reflect a response to climate change. Wintering birds are now observed further north (as noted in Uzbekistan by Ten *et al* 2025; Plate 3), while numbers at the most southerly sites (in Iran) are decreasing (Ashoori *et al* 2025). A similar northward shift of wintering grounds has been described for Great Bustards *Otis tarda* in Central Asia (Kessler & Smith 2014). However, a corresponding northward shift of breeding areas has not been described for either species.

The major threat identified on the wintering grounds is poaching, which can prevent birds from establishing regular use of a site as hunters learn of their presence (*eg* in Tajikistan; Muratov 2025) or force them into safer border areas (*eg* in Iran; Yousefi *et al* 2017). On the other hand, a *de facto* hunting ban in Turkmenistan since 2018 has eased concerns of poaching there (Rustamov & Shcherbina 2025). Worryingly, major energy developments along the Turkestan migratory flyway can be expected to increase rates of mortality if

Table 5. Numbers of mature Little Bustards estimated at breeding grounds within the Turkestan flyway, ordered north to south. See Table 1 for further explanations. EN = Endangered, VU = Vulnerable, NT = Near Threatened, DD = Data Deficient. *Does not include Orenburg, which is accounted in the Caucasus flyway. **For provincial level Red List assessments within North Caucasus and Volga regions, consult Oparin *et al* (2025).

Country	Region	Min	Max	Quality of estimate	Status	Trend 1950–1990	Trend 1990–2020	Trend 2020–2023	Trend 1950–2023	Source
Russia	Urals*	5010	5020	3	VU**	↘	↗	?	↘	Oparin *et al* 2025
Russia	Western Siberia	150	320	3	VU**	absent	↗	↗	↗	Oparin *et al* 2025
Kazakhstan	N Kaz, E of Emba river	96 532	268 910	3	EN	↘	↗	↗	?	Koshkin *et al* 2025
China	Entire country (Xinjiang)	0	0	N/A	DD	↘	↘	† (as breeder)	†	Gao *et al* 2008
Kazakhstan	Southern isolated pops	900	900	3	EN	↘	↗	?	?	Koshkin *et al* 2025
Uzbekistan	Entire country	2	10	1	VU	↘	↘	↘	↘	Ten *et al* 2025
Kyrgyzstan	Entire country	1496	1965	3	NT	↘	↗	possibly →	↗	Campeau *et al* 2025
Turkmenistan	Entire country	4	4	5	not listed	→ to ↘	↗	↗	↗	Rustamov & Shcherbina 2025
Iran	NE Iran	0	10	1	protected	no data	possible ↘	possible ↘	possible ↘	Ashoori *et al* 2025
Summary: Turkestan flyway		**104 094**	**277 139**	**Ave = 2.8**						

Table 6. Numbers of Little Bustards estimated at wintering grounds within the Caucasus flyway, ordered north to south. See Table 5 for further explanations.

Country	Region	Winter Min	Winter Max	Quality of estimate	Status	Trend 1950–1990	Trend 1990–2020	Trend 2020–2023	Trend 1950–2023	Source
Uzbekistan	Entire country	6500	7500	2	VU	↘	↗	↗	↗	Ten *et al* 2025
Tajikistan	Entire country	535	2270	4.3	NT	N/A	↗	↗ + ↘	↗	Muratov 2025
Turkmenistan	Entire country	5440	9470	3.6	not listed	→ to ↘	↗	↗	↗	Rustamov & Shcherbina 2025
Iran	NE Iran	3750	5500	3	protected	N/A	↗	↘	↘	Ashoori *et al* 2025
Summary: Turkestan flyway		**16 225**	**24 740**	**Ave = 3.2**						

mitigation is insufficient (see, *eg*, Plate 3). These include the Kungrad project, involving an 800 km transmission line perpendicular to migratory pathways (Asian Development Bank [ADB] project 57342; Collar & Kessler 2024); Samarkand 1 & 2 (ADB projects 58290 & 58291, www.adb.com); and the Hyrasia project in Kazakhstan's Mangystau province (hyrasia.one). Meanwhile, the impact of current agricultural practices on productivity and female mortality in this flyway is almost totally unknown, and is likely to differ significantly across the wide breeding range.

South Asia flyway

The least documented region within the eastern range of the Little Bustard is South Asia, where the species is observed to winter in the northern (Khyber Pakhtunkhwa) and southern (Balochistan and Sindh) regions of Pakistan (Khan *et al* 2025). Birds presumably reach these areas by transiting through adjacent provinces of Afghanistan (Kandahar and Nangarhar, respectively), where the species has also been observed in winter (Ostrowski 2025). Historically, the Little Bustard was considered a regular and 'tolerably abundant' winter visitor to the Punjab west of the Indus, where it was a target for hunters and falconers who could kill up to a dozen per day, and a vagrant in what is now India (Hume & Marshall 1879). Sarudny (1911) noted Little Bustards overwintering as far south as Sistan and Baluchistan in south-eastern Iran; a relatively short flight from these regions could explain some of the historical records in Pakistan's Balochistan province. Since 1990, there have been four or fewer individuals noted per winter in Afghanistan and Pakistan (Khan *et al* 2025, Ostrowski 2025), most of which are reported by hunters as neither country is well surveyed.

The breeding grounds of these birds are a matter of speculation. Perhaps a small number of Little Bustards nest in Kandahar, where there has been little fieldwork, but where intriguing spring observations (March and April) indicate that birds might not

Plate 3. Little Bustards at Dashtobod, Jizzakh, Uzbekistan, a new wintering site in the Turkestan flyway (but note the powerlines), 12 January 2025. © *Kőrösi Levente*

Plate 4. Hunted Little Bustard in the South Asia flyway, with Common Quail *Coturnix coturnix*, Thana, Malakand, Khyber Pakhtunkhwa, Pakistan, 17 February 2021. Photographer anonymous. Contributed by Pakistan Historical Records/eBird.

only pass the winter there (Ostrowski 2025). Another plausible source for the birds wintering in Balochistan and Sindh is Iran, where small breeding populations in the Caspian lowlands, if still extant, are on the verge of complete extirpation (Ashoori *et al* 2025). A handful of breeding attempts have also been registered in the Kopet Dag range of Turkmenistan, the most recent in 2023 (Rustamov & Shcherbina 2025).

If the breeding grounds do not lie within South Asia itself, these wintering birds may represent the longest-distance migrant Little Bustards on the Turkestan flyway. To reach northern Pakistan, this would require either a circuitous journey involving a counter-clockwise orientation not observed in Little Bustards elsewhere in Asia, or flight from Tajikistan through the Hindu Kush via a pass such as Salang at almost 4000 m elevation. However, both of these options—a northbound leg or a high-altitude pass—would seem counterintuitive for birds presumably moving to avoid winter weather.

Outside Iran and Turkmenistan, where protected areas are monitored and some targeted surveys are undertaken, the presence of Little Bustards in this flyway is not well described. It would seem from available records that in this flyway the Little Bustard is on the brink of total extirpation, with the primary threat—and also primary source of records—being illegal hunting (Plate 4). We thus estimate that perhaps 10–50 breeding Little Bustards remain within this region.

CONCLUSIONS

Overall trends

By summing the population estimates made above for each of the flyways within the eastern range of the Little Bustard, we arrive at a total estimate of 94 700–178 320 breeding Little Bustards within the eastern population (Table 7). Our minimum estimate is 150% higher than that of Morales & Bretagnolle (2022a), and our maximum estimate is 25% higher. The differences between our results may be attributed as much to the finer-grained detail of this review as to actual changes in population size. Note additionally that the numbers we present for the eastern range refer to breeding individuals, whereas those for the western range are presented for 'individuals'. We find that the eastern population now accounts for almost two-thirds of a global estimated population of 145 894–288 279 Little Bustards (Table 7).

Table 7. The estimated total breeding numbers of Little Bustard within their eastern range, obtained by summing our estimates for each flyway. The percentage contribution of each flyway to the entire eastern population is estimated. The western range population estimate is from Morales & Bretagnolle (2022a).

	Estimated breeding individuals			
Flyway	**Minimum**	**Maximum**	**Percentage of eastern population**	**Overall trend**
Black Sea	100	120	0.1%	Declining
Caucasus	69 850	128 150	72–74%	Mixed
Turkestan	24 740	50 000	26–28%	Mixed
South Asia	10	50	<0.1%	Near extirpation
Totals			**Percentage of global population**	
Eastern range	94 700	178 320	62–65%	Mixed
Western range ('individuals')	51 194	109 959	35–38%	Declining
Global estimate	**145 894**	**288 279**		

It is clear that the eastern population of Little Bustards cannot be regarded as a single entity, as trends within its component flyways differ greatly. Little Bustards within the Black Sea and South Asia flyways are declining and near extirpation. Simultaneously, Little Bustards are expanding into foothill habitats in southern Kazakhstan (Shakula *et al* 2017) and have resumed breeding in Kyrgyzstan (Campeau *et al* 2022). The Caucasus flyway contains by far the largest numbers of Little Bustards, but the concentration of these birds during winter, when they are more easily counted, may disguise regional variation in trends across the breeding grounds from which they originate, where there may be very different agricultural practices.

We see a continuation of the 150-year trend towards an increasing gap between the western and eastern ranges, as Little Bustard populations in Crimea, mainland Ukraine and Türkiye, all considered Critically Endangered (Kılıç & Eken 2004, Andryushchenko 2009, Kostin 2015), continue to decline (Figure 1). Our review identifies a continuing diminishment in area of the eastern range, with contraction along three of its boundaries. First, the western edge, previously identified within Ukraine, now effectively lies east of the midpoint of the Pontic–Caspian steppe. Second, a trend towards wintering at higher latitudes has the effect of moving the southern boundary in Asia northwards. Third, to the east, the Little Bustard has been extirpated from Ningxia and southern Xinjiang (Gao *et al* 2008). Breeding birds are no longer observed in China, and autumn passage is constrained to the extreme west of Tacheng prefecture, Xinjiang, where regular flocks of 10–20 birds and occasionally over 100 birds are observed (Muyang Wang pers comm, xinjiang.china.birding.day, eBird).

We also observe a continued contraction of wintering populations into border areas (Yousefi *et al* 2017; Figure 1), coinciding with the higher hunting pressure reported in winter quarters.

Conservation measures

Having collated and considered the numbers of birds in each of the eastern range states of the Little Bustard, we reach the mildly encouraging conclusion that the species retains a moderately healthy population in the region of 94 700–178 320 adults, with declines in many areas being to some degree offset by increases in others. Nevertheless, five factors

render the outlook for the species discouraging, and need addressing: these are the persistence and ubiquity of hunting, agricultural (re)intensification, the proliferation of powerlines, the effects of global warming and inadequate investment in scientific research and management resources.

Hunting is by far the oldest and most widespread threat to the species. Among the 15 nationally dedicated papers in this *Sandgrouse* special feature, covering 18 countries, plus one covering the Arabian peninsula, hunting (also termed poaching depending on circumstance) is identified as the main threat in eight (Afghanistan, Armenia, Azerbaijan, Iran, Iraq, Lebanon, Tajikistan and Turkmenistan [at least until 2018]) plus the Arabian peninsula, and as a significant threat in seven (Georgia, Kazakhstan, Kyrgyzstan, Pakistan, Syria, Türkiye, Uzbekistan), with only three (Israel, Jordan [still officially to record the species] and Russia) not commenting. These countries have deep-rooted hunting traditions, but the threat that hunting poses also to Great Bustard (Endangered) and Asian Houbara *Chlamydotis macqueenii* (Vulnerable) in many of them is such that a major outreach campaign to press for stronger legal enforcement and greater self-regulation by hunters through their associations and clubs may be a way forward (Dolman *et al* 2021, Kessler & Batbayar 2023). Most particularly, however, the curtailing of poaching in Azerbaijan, where up to 30 000 Little Bustards may be killed each year (Brochet *et al* 2019) and where international falconry interest seems to be stirring (Collar & Kessler 2021, Farajli 2025), will be vital to the maintenance of the thousands of birds that funnel into the country to escape the winter in Russia and north-west Kazakhstan.

It is certain that agricultural intensification represents a major threat to the Little Bustard, as is obvious now from the trajectory of its populations in the Iberian peninsula (Morales & Bretagnolle 2022a) and Türkiye (Özgencil *et al* 2025). It may well come to surpass hunting as the primary cause of decline, although it is instructive to note that Little Bustard numbers in Kazakhstan in the middle of the 20th century plummeted not only through loss of habitat and the impact of mechanised harvesting on productivity and survival (see Campeau *et al* 2025) but also because 'new settlers mercilessly destroyed the fauna of the virgin steppes' (Mazhitova *et al* 2021). The abandonment of agriculture following the end of the Soviet Union led, in many areas, to the recovery of farmland and steppe bird populations, but, as the former Soviet countries recovered economically, agricultural re-intensification was thought likely to reverse these numerical gains (Kamp *et al* 2011). In terms of impacts on Little Bustards, the evidence varies geographically and temporally. In the Volga region the loss of both grazing and agriculture produced unsuitable breeding habitat; although a resumption of economic activity is promoting the reclamation of farmland, clutches are destroyed (Oparin *et al* 2025). Intensification threatens the recovery of breeding populations in Kyrgyzstan (Campeau *et al* 2025). On the wintering grounds, intensification has resulted in less suitable habitats in Tajikistan (Muratov 2025) but attractive ones in Turkmenistan (Rustamov & Shcherbina 2025). Given differences in breeding and crop phenology, research specific to localities throughout the range of the Little Bustard is needed to provide the evidence base for the development of environmentally sound policy and practice in food production.

The development of renewable energy in response to climate change, widely recognised as a global imperative, is advancing with great speed in many of the Little Bustard's range states, and typically involves vast installations at remote sites, with energy transmitted via long-distance powerlines—a flight hazard that bustards, in particular, cannot see (Silva *et al* 2023). The sunny, windy steppe landscapes inhabited by Little Bustards in their eastern range provide huge opportunities for solar and wind power capture and are now prime targets for energy developments on a massive scale, such as outlined above for the

Turkestan flyway. These structures will assuredly devastate Little Bustard populations, as they already do in Iberia (Marcelino *et al* 2017).

Climate change itself will require ongoing modification of crop choice and agricultural work schedules, with impacts on Little Bustards that are difficult to predict. However, higher temperatures inhibit activity in this species, constraining breeding and foraging schedules to the point where productivity and survival may be compromised (Silva *et al* 2015). A trend towards using more northerly wintering grounds, as noted above, has not yet been matched by a northward shift in breeding range. Paradoxically, if migratory distances between breeding and wintering areas diminish, there may be an incidental benefit owing to the reduction in the number and range of threats (including powerlines) the travelling birds face, even providing conservationists with opportunities to retain them on their breeding grounds, where stronger protections can be implemented (*eg* Bankovics & Lóránt 2018, Guo 2021). Nevertheless, reducing migratory or dispersive behaviour may render birds less able to escape further rising temperatures, and result in unforeseen impacts on metapopulation dynamics. Certainly, the dangers to the future of all biodiversity, including human life, will only multiply if politicians and citizens fail to take vigorous and immediate action to reduce carbon emissions.

To engage with and control hunting, develop and implement ecologically sustainable and wildlife-compatible food production, and campaign articulately for both decarbonisation and measures to reduce the impact of energy infrastructure on wildlife including the Little Bustard (via on-site generation or full mitigation of powerline impacts) requires major investment in integrated but independent systems of applied research and practical management. Telemetry studies would yield invaluable information on the distribution of Little Bustard populations in summer, on migration and in winter, as well as on survival rates, threats and management responses. Studies on productivity and survival related to habitat availability would point to land-use strategies that best combine the interests of farming and wildlife. Sensitive use of media—television, radio and social—could transform popular understanding of the dangers of uncontrolled hunting, unchecked carbon emissions and unmitigated powerlines, as well as generate interest and pride in steppe areas often perceived as empty 'wastelands' awaiting proper development. Such measures may seem fanciful when expressed so starkly, but they represent the best options for ensuring that the Little Bustard survives the great changes that are undoubtedly coming to the countries of its eastern range.

ACKNOWLEDGEMENTS

We express our deepest appreciation to the authors of articles in this special issue. We thank Yuri Andryushchenko, Dimitris Kokkinidis, and Muyang Wang for kindly sharing information regarding Little Bustard populations in Crimea, Greece, and Xinjiang, and Alphan Anak, Attila Steiner, Kőrösi Levente, Azan Karam (Pakistan Historical Records) and the Macaulay Library for their permission to use the plates.

LITERATURE CITED

Aghababyan, K. 2025. A historical overview of Little Bustard *Tetrax tetrax* records in Armenia suggests a need for improved monitoring and conservation measures. *Sandgrouse* 47: 80–86.

Aidek, A, KM Ararat, S Awad, S Azar, F Itani, F Khoury & G Ramadan-Jaradi. 2025. The Little Bustard *Tetrax tetrax* in Iraq, Syria, Lebanon and Jordan. *Sandgrouse* 47: 38–47.

Andryushchenko, YA. 2009. [Little Bustard]. *In*: Akimov, IA (ed). [*Red Book of Ukraine: Animals*.]. Globalkonsalting, Kiev, Ukraine, p445. [In Ukrainian]

Ashoori, A, FH Tayefeh & LP Campeau. 2025. Iran's Little Bustards *Tetrax tetrax* show the first signs of a renewed decline: an updated status, 2016–2024. *Sandgrouse* 47: 102–110.

Athanasios, K. 2023. Outarde canepetière. *In*: *Red List of Greece*. Natural Environment & Climate Change Agency, Athens, Greece.

Averin, YV, IM Ganya & GA Uspenskii. 1971. [*Birds of Moldova. Vol. II.*] Shtiinza, Kishinev, USSR. [In Russian]

Bankovics, A & L Miklós. 2018. *Guidelines on Measures to Secure the Successful Wintering of Great Bustard Populations in Middle-Europe*. Convention on Migratory Species, Brussels, Belgium. Document: UNEP/CMS/GB/MOS4/Doc.6.4.3.

Baumann, M, J Kamp, F Pötzschner, B Bleyhl, A Dara, B Hankerson, AV Prishchepov, F Schierhorn, D Müller, N Hölzel, R Krämer, R Urazaliyev & T Kuemmerle. 2020. Declining human pressure and opportunities for rewilding in the steppes of Eurasia. *Diversity & Distributions* 26: 1058–1070.

BirdLife International. 2018. Species factsheet: Little Bustard *Tetrax tetrax*. Downloaded from https://datazone.birdlife.org/species/factsheet/little-bustard-tetrax-tetrax on 30/03/2025.

Bliznyuk, AI. 2018. [Migration of the Little Bustard in European Russia.] *Russian Ornithological Journal* 27(1611): 2343–2349. [In Russian]

Boev, ZN. 2015. [Little Bustard.] *In*: Golemanski V (ed). [*Red Book of the Republic of Bulgaria. Vol. 2*.] BAN & MOSV, Sofia, Bulgaria, p45. [In Bulgarian]

Brochet, AL, W van den Bossche, VR Jones, H Arnardottir, D Damoc, M Demko, G Driessens, K Flensted, M Gerber, M Ghasabyan, D Gradinarov, J Hansen, M Horváth, M Karlonas, J Krogulec, T Kuzmenko, L Lachman, T Lehtiniemi, P Lorgé, U Lötberg, J Lusby, G Ottens, JY Paquet, A Rukhaia, M Schmidt, P Shimmings, A Stipnieks, E Sultanov, Z Vermouzek, A Vintchevski, V Volke, G Willi & SHM Butchart. 2019. Illegal killing and taking of birds in Europe outside the Mediterranean: assessing the scope and scale of a complex issue. *Bird Conservation International* 29: 10–40.

Budagashvili, N. 2025. Challenges and opportunities for the conservation of large but fluctuating flocks of Little Bustards *Tetrax tetrax* in eastern Georgia. *Sandgrouse* 47: 73–79.

Campbell, O & M Kessler. 2025. Wild vagrants and intentional releases? Records of Little Bustard *Tetrax tetrax* in the Arabian peninsula. *Sandgrouse* 47: 52–58.

Campeau, LP & M Kessler. 2025. Differential migration of Little Bustard *Tetrax tetrax* at the fringes of its eastern range. *Sandgrouse* 47: 167–173.

Campeau, LP & SV Kulagin. 2022. The return of breeding Little Bustards in the Tulek Valley IBA, Kyrgyzstan. *Sandgrouse* 44: 360–371.

Campeau, LB, SV Kulagin & P Isayenko. 2025. Mapping the recovery of the Little Bustard *Tetrax tetrax* in Kyrgyzstan. *Sandgrouse* 47: 122–132.

Collar, NJ. 1978. Bustard Group General Report. *International Committee for Bird Preservation Bulletin* 13: 129–134.

Collar, NJ & M Kessler. 2021. Hunting of Little Bustards *Tetrax tetrax* in Azerbaijan: the global conservation perspective. *Sandgrouse* 43: 281–285.

Collar, NJ & M Kessler. 2024. Preservation of major migratory populations of Asian Houbara *Chlamydotis macqueenii* requires undergrounding of Uzbekistan's Kungrad powerline. *Sandgrouse* 46: 62–69.

Collar, NJ, H Baral, N Batbayar, G Bhardwaj, N Brahma, R Burnside, A Choudhury, O Combreau, P Dolman, P Donald, S Dutta, D Gadhavi, K Gore, O Goroshko, C Hong, G Jathar, R Jha, Y Jhala, M Koshkin & AE Kessler. 2017. Averting the extinction of bustards in Asia. *Forktail* 33: 1–26.

Dara, A, M Baumann, T Kuemmerle, D Pflugmacher, A Rabe, P Griffiths, N Hölzel, J Kamp, M Freitag & P Hostert. 2018. Mapping the timing of cropland abandonment and recultivation in northern Kazakhstan using annual Landsat time series. *Remote Sensing of Environment* 213: 49–60.

Dement'ev, GP. 1951. Otidiformes. *In*: [*Birds of the Soviet Union. Vol. 2*.] Soviet Science, Moscow, USSR, pp139–168. [In Russian]

Dolman, PM, KM Scotland, RJ Burnside & NJ Collar. 2021. Sustainable hunting and the conservation of the threatened houbara bustards. *Journal of Nature Conservation* 61: 126000.

Farajli, Z. 2025. Assessing the wintering population and conservation challenges of the Little Bustard *Tetrax tetrax* in Azerbaijan. *Sandgrouse* 47: 87–101.

Fedosov, VN. 2019. [Current status of Little Bustard in Orenburg oblast' and other parts of its range.] *Strepet* 17: 4–69. [In Russian]

Flint, P & C Richardson. 2024. *The Birds of Cyprus. An Annotated Checklist*. BOC Checklist Series 28. British Ornithologist's Club, Tring, UK.

Gao, X, W Yang, J Qiao, J Yao & K Xu. 2008. Distribution and status of bustards in China. *Frontiers of Biology in China* 3: 385–391.

Gavrin, VF. 1962. [Bustards.] *In*: Gavrin, VF, IA Dolgushin, MN Korelev & MA Kuz'mina (eds). [*Birds of Kazakhstan*] Academy of Science of the Kazakh SSR, Alma-Ata, USSR, pp5–38. [In Russian]

Goodman, SM & PL Meininger. 1989. *The Birds of Egypt*. Oxford University Press, Oxford, UK.

Government of Georgia. 2014. [Ordinance No. 190: On the Approval of the Red List of Georgia]. Tbilisi, Georgia. [In Georgian]

Gubin, BM. 2007. [Little Bustard.] *In*: [*Birds of Central Asia: Volume 1*]. Almaty, Kazakhstan, pp391–394. [In Russian]

Gubin, BM. 2010. [Little Bustard]. *In*: [*Red Book of the Republic of Kazakhstan. Vol 1. Animals*]. DPS, Almaty, Kazakhstan. [In Russian]

Gubin, BM. 2020. [*Birds of the Deserts of Kazakhstan*. Vol. 3]. Kolor, Almaty, Kazakhstan. [In Russian]

Guo J. 2021. Two great bustard populations 'overwintering in situ' were found in Baicheng, Jilin, and the analysis is related to rising temperature. China News Service, Changchun, China. Accessed on 19 February 2021 from https://www.yqqlm.com/2021/02/two-great-bustard-populations-overwintering-in-situ-were-found-in-baicheng-jilin-and-the-analysis-is-related-to-rising-temperature/

Hume, AO & CHT Marshall. 1879. *The Game Birds of India, Burmah, and Ceylon. Vol. 1*. Privately published, Calcutta.

Isakov, YA & VE Flint. 1987. [Family Otididae.] *In*: [*Birds of the USSR: Galliformes, Gruiformes*]. Science, Leningrad, USSR, pp465–492. [In Russian]

Kamp, J, R Urazaliev, PF Donald & N Hölzel. 2011. Post-Soviet agricultural change predicts future declines after recent recovery in Eurasian steppe bird populations. *Biological Conservation* 144: 2607–2614.

Kandaurov, EK. 1992. The all-Russian survey of the Great Bustard and Little Bustard. *Bustard Studies* 5: 63–66.

Kessler, A & AT Smith. 2014. The status of the Great Bustard (*Otis tarda tarda*) in Central Asia: from the Caspian Sea to the Altai. *Aquila* 121: 115–132.

Kessler, M & N Batbayar (eds). 2023. *Revised Action Plan for the Great Bustard in Asia*. CMS Technical Series Publication No. 47. Convention on Migratory Species, Bonn, Germany. https://www.cms.int/en/publications/technical-series

Khan, A, NUH Khan, S Uddin & A Karam. 2024. Status of the Little Bustard *Tetrax tetrax* in Pakistan based on historical and recent sighting records. *Sandgrouse* 47: 160–166

Khokhlov, AN & MP Il'yukh. 2013. [Little Bustard] *Tetrax tetrax*. *In*: Likhovid, AA (ed). [*Red Book of Stavropol' Krai. Vol. 2. Animals*]. Asterisk, Stavropol', Russia, p191. [In Russian]

Kılıç, D & G Eken. 2004. [*Important Bird Areas of Turkey. Update*]. Doğa Derneği, İzmir, Türkiye. [In Turkish]

Koshkin, M. 2011. *Habitat preferences of steppe breeding birds in Central Kazakhstan, in relation to different forms of land use*. MSc thesis. University of East Anglia, UK.

Koshkin, MA, R Urazaliyev & BM Gubin. 2025. Populations of Little Bustards *Tetrax tetrax* in Kazakhstan have rebounded following a period of agricultural abandonment. *Sandgrouse* 47: 111–121.

Kostin, SY. 2015. [Little Bustard]. *In*: Ivanov, SP (ed). [*Red Book of the Republic of Crimea: Animals*] Arial, Simferopol', p335. [In Russian]

Lokhman, YV. 2017. [Little Bustard]. *In*: Zamotailov, AS, YV Lokhman & BI Vol'fov (eds). [*Red Book of Krasnodar Krai.*] Krasnodar Krai Administration, Krasnodar, Russia, pp552–553.

Marcelino, J, F Moreira, S Mañosa, F Cuscó, MB Morales, EL García de la Morena, G Bota, JM Palmeirim & JP Silva. 2017. Tracking data of the Little Bustard *Tetrax tetrax* in Iberia shows high anthropogenic mortality. *Bird Conservation International* 28: 509–520.

Mazhitova, Z, A Zhalmurzina, S Kolganatova, A Orazbakov & T Satbai. 2021. Environmental consequences of Khrushchev's Virgin Land Campaign in Kazakhstan (1950s–1960s). *E3S Web of Conferences* 258: 05036.

Menzbir, MA. 1934. [*The Migration of Birds from a Zoogeographical Perspective.*] Biomedgiz, Moscow, USSR. [In Russian]

Ministry of Environment Water and Forests. 2022. Lista roșie națională a speciilor de păsări din România [National Red List of Bird Species in Romania]. *Monitorul Oficial al României [Official Gazette of Romania]* 190(798): 3–111. [In Romanian]

Morales, MB & V Bretagnolle. 2022a. An update on the conservation status of the Little Bustard *Tetrax tetrax*: global and local population estimates, trends, and threats. *Bird Conservation International* 32: 337–359.

Morales, MB & V Bretagnolle. 2022b. The Little Bustard around the world: distribution, global conservation status, threats and population trends. *In*: Bretagnolle, V, J Traba & MB Morales (eds). *Little Bustard: Ecology and Conservation*. Springer, Cham, Switzerland, pp57–79.

Muratov, R. 2025. Slight increase in the number of wintering Little Bustards *Tetrax tetrax* in Tajikistan. *Sandgrouse* 47: 150–154.

Oparin, ML, IA Kondratenkov, OS Oparina, & AB Mamayev. 2018. Abundance of the Little Bustard *Tetrax tetrax* L. 1758 (Otididae, Aves) in Saratov Oblast'. *Biology Bulletin* 45: 1165–1173.

Oparin, ML, OS Oparina, AA Abushin, VN Fedosov & AA Nefedov. 2025. Status of Little Bustard *Tetrax tetrax* in Russia based on assessments in four key regions. *Sandgrouse* 47: 59–72.

Ostrowski, S. 2025. The Little Bustard *Tetrax tetrax* in Afghanistan. *Sandgrouse* 47: 155–159.

Özgencil, IK, QH Mueen, KE Yavuz, MS Sözen, A Karataş, İ Uysal, ÖF Şahin, AA Çekici, K Kaplan, MM Karataş, M Erturhan, A Uslu, B Hatinoğlu, AC Tinaz, DM Özsoy, KA Boyla, S İsfendiyaroğlu, S Ekşioğlu & F Akarsu. 2025. Türkiye's Little Bustards *Tetrax tetrax* in decline: assessing distribution, population trends and threats. *Sandgrouse* 47: 26–37.

Papakonstantinou K, R Tsiakiris, T Kominos & G Katsadorakis. 2009. *Tetrax tetrax*, Little Bustard. *In:* Legakis A. & P Maragkou (eds). [*Red Book of Threatened Animals of Greece.*] Hellenic Zoological Society, Athens, Greece, pp255–256. [In Greek]

Perlman, Y. 2025. Decline in Little Bustard *Tetrax tetrax* numbers wintering in Israel since the 1980s. *Sandgrouse* 47: 48–51.

Radišić, D, V Vasić, S Puzović, M Ruzić, M Šćiban, B Grubac & A Vujić (eds). 2018. *Red Book of Fauna of Serbia III: Birds*. University of Novi Sad and Society for the Protection and Study of Birds of Serbia, Novi Sad, Serbia.

Rustamov, EA & AA Shcherbina. 2025. The Little Bustard *Tetrax tetrax* in Turkmenistan: an analysis of status, 1880–2024. *Sandgrouse* 47: 140–149.

Ryabov, AF. 1949. [On the ecology of steppe birds of northern Kazakhstan and observations in Naurzum Zapovednik.] *Works of the Naurzum Government Zapovednik* 2: 153–232. [In Russian]

Sarudny, NA. 1911. [List of birds of Persia]. *Journal für Ornithologie* 59: 13–241. [In German]

Savitskii, RM. 2024. [Little Bustard]. *In*: [*Red Book of Rostov Oblast'*.] Konstanta, Rostov-na-Donu, Russia, p261.

Shcherbak, MM (ed) 1994. [Little Bustard]. *In:* [*Red Book of Ukraine: Animals*]. Ukraine Encyclopedia, Kyiv, Ukraine. [In Ukrainian and Russian]

Shakula, VF, SV Shakula & GV Shakula. 2017. [Little Bustard as a natural component of agricultural landscapes of southern Kazakhstan.] *In*: Vinober, AV (ed) [*Biosphere Economy and Sustainable Development of Rural Areas.*] Irkutsk, Russia, pp23–25. [In Russian]

Shevchenko, VL, PB Debelo, JeI Gavrilov, VA Naglov & AK Fedosenko. 1993. [On the avifauna of the Volga-Ural interfluve (final part)]. *In*: [*Fauna and Biology of Birds of Kazakhstan*.] Institute of Zoology, Almaty, Kazakhstan, pp7–103. [In Russian]

Silva, JP, I Catry, JM Palmeirim & F Moreira. 2015. Freezing heat: thermally imposed constraints on the daily activity patterns of a free-ranging grassland bird. *Ecosphere* 6: 119.

Silva, JP, AT Marques, J Bernardino, T Allinson, Y Andryushchenko, S Dutta, M Kessler, RC Martins, F Moreira, J Pallett, MD Pretorius, HA 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.

Sushkin, PP. 1908. [Birds of the middle Kyrgyz steppe: Turgai and eastern Ural'sk Oblast's.] *In*: [*Materials on the Fauna and Flora of the Russian Empire: Zoological Department. Vol. 8*.]. V Richter, Moscow, Russia, pp1–803. [In Russian]

Ten, A, M Gritsina, T Abduraupov, E Kreuzberg, M Mitropolskiy, N Marmazinskaya & A Raykov. 2025. Warming temperatures and reduced snow cover are associated with new wintering grounds for the Little Bustard *Tetrax tetrax* in Uzbekistan. *Sandgrouse* 47: 133–139.

Til'ba, PA. 1999. [Avifauna of the Imeriti lowland. Part 1: Non-passerines.] *Caucasus Ornithological Journal* 11: 167–204. [In Russian]

Til'ba, PA. 2024. ['*Red Book' of the Birds of Kuban'*]. Traditsiya, Krasnodar, Russia. [In Russian]

Til'ba, PA & YV Lokhman. 2007. [Little Bustard]. *In*: Zamotailov, AS (ed) [*Red Book of Krasnodar Krai.*] PTP Krasnodar, Krasnodar, Russia, pp393-394. [In Russian]

World Bank. 2024. Environmental and Social Scoping Report Azerbaijan Scaling-Up Renewable Energy Project (P505208). WorldBank Group, Washington DC. http://documents.worldbank.org/curated/en/099082524135528588

Xu G & Ma M. 2016. [Little Bustard: half a year in Kurustai, Xinjiang.] *Forest and Humankind* 3: 118–123. [In Chinese]

Yousefi, M, A Kafash, S Malakoutikhah, A Ashoori, A Khani, Y Mehdizade, F Ataei, SS Ilanloo, HR Rezaei & JP Silva. 2017. Distance to international border shapes the distribution pattern of the growing Little Bustard *Tetrax tetrax* winter population in Northern Iran. *Bird Conservation International* 28: 499–508.

Zuban, IA, AY Timoshenko, PS Dmitriyev, SN Gashev, MN Kalashnikov, BM Suindykov, VS Lunyov & SV Shnel. 2025. Review of rare bird species in the North Kazakhstan: update and additions to the regional avifauna list. *Acta Biologica Siberica* 11: 223–248.

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Türkiye's Little Bustards *Tetrax tetrax* in decline: assessing distribution, population trends and threats

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Summary: The Little Bustard *Tetrax tetrax*, a key indicator of grassland health, has experienced significant population declines across its range. In Türkiye, the species was classified as Critically Endangered (CR) in 2004, and recent estimates suggest that the breeding population has nearly disappeared, with an estimated 5–30 'pairs' remaining. Despite its precarious status as a breeding species and its presence during migration and winter, no systematic surveys have been conducted for Little Bustards in Türkiye for almost two decades. This study integrates published and grey literature, citizen science data and expert interviews to assess the status, distribution and movements of Little Bustards in Türkiye. We estimate a breeding population of 10–20 individuals, restricted to a few localities in eastern Türkiye, a migratory population of 250–400 individuals and a wintering population of 100–200 birds, which primarily use sites in coastal regions. The threats to these populations in Türkiye are known or inferred to include agricultural intensification and expansion, overgrazing and hunting. An exceptional influx of Little Bustards in 2024/2025 is unexplained. Urgent conservation actions and targeted surveys are needed to protect the remaining breeding and non-breeding populations, identify ongoing threats and ensure the species' survival in Türkiye.

INTRODUCTION

The Little Bustard *Tetrax tetrax* is a rare breeding species in Türkiye, with sporadic records of migrating and wintering individuals along the Mediterranean, Aegean and Black Sea coasts (Kılıç & Eken 2004, Eken *et al* 2006, Kirwan *et al* 2008). Historically, and into the 21st century, central, eastern and north-western Türkiye hosted small breeding populations of the species (Kasparek 1989, Kirwan *et al* 2008). However, over recent decades its populations have declined markedly, and the latest national-level Red List assessment in 2004 classified the Little Bustard as Critically Endangered (CR), citing an estimated decline of more than 80% in the breeding population, which was believed to number some 30–60 individuals (Kılıç & Eken 2004).

The most recent national-level assessment of Little Bustards in Türkiye was carried out in 2006, and it reported little evidence of the species' persistence, suggesting that it might be considered extinct as a breeding species in the country (Özbağdatlı & Tavares 2006). Since then, no systematic assessments or surveys have been conducted to determine the status of breeding or non-breeding populations and threats facing them. Furthermore, although sporadic non-breeding records have been reported through citizen science observations and social media, there is no comprehensive understanding of the species' non-breeding populations and movements within Türkiye or between Türkiye and neighbouring regions. Given the ongoing threats, including extensive habitat loss to agricultural intensification and illegal hunting (Kirwan *et al* 2008, Yılmaz *et al* 2021), identifying key areas where populations may still persist, especially in the rarely surveyed part of the species' range in eastern Türkiye, is essential.

We compile data on Little Bustard sightings in Türkiye with the aim of estimating breeding and non-breeding population sizes, distribution and routes followed by Little Bustards during autumn migration and winter and identifying threats facing the species in the country.

METHODS

To obtain a comprehensive understanding of the past and present status of Little Bustards in Türkiye, we followed a multi-step approach. First, we reviewed all available published and grey literature on the species. Second, we downloaded all Little Bustard observation records from eBird and used only those that had been reviewed and confirmed (Cornell Lab of Ornithology 2025). Third, we examined all observation and photographic records of Little Bustards on the national bird photography and observation database TRAKUŞ (TRAKUŞ 2025) and contacted the observers for additional details, such as the number of individuals observed and exact location. Fourth, we reviewed relevant social media platforms (Instagram, Facebook) to collect recent sighting records. Lastly, we interviewed several researchers, photographers and birdwatchers who regularly observe the species or have studied it in the past to collect their personal unpublished records. We also included our own observations, collected opportunistically across Türkiye during fieldwork focused on other species over the last two decades.

We used the data to present an overview of the historical (up to 2015) and current (post-2015) distributional ranges of the species' breeding populations, as well as its autumn and winter movements within and through Türkiye. We defined the breeding season as May to August (Cramp 1980, Kirwan *et al* 2008). We opted to present only the current non-breeding range of the species owing to data limitations. To account for uncertainties associated with some records (Aceves-Bueno *et al* 2017) and ensure compatibility with national and continental bird atlas data (*eg* Boyla *et al* 2019, Keller *et al* 2020), we mapped the species' distribution at a coarse resolution of 50×50 km. We then focused further on the autumn and winter records and flight direction notes recorded alongside some observations to broadly assess potential movement routes of Little Bustards in and around Türkiye, as well as population sizes across the species' non-breeding range. For current distributional ranges and population sizes, we used records from the past 10 years (from 2015 onwards), and integrated information from the literature and all available sightings.

RESULTS

After removing duplicate sightings, we compiled a total of 187 records, including 63 from eBird, 50 from TRAKUŞ, seven from our own unpublished data, and 67 from published and grey literature.

We estimate the Little Bustard breeding population in Türkiye at 10–20 individuals, the migrating population at 250–400 individuals, and the wintering population at 100–200 individuals (Table 1). The following sub-sections provide detailed descriptions of historical and recent records for each population, along with their distribution maps. Population size and trend estimates for these populations are summarised in Table 1. The threats to the species are then itemised.

Table 1. Population size and trend estimates for the Little Bustard in Türkiye. 'Migration' covers pre-migratory gatherings and stopover flocks. Quality of estimate: 1 = low, 5 = high.

Season	Number of birds	Important sites	Quality of estimate	Population trend			
				1950–1990	1990–2020	2020–2023	1950–2023
Breeding	10–20	2	3	↘	↘	↘	↘
Migration	250–400	3	2	↘	↘	?	↘
Wintering	100–200	3	3	↘	↘	↘	↘

Status and distribution of the breeding population

Only 34 of the records we compiled (*c*18%) pertained to the breeding season; they separate into three general regions.

North-west. Records of breeding Little Bustards in north-western Türkiye date back to the 1930s, when the species was apparently widespread and numerous in Bursa, south of the Sea of Marmara, and where it was extensively hunted (Kasparek 1989). The most recent breeding season sightings from this region are from the 1980s, and the breeding population in this area is certainly extinct (Goriup & Parr 1985, Kasparek 1989, Kirwan *et al* 2008).

Central. Breeding records of Little Bustards in central Türkiye date back to the 1940s, with regular observations around Lake Tuz Important Bird Area (IBA) until the decade 2000–2010 (Figure 1; OST 1975, Kasparek 1989, Balmer & Betton 2004, Kirwan *et al* 2008). During a regional breeding bird atlas survey conducted in the Konya Closed Basin, a population of 40 individuals was recorded in 1998 and 1999, dispersed across several localities around Lake Tuz (Eken & Magnin 2000). This was the highest number of breeding Little Bustards ever reported from central Türkiye. Additional records of adults from the summers of 1998 and 1999 suggest that small breeding populations persisted in at least 3–4 localities west and south of Lake Tuz IBA, including Lake Tersakan and Lake Kulu IBAs (Figure 1), as well as the Sultanhanı Plain (Cornell Lab of Ornithology 2025).

Further breeding season records from central Türkiye include two females observed in May 1992 in Sivrihisar, Eskişehir, and one female in Kütahya (OST 1975, Kirwan & Martins 2000). These areas, which support Türkiye's largest Great Bustard *Otis tarda* populations (Eken *et al* 2006, Özgencil *et al* 2021), contain protected habitats that seem highly suitable for Little Bustards, suggesting that a small breeding population is likely to have existed in the past. There are also records of breeding Little Bustards from the Karamık marshes (Figure 1), north of lake Eğirdir, from the 1980s and 2000s (Kasparek 1989, authors' unpublished observations). The small breeding population in this area is believed to have been extirpated before 2010. The most recent records from central Türkiye are from two localities, Lake Kulu IBA (Figure 1; north of Lake Tuz) and Tavşançalı (west of Lake Tuz), where a total of eight individuals was detected in the spring and summer of 2004 (Cornell Lab of Ornithology 2025). However, the species has not been observed in central Türkiye during the breeding season since then. Even extensive fieldwork that has been carried out every spring since 2018 around Lake Tuz Special Environmental Protection Area (Özgencil & Özcan 2018, Özgencil 2019) failed to detect any Little Bustards. Nevertheless, the Turkish Breeding Bird Atlas, which was a part of the greater European Breeding Bird Atlas 2 (Keller *et al* 2020), reported a breeding population of 1–9 'pairs' from the area (Boyla *et al* 2019). As some of these former breeding sites, such as Lake Kulu IBA, are regularly visited by birdwatchers and no individuals have been observed despite extensive, high-effort surveys, it is likely that the breeding population in all of central Türkiye was extirpated sometime before 2010.

East. Breeding records of Little Bustards in eastern Türkiye are primarily from the Muş, Bulanık and Malazgirt plains (Figure 1). Although the species' presence in Muş, west of Lake Van, was known as early as the 1960s (Goriup & Parr 1985), the earliest detailed record from this region dates to the summer of 1987, when an adult male was observed along the Murat river (Cornell Lab of Ornithology 2025). A later sighting occurred in 2003, when a single individual was recorded in the Bulanık–Malazgirt Plains IBA (Balmer & Betton 2004). In 2006, the total breeding population across the Bulanık, Malazgirt and Muş plains was estimated at 3–5 'pairs' (Eken *et al* 2006). Later on, up to five individuals were observed in the Muş Plain IBA during the summers of 2008 and 2009 (Kirwan *et al* 2014, Cornell Lab of Ornithology 2025, TRAKUŞ 2025). The most recent records from

eastern Türkiye come from the Muş plain, where two individuals were seen in summer 2016 (Cornell Lab of Ornithology 2025, TRAKUŞ 2025). According to the Turkish Breeding Atlas, Muş plain, the area west of Lake Van, and the Bulanık–Malazgirt plains each had an estimated breeding population of 1–9 'pairs' (Boyla *et al* 2019). Additionally, species distribution models developed for EBBA2, which consider climatic and land-cover variables among others, suggest that these sites remain marginally suitable for Little Bustards (Keller *et al* 2020). Given this, and the fact that this part of the country received little attention from researchers, birdwatchers and photographers over the past two decades, it is entirely possible that a small breeding population persists in the region.

The only other notable records from the eastern half of Türkiye include a pair observed near Sulakyurt, Ardahan, in north-eastern Türkiye in late May 2022 (authors' unpublished observations) and two males seen in Ceylanpınar, Şanlıurfa, in the south-east in April 1981 (Goriup & Parr 1985). The Sulakyurt area contains extensive stretches of seemingly suitable habitat for the species and may still harbour a small breeding population. The Ceylanpınar area, before the shift to intensive irrigated agriculture, contained large areas that were likely suitable for Little Bustards (Magnin & Yarar 1997, Kılıç & Eken 2004, Eken *et al* 2006). This, and the presence of displaying males in the early 1980s, suggest that the area supported a small breeding population that has since been extirpated (Cramp 1980, Kirwan *et al* 2008).

Current total. The most recent population size estimate for Little Bustards in Türkiye, covering 2013–2018, was 5–30 'pairs' (Burfield *et al* 2023). We revise this estimate to 10–20 individuals, which we believe are distributed between three localities in eastern and north-eastern Türkiye, each supporting only several individuals (Figure 1).

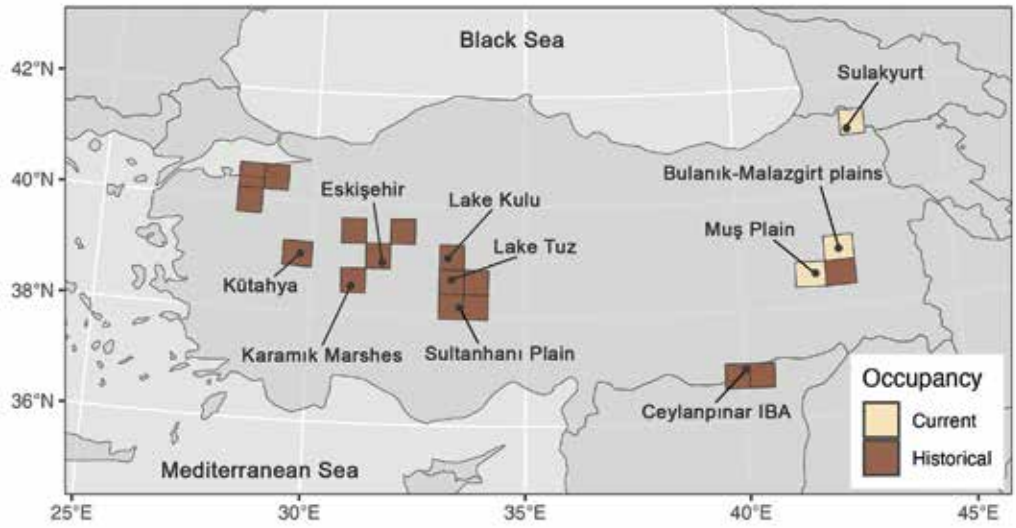

Figure 1. Estimated historical (before 2015) and current (after 2015) breeding distribution of the Little Bustard *Tetrax tetrax* in Türkiye. Squares, 50×50 km, indicate breeding areas (dark = historical, pale = current), and correspond with the grid of the Turkish Breeding Bird Atlas (Boyla *et al* 2019). Key sites mentioned in the text are labelled.

Status and distribution of the non-breeding population

Owing to the facultative and sporadic nature of the autumn and winter movements of the species (Cramp 1980, Bretagnolle *et al* 2022), we opted to present a single distribution map

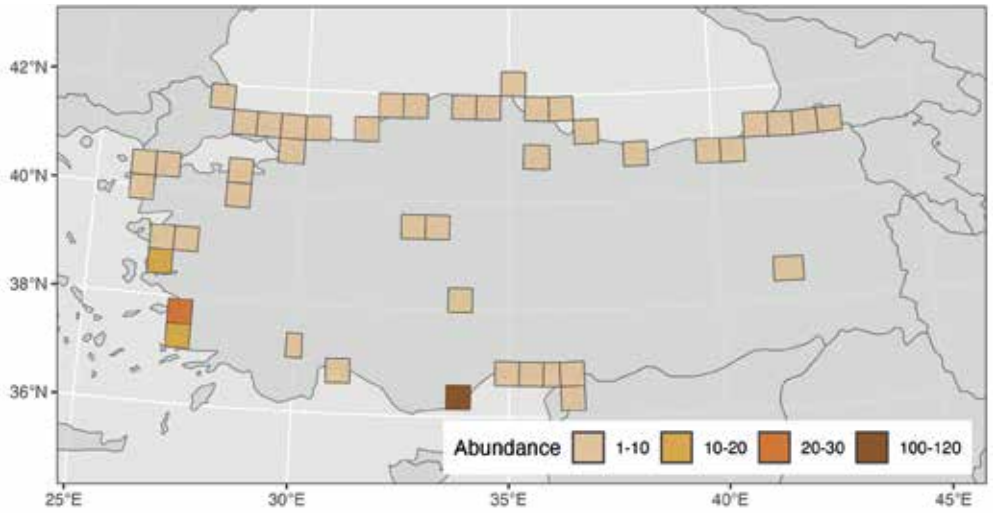

Figure 2. Non-breeding distribution and local abundance estimates for the Little Bustard *Tetrax tetrax* in Türkiye in 2015–2025. Number of individuals in a 50×50 km grid square is represented by the colour. The grid corresponds to that used in the European and Turkish Breeding Bird Atlases.

for migrating and wintering Little Bustard populations (Figure 2), although we present separate population size estimates for each of these populations in Table 1.

Relatively small numbers of Little Bustards migrate through or winter in Türkiye (Kirwan *et al* 2008). Individuals observed during autumn migration or winter are likely to originate from breeding populations in Ukraine or southern Russia, which are the closest breeding areas north of Türkiye (Keller *et al* 2020). However, it is highly probable that at least some of the individuals wintering along the Mediterranean coast are those that breed in central and eastern Türkiye, as discussed above (Kasparek 1989, Kirwan *et al* 2008).

Autumn and winter records of Little Bustards in Türkiye are mostly restricted to the coastal regions, with the majority of observations concentrated in the Black Sea region (Figure 2). This predominantly coastal distribution of non-breeding Little Bustards may be attributed to the mountain ranges running parallel to the Black Sea coastline acting as a potential barrier to movement inland (Kirwan *et al* 2008). The earliest records of non-breeding individuals in north-western and western Türkiye date from the mid-19th century (Kasparek 1989, Kirwan *et al* 2008). Most non-breeding observations involve small groups of 1–3 individuals, with a few notable exceptions: two deltas on the west coast, Gediz Delta and Büyük Menderes Delta IBAs, have hosted larger groups of 10–30 individuals, while a site on the south coast, Göksu Delta IBA, recorded an exceptional 100–120 individuals in the winter of 2025 (Plate 1, Figure 2; Cornell Lab of Ornithology 2025).

In some years, Türkiye receives larger numbers of migrating and wintering Little Bustards than usual, possibly owing to unfavourable conditions to the north. Early 2025 was particularly notable in this regard, with record numbers of non-breeding Little Bustard sightings at multiple sites. The more than 100 birds in the Göksu Delta IBA represented the joint-largest congregation ever documented in Türkiye, matched only by the 119 birds recorded in Ceylanpınar IBA near the Syrian border in March 1969 (Figure 1; OST 1972). Additionally, the first ever wintering records from Ankara in central Türkiye (both involving single birds) were documented in December 2024 (Plate 2) and March 2025 (Cornell Lab of Ornithology 2025). The only other non-breeding record in central

Plate 1. Part of a flock of over 100 Little Bustards *Tetrax tetrax* observed at the Göksu Delta in January 2025. © *Ahmet Karataş*

Plate 2. The first Little Bustard *Tetrax tetrax* ever seen in Ankara in central Türkiye, December 2024. © *Kubilay Yakup Kaplan*

Türkiye over the past decade is of a hunted individual south of Lake Tuz in November 2017 (authors' unpublished observations).

The only non-breeding records of the species in eastern Türkiye over the past decade come from Muş Plain IBA, where 1–2 individuals were observed in early and mid-March 2021 (Cornell Lab of Ornithology 2025). Given the harsh winter conditions in the region (Eken *et al* 2006, Tanrıverdi 2015), we classify this as a non-breeding record while acknowledging that these individuals may have been early arrivals for breeding. Meanwhile, the once

important sites near the Syrian border in Ceylanpınar IBA, Şanlıurfa, no longer appear to host wintering Little Bustards (Kasparek 1989, Kirwan *et al* 2008).

To our knowledge, no population estimates have previously been reported for migrating or wintering Little Bustards in Türkiye. The facultative nature of the species' autumn and winter migration complicates distinctions between migrating and wintering individuals. However, we opt to provide separate estimates for these two groups: 250–400 individuals on passage, and 100–200 individuals overwintering (Table 1). Comparing these numbers with historical records (Kasparek 1989, Kirwan *et al* 2008) and accounts from elderly locals in north-eastern Türkiye mentioning hundreds of Little Bustards migrating through or wintering in the valleys of the north-east (authors' unpublished observations), it appears that both migrating and wintering populations have declined over the past century.

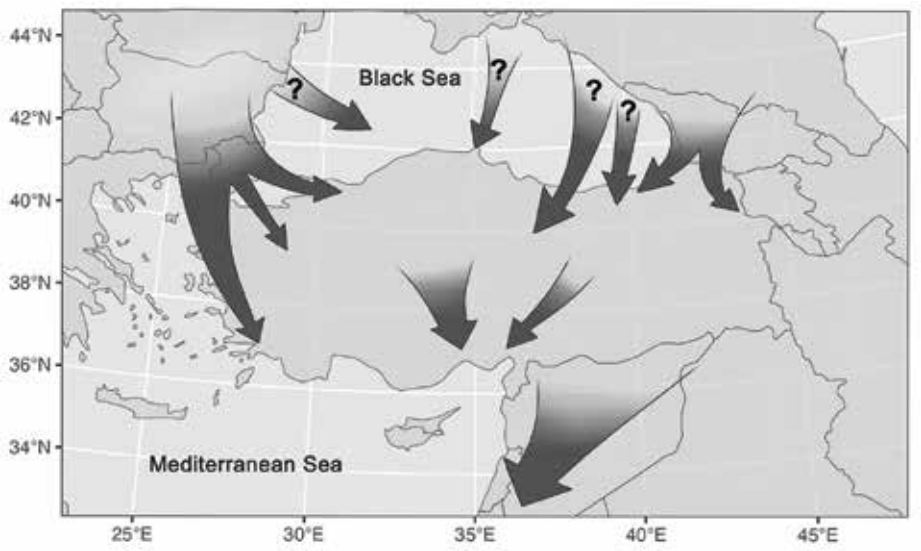

Figure 3. Hypothesised migratory routes of Little Bustards *Tetrax tetrax* in Türkiye during the autumn and winter.

Movements of Little Bustards within or through Türkiye

Regular records of individuals in north-western Türkiye suggest a migratory route via Thracian Türkiye. These individuals may arrive overland or, alternatively, may cross the Black Sea to reach north-western Türkiye. Once there, they may continue southwards to staging or wintering grounds along the western coast or take an easterly route to reach the western Black Sea coast of Türkiye (Figure 3). Some may even travel inland to central Türkiye or as far as the southern Mediterranean coast. Observations of individuals crossing the Taurus range in Karaman province (Kasparek 1989) support this hypothesis. Additionally, a sighting in winter 2016 of Little Bustards arriving on Türkiye's north coasts over the Black Sea in Ordu province (Plate 3; authors' unpublished observations), combined with their known ability to perform long-distance migratory flights (Bretagnolle *et al* 2022), supports the likelihood that some individuals breeding across the Kerch strait and in eastern Crimea (Collar *et al* 2020, Keller *et al* 2020) may fly directly over the Black Sea to reach their wintering grounds in northern Türkiye. Figure 3 presents these hypothesised autumn and winter movement pathways of Little Bustards in Türkiye.

A larger number of individuals are likely to enter Türkiye at its north-eastern corner (Figure 3). These birds probably originate from breeding populations in south-western

Plate 3. A male Little Bustard *Tetrax tetrax* observed flying over the Black Sea and arriving at a bay in Ordu, Türkiye, in the winter of 2016. © *Ahmet Karataş*

Russia (Collar *et al* 2020, Keller *et al* 2020). Some of them may cross the Black Sea from points near the western Caucasus, around or north of Sochi, while others may follow the coastline before further dispersing into Türkiye. These birds may either remain along the north coasts, move inland toward central Türkiye or the Mediterranean coast, or continue onward to wintering grounds beyond the borders of Türkiye (BirdLife International 2018, Collar *et al* 2020).

Threats

Agricultural intensification and associated habitat changes are the primary drivers of Little Bustard declines globally (BirdLife International 2018, Keller *et al* 2020, Bretagnolle *et al* 2022), and Türkiye is no exception (Eken *et al* 2006, Kirwan *et al* 2008). Over the past two decades, agricultural intensification has accelerated across the country, with some of the former and current Little Bustard breeding sites among the most affected areas (Kirwan *et al* 2008, Özgencil *et al* 2021, Yılmaz *et al* 2021). In central Türkiye, intensification often involves the conversion of dry grasslands and low-intensity farmlands into heavily irrigated agricultural landscapes (Yılmaz *et al* 2021, Çolak *et al* 2022). This conversion eliminates diverse land-use mosaics, reducing the quantity of both breeding and non-breeding habitats (Cramp 1980, Morales *et al* 2005, Collar *et al* 2020, Bretagnolle *et al* 2022). Other agriculture-related threats, including desertification, salinisation, increased human disturbance, the crushing of females, eggs and young by agricultural machinery, and heavy pesticide and herbicide use (Bretagnolle *et al* 2011, 2022), must also have contributed to the decline of the Little Bustard in Türkiye. As a farmland bird, it may have also suffered from the widespread use of DDT across the country in the 1950s, which is considered to be the primary cause of the extinction of Northern Bald Ibis *Geronticus eremita* in Türkiye (Kirwan *et al* 2008, Böhm *et al* 2021). Furthermore, widespread wetland drainage and uncontrolled surface and groundwater use, largely driven by agricultural demands, have likely further degraded the quality and suitability of both breeding and non-breeding habitats (Eken *et al* 2006, Yılmaz *et al* 2021, Çolak *et al* 2022).

Overgrazing, which is a widespread problem in Türkiye (Eken *et al* 2006, Ambarlı *et al* 2016), may have contributed to the decline of Little Bustards in the country. It reduces arthropod populations and edible plant biomass during the breeding and winter seasons (Bretagnolle *et al* 2011), and is a particular problem for steppe wildlife around lake Tuz, a former breeding site for Little Bustards (Özgencil *et al* 2021, 2022).

Historically, hunting of Little Bustards was a tradition in north-eastern Türkiye, where locals relied on its meat for winter consumption before economic growth from tea cultivation transformed the region (authors' unpublished observations). The Turkish literature contains numerous records of Little Bustard hunting, with the earliest dating back to the 19th century (Kasparek 1989). Hunting of Little Bustard has long been banned in Türkiye (Goriup & Parr 1985, DKMP 2024), but enforcement is weak. Moreover, although the majority of breeding, migrating and wintering Little Bustard populations in Türkiye are located within IBAs (Kılıç & Eken 2004, Eken *et al* 2006), these areas lack effective protection. We therefore presume that hunting likely remains a major threat to the species throughout its annual cycle, as it does for Türkiye's legally protected Great Bustards (Özgencil *et al* 2021). Stories we heard from hunters, who openly admit to shooting Little Bustards across different regions of Türkiye over the past two decades, support this view.

To our knowledge, there are no documented cases of powerline collisions involving the Little Bustard in Türkiye. However, since powerline collisions have been reported as a cause of mortality for the species elsewhere in the world (Bretagnolle *et al* 2022, Silva *et al* 2023), the problem is clearly likely to affect the species in Türkiye as well.

CONCLUSIONS

The Little Bustard is a critically endangered and rare breeding species in Türkiye (Kılıç & Eken 2004, Kirwan *et al* 2008), with an estimated 10–20 breeding individuals remaining in the entire country. Although the migrating and wintering population is larger, historical records suggest that this population has also declined, probably due to a combination of breeding population declines both within and outside Türkiye (BirdLife International 2018, Collar *et al* 2020). Despite the recent growth in the amount of data collected via citizen science, the species remains understudied in Türkiye, with the most recent national-level assessment dating back to 2006 (Özbağdatlı & Tavares 2006). Consequently, the greatest threat to Little Bustards in the country may be the lack of scientific, species-specific surveys and updated assessments, which are crucial for obtaining a more accurate understanding of distribution, population sizes and, crucially, key threats to the species and the solutions to them. Targeted surveys in eastern and north-eastern Türkiye are urgently needed to assess the status of the remaining breeding populations before they disappear. Moreover, intensive surveys are needed in and around lake Tuz to identify the causes and remedies of the adverse situation of the species in a former breeding stronghold.

Addressing the threats posed by agricultural intensification and hunting remains a conservation challenge for steppe avifauna in Türkiye (Özgencil *et al* 2021, Yılmaz *et al* 2021). Currently, the most feasible conservation actions for preserving the remaining breeding populations of Little Bustards involve identifying their exact breeding locations and implementing targeted conservation measures. These should include modifications to agricultural practices and protection against illegal hunting, leveraging both domestic and international funding sources.

Illegal hunting likely remains a threat for migrating and wintering Little Bustards in Türkiye, with no solution in sight. The species' wide non-breeding distribution presents a challenge for conservation efforts, although it is possible to identify a few key congregation sites, such as the Göksu Delta IBA, which has regularly harboured migrating and wintering Little Bustards for decades (Kirwan *et al* 2008, Cornell Lab of Ornithology

2025, TRAKUŞ 2025). Nevertheless, it is highly likely that some other wintering locations of the species remain undiscovered. If further studies can identify additional regular wintering areas, it will not only facilitate the distinction between true wintering and stopover, but also help determine which areas need to be protected and in what manner.

Owing to the sparsity of studies of this species in Türkiye, the population size and migratory pathways presented in this study are of no more than medium quality. Moreover, the origins of Little Bustards observed in Türkiye during autumn and winter remain unknown. Stable isotope analyses of shed feathers (Hobson 1999) collected from wintering grounds could provide an insight into the sources of these individuals with minimal or no disturbance to the birds.

The year 2025 was a year of exceptional influx of Little Bustards in Türkiye, with nearly 40% of all TRAKUŞ records and 50% of eBird records occurring in the autumn of 2024 and winter of 2024–2025. Several locations reported record-breaking counts of individuals, most notably the observation of 100–120 birds at the Göksu Delta IBA in January (see above). Researchers initially suspected that adverse climatic conditions to the north may have driven this influx. However, climate summaries for the winter of 2025 (Hersbach *et al* 2025) indicate that both Ukraine and southern Russia, the most likely origins of migrating and wintering Little Bustards in Türkiye, experienced relatively warm conditions during winter. On the other hand, ongoing war has led to the abandonment of vast agricultural areas in eastern Ukraine (FAO 2023). As Little Bustards can significantly benefit from land abandonment (Bretagnolle *et al* 2022), we hypothesise that the increased number of Little Bustards recently observed in Türkiye may be attributed to improved breeding conditions in eastern Ukraine. However, colleagues in Ukraine and Russia—Y Andryushchenko, ML Oparin and OS Oparina—indicate that there is no evidence of an increase in the number of Little Bustards breeding in Crimea or around the Kerch strait, nor of a particular event or circumstance that could have caused Türkiye's influx of 2025. Currently, the reasons behind this unprecedented movement of Little Bustards remain unknown. Further research considering all potential contributing factors, including habitat changes, population trends and climatic conditions in the species' breeding grounds in Ukraine and Russia, may provide better insight into this unusual event.

ACKNOWLEDGEMENTS

We would like extend our thanks to Dr Louis-Philippe Campeau and Dr Mimi Kessler for inviting us to contribute to this wonderful special issue and Dr Mimi Kessler and Dr Nigel Collar for providing valuable feedback on the manuscript. We would also like to thank the TRAKUŞ and eBird users Osman Can Altan, Alphan Anak, Şükrü Süha Aray, Cevahir Arduç, Mustafa Arık, Engin Bıyıkoğlu, Timur Çağlar, Hüseyin Çiçek, Kemal Ergün, Ertuğrul Divlecen, Volkan Donbaloğlu, Turgut Ege, Ömer Furtun, Caner Gönel, Göktuğ Güzelbey, İsmail Hazar, Timur İhsan Türker, Mevlüt İkiz, Murtaza Kaba, Kemal Kahraman, Ali Kahveci, Fuat Kaya, Emrah Kayhan, Nadir Köksoy, Ömer Necipoğlu, Elif Ogralı, Abdullah Öğünç, Mehmet Ali Öktem, İdris Ölmez, Gürhan Sinan Özgünlü, Berkay Özünlü, Cenk Polat, Mehmet Şenol, Alper Tüydeş, Murat Uyman, Özmen Yeltekin, Ahmet Yılmaz and Tamer Yılmaz for providing details of their observations.

LITERATURE CITED

Aceves-Bueno, E, AS Adeleye, M Feraud, Y Huang, M Tao, Y Yang & SE Anderson. 2017. The accuracy of citizen science data: a quantitative review. *Bulletin of the Ecological Society of America* 98: 278–290.

Ambarlı, D, US Zeydanlı, Ö Balkız, S Aslan, E Karaçetin, M Sözen, Ç Ilgaz, AG Ergen, Y Lise & SD Çağlayan. 2016. An overview of biodiversity and conservation status of steppes of the Anatolian Biogeographical Region. *Biodiversity and Conservation* 25: 2491–2519.

Balmer, D & K Betton (compilers). 2004. Around the Region. *Sandgrouse* 26: 160-168.

BirdLife International. 2018. IUCN Red List of Threatened Species: *Tetrax tetrax* (Europe and Global assessments). *IUCN Red List of Threatened Species*. https://www.iucnredlist.org/en.

Böhm, C, CGR Bowden, PJ Seddon, T Hatipoğlu, W Oubrou, ME Bekkay, MA Quevedo, J Fritz, C Yeniyurt, JM Lopez, JF Orueta, D Frigerio & M Unsöld. 2021. The northern bald ibis *Geronticus eremita*: history, current status and future perspectives. *Oryx* 55: 934–946.

Boyla, KA, L Sınav & DE Dizdaroğlu. 2019. [*Türkiye Breeding Bird Atlas*.] WWF-Türkiye, Doğal Hayatı Koruma Vakfı, Istanbul, Türkiye. [In Turkish]

Bretagnolle, V, A Villers, L Denonfoux, T Cornulier, P Inchausti & I Badenhausser. 2011. Rapid recovery of a depleted population of Little Bustards *Tetrax tetrax* following provision of alfalfa through an agri-environment scheme. *Ibis* 153: 4–13.

Bretagnolle, V, S Mañosa & MB Morales. 2022. Natural history of the Little Bustard: morphology, biometry, diet, sexual dimorphism, and social and breeding behaviour. *In*: Bretagnolle, V, J Traba & MB Morales (eds). *Little Bustard: Ecology and Conservation*. Springer International Publishing, Cham, pp29-56.

Burfield, IJ, CA Rutherford, E Fernando, H Grice, A Piggott, RW Martin, M Balman, MI Evans & A Staneva. 2023. Birds in Europe 4: the fourth assessment of Species of European Conservation Concern. *Bird Conservation International* 33: e66.

Çolak, MA, B Öztaş, İK Özgencil, M Soyluer, M Korkmaz, A Ramírez-García, M Metin, G Yılmaz, S Ertuğrul, ÜN Tavşanoğlu, CA Amorim, C Özen, MA Yağcı, A Yağcı, JP Pacheco, K Özkan, M Beklioğlu, E Jeppesen & Z Akyürek. 2022. Increased water abstraction and climate change have substantial effect on morphometry, salinity, and biotic communities in lakes: examples from the semi-arid Burdur basin (Turkey). *Water* 14: 1241.

Collar, N, E Garcia & E de Juana. 2020. Little Bustard (*Tetrax tetrax*), version 1.0. *Birds of the World*. https://doi.org/10.2173/bow.litbus1.01.

Cornell Lab of Ornithology. 2025. *eBird Basic Dataset* (Version Jan-2025).

Cramp, S. (ed) 1980. *Handbook of the Birds of Europe, the Middle East, and North Africa: The Birds of the Western Palearctic: Vol. 2*. Oxford University Press, UK.

DKMP. 2024. [*2014-2025 Central Hunting Commission (MAK) Decisions during the Hunting Season*.] TC Tarim ve Orman Bakanlığı, Doğa Koruma ve Milli Parklar Genel Müdürlüğü. [In Turkish]

Eken, G & G Magnin. 2000. *A Preliminary Biodiversity Atlas of the Konya Basin, Central Turkey*. Doğal Hayatı Koruma Derneği, Istanbul, Türkiye.

Eken, G, S İsfandiyaroğlu & M Bozdoğan. 2006. [*Important Bird Areas in Türkiye*.] (Vols. 1 & 2). Doğa Derneği. https://www.dogadernegi.org/onemli-doga-alanlari/. [In Turkish]

FAO. 2023. *Impact of the War on Agricultural Enterprises–Findings of a Nationwide Survey of Agricultural Enterprises with Land up to 250 hectares*. FAO, Rome, Italy.

Fontaine, A, A Simard, N Brunet & KH Elliott. 2022. Scientific contributions of citizen science applied to rare or threatened animals. *Conservation Biology* 36: e13976.

Goriup, PD & D Parr. 1985. Results of the ICBP bustard survey of Turkey, 1981. *Bustard Studies* 2: 77–97.

Hersbach, H, B Bell, P Berrisford, G Biavati, A Horányi, J Muñoz Sabater, J Nicolas, C Peubey, R Radu & I Rozum. 2025. ERA5 hourly data on single levels from 1940 to present. *Copernicus Climate Change Service (C3s) Climate Data Store (Cds)* 10(10.24381).

Hobson, KA. 1999. Tracing origins and migration of wildlife using stable isotopes: a review. *Oecologia* 120: 314–326.

Kasparek, M. 1989. Status and distribution of the Great Bustard and the Little Bustard in Turkey. *Bustard Studies* 4: 80–113.

Keller, V, S Herrando, P Voříšek, M Franch, M Kipson, P Milanesi, D Martí, M Anton, A Klvanová & MV Kalyakin. 2020. *European Breeding Bird Atlas 2: Distribution, Abundance and Change*. Lynx Edicions, Barcelona.

Kılıç, D & G Eken. 2004. [*Important Bird Areas in Türkiye Update*.] Doğa Derneği, Ankara, Türkiye. [In Turkish]

Kirwan, G, B Demirci, H Welch, K Boyla, M Özen, P Castell & T Marlow. 2008. *The Birds of Turkey*. Bloomsbury Publishing, UK.

Kirwan, G & R Martins. 2000. Turkey Bird Report 1992–1996. *Sandgrouse* 22: 13–35.

Kirwan, G, M Özen, M Erturhan & A Atahan. 2014. Turkey Bird Report 2007–2011. *Sandgrouse* 36: 146-175.

Magnin, G & M Yarar. 1997. *Important Bird Areas in Turkey*. Doğal Hayatı Koruma Derneği, Ankara, Türkiye.

Morales, MB, JT García & B Arroyo. 2005. Can landscape composition changes predict spatial and annual variation of little bustard male abundance? *Animal Conservation* 8: 167–174.

Ornithological Society of Turkey. 1972. *Turkey Bird Report 1968-69* (No. 2; Turkey Bird Reports).

Ornithological Society of Turkey. 1975. *Turkey Bird Report 1970-73* (No. 3; Turkey Bird Reports).

Özbağdatlı, N & JP Tavares. 2006. *The Situation of Great and Little Bustards in Turkey*. Doğa Derneği, Ankara, Türkiye. https://www.dogadernegi.org/wp-content/uploads/2015/09/Great-and-little-bustard-in-Turkey-toy-makale.pdf.

Özgencil, İK 2019. *Searching for White-headed Duck (Oxyura leucocephala) Breeding and Wintering Grounds in Central Anatolia and Monitoring of its Populations* (The Mohamed bin Zayed Species Conservation Project No. 182515710). https://www.speciesconservation.org/case-studies-projects/white-headed-duck/15710.

Özgencil, İK & C Özcan. 2018. *Monitoring of Great Bustard (Otis tarda) and Steppe Eagle (Aquila nipalensis) populations in Lake Tuz Special Environmental Protection Area*. Doğa Derneği, Ankara, Türkiye.

Özgencil, İK, F Akarsu, MM Karataş, A Gürsoy-Ergen, F Saygili-Yiğit, M Karakaya & M Soyluer. 2021. Current status of Great Bustard *Otis tarda* in Turkey: population size, distribution, movements, and threats. *Bird Conservation International* 32: 531-543.

Özgencil, İK, M Soyluer, MM Karataş & F Akarsu. 2022. Unconventional habitat choices by some Great Bustard *Otis tarda tarda* populations in Turkey. *Sandgrouse* 44: 113–121.

Silva, JP, AT Marques, J Bernardino, T Allinson, Y Andryushchenko, S Dutta, M Kessler, RC Martins, F Moreira, J Pallett, MD Pretorius, HA 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.

Tanrıverdi, A. 2015. [Research on the reproduction ecology of Great Bustard (*Otis tarda* L., 1758) within the border of Muş Province.] Doctoral dissertation, Yüzüncü Yıl University. https://tez.yok.gov.tr/UlusalTezMerkezi. [In Turkish]

TRAKUŞ. 2025. *TRAKUŞ Database*. TRAKUŞ. https://www.trakus.org.

Yılmaz, G, MA Çolak, İK Özgencil, M Metin, M Korkmaz, S Ertuğrul, M Soyluer, T Bucak, ÜN Tavşanoğlu & K Özkan. 2021. Decadal changes in size, salinity, waterbirds, and fish in lakes of the Konya closed basin, Turkey, associated with climate change and increasing water abstraction for agriculture. *Inland Waters* 11: 538–555.

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The Little Bustard *Tetrax tetrax* in Iraq, Syria, Lebanon and Jordan

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Summary: In this report records of the Little Bustard *Tetrax tetrax* in Iraq, Syria, Lebanon and Jordan are listed and assessed. Little Bustard is considered to be a scarce to rare passage migrant and winter visitor to parts of these countries, which lie at the southern border of its winter range. A significant increase in sightings over the last two decades is presented; all these records are of hunted first-winter birds and adult females, suggesting that females and young birds move further south in winter than adult males. We find the main threats to this species in the region to be illegal hunting and habitat loss, and argue for the need for further research and especially for the improved regulation of hunting.

INTRODUCTION

The Little Bustard *Tetrax tetrax* has two geographically disjunct and genetically distinct breeding populations: a western and an eastern group (Morales & Bretagnolle 2022). The western birds are resident or migrants in western Europe and north-west Africa. The eastern population is either resident or consists of migrants that spend the winter in Türkiye, the Caucasus and Iran, with Azerbaijan holding one of their main wintering quarters. Small numbers of this eastern population apparently overwinter erratically in parts of the Middle East (BirdLife International 2018). The preferred natural habitat is generally grassland steppes throughout the year, with an ability to use less intensively managed agricultural areas (Silva *et al* 2022).

Much of the region covered in this review, which apparently represents the southern border of the Little Bustard's wintering range, has received limited ornithological attention. Information about the species' occurrence as a passage migrant, winter visitor and even former breeder in Iraq, Syria and Lebanon is limited in the literature (and non-existent for Jordan), with a few records available in various publications including bird checklists and reports by visiting ornithologists and local hunters (Weigold 1913, Goodbody 1945, Misonne 1956, Flach 1959, Jeffery 1978, Baumgart *et al* 1995, Ramadan-Jaradi & Ramadan-Jaradi 1999, Ramadan-Jaradi *et al* 2020). Evans (1994) mentioned three sites in northern Syria where the Little Bustard is likely to be a regular winter visitor, but did not provide further evidence. Based on a review of available records and observations, we discuss the status of and threats to the species as well as the need for developing the capacity and conditions for further research.

METHODS

Data were collected from the literature, complemented by interviews with locals (*eg* rangers in Jordan), records from birdwatchers, and reports and photos sent to us by hunters in Syria and Lebanon (we increased our communication with hunters in response to the invitation to prepare this review). There have been no survey efforts or projects targeting this species in these countries so far. Except for KA in Iraq, we ourselves have not recorded the species recently in our respective countries.

RESULTS

Records from Iraq span the years 1918–2019, mostly during winter and spring (February–April). In Syria the records are for the period 1912–2024 while those in Lebanon stem from the period 1958–2016 (between October and December). Prior to 1957, Little Bustards were also recorded during April–June, indicating local breeding, but all records from

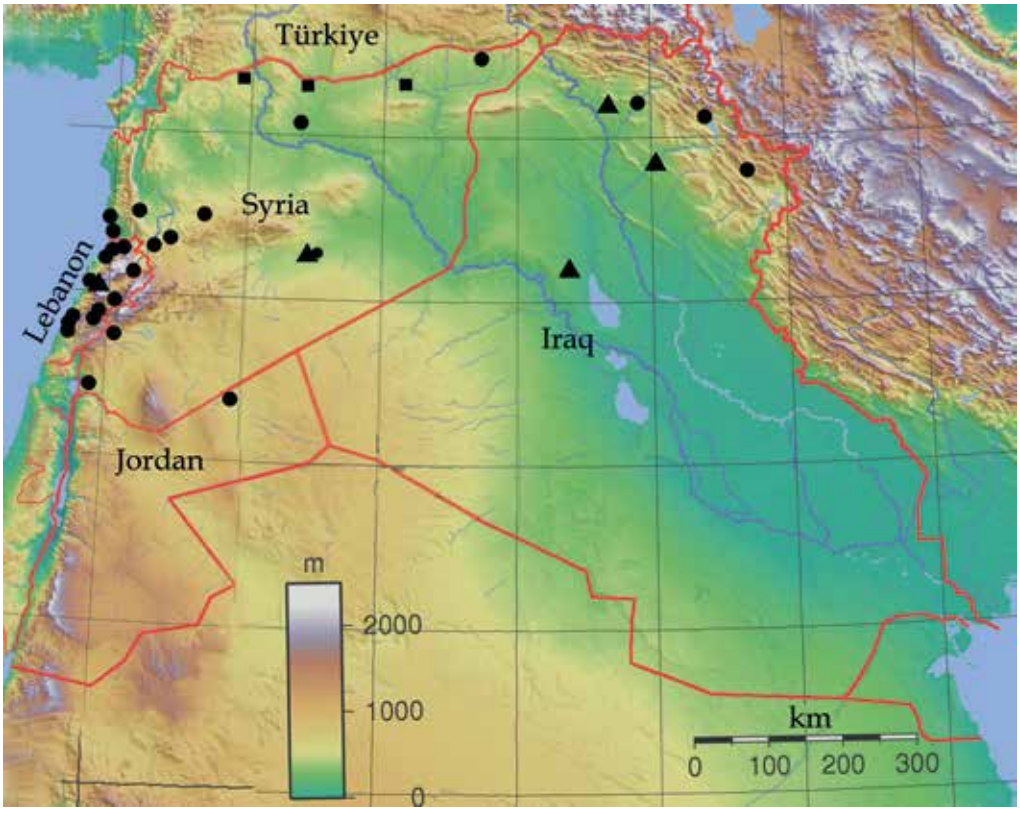

Figure 1. Records of Little Bustard *Tetrax tetrax* in Iraq, Syria, Lebanon and Jordan. Triangles: pre-1960 records; circles: post-1960 wintering/passage migrant records; squares: former breeding sites. Relevant records in Palestine, near the Jordanian border, are not shown in this map (see text).

1975 onwards have been of migrants and possible winter visitors during the months of October–February.

Although there were no surveys focusing specifically on this species, the number of records, both recent and historical, allows us to reach some conclusions about the Little Bustard's status and used habitats. Nevertheless, all the data must be considered with caution, given that regular surveys and birdwatching activities were and are still impossible in many parts of the region due to security issues near borders, violent conflicts and limited resources and trained personnel to carry out extensive surveys. Figure 1 shows the locations of records of Little Bustards in the countries covered by this report.

Iraq

The Little Bustard has been reported as a scarce passage migrant and rare winter visitor in Iraq (Salim *et al* 2012). The areas with most records lie in the north-western parts of the country. A comparison with records published before 1950 indicates a decline in numbers. The highest count was of 40 near Wardak in February 1942 (Allouse 1953). Moreover, four individuals were recorded in the Ramadi Desert in March 1918 (Thornhill 1918), and one was hunted near Mosul in 1926 (Ticehurst *et al* 1926).

More recently, after approximately six decades without observations, three Little Bustards were observed north-west of Dukan Lake in May 2009. An additional six were recorded near the Tanjero river in April 2018. The highest single count in recent years

was of eight Little Bustards sighted north-west of Erbil in March 2019. All records were in open steppe (NW Iraq) and desert (Ramadi) habitats. The record in May indicates possible breeding, although other evidence of breeding in northern Iraq is lacking from both the historical literature and recent sightings.

Hunting is the main threat to the Little Bustard in Iraq. In addition, intensive agriculture is transforming the landscape and there is excessive use of pesticides at the local scale. According to the Environmental Protection and Improvement Law No. 27 of 2009 of Iraq's Ministry of Environment, and Wildlife Protection Law No. 17 of 2010 of the Ministry of Agriculture, breeding and migratory bird species are generally protected from hunting, which should be limited to certain species in prescribed hunting seasons and areas. However, there are significant challenges to the implementation of these laws due to a lack of awareness and knowledge about the conservation status of each species. Political instability in the region also hinders effective enforcement and public engagement in conservation efforts. None of the areas in which Little Bustards have been recorded in Iraq is currently protected, which indicates a need for action in terms of the protection of steppe habitat and its avifauna. At least one of the sites is listed as an IBA/KBA (Dukan Lake), but several other IBAs in northern Iraq are also potentially relevant for wintering Little Bustard (*eg* Mosul Lake, Dohuk Lake, Darbandikhan Lake), and conservation actions could be prioritised in these in the future.

Syria

Misonne (1956) reported Little Bustards breeding at Tell Abiad in north-eastern Syria near the Turkish border. Indirect evidence of local breeding in the first half of the last century comes in records of the species in spring and early summer between Aleppo and the Euphrates in April 1911 (Weigold 1912, 1913) and at Tell Tamer in May 1945 (Goodbody 1945).

The Little Bustard is also a rare winter visitor and a scarce passage migrant in Syria. Records of non-breeding birds include a skin found 40 km east of Palmyra in 1948–1950 (Jeffery 1978) and a female killed near Salamiyah (east of Hamah) in 1975–1982 (Baumgart *et al* 1995). Zakaria (1983) also reported this species as a winter visitor in small numbers east of Homs in the 1950s and 1960s. However, it was presumed to be absent in 2000–2003 in the vicinity of Palmyra and its surroundings (Serra *et al* 2005), and later to be extinct in the country (Murdoch & Betton 2008).

However, photos of hunted birds confirm the species' continued occasional presence in Syria. These recent records include a female hunted 60 km east of Palmyra in October 2007, a female hunted in Arab Ash-shate' south of Tartous in October 2023, a female hunted in Al-Qahtaniyeh in north-east Syria and a female/juvenile hunted in Kabsh east of the Euphrates, both in October 2024 (Plate 1A). Other birds killed in 2024 include a juvenile on 12 November north-west of Damascus, a female/juvenile on 25 November east of Mesiaf (Plate 1B), a juvenile east of lake Qattinah on 15 December (Plate 1C), and five females on 19 December in the southern coastal region (Plate 1D).

Although we have received photos of 12 birds killed, the number is likely to be much higher. Two hunters from the southern coastal area confirmed that this species is regularly sighted during autumn and winter, although its numbers fluctuate annually. The hunters from the coastal area do not know that it is a species of bustard; they call it *sansal* in Arabic (AA pers obs). These recent records suggest that the Little Bustard is still a rare winter visitor along the coast, in southern and perhaps central Syria. Small numbers probably also winter in northern Syria near the Turkish border where access for birdwatchers and researchers has been difficult or impossible since 2011. It is generally assumed that the Little Bustard has been overlooked in Syria during the last decade due to the war and other security issues. Moreover, because this species is unlikely to fly over the open sea

Plate 1. Some of the Little Bustards killed in Syria in 2024 (A): in Kabsh, east of the Euphrates (anonymous hunter; via AA); (B): east of Mesiaf © *Ahmad Rahmoun*; (C): east of lake Qattinah © *Salman Al-Qadi*; (D): in southern coastal region (anonymous hunter; via AA).

Table 1. Population estimates for breeding, passage, and wintering Little Bustards in Iraq, Syria, Lebanon and Jordan. 'Migration' covers pre-migratory gatherings and stopover flocks. Quality of estimate: 1 = low, 5 = high. ? = trend cannot be established due to insufficient records. † = extirpated

Country	Season	Number of birds	Important sites	Quality of estimate	Population trend		
					1950–1990	1990–2020	2020–2023
Iraq	Breeding	0	N/A	0	May have bred prior to 1950s	† ?	† ?
	Migration	10–100	6	2	↘	?	?
	Wintering	15–150	2	3	↘	↘ ?	→ ?
Syria	Breeding	0	N/A	3	Extirpation of breeding population	†	†
	Migration	10–100	1	2	↘	No data	↘ ?
	Wintering	10–100	3	2	↘	No data	↘ ?
Lebanon	Breeding	0	N/A	2	N/A	N/A	N/A
	Migration	5–50		2	↘ ?	↘ ?	↘ ?
	Wintering	2–20	1	2	↘ ?	↘ ?	↘ ?
Jordan	Breeding	0	N/A	2	N/A	N/A	N/A
	Migration	1–10	1	2	?	?	?
	Wintering	1–10	1	2	?	?	?
Totals for all four countries	Breeding	0	N/A	Average = 2	Breeders disappeared	† ?	† ?
	Wintering	30–280	4+	Average = 2	↘	↘	↘ ?

Plate 2. Former breeding habitats of Little Bustard in north-north-east Syria. (A) Grassland steppe and fallow fields used as rangeland (this area still being a habitat for Asian Houbara), north of Deir ez-Zor, March 2010; (B) rain-fed, extensive wheat and barley fields in what used to be steppe habitat, north-east of ar-Raqqa, February 2022. © *Ahmad Aidek*

from the north or north-west, birds observed in Lebanon and Palestine during autumn and winter must pass through Syria.

In the occupied part of the Golan Heights, southern Syria, the Little Bustard is a winter visitor (Shirihai 1996). Seventeen birds were observed at Bnei Israel Reservoir, Golan, on 14–20 March 2005 (Balmer & Betton 2005), and one bird on 20 October 2005 (Balmer & Betton 2006). The area used by wintering Little Bustards probably extends beyond the occupied area to the entire Golan Heights and its surroundings.

The typical habitat where the species was breeding in northern Syria used to be a steppe composed of low shrubs, grasses and herbs, mixed with agricultural fields, while the area east of Palmyra, east of Homs and Hama where the species has been recorded as a passage migrant and possible winter visitor is rolling or flat semi-desert or arid steppe (Barkoudah *et al* 2002). The area east of Mesiaf near the coast and around Homs consists of agricultural land and low hills. One record north-west of Damascus is within a rocky mountainous area at 1500 m asl, but elsewhere records are from 50–650 m asl. Although this species prefers flat areas during the breeding and winter seasons, it may cross mountain ranges during migration, as indicated by a further record in a mountainous area in Lebanon (see below).

The northern regions of Syria, also known as Syrian Mesopotamia, were once home not only to the Little Bustard but also to breeding Great Bustard *Otis tarda* and Asian Houbara *Chlamydotis macqueenii* (Aharoni 1932, Goodbody 1945, Brown 1946, Kumerloeve 1968). Records indicate that all bustard species ceased breeding in Syria around 1960. The disappearance of breeding bustards near the Turkish border may be attributed to agricultural expansion and hunting in that area (Plate 2). Motor pumps became the principal means of extracting water for irrigation by the early 1950s, freeing farmers from riverside agriculture and enabling them to cultivate the entire stretch of bottomland and terraces (Hole & Smith 2012). Zakaria (1983) mentioned that all species of bustards in Syria have been exposed to heavy hunting since the 1950s–1960s, and that they were doomed to extinction if not protected. Today, the main threat to migrants and birds attempting to overwinter remains hunting, in addition to less favourable conditions caused by the

transformation of large areas of grassland steppes to farmland and the degradation of steppe habitats through drought and overgrazing. None of the sites where the Little Bustard has been recorded is located in a protected area. The Ras-el Ayn IBA in northern Syria was within the former breeding range and may possibly be important for wintering birds. Recent winter records are close to two IBAs: Bahrat Homs and Jabal Bilas.

Despite the existence of laws prohibiting hunting in Syria, this activity has evolved significantly from being the hobby of a few to a widespread practice, leading to the indiscriminate elimination of various bird and mammal species. This trend was exacerbated by the onset of civil war in 2011 (Aidek 2024). The current regulation established under Law No. 14 of 2023, superseding the previous Decree No. 152 of 1970, governs wild animal hunting, but despite these laws and the issuance of several other decisions to ban hunting for a whole year or several years, hunting has never been stopped. In many cases this is because the supposed enforcers of the hunting law are those doing the hunting (AA pers obs). Widespread corruption of the police and security personnel under the previous Assad government made it easy for hunters simply to bribe officials.

Lebanon

Prior to 2013 the Little Bustard was considered a vagrant, with a single record south-east of Saida in October 1958. However, in the four years 2013–2016 the species was recorded at nine different sites on ten dates, all in November or December, as follows: one bird, Jiyyeh electricity plant, December 2013; one, Anjar, one, Saida, and one, Tal Znoub (West Beqaa'), all November 2014; one, Ras Baalbek, December 2015; one, Al Arida, one, Blat area (Jbeil, Byblos), three shot and (next day) two seen, Akkar plain, and one, Sareen El Fawqa (Saraain El Faouqa), 15 km south-west of Baalbek, all December 2016. Since then, single birds were hunted on the Akkar plain and the Minyeh coastal plain, both in November 2022. Most habitats where these records were made are open, flat plains, or rolling terrain with a mix of dwarf shrub, grassland steppe vegetation and extensive agricultural fields (SA, FI & GR-J pers obs). Birds were encountered at altitudes ranging from *c*10 m (coastal plains) up to 900 m asl (in the Beqaa').

These records now suggest the Little Bustard is a scarce passage migrant. Wintering is also very likely, although the birds are likely to be highly vulnerable to uncontrolled hunting (Ramadan-Jaradi *et al* 2020; https://www.komitee.de/en/campaigns-and-operations/lebanon/). The main threats to the species in Lebanon are excessive illegal hunting and disturbance by activities such as intensive agriculture and urbanisation (AA, FI pers obs). Under Lebanon's hunting law No. 580, which was updated in 2004, the hunting season is declared every year by the Ministry of Environment and implementation and enforcement are carried out by the national Internal Security Force (https://www.komitee.de/en/campaigns-and-operations/lebanon/bird-shooting-in-lebanon/the-lebanese-hunting-law/). However, the law is poorly implemented due to regional conflict, political instability, economic collapse and lack of resources, as nature protection under contemporary conditions is not considered a priority. None of the sites where the Little Bustard has been recorded in Lebanon is located in a protected area.

Jordan

The Little Bustard has not yet been officially recorded in Jordan. Nevertheless, according to recently interviewed rangers working at the Burqu' Nature Reserve in north-eastern Jordan, the species is a very rare passage migrant during October–December, with a 'few single birds seen' in the last few years, most recently in December 2023. Only single individuals have been observed, according to one of the rangers, and these were only flying through or apparently staging in the area, which lies in the Hamada desert of Ruweished, close to

the Syrian border. The ranger described the bird he saw, distinguished it from the Asian Houbara and referred to it in Arabic as the 'Azerbaijani Bustard', which is the name used by hunters from the Gulf region for the Little Bustard (Collar & Kessler 2021).

Andrews (1995) speculated that the Little Bustard occurs as a rare winter visitor in the extreme north of Jordan. If so, that would include the less accessible basalt steppe, flat/hilly semi-desert and Hamada desert. Andrews based his assumption on records of wintering birds in the Golan Heights (up to *c*60 birds in the 1980–1990s; Shirihai 1996) close to the Jordanian border. The area along the Syrian border, east of Um Al-Quttayn, appears to have suitable steppe habitats and further east along the Syrian border there are flat to hilly desert areas with mudflats and shallow wadis that are often flooded in winter, at altitudes of 500–900 m asl. Part of these areas near the border are of limited access to hunters due to military presence. Other parts are apparently visited by hunters from the Gulf region during autumn, winter and spring, although hunting in these areas is generally prohibited. Additionally, there are records of single birds in Palestine, just west of the River Jordan, during the winter season, in addition to passage migrants in other parts of the West Bank (Awad *et al* 2022). This indicates that birds wintering in Palestine cross the northern parts of Jordan and/or Lebanon during their migration.

Hunting, trapping and trading of most wild birds are generally prohibited in Jordan (Jordanian Agriculture Law, Article 56, 2015). Rock Doves *Columba livia*, Eurasian Collared Doves *Streptopelia decaocto*, Laughing Doves *Spilopelia senegalensis*, Quail *Coturnix coturnix*, Chukar *Alectoris chukar* and Sand Partridge *Ammoperdix heyi* are permitted to be hunted in specified areas, seasons and years. However, the seasonally recommended schedules and permitted hunting bags are based on the opinions and undocumented field observations of rangers and some members of the National Wildlife Committee, and the subsequent Minister's decision. This system does not seem to operate with clear and standard procedures for assessing wild bird populations and the magnitude and impacts of hunting activities in Jordan. Moreover, many other species are hunted illegally in various parts of Jordan which are not designated for hunting, including species that are rare or threatened. This indicates a weakness in law implementation (Eid & Handal 2018). Hunting in Jordan has become a widespread hobby among Jordanian men in recent years; however, many hunters are not well trained in using shotguns and bird identification, while many do not even possess a hunting permit.

DISCUSSION

Breeding of the Little Bustard occurred locally in the north of Syria and possibly Iraq, close to the Turkish border, until the 1950s (Weigold 1913, Goodbody 1945, Misonne 1956). More recently, after many decades with very limited observations, the species has been recorded as a scarce passage migrant and winter visitor in northern Iraq and rare passage migrant and possibly regular winter visitor to parts of Lebanon and Syria, with currently unsubstantiated reports from local rangers in Jordan.

All the photographs available are of adult females and first-winter birds. In other areas of the Little Bustard's range, females and their young are observed to gather into pre-migratory flocks (Tarjuelo *et al* 2013, Morales *et al* 2022). Females might be more sensitive to colder weather being slightly smaller and thus move further south during challenging weather. This could lead to irruptive movement of females (both adult and young) to the Levant region in some years. In any case, the lack of observations of adult males in these southern reaches of the Little Bustard's Middle Eastern wintering range may reflect a case of differential migration, with females and young birds migrating further than males, as has been observed in Eastern Great Bustards *Otis tarda dybowskii* (Wang *et al* 2023).

Records of passage migrants and winter visitors probably involve birds from the closest breeding areas, which lie in Türkiye and areas north of the Caucasus (BirdLife International 2018, Morales & Bretagnolle 2022). There have been no systematic surveys to estimate Little Bustard numbers in the area under review owing to armed conflicts. Moreover, resources are often lacking to develop capacity and carry out long-term and extensive surveys. Only small groups and single birds have been recorded recently in Iraq, Syria and Lebanon, and it is possible that the species has been overlooked in Jordan and in the northern areas near the less accessible northern Syrian border.

This lack of monitoring and surveys is not likely to be the major explanatory factor for the low number of observed birds. Little Bustards wintering in the Middle East, especially in Syria and Lebanon, face severe challenges. First, they are very likely being decimated or even exterminated by unregulated, excessive hunting. Indeed, all recent records in Syria and Lebanon are of hunted birds. This threat is rooted in the lack of awareness about the importance of wild birds and their habitats, very few sites designated as protected areas where hunting is prohibited, and generally weak implementation of laws in all countries covered in this report. There is a clear lack of capacity and awareness at various levels, and standard procedures prepared by wildlife experts to regulate hunting to a sustainable level are ignored. Furthermore, habitat loss and agricultural intensification are also major threats to wintering birds and may have played a role in the disappearance of breeding birds along the Syrian–Turkish borders during the 1950s and 1960s. In the past, large steppe areas were used as rangeland and rain-fed cereal fields. This was managed by a rotational system in which some fields remained fallow in some years and were partly used as rangeland. Such extensive agriculture has been shown to benefit Little Bustards in the Iberian Peninsula (Silva *et al* 2022). A transformation to intensive agriculture has been going on since the 1950s in Syria and other countries of the region (Holes & Smith 2012). Thus, although hunting and habitat loss are considered the main threats throughout the Little Bustard's range (Silva *et al* 2022), they are probably even more acute in the Middle East.

We recommend the following actions to address the threats described above. First, to properly assess the surviving populations, it is necessary to conduct coordinated surveys and establish a database for the countries of the Levant. This would require sufficient resources for developing capacity in the region, and could be part of an action plan for the protection of bustard species in the OSME region. Second, to tackle illegal hunting, we need effective law implementation while stepping up the protection of key areas for bustards and other birds. Educational programs for hunters, government officials and decision-makers may be crucial in this regard. Hunters especially should be trained in the identification of birds and regularly informed about rare and threatened species at the regional and global levels, something that AA has sought to do on social media in Syria when hunters have posted pictures of their kills. Fostering the awareness of local people has proved more effective than relying solely on legal restrictions (Aidek 2024).

ACKNOWLEDGEMENTS

We are grateful to Mimi Kessler, Louis-Philippe Campeau and Nigel Collar for their reviews and valuable comments, and to all who have assisted in recent fieldwork and shared photos and information about the Little Bustard.

LITERATURE CITED

Aharoni, J. 1926. Die Brutvögel Palästinas. *Beiträge zur Fortpflanzungsbiologie der Vögel* 2: 49–51. [In German]

Aharoni, J. 1932. Bemerkungen und Ergänzungen zu R. Meinertzhagens Werk 'Nicoll's Birds of Egypt'. *Journal für Ornithologie* 80: 416–420. [In German]

Aidek, EA. 2024. New bird species in Syria: recent additions, Audouin's Gulls at Tartous in April 2017 and Greater Painted-snipe near Palmyra in April 2024. *Dutch Birding* 46: 324-326.

Allouse, B. 1953. *The Avifauna of Iraq*. Iraq Natural History Museum, Baghdad.
Allouse, B. 1960, 1961, 1962. [*Birds of Iraq*]. Vols I, II, III. Al-Rabita Press, Baghdad. [In Arabic]
Andrews, IJ. 1995. *The Birds of the Hashemite Kingdom of Jordan*. Musselburgh.
Awad, S, M Farhoud & B Jarayseh. 2022. *Checklist of the Birds of Palestine*. Environmental Education Center, Beit Jala, Palestine.
Balmer, D & K Betton (compilers). 2005. Around the Region. *Sandgrouse* 27: 170-176.
Balmer, D & K Betton (compilers). 2006. Around the Region. *Sandgrouse* 28: 90-96.
Barkoudah, YM, S Ali, I Qadi, S Nader, F Haj-Mousa, N Sanadiqi, H Sadat & K Abd Alatif. 2002. [*Atlas of the Syrian Flora*.] Ministry of State for Environment Affairs, Damascus. [In Arabic]
Baumgart, W, M Kasparek & B Stephan. 1995. *Die Vögel Syriens: Eine Übersicht*. Kasparek Verlag, Heidelberg.
BirdLife International. 2018. Species factsheet: Little Bustard *Tetrax tetrax*. Downloaded from https://datazone.birdlife.org/species/factsheet/little-bustard-tetrax-tetrax on 02/12/2024.
Brown, ES. 1946. Notes on birds seen on a trip in northern Syria. *Middle East Biological Scheme, Jerusalem Naturalists Club Bulletin* 33: 1–6.
Collar, NJ & M Kessler 2021. Hunting of Little Bustards *Tetrax tetrax* in Azerbaijan: the global conservation perspective. *Sandgrouse* 43: 281-285.
Eid, E & R Handal. 2018. Illegal hunting in Jordan: using social media to assess impacts on wildlife. *Oryx* 52: 730-735.
Evans, MI 1994. *Important Bird Areas of the Middle East*. BirdLife International Series No. 2. Cambridge, United Kingdom.
Goodbody, JG. 1945. Records of birds seen in the Tell Tamer area, NE Syria, May–July 1945. *Middle East Biological Scheme Bulletin* 2: 1–8.
Hole, F & R Smith. 2012. Arid land agriculture in northeastern Syria. *In*: Gutman, G *et al* (eds) *Land Change Science. Remote Sensing and Digital Image Processing*, vol 6. Springer, Dordrecht, pp209-222.
Jeffery, WH. 1978. Birds from Station T–3, Palmyra 1948–50. *Army Bird-watching Society Periodic Publication* 3: 99–101.
Kumerloeve, H. 1968. Recherches sur l'avifaune de la Republique Arabe Syrienne; essai d'un aperçu. *Alauda* 36: 1-26. [in French]
Misonne, X. 1956. Liste des oiseaux nicheurs de la région de Tell-Abiad, N. E. de la Syrie. *Le Gerfaut* 46: 195–197. [In French]
Morales, MB & V Bretagnolle. 2022. The Little Bustard around the world: distribution, global conservation status, threats and population trends. *In*: Bretagnolle, V, J Traba & MB Morales (eds). *Little Bustard: Ecology and Conservation*, Springer (Wildlife Research Monographs, Vol. 5), pp57–79.
Morales, MB, S Mañosa, A Villers, EL García de la Morena & V Bretagnolle. 2022. Migration, movements, and non-breeding ecology. *In*: Bretagnolle, V, J Traba & MB Morales (eds). *Little Bustard: Ecology and Conservation*. Springer (Wildlife Research Monographs, Vol. 5), pp123–149.
Murdoch, DA & KF Betton. 2008. A checklist of the birds of Syria. *Sandgrouse* Supplement 2.
Ramadan-Jaradi, G & M Ramadan-Jaradi. 1999. An updated checklist of the birds of Lebanon. *Sandgrouse* 21: 132-170.
Ramadan-Jaradi, G, F Itani, J Hogg, A Serhal & M Ramadan-Jaradi. 2020. Updated checklist of the birds of Lebanon, with notes on four new breeding species in spring 2020. *Sandgrouse* 42: 186-238.
Salim, MA, OF Al-Sheikhly, KA Majeed & RF Porter. 2012. An annotated checklist of the birds of Iraq. *Sandgrouse* 34: 3-44.
Serra, GM, A Abdallah, G Al-Asaad, G Al-Qaim & AK Abdallah. 2005. A long-term bird survey in the central Syrian desert (2000–2003) part 1. *Sandgrouse* 27: 9–23.
Shirihai, H. 1996. *The Birds of Israel*. Academic Press, London.
Silva, JP, B Arroyo, AT Marques, MB Morales, P Devoucoux & F Mougeot. 2022. Threats affecting Little Bustards: human impacts. *In*: Bretagnolle, V, J Traba & MB Morales (eds). *Little Bustard: Ecology and Conservation*. Springer (Wildlife Research Monographs, Vol. 5), pp242–271.
Tarjuelo, R, MP Delgado, G Bota, M Morales, J Traba, J, A Ponjoan, I Hervás, I & S Mañosa. 2013. Not only habitat but also sex: factors affecting spatial distribution of Little Bustard *Tetrax tetrax* families. *Acta Ornithologica* 48: 119–128.
Thornhill, CM. 1918. Some notes on game-birds in Mesopotamia. *Journal of the Bombay Natural History Society* 25: 486–490.
Ticehurst, CB, P Cox & RE Cheesman. 1926. Additional notes on the avifauna of Iraq. *Journal of the Bombay Natural History Society* 31: 91–119.
Traba, J, MB Morales, JP Silva, V Bretagnolle & P Devoucoux. 2022. Habitat selection and space use. *In*: Bretagnolle, V, J Traba & MB Morales (eds). *Little Bustard: Ecology and Conservation*. Springer (Wildlife Research Monographs, Vol. 5), pp101–121.
Tristram, HB. 1864. Report on the birds of Palestine. *Proc. Zool. Soc. London* 426–456.

Wang, Y, G Purev-Ochir, A Gungaa, B Erdenechimeg, O Terbish, D Khurelbaatar, Z Wang, C Mi & Y Guo. 2022. Migration patterns and conservation status of Asian Great Bustard (*Otis tarda dybowskii*) in northeast Asia. *Journal of Ornithology* 164: 341–352.

Weigold, H. 1912/13. Ein Monat Ornithologie in den Wüsten und Kulturoasen nordwest Mesopotamiens und Innersyriens. *Journal für Ornithologie* 60: 249-297, 365-410; 61: 1-40. [In German]

Zakaria, AW. 1983 [*Animals and Birds of Al Sham countries*.] Palestine Geographic Center, Damascus. [In Arabic]

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Decline in Little Bustard *Tetrax tetrax* numbers wintering in Israel since the 1980s

YOAV PERLMAN

Summary: Little Bustard *Tetrax tetrax* is a rare non-breeding winter visitor to Israel. Until the 1980s, small and medium-sized flocks were recorded annually, mainly in the Golan area. At this time, an estimated 100 individuals wintered in Israel annually. Since the 1990s, numbers of wintering Little Bustards in Israel have declined gradually. The last sizeable flock consisted of 21 birds and was recorded in January 2014. Since then, numbers have dropped even further. In recent years the annual number wintering in Israel is either zero or single birds. The observed decline is probably unrelated to land-use changes or other factors in Israel, but may be linked to processes elsewhere.

INTRODUCTION

Historically, the Little Bustard *Tetrax tetrax* has been a rare, locally scarce, non-breeding visitor to Israel in winter, mainly to the north of the country (Shirihai 1996). There are a few historical records, including an individual hunted by Aharoni (1912). It arrives in November and stays until March. In winter, it favours open grassy plains and cultivated fields, especially cereals and legumes. Its distribution in Israel has been concentrated in the Golan area, where vast uncultivated grassy plains are available.

Since the 1990s, observed numbers of this species have dropped gradually. I review these changes and evaluate the current status and potential causes of the decline of the Little Bustard in Israel.

METHODS

For this study, all available published and unpublished data on Little Bustard occurrence, both in print and online, were collated (Appendix 1). Because the Little Bustard has always been a rare bird in Israel, and thus notable, reporting rates are expected to be high, especially since 2000 as the number of birdwatchers increased in the country.

Little quantitative information is available about the species in Israel before the 1980s; for this reason, estimates begin with the survey counts and national-level estimates recorded by Paz (1987) and Shirihai (1996) for that decade (Table 1, Figure 1). During the late 1990s and early 2000s, when professional birdwatching developed in Israel, records were collated into online databases. The earliest of these are Israbirdnet, an email group used by Israeli and visiting birdwatchers to report bird observations, and a dataset maintained by Israel Nature and Parks Authority (INPA) rangers. Since 2013, bird records in Israel have been collected using an online system developed by BirdLife Israel, and since 2018 using eBird (Sullivan *et al* 2009), these data being duplicated on the BirdLife Israel website (birds.org.il). Specimens taken within Israel for natural history collections were identified through correspondence with the main museums that are known to hold significant collections from Israel.

Due to the lack of systematically collected data before the 2000s, statistical trend analysis between decades is not possible. Therefore, to assess temporal changes in the numbers of Little Bustards wintering in Israel between the 1980s and the present, two simple decadal indices were calculated: 1) the highest count per decade; and 2) the decadal mean of the mean annual counts, for which mean annual count is defined as the mean of all observations that year. For the current decade, information through early 2025 was used. Duplicate reports of the same bird or flock were removed from the analysis.

Table 1. Decadal mean of accumulated annual counts, and highest counts per decade, of Little Bustards *Tetrax tetrax* wintering in Israel. The species is not noted in the country in other seasons. For quality of estimate, 1 = low, 5 = high.

Decade	Decadal mean of mean annual counts	Highest count per decade	Important sites	Quality of estimate
1980	60.0	70	1	1
1990	7.2	26	1	2
2000	3.0	17	1	4
2010	2.1	21	0	5
2020	1.0	9	0	5

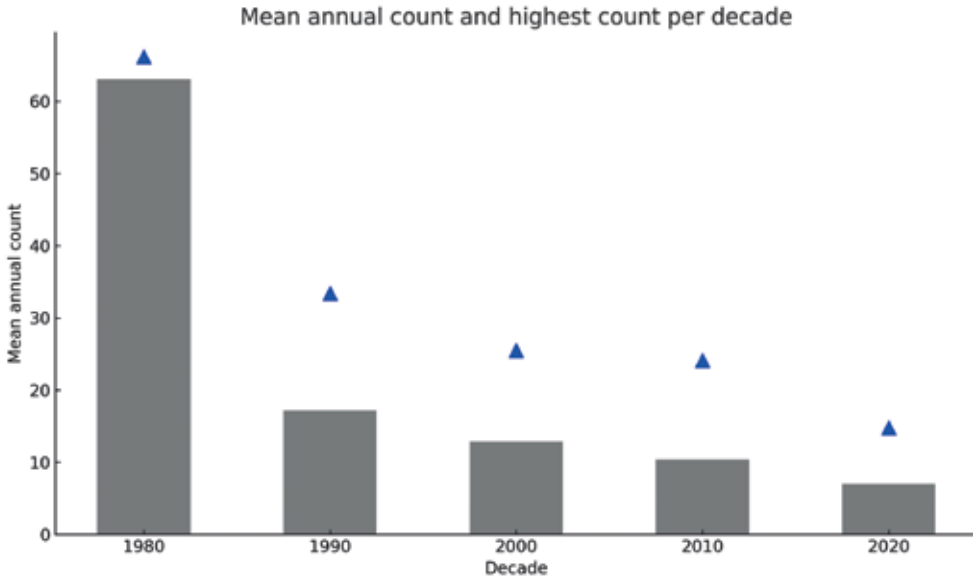

Figure 1. Decadal mean of mean annual counts (grey bars), and highest counts per decade (blue triangles) of Little Bustards *Tetrax tetrax* wintering in Israel.

RESULTS

The number of records of Little Bustard in Israel is 61 (Appendix 1). The decadal indices are presented in Figure 1 and Table 1. Until the late 1980s, a flock numbering 50–70 individuals returned to winter annually in the grasslands surrounding the Bnei Israel reservoir (32.85 N, 35.79 E). Smaller flocks were recorded regularly in the Hula valley and in cultivated fields in the Bet She'an valley. Small numbers, singles or small groups, were recorded as wintering and on passage in other parts of the country, including in semi-arid zones of the southern Judean plains. Thus during the 1980s, the national estimate of the wintering population was 100 individuals (Shirihai 1996). However, spatially- and temporally-explicit information on any of those records away from the main flock in the Golan are not available. Therefore, for the analysis here, only the figures concerning the Golan flock are used. Additionally, because of the paucity of historical data, it is unclear whether the estimate of 100 wintering birds reflects the pre-1980s as well.

Plate 1. Little Bustards *Tetrax tetrax* in an alfalfa field, Kfar Ruppin, Bet She'an valley, January 2014. Part of a flock of 21, the last sizeable flock recorded in Israel. © *Yoav Perlman*

From the 1990s, the largest flock wintering in the Golan shrank in size until it disappeared in the 2000s. However, exact counts depicting this decline in the 1990s and additional records from other parts of the country are largely missing. In the latter decade, the Little Bustard became a very rare winter visitor in Israel, observed only in small numbers, mainly in the Hula valley, Jizreel valley, Bet She'an valley and southern Judean plains, with a mean decadal count of 3 and highest count of 17. In some years only single birds were seen, occasionally small flocks. In the 2010s, the mean decadal count stayed low, at 2.1. The last sizeable flock was observed between December 2013 and January 2014 in the Bet She'an valley, numbering 21 birds. Since 2020, the species has not been recorded every year in Israel, having been unrecorded in winters 2021/22 and 2023/24. Records come mainly from the Bet She'an valley, with fewer records from Golan, Hula valley and other parts of the country. The decadal mean count in 2020s is 0.98. However, in winter 2024/25 an extraordinary number of Little Bustards was recorded in Israel, with a total 20 birds in the Bet She'an, Hula and Acre valleys and near Be'er Sheva in the northern Negev, including a flock of nine in the Bet She'an valley.

DISCUSSION

The decline in numbers of Little Bustards observed in Israel since the 1990s is likely to reflect the true tendency of its status in Israel, despite incomplete coverage in some years and the cryptic nature of Little Bustards in winter. Certainly, the large flock that used to winter in the Golan area until the 1980s no longer winters there. Recent observations are of single birds, at most.

The reasons for this observed decline of wintering Little Bustards in Israel are unclear. Previously used grassland habitat in the Golan is still vast and fairly well protected, and capable of supporting wintering flocks of Little Bustard. The agricultural zones where Little Bustards used to winter regularly in small numbers have undergone moderate changes, including agricultural intensification. Suitable large cereal and legume fields are still dominant in the Bet She'an and Jizreel valleys. There are no documented cases of direct mortality of Little Bustard in Israel, except birds collected for museums. Therefore, it is possible that the decline observed in Israel is linked with processes operating outside Israel.

ACKNOWLEDGEMENTS

Information presented here was collected by many birders, local and visiting, to whom I am grateful. Special thanks to Ohad Hatsofe from Israel Nature and Parks Authority for providing information from their data-

base. Thanks to Amos Belmaker (Steinhardt Museum of Natural History, Tel Aviv University), Alex Bond (Natural History Museum, Tring) and Paul Sweet (American Museum of Natural History) for providing information on specimens in their collections. Thanks to Nigel Collar, Mimi Kessler and Louis-Philippe Campeau for the useful comments on earlier versions of this manuscript.

LITERATURE CITED

Aharoni, J. 1912. Houbara macqueeni Gray. *Ornithologisches Jahrbuch* 23: 1–14.

Paz, U. 1987. *The Birds of Israel*. Helm, London.

Shirihai, H. 1996. *The Birds of Israel*. Academic Press, London.

Sullivan, BL, CL Wood, MJ Iliff, RE Bonney, D Fink & S Kelling. 2009. eBird: a citizen-based bird observation network in the biological sciences. *Biological Conservation* 142: 2282-2292.

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Appendix 1. All records of Little Bustard in Israel, in chronological order, 1911–early 2025

Codes: BSV = Bet She'an valley; CP = Coastal Plains; EG = Eastern Galilee; e/b = eBird/birds.org.il; HV = Hula valley; INPA = Israel National Parks Authority; isra = israbirdnet; JP = Judean Plains; NCP = Northern Coastal Plains; res. = reservoir; S1996 = Shirihai, H. 1996 Birds of Israel; TAU = Tel Aviv University Nature Collections; WN = Western Negev

1, **Sartaba**, Samaria, 01.01.1911 (Yisrael Aharoni, specimen in American Museum of Natural History); 23, **Bet She'an**, BSV, 06.12.1924 (Dr WK Bigger, S1996, 1 specimen in Natural History Museum, UK); 6, **Jaffa**, CP, 01.12.1933 (Ridenko, S1996); 1, **Kfar Masaryk**, Northern CP, 31.12.1949 (unknown, specimen in TAU); 13, **Bet She'an**, BSV, 22.01.1973 (Shimoni Ofer, S1996); 1, **Sde Eliyahu**, BSV, 18.11.1974 (Shalom Zuaretz, specimen in TAU); 1, **Tel Aviv**, CP, 09.11.1981 (Oz Horine, S1996); 3, **Kerem Shalom**, WN, 06.01.1983 (Oz Horine, S1996); 1, **Bnei Israel res.**, Golan, 04.01.1984 (Dror Pevzner, INPA); 1, **Tal Shahar**, JP, 07.12.1985 (Arie Rochman, INPA), 1, **Kfar Ruppin**, BSV, 27.12.1986 (Dan Alon, e/b); 1, **Kokhav Hayarden**, EG, 14.01.1987 (Avri Lachman, INPA); 11, **Hula valley**, HV, 28.11.1989 (Yaron Baser, S1996); 19, **Bet She'an**, BSV, 09.12.1989 (Ehud Dovrat, S1996); 1, **Ein Afek**, NCP, 25.12.1989 (Shai Blitzblau, INPA); 26, **Bet She'an**, BSV, 11.12.1992 (Ehud Dovrat, S1996); 17, **Kfar Ruppin**, BSV, 03.12.1994 (Rami Mizrachi, e/b); 10, **Kfar Ruppin**, BSV, 30.01.1996 (Eyal Shochat, e/b); 8, **Kfar Ruppin**, BSV, 29.11.1996 (Dubi Shapiro, e/b); 10, **Kfar Ruppin**, BSV, 14.01.1998 (Eyal Shochat, e/b); 1, **Kfar Ruppin**, BSV, 27.11.1998 (Dubi Shapiro, e/b); 1, **Sde Eliyahu**, BSV, 11.12.1999 (Rami Mizrachi, e/b); 1, **Bnei Israel res.**, Golan, 17.12.1999 (unknown, INPA); 1, **Bnei Israel res.**, Golan, 07.12.2000 (Ran Lotan, INPA); 6, **Bnei Israel res.**, Golan, 24.01.2002 (Yoav Perlman, e/b); 17, **Bnei Israel res.**, Golan, 20.02.2005 (Tuvia Kahn, e/b); 1, **Bnei Israel res.**, Golan, 17.11.2005 (Eran Banker, isra); 1, **Agamon Hula**, HV, 21.01.2006 (Yoav Perlman, isra); 1, **Ramot Meir**, JP, 10.10.2006 (Yoav Motro, isra); 1, **Majrase**, Northern Lake Kinneret, 28.12.2007 (Nathan Bainosoviz, INPA); 3, **Ramot Issaschar**, EG, 16.01.2008 (Ali Ahed, INPA); 1, **Revadim fields**, JP, 13.12.2008 (Ezra Hadad, isra); 1, **Agamon Hula**, HV, 14.12.2008 (Dotan Yosha, isra); 1, **Ein Hamifratz**, NCP, 19.12.2008 (Pablo Rudaeff, isra); 1, **Bnei Israel res.**, Golan, 01.01.2009 (Rony Livne, e/b); 1, **east of Katzrin**, Golan, 30.01.2009 (Eran Banker, isra); 1, **Wadi Adorayim**, Southern JP, 07.12.2010 (Ezra Hadad, isra); 1, **Kokhav Hayarden**, EG, 28.11.2011 (Roi Ben Yosef, INPA); 1, **Afula**, Jizreel valley, 08.12.2011 (Roi Ben Yosef, INPA); 1, **Agamon Hula**, HV, 11.12.2011 (Gev Galili, e/b); 1, **Be'eri**, WN, 14.12.2011 (Ziv & Michal De-Porto, isra); 1, **Hamadiya**, BSV, 06.01.2012 (Ami Dorfman, INPA); 2, **Ramtaniya res.**, Golan, 20.01.2012 (BirdLife Israel, e/b); 6, **Kfar Ruppin**, BSV, 12.01.2013 (Niv Bessor, e/b); 3, **Ma'akhaz ruins**, Southern JP, 20.12.2013 (Ezra Hadad, e/b); 21, **Kfar Ruppin**, BSV, 02.01.2014 (Tuvia Kahn, e/b); 3, **Agamon Hula**, HV, 15.01.2014 (Nadav Israeli, e/b); 1, **Area 81**, Southern JP, 24.01.2015 (Elon Gur, e/b); 1, **Lehavot Habashan fishponds**, HV, 21.11.2016 (Hula Bird Festival 2016, e/b); 1, **Kibbutz Ram'on**, Harod valley, 01.01.2017 (Tuvia Kahn, e/b); 4, **Maoz Haim**, BSV, 04.01.2017 (Oded Ovadia, e/b); 1, **Hazore'a fishponds**, Jizreel valley, 27.11.2019 (Uri Gabay, e/b); 1, Gal'on, Southern JP, 21.11.2020 (Liad Cohen, INPA); 1, **Maoz Haim**, BSV, 27.12.2023 (Eldad Golan, e/b); 1, **Be'er Sheva**, Northern Negev, 30.11.2024 (Micha Korkus, e/b); 4, **Kfar Ruppin**, BSV, 04.12.2024 (Nadav Israeli, e/b); 1, **Kfar Masaryk**, NCP, 12.12.2024 (Gal Sahar, e/b); 2, **Agamon Hula**, HV, 29.12.2024 (Amit Goldstein, e/b); 2, **Ramat Tzvaim**, BSV, 07.01.2024 (Ofir Lotan, e/b); 9, **Maale Gilboa**, BSV, 16.01.2025 (Avner Rinot, e/b); 1, **Bnei Israel res.**, Golan, 29.01.2025 (Noam Nusbaum, e/b)

Wild vagrants and intentional releases? Records of Little Bustard *Tetrax tetrax* in the Arabian peninsula

OSCAR CAMPBELL & MIMI KESSLER

Summary: The globally Near Threatened Little Bustard *Tetrax tetrax* is a vagrant to the Arabian peninsula. A search of published and online resources, together with expert interviews, identified a total of eight records of birds believed to have occurred naturally, involving three of the seven countries concerned: Saudi Arabia (5 records), Oman (2), United Arab Emirates (UAE) (1). Apart from UAE, no evidence indicating importation or captive breeding of the species was obtained. Vagrants to the region are vulnerable to hunting and monitoring of social media in relation to this activity may produce records in the future.

INTRODUCTION

Although western European populations of the globally Near Threatened Little Bustard *Tetrax tetrax* are mainly sedentary or dispersive, eastern populations are almost wholly migratory, moving south to spend the winter from Türkiye to the north-west Indian subcontinent, with a particular concentration in Azerbaijan (BirdLife International 2018, Collar *et al* 2020, Farajli & Mammadsoy 2023). The severe fragmentation of the species' range, population data and reasons for its decline are reviewed by Morales & Bretagnolle (2021).

Little Bustard is regarded as a fairly common winter visitor to the northern plains of Iran (Ashoori *et al* 2025). As it is also a rare passage migrant and winter visitor to the Levant and Iraq (Aidek *et al* 2025, IRDC 2025, Perlman 2025) and the eastern Mediterranean, with vagrants reaching Cyprus (Porter *et al* 2024), there is the possibility of its occurrence, primarily during winter, in the countries of the Arabian peninsula. We summarise the known status of the species in this area, which comprises Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates (UAE) and Yemen.

METHODOLOGY

All readily available sources, both print (see Table 1 for citations) and online (www.ebird.org, www.gbif.org, www.inaturalist.org), were searched for records of Little Bustards from the area of interest. iNaturalist had no records, whilst all those in GBIF were also listed in eBird; hence only eBird is cited as a source in Table 1. In addition, an attempt was made to contact at least one expert resident in, or with a comprehensive knowledge of, each country (see Table 1 and Acknowledgements).

As well as investigating records of the species in an apparently wild state, we attempted to gather information on captive birds in each country. Records of permitted trade in this species were sought from the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) trade database (trade.CITES.org, v 2024.1) to identify individuals which may have been produced in, or released from, captivity. Since 1987 the Little Bustard has been listed on CITES Appendix II, which requires exporting parties to the convention to issue permits and confirm that trade is not detrimental to the species within its borders.

RESULTS

Records and their sources are summarised in Table 1. Porter *et al* (2024), Blair *et al* (2024) and eBird (2025) were consulted for all countries and are not explicitly cited therein. Records of Little Bustard in an apparently wild state were identified within three of the seven countries under study: Oman and Saudi Arabia have two and five records respectively,

Table 1. Summary of Little Bustard *Tetrax tetrax* records from the Arabian peninsula

Country	Records believed to pertain to wild birds	Records believed to pertain to captive birds	Source(s)
Bahrain	None	None; no known importation or releases	H King in litt.
Kuwait	None	None; no known importation or releases	A Al-Sirhan in litt, Pope & Zogaris (2012), Kuwait Birds (2025).
Oman	One, Saham, Al Batinah, 17 Dec 1964 One, Sun Farms, Sohar, Al Batinah, 25–26 Dec 2011	None; no known importation or releases	J Eriksen in litt, Eriksen & Victor (2013).
Qatar	None	None; no known importation or releases	G Farnell in litt, Birds of Qatar (2025).
Saudi Arabia	One, near Dumat Al Jandal, Al Jawf, 8 Oct 2017 One, south of Umluj, Tabuk, 21 Apr 2018[$1] Three, Luga, near Rafha, Northern Borders region, first week of Jan 2023* One, Rafha, Northern Borders region, winter 2023-24* One, near Umluj, Tabuk, 20 Dec 2024*	None; no known importation or releases	G Askew in litt; J Babbington in litt; S AlWoseamer pers comm; Boland & Alsuhaibany (2020).
United Arab Emirates	One, Wamm Farms, Fujairah, 1–5 Dec 2016[$2]	One, Mushrif Palace Gardens, Abu Dhabi, 16 Dec 1996 One, Ras al-Khaimah 22 Nov 2008 Approximately 30, held in captivity, Abu Dhabi, 2009 onwards[#] Three, Dubai desert, Dubai, 2009 (exact date uncertain) One, Madinat Zayed, Abu Dhabi, 8 Dec 2010[$3] "A few" individuals kept in a private collection in Ras al-Khaimah (date uncertain)	A al Ali in litt, M Mazrouie in litt, V Motteau in litt, Pedersen *et al* (2025).
Yemen	None	None; no known importation or releases	O AlSaghier in litt, RF Porter pers comm, Porter & Suleiman 2022.

Table key:
* = These records appear not to have been previously published in ornithological literature; source is social media and interviews with falconers by ST AlWoseamer, hence dates imprecise.
[#] = Given to an Asian Houbara *Chlamydotis macqueenii* breeding facility after confiscation by customs (see Discussion for further details).
[$] = Online photographs available, at following sources:
[$1] = See www.ebird.org/checklist/S46988165
[$2] = See www.ebird.org/checklist/S33223474, www.ebird.org/checklist/S33145007
[$3] = See www.ebird.org/checklist/S60531519

and there is one record from the UAE (Table 1, Figure 1). Seven of the eight observations occurred after 2010. Of birds photographed and viewable online (links in Table 1), one (UAE, 2010) was likely to be a juvenile (record not accepted as a wild individual by the Emirates Bird Records Committee, as considered a possible captive bird; see Discussion), another (UAE, 2016) was either a female or a juvenile, and a third (Saudi Arabia, 2018) was a male in breeding plumage.

The CITES trade database yielded two records relevant to our study area (not listed in Table 1). In 2011 a permit was issued to transfer one body of a Little Bustard from the UAE to Kazakhstan for scientific purposes; the specimen was reported to be a wild-born individual originating from an unknown country. In 2022 two liquid samples from Little Bustards were transferred from the UAE to Europe for scientific purposes. The bird or birds (the number of samples is specified, but not the number of birds) from which the samples were taken was or were reported as having been bred in captivity (*ie* CITES source code C on the permits).

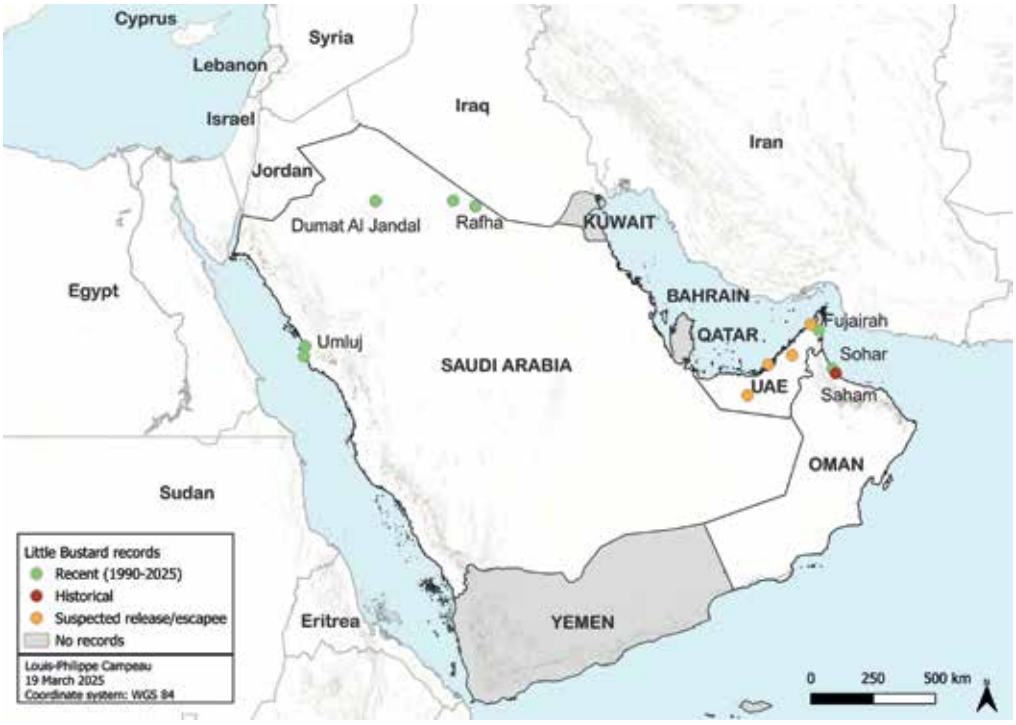

Figure 1. Map of documented observations of Little Bustard *Tetrax tetrax* in the Arabian peninsula, as listed in Table 1.

DISCUSSION

Number and location of observations

The Little Bustard is a vagrant to the Arabian peninsula, with only eight records in three countries believed to relate to wild birds. Of the four countries that have not recorded the species at all, perhaps most surprising is Kuwait, which is both relatively well-watched and close to the regular wintering grounds of the species. Seven of the eight records are post-2010, but the general increase in ornithological observations across the region

as a whole makes it difficult to draw conclusions with regard to trends in the regional occurrence of the species.

The greater frequency of records from Saudi Arabia, despite the relatively low level of ornithological activity there until recent years, may reflect that country's much greater area and northerly position on the Arabian peninsula, and its location along two potential migratory pathways. However, the size of the hunting community, estimated at approximately 20 000 active falconers (Saudi Falcons Club in litt), may be an equally important factor; indeed, three of the five Saudi Arabian records derive from hunting reports and a fourth (in 2018) was captured in circumstances that are uncertain. Clearly, observations and successful hunts of species unusual to the region are particularly likely to draw interest within this community's social media.

As with the 2018 Saudi record, circumstances surrounding the records from Oman (1964) and Saudi Arabia (2017) are also not clearly known. The records from Oman (1996) and UAE (2016, Plate 1) were made by birdwatchers. The observation of a male Little Bustard in breeding plumage (Saudi Arabia, 2018) stands in contrast to the general trend of predominately female or juvenile migrants or vagrants noted in other parts of the Middle East (*eg* Aidek *et al* 2025).

Phenology of observations

Discarding the Saudi Arabian record lacking a precise date, six records are from December to early January and are likely to reflect overshoots fleeing particularly severe weather conditions in Central Asia or the northern Middle East, or disorientated birds that misjudged distance to their wintering grounds. Data are too few to reliably correlate occurrence in the Arabian peninsula with temperatures on the usual wintering grounds,

Plate 1. Little Bustard *Tetrax tetrax*, Wamm Farms, UAE, 3 December 2016. This bird represents the only UAE record accepted by the Emirates Bird Records Committee as a wild vagrant. © *Mark Smiles*

although the UAE record in early December 2016 coincided with a remarkable influx of other Central Asian species, particularly Black-throated Thrush *Turdus atrogularis* (Campbell & Smiles 2020).

Two of the four dated records from Saudi Arabia are rather different in timing and, at first glance, would appear referable to early autumn (8 October) and late spring (21 April) migrants. However, both are somewhat peculiar dates, given that the species is unknown before the second week of October at the migration watchpoint of Beshbarmag, Azerbaijan (which lies at nine degrees of latitude, and hence *c*1000 km further north than the northernmost part of Saudi Arabia; Heiss *et al* 2020); indeed, it does not become particularly numerous there until late October. Spring passage of Little Bustard at Beshbarmag involves only a very small proportion of the birds that use it on autumn passage but peaks sharply in late March, and the species is unknown there from 10 April onwards (Trektellen 2024). Note that Trektellen summary data mask enormous annual fluctuations in numbers at this watchpoint but, even so, against the pattern presented there, records from as far south as Saudi Arabia as early as 8 October in autumn and as late as 21 April in spring seem remarkable.

One explanation may be that records of Little Bustard from the Red Sea coast and north-west Saudi Arabia originate from wintering or breeding populations in Türkiye, rather than the Caucasus region. Records from Iraq and Syria, particularly in October (Aidek *et al* 2025), may support this conjecture. However, the species is regarded in Türkiye as rare and infrequent at any time of the year (Kirwan *et al* 2008, Özgencil *et al* 2025).

Given the rapid spread of agriculture—in particular, large fields of various fodder grasses, wheat *Triticum aestivum* and alfalfa *Medicago sativa*—across the Arabian peninsula in recent decades (Jennings 2010), and the increasing use of such agricultural areas by globally Critically Endangered species such as Sociable Lapwing *Vanellus gregarius*, for example in Saudi Arabia (Babbington & Roberts 2017) and the UAE (OC pers obs), it would not be surprising if Little Bustard were found to occur with somewhat greater frequency regionally than it has in the past. However, unlike Sociable Lapwing, Little Bustard does not routinely cross the Arabian peninsula, and its sensitivity to hunting may constrain it to northern borderlands of the Middle East where, for much of the year, hunting and disturbance are limited (*eg* in Iran; Yousefi *et al* 2018).

Issues associated with hunting

Outside border zones and agricultural zones with strictly controlled access, at least some sites on the Arabian peninsula likely to be attractive to vagrant Little Bustards are unquestionably targeted by hunters. This is the case across much of northern Saudi Arabia, where hunting pressures in autumn and winter are particularly severe (OC & MK pers obs). Most reports of the species in Lebanon (where it is a vagrant or a scarce non-breeding visitor) are based on monitoring of hunting records (Ramadan-Jaradi *et al* 2017, Aidek *et al* 2025). Given that nine individuals were reported as shot in Lebanon in December 2016 (compared to none found first by birdwatchers), that country may represent a 'sink' for individual birds unfortunate enough to reach it during winter, although birds not killed may be forced to move to neighbouring countries by the disturbance associated with hunting.

Hence, it would not be surprising if future records of the species in the Arabian peninsula originate from hunters at least as often as from ornithologists. Indeed, the April 2018 record from Saudi Arabia involved a bird that was found injured (cause uncertain). The monitoring of social media posts from hunters and associated groups may result in additional records of the species regionally. However, this task is both time-consuming and logistically difficult as such posts are visible only to subscribers and disappear after

viewing. Even screenshotting a post on some platforms (*eg* Snapchat) is not possible without the author being alerted to this happening. If the author has concerns that this screenshotting may lead to negative consequences (*eg* a report of illegal activity to authorities) they may remove the subscriber from future access to their posts, and there may be undesirable social consequences within the hunting community.

Captive individuals and records from trade

As listed in Table 1, records believed to pertain to captive birds are exceptional in the region and were only identified within the UAE. However, this may reflect the difficulty of investigating the existence of such birds, and it would not be unexpected if private collections in various countries in the region held the species. The three UAE records believed to pertain to captive birds and with a definite date are all from months that would be compatible with natural vagrancy and, indeed, it is by no means impossible that some may be the result of that; however, the individual circumstances of each record either are unclear or, where known, could be taken to imply a non-natural origin. Hence these records were deemed by the Emirates Bird Records Committee to be too associated with doubt to be reasonably regarded as pertaining to natural vagrancy (Pedersen *et al* 2025). For example, the 1996 bird was recorded in a small urban park, an unusual location for a wild vagrant. The 2010 record was of a hunted bird which was reported to behave as a wild bird, and its location was compatible with natural vagrancy, but the record occurred soon after a number of Little Bustards were confiscated by UAE customs, who deposited them in a breeding facility for Asian Houbara *Chlamydotis macqueenii* (V Motteau in litt). The CITES record from 2011 would appear to concern the transfer of the body of one of these birds.

The second CITES record, of specimens from captive-bred Little Bustard(s) in 2022, suggests that the birds taken into custody had bred in captivity, as there are no CITES permits registering the importation of other Little Bustards to the UAE to serve as founder stock for captive breeding. Together, these records indicate that there is some degree of interest in trade and breeding of Little Bustards in captivity. A motivation may be the use of this species in hunting and falcon training, as it is known that Little Bustard flocks in Azerbaijan are a target of 'falconry tourism', which is commercially advertised and highlighted in social media posts (Collar & Kessler 2021).

ACKNOWLEDGEMENTS

We are indebted to the following for responding to queries promptly and helpfully: Ahmed al Ali, Abdulrahman Al-Sirhan, Omar AlSaghier, Gregory Askew, Jem Babbington, Jens Eriksen, Gavin Farnell, Mike Jennings, Howard King, Mohamed Mazrouie, Valentin Motteau and Richard Porter. We thank Sultan Turki AlWoseamer for sharing information from social media postings. We are also grateful to Manuel Morales and Richard Porter for prompt assistance with references, and to Louis-Philippe Campeau for review of the sex and age of photographed birds, and providing the map presented as Figure 1.

LITERATURE CITED

Aidek, A, KM Ararat, S Awad, S Azar, F Itani, F Khoury & G Ramadan-Jaradi. 2025. The Little Bustard *Tetrax tetrax* in Iraq, Syria, Lebanon and Jordan. *Sandgrouse* 47: 38–47.

Ashoori, A, FH Tayefeh & LP Campeau. 2025. Iran's Little Bustards *Tetrax tetrax* show the first signs of a renewed decline: an updated status, 2016–2024. *Sandgrouse* 47: 102–110.

Babbington, J & P Roberts. 2017. An update on the wintering status of Sociable Lapwings *Vanellus gregarius* in Saudi Arabia with a new wintering location in the Eastern province. *Sandgrouse* 39: 172–176.

BirdLife International. 2018. Species factsheet: Little Bustard *Tetrax tetrax*. Downloaded from https://datazone.birdlife.org/species/factsheet/little-bustard-tetrax-tetrax. Accessed 13 February 2025.

Birds of Qatar. 2025. www.qatarbirds.org/. Accessed 13 February 2025.

Blair, M, S Preddy & A Al-Sirhan. 2024. OSME Region List of Birds. www.osme.org/orl/. Accessed 5 March 2025.

Boland, C & A Alsuhaibany. 2020. *The Birds of Saudi Arabia Volume 2 – Species Accounts*. Motivate, Dubai.
Campbell, O & M Smiles. 2020. An unprecedented influx of Black-throated Thrushes *Turdus atrogularis* to the United Arab Emirates in winter 2016/17. *Sandgrouse* 42: 84–91.
Collar, N, E 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, Eds). Cornell Lab of Ornithology, New York.
Collar, NJ & M Kessler. 2021. Hunting of Little Bustards *Tetrax tetrax* in Azerbaijan: the global conservation perspective. *Sandgrouse* 43: 281–285.
eBird. 2025. Species Maps. www.ebird.org/map. Accessed 5 March 2025.
Eriksen, J & R Victor. 2013. Oman Bird List. Edition 7. Centre for Environmental Studies and Research, Sultan Qaboos University.
Farajli, Z & E Mammadsoy. 2023. A preliminary survey of the range, numbers and conservation needs of Little Bustards *Tetrax tetrax* wintering in Azerbaijan. *Sandgrouse* 45: 35–48.
Heiss, M, K Gauger, C Himmel, P Fetting, TA Haraldsson, G Cauca, Z Fərəcli & 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.
IRDC. 2025. Birds of Israel – Checklist. www.israbirding.com/checklist/. Accessed 6 March 2025.
Jennings, M. 2010. Atlas of the Breeding Birds of Arabia. *Fauna of Arabia* 25: 1–751.
Kirwan, GM, KA Boyla, P Castell, B Demirci, M Özen, H Welch & T Marlow. 2008. *The Birds of Turkey*. Christopher Helm, London.
KuwaitBirds. 2025. www.kuwaitbirds.org/birds/checklist. Accessed 13 February 2025.
Morales MB & V Bretagnolle. 2022. An update on the conservation status of the Little Bustard *Tetrax tetrax*: global and local population estimates, trends, and threats. *Bird Conservation International* 32: 337–359.
Özgencil, IK, QH Mueen, KE Yavuz, MS Sözen, A Karataş, İ Uysal, ÖF Şahin, AA Çekici, K Kaplan, MM Karataş, M Erturhan, A Uslu, B Hatinoğlu, AC Tinaz, DM Özsoy, KA Boyla, S İsfendiyaroğlu, S Ekşioğlu & F Akarsu. 2025. Türkiye's Little Bustards *Tetrax tetrax* in decline: assessing distribution, population trends and threats. *Sandgrouse* 47: 26–37
Pedersen, T, MC Smiles, OJ Campbell & SJ Aspinall (compilers). 2025. *EBRC Annotated Checklist of the Birds of the United Arab Emirates*. www.uaebirding.com/bird-checklists. [Accessed 5 March 2025]
Perlman, Y. 2025. Decline in Little Bustard *Tetrax tetrax* numbers wintering in Israel since the 1980s. *Sandgrouse* 47: 48–51.
Pope, M & S Zogaris (eds). 2012. *Birds of Kuwait – A Comprehensive Visual Guide*. KUFPEC, Biodiversity East, Cyprus.
Porter, R & AS Suleiman. 2022. Birds of the Socotra Archipelago, Yemen: an annotated checklist. *Sandgrouse* 44: 262–324.
Porter, R, O Campbell & A Al-Sirhan 2024. *Birds of the Middle East*. Third edition. Bloomsbury, London.
Ramadan-Jaradi, G, F Itani & A Serhal. 2017. Interesting bird records for Lebanon including a Diederik Cuckoo *Chrysococcyx caprius*, two Red Crossbills *Loxia curvirostra* and the first records of Macqueen's Bustard *Chlamydotis macqueenii* and Blue-cheeked Bee-eater *Merops persicus* for over 58 and 70 years respectively. *Sandgrouse* 39: 187–192.
Trektellen. 2025. Totals Besh Barmag 2015–2024. https://www.trektellen.org/site/yeartotals/1533/2024. Accessed 5 March 2025.
Yousefi, M, A Kafash, S Malakoutikhah, A Ashoori, A Khani, Y Mehdizade, F Ataei, SS Ilanloo, HR Rezaei & JP Silva. 2018. Distance to international border shapes the distribution pattern of the growing Little Bustard *Tetrax tetrax* winter population in northern Iran. *Bird Conservation International* 28: 499–508.

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Status of Little Bustard *Tetrax tetrax* in Russia based on assessments in four key regions

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Summary: We review the current distribution and numbers of the Little Bustard *Tetrax tetrax* in the Russian Federation with a focus on (1) Republic of Kalmykia, (2) Saratov and Volgograd oblast's, (3) Orenburg oblast' and (4) Western Siberia. We describe the regions of Russia in which this species currently nests, habitats used in the breeding period and during post-breeding short-distance migrations, and its migration routes to and from wintering grounds. We estimate the total number of Little Bustards in Russia at 100 000–130 000 individuals, but this figure is approximate, as it is based on different methods, involving detailed and comprehensive surveys of entire territories, transects with the extrapolation of data to an entire region and expert estimates. In the breeding season and during post-breeding short-distance migrations, Little Bustards are unevenly distributed across the region. In spring, birds use agricultural land with fallow fields and uncultivated steppe with abandoned fields. In autumn, the species predominantly uses agricultural landscapes. The main threats to Russian Little Bustard populations are the intensification of agricultural production through chemical applications, the reclamation of long-abandoned fields and virgin lands to cultivate more oil-producing and winter cereal crops, collisions with overhead powerlines and illegal hunting, both in winter and, to a lesser extent, when birds form pre-migration flocks in autumn.

INTRODUCTION

The Little Bustard *Tetrax tetrax* is listed in the Red Data Book of the Russian Federation as a Rare (category 3) and Vulnerable species, assigned as national conservation priority III (Oparin & Fedosov 2021), a status that raises concern for its future without prescribing intervention measures. It usually inhabits steppes and semi-deserts, but can also be found in sandy steppes and dry meadows used for grazing livestock. It prefers nesting in flat or slightly undulating virgin lands, areas with perennial grasses and fallows at early and late successional stages; more rarely it breeds in crop rotation areas, but avoids weedy fallows. Such habitat involves somewhat sparse and relatively short vegetation mixed with small open *solonetz* (compact sodium-rich soil of usually low fertility) areas (Oparin & Fedosov 2021).

Until the 1930s, the Little Bustard's range in Russia covered the entire steppe zone from its western limit to the foothills of the Altai, even extending into the forest-steppe zone (Spangenberg 1951). Around the middle of the 20th century this continuous range began to fragment as a result of agricultural expansion and intensification and soon consisted of small isolated segments, with the species disappearing from the Central Black Earth region—Voronezh (Vengerov 2005, AYu Sokolov pers comm), Tambov (Sokolov & Lada 2012), Penza (hence omitted from Anon. 2005) and Ulyanovsk oblast's (Artem'eva *et al* 2015)—and the Republic of Tatarstan (Akseev *et al* 2016) (Figure 1). We outline the contemporary status of the Little Bustard across the Russian Federation with reference to four economic regions, described below from west to east (see Figure 1). Oblast' is Russian for province, with krai being equal in status but referring to historical border areas. Republics are also of roughly equivalent status, with special rights for the titular nationality.

First, in the North Caucasus region, the species currently breeds in Rostov oblast', Stavropol' krai, the Chechen Republic and Dagestan (Belik 2013, 2014, Malovichko & Fedosov 2006, Dzhamirzoev *et al* 2013, Fedosov & Malovichko 2018, Gizatulin 2020), with a small population surviving in the Azov region in the Taman peninsula of Krasnodar krai (Lokhman 2017). It is, however, considered extinct as a breeding species in the foothills

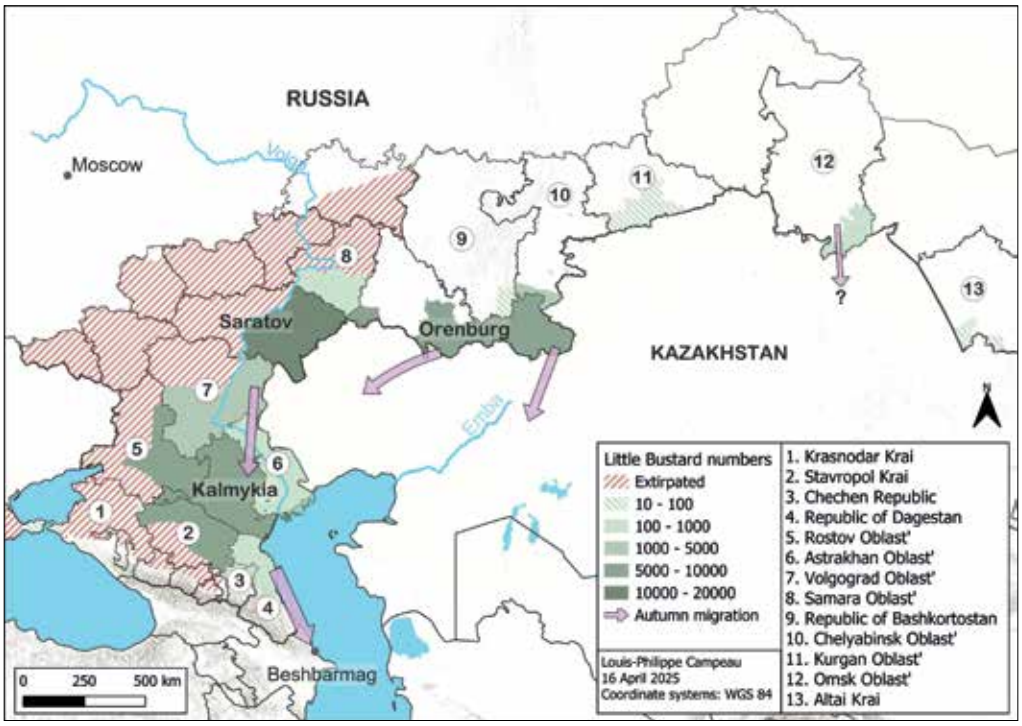

Figure 1. Map of the Little Bustard's breeding distribution in Russia.

of the Caucasus range, in the republics of Karachay-Chekessiya, Kabardino-Balkaria and Ingushetia (Dzuev 2000, Batkhiev & Tochiev 2007, Karavaev & Khubiev 2013).

Second, further north-east in the Volga region small numbers breed in the dry steppes and semi-deserts of Astrakhan' oblast' (Finogenov 2007, Reutskii 2014), with larger numbers found in Kalmykia (Muzaev *et al* 2015). Immediately to the north, along the lower Volga, the Little Bustard breeds in Volgograd and Saratov oblast's, mainly in their trans-Volga sectors (east of the river) (Chernobai & Bukreev 2017, Oparin *et al* 2017, Oparina & Oparin 2020, Oparin & Oparina 2021). This pattern recurs in the middle course of the river, with all breeding birds in Samara oblast' found in trans-Volga areas (Pavlov *et al* 2009, Kuzovenko & Lebedeva 2018).

Third, in the Ural region, the species is mostly recorded in Orenburg oblast' and across the Ural mountain range in Chelyabinsk oblast', where it inhabits steppes adjacent to Kazakhstan (Korovin 2001, 2004, 2013, Fedosov *et al* 2017, Fedosov 2019, Kornev & Gavlyuk 2019). In the 21st century, a few widely dispersed displaying males have also been recorded in the east of Bashkortostan (Gashek & Chichkova 2014).

Finally, Western Siberia forms the eastern boundary of the Little Bustard's range in Russia. Kurgan oblast', although strictly part of the Ural region, is treated here as part of this population as it shares many similarities with Siberian populations. Indeed, since the late 20th century, Little Bustard populations in Kazakhstan have begun to reoccupy steppe areas in the south of Kurgan and Omsk oblast's, as well as Altai krai (Tarasov 2011, Nefedov 2013, Kotlov 2015), and in May 2013 some vagrant birds were recorded in south-west Tyva Republic (Archimaeva & Zabelin 2015). All the populations described above are migratory.

Published population estimates

In the 1990s, Little Bustard numbers were low throughout Russia owing to socio-economic changes. Following the collapse of the Soviet Union, up to half of all agricultural fields were left unworked and there was a sharp reduction in livestock grazing. Unlike in drier steppes further south, higher rainfall promoted the growth of weedy vegetation that was too tall to be suitable as breeding habitat (Oparin *et al* 2016). However, in the early 2000s the species' population gradually began to rise, reaching a peak in 2010–2017, when the largest numbers were recorded in the European part of Russia. Currently, however, the population in that part of the country is in decline.

The account that follows is largely based on data from the Red Books of the administrative units mentioned, which were published between 2009 and 2020. In the North Caucasus, the core areas are Rostov oblast' and Stavropol' krai with 5000–6000 and 4800–5600 breeding birds respectively (Malovichko & Fedosov 2006, Belik 2014, Fedosov & Malovichko 2018). Closer to the Caucasus mountain range, 800–1000 individuals breed in Dagestan (Dzhamirzoev *et al* 2013), about 500 in Chechnya (Gizatulin 2020), and a few individuals on the Taman peninsula in Krasnodar krai (Lokhman 2017).

In the Volga region, a small number nest in Astrakhan' oblast' along the Volga–Akhtuba floodplain all the way down to the Volga delta (Lindeman *et al* 2005) and around numerous shallow seasonal lakes in the steppe along the Volga (Reutskii 2014). Around 15 000 Little Bustards used to nest in Kalmykia (Muzaev *et al* 2015), where the current breeding population is roughly estimated to be 9000 individuals. Most of these nested in the west in the dry grass steppes of the Ergeni hills, where transect surveys showed an average density of 192 individuals/100 km² in early April and 125 individuals/100 km² in early May (Muzaev *et al* 2015, Ubushaev *et al* 2016). The population breeding near the lower Volga consists of about 9000–18 000 birds in Saratov oblast' (Oparin *et al* 2017; also Table 1) and 4400–5000 in Volgograd oblast' (Chernobai & Bukreev 2017). This number was higher, up to 30 000 from the early 2000s to the late 2010s, but since that time the Little Bustard has completely disappeared from the right bank of the Volga in Saratov oblast' and adjacent areas in Volgograd oblast' (Oparin *et al* 2017, Oparina & Oparin 2020, Oparin & Oparina 2021). Only 50–150 birds inhabit Samara oblast' (Pavlov *et al* 2009), also east of the Volga river.

In the Ural region, a population of 2000–3000 birds has been estimated in Orenburg oblast' (Kornev & Gavlyuk 2019), although extrapolation of the results of a special survey conducted across a portion of the oblast' in May 2016 to the total, but not yet fully utilised, area of potential nesting habitats suggested the possibility of as many as 75 000 (Fedosov *et al* 2017, Fedosov 2019). Some 5000 birds were estimated in Chelyabinsk oblast' in the early 2010s (Korovin 2013), but in trans-Ural Bashkortostan only a few individuals have been recorded in the breeding season (Gashek & Chichkova 2014).

Finally, some 100–200 birds nest in the steppe regions of Western Siberia, divided between Kurgan and Omsk oblast's and Altai krai (Tarasov 2011, Nefedov 2013, Kotlov 2015).

The total Russian population in 2010–2017 was estimated at 100 000–130 000 breeding individuals (Oparin & Fedosov 2021); the relative importance of major administrative divisions in terms of numbers is shown in Figure 1. This number exceeds the total largely derived from published sources from each region, which is (at its uppermost limit) 61 050 breeding birds (see Table 1). While this is considerably lower than the 150 000–200 000 wintering individuals recorded in Azerbaijan (Gauger 2007), it is possible that the sources used have omitted some breeding populations in the Russian Federation, or more likely that there is a considerable influx of Little Bustards from Kazakhstan into the Caucasus flyway. Birds from Orenburg oblast', the Volga region and Volga–Don interfluve migrate through the territories of Kalmykia and Stavropol' krai, and then fly across Dagestan and

Table 1. Population estimates for the Little Bustard per administrative unit (federal subject) of the Russian Federation, arranged by economic regions. Data are presented for the breeding period, assembly for migration and wintering (Dagestan and Kalmykia only). The year that follows the name of administrative units is that of the publication of the most recent local Red Book, on which the corresponding Little Bustard numbers are based. Numbers for areas in italics are updated estimates by the authors of this article. 'Migration' covers pre-migratory gatherings and stopover flocks. Quality of estimate: 1 = low, 5 = high. Ave = average. † = extirpated.

Economic region	Season	Number of birds	Important sites	Quality of estimate	Population change trends			
					1950–1990	1990–2020	2020–2023	1950–2023
North Caucasus	**Breeding (total)**	**11 106–13 110**	4	Ave 3.8	↘	↗	↘	↗
	Krasnodar Krai 2017	6–10	1	3	↘	↘	N/A	↘
	Rostov oblast' 2014	5000–6000		3	↘	↗	N/A	↗
	Stavropol' krai 2018	4800–5600		4	↘	↗	N/A	↗
	Republic of Dagestan 2013	800–1000		4	↘	↗	N/A	↗
	Republic of Chechnya 2020	500		4	↘	↗	N/A	↗
	Migration	*c*100 000	Dagestan	5	↘	↗	↘	↘
	Wintering	300	Dagestan	5	N/A	N/A	N/A	N/A
Volga region	**Breeding (total)**	**22 750–32 650**	5	Ave 3.6	↘	↗	↘	↘
	Saratov oblast' 2017	9000–18 000	1	4	↘	↗	↘	↘
	Republic of Kalmykia 2013	9000	1	4	↘	↗	↘	↘
	Volgograd oblast' 2017	4400–5000	1	3	↘	↗	↘	↘
	Astrakhan' oblast' 2013	300–500	2	4	↘	↗	↘	↘
	Samara oblast' 2009	50–150	1	3	↘	↘	↘	↘
	Migration	100 000	3	5	↘	↗	↘	↘
	Wintering	100–200						

Ural	**Breeding (total)**	**15 010–15 020**	3	Ave 3.3	↘	↗	↘	↘
	Orenburg oblast' 2019	10 000	1	2	↘	↗	N/A	↘
	Chelyabinsk oblast' 2013	5000	1	4	↘	↗	N/A	↘
	Republic of Bashkortostan 2014	10–20	1	3	Absent	↗	N/A	↗
	Migration	N/A	N/A	N/A	↘	↗	N/A	↘
	Wintering	0						
Western Siberia	**Breeding (total)**	**150–320**	5	3				
	Kurgan oblast' 2012	50–100	1	4	†	↗	N/A	↗
	Omsk oblast' 2015	100–200	5	3	†	↗	↗	↗
	Altai krai 2016	0–20	2	2	†	↗	↗	↗
	Migration	1000	3	3	†	↗	↗	↗
	Wintering	0						
Totals in all areas	**Breeding**	**49 000–61 070**	17	Ave 3.5				
	Migration	100 000	14	Ave 4				
	Wintering	410–510						

follow a narrow strip along the shore of the Caspian Sea past Beshbarmag mountain in the foothills of the eastern extremity of the Greater Caucasus in Azerbaijan (Bliznyuk 1996). In 2015, 93 000 Little Bustards were counted in the Kalmyk section of this flyway (Ubushaev *et al* 2016), and 181 000 birds flew past Beshbarmag in autumn 2024 (Farajli 2025).

METHODS

This section outlines the methodology of the latest research by the authors in the most important regions for the bird's habitation, namely (within the Volga region, 1) the Republic of Kalmykia and (2) Saratov and Volgograd oblast's, in the Ural region (3) Orenburg oblast', and in western Siberia (4) a group of three disjunct regions consisting of Kurgan and Omsk oblast's and Altai krai (Korovin 2013, Nefedov 2013, Muzaev *et al* 2015, Oparin *et al* 2017, Fedosov 2019).

Republic of Kalmykia

Since 2020, AAA has kept a record of all Little Bustards (549 records) encountered in Kalmykia and adjacent provinces. These include the results of breeding transect surveys (2022–2024) in the southern Ergeni hills undertaken by car in late May and early June, covering a total of 917 km with a transect width of 500 m. In 2020–2024, over the months of December and January, we also carried out regular fixed transects of around 800 km in the Chernye Zemli (Black Earth) Nature Reserve and its surroundings, over an area of about 1000 km^2. This protected area preserves natural steppe and semi-desert landscapes known to be used by the Little Bustard.

Saratov and Volgograd oblast's

Over the past 25 years, MLO and OSO have collected data on the abundance and distribution of the Little Bustard by habitat in the breeding season and during pre-migration movements in the trans-Volga region in Saratov oblast' and the adjacent Drofinyi Sanctuary in Staropoltavsky district, Volgograd oblast', on the border with Krasnokutskii district of Saratov oblast'. We conducted comprehensive surveys in mid- to late September in the years 1998–2000, 2011–2012, 2014–2017 and 2024. This work, covering 12 000 km^2 in the dry steppe of the *syrt* (dry upland plain) in the trans-Volga region and another 500 km^2 in the Drofinyi Sanctuary, also in the *syrt*, was conducted using the method described by Oparin *et al* (2003). The survey of the larger area started in mid-September and lasted 10 days. The research team divided into six groups, two people in each, and covered the areas in four-wheel-drive vehicles using navigation tablets with 1:100 000 maps. Each group surveyed an area of 200 km^2 daily when the weather allowed, from sunrise until sunset, with breaks during the height of the day when birds are less active. The geographical coordinates of all Little Bustard records were logged using GPS, their habitats were mapped and official data on land use in Saratov oblast' were consulted.

In May 2019–2023 we conducted a series of transect surveys, using a variable transect width, in the flat semi-desert in the trans-Volga region between the Bol'shoi Uzen' and Malyi Uzen' rivers and the Bol'shoi Uzen' and Dyura rivers in the Caspian depression (Alexandrovo-Gaiskii district, Saratov oblast') to count displaying males (Bibby *et al* 1998), covering 288 km on foot and 580 km by car over the period.

In the autumn of 1998–2000, 2011–2012 and 2014–2017, we conducted comprehensive research into the abundance and distribution of Great and Little Bustards in a study area of 12 000 km^2 in the southern half of the trans-Volga region in Saratov oblast' (Figure 2). This allowed us to specify the relative numbers of the Little Bustard (Oparin *et al* 2017).

We drew the Little Bustard occupancy index from the average of birds in 100 randomly selected territorial survey units. A territorial unit covered 25 km^2 (5×5 km).

Orenburg oblast'

In May 2011, VNF conducted a transect and stationary survey (Bibby *et al* 2000) of the Little Bustard from the southern edge of the Ural mountains to the eastern border of the oblast' (Fedosov & Fedosov 2017, Fedosov *et al* 2017), covering the entirety of the Little Bustard's breeding range in the Ural region. This transect involved a straight-line distance of approximately 700 km, but the transect's total length was over 2500 km. The total number of stationary survey points was 257. Over 5–19 May 2016, VNF re-surveyed birds in this region using the same methods and consulting local game experts. By these means he confirmed and refined the species' distribution and ecology, assessed threats and outlined conservation measures.

The Little Bustard's range in the oblast' is limited mainly to *Festuca–Stipa* and *Artemisia–*cereal steppes. These habitats lie south of the Samara and Ural rivers and east of the Ural mountains (Fedosov 2019), and their total area was used to extrapolate the survey counts to infer a potential Little Bustard breeding population in the entire oblast'.

Western Siberia

AAN researched the status of the Little Bustard in the southern areas of Kurgan and Omsk oblast's and Altai krai, where it has been historically observed. Little Bustards were recorded from spring to autumn through AAN's annual fieldwork, mostly in Omsk oblast' (1995–2025, where he noted the first post-1950s record in 2000) and through consultations with other specialists.

RESULTS

Republic of Kalmykia

Breeding season

The breeding transect surveys in the southern Ergeni hills between 2022 and 2024 recorded 113 Little Bustards, with an average of 27.4 individuals/100 km² (range 15.6–46.7). Thus, compared with the 2015 benchmark of 125 individuals/100 km² in early May (see Methods), the density of the breeding population dropped roughly five-fold over the 10-year period.

A notable population decrease was also recorded in eastern Kalmykia, on the plains and sandy dunes of the Caspian seaboard. In early May 2015, 73 Little Bustards were recorded on a transect 875 km long with a 500 m detection width (250 m to each side) across the Chernye Zemli Nature Reserve and its surroundings, giving a density of 16.7 birds/100 km². Since 2020, when four clutches and broods were recorded in the reserve, there have been only a few records of lone adult birds. In general, the average population density in the breeding season in years with favourable weather (wet) did not exceed 0.92 individuals/100 km² inside the nature reserve (AAA unpubl data). These figures suggest a striking 18-fold decline in under ten years, which we attribute to the plowing of fallow lands and some virgin steppe.

Little Bustard records in Kalmykia lie primarily within large areas of virgin grass steppe, long-abandoned fields and the transitional zone between steppe and cereal fields, rather than newly plowed fields. This suggests that the current negative trend in Little Bustard numbers in Kalmykia is the result of a reduction and degradation of nesting habitats in response to human economic activity and, possibly, of a decline in food quality caused by lower cold-season rainfall. Official statistics indicate that 658 km² of virgin steppe and long-abandoned fields were lost to agriculture between 2013 and 2023, yet the numbers of free-grazing livestock remained stable, thereby increasing grazing pressure on the uncultivated steppe areas that remain along small river valleys.

Using recent Sentinel-2 satellite imagery, we measured the total area of suitable Little Bustard habitats within the Ergeni hills to be 20 851 km². Applying the average breeding density of 27.4 individuals/100 km² (mentioned in the first paragraph of this section) to this area yields a potential population of 5713 birds. Our automobile surveys during the breeding season were more likely to detect males, which display conspicuously at this time. Indeed, in the field we observed an average of one female for every five males, or in this case, 4761 males to 952 females. Owing to the survey methodology, we consider the estimated number of males, which we round to 5000, to be more accurate than the estimation of number of females. To approximate the number of females using this more reliable census of males, we apply a male:female ratio of 1:0.8. This is a more generous ratio than those of threatened but well-researched populations in Europe (Serrano-Davies *et al* 2023), since in Kalmykia the proportion of fields to pastures is very low and wheat is usually harvested only at the end of June/early July, after the breeding season is over. This yields a total estimate of 9000 (5000 males and 4000 females) in the Ergeni hills.

Meanwhile, only 16 large semi-desert sites with a total area of 8653 km² suitable for the nesting of Little Bustards were identified in eastern Kalmykia, which experiences greater aridity and higher livestock grazing. With the current nesting density of 0.92 individuals/100 km², the Caspian plains (*ie* eastern Kalmykia) cannot be inhabited by more than 80 individuals. Discounting these in order not to give a false sense of accuracy, the total size of the Little Bustard's population in the republic is posited as 9000 individuals.

Pre-migration gatherings, migration and wintering

No targeted surveys of Little Bustards were conducted during autumn migration. Owing to a steady decline in the duration of snow cover and increase in temperatures, Little Bustards spend increasingly more time in eastern Kalmykia before moving on (AAA pers obs). In the Chernye Zemli Reserve and its surroundings, 114 individuals were recorded (on the same transect as in May 2015) in the winter months of 2019/2020, two individuals in 2020/2021, 79 in 2021/2022, 482 in 2022/2023 and 41 in 2023/2024. With the exception of the abnormally warm year 2020, the largest number of Little Bustards occurs in early to mid-December. On average, these censuses yield a wintering population of Little Bustards in eastern Kalmykia of 100–200 individuals. By January, only single wintering birds (under 10 annually) usually remain in and around the reserve.

Saratov and Volgograd oblast's

Breeding season

Little Bustard numbers dropped critically in the 1990s, in response to the replacement of agricultural fields by tall weeds unsuitable for the species' breeding. Grazing fell by 70–80% compared to the Soviet period owing to a sharp reduction in livestock, and the recovery of the original rangeland vegetation was slow: only by the mid-2000s and in the 2010s was the steppe attractive enough as breeding habitat for the species once more. Such profound socio-economic reversals were observed throughout the Russian Federation in the 1990s and 2000s.

The trans-Volga semi-desert in Alexandrovo-Gaiskii district of Saratov oblast' is now occupied by moderately grazed rangelands on long-abandoned agricultural fields and virgin lands. Until 1990, 55% of the district's territory was occupied by rotational crop fields, 25% by river-fed meadows and 20% by heavily grazed rangelands. In the early 1990s, the crop fields were abandoned and livestock numbers dropped significantly (Oparin *et al* 2016). The density of male Little Bustards was low, ranging from 0.12 to 0.67 per 100 hectares, with no discernible trend ($R^2 = 0.09$).

In the spring of 2021, during our breeding surveys of displaying males, 39 Little Bustards were observed on 23 occasions in the 500 km² Drofinyi Sanctuary in Volgograd

oblast'. The sanctuary is located 130 km north of the Alexandrovo-Gaiskii district in the steppe zone. However, its protected status does not give it the power to regulate economic activities, and land use is typically around 70% winter and spring crops and 27% pastures (which include both virgin lands and abandoned fields) with sparse but diverse grass vegetation. Most Little Bustards (56%) were recorded in agricultural fields and 17 (44%) in pastures, highlighting the relative importance of the latter. Of all records, 18 (78%) were of single birds and 2 were 'pairs', with flocks of 3, 4 and 10 individuals registered once each. All the recorded birds were males, so we use a ratio of 1 male to 0.8 females to calculate the total population (thus 39 + 31 = 70), based on evidence that female mortality is likely to be higher than male because of the risks associated with agricultural machinery during incubation, although most breeding in the area is done either on fallow agricultural land or in virgin land/pastures, arguably leading to lower casualty rates than in the more intensively farmed landscape where this issue is most often investigated (Serano-Davies *et al* 2023).

The Little Bustard formerly bred on the right bank of the Volga in Saratov oblast' and adjacent areas in Volgograd oblast', but our repeated autumn surveys and regular interviews with game guards demonstrated that it had completely stopped nesting there by 2010 (Khrustov & Shlyakhtin 2006).

Based on our fieldwork across Saratov oblast' since 1995, we posit that some 5000–10 000 male Little Bustards are present on the left bank each breeding season. Applying a sex ratio of 1:08 we thus estimate the Little Bustard population in Saratov oblast' at 9000–18 000 individuals.

Pre-migration aggregations and migration

We also surveyed the 12 000 km^2 study area in the dry steppe of the *syrt* plain in the trans-Volga part of Saratov oblast' in the autumn of 2017, counting 3889 Little Bustards in 55 flocks. Groups of up to 100 birds comprised 80%, 101–200 9.1%, and 201–400 10.9% of the total. We mapped all Little Bustard records, revealing that the density of the species in the pre-migration period increases from the west (0.3 individuals/100 ha) through the east and south (0.4 individuals/100 ha) to the south-east (0.6 individuals/100 ha). This area is characterised by a gently undulating landscape covered with *Festuca–Stipa* communities and sparse grass, with *solonetz* occupying 10–20% of its area. Up to 80% of this area is occupied by agricultural fields. In the west of the area, almost all fields are currently in use, while abandoned fields make up 20–30% in the south and east, accounting for the higher density of Little Bustards there, given their preference for virgin areas and abandoned fields.

We conducted no comprehensive autumn surveys from 2018 to 2023 as we focused then on the breeding period, so we cannot estimate further dynamics in the numbers of Little Bustards in the pre-migration period. However, in autumn 2024 we counted only 303 individuals at 17 sites across 12 000 km^2 of this area, forcing us to conclude that the species has undergone a genuine decline. This assumption was supported by Dr AV Bykov (pers comm) based on his own observations in 2022–2024 in the vicinity of lake El'ton, located in the semi-desert of the Volgograd Volga region, as well as by Prof VP Belik (pers comm), who worked west of Lake El'ton in 2022.

Orenburg oblast'

The Little Bustard is distributed unevenly in Orenburg oblast'. Towards the west it decreases in abundance, being unrecorded north of Kurmanaevskii district and not breeding on two watershed ridges in the Samara–Ural interfluve. Lands in the north-east of the oblast' (north of the Ural river) are widely cultivated while river valleys

Figure 2. Saratov oblast' showing the study site in the trans-Volga part of Saratov oblast' (red outline) where the Little Bustards were counted. The Volga river is in blue.

are occupied by meadows, fragmenting the range into small patches. East of the Ural mountains, it is common in all districts of the oblast', even spilling over in small numbers into Bashkortostan and southern Chelyabinsk oblast'. The species was found to prefer landscapes in which cultivated fields adjoin steppe, fallows and abandoned fields.

The field survey in 2017 recorded 282 birds with an average density of adult males of 1.5 individuals per 1 km^2, similar to that found in May 2011. Extrapolation to the estimated area of all suitable habitats within Orenburg oblast' results in 75 000 individuals (Fedosov 2019), but local ornithologists from Orenburg Pedagogical University do not find the Little Bustard distributed across the entirety of this habitat, and estimate a Little Bustard population of 3000 individuals in the oblast' (Kornev & Gavlyuk 2019). Reasons for this disparity likely include spatial heterogeneity in reduction of threats which led to the near-extirpation of the species, and an insufficient period for the species to refill the extent of its ecological niche.

This region includes the Orenburg Nature Reserve, which is intended to protect unique steppe ecosystems and their components, including the Little Bustard. The total area of its five steppe clusters is 382 km^2. In 2016, the density of Little Bustards within the protected area was found to be only 0.2 individuals/km^2, whereas outside the reserve it was 1.5 individuals/km^2 (Fedosov 2019). Unchecked by economic activity and currently uninhabited by wild ungulates, the reserve has taller, thicker grass, shrubs and accumulations of dead plants, preventing the birds from mating and feeding. Paradoxically, therefore, the conservation status of the Little Bustard is currently impaired rather than improved by the reserve.

Western Siberia

Information is far too sparse to provide a reliable synopsis of the status of the Little Bustard in this huge region. Material gathered by AAN for this review itemises the districts in three administrative divisions, all bordering Kazakhstan, where the species

occurs: three southern districts (Tselinnyi, Zverinogolovskii and Kurtamyshskii [shaded in Figure 1], with single records from Ketovskii, Pritobol'ny and Polovinskii) of Kurgan oblast' bordering Kazakhstan's Kostanay region; the five south-easternmost districts (Pavlogradskii, Russko-Polyanskii, Novovarshavskii, Okoneshnikovskii and Cherlakskii [shaded in Figure 1]) of Omsk oblast' near Kazakhstan's Pavlodar region; and two (Loktevskii and Uglovskii, shaded in Figure 1) in Altai krai. The absence of the species in the two adjacent districts forming south-westernmost Novosibirsk oblast', which separates Omsk oblast' from Altai krai, may simply reflect an absence of survey work, although this gap is also predicted by niche modelling to occur on the Kazakhstan side of the border (Koshkin *et al* 2025). Clearly more comprehensive fieldwork is needed to provide an overall status update on the situation in the region.

Regular monitoring in Omsk oblast' by AAN between 1997 and 2023 has produced the largest number of records of Little Bustards in Western Siberia, with little geographical change in distribution and important sites over this time and indeed since studies in the late 19th century (Ruzskii 1897). Breeding sites were found in two districts in 2000, three in 2002, four in 2004–2013 and five in 2024 (AAN pers obs). Okoneshnikovskii and Cherlakskii districts share the Stepnoi Sanctuary, an important location for the species. Distances between sites used by Little Bustards in the oblast' range from 10 to 100 km. Up to 2004, there were oral reports of flocks of up to 40 birds in the south of the oblast', and in early October that year a large pre-migration aggregation, up to 200 birds, was seen in Russko-Polyanskii district. After 2004, however, population growth ceased owing to increasing poaching activity (Nefedov 2007, 2013).

DISCUSSION

The evidence assembled here shows that more targeted studies of the Little Bustard's distribution and population dynamics are needed across the relevant regions of Russia. Most records of and data on the species have been gathered during surveys of other steppe birds. A few specific studies have been conducted in certain regions (north Caucasus, the southern Volga–Don interfluve, lower Volga, Orenburg oblast', southern Urals and Western Siberia), almost all of them between 1990 and 2017. The diverse methods used in the studies are not always described in sufficient detail, with only expert estimates of the abundance provided in many cases. Nevertheless, these give an idea of the current distribution and abundance of the Russian populations of the Little Bustard and their distribution across habitats during the breeding season, post-breeding movements and migrations to wintering grounds. Based on these studies, we posit a breeding population for the Russian Federation of 49 000 to 61 000 individuals (Table 1).

The data we provide suggest that most of the species' breeding populations in Russia are concentrated in the north Caucasus region including the Republic of Kalmykia; Volga–Don interfluve and Rostov and Astrakhan' oblast's; lower Volga region in Volgograd and Saratov oblast's, mainly in on the right bank of the Volga; Orenburg oblast', mainly in the south-east along the Kazakhstan border; Kurgan and Omsk oblast's and the Altai krai. In other steppe regions of Russia the species is either unrecorded or extremely rare.

Compared to the Soviet era, particularly its last decade, Little Bustard numbers have increased today even as its range has contracted owing to the loss of its territories in the Central Black Earth region (Penza and Ulyanovsk oblast's and Republic of Tatarstan). The growth is associated with a fall in agricultural production and grazing in the 1990s that initially reduced available habitats further, but by the mid and late 2000s led to the restoration of rangelands and plant communities favourable to the species.

Nevertheless, most regional populations across Russia are currently in decline. The main threats to Russian Little Bustard populations are: 1. (re-)intensification of

agricultural production, including the use of chemical biocides; 2. conversion of long-abandoned fields and virgin lands to oil-bearing and winter cereal crops; 3. collisions with overhead powerlines; and 4. illegal hunting in pre-migration flocking areas and on wintering grounds. Although 3 and 4 are recognised as threats in Russia, dedicated research is needed to quantify their impact and identify hotspots.

The Little Bustard benefits from the protection afforded by the Rostov, Chernye Zemli and Dagestan Nature Reserves, plus many steppe federal and regional sanctuaries in the Russian Federation. However, the plowing-up of rangelands must be stopped and the cultivation of perennial fodder grasses and spring cereals and legumes encouraged. This would require monetary compensations to farmers, although this is an issue that has not been resolved in the nature conservation legislation of the Russian Federation.

ACKNOWLEDGEMENTS

The authors express their thanks to AB Mamaev and OA Ruban for participating in the collection of material and preparation of some illustrations in this article. Translation of the original Russian version was provided by Shamil Gareev.

LITERATURE CITED

Akseev, IV, DN Galimova & OV Akseev. 2016. [Little Bustard.] *In:* [*Red Data Book of the Republic of Tatarstan. Animals, plants, mushrooms*.] 3rd edition. Ideal Press, Kazan', p235. [In Russian]

Anon. (ed.) 2005. [*Red Data Book of the Penza Oblast'*.] Vol. 2. Animals. 2nd edition. Penzenskaya Pravda, Penza. [In Russian]

Archimaeva, TP & VI Zabelin. 2015. [Encounters with the Little Bustard *Tetrax tetrax* in south-western Tuva.] *Russian Ornithological Journal* 24(1120): 980–981. [In Russian]

Artem'eva, EA, AV Maslennikov & MV Korepova (eds). 2015. [*Red Book of Ulyanovsk Oblast'*.] Buki Vedi, Moscow. [In Russian]

Batkhiev, AM & TYu Tochiev. 2007. [Little Bustard.] *In:* [*Red Data Book of the Republic of Ingushetia. Plants, animals*.] Serdalo, Magas, pp279–280. [In Russian]

Belik, VP. 2013. [On the summer avifauna of the Bogdo-Baskunchak Nature Reserve and its surroundings.] In: *Studies of the natural complex of the Baskunchak lake area*. Volgograd, pp27–34. [In Russian]

Belik, VP. 2014. [Little Bustard.] In: *Red Data Book of Rostov oblast'*. Vol. 1. Animals. 2nd edition. Ministry of Natural Resources of Rostov Oblast', Rostov-on-Don, pp1072–1077. [In Russian]

Bibby, C, M Jones & S Marsden. 1998. *Expedition Field Techniques: Bird Surveys*. Royal Geographical Society, London.

Bliznyuk, AI. 1996. [Little Bustard migration through Kalmykia.] *Ornithology* 27: 279–280. [In Russian]

Chernobai, VF & SA Bukreev. 2017. [Little Bustard.] In: *Red Data Book of Volgograd oblast'*. Vol. 1. Animals. 2nd edition, revised and updated. Izdat-Print, Voronezh, p152. [In Russian]

Collar, NJ & M Kessler. 2021. Hunting of Little Bustards *Tetrax tetrax* in Azerbaijan: the global conservation perspective. *Sandgrouse* 43: 281–285.

Dement'ev, GP. 1952. [*Birds of Turkmenistan*.] Vol. 1. Academy of Sciences of the Turkmen SSR, Ashgabat. [In Russian]

Dzhamirzoev, GS, SA Bukreev, RM Barkhalov, LF Mazanaeva, YuA Yarovenko, KM Kuniev, SA Plaksa, AG Perevozov, SV Gazaryan, AD Askenderov, NI Nasrulaev, EA Babaev & AYu Yarovenko. 2013. [Rare vertebrate animals of the Dagestan Nature Reserve.] *Materials of the Dagestan Nature Reserve* 6. Makhachkala, 372 pages. [In Russian]

Dzuev, RI. 2000. *In:* [*Red Data Book of the Kabardino-Balkarian Republic.*] Tl-Fa, Nal'chik, p82. [In Russian]

Farajli, Z. 2025. Assessing the wintering population and conservation challenges of the Little Bustard *Tetrax tetrax* in Azerbaijan. *Sandgrouse* 47: 87–101.

Fedosov, VN. 2019. [The current state of Little Bustard populations in Orenburg oblast' and other parts of its range.] *Strepet* 17, 1: 4–66. [In Russian]

Fedosov, VN & LV Malovichko. 2018. [Modern distribution of the Little Bustard in Stavropol'.] *Russian Ornithological Journal* 27(1706): 5991–5998. [In Russian]

Fedosov, VN, AV Fedosov & AN Antonchikov. 2017. [Surveys of the Little Bustard in Orenburg Oblast' and prospects for its protection.] *Steppe Bulletin* 49: 55–58. [In Russian]

Finogenov, OV. 2007. [Little Bustard's ecology in semi-deserts and deserts in the south of the lower Volga region.] Abstract from a PhD thesis. Astrakhan'. [In Russian]

Gashek, VA & AS Chichkova. 2014. [Little Bustard.] In: *Red Data Book of the Republic of Bashkortostan*. Vol. 2. Animals. 2nd edition, updated and revised. Informreklama, Ufa. [In Russian]

Gauger, K. 2007. Occurrence, ecology and conservation of wintering Little Bustards *Tetrax tetrax* in Azerbaijan. *Archiv für Naturschutz und Landschaftsforschung* 46: 5–27.

Gizatulin, II. 2020. [Little Bustard.] *In: Red Data Book of the Chechen Republic*. 2nd edition. Yuzhny Publishing House, Rostov-on-Don, pp415–416. [In Russian]

Heiss, M & K Gauger. 2011. Coastal bird migration at the Caspian shore of the Azerbaijan Republic in October 2007. *Podoces* 6: 59–71.

Heiss, M, K Gauger, C Himmel, P Fetting, TA Haraldsson, G Caucal, Z Fərəcli & 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.

Isakov, YuA & KA Vorobyov. 1940. [Overview of the wintering and migration of birds in southern Caspian area.] *Materials of the Khasan-Kuli Reserve* 1: 5–159. [In Russian]

Isakov, YuA & VE Flint. 1987. [Family Otididae.] In: *Birds of the USSR. Galliformes, Gruiformes*. Nauka, Leningrad, pp465–502. [In Russian]

Karavaev, AA & AB Khubiev. 2013. *In:* [*Red Data Book of the Karachay-Cherkess Republic.*] Nartizdat, Cherkess, p124. [In Russian]

Khrustov, AV & GV Shlyakhtin. 2006. [Little Bustard.] *In: Red Data Book of Saratov oblast'. Fungi. Lichens. Plants. Animals*. Publishing House of the Chamber for Trade and Industry of Saratov oblast', Saratov, pp428–429. [In Russian]

Kornev, SV & EV Gavlyuk. 2019. [Little Bustard.] *In: Red Data Book of Orenburg oblast'. Rare and endangered species of animals, plants, and fungi: official publication*. Mir, Voronezh, pp149–150. [In Russian]

Korovin, VA. 2001. [Bird population dynamics in the steppe agricultural landscape associated with changes in land use.] *Achievements and Problems of Ornithology in Northern Eurasia at the Turn of the Century*. Proceedings of the 11th International Ornithological Conference. Matbugat Iorty, Kazan', pp468–477. [In Russian]

Korovin, VA. 2004. [*Birds in the agricultural landscapes of the Urals*.] Publishing House of Ural University, Yekaterinburg, 504 pages. [In Russian]

Korovin, VA. 2013. [Restoration of the Little Bustard population in the north of the steppe trans-Urals.] *Volga Ecological Journal* 1: 51–60. [In Russian]

Koshkin, MA, R Urazaliyev & BM Gubin. 2025. Populations of Little Bustards *Tetrax tetrax* in Kazakhstan have rebounded following a period of agricultural abandonment. *Sandgrouse* 47: 111–121.

Kotlov, AA. 2015. [On the distribution of rare birds in the south-west of Kulunda.] *Altai Zoological Journal* 9: 69–71. [In Russian]

Kreuzberg-Mukhina, EA & EN Lanovenko. 2003. [About the wintering of the Little Bustard in Uzbekistan.] *Strepet* 1: 5–9. [In Russian]

Kuzovenko, AE & GP Lebedeva. 2018. [Little Bustard.] In: *Red Data Book of Samara Oblast'*. Vol. II. Rare species of animals. Publishing House of the Nayanova Samara Regional State Academy, Samara, p256. [In Russian]

Lindeman, GV, BD Abaturov, AV Bykov & VA Lopushkov. 2005. [*Vertebrate population dynamics in the trans-Volga semi-desert*.] Nauka, Moscow, 252 pages. [In Russian]

Lokhman, YuV. 2017. [Little Bustard.] *In: Red Data Book of Krasnodar krai. Animals*. 3rd edition. Administration of Krasnodar Krai, Krasnodar, pp552–553. [In Russian]

Malovichko, LV, VN Fedosov. 2006. [Current state of the Little Bustard population in Stavropol' krai.] *Development of modern ornithology in northern Eurasia*. Proceedings of the 12th International Ornithological Conference of Northern Eurasia. Stavropol', pp485–497. [In Russian]

Muzaev, VM, VE Badmaev, BI Ubushaev & GI Erdnenov. 2015. [On the current population of Otididae in Kalmykia.] *Steppe Birds of the Northern Caucasus and Adjacent Regions: Study, Use, Protection*. Proceedings of the international conference. Rostov-on-Don, pp121–134. [In Russian]

Nefedov, AA. 2013. [Otididae in Omsk Oblast'.] *Steppe Bulletin* 38: 44–47. [In Russian]

Oparin, ML, IA Kondratenkov & OS Oparina. 2003. [The size of the trans-Volga population of the Great Bustard *Otis tarda*.] *Bulletin of the Russian Academy of Sciences. Biological Series* 6: 675–682. [In Russian]

Oparin, ML, IA Kondratenkov, OS Oparina & AB Mamaev. 2017. [Little Bustard population in Saratov oblast'.] *Volga Ecological Journal* 2: 157–169. [In Russian]

Oparin, ML & OS Oparina. 2021. [Little Bustard.] *In: Red Data Book of Saratov Oblast'. Fungi. Lichens. Plants. Animals.* Ministry of Natural Resources and Environment of Saratov Oblast'. Papirus, Saratov, p397. [In Russian]

Oparin, ML, OS Oparina & LS Trofimova. 2016. [*Patterns of bioresources dynamics in steppe landscapes*.] Publishing House of Saratov University, Saratov, 204 pages. [In Russian]

Oparin, ML & VN Fedosov. 2021. [Little Bustard *Tetrax tetrax* Linnaeus, 1758.] In: [*Red Data Book of the Russian Federation. Animals*.] 2nd edition. VNII Ekologiya, Moscow, pp700–702. [In Russian]

Oparina, OS & ML Oparin. 2020. [Impact of intensive agricultural production in the trans-Volga part of Saratov oblast' on Little and Great Bbustard populations.] In: *Biodiversity and Anthropogenic Transformation of Natural Ecosystems*. Edited by MA Zanin. Saratovsky Istochnik, Saratov, pp57–63. [In Russian]

Pavlov, SI, VM Shaposhnikov, GP Lebedeva, DV Magdeev, SV Simak, EN Dubrovskii & VP Yasyuk. 2009. [Little Bustard.] In: *Red Data Book of Samara Oblast'*. Vol. 2. Togliatti, p270. [In Russian]

Reutskii, ND. 2014. [Annotated list of birds in Astrakhan' Oblast' with data on their distribution across natural complexes (part two).] *Astrakhan' Bulletin of Environmental Education* 28, 2: 121–159. [In Russian]

Rustamov, EA. 2013. [Summary of modern avifauna in Turkmenistan.] *In:* Sopyev, OS & ShR Herremov (eds). *Study of the Biodiversity of Turkmenistan (Vertebrates)*. Scientific collection. (Dedicated to the 95th anniversary of AK Rustamov and 60th anniversary of EA Rustamov). Moscow–Ashkhabad, pp125–171. [In Russian]

Ruzskii, M. 1897. [Brief faunistic overview of the southern strip of Tobol'sk province (Report to Mr. Tobol'sk Governor on zoological surveys conducted in 1896).] *Yearbook of the Tobol'sk Provincial Museum* VII. Tobol'sk Provincial Printing House, Tobol'sk, pp37–82. [In Russian]

Saparmuradov, D. 2011. Little Bustard. *In:* [*Red Data Book of Turkmenistan*.] Ylym, Ashgabat, pp274–275. [In Russian]

Serrano-Davies, E, J Traba, B Arroyo, F Mougeot, F Cuscó, S Mañosa, G Bota, N Faria, A Villers, F Casas, C Attié, P Devoucoux, V Bretagnolle & MB Morales. 2023. Biased adult sex ratios in Western Europe populations of Little Bustard *Tetrax tetrax* as a potential warning signal of unbalanced mortalities. *Bird Conservation International* 33: e40.

Sokolov, AS & GA Lada. 2012. [Little Bustard.] In: *Red Data Book of Tambov Oblast'. Animals* (2nd ed). Yulis, Tambov, p265. [In Russian]

Spangenberg, EP. 1951. Otidiformes. *In*: *Birds of the Soviet Union*. Vol. II. Sovetskaya nauka, Moscow, pp139–168. [In Russian]

Tarasov, VV. 2011. [The status of rare bird species in Kurgan oblast'.] *Materials on the Distribution of Birds in the Urals, Cis-Ural Area and Western Siberia* 16. Publishing House of Ural University, Yekaterinburg, pp110–139. [In Russian]

Ubushaev, BI, VYa Badmaev, GI Erdnenov, VM Muzaev & PA Medzhidov. 2016. [Final assessment of the Little Bustard's breeding and migrating populations in the Republic of Kalmykia.] Research report dated November 5, 2015. Ministry of Natural Resources and Environment of the Russian Federation. Chornye Zemli State Nature Biosphere Reserve. Komsomol'skii, Republic of Kalmykia, 30 pages. [In Russian]

Vengerov, PD. 2005. [*Birds and Little-used Agricultural Lands in Voronezh Oblast'*.] Voronezh, pp152. [In Russian]

Vereshchagin, NK. 1940. [Wintering of the Little Bustard *Otis tetrax* L. and Great Bustard *Otis tarda* L. in eastern Transcaucasia.] *Bulletin of the Azerbaijan branch of the Academy of Sciences of the USSR* 5: 57–65. [In Russian]

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Challenges and opportunities for the conservation of large but fluctuating flocks of Little Bustards *Tetrax tetrax* in eastern Georgia

NIKA BUDAGASHVILI

Summary: Four winter surveys in 2020–2024 found that large but fluctuating numbers of Little Bustards *Tetrax tetrax* use eastern Georgia, notably Dedoplistskaro municipality, as an important wintering area, with flocks often crossing from Azerbaijan. However, habitat loss due to expanding olive and almond plantations, along with overgrazing, has led to fragmentation and increased vulnerability to poaching outside protected areas. Recent conservation initiatives, such as the establishment of the Nugzar Zazanashvili Samukhi Multipurpose Use Protected Area and pastureland restoration by the Society for Nature Conservation (SABUKO), contribute to the formal protection of key wintering habitats to secure the species' long-term survival, but more is needed to prevent the ongoing fragmentation and degradation of the area's steppe and traditional farmland.

INTRODUCTION

The German naturalist Gustav Radde (1884) noted that Little Bustards *Tetrax tetrax* were a common sight in winter in Azerbaijan and the environs of Tbilisi in Georgia. He recorded that, when the weather was too harsh in the species' main wintering areas around Lankaran and the Mughan plain in Azerbaijan, flocks moved into Georgia. He added that Little Bustards were then a very common game bird sold in the public markets of old Tbilisi. Little is known about the numbers of wintering birds in the two countries in the nineteenth century, but according to Satunin (1907) the number of wintering birds was strongly dependent on the weather, and there were bigger flocks if the winter was harsh. That still seems to be the case, as we show below.

Vereshchagin (1940) also mentioned transboundary wintering sites of Little Bustards in Georgia which coincide with modern wintering areas (Figure 1). Likewise, Markov (1955) reported that Little Bustards used to visit the warmer parts of Georgia to overwinter, mentioning a population in the coastal areas of the Black Sea in western Georgia, albeit in smaller numbers. He hypothesised that the Little Bustards visiting the Black Sea coast might breed within Europe, unlike the flocks that visit the Shiraki and Iori river valleys (Iori plateau) in the very east of Georgia,

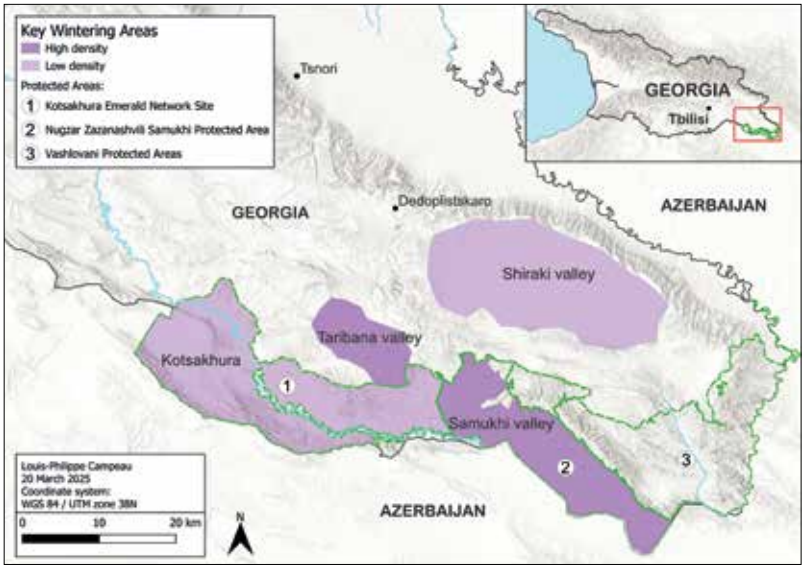

Figure 1. Key contemporary wintering areas of Little Bustards in Georgia.

Plate 1. Calling male Little Bustard near Dedoplistskaro, Georgia, June 2024. © *Sergey Bystritsky*

near Azerbaijan. Nowadays, however, sightings from western Georgia are limited to occasional individuals during migration, and no regular wintering flocks occur there, although very recently small wintering flocks (estimated at 100–200 individuals) have been seen in several successive years on the fields around Katsoburi Managed Reserve in south-western Abasha municipality (G Metreveli pers comm). Markov (1955) noted that most flocks of wintering birds came from the Azerbaijani side into the semi-arid territories of southern and eastern Georgia, most notably Marneuli, Bolnisi, Sagarejo and especially Dedoplistskaro municipalities, besides the environs of Tbilisi. This situation remains more or less the same today, with hunters reporting that small flocks are sometimes seen as far south as Gardabani municipality, which borders Azerbaijan in the Kura river valley.

While the Little Bustard is primarily a wintering species in Georgia, Markov mentioned that it once bred on the Javakheti Plateau (1800 m asl) according to local inhabitants. In 2017, local ecologist Dachi Shoshitashvili witnessed a courtship display by a male Little Bustard further east in Dedoplistskaro municipality, in the Kakheti region of extreme eastern Georgia. Several females were seen nearby, but breeding has not been confirmed (https://t.ly/MMtyn). Another observation was reported on 12 June 2024, when Sergey Bystritsky photographed a solitary calling male Little Bustard near Dedoplistskaro (Plate 1). The bird was still present three days later, but no females were seen on either occasion. The current extent of Little Bustard breeding in Georgia requires additional research.

METHODS

We conducted surveys over four winters in the years 2020–2024. The first field survey in January 2021 was organised by the Society for Nature Conservation (SABUKO) in a collaborative effort with several small teams of observers (https://t.ly/gkaZl). Each team started the count at the same time and covered different points in Dedoplistskaro municipality. This collaborative counting technique provided more accurate data by covering a larger area and minimised the possibility of either missing large flocks or double-counting birds. We covered five sites: the steppes of Vashlovani National Park; adjacent steppes around Kotsakhura ridge and Chachuna Managed Reserve (Kotsakhura Emerald Network Site); Taribana valley; Shiraki valley; and Samukhi valley, now a newly established protected area named Nugzar Zazanashvili Samukhi Multipurpose Use Protected Area. This last site contains the main transboundary wintering location for big flocks of Little Bustards and is designated as IUCN Protected Area Category VI—a protected area with sustainable use of natural resources.

Plate 2. Typical habitat for wintering Little Bustards, Kotsakhura Emerald Network Site, 2024. © *Nika Budagashvili*

The data from subsequent winter seasons (December–February 2021–22, 2022–23, and 2023–24) were collected opportunistically through counts of Little Bustard flocks during other projects. Additionally, in December 2023–January 2024 we collaborated with colleagues in Azerbaijan on a transboundary coordinated count.

During all surveys we kept general notes on the habitats in which the flocks were found. To assess the size of the larger flocks encountered, we used reference points to subdivide the flocks into more manageable subunits. We then counted the number of birds within some of these blocks and extrapolated that count to blocks with similar densities to estimate the total number of birds. When possible, photographs and videos were taken, which allowed us to count the birds more accurately. Finally, to complement these data and avoid overlooking large wintering flocks, social media platforms and open access citizen science platforms were consulted, and records by local and visiting birdwatchers were assembled.

RESULTS

Distribution, habitat and population estimates

The main wintering sites for Little Bustards in Georgia are located in protected areas or their vicinity. The three key areas are the newly created transborder Nugzar Zazanashvili Samukhi Multipurpose Use Protected Area, the Kotsakhura Emerald Network Site and the unprotected Taribana valley (Figure 1, Plates 2, 3). Little Bustards were also found in smaller numbers around the larger Vashlovani National Park (which borders the Nugzar Zazanashvili area) and the unprotected Shiraki valley. The biggest roosting flocks are often in the Nugzar Zazanashvili Samukhi Multipurpose Use Protected Area (Samukhi valley), which borders Azerbaijan and where disturbance factors are absent or very limited because of the strict militarised control of the border area.

Plate 3. Little Bustards feeding in their preferred habitat in Georgia, Taribana valley, 2022. © *Nika Budagashvili*

Currently, Little Bustards in Georgia are found predominantly in the country's eastern semi-deserts, which are characterised by sparse vegetation. These habitats typically feature dry, sandy or rocky terrain with sporadic patches of shrubs and medium-sized grass (Box *et al* 2000). The most widespread habitat type in the region is Submediterranean Artemisia steppe, as classified by EUNIS (European Nature Information System). The open arid forests are dominated by pistachio *Pistacieta mutica* mixed with juniper *Juniperus foetidissima* and *J. polycarpos*. The phrygana-like vegetation, found mostly on badlands, is dominated by low, dense, drought-resistant small trees and shrubs (*Tamarix* spp., *Hippophae rhamnoides*, *Reaumuria alternifolia*, *Caragana grandiflora*, *Atraphaxis spinosa*, *Paliurus spina-christi*, *Ephedra distachya*). The semi-desert vegetation is characterised by *Artemisia lerchiana* mixed with *Salsola ericoides* and *Gamanthus pilosus*. The steppe vegetation is dominated by Graminaceae (*Stipa lessingiana*, *S. capillata*, *Bothriochloa ishaemum*, *B. caucasica*, *Onobrychis* spp, *Glycyrrhiza glabra*) (Lachashvili *et al* 2007, Lachashvili & Khachidze 2010). These habitats are used by human communities as winter pastures, such that wintering Little Bustards have co-existed with nomadic shepherds and sheep for centuries. Despite their arid conditions, semi-deserts often support a variety of resilient plant and animal species adapted to survive in harsh environments. In general, Little Bustard flocks are mostly observed in places where steppe vegetation (*Artemisia* spp *etc*) is comparatively high and dense, as well as on green wheatfields.

During the first and most intensive year of monitoring (winter 2020–2021), we counted around 10 000 individuals across south-eastern Georgia through our collaborative efforts (Table 1). An exceptional observation of a single flock consisting of as many as 10 000–15 000 individuals was made by NB with N Paposhvili and G Epitashvili (both Ilia State University) in January 2019. The earliest flocks generally appear in Georgia in late November and some smaller flocks remain until the first two weeks of March.

Our survey findings from 2021 to 2024 show notable fluctuations in the wintering numbers of Little Bustards in Georgia (Table 1). In 2020–2021, a relatively stable population totalling about 10 000 individuals was recorded at five important sites with high-quality estimates. In 2021–2022 the population estimate expanded to 10 000–20 000, but with slightly lower reliability. The 2022–2023 season had another significant increase in Little Bustard numbers, with estimates ranging from 20 000 to 70 000, but again with lower quality estimates. In 2023–2024 numbers fell sharply to between 1000 and 2000 individuals.

Table 1. Population estimates for the Little Bustard in Georgia, 2021–2024. Interannual fluctuations in this table are likely to represent irregular movements of individuals across an international border rather than changes in the Georgia–Azerbaijan transborder wintering population. The Little Bustard has only been observed incidentally during the breeding season and its breeding status needs confirmation. Quality of estimate: 1 = low, 5 = high.

Season	Year	Number of birds	Important sites	Quality of estimate
Late autumn to early spring	2020–2021	10 000	5	5
	2021–2022	10 000–20 000	5	4
	2022–2023	20 000–70 0000	5	3
	2023–2024	1000–2000	5	3

Threats and conservation actions

Little Bustards face a series of threats as they winter in eastern Georgia. The first consists of changes in land use. Wintering Little Bustards feed on the seeds of plants, as well as on emerging plants and wheat seedlings in late winter and early spring. However, large tracts of traditional Little Bustard wintering sites not located within protected areas have been recently transformed into vast olive and almond tree plantations unsuitable for Little Bustards (Plate 4). This has occurred through the sale of lands from local owners to businessmen who convert the agricultural zoning to allow plantations. We could clearly see the increase in this practice during our annual monitoring of the Little Bustard's wintering range.

This destruction of steppeland not only reduces the habitats available for wintering Little Bustards but also worsens existing conditions of overgrazing. Local cattle, sheep, goats and cows are already unsustainably grazed, leading to reduced grassland cover and habitat degradation (Gintzburger *et al* 2012, Gunya *et al* 2019). As more land is diverted to commercial tree plantations, the remaining pastures are under ever-increasing pressure, with real risks of desertification.

The combined effects of plantations and overgrazing have fragmented the Little Bustard's wintering grounds. In a worst-case scenario, protected areas could be the last places where suitable habitat remains for the species, although there too the threat of overgrazing remains. The need to move between patches of low-quality and disturbed habitat may increase the vulnerability of flocks to a third threat: poaching. Poachers continue to target Little Bustards, even though they are a protected species in Georgia, listed as vulnerable (VU) on the National Red List (2014), with a fine of 400 GEL (*c*US$ 150) per individual killed. According to a Facebook post of the State Sub-Agency Department of Environmental Supervision on 10 December 2016, a group of poachers was apprehended in the Dedoplistskaro municipality (https://t.ly/U29Rf) with 16 illegally killed Little Bustards.

Despite these threats, there are positive developments. In 2022, the Parliament of Georgia approved the Law on the Establishment of Nugzar Zazanashvili Samukhi Multipurpose Use Protected Area (IUCN Category VI), with the purpose of both securing the long-term survival of the reintroduced Goitered Gazelle *Gazella subgutturosa* and protecting the major wintering site for Little Bustards. The management plan for the protected area, under preparation, will provide additional legislative levers to those fighting to protect Little Bustards in their wintering range in Georgia.

Plate 4. Habitat conversion to olive plantations in the Little Bustards' wintering range in the Taribana valley, 2024. *© SABUKO – Society for Nature Conservation*

DISCUSSION

Our observations support the hypothesis that most wintering Little Bustards in Georgia are part of a single wintering population that moves from adjacent areas of Azerbaijan using the transboundary semi-arid steppes of the Kura, Iori and Alazani river valleys. We recorded strong annual fluctuations in Georgia's wintering numbers of the species, with a high of some 70 000 individuals in 2022–2023 and a low of only 1000–2000 the following winter. We assume that movements of a large portion of this transborder population into Georgia are linked to the availability of food resources and pressures from disturbance, but research is needed to establish the causes. Vereshchagin (1940) noted that Little Bustards prefer green agricultural fields rather than natural steppes for feeding; such resources are available on the Azerbaijan side of the border. These large fields may also offer reduced disturbance, as public access to them is restricted. However, powerlines in the vicinity of the fields are known to kill Eastern Imperial Eagles *Aquila heliaca* monitored by GPS telemetry by SABUKO (NB unpublished data), and doubtless represent a threat to Little Bustards also.

Although at times the majority of the transboundary population of Little Bustards may cross into Georgia, the number of wintering Little Bustards in the country generally ranges from 10 000 to 20 000 individuals each winter. Thus, an estimate of the size of this transboundary population cannot be made by simply adding uncoordinated survey counts taken in both countries; and trends in the transborder population size cannot necessarily be interpreted from counts in a single country. To refine our winter estimates and reduce the risk of double counting, regular coordinated counts across both sides of the border are required, preferably in the middle of the winter season. Unfortunately, on the dates chosen for implementation of this coordinated methodology from December 2023–January 2024, no birds were observed on the Georgian side of the border. The largest flock we observed

during an independent survey on 9 December 2023 consisted of 260 Little Bustards in the Taribana valley, although as many as 1000 Little Bustards were observed in the Samukhi valley in January by visiting birdwatchers. During the coordinated survey, 27 000–28 000 Little Bustards were observed across the border in Azerbaijan in different wintering locations, including Jeyranchol agropark and near Ajinohur and Korchay (Z Farajli pers comm). The reasons for the paucity of wintering Little Bustards in Georgia at that time are unknown, but did not seem to be related to weather conditions. We recommend repeating coordinated surveys in future winters to assess whether the most recent counts of Little Bustard in Georgia represent a decline.

To conclude, the Little Bustard continues to use eastern Georgia as an important wintering site, especially in harsher winters, although more precise data can only come from transborder surveys coordinated with Azerbaijan. Its pastureland habitat is rapidly being lost to olive and almond tree plantations and degraded by overgrazing, which is further aggravated by pastureland loss. This fragmentation of wintering habitat increasingly concentrates flocks in dispersed, isolated locations, rendering them more vulnerable to poaching. Positive developments, such as the notification of the Nugzar Zazanashvili Samukhi Multipurpose Use Protected Area, and SABUKO's work to restore pasturelands, would be well complemented by the official protection of the key Samukhi valley wintering site.

ACKNOWLEDGEMENTS

I am grateful to the Society for Nature Conservation (SABUKO) and its team for their support. Thanks to the members of the first field survey for their contributions in this work. Additional thanks to Irakli Matcharashvili, Mimi Kessler and Louis-Philippe Campeau for sharing valuable advice. Special thanks are due to Sergey Bystritsky for kindly sharing his images for this study and to Giza Seskuria for help with the map.

LITERATURE CITED

Box, E, K Fujiwara, G Nakhutsrishvili, N Zazanashvili, RJ Liebermann & A Miyawaki. 2000. Vegetation and landscape of Georgia (Caucasus) as a basis for landscape restoration. *Bulletin of the Institute of Environmental Science and Technology, Yokohama National University* 26: 69–102.

Gintzburger, G, N Lachashvili & T Popiashvili. 2012. *Rangelands condition and assessment: Vashlovani National Park and associated project areas*. Unpublished mission report for Fauna and Flora International (FFI).

Gunya, A, U Gairabekov, Y Karaev, A Lysenko, R Elmurzaev & H Janibekova. 2019. Post-Soviet transformations in pastoral systems in the north Caucasus: the development of hybrid institutions. *Mountain Research and Development* 39: R49-R59.

Lachashvili, I, N Lachashvili & M Khachidze. 2007. [*Conspectus of Flora of Kiziki (East Georgia).*] Tbilisi Botanical Garden and Institute of Botany. Tbilisi, 'Universal', 2007. [In Georgian]

Lachashvili, N & M Khachidze. 2010. [*Desert Flora and Vegetation of Georgia.*] Tbilisi Botanical Garden and Institute of Botany. Tbilisi, 'Universal', 2007. [In Georgian]

Markov, E. 1955. [*Winged Guests of Georgia (scientific-popular study).*] Sakhelgami, Tbilisi. [In Georgian]

Radde, G. 1884. [*Ornithological Fauna of the Caucasus.*] Systematic and Biological-Geographical Description of Caucasian Birds. Printing Office of the Office of the Chief Civil Unit in the Caucasus, Tiflis. [In German]

Satunin, K. 1907. [*Materials for the Knowledge of the Birds of the Caucasus Region.*] Printing house of KP Kozlovsky (Golovinsky prost., L. 12) and the Office of the Viceroy of His Imperial Majesty in the Caucasus, Tiflis. [In Russian]

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]

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A historical overview of Little Bustard *Tetrax tetrax* records in Armenia suggests a need for improved monitoring and conservation measures

KAREN AGHABABYAN

Summary: There are very few records of the nationally protected Little Bustard *Tetrax tetrax* (Vulnerable) in Armenia, either from hunting incidents or in the National Bird Monitoring Program (2003–2024). This suggests a need to increase monitoring efforts along the western and south-western borders of Armenia during autumn migration in order to identify known and still suitable areas for the species. Illegal hunting appears to be the major threat to the species. To protect visiting Little Bustards in Armenia, it is necessary to officially adopt the known and still suitable areas as Emerald Sites and exclude them from Public Hunting Lands, eliminating the presence of hunters in such areas.

INTRODUCTION

Armenia is a landlocked mountainous country with an area of 29 743 km^2 and an elevation range from 375 to 4090 m asl. Thanks to this significant elevation span, various climatic conditions create a high diversity of landscapes, including semi-desert, juniper woodland, deciduous forest, mountain steppe and meadows, and subalpine areas. The terrain includes flat plains, mountain plateaus and rugged areas, such as deep canyons, cliffs and rocky outcrops (Aghababyan *et al* 2015).

The Little Bustard *Tetrax tetrax* was first reported for Armenia in the summer of 1920 in the northern regions of the country (Leister & Sosnin 1942). Later, one specimen was taken in October 1926 near lake Sevan, and two in November 1928 and November 1929 on the Ararat plain (Leister & Sosnin 1942). After almost 70 years, the next set of records of the species came out of the international 'Birds of Armenia' project that provided an inventory of the avian fauna of Armenia through field surveys conducted from 1993 to 1997 (Adamian & Klem 1999). The Little Bustard was recorded on the Ararat plain in November 1994 (single bird), August 1997 (4–5 birds), and September 1997 (30 birds), while two birds were recorded along the Araks river near Araksavan village in August 1997, these few records leading to the species being considered a casual migrant in the country (Adamian & Klem 1999). Another two birds were seen in the vicinity of lake Arpi by a group of ornithologists in 2000 (Aghasyan & Kalashian 2010). Based on these data, the Little Bustard was assessed as Vulnerable B2ab(ii)+Ca(i)+D1 in the last edition of the National Red Data Book of Armenia (Aghasyan & Kalashian 2010), which means that hunting of the species is prohibited.

A perceived increase in Little Bustard numbers led to the creation of the Sardarapat Important Bird and Biodiversity Area (IBA) in south-western Armenia in 2002 (BirdLife International 2025) (Plates 1–2). The area includes the westernmost part of the Ararat plain and part of the Araks river valley. The species was used as a trigger along with the Great Bustard *Otis tarda*. The number of Little Bustards at this site has been estimated to be 1000–1500 individuals in 1995, based on evidence in Adamian & Klem (1999) and interviews with local hunters. However, there are no reports of such large numbers of Little Bustards from this area, either in published literature or in unpublished observations; the estimate seems unjustified and requires further investigation.

Plate 1. Semidesert in Sardarapat IBA. © *Karen Aghababyan*

Plate 2. Semi-desert in Sardarapat IBA. © *Karen Aghababyan*

METHODS

I present an assessment of the status of Little Bustards in Armenia which draws on the results of the National Bird Monitoring Program (NBM), which was launched in 2003. It started as an initiative of a private individual, and since 2015 has been implemented by the BirdLinks Armenia NGO. The NBM subdivided Armenia into 374 10-km^2 squares. As of 2024, 328 of these have been surveyed (88%); the remaining 46 squares (12%) have not been visited due to their proximity to the international border, where access is restricted. Within the covered squares, 57 (15%) have been visited every year since 2003, 91 (24%) were visited at least every three years, and the remaining 180 (48%) were visited opportunistically at least three times in total (Figure 1). Surveys for the NBM are undertaken intensively at the beginning of the breeding season, from 20 April to 15 June, when up to three teams are in the field every day. In other seasons the frequency of field visits is about 2–3 times lower.

In each square, data on birds were obtained from two different sources: incidental observations and standardised counts (Voříšek *et al*. 2008). Incidental observations were provided by birdwatchers and accepted as long as they conformed to minimum data requirements: accurate species identification, observation date, geographical coordinates, name of nearest locality (human settlement, mountain, historical site, etc.), breeding code (likelihood of breeding locally based on the bird's behaviour), observer name and contact details. Standardised counts were conducted by both ornithologists and skilled birdwatchers. These were carried out during a fixed period of 1 or 2 hours when an observer slowly walked along a transect route, counting all the birds within 100 m on either side of the transect (hence covering a strip 200 m wide). As far as possible, surveys were done at the time of the day when birds were most active (as a rule, early morning) in favourable weather conditions, such as the absence of rain, and wind below Beaufort Force 3. All data were collated at the end of each counting season, entered into a database and double-checked.

In addition to data from the NBM, I also used opportunistic records obtained from the Armenian Ornithological Society and from foreign birdwatchers who visit Armenia. These were obtained through direct communication and through the eBird Basic Dataset (2024) and Armenia.Observation.Org (2024) platforms.

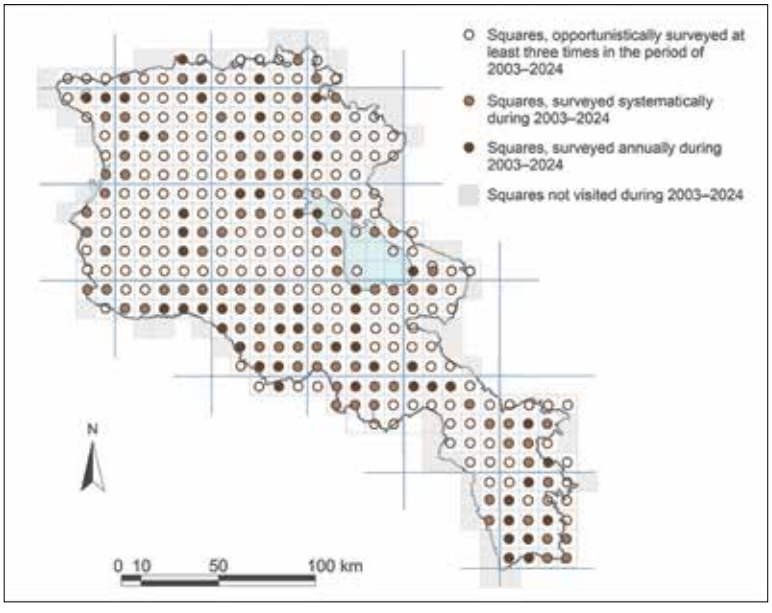

Figure 1. Survey coverage within Armenia within the framework of the National Birds Monitoring Program (BirdLinks Armenia 2019).

RESULTS

Distribution and population estimates

All records of Little Bustards in Armenia from 1926 to 2002 and from 2003 to 2024 (NBM survey period; surveys were not conducted during the COVID19 pandemic) were from 11 sites in the centre, west and south-west of the country (Figure 2).

Although spanning twenty years, the NBM surveys did not record the Little Bustard in Armenia. However, two specimens were reported by the Museum of Armenian Nature, which obtained them from local hunters. One of these was taken near Karakert village in October 2013 (point 10 in Figure 2), and the other near Argina village in November 2014 (point 11 in Figure 2). The habitats where the birds were recorded are primarily dry semi-deserts dominated by *Artemisia fragrans* and *Salsola* sp (KA pers obs).

The overall estimation of the species' population from 1950 to 2023 is presented in Table 1. As data are scarce, determining the population trend is challenging.

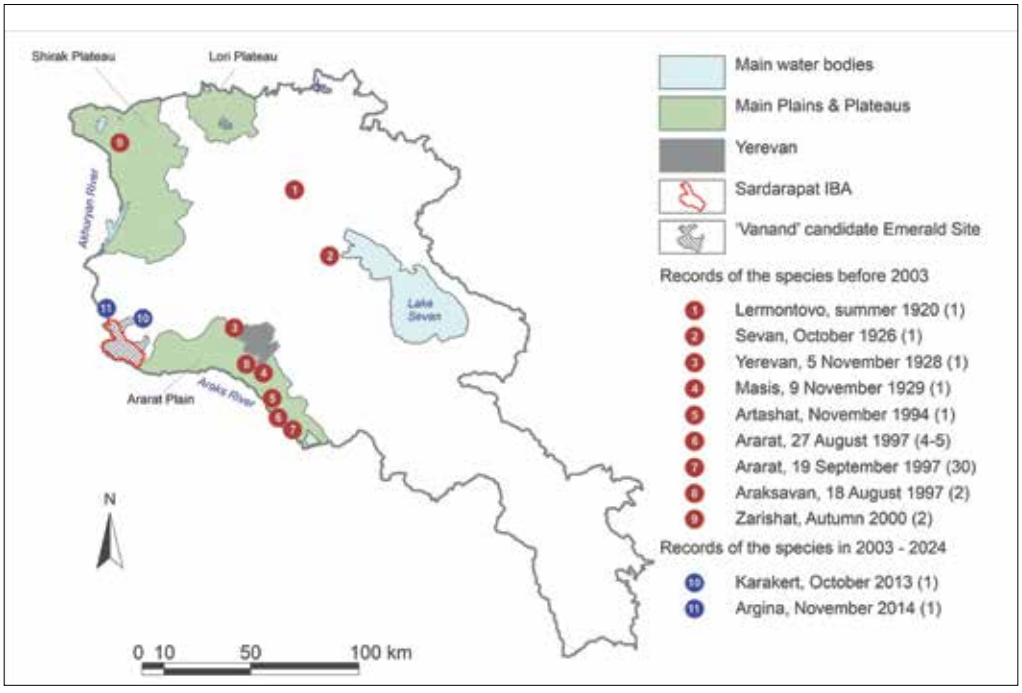

Figure 2. Records of Little Bustard *Tetrax tetrax* in Armenia. Numbers in parentheses indicate the number of individual birds observed at the site.

Threats and conservation actions

Considering the scarcity of records of the species in Armenia, it is hard to evaluate the threats. Both birds recorded in 2013 and 2014 were illegally hunted, and poaching remains a potential threat to Little Bustards entering the country. Hunting in Armenia is allowed in the Public Hunting Lands designated by the Ministry of Environment. There is an approved list of permitted game bird species which is revised annually. Nevertheless, illegal hunting of many protected bird species is relatively frequent (Aghababyan *et al* 2023). One of the reasons for illegal hunting is the poor education of hunters and the absence of mandatory tests to assess their knowledge of game birds and red-listed species,

as well as their skills in field identification (Aghababyan *et al* 2023). Illegal hunting of Little Bustards probably takes place opportunistically or accidentally while hunters legally target Chukar *Alectoris chukar* and Calandra Lark *Melanocorypha calandra* in the Public Hunting Lands. Most of the hunters from local villages know the Great Bustard (also poached illegally), Chukar, and Calandra Lark very well, and so the Little Bustard may also be seen as another large bird which would be a source of meat. Some local hunters recognise the species, but are not aware of its conservation status.

Agricultural intensification and residential development also play a role in constraining potential habitat for the Little Bustard. The Ararat plain, where the species was recorded in the 1920s and 1990s, was thoroughly transformed by agriculture during the Soviet period and further in the 2000s through ongoing urbanisation, resulting in its fragmentation into fields and semi-urban areas.

The candidate Emerald Site 'Vanand', adjacent to the Ararat plain, is identified for official protection under the Bern Convention (Fayvush *et al* 2016). Additionally, the Little Bustard was considered a trigger species for Sardarapat IBA (which overlaps with Emerald Site 'Vanand') based on expert assessment (BirdLife International 2025), although as mentioned above, this assessment may have been incorrect.

Table 1. Population estimates and trends for the Little Bustard in Armenia. 'Migration' covers pre-migratory gatherings and stopover flocks. Quality of estimate: 1 = low, 5 = high. Ins data = insufficient data.

Seasont	Number of birds	Important sites	Quality of estimate	Population estimate and trend			
				1950–1990	1990–2020	2020–2023	1950–2023
Breeding	0	0	5	0	0	0	0
Migration	10–100	3	3	10–30 Ins data	10–50 Ins data	0–10 Ins data	10–100 Ins data
Wintering	0	0	4	0	0	0	0

DISCUSSION

Little Bustard was scarcely recorded in Armenia from 2003 to 2024, despite the increase in ornithological monitoring supported by the development of citizen science in that period. The species was never reported through the NBM scheme and the only records from that time are from hunters who illegally poached the bird. The scarcity of records can be partly related to the decline of the breeding population of this species in the areas north of Armenia, as the overall population, especially in western Russia, is estimated to be experiencing a moderate decline (BirdLife International 2018). Also, it is possible that the birds observed on the Ararat plain come to Armenia from Türkiye, where the breeding population is scarce already and is estimated at 5–50 breeding males (BirdLife International 2015, Morales & Bretagnolle 2022). It is also possible that birds now prefer flying along the western and then south-western borders of Armenia, avoiding the urbanised Ararat plain. The westernmost point where the species was recorded in 2014 (point 11 in Figure 2) is located in the border zone which is administratively difficult to access, resulting in only occasional visits by ornithologists and citizen scientists. Nevertheless, hunters and fishermen continue to apply for and obtain special permits to enter this area.

In addition, there is little survey effort during autumn migration along the western and south-western borders of Armenia, as ornithologists and citizen scientists usually concentrate their efforts during this season on the wetlands of the Ararat plain, lake Arpi (north-west Armenia), Lori plateau (north), and lake Sevan (Figure 2). It is also possible that we miss the migration of Little Bustards because of a spatiotemporal gap in our

efforts, as we finalise the autumn migration counts in October and then begin wintering bird counts in late November: historical evidence shows that many birds fly through Armenia in November.

If the lack of records of Little Bustards is due in part to limited and insufficiently targeted survey efforts, the NBM must be expanded to the sites along Armenia's western and south-western borders from September to November and also involve hunters and fishermen. Such an expansion would also benefit the counts of other migratory birds, such as Great Bustards, raptors and cranes. Also, considering the recent reports of large numbers of wintering Little Bustards in Azerbaijan (Farajli 2025) it might be worth monitoring flatter areas at the north-eastern corner of Armenia (as the rest of the areas along the eastern border are characterised by rugged high mountains). In all regions the involvement of hunters in surveys might also have positive conservation effects, as it can improve their knowledge of the species and shift their interest from shooting to surveying.

Moreover, to increase the protection of migrating Little Bustards in Armenia, it is necessary to (1) improve the conditions of hunters' licensing by introducing a new exam; (2) exclude from the Public Hunting Lands all areas of international conservation importance, such as Important Bird Areas and Emerald Sites (Aghababyan *et al* 2023); (3) recognise the candidate Emerald Site 'Vanand' and develop a management plan for it, where birdwatching can become an essential component in increasing the sustainability of the local communities; and (4) increase cooperation with the scientific communities of the countries where the species is breeding in order to implement satellite telemetry programs and better understand the pattern of the species' migration through Armenia.

ACKNOWLEDGEMENTS

The National Bird Monitoring Program in Armenia is continuously supported by the members of the Armenian Ornithological Society. It was also funded by the European Bird Census Council through a grant from the MAVA Foundation for the European Breeding Bird Atlas – EBBA2, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH supported Environmental Programme, and the Eurasia Partnership Foundation within the framework of the 'Support to the Armenia–Türkiye Normalization Process: Rapid Responses' programme (2023–2024) funded by the European Union (grant number Y23-3002-RR). We would like to thank Mr Vardges Hakobyan and the Administration of the Museum of Armenian Nature for providing the necessary information on the collected specimens of the Little Bustards.

LITERATURE CITED

Adamian, M & D Klem, Jr. 1999. *Handbook of the Birds of Armenia*. American University of Armenia, Oakland.

Aghababyan, K, A Khachatryan, S Baloyan, V Grigoryan, A Khechoyan, K Hambardzumyan, A Ghazaryan, V Gevorgyan & C Rostron. 2023. Influence of Public Hunting Lands on waterbirds of internationally recognized conservation areas in Armenia. *GSC Advanced Research and Reviews* 17(02): 87–103.

Aghababyan, KE, H Ter-Voskanyan, S Tumanyan & A Khachatryan. 2015. First national atlas of the birds of Armenia. *Bird Census News* 28: 52–58.

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

Armenia.Observation.Org. 2024. *Tetrax tetrax*. Dataset of Observation International Foundation. https://armenia.observation.org/. [Accessed 19 December 2024]

BirdLife International. 2015. *European Red List of Birds*. Office for Official Publications of the European Communities, Luxembourg.

BirdLife International. 2018. Species factsheet: Little Bustard *Tetrax tetrax*. https://datazone.birdlife.org/species/factsheet/little-bustard-tetrax-tetrax. [Accessed 29 December 2024]

BirdLife International. 2025. Site factsheet: *Sardarapat*. https://datazone.birdlife.org/site/factsheet/sardarapat. [Accessed 3 January 2025]

BirdLinks Armenia. 2019. *Guidelines for National Bird Monitoring in Armenia*. BirdLinks Armenia NGO. Technical Report BLA-001-2019.

Collar, N & M Kessler. 2021. Hunting of Little Bustards *Tetrax tetrax* in Azerbaijan: the global conservation perspective. *Sandgrouse* 43: 281–285.

eBird Basic Dataset. 2024. *Version: EBD_relDec-2024*. Cornell Lab of Ornithology, Ithaca, New York.

Farajli, Z. 2025. Assessing the wintering population and conservation challenges of the Little Bustard *Tetrax tetrax* in Azerbaijan. *Sandgrouse* 47: 87–101.

Fayvush, G, M Arakelyan, K Aghababyan, A Aleksanyan, A Aslanyan, A Ghazaryan, M Oganesyan, M Kalashyan & S Nahapetyan. 2016. *The 'Emerald' Network in the Republic of Armenia*. Ministry of Nature Protection, Yerevan.

Heath, MF, MI Evans, DG Hoccom, AJ Payne & NB Peet (eds). 2000. *Important Bird Areas in Europe: priority sites for conservation*, Volume 1 Northern Europe, Volume 2 Southern Europe. BirdLife International, Cambridge.

Leister, AF & GV Sosnin. 1942. [*Materials on Ornithofauna of the Armenian SSR*.] ARMFAN, Yerevan. [In Russian]

Morales, MB & V Bretagnolle. 2022. An update on the conservation status of the Little Bustard *Tetrax tetrax*: global and local population estimates, trends, and threats. *Bird Conservation International* 32: 337–359.

Voříšek, P, A Klvaňová, S Wotton & RD Gregory. 2008. *A best practice guide for wild bird monitoring schemes*. First edition. RSPB/CSO.

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Assessing the wintering population and conservation challenges of the Little Bustard *Tetrax tetrax* in Azerbaijan

ZULFU FARAJLI

Summary: The Little Bustard *Tetrax tetrax* has a breeding distribution spanning Europe and Central Asia, with Azerbaijan hosting a globally significant wintering population, representing up to *c*69% of the species' total population. A 10-day preliminary survey in early 2023 documented nearly 20 000 Little Bustards and highlighted illegal poaching and land conversion as major conservation challenges. More extensive surveys in early 2024 and 2025 provided a fuller assessment of the Transcaucasian wintering population. These larger undertakings recorded nearly 100 000 and 160 000 Little Bustards respectively, and significantly advanced our understanding of the species' distribution, population and conservation challenges in the region. Poaching remains the primary threat to the Little Bustard in Azerbaijan, with illegal hunting by Arab falconers exacerbating conservation challenges. Although hunting pressure has declined over recent decades due to protective measures, enforcement remains weak and many offenders persist despite fines. Falconry-related activities, such as off-road driving, also degrade habitats and increase bird mortality risks. Additionally, habitat loss due to agricultural expansion has forced Little Bustards to adapt to the agricultural landscape mosaic. While they have shown some flexibility in their habitat use, overgrazing and pastureland mismanagement further threaten their survival. Another significant concern is collision with powerlines, particularly in migration corridors and wintering areas. Powerlines have caused high mortality rates in the past, and new energy infrastructure projects could magnify the problem. Given Azerbaijan's importance in hosting a large proportion of the global population, conservation measures—including stronger anti-poaching laws, habitat protection, and mitigation of infrastructure risks—are urgently needed to safeguard the species' future.

INTRODUCTION

The Little Bustard *Tetrax tetrax* has an extensive global distribution, which although stretching from Portugal in the west to Xinjiang, China, in the east, has been much fragmented over the 20th century (BirdLife International 2018). In the first half of the 20th century, Little Bustards bred in some parts of Azerbaijan, possibly continuing to do so in Gobustan into the 1950s or 1960s (Radde 1884, Patrikeev 2004). More notably, however, Azerbaijan serves as a crucial habitat for possibly the world's largest wintering population of the species (Vereschagin 1940, Gauger 2007, Heiss 2013, Heiss *et al* 2020). These birds migrate from northern breeding grounds in Russia and Kazakhstan, passing through and congregating in the Caucasus region. Classified as globally Near Threatened (BirdLife International 2018), the species is listed in Azerbaijan's Red Book as Near Threatened (MENR 2023) and consequently has national protected status.

The primary period of Little Bustard autumn migration through Azerbaijan's Beshbarmag bottleneck, on the Caspian Sea coast 70 km north-west of Baku, typically begins in October, reaching its peak intensity in November, with birds settling further south to overwinter and move between sites, presumably responding to weather, food availability and disturbance. The return journey takes place during March and April, likely on a broad-front migration, as spring numbers at Beshbarmag are considerably lower; Heiss (2013) speculated that the birds might cross the Caspian Sea on their way back to the breeding grounds. Based on Gauger's (2007) fieldwork in the early 2000s, the Little Bustard was found to have a strong preference for large, undisturbed areas of semi-desert and steppe used for winter pasturing, but tended to avoid areas with intensive agriculture. In Azerbaijan, the species faces a series of threats, especially poaching, overgrazing and destruction of suitable habitats, and powerline collisions.

Prior to the 1930s, it is estimated that up to 300 000 Little Bustards wintered in Azerbaijan (Patrikeev 2004). While no detailed survey results exist from the early Soviet

Figure 1. Map of Azerbaijan and neighbouring countries showing the 17 main sites we surveyed, plus our routes, in 2024 and 2025 combined (NP = National Park).

period, Vereschagin estimated that, during the 1930s, 40 000–50 000 Little Bustards were hunted each winter in Azerbaijan, decreasing to 20 000 by the 1940s (Vereschagin 1940). He observed that motor vehicles, which Little Bustards allowed to come much closer than humans on foot, significantly facilitated bird hunting in Transcaucasia. In the second half of the 20th century, the species experienced significant declines globally; however, relatively high numbers of Little Bustards were still reported in Azerbaijan on some occasions around the turn of the century. For example, 62 300 individuals were observed in 1971 and 30 000 in 1982 in Kizilagach National Park (Patrikeev 2004), and Gauger (2007), citing Martinez *et al* (1997), reported an estimated 100 000 birds in the same location during the winter of 1990. This led Gauger (2007) to question whether the lack of observations was due to a genuine large decline of the species or simply a lack of data over the period.

The number of Little Bustards wintering in the country each year varies in total and with area, depending on regional and local weather conditions (Gauger 2007). Differences can be dramatic: having recorded 62 300 birds in Kizilagach National Park in 1971, Patrikeev (2004) found none in 1984/85 or 85/86. For him one explanation for such local movements was possibly disturbance, driving birds from Shirvan to Kizilagach and from Korchay to Ajinohur (Figure 1). Increased hunting pressure in the 1980s might have caused the birds to shift their preference to the Mughan steppes (Patrikeev 2004).

After his 2005/06 winter monitoring, Gauger (2007) estimated the minimum number of Little Bustards wintering in Azerbaijan at 150 000, with a maximum of 200 000. He also reported a single site count of approximately 35 000 birds in Aghghol National Park. Occasional observations from the Beshbarmag bottleneck in the mid-2000s provide additional data on migrating Little Bustards. In autumn 2011 the count of birds there

exceeded 100 000, a figure estimated to represent 41–44% of the global population of the species at the time (Heiss 2013). Subsequent autumn tallies documented fewer than 30 000 Little Bustards migrating through the bottleneck until autumn 2024, when over 181 000 birds were recorded between 15 October and 13 November, surpassing all previous counts. Indeed, this number exceeds the published estimated breeding population of the Little Bustard in its eastern range and represents 40–69% of the estimated global population (BirdLife International 2018, Morales & Bretagnolle 2022).

However, these figures only capture a portion of the wintering population in Azerbaijan for two reasons: first, there is an additional migration of Little Bustards in the western regions of the country, as evidenced by earlier data (Vereschagin 1940, pers obs); second, the counts at Beshbarmag ended in mid-November, while Little Bustards may continue to arrive afterwards, depending on weather conditions further north. Similarly, during the winter of 2025, an increase in reports of Little Bustards was observed in regions where the species had previously been uncommon, including Croatia, Greece, and Türkiye (evidence from Birding Croatia, Balkans Rare Bird Sightings, social media). This pattern, in conjunction with the high numbers recorded during migration counts at Beshbarmag—despite reduced field effort—yet yielding a higher total count of individuals in 2025 compared to 2024, suggests a large-scale southward displacement of the population. This shift is likely to be driven by ecological or climatic factors operating in Russia and/or Kazakhstan.

To conserve this significant portion of the global population effectively, a deeper understanding is needed of its distribution, numbers, ecology and threats. In 2023 colleagues and I implemented a preliminary survey to gauge the size of the wintering population and document the conservation issues affecting it. In 10 days we counted 19 221 Little Bustards across 29 different locations, documented illegal poaching of the birds and identified land conversion as an additional threat (Farajli & Mammadsoy 2023). In 2024 and 2025, with higher effort and more people, we undertook a larger survey aiming for a comprehensive review of the winter range and numbers in Azerbaijan. Furthermore, a team of ornithologists in Georgia coordinated their surveys in suitable areas near the border to reduce the risk of double-counts and document the birds' movements there (Budagashvili 2025). This paper seeks to present the latest population estimates of Little Bustards in Azerbaijan as well as to highlight the threats they face.

METHODS

We took a comprehensive approach intended to provide insights into the ecological dynamics and conservation needs of the Little Bustard populations in Azerbaijan. Our survey focused on habitats known to be used by wintering Little Bustards or identified through satellite imagery. Both the literature and our 2023 preliminary survey indicated that in Azerbaijan the species makes use of a mix of habitats, including grass steppes, winter crops and fallow fields (Gauger 2007, Heiss 2013, Farajli & Mammadsoy 2023). These habitats are well represented in the Caucasus region, with shrub desert and steppe ecosystems being particularly extensive. This ecoregion, spanning Azerbaijan, Georgia and Iran, covers approximately 6.4 million hectares, at elevations ranging from 27 m to 900 m, and covers about 70% of Azerbaijan's land area (WWF 2018). However, agricultural landscapes, including winter crops and fallow fields, are also widespread within this region.

During our 31 days of fieldwork between 13 January and 14 February 2024 and 22 days between 30 January and 21 February 2025, we drove from 9:00 to 18:00 along predetermined itineraries, pausing in suitable open habitats to scan carefully for Little Bustards from whatever vantage points we could find. We used cars to move between and within sites, but suitable roadless habitats were also explored on foot. In total we drove just short of 6540 km and 4500 km in 2024 and 2025 respectively. Certain large locations

needed more than a day of coverage. As a result, Little Bustards were encountered in three main ways: (a) on the ground, including birds flushed by our approach, (b) in flying flocks, or (c) by feathers or dead specimens (including collision victims, roadside game markets and falconer leftovers).

During the survey we systematically recorded data concerning any encountered Little Bustards, including GPS coordinates, flock sizes, habitat types and potential threats. When standing flocks were near human settlements (*eg* farms, houses) or infrastructure (*eg* main roads and powerlines) we visually estimated the distances between them to better understand the birds' tolerance of human activities. We visually assessed plant height in the vicinity of the birds and categorised it as follows: 1 (<10 cm), 2 (10–30 cm), 3 (30–50 cm), or 4 (>50 cm). We rated the quality of our bird counts on a scale from 1 to 5, where 1 represented brief sightings of distant flocks, and 5 represented thorough and repeated counts of all birds. We supplemented written notes of observations with photographs of certain flocks; these allowed for a more accurate count and enabled corrections to be made if required. Two or more birds together, whether on the ground or in the air, were considered a flock.

RESULTS

Distribution, numbers and habitat

Little Bustards were observed in nearly all of the 17 main sites we targeted for survey (Figures 1 & 2). Of these sites, 14 were visited in both 2024 and 2025, but Quba, which held only 80 birds in 2024, was omitted in 2025 while Balakan, Beylegan and Tartar were only visited for the first time in 2025 but no birds were found. Jeyranchol also lacked birds in 2025 despite past observations in the literature and our 2024 survey (Figures 1 & 2). In total, we recorded 97 355 and 159 156 individuals in 2024 and 2025 respectively, while acknowledging the possibility of double-counting in some areas. After adjusting for potential overestimation, and an estimate by other observers at Shirvan in 2025, the population sizes were refined to *c*95 000 and *c*175 000 individuals for 2024 and 2025, respectively (Table 1, Figure 2). The quality of our bird counts averaged 4.17. Mean flock size was 2310 individuals, based on 67 and 40 locations in 2024 and 2025 respectively. The highest elevation we found the birds was just above 400 m. Throughout our survey, Little Bustards primarily used two habitat types: (a) natural steppe environments, and (b) fallow lands interspersed with winter crops (including pivot irrigation areas known as 'agroparks'; Plate 1), notably barley and wheat. We did not observe any Little Bustards in true desert or semi-desert habitats.

In 2024, the largest congregations of the species were observed in Shirvan and Kizilagach National Parks, with 25 573 and 17 850 birds respectively (Figure 2). These two locations hosted 45.7% of all the birds counted in that year, indicating their importance for the conservation of the species. In Shirvan National Park we observed three subpopulations with seemingly little movement between flocks. Within both parks, the birds occupied natural steppe with a plant height of 20–50 cm, and were observed in flocks of 20–8000 individuals. However, outside these national parks more than 37 000 Little Bustards were spotted in agroparks in 2024, highlighting the significance of these unprotected lands for the species. At present, there are at least 12 large-scale agroparks in the parts of the country we visited, with one company alone cultivating 60 000 ha across Jeyranchol, Samukh and Hajigabul districts since 2014.

In 2025 the highest concentrations of birds were recorded in the districts of Qobustan, Hajigabul, Tartar and Yevlakh, as well as in Shirvan National Park, with each site supporting almost or exceeding 20 000 individuals (Figure 2). Collectively, these areas accounted for approximately 81% of the total birds recorded that year. Notably, a substantial decline

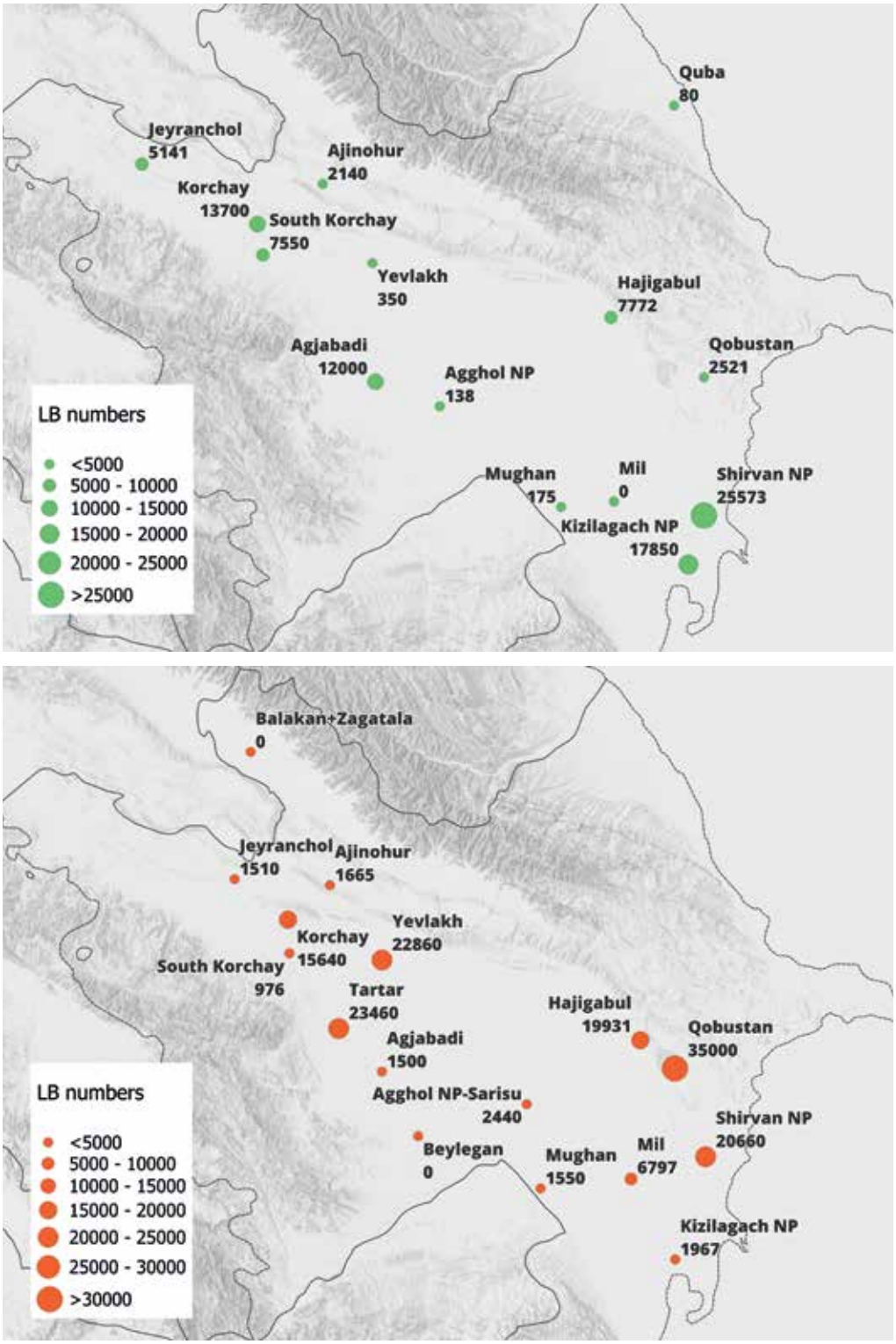

Figure 2. Key sites where Little Bustards were recorded during our 2024 (green) and 2025 (red) surveys. Nearby flocks are lumped together for display purposes.

was observed in previously significant sites including Agjagabi Agropark and Kizilagach National Park, where the combined population approached 30 000 individuals in 2024 but dropped to fewer than 3500 individuals in 2025 (Table 1).

In the winters of 2024 and 2025, winter crops, characterised by a total plant height consistently below 20 cm, supported 46 319 and 50 865 birds, respectively. Steppe habitats, where plant height exceeded 20 cm, hosted 48 780 and 69 055 individuals respectively. The remaining birds were recorded either in flight or within habitats exhibiting a mosaic of vegetation height categories. Further research is necessary to refine our understanding of habitat preferences in relation to spatial coverage in these environments. In seven locations, flocks were observed less than 50 m from settlements and infrastructure, suggesting an adaptation to mosaic habitats near human activity and a tolerance for disturbance in the absence of hunting. Flock sizes in these locations were generally below 1650 individuals, with the exception of Qobustan, where in 2025 an estimated 35 000 birds were dispersed across the steppe, some feeding in close proximity to shepherd farms, likely due to the absence of hunting pressure. Flock sizes ranged from 100 to 5000 individuals at distances of 50–100 m (four locations) from human infrastructure and increased to 8000 at 150 m (one location). This pattern conjecturally suggests that larger congregations tend to occur at greater distances from settlements and infrastructure.

In addition to wintering grounds noted in the literature and those monitored in 2023, two notable new locations were discovered in 2024 and 2025. One, in 2024, was the agropark in Agjabadi (Agjabadi Wheat LLC), where an estimated 12 000 birds were observed; the other, in 2025, was in Tartar, where over 23 000 individuals had gathered. In contrast, significantly lower numbers were recorded at the historically well-documented wintering site of Aghgol National Park and its surroundings, with only 138 birds observed in 2024 and 2440 in 2025. Rangers from this park have also reported a decline in Little Bustard sightings in recent years compared to a decade ago, suggesting a potential shift in wintering areas toward safer locations such as the agropark in Agjabadi, where food resources are abundant and hunting is prohibited. Although hunting is also banned within the national park, frequent human activity, including fishing and the presence of domestic livestock, may contribute to higher levels of disturbance for Little Bustards. In contrast, agroparks offer a more stable and readily available food supply, potentially making them more favorable wintering habitats. However, in 2025 we recorded only 1500 Little Bustards in this park. According to local workers, the species had initially been present in high numbers, similar to the previous year, but the birds left the area following ongoing harvest and plowing activities. Additionally, a single gun cartridge was discovered, suggesting potential hunting activity on the site. Local sources claimed that shotguns are used for deterrence by firing into the air rather than for direct hunting, but we could not verify this.

Likewise, a significant number of birds (exceeding 7500 in 2024) were sighted in fields south of the Korchay sanctuary/agroparks (Plates 1 & 2). However, the movements of birds between these fields and agroparks are not well understood. Workers at these agricultural facilities informed us that they scared the birds away daily, but that they returned for roosting in the evening. Our observations in the agropark confirmed this claim, as in both 2024 and 2025 we encountered significant numbers of Little Bustards (13 700 and 15 640 respectively) just before sunset. A parallel pattern is evident in the Mughan steppes, where the presence of falconry and hunting activities is likely to drive Little Bustards to congregate in the agropark in Bilesuvar. Even so, despite daily falconry activity on the nearby Mil plains by foreigners, over 6700 birds were present.

To improve our understanding of transboundary movements, in 2024 we coordinated our surveys with those of a team of Georgian ornithologists from SABUKO (Society for Nature Conservation) in Vashlovani National Park near the Azerbaijani border. Despite

investing over six hours in the field and covering almost 150 km by vehicle, the Georgian team was unable to spot any Little Bustards (Budagashvili 2025). This mirrored our team's experience, where we only encountered a single bird in the western parts of the Jeyranchol steppes along the Georgian border after a six-hour drive spanning 96 km (providing visual coverage of approximately 755 km^2). Records on eBird indicate a peak count of (only) 468 Little Bustards on the Georgian side of the border on 9 December 2023 (Kitel & Kochetkov 2023), but nearly 2000 birds were recorded on 17 December 2024 and up to 5600 individuals on 3 March 2025 in Samukhi near the Azerbaijani border (N Budagashvili pers comm, A Rukhaia pers comm).

Plate 1. A flock of Little Bustards in an agropark (pivot-irrigated fields) in Korchay Sanctuary, 2024.
© Elvin Mammadsoy

Hunting

During our fieldwork in both 2023 and 2024, we encountered up to 10 roadside markets or stalls where dead Little Bustards were being sold alongside other types of game. Drawing on information from locals and our own investigations, we found that these activities are particularly prevalent along the main highway between the districts of Hajigabul and Kürdemir, where the sale of Little Bustards (as well as other hunted or trapped animals) occurs during the winter season. Gauger (2007) also noted similar roadside markets in these districts. By collaborating with local authorities, we successfully closed down these roadside markets and disseminated our findings through social media to the public. With law enforcement charged with taking action to curb such illegal wildlife trade, recognising the protected status of the species listed in the Red Book, our efforts garnered attention in the local media.

After some time, we conducted monitoring efforts to assess the situation in 2024 and found no such markets along the highway, suggesting that they had either been dismantled or relocated. Similarly in 2025 we encountered no such stalls alongside the same highway during our visits and this either indicates our previous campaign was

successful or they just relocated to a new location. Ongoing monitoring in future years will help answer this question.

During our surveys, groups of falconers from Qatar and UAE were discovered hunting in the central Mil steppes near Bilesuvar district, an area historically known to host 20 000 to 30 000 wintering Little Bustards (Patrikeev 2004, Gauger 2007). Further investigation revealed that one group consisted of the same individuals who have been visiting Azerbaijan for Little Bustard hunting since 2019, indicating that any fines imposed in previous years have failed as a deterrent, and that these individuals were not barred from entry to the country. Additionally, the Ministry of Environment and Natural Resources imposed fines on only one individual from this particular group in 2024, and the penalties were considerably lower than those mandated by law. Illegal hunting, including of birds and animals completely protected by law, is subject to criminal liability in Azerbaijan (Criminal Code of the Azerbaijan Republic, Article 258). Subsequently, the other individuals involved in the incident left the country.

In 2025, reports of similar hunting parties once again emerged. Through local knowledge, and our field visits, we identified three distinct hunting groups from Qatar and the UAE operating in the south-eastern region of Azerbaijan, primarily in the Mughan steppe and Mil plain.

Plate 2. Counting Little Bustards in Korchay Sanctuary, 2024. © *Elvin Mammadsoy*

Treatment as crop pests in agroparks

Apart from the threats of falconry and poaching for meat, we have identified a new hunting pressure on the Little Bustards which involves one of the key stakeholders in their conservation: agroparks or large-scale agricultural landowners subsidised by the government. In both the 2024 and 2025 surveys we discovered that some of these companies incentivise local hunters to shoot birds in order to deter them from feeding on crops, in the mistaken belief that this will reduce crop loss.

Plate 3. Fresh remains of a Little Bustard that collided with a low-voltage transmission line in Hajibagul, 31 January 2025. © *Zulfu Farajli*

Powerlines

Collision with powerlines also represents a significant threat, especially for larger flocks of birds. While we did not observe any fatalities resulting from birds colliding with powerlines during our 2024 survey, this may have been easily overlooked since collision monitoring was not our primary focus. By contrast in 2025 we found over 10 Little Bustard remains while driving and walking along 6 km of distribution line, some being quite fresh under a low voltage (35 kV) line in Hajigabul district (Plate 3). Given that this transmission line extends over 20 km through suitable Little Bustard habitat, the potential number of mortalities is likely to be significant at this location.

Overgrazing

In addition to the direct threats outlined above, overgrazing remains a significant challenge for the conservation of Little Bustards. During our surveys, flocks of sheep and cattle were recorded across nearly all natural steppe habitats, including Shirvan, Aghgol and Kizilagach National Parks. Of particular concern is the extent and density of domesticated cattle (cows and buffaloes) within Kizilagach National Park, despite its designation as a Ramsar site.

DISCUSSION

In European Russia and Kazakhstan, where Azerbaijan's wintering Little Bustards are thought to breed, achieving a high level of population monitoring through field surveys is impractical. Consequently, monitoring of major concentrations of birds, as can be achieved in the relatively small areas of the Transcaucasus, is an expedient means of assessing the wider region's population size and trends, despite the species' migratory changes over the years due to temperature variations and disturbance (Patrikeev 2004). Winter surveys

of Little Bustards in Azerbaijan recorded approximately 95 000 and 156 000 individuals, highlighting the country's critical role in the species' wintering range. Based on these surveys, autumn counts at Beshbarmag and other data, the estimated annual wintering population of Little Bustards in Azerbaijan ranges between 65 600 and 208 100 individuals (Table 1), with fluctuations primarily driven by variable weather conditions in their northern range. The population is considered likely to be stable based on overall numbers in the last two decades (Table 1). Furthermore, considering maximum reported individuals from Azerbaijan, Georgia and Iran the total wintering population of Little Bustards in the Transcaucasus is estimated not to exceed 230 000–250 000 individuals, with Azerbaijan hosting the majority of this population.

Across observations conducted over two years at 107 locations, flock sizes exceeded 3000 individuals on 21 occasions. The enumeration of such large aggregations posed a considerable challenge, necessitating estimations based on counting in increments of ten, fifty or, in some instances, one hundred before flock dispersion occurred. In these cases, count quality was assigned a score of 4 when estimations were made in groups of ten to fifty, and a score of 3 when counting by hundreds was required. On seven occasions, a quality score of 2 was assigned due to significant observer–flock distance or exceptionally large flock sizes. Scoring was based on self-evaluation of the observers involved and subsequently reviewed by the team to enhance accuracy.

Given the substantial discrepancies between population estimates reported in the literature (Gauger 2007), our survey data, and counts from the Beshbarmag bottleneck (*eg* just above 12 000 birds in autumn 2023)—along with the decline observed in Georgia and Iran during the 2023/24 season relative to previous years (N Budagashvili pers comm, Anon pers comm)—it appears that the wintering distribution of Little Bustards is strongly influenced by weather conditions. However, in 2024/25, a higher number of individuals were recorded during migration and wintering in Azerbaijan and other regions. Owing to the irregularity of their movements, continued research and systematic monitoring are necessary to assess whether (or the degree to which) there is a genuine decline in the overall wintering population that is currently being masked by the natural variability attributable to regional and local conditions (for trends, see Table 1). Moreover, transboundary initiatives are necessary to achieve a sufficient understanding of the movements of Little Bustards between neighbouring countries such as Georgia and Iran. Satellite telemetry could greatly help detect patterns in movements within and between wintering and breeding grounds.

Our observations suggest that Little Bustards are now less tied than they were to natural steppes, such as Vashlovani and Chachuna in Georgia and Jeyranchol (steppe part) in Azerbaijan, where they previously wintered in their thousands (N Budagashvili pers comm, Gauger 2007), instead preferring the agroparks nearby in Jeyranchol and Samukh. Given the considerable size of the agroparks (stretching for tens of kilometres) and their presumed suitability as habitat, we suspect that the actual number of birds residing inside could be even greater. Despite our repeated requests, we were denied entry to these two vast agricultural facilities and could only count the birds visible from outside. As a result only some 4500 birds were recorded in Jeyranchol agropark in 2024 and something over 1500 birds in Samukh agropark in 2025 (Figure 2). Given our inability to explore two significant agricultural areas with suitable habitat (and other challenges, such as limited accessibility due to snowfall obstructing dirt roads in other locations), it is plausible that the actual number of birds wintering in Azerbaijan may be higher than our recorded counts.

Similarly, movements of birds across the Azerbaijan–Iran border present challenges for a complete census of Little Bustards. In the Mughan (Moghan) plains of Ardabil, Iran, which border the plains of the same name in Azerbaijan, up to 10 000 Little Bustards

Table 1. Wintering population size and trends of Little Bustards in the 17 main sites targeted for survey in Azerbaijan in 2024 and 2025. Quality of estimate: 1 = low, 5 = high. * = key source Patrikeev (2004), also Vereschagin (1940); ** = key source Gauger (2007), also eBird; *** = author's rounded estimate, using data from previous two winter surveys. The movement patterns of birds between Aghgol NP (A) and surroundings (eg Agjabadi), and those between Korchay Sanctuary (B) and its southern vicinity, are currently not fully understood (see Discussion). [1] In Shirvan National Park, an additional estimate from independent observers János Oláh and Hikmet Qemberov in 2025 was incorporated as the maximum value. [2] For Kizilagach, the minimum population estimate excludes the exceptionally warm winters of 1984/85 and 1985/86, during which no individuals were recorded, as reported by Patrikeev (2004). [3] The total provided for these time periods is the total estimate provided by the authors cited, which does not equal the sum of values for each site listed above.

Region (Figure 1)	Number of birds 2023/2024	Number of birds 2024/2025	Important sites	Average quality of estimate	Population trend			
					1950–1990* ↘	1990–2020** ↗	2020–2025*** →	1950–2023 ?
Qobustan	2521	35 000	1	5	?	20 000	2500–35 000	↘
Hajigabul	7772	19 931	3	4	?	500–7500	7000–20 000	↗
Quba	80	?	1	5	?	50–500	50–500	→
Yevlakh	350	22 860	2	5	<7000	?	300–20 000	?
Korchay	13 700	15 640	3	4	300–600	<15 000	13 000–15 000	? (B)
South of Korchay	7550	976	4	4	?	?	1000–7500	? (B)
Jeyranchol	5141	1510	2	3	?	15 000	1500–5000	↘
Ajinohur	2140	1665	1	5	200–300	10 000	1500–2000	↘
Balakan + Zagatala	?	0	2	5	900–2000 (30s)	185	0–100	↘
Mil Plain	0	6797	3	4	5000–10 000	?	5000–7000	↘
Mughan Steppe	175	1550	1	3	10 000–30 000	>20 000	200–1500	↘
Shirvan NP + Salyan	25 573	20 660–40 000[1]	4	4	400–1000	<25 000	20 000–40 000	↗
Kizilagach NP	17 850	1967	3	4	2000[2]–62 300	8000	2000–20 000	?
Aghgol NP + Sarisu	138	2440	3	5	40–590	<35 000	100–2500	↘ (A)
Agjabadi	12 000	1500	1	3	?	?	1500–12 000	? (A)
Barda + Tartar	?	23 460	1	3	?	?	10 000–20 000	? (A)
Beylegan	?	0	2	5		6800	0	? (A)
Country TOTAL	**94 990**	**175 296**	**37**	**4.2**	**8000–40 000[3]**	**150 000–200 000[3]**	**65 650–208 100**	**?**

were observed in the early years of the century (Sehhatisabet *et al* 2012). It is important to highlight that the number of Little Bustards wintering in the Mughan plains (Iran) varies considerably from year to year, with numbers occasionally falling below 1000. Furthermore, flocks spend less time at this area, typically arriving in mid-December and departing by mid-February (Sehhatisabet *et al* 2012) and then staging in Azerbaijan before moving back further north. In 2025 an estimated 1550 birds were observed in the agropark in Bilesuvar near the Iranian border, whereas only 175 birds were found in 2024 (Figure 2).

On 30 January 2025, an estimated 35 000 birds were recorded in western Qobustan. However, by early February, observations in Shirvan National Park indicated a significant increase in bird numbers, rising from some 5000 individuals on 19 January (ZF data) to 20 000–40 000 individuals on 16 and 19 February (ZF data, János Oláh and Hikmet Qemberov pers comm). Whether this increase resulted from the movement of the same birds southward from Qobustan in response to adverse weather conditions remains uncertain.

Hunting

The main threat to the Little Bustard in Azerbaijan remains poaching. According to one estimate in the winter of 1960/61 in Kizilagach no fewer than 2500 birds were hunted (Ivanov & Priklonskii 1965). Thanks to the protection of the species, hunting pressure has decreased significantly in recent decades, but it still presents a threat.

Over the past few years, the Little Bustard has faced a new and important challenge in Azerbaijan from Gulf state falconers (Collar & Kessler 2021), despite its protected status in the country (MENR 2023). Falconry has been described as 'a way of connecting to nature' (UNESCO Intangible Cultural Heritage of Humanity) and typically kills smaller numbers of individuals of a game species than hunting with guns (Šegrt *et al* 2008). However, the reckless off-road driving of falconers in SUVs across the steppes contributes to habitat degradation and increases the birds' energy expenditure during winter. The extent of this impact depends on the scale and logistics of falconry—large-scale operations involving tens of falcons and vehicles as observed during our surveys indicates that these hunting parties can be just as disruptive as traditional hunting with firearms. This additional stress may also heighten the risk of collisions with human infrastructure, such as powerlines, as birds attempt to evade approaching vehicles. Of further concern is that many of these falconers are repeat offenders—individuals who have been fined in previous years but remain undeterred from engaging in illegal hunting activities.

The threat of being targeted in agroparks as crop pests is a new dimension to the problem of poaching. Apart from the illegality of targeting this protected species, and of hunting outside designated areas (hunting grounds), this approach is also ineffective, as according to local hunters the majority of birds quickly return to the same areas. To address this issue, we are currently trying to collaborate with these companies to explore sustainable deterrent methods. In 2025 with a member of management of an agropark we discussed the feasibility of deploying some sustainable diverters such as motion-detected sprinklers (although these are deemed to be ineffective in agroparks), while bird-shaped kites or 'motion scarecrows' have been identified as of potential value and need testing in future studies.

To address the primary threat of poaching, national laws in Azerbaijan should explicitly prohibit companies from promoting illegal bustard hunting, especially by foreign visitors, as emphasised by Collar & Kessler (2021). Legislation must also evolve to enable the Ministry of Ecology and Natural Resources (MENR) to penalise individuals based on evidence from social media posts suggesting poaching, rather than relying solely on issuing fines when poachers are caught with killed birds. Additionally, Azerbaijan

could benefit from becoming a party to the Convention on the Conservation of Migratory Species of Wild Animals (CMS), which would enhance conservation efforts for Little Bustards and other migratory species.

Powerlines

Little Bustards, like other large ground-dwelling birds such as geese, storks and cranes, are particularly vulnerable to collisions with powerlines. Their eyes are positioned on the sides of their heads, providing wide 310° vision for detecting predators, but leaving them with poor forward vision (Martin & Shaw 2010). In the 1960s, studies reported up to 10 bird fatalities per kilometre along the Kizilagach powerlines (Patrikeev 2004). Little Bustards are at high risk of colliding with powerlines (especially low voltage lines) when startled by human activity or predators, or when flying in low-visibility conditions such as at night or in fog. In a single foggy day, the remains of 50 birds were found beneath a 5-km stretch of telephone wires in Kizilagach (Ivanov & Priklonskii 1965).

According to Central Baltic Programme's Report on Electric Industry of Azerbaijan (2023) the total length of high-voltage (110–500 kV) transmission lines alone already exceeds 7600 km. In this regard, a proposed renewable energy project currently under consideration is particularly worrying. According to the online Draft Environmental and Social Scoping Report for the Azerbaijan Scaling-Up Renewable Energy Project (AZURE Project, P505208) under consideration by the World Bank, some of the newly proposed transmission lines would traverse the buffer zone of Shirvan National Park, encircle its landward side and pass through the main migration corridors of Little Bustards and other birds. This poses a significant threat to flocks moving between nearby agricultural lands and the Shirvan park, as they are likely to encounter these powerlines mid-air, potentially resulting in numerous fatalities. Given the park's critical importance in holding one of the largest concentrations of wintering Little Bustards in Azerbaijan (approximately 25 000–40 000 birds, Table 1), it is essential to implement appropriate mitigation measures before any energy sector developments proceed. Rerouting or burying the wires in key migration and wintering areas should be prioritised. Little Bustards are known to collide with both high-voltage transmission lines and low-voltage distribution lines as well as telephone, railway and other lines, and there is limited evidence that 'bird flight diverters' reduce mortality for bustard species significantly (Silva *et al* 2023). Moreover, the building of new transmission lines might cause Little Bustards to desert suitable habitats, because raptors use the pylons to perch and search for prey (Silva 2010).

Given the large numbers of birds wintering and the high number of transmission lines, hundreds of Little Bustards may perish annually due to transmission line collisions in Azerbaijan during migration and winter. Considering the scavengers likely remove a significant portion of the carcasses as well, more research focused on collision mortality is needed to assess the true scale of the impact.

Farming expansion and intensification

Agriculture is the foremost threat to grassland birds on a global scale (Douglas *et al* 2023). In Azerbaijan, the conversion of natural steppes into agricultural land has altered the habitat use dynamics of Little Bustards, causing them to shift from their historic natural steppe habitats to mosaic agricultural landscapes. Little Bustards have been able to partially adapt to these changes by modifying their diet to perennial herbs (Belik 1986). Our observations show that when the disturbance is high in natural steppes, Little Bustards prefer agroparks or mosaic habitats. Similarly overgrazing in all the steppes and protected areas like Kizilagach, Aghgol and Shirvan National Parks contributes to the destruction of suitable habitats for wintering Little Bustards. With Azerbaijan's growing

human population and the increasing demand for dairy and meat products (Food and Agriculture Organization of the United Nations 2023), the conservation of natural steppes—predominantly used as pastureland by herders—has become increasingly critical. Immediate measures are required to prevent the mismanagement of protected areas and mitigate overgrazing in key habitats essential for the Little Bustard population.

Conclusion

In most years, Azerbaijan's wintering population of Little Bustards appears to comprise a very large proportion, perhaps more than 50%, of the global total. Consequently, Azerbaijan has an international obligation to protect these highly vulnerable concentrations from anthropogenic perturbations caused by hunting, powerline kill and habitat loss. As outlined above, each of these threats is significant in itself, but in combination they have the potential to produce a strong, relentless numerical decline to the point where the current phenomenon, involving several hundred thousand birds, disappears forever. The most efficient and effective way to counter this possibility is through the development and implementation of a plan that integrates measures to control direct exploitation, restrict energy infrastructure and promote sustainable agricultural practices. Further monitoring research, especially through the use of telemetry devices, is necessary to assess the full impact of these threats on Little Bustard populations and to develop the scientifically robust and strategically coherent responses by which the future of the species can be secured.

ACKNOWLEDGEMENTS

I would like to express my appreciation to the Rufford Foundation, The British Birds Charitable Trust (BBCT) and the Ornithological Society of the Middle East (OSME) for their financial support toward our project. Additionally, I extend my gratitude to Dr Rob Sheldon, Dr Nigel Collar and Dr Mimi Kessler for their patient guidance in planning the fieldwork and addressing any questions related to the completion of this project and paper. Special recognition is owed to Louis-Philippe Campeau and Dr Nigel Collar, whose insightful feedback on the draft of this paper were indispensable. I thank Elvin Mammadsoy, Leyla Muslim, Anar Mammadov and Ramil Hasanov for their invaluable assistance during the month-long field-work, without which this project would not have been possible; János Oláh and Hikmet Qemberov, for their contribution of data from Shirvan National Park in 2025; and, finally, all local stakeholders, especially workers of agroparks who helped us count the birds in their territories, as well as exchanging sustainable conservation ideas.

LITERATURE CITED

Belik, VP. 1986. [Distribution, numbers and some ecological features of the Little Bustard in the south-east of the European part of the USSR.] *Bustards and Ways of their Conservation.* Glavokhoty, Moscow, pp66-70. [In Russian]

BirdLife International. 2018. Species factsheet: Little Bustard *Tetrax tetrax*. Downloaded from https://datazone.birdlife.org/species/factsheet/little-bustard-tetrax-tetrax on 03/03/2024.

Budagashvili, N. 2025. Challenges and opportunities for the conservation of large but fluctuating flocks of Little Bustards *Tetrax tetrax* in eastern Georgia. *Sandgrouse* 47: 73–79.

Central Baltic Programme. 2023. Electrical Industry of the Republic of Azerbaijan. Central Baltic Programme. Retrieved from https://centralbaltic.eu/wp-content/uploads/2023/05/Electrical-Industry-of-the-Azerbaijan_2023.pdf.

Collar, NJ & M Kessler. 2021. Hunting of Little Bustards *Tetrax tetrax* in Azerbaijan: the global conservation perspective. *Sandgrouse* 43: 281–285.

Douglas, DJT, J Waldinger, Z Buckmire, K Gibb, JP Medina, L Sutcliff, C Beckmann, NJ Collar, R Jansen, J Kamp, I Little, R Sheldon, A Yanosky & N Koper. 2023. A global synthesis identifies agriculture as the main threat to declining grassland birds. *Ibis* 165: 1107-1128.

Farajli, Z & E Mammadsoy. 2023. A preliminary survey of the range, numbers and conservation needs of Little Bustards *Tetrax tetrax* wintering in Azerbaijan. *Sandgrouse* 45: 35–48.

Food and Agriculture Organization of the United Nations (FAO). 2023. Per capita consumption of meat – FAO. Food Balances: Food Balances (2013, old methodology and population); Food Balances: Food Balances (2010–). Retrieved 13 August 2024 from https://ourworldindata.org/grapher/daily-meat-consumption-per-person.

Gauger, K. 2007. Occurrence, ecology and conservation of wintering Little Bustards *Tetrax tetrax* in Azerbaijan. *Archiv für Naturschutz und Landschaftsforschung* 46: 5–27.

Heiss, M. 2013. The importance of the Besh Barmag bottleneck (Azerbaijan) for Eurasian migrant birds. *Acta Ornithologica* 48: 151–164.

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.

Ivanov, FV & SG Priklonskii. 1965. [Little Bustard in the USSR and measures for its conservation on the wintering grounds.] *Ornithology* 7: 130–133. [In Russian]

Kitel, D & V Kochetkov. 2023. eBird Checklist: https://ebird.org/checklist/S156007581. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available at: http://www.ebird.org.

Martin, GR & JM Shaw. 2010. Bird collisions with power lines: failing to see the way ahead? *Biological Conservation* 143: 2695–2702.

Martinez, C & GG Tapia. 2002. Density of the Little Bustard *Tetrax tetrax* in relation to agricultural intensification in central Spain. *Ardeola* 49: 301–304.

Martinez, C, R Rufino & V Belik. 1997. Little Bustard. *The EBCC Atlas of European Breeding Birds: Their Distribution and Abundance*. European Bird Census Council.

Ministry of Ecology and Natural Resources of Azerbaijan (MENR), Institute of Zoology, National Academy of Science. 2023. Azərbaycan Respublikasının Qırmızı Kitabı—Fauna [*Red Book of the Republic of Azerbaijan Fauna*]. III edition. Baku. [In Azeri]

Morales, MB & V Bretagnolle. 2022. An update on the conservation status of the Little Bustard *Tetrax tetrax*: global and local population estimates, trends, and threats. *Bird Conservation International* 32: 337–359.

Patrikeev, M. 2004. *The Birds of Azerbaijan*. Pensoft Series Faunistica 38, Sofia/Moscow.

Šegrt, V, R Kenward, M Grubešić & P Silić. 2008. A comparison of falconry and hunting with guns with respect to the distribution of local game. *Wildlife Biology* 14: 125–128.

Sehhatisabet, ME, F Abdi, 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: 279–287.

Silva, JP, M Santos, L Queirós, D Leitão, F Moreira, M Pinto, M Leqoc & JA Cabral. 2010. Estimating the influence of overhead transmission power lines and landscape context on the density of Little Bustard *Tetrax tetrax* breeding populations. *Ecological Modelling* 221: 1954–1963.

Silva, JP, AT Marques, J Bernardino, T Allinson, Y Andryushchenko, S Dutta, M Kessler, RC Martins, F Moreira, J Pallett, MD Pretorius, HA Scott, JM Shaw & NJ Collar. 2023. The effects of power lines on bustards: how best to mitigate, how best to monitor? *Bird Conservation International* 33: e30.

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]

WWF. 2018. Southwestern Asia: Azerbaijan, into Georgia and Iran. Available from: https://www.worldwildlife.org/ecoregions/pa1305. [Accessed 03 March 2024].

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Iran's Little Bustards *Tetrax tetrax* show the first signs of a renewed decline: an updated status, 2016-2024

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Summary: The Little Bustard *Tetrax tetrax* is a regular wintering migrant in Iran and a scarce, potentially extirpated breeder in Miankaleh Wildlife Refuge and Golestan National Park. We use recent records from citizen science platforms and communications with regional officials from the Department of Environment of Iran to update important publications by Sehhatisabet *et al* (2012) and Yousefi *et al* (2017). We posit a wintering population of between 18 000 and 40 000 birds, with large fluctuations from winter to winter, seemingly correlated with weather conditions. These Little Bustards make regular use of four regions, the most important being the Moghan plain in Ardabil province and the Sarakhs plain in Khorasan-e-Razavi province in north-west and north-east Iran respectively, with both continuing to host thousands of birds. On the other hand, the lowlands of the Caspian Sea, especially traditional wintering areas in Mazandaran and Golestan provinces as well as in Gilan province, are under threat from decreasing sea levels and ensuing vegetation changes unfavourable to the Little Bustard. Nevertheless, illegal hunting remains by far the main threat in all areas.

INTRODUCTION

Iran holds an important wintering population of Little Bustards *Tetrax tetrax* from the east of the species' range, occurring in large numbers across the northern parts of the country (Yousefi *et al* 2017). The birds are usually present between November and February, when they favour meadows and low-intensity agricultural lands near wetlands as well as extensive plains with either dry grasslands, cereal cultures or fallow fields (Sehhatisabet *et al* 2012). It is very likely that they arrive from Kazakhstan and Russia, especially those wintering in the north-west of the country on the border with Azerbaijan (Gauger 2007, Sehhatisabet *et al* 2012), although the birds found in the north-east are likely to originate from central and eastern Kazakhstan, including the foothills of the Tian Shan and Altai mountains (Kessler *et al* 2025). At least four distinct areas in northern Iran are frequently used (numbered triangles in Figure 1), with some of them hosting flocks of thousands of birds concentrated in relatively small areas. However, the use of these areas shows high annual variation (Yousefi *et al* 2017), perhaps associated with weather conditions or disturbance in other parts of their migratory pathway.

Globally, the Little Bustard is listed as Near Threatened (NT) on the IUCN's Red List and is also listed in CITES Appendix II (BirdLife International 2018). Within Iran, where there are three possible conservation designations (unprotected, protected and endangered), the species is a 'protected' regular winter migrant, meaning that its hunting is punishable by law, but that it is not considered at risk of extinction. Two recent studies assessed population trends (Sehhatisabet *et al* 2012, Yousefi *et al* 2017), with the latter recording larger wintering populations, especially in eastern Iran. Although the methodology varied between these studies, with Yousefi *et al* (2017) explicitly building upon the earlier study and covering 38 new sites, they nevertheless attribute their maximal count of 57 086 individuals, as opposed to Sehhatisabet *et al*'s (2012) 14 472 individuals, to a 'considerable population increase and probable range expansion' of the species' wintering range in Iran. Here we seek to discover whether this trend has continued and to assess the status of the species in its four key wintering areas, based on records since 2016.

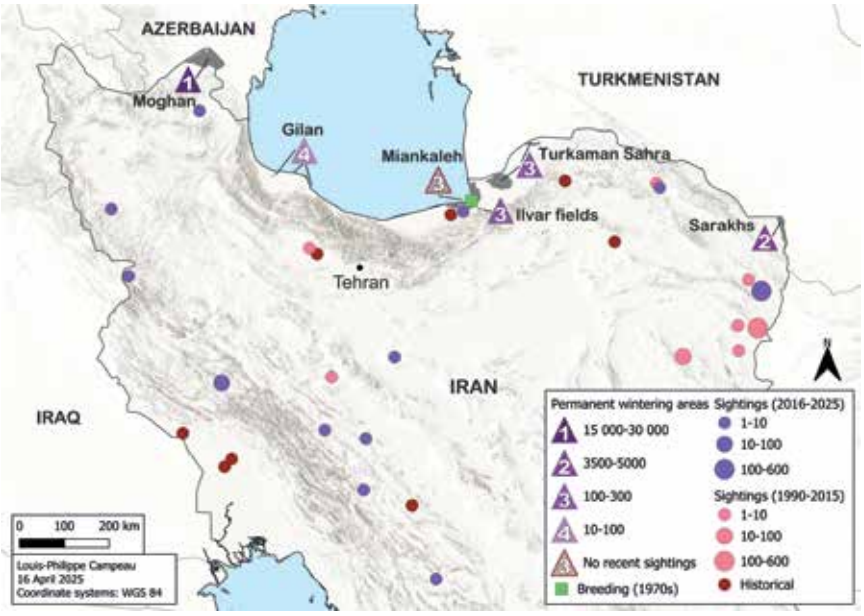

Figure 1. Current and historical wintering areas of Little Bustard in Iran.

METHODS

In order to evaluate the status of the Little Bustard in Iran, we first reviewed the published literature up to 2017, the date of the most recent research dedicated to this species in the country (Yousefi *et al* 2017). We then updated this knowledge by summarising recent sightings from the Global Biodiversity Information Facility (GBIF), as well as information sought and received from five experts working for the Iranian Department of Environment: Dr Ali Khani (Khorasan-e-Razavi provincial office), Mahmoud Shakiba (Golestan provincial office), Fazel Abdi and Mansour Javidzadeh (Ardabil provincial office) and Yaghoub Rakhshbahar (Gilan provincial office), as well as Dr Haji Gholi Kami of Golestan University. These data were complemented by oral records from birdwatchers across the country, as well as recent records from the Iranian Bird Records Committee (http://iranbirdrecords.ir).

RESULTS

Literature review

There are relatively few historical records of the Little Bustard's presence in Iran. Before or in 1876, a hunted bird from near Gharpooz Abad, Tehran, was reported to WT Blanford, who mentioned that the species was common west of the Caspian and believed his own observation of a small bustard on a Persian gulf island involved this species (Blanford 1876). In his 1896 travels, Zarudny (1900) mentioned large numbers of the species near Hossein-Abad (current Khorasan-e-Razavi province). In subsequent travels in 1898, he encountered regular 'small groups' in March in the Quchan-Mashad valley (current Khorasan-e-Razavi province), with other encounters at higher altitudes across the border from Akhal-Teke in Turkmenistan in the same month, but saw none in the autumn; he suggested that the Hari-Rud river, which is currently the border between Iran and Afghanistan, was the main migration path for Little Bustards entering and exiting Iran (Zarudny 1903). Adding information from a third trip in 1900–1901, Zarudny (1903) created a list of the birds of Persia in which the Little Bustard is reported as occurring in every

area of the country except south Baluchistan, while wintering in numbers in the Caspian lowlands and to a lesser extent in the north-west, near the Atrek river in Khorasan, in the areas of Sistan, Kermanshah and north Baluchistan, potentially along the Persian Gulf littoral, and in the Zagros mountains (for the last four areas listed, his is the last published mention or speculation of regular wintering). He also listed the Little Bustard as breeding in the Caspian lowlands (with a '!' denoting emphasis) (Sarudny [*sic*] 1911).

Following Zarudny's publications, another bird was reported by a Major Watts near Shush, Khuzestan (Ludlow 1917). In February 1964, 45 birds were reported from Meyan Kaleh (Miankaleh), with a mention that the species overwinters in numbers further east on the Turkaman steppe (Nielsen & Speyer 1964). All these records were of wintering birds, until a male in breeding plumage was caught on 13 May 1952 in the Atrek valley. It was considered an anomaly (Diesselhorst 1962, Érard & Etchécopar 1970) and despite another enigmatic record of two birds in the Miankaleh area on 31 August (seemingly in 1960: Feeny *et al* 1968) and their own observation of a male in flight on 16 April 1967 near Abadeh, Fars, Érard & Etchécopar (1970) concluded that there was no evidence for breeding other than Zarudny's 1911 mention.

The first exhaustive publication on the birds of Iran was released in 1975, but only mentioned the Little Bustard briefly, stating that 'it is relatively abundant in winter [and] it breeds in small numbers in Iran' (Scott *et al* 1975). This supposed breeding is based on three sightings of males near the eastern end of the Miankaleh peninsula, the first of 2 individuals on 10 July 1972, the second of 4 birds on 31 August 1972 and the third (and most important) of 2 males displaying on 9 May 1973. As far as we are aware, these are the last confirmed observations of Little Bustards in Iran during the breeding period. Scott *et al* (1975) also provided a description of the bird's wintering grounds for the whole of Iran, with regular sightings of hundreds near the Miankaleh peninsula and neighbouring areas in Golestan province, as well as a single observation each for the provinces of Ardabil (Moghan plain, November 1971) and Khuzestan (Dez river, January 1974). These flocks in northern Iran were then assumed to be declining, until larger ones were encountered during waterbird surveys in the early 1980s, a trend tentatively attributed to harsh winters further north (Razdan & Mansoori 1989). The Encyclopædia Iranica describes the Little Bustard as a rare breeding bird in the eastern Alborz mountains bordering the Caspian lowlands, but a common winter migrant to the Turkaman steppes in Golestan and the Miankaleh peninsula in Mazandaran, with much smaller numbers in Iranian Azerbaijan (A'lam & Scott 1990). Numbers at Miankaleh gradually dropped until no birds could be found by the late 1980s (Scott 1995). However, winter populations there are again mentioned in Mansouri (2008) and in Kaboli *et al* (2012), which states that the species is also a regular winter visitor to the Sarakhs plain in Khorasan-e-Razavi. Finally, single winter records outside these key wintering areas include a bird in Mooteh near Esfahan in 1994 (Evans 1994) and another near Gharpooz Abad in December 2009 (M Tohidifar pers comm).

Sehhatisabet *et al* (2012) undertook a preliminary assessment of the distribution and population size of wintering Little Bustards based on autumn and winter surveys from 2005 to 2009. They reported the bird's presence at 15 out of 84 surveyed sites. Based on these surveyed sites, three main wintering regions were identified: the Moghan plain in the north-west of the country (up to 6000 individuals), the Turkaman Sahra plain near the south-eastern corner of the Caspian Sea including the Miankaleh peninsula (up to 450 individuals), and the Sarakhs plain in the north-east, close to the Turkmen and Afghan borders (3500 individuals) (Figure 1). At the national scale, they estimated the Iranian wintering population of Little Bustard at 5000–10 000 individuals, while also highlighting occasional larger observations such as one of up to 10 050 birds during the winter of 2009 in the Moghan plain.

A second recent study, by Yousefi *et al* (2017), was based on winter surveys in northern Iran carried out between 2010 and 2015, with each site visited yearly. The authors modelled the suitability of potential winter habitat for the species to identify new areas for surveying, and upon visiting these sites indeed found new populations, notably in the eastern part of the Khorasan-e-Razavi province. In their last year of survey, they counted a maximum of 57 086 individuals spread over four key regions listed in order of importance: (1) the Moghan plain in Ardabil province, total 9500–50 000 birds; (2) the Sarakhs plain and Taybad (Rahneh) along with many minor sites in Khorasan-e-Razavi, total 1640–6268 birds; (3) the Turkaman Sahra plain including Alagol wetland and Kerend in Golestan, total 80–216 birds; and (4) the lowlands of the Caspian Sea in Gilan province, total 9–1863 birds, and the Miankaleh peninsula in Mazandaran province, total 20–32 birds.

Recent records

Following the regional classification from Yousefi *et al* (2017), we divide the subsequent sightings from 2016 onwards between the same four regions presented in order of importance: the Moghan plain, the Sarakhs plain and other parts of Khorasan-e-Razavi province, the Turkaman Sahra plain along with the Miankaleh peninsula and the south-east Caspian lowlands. We present the Miankaleh peninsula along with the Turkaman Sahra plain because the two areas are only 45 km apart and birds are known to fly between them (HG Kami pers comm). A fifth section details records from outside these core wintering zones.

1. *Moghan plain (Ardabil)*

The vast agricultural lands in the north of Ardabil province, between the cities of Pars Abad and Bile Savar Moghan along the border with Azerbaijan, are currently the main permanent wintering habitats of the Little Bustard in Iran. The Department of Environment conducts annual Little Bustard counts during which its experts drive fixed transects and count the flocks of wintering birds, either visually with binoculars and telescopes or with the help of photography. The results show regular use: 32 990 birds for the winter of 2021–22, 28 800 in 2022–23, 13 257 in 2023–24 and 25 190 in 2024–25 (F Abdi & M Javidzadeh pers comm).

2. *Sarakhs plain (Khorasan-e-Razavi)*

Over two days in January from 2021 to 2025 (except 2022), A Khani and M Naghibi conducted Little Bustard counts in and around the Sarakhs plain. This monitoring followed the same itinerary each year and was done by car with experts stopping after sighting birds to count/take photographs. The first day was dedicated to the areas west of the Tajan river (the Sarakhs fields), with a drive of about 15 km which passed through crops such as alfalfa, cotton and wheat. Most Little Bustard observations were made over this first day. The second day followed a 45 km route toward the Dosti dam further south, with up to a few hundred Little Bustards encountered in the fields known as Shir Tappeh. In total, these January counts revealed 3500 individuals in 2021, 638 in 2023, 1500–2000 in 2024 and 1500 in 2025.

3. *Turkaman Sahra plain (Golestan) and Miankaleh peninsula (Mazandaran)*

These areas combine coastal wetland and meadows around the Miankaleh Wildlife Refuge with dry agricultural fields and grasslands in the Turkaman Sahra plain. Taken together, they hold the longest-studied wintering population of Little Bustards with regular observations since the 1950s. Birds there were historically attracted by freshly sown wheat fields, as well as meadows near wetlands and the Caspian coast. However, the species

seems to have deserted these traditional areas, as despite annual field surveys conducted at least once a month in winter and every day over the two weeks of the January waterbird census, no birds have been seen since 2020 by M Shakiba of the Golestan provincial office of the Department of Environment and local birdwatcher S Roshanian. This contrasts with their regular observations up to that year, especially in the area from Voshmgir Dam to the Shahid Marjani fish farm and Gomishan wetland, when flocks of 5–300 birds were frequently encountered. The situation is similar at Alagol wetland, where the last observations of 8 individuals dates from 2017 (S Roshanian pers comm). The estimated total wintering population in this area during the 2010s was around 450 individuals (M Shakiba and S Roshanian pers comm).

Nevertheless, flocks of over 300 and 200–250 birds were seen in the winters of 2021–22 and 2022–23 respectively in agricultural fields north of the village of Ilvar in Golestan, which lies roughly 50 km from both the Miankaleh Wildlife Refuge and the Turkaman Sahra plain (HG Kami pers comm). It is likely that these birds used both areas during these winters, if only irregularly. However, no sightings were obtained from the Ilvar fields in 2023–24 and 2024–25, despite ongoing monitoring.

As noted above, Little Bustards were previously recorded during the breeding season in this region, seemingly the last such record being made by Scott *et al* (1975) in 1973.

Plate 1. Little Bustards landing in Bujaqh National Park, December 2017. © *Hadi Ansari*

4. *Lowlands of the south-western Caspian Sea (Gilan)*

The wintering population in this area relies on meadows near wetlands and harvested rice fields. It is usually relatively small (50–100 individuals), but in some very cold winters, such as those of 2009 and 2013, much larger flocks of 500–1000 birds have been encountered feeding in rice fields all over Gilan province, with an estimated total of 2000–3000 individuals (AA and F Naziri pers obs). Bujaqh National Park is now the most

important and safe wintering area for this species in the region, with up to 80 individuals seen regularly (Plate 1). However, in 2024 there were only two sightings of the species there, with 2 and 3 individuals respectively. A flock of 24 in November 2022 in the grasslands south of Anzali Wetland (part of the Siah Kashim Protected Area) was the largest reported in Gilan in recent years (AA pers obs).

5. ***Other recent records of the Little Bustard in Iran***

From 2016 to 2025, there were 12 records of Little Bustards from outside the four established wintering areas described above. From west to east, these sites comprised: Mahabad county, West Azerbaijan (2024 or 2025, 1 individual), Zarivar wetland in Kurdistan (2022, 1), Qara Qayeh reservoir, Ardabil (2016, 1), Sefidkooh Protected Area near Khorramabad, Lorestan (2023, 40), Ban County, Chaharmahal and Bakhtiari (2019, 1), Ghahderijan plain, between Falavarjan and Najaf-Abad, Esfahan (2016, 8), Semirom Heights, Esfahan (2016, 1), Abbas Abad Wildlife Refuge, Esfahan (2016, 6), Kamjan international wetland in Fars (2025, 1), Galugah, Mazandaran (2021, 1) near the main Quchan–Shirvan road (2016, 3) and Torbat-e Jam in Khorasan-e-Razavi (2024, 150).

DISCUSSION

The most important threat to the Little Bustard throughout its range in Iran is hunting (Ashoori 2009, Sehhatisabet *et al* 2012, Yousefi *et al* 2017). In the lowlands south of the Caspian Sea, there is a significant risk from nets deployed by hunters over harvested rice paddies, where they often sprinkle seeds to catch wintering waterbirds (Ashoori 2008, 2009). Indeed, from October to December, live and hunted birds are sold at local markets in Gilan province; a Little Bustard carcass was seen in October 2006 alongside photographic evidence of a live one (Ashoori 2008). In December 2024, the body of a hunted Little Bustard was seized by officials near the Anzali wetland (A Aghaei pers obs).

As Yousefi *et al* (2017) showed, proximity to the border is the main factor in explaining Little Bustard densities, as these areas suffer less from hunting pressure. Both the Moghan and Sarakhs plains, hosting the largest wintering populations in Iran, are located in border zones in northern Iran that are also closer to the bird's breeding grounds. Nevertheless, proximity to the border alone cannot safeguard the species. On the Moghan plain, offices of the Department of Environment are present in both Bileh Savar and Parsabad, where biologists and rangers are tasked with protecting the wintering Little Bustards. They can also rely on an extra ranger station further west in Aslandoz, as well as on the actual military personnel on the border with Azerbaijan. Despite this significant presence, hunting continues and is usually done by night when hunters target resting flocks and can kill up to 50 individuals in one attack. These are often hunters from Ardabil province and there are currently no records of falconers targeting the area. Furthermore, the local practice of 'jaleh', which involves villagers setting numerous foot snares in farmlands near villages to capture live birds, is considered to be as damaging to the Moghan plain population as hunting, with rangers able to remove only a fraction of the traps. Thus, despite more than 10 arrests in 2024 with fines of up to 118 438 000 rials (around US$1450), poaching continues even in well-monitored areas (M Javidzadeh pers comm; Plate 2).

Studies have also found that almost all of the new important areas where Little Bustards gather are unprotected farmland and grassland. In recent years, the quality and quantity of the few protected areas used by this species in Iran, such as Bujaqh National Park and Miankaleh Wildlife Refuge, have been reduced owing to the receding waters of the Caspian Sea, and grasslands suitable for this species have been covered with shrubby plants such as *Carex* and *Rubus* that the bird avoids (Sehhatisabet *et al* 2012, Yousefi *et al* 2017). A similar trend has been noted in the Atrek river plain across the border in

Plate 2. Illegal hunting on the Moghan plain, 22 November 2024. © *Mansour Javidzadeh*

Turkmenistan, where what used to be the country's main wintering area for the species in the 20th century is now barely used (Rustamov & Shcherbina 2025). This explains why only two sightings of Little Bustards were reported from Bujaqh National Park in the autumn and winter of 2024 and none from Miankaleh over the last five years, while numbers in the Moghan and Sarakhs plains are more stable.

In Ardabil province, the largest concentration of this species occurs in mid- to late autumn, while in Golestan province this takes place in January and February. Both these periods coincide with the local rapeseed and wheat sowing and early plant growth period. Little Bustards show a clear preference for rapeseed crops when available, with reports from 2021 and 2022 near Ilvar village, Golestan, of flocks arriving when the crop reached 10–15 cm in height and bore 4–5 leaves, the birds eating all the leaves and forcing the farmers to re-plow the fields to sow wheat and barley (HG Kami pers comm). Conflict between farmers and Little Bustards also arises when the birds leave pastures and stubbles to feed in recently sowed fields (A Khodkar and S Roshanian pers comm). There is concern over the intensive use of chemical fertilisers, especially in Golestan province, although no casualties have yet been observed (S Roshanian pers comm).

Amplifying habitat degradation, climate change could make many of the current wintering areas unsuitable in the future. It seems clear that annual variations in weather affect the size of wintering flocks, with thousands of birds present in severe winters and none in warmer ones, such as the winter of 2008–09. Iran's eastern provinces (along with southern ones where no Little Bustard are regularly found) are becoming significantly warmer, particularly in winter (Ahmadi *et al* 2017). In the long term, this may limit or prevent Little Bustards from overwintering in areas like the Sarakhs plain, although north-west Iran, which includes the Moghan plain, is currently less affected by temperature changes (Ahmadi *et al* 2017).

Table 1. Population estimates for the Little Bustard in key areas of Iran. Quality of estimate: 1 = low, 5 = high.

Geographic region	Season	Numbers	Important sites	Quality of estimate	Population trend			
					1950–1990	1990–2020	2020–2023	1950–2023
Moghan plain (Ardabil)	Wintering	15 000–35 000	3	3	No data	→	→	→
Sarakhs plain (Khorasan-e-Razavi)	Wintering	3500–5000	1	4	No data	↗	↘	↘
Turkaman Sahra plain (Golestan) & Miankaleh peninsula (Mazandaran)	Breeding	0–10	—	1	No data	↘ ?	↘ ?	↘ ?
	Wintering	250–500	3	4	↘	↗	↘	↘
Lowlands of SW Caspian Sea (Gilan)	Wintering	25–80	2	3	↘	↗	↘	↘
Totals for all provinces	Breeding	0–10	1	—				
	Wintering	18 775–40 580	9	Average 3.5				

Finally, collision with electrical powerlines is a known threat to all bustard species (Silva *et al* 2022). Although no specific research on this issue has been conducted in Iran, three female-type birds were found dead under powerlines in agricultural fields near Ilvar, Golestan, over the winters of 2021–22 and 2022–23 (HG Kami pers comm).

Our review of both literature and recent sightings suggests a limited decrease in the number of wintering Little Bustards in Iran since the publication by Yousefi *et al* (2017), with between 18 000 to 40 000 birds seen per year (Table 1), thereby reversing the trend that the latter authors registered. Setting aside anomalously large flocks, such as the 50 000 birds in winter 2014–15 in the Moghan plain (Yousefi *et al* 2017), it appears that two of the four main wintering areas in Golestan and Gilan now hold much reduced numbers. Indeed, all experts consulted voiced concerns about a decline since 2016, except for the Moghan plain where numbers are currently stable. As Little Bustards winter near international borders, to evaluate this decline, the eastern population as a whole should be assessed, with management and action plans implemented at the regional level. Since the presence of the Little Bustard in Iran is highly affected by weather patterns, notably very cold winters when more birds fly in to overwinter, it could be that the reason for this apparent national decline is linked to climate change and warmer winters further north, in the Caucasus and Central Asia, as suggested by evidence from Uzbekistan in such years (Ten *et al* 2025).

ACKNOWLEDGEMENTS

We are very grateful to the Provincial Offices of the Department of Environment in Ardabil and Gilan, and Dr Ali Khani, Dr Haji Gholi Kami, Mahmoud Shakiba, Fazel Abdi, Mansour Javidzadeh, Yaghoub Rakhshbahar, Asghar Khodkar, Siavash Roshanian, Hojat Sayadi, Mehdi Naghibi, Fardin Naziri and Amin Aghaei for providing data.

LITERATURE CITED

A'lam, H & DA Scott. 1990. Bustard. *In: Encyclopædia Iranica*, Vol. IV, Fasc. 6, pp575-577. https://www.iranicaonline.org/articles/bustard-game-birds/.

Ahmadi, F, MN Tahroudi, R Mirabbasi, K Khalili & D Jhajharia. 2018. Spatiotemporal trend and abrupt change analysis of temperature in Iran. *Meteorological Applications* 25: 314-321.

Ashoori, A. 2008. Birds offered for sale in the Langarud market, southwestern Caspian Sea. *Podoces* 3: 97–131.

Ashoori, A. 2009. [*Endangered and Protected Birds of Gilan Province*.] Katibeh Gil, Iran. [In Farsi].

BirdLife International. 2018. Species factsheet: Little Bustard *Tetrax tetrax*. Downloaded from https://datazone.birdlife.org/species/factsheet/little-bustard-tetrax-tetrax on 30/03/2025.

Blanford, WT. 1876. *Eastern Persia. An Account of the Journeys of the Persian Boundary Commission 1870-71-72*, 2 vols. London.

Diesselhorst, G. 1962. Anmerkungen zu zwei kleinen Vogelsammlungen aus Iran. *Stuttgarter Beiträge zur Naturkunde*. 86: 1–29. [in German]

Érard, C & RD Etchécopar. 1970. Contribution à l'étude des oiseaux d'Iran. (Résultats de la Mission Etchécopar 1967). *Mémoires du Muséum National d'Histoire Naturelle*, Nouvelle Série. Série A, tome LXVI.

Evans, M. 1994. *Important Bird Areas in the Middle East*. BirdLife International, Cambridge, UK.

Feeny, PP, RW Arnold & RS Bailey. 1968. Autumn migration in the south Caspian region. *Ibis* 110: 35–69.

Gauger, K. 2007. Occurrence, ecology and conservation of wintering Little Bustards *Tetrax tetrax* in Azerbaijan. *Archiv für Naturschutz und Landschaftsforschung* 46: 5–27.

Kaboli, M, M Aliabadian, M Tohidifar, A Hashemi & CS Roselaar. 2012. *Atlas of Birds of Iran*. Iran Department of Environment, Tehran.

Kessler, M, L-P Campeau & NJ Collar. 2025. Recovery at risk: a flyway-level population assessment of the Little Bustard *Tetrax tetrax* in its eastern range. *Sandgrouse* 47: 6–25.

Mansoori, J. 2008. [*A Field Guide to the Birds of Iran*.] Farzaneh Publishing, Tehran. [In Farsi]

Nielsen, BP & HJ Speyer. 1967. Some observations of birds in northern Iran. *Dansk Ornitologisk Forenings Tidsskrift*. 61: 30–39.

Razdan, T & J Mansoori. 1989. A review of the bustard situation in the Islamic Republic of Iran. *Bustard Studies* 4: 135–145.

Rustamov, EA & AA Shcherbina. 2025. The Little Bustard *Tetrax tetrax* in Turkmenistan: an analysis of status, 1880–2024. *Sandgrouse* 47: 140–149

Sarudny, N. 1911. Verzeichnis der Vögel Persiens. *Journal für Ornithologie* 59: 185-241. [In German]

Scott, DA, H Moravej-Hamadani & A Adhami-Mirhosseyni. 1975. [*The Birds of Iran*.] Iran Department of Environment, Tehran. [In Farsi, with Latin, English and French names]

Scott, DA. 1995. *A Directory of Wetlands in the Middle East*. IUCN and IWRB, Gland, Switzerland and Slimbridge, UK.

Sehhatisabet, ME, F Abdi, 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: 279–287.

Silva, JP, AT Marques, J Bernardino, T Allinson, Y Andryushchenko, S Dutta, M Kessler, RC Martins, F Moreira, J Pallett, MD Pretorius, HA Scott, JM Shaw & NJ Collar. 2022. The effects of powerlines on bustards: how best to mitigate, how best to monitor? *Bird Conservation International* 33: e30.

Ten, A, M Gritsina, T Abduraupov, E Kreuzberg, M Mitropolskiy, N Marmazinskaya & A Raykov. 2025. Warming temperatures and reduced snow cover are associated with new wintering grounds for the Little Bustard *Tetrax tetrax* in Uzbekistan. *Sandgrouse* 47: 133–139.

Yousefi, M, A Kafash, Sh Malakoutikhah, A Ashoori, A Khani, Y Mehdizade, F Ataei, SSh Ilanloo, HR Rezaei & JP Silva. 2017. Distance to international border shapes the distribution pattern of the growing Little Bustard *Tetrax tetrax* winter population in northern Iran. *Bird Conservation International*: 28: 499-508.

Zarudny, NA. 1900. [*Excursion in North-east Persia and the Birds of this Country*.] Imperial Academy of Science, Saint-Petersburg. [In Russian]

Zarudny, NA. 1903. [The birds of Eastern Persia. Ornithological results of an excursion through Eastern Persia in 1898.] *Zapiski Russkogo Geograficheskogo Obshchestva po obshchei Geografii* 36(2): 1–468. [In Russian]

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Populations of Little Bustards *Tetrax tetrax* in Kazakhstan have rebounded following a period of agricultural abandonment

MAXIM A KOSHKIN, RUSLAN URAZALIYEV & BORIS M GUBIN

Summary: Numbers of the Little Bustard *Tetrax tetrax* in Kazakhstan were probably high until the first half of the 20th century, when the large-scale conversion of steppes into arable land combined with uncontrolled hunting led to widespread population declines. After the collapse of the Soviet Union, the population of the species began to increase again in the country. Currently, its key habitats are the steppes and semi-deserts of central, northern and western Kazakhstan, where it appears to do well in undisturbed steppe, hayfields and abandoned crop fields. It is found at lower densities in foothills in the south-eastern part of the country and across the semi-deserts of the south. We used density estimates from surveys conducted in central Kazakhstan in 2011 to extrapolate population estimates for the Little Bustard across similar suitable habitats in the northern regions of the country. In the southern regions, where the species gravitates to foothill steppes and meadows and is recorded at lower densities in semi-desert habitats, we based our estimate on the sum of maximum counts at key sites. Our estimate of the total population of Little Bustards breeding in Kazakhstan is 210 900 individuals (123 400–342 200, a range which reflects uncertainty concerning the sex ratio). The main threats are land-use changes impacting breeding success and female survival, collisions with the expanding powerline network, and a low but persistent level of poaching.

INTRODUCTION

The limited historical records available indicate that in the first half of the 20th century the Little Bustard *Tetrax tetrax* was breeding in foothills in the south of Kazakhstan (Gavrin 1962) and was common in steppes in the north and east of the country, where congregations of thousands were recorded (Gavrin 1962, Potapov & Flint 1987). A large-scale conversion of natural steppe to arable land and uncontrolled hunting led to a sharp decline in numbers by the 1950s (Gavrin 1962), and possibly to the species' extirpation from some regions by the 1960s–70s (Kovshar' 2019). However, towards the end of the last century, numbers of Little Bustards were noted to increase in many regions of Kazakhstan (Gubin 2007). Such increases occurred among breeding Little Bustards in the northern (Vilkov 2014, Sorochinskii 2023, Zuban *et al* 2025), eastern (Berezovikov & Anisimov 2013, Berezovikov & Feldman 2015, Starikov 2015), central (Yakovlev *et al* 2016, Bragin 2019) and southern (Gubin & Karpov 1999, Kolbintsev 2015, Shakula *et al* 2017) regions of the country. Similar increases in abundance were noted for other steppe bird species during this time (Kamp *et al* 2011) and attributed to the increased availability of suitable habitats associated with the abandonment of large areas of arable land in the 1990s. In the first decade of the 21st century, the Little Bustard was recorded as breeding in 21 Important Bird Areas (IBAs) of the country, out of 127 total IBAs described (BirdLife International 2025). At that time, the Little Bustard was assessed as Category II in the Red Data Book of Kazakhstan, as a species that was recently threatened with extinction but beginning to increase in numbers (Gubin 2010). BirdLife International (2018), categorising the species as globally Near Threatened, estimated a total of 20 000 individuals for Kazakhstan and Kyrgyzstan combined, but recognised that this was probably an underestimate.

In northern Kazakhstan, the Little Bustard is currently found breeding across vast areas of steppe, semi-desert and agricultural landscapes (Berezovikov & Anisimov 2013, Vilkov 2014, Bragin 2019). Suitable breeding habitats for the species across the drier southern provinces are limited to the foothills of mountain ranges or meadows around waterbodies and in riverine floodplains. Although it is unknown when Little Bustards began to use anthropogenically modified habitats, recent publications suggest that

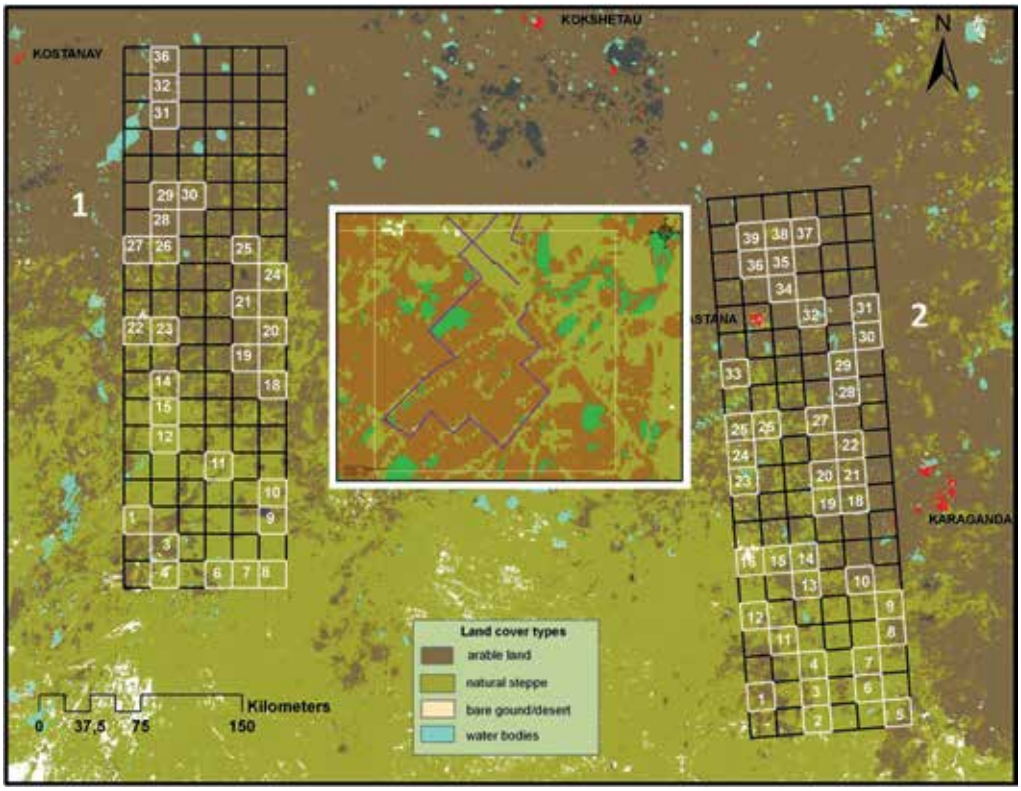

Figure 1. Map of sampling plots for surveys of steppe breeding birds in central Kazakhstan in April and May 2011. Rectangles 1 and 2 represent two major survey regions, subdivided into numbered 20×20 km survey plots. The inset (white rectangle) provides an example of a driven transect laid out in one of these numbered plots (reproduced from Koshkin 2011). Urban areas are represented in red and labelled.

breeding birds are found on grazed natural steppe and arable fields under fodder and cereal crops (both abandoned and active) (Gubin & Karpov 1999, Gubin 2015, Starikov 2015, Shakula *et al* 2017).

In the 20th century, Little Bustards were scarce on migration in Kazakhstan. Shevchenko *et al* (1993) cited the following maximum autumn counts of individuals in the north-west of the country: 170 (1957), 40 (1964), 250 (1972), 30 (1977), 300 (1985). For the same general area, Shevchenko *et al* (1977) reported a maximum day count of 79 birds (in six flocks) during spring migration in April 1965.

Incidental data this century show a trend towards increased size of migratory flocks. For example, in September 2007, between the Turgen' and the Issyk rivers in Almaty province, Karpov (2008) observed many small groups of Little Bustards, as well as two flocks of 100 and 200 individuals. In March 2016, flocks of 100–400 and aggregations of up to 1500 were regularly observed near Bozhban settlement in central Turkistan province (Gubin 2020). In September 2016 T Iskakov recorded a flock of 700 in Akmola province, and in March 2024 G Dyakin recorded a flock of 200 in Almaty province (Birds.kz 2024). An aggregation of up to 400 was recorded near Astana on 22 August 2024 (RU pers obs).

The main wintering grounds of Little Bustards breeding in central and eastern Kazakhstan are located in Uzbekistan, Turkmenistan and Iran and, for birds breeding in the west of the country, probably the Caucasus region (Gauger 2007). Although there are no published historical records of Little Bustards wintering in Kazakhstan, the

observation of 141 birds west of Shymkent city in Turkistan province on 20 January 2024 (https://kz.birding.day/) suggests that wintering takes place, but is probably rare.

In recent decades, there has been little research on the Little Bustard in Kazakhstan, except for two local studies of the biology of the species in the south of the country (Karpov & Gubin 1993, Gubin & Karpov 1994). Data on the abundance of the species has largely derived from more general surveys, *eg* a survey of breeding steppe bird species over an area of 96 000 km^2 in central Kazakhstan from April–May 2011, when a mean density of breeding male Little Bustards of 0.24 individuals per km^2 (95% CI; 0.14–0.39) was reported (Koshkin 2011). Densities of the species were five times higher in abandoned and recently mown perennial grass fields (hayfields) than in undisturbed steppe, with medium densities in abandoned arable fields and very low densities in cultivated fields (Koshkin 2011). During surveys of Asian Houbara *Chlamydotis macqueenii* in April 2010 east of lake Balkhash, 48 Little Bustards were recorded along a 173 km route, and a density of 1.39 individuals/km^2 was obtained for a 200 m-wide survey strip. Extrapolation of this density to the local area of suitable habitat (160 km^2) suggested a total population of 223 individuals (Gubin 2015).

METHODOLOGY

In consideration of the different habitats used by Little Bustards in the north and south of Kazakhstan, and the different data sources available, we developed two methodologies to estimate the species' abundance in Kazakhstan, one for the northern provinces (West Kazakhstan, Atyrau, Aktobe, Kostanay, Ulytau, North Kazakhstan, Akmola, Karaganda, Pavlodar, Abai and East Kazakhstan) and one for the southern provinces (Jetysu, Almaty, Jambyl, Turkistan, Kyzylorda and Mangystau). We then sum these two regional estimates to derive a national estimate.

Plate 1. Male Little Bustard near Astana, May 2020. © *R Urazaliyev*

Plate 2. Female Little Bustard over an arable field, central Kazakhstan, April 2011. © *M Koshkin*

Northern provinces

Our abundance estimate for Kazakhstan's northern provinces combines data from two relatively recent studies involving Little Bustards. The first assessed the abundance of several bird species nesting in steppe and semi-desert biomes in central Kazakhstan, during which the density of the Little Bustard was estimated in five major land-use types (Koshkin 2011). The second study modelled the spatial distribution of the species in the northern regions of the country, based on presence points and several environmental predictors (RU unpubl data).

For the first study, driven transects were conducted in April and May 2011 at two sites located in the central-northern part of the country (Akmola, Karaganda, Kostanay and Ulytau provinces) with a total area of 96 000 km^2 (Figure 1), using distance sampling (Buckland *et al* 2008). As the survey design employed random sampling within 64 20×20 km plots, the recorded average density of the species may be considered representative of the total area surveyed. As the data were greatly skewed towards the more conspicuous breeding males (Plate 1), the analysis was limited to observations of males only, but the surveys also recorded some females (Plate 2).

The second study used the maximum entropy method implemented in MaxEnt software (version 3.3.1: Soberon & Peterson 2005, Phillips & Duduk 2008, Phillips 2015) to model the breeding distribution in steppe and semi-desert zones. MaxEnt constructs probabilistic models of species distributions based on occurrence locations and a set of environmental and climatic predictors. Little Bustard locations were obtained from field surveys conducted by the Kazakhstan Association for the Conservation of Biodiversity (ACBK) between 2009 and 2017, involving around 2000 walked and driven transects, as well as records obtained

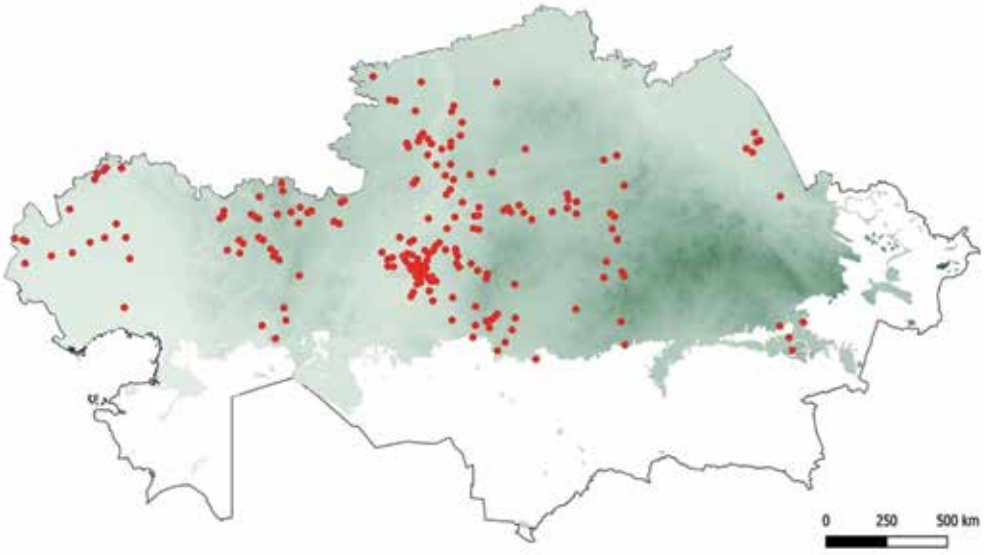

Figure 2. Spatially thinned Little Bustard observations (red dots) in Kazakhstan during the breeding season (April–June; from surveys conducted from 2009–2017 and citizen science databases queried in 2017) used to model the spatial distribution of the species in MaxEnt (198 points). Grey-green shading represents areas of steppe and semi-desert biomes (Econet 2006). Darker green colours represent higher elevations.

in 2017 from a national birdwatching database (https://kz.birding.day/), and the World Birds Database (https://avibase.bsc-eoc.org/avibase.jsp?lang=EN). A total of 644 breeding season (April–June) presence points were obtained. To avoid overweighting the model, these locations were spatially thinned using the Spatial Rarefy tool in ArcGIS version 10.6, resulting in 198 observation points used for modelling (Figure 2).

We included the following layers as environmental variables potentially affecting the distribution of the Little Bustard: 1. Land cover and land use (GLC_FCS30-2015: Zhang *et al* 2021); 2. elevation and relief (downloaded from http://www.srtm.csi.cgiar.org); 3. Normalised Difference Vegetation Index (NDVI) for April, May and June (downloaded from http://free.vgt.vito.be); 4. temperature (annual average and in the hottest month; BIOCLIM v1.4; https://www.worldclim.org); 5. precipitation (annual average and in the driest month; BIOCLIM v1.4); and 6. distance to nearest waterbody and nearest settlement (calculated in ArcGIS). Modelling was conducted at a spatial resolution of 1 km^2 across the steppe and semi-desert ecozones (as defined by Econet 2006). The MaxSSS (Maximum Sum of Similarity Scores) technique was used to identify the threshold where the model's predictions are most similar to the actual, known outcomes (*eg*, whether the species is truly present in certain areas), ensuring a balance between accuracy and reliability. To assess model performance, we used the area under the curve (AUC) of the receiver operating characteristic (ROC) plot, a threshold-independent and prevalence-insensitive metric. Following Swets (1988), models with an AUC ≥ 0.70 were considered reliable for further analysis.

As noted above, our survey method detected primarily males. To estimate the total number of breeding birds for the northern provinces of Kazakhstan a sex ratio of 1:0.4 (M:F) was used, which is estimated for Spain and Portugal, where similar agricultural conditions which result in higher female mortality are encountered (Serano-Davies *et al* 2023).

Southern provinces

To estimate abundance in the southern provinces, we conducted a review of all available sources from the last 35 years, including journal publications and databases. We were able to locate only four sources which provided local population estimates (Table 1). We summed the maximum abundance estimates for each area/location to reach a minimum estimate for the southern regions of the country. The resulting estimate of breeding individuals (both sexes) was based on abundance data of different quality, including publications that referred to 'breeding individuals', 'breeding pairs' or 'breeding males'. When the last category was used, the number of breeding individuals was inferred using a 1:0.4 sex ratio.

Table 1. Published estimates and records of breeding Little Bustards (≥ 10 individuals) in southern provinces of Kazakhstan. Where records refer to 'breeding males', the number presented here adds an equal number of females.

Year	Month/ season	Breeding individuals	Area	Province	Source
1991	spring	84	surroundings of Bilikol Lake	Jambyl	Gubin & Karpov 1994
2017	April	700	suitable habitat within Turkistan and the southern part of Jambyl provinces	Turkistan/Jambyl	Shakula *et al* 2017
2000–2002	August	14	western part of the Alakol depression	Jetysu	Berezovikov & Anisimov 2013
2006	spring	80	IBA 'Donyztau cliff faces'	Aktobe (southern portion)	BirdLife IBA Database

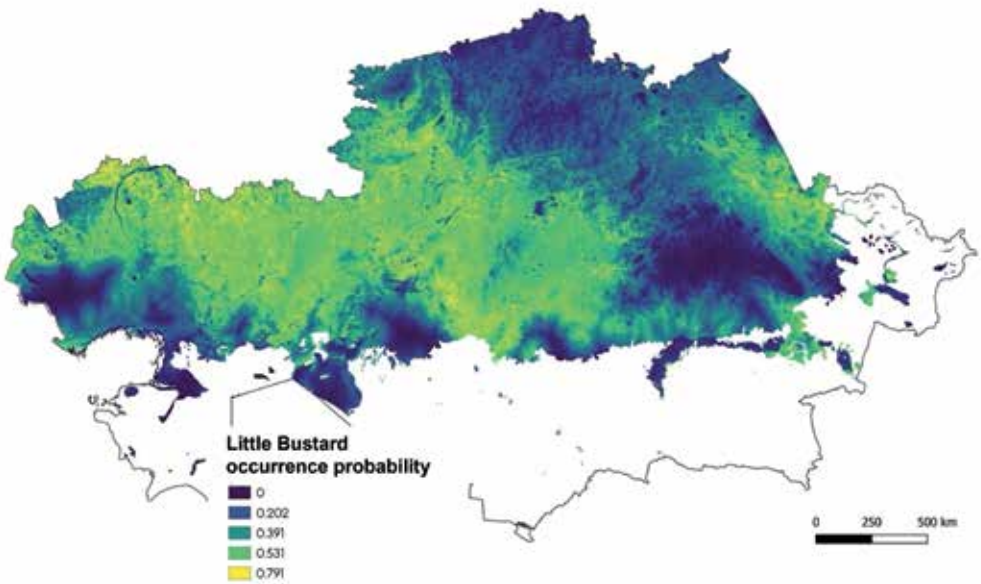

Figure 3. Environmental suitability for breeding Little Bustard in northern Kazakhstan, as predicted by MaxEnt, based on 198 location points and 11 topographical and climatic layers. Brighter colours (yellow and green) represent environments of higher suitability, with values of 0.5 or greater predicted to be suitable habitats.

RESULTS

Distribution and abundance estimates

Northern provinces

The maximum likelihood model of the breeding distribution of Little Bustards exhibited an AUC value above 0.75, indicating high confidence in the predictions (Figure 3). None of the 11 predictor variables was dropped from the final model. The model finds a higher probability of breeding Little Bustards across steppes and semi-deserts between the Ural river and the western border of Karaganda province. An additional high-likelihood area is predicted along the Irtysh river between the cities of Pavlodar and Semey in the east of the country.

The MaxSSS threshold, identifying areas suitable for the species (grey polygons in Figure 4), was calculated as 0.5. This 'predicted northern breeding distribution' encompasses 625 121 km^2, as measured in the Albers Equal Area Conic projection for North Asia. Generally, the predicted area corresponds well with breeding season observations of the species, including the recently published data that were not used in modelling. An exception is some areas to the north, which were not predicted to be suitable but where the species was recorded relatively recently. Conversely, some areas predicted as suitable are yet to yield any recent observations; these are areas on the border between West Kazakhstan and Aktobe provinces, the western part of Kostanay province and the northern part of Ulytau province (Figure 4).

Extrapolation of the mean breeding male density derived from the survey in central Kazakhstan (0.24 males per km^2; 95% CI, 0.14–0.39) to the area surveyed in that study (96 000 km^2) gives a rounded abundance value of 23 000 (95% CI 13 440–37 440) male Little Bustards during the breeding season, or around 32 000 breeding individuals assuming the 1:0.4 sex ratio. The survey area largely falls within the area predicted by the MaxEnt model, except for the northernmost survey plots. Extrapolating the density of breeding males in the survey area to the predicted northern breeding distribution gives a rounded estimate of 150 000 (95% CI, 87 500–243 800) breeding males and 210 000 (95% CI, 122 500–341 300) breeding individuals, assuming a 1:0.4 sex ratio.

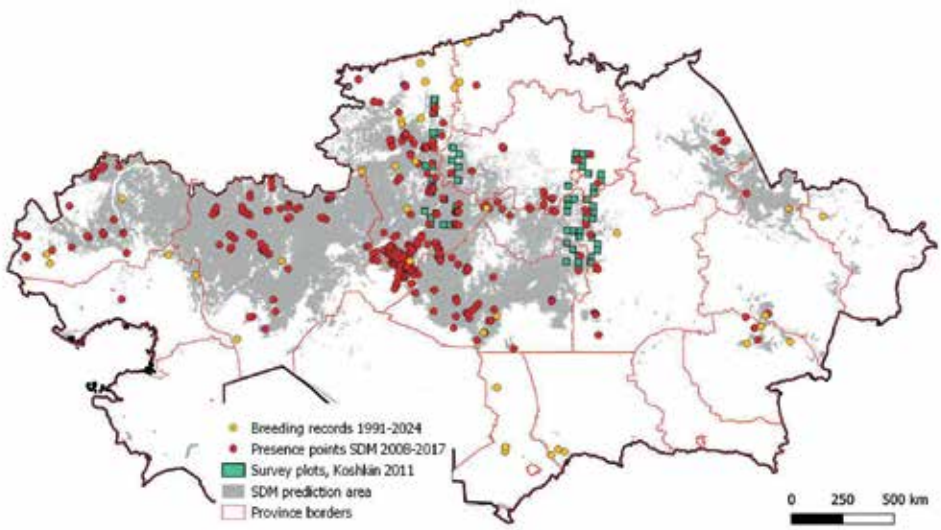

Figure 4. Breeding season records of Little Bustard in Kazakhstan from the published literature (yellow circles), presence points used for MaxEnt modelling (red circles), plots surveyed in 2011 (green squares, Koshkin 2011) and predicted northern breeding distribution for Little Bustard (grey).

Southern provinces

Based on the summed total of four local studies, the breeding population in the southern provinces of Kazakhstan is conservatively estimated at approximately 900 breeding individuals using a 1:0.4 sex ratio.

National estimate

By adding the estimate from the northern and southern breeding populations we obtain an estimate of breeding Little Bustard for the whole of Kazakhstan of 210 900 breeding individuals, with a possible range between 123 400–342 200 individuals (Table 2).

Table 2. Estimation of current Little Bustard abundance and population trends in the northern and southern regions of Kazakhstan. Population estimates during the migration season are not available owing to a paucity of records. Quality of estimate: 1 = low, 5 = high.

Region	Season	Number of birds	Important sites	Quality of estimate	Population trend			
					1950–1990	1990–2020	2020–2024	1950–2024
Northern	Breeding	122 500–341 300	20	3	↘	↗	↗	?
Southern	Breeding	900	3	3	↘	↗	?	?
Totals for Kazakhstan	Breeding	123 400–342 200	23	Average 3				

Threats and conservation measures

Land-use change represents one of the main threats to the Little Bustard in Kazakhstan. In many parts of its range, the species is confined to anthropogenic landscapes, suggesting that changes in agricultural practice or land use that are not compatible with the reproduction and survival of the species could lead to a decline in numbers. For example, a shift away from alfalfa cultivation in the southern provinces could lead to a decline in local populations that often nest successfully in or near these fields. Similarly, a shift to more intensive farming in the northern and central regions, where the species seems to benefit from abandoned arable land and hayfields, could potentially reduce its numbers. Considering that the Virgin Lands Campaign, a program of massive agricultural expansion in the second half of the 20th century, is recognised as a key factor influencing steep declines in Little Bustard populations (Gubin 2007, Kovshar' 2019), it is important to continue to monitor changes in land use across Kazakhstan's vast Little Bustard breeding grounds and the effects of these changes on the species.

The second threat, the impact of which likely varies greatly from region to region, is mortality from collision with powerlines. Although no specific studies have been carried out on the impact of powerlines on the Little Bustard in Kazakhstan, mortality data have been gathered incidentally during research focused on birds of prey. For example, during a survey of 680 km of powerlines in central Kazakhstan in 2012, the remains of five Little Bustards were found (Voronova *et al* 2012). In October 2023, during a survey of 140.9 km of transmission lines in West Kazakhstan province (within Bokeyorda State Nature Reserve and the Ashchyozek State Nature Reserve), the remains of four Little Bustards were found (RU unpubl data).

The third threat is poaching: limited anecdotal evidence from different parts of the species' range over the last 20 years confirms that illegal shooting of Little Bustards takes place. For example, in August 2001 a dead juvenile was found in the Alakol basin, probably killed by a poacher (Berezovikov & Anisimov 2013), and in October 2017

two Little Bustards were shot by hunters in Kostanay province (A Timoshenko pers comm). According to media reports, poachers who shot Little Bustards were detained in Kostanay province (www.time.kz; September 2009), in Aktobe province (www.diapazon.kz; September 2019) and in Jambyl province (www.365info.kz; October 2017). People in a vehicle were observed shooting a Little Bustard in Turkistan province outside any hunting season in 2017 (M Kessler pers comm). At the same time, it is important to note that the threat of poaching to the birds breeding in Kazakhstan is probably many times higher on wintering grounds to the south and in the Caucasus, where the species gathers in larger flocks. According to one estimate, an annual average of 30 000 Little Bustards are illegally shot in Azerbaijan alone (Brochet *et al* 2019). Despite the protected status of this species in Iran, illegal hunting of wintering birds is considered likely due to poor law enforcement (Sehhatisabet *et al* 2012).

DISCUSSION

We provide the first data-driven estimate of the abundance of the Little Bustard in Kazakhstan. Our estimate of 210 900 breeding individuals is significantly higher than the only previously published estimate for Kazakhstan (also including Kyrgyzstan) of 20 000 individuals in 2012 (BirdLife International 2018). Even at the time of its publication, the latter was probably a gross underestimate as it was based on information gathered before populations in North Eurasia had begun to recover. Observations of large wintering congregations, *eg* over 150 000 individuals in Azerbaijan (Gauger 2007), and a flock of 6000 in Jizzakh province of Uzbekistan (10 February 2024; Ten *et al* 2025, T Abduraupov pers comm), support our higher estimation.

However, our use of a sex ratio from a study in Europe and our application of the average density across vast areas of suitable habitat should be treated with care. In reality, the sex ratio is likely to vary between breeding sites in natural and agricultural areas, and between agricultural areas with different cultivation methods. There is also a possibility that the species may not have re-expanded across all suitable territories available in Kazakhstan.

Our estimate could be improved in several ways. The abundance assessment for northern regions of Kazakhstan assumes that the Little Bustard's density across northern Kazakhstan is equivalent to that measured at Koshkin's (2011) survey sites, which was an average across different habitat types surveyed. However, as densities can vary greatly by habitat type (Koshkin 2011), our abundance estimate could be improved if habitat-specific densities were extrapolated to the area of each habitat available within the predicted breeding area. Even more useful would be to carry out surveys in different parts of the range, particularly the north, west and south, to understand the species' densities at a finer scale.

Our assessment of abundance for southern regions of Kazakhstan is likely to be an underestimate, as the dataset from which we drew was small and did not cover the entirety of the range. However, there are no reasons to expect high numbers of breeding Little Bustards in the south due to limited suitable habitat. Consequently, the proportional contribution of the southern populations to the countrywide population estimate is likely to be very small.

Given that large migratory and pre-migratory aggregations of Little Bustards were recorded in the north and south of Kazakhstan in 2024 (as described in the Introduction), it is likely that the population continues to grow. However, some of these birds may originate from the bordering regions of Russia or Kyrgyzstan, with estimates of from *c*23 000–33 000 (Volga region; Oparin *et al* 2025) and *c*1500–2000 (Campeau *et al* 2025) breeding individuals respectively. Unless significant land-use changes occur, the upward population trend is

likely to continue or will stabilise soon. However, large-scale intensification of agriculture, reclamation of abandoned agricultural land and new areas of steppe could reverse the observed recovery, causing a rapid and significant decline in the species' numbers. Mortality from collisions with powerlines may increase with the expansion of the network as new oil sites open and green energy expands. The existing penalties for illegal shooting of the red-listed Little Bustard in Kazakhstan can be considered effective (around US$750 fine in 2024), as there is no evidence of large-scale poaching of Little Bustard in the country, despite its increase in numbers.

ACKNOWLEDGEMENTS

We thank all the donors for providing funding for the surveys and all the individuals who contributed to this article, either through participation in data collection or assistance with the draft. In particular, we acknowledge Paul Dolman, Nigel Collar and Johannes Kamp for providing guidance on field surveys and data analysis in 2011, and thank Mimi Kessler and Louis-Philippe Campeau for their useful comments on the draft of this paper.

LITERATURE CITED

Berezovikov, NN & EI Anisimov. 2013. [New data on Little Bustard *Tetrax tetrax* in Alakol depression.] *Russian Journal of Ornithology* 22(912): 2307–2308. [In Russian]

Berezovikov, NN & AS Feldman. 2015. [Return of the Little Bustard *Tetrax tetrax* to the steppes of Semipalatinsk Priirtysh'e.] *Russian Journal of Ornithology* 24(1096): 212–214. [In Russian]

BirdLife International. 2018. Species factsheet: Little Bustard *Tetrax tetrax*. Downloaded from https://datazone.birdlife.org/species/factsheet/little-bustard-tetrax-tetrax on 23/02/2025.

BirdLife International. 2025. Country profile: Kazakhstan. www.birdlife.org. Downloaded on 23/02/2025.

Birds.kz. 2024. Online database of the birdwatching community of Kazakhstan. https://kz.birding.day/.

Bragin, EA. 2019. [Little Bustard *Tetrax tetrax* and Great Bustard *Otis tarda* in the Kustanai region: population dynamics in the XX-XXI centuries.] *Russian Journal of Ornithology* 28(1757): 1705–1714. [In Russian]

Brochet, A-L, W van den Bossche, VR Jones, H Arnardottir, D Damoc, M Demko, G Driessens, K Flensted, M Gerber, M Ghasabyan, D Gradinarov, J Hansen, M Horváth, M Karlonas, J Krogulec, T Kuzmenko, L Lachman, T Lehtiniemi, P Lorgé, U Lötberg, J Lusby, G Ottens, J-Y Paquet, A Rukhaia, M Schmidt, P Shimmings, A Stipnieks, E Sultanov, Z Vermouzek, A Vintchevski, V Volke, G Willi & SHM Butchart. 2019. Illegal killing and taking of birds in Europe outside the Mediterranean: assessing the scope and scale of a complex issue. *Bird Conservation International* 29: 10–40.

Buckland, ST, SJ Marsden & RE Green. 2008. Estimating bird abundance: making methods work. *Bird Conservation International* 18(S1): S91–S108.

Campeau, LB, SV Kulagin & P Isayenko. 2025. Mapping the recovery of the Little Bustard *Tetrax tetrax* in Kyrgyzstan. *Sandgrouse* 47: 122–132.

Gauger, K. 2007. Occurrence, ecology and conservation of wintering Little Bustards *Tetrax tetrax* in Azerbaijan. *Archiv für Naturschutz und Landschaftsforschung* 46: 5–27.

Gavrin, VF. 1962. [Little Bustard.] *In*: *Birds of Kazakhstan* Vol. 2. Academy of Sciences of Kazakh SSR, Alma-Ata, pp12–26. [In Russian]

Gubin, BM. 2007. [Little Bustard.] *In: Birds of Central Asia*. Vol. 1. Kazakhstan Bird Protection Society, Almaty, pp391–394. [In Russian]

Gubin, BM. 2010 [Little Bustard.] *In: Red Book of Kazakhstan*. *Animals*. Vol. 1. Ed. 3. Almaty, pp164–165. [In Russian]

Gubin, BM. 2015. [Little Bustard.] *In: Birds of Deserts of Kazakhstan*. Vol. 1. Kolor, Almaty. [In Russian]

Gubin, BM. 2020. [Little Bustard.] *In: Birds of Deserts of Kazakhstan*. Vol. 3. Spring R, Almaty. [In Russian]

Gubin, BM & FF Karpov. 1994. [Current and associated behaviours of the Little Bustard in the foothills of the Lesser Karatau Mountains (Southern Kazakhstan).] *Selevinia* 1: 40–60. [In Russian]

Gubin, BM & FF Karpov. 1999. [Materials on nesting birds of Lake Bilikol (South Kazakhstan).] *Russian Journal of Ornithology* 75: 3–13. [In Russian]

Kamp, J, R Urazaliev, PF Donald & N Hölzel. 2011. Post-Soviet agricultural change predicts future declines after recent recovery in Eurasian steppe bird populations. *Biological Conservation* 144: 2607–2614.

Karpov, FF. 2008. [Autumn migration of Little Bustards in the interfluve of Turgen' and Issyk in 2007.] *Kazakhstan Ornithological Bulletin* 2008: 134. [In Russian]

Karpov, FF & BM Gubin. 1993. [Numbers and distribution of Little Bustards on the shore of Lake Bilikol (foothills of the Lesser Karatau).] *News of National Academy of Sciences of Kazakhstan* 6: 38–43. [In Russian]

Kolbintsev, VG. 2015. [New sightings of Little Bustard *Tetrax tetrax* in the foothills of the Karatau and Talas Alatau.] *Russian Journal of Ornithology* 24(1139): 1577. [In Russian]

Koshkin, M. 2011. Habitat preferences of steppe breeding birds in Central Kazakhstan, in relation to different forms of land use. MSc thesis. University of East Anglia.

Kovshar', AF. 2019. [Little Bustard.] *In: Birds of the Tien Shan*. Vol. 1. Almaty, pp319–321. [In Russian]

Oparin, ML, OS Oparina, AA Abushin, VN Fedosov & AA Nefedov. 2025. Status of Little Bustard *Tetrax tetrax* in Russia based on assessments in four key regions. *Sandgrouse* 47: 59–72.

Phillips, S. 2015. Maxent software for species habitat modelling. Version 08.2015. Available at: http://www.cs.princeton.edu/~schapire/maxent/.

Phillips, SJ & M Dudik. 2008. Modelling of species distribution with MAXENT: new extensions and a comprehensive evaluation. *Ecography* 31: 161–175.

Potapov, PL & VE Flint. 1987. [*Birds of the USSR: Galliformes, Gruiformes*.] Nauka, Leningrad. [In Russian]

Sehhatisabet, ME, F Abdi, 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: 279–287.

Serrano-Davies, E, J Traba, B Arroyo, F Mougeot, F Cuscó, S Mañosa, G Bota, N Faria, A Villers, F Casas, C Attié, P Devoucoux, V Bretagnolle & MB Morales. 2023. Biased adult sex ratios in Western Europe populations of Little Bustard *Tetrax tetrax* as a potential warning signal of unbalanced mortalities. *Bird Conservation International* 33: 40.

Shakula, VF, SV Shakula & GV Shakula. 2017. [Little Bustard—a natural component of agricultural landscapes of South Kazakhstan.] *In: Proceedings of the Conference 'Biosphere farming and sustainable development of rural areas'*. Ottisk, Irkutsk, pp 23–25. [In Russian]

Shevchenko, VL, PV Debelo, JI Gavrilov & AK Fedosenko. 1977. [Distribution and numbers of some rare bird species north of the Caspian Sea.] *In: Rare and Disappearing Animals and Birds of Kazakhstan.* Academy of Sciences of Kazakh SSR, Alma-Ata, pp17–20. [In Russian]

Shevchenko, VL, PV Debelo, EI Gavrilov, VA Naglov & AK Fedosenko. 1993. [On the avifauna of the Volga-Ural interfluve.] *In: Fauna and biology of birds of Kazakhstan.* National Academy of Sciences of the Republic of Kazakhstan, Almaty, pp7–103. [In Russian]

Soberon, J & AT Peterson. 2005. Interpretations of models of fundamental ecological niches and species' distributional areas. *Biodiversity Informatics* 2: 1–10.

Sorochinskii, MV. 2023. [Materials on the Little Bustard *Tetrax tetrax* in the North Kazakhstan region.] *Russian Journal of Ornithology* 32(2305): 2179–2183. [In Russian]

Starikov, SV. 2015. [Observations of Little Bustard *Tetrax tetrax* in the steppes of the Kalbinskii Plateau (Eastern Kazakhstan).] *Russian Journal of Ornithology* 24(1212): 4068–4069. [In Russian]

Swets, JA. 1988. Measuring the accuracy of diagnostic systems. *Science* 240: 1285–1293.

Ten, A, M Gritsina, T Abduraupov, E Kreuzberg, M Mitropolskiy, N Marmazinskaya & A Raykov. 2025. Warming temperatures and reduced snow cover are associated with new wintering grounds for the Little Bustard *Tetrax tetrax* in Uzbekistan. *Sandgrouse* 47: 133-139.

Vilkov, VS. 2014. [Little Bustard *Tetrax tetrax* nests again in the North Kazakhstan region.] *Russian Journal of Ornithology* 23(1088): 4165. [In Russian]

Voronova, VV, GI Pulikova, KK Kim, EV Andreeva, VR Bekker & T Aitbaev. 2012. [The impact of power lines on bird mortality in central Kazakhstan.] *Raptor Conservation* 24: 52–60. [In Russian]

Yakovlev, VA, AP Berber, NT Erzhanov, OA Rybalkina & DE Tuganov. 2016. [New data on the Great Bustard *Otis tarda*, Little Bustard *Tetrax tetrax* and Houbara Bustard *Chlamydotis undulata* in Central Kazakhstan.] *Russian Journal of Ornithology* 25(1367): 4522–4526. [In Russian]

Zhang, X, L Liu, X Chen, Y Gao, S Xie & J Mi. 2021. GLC_FCS30: global land-cover product with fine classification system at 30 m using time-series Landsat imagery. *Earth System Science Data* 13: 2753–2776.

Zuban, IA, AY Timoshenko, PS Dmitriyev, SN Gashev, MN Kalashnikov, BM Suindykov, VS Lunyov & SV Shnel. 2025. Review of rare bird species in the North Kazakhstan: update and additions to the regional avifauna list. *Acta Biologica Sibirica* 11: 223–248.

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Mapping the recovery of the Little Bustard *Tetrax tetrax* in Kyrgyzstan

LOUIS-PHILIPPE CAMPEAU, SERGEY V KULAGIN & PAVEL ISAYENKO

Summary: We present the findings of two seasons of breeding surveys based on listening points for displaying male Little Bustards *Tetrax tetrax* in 2021 and 2023 in the Chuy valley in northern Kyrgyzstan. We estimate that there are now between 1400 and 1900 breeding Little Bustards in the region, where they were considered extinct just five years ago. Displaying males' densities were as high as 1.73 birds per km^2 in the centre of a studied lek, although at a landscape level they were lower at 0.55 birds per km^2. Outside our repeat survey sites, through one-off investigations and opportunistic observations, we found that Little Bustards occupy a large part of the Chuy valley. They have expanded into new areas since 2021 and larger migratory flocks are now encountered, reflecting a population that is still recovering, both within Kyrgyzstan and beyond. However, this recovery is constrained by the habitat preference of Little Bustards for steppe pasturelands when not overgrazed and especially alfalfa fields, where agricultural machinery is a significant cause of clutch destruction and female mortality. Illegal hunting also poses a significant risk that is likely to increase as people learn about the bird's renewed presence. Modifying agricultural practices and promoting the importance of agricultural habitats for wildlife conservation, while routing new infrastructure such as electrical powerlines away from Little Bustard areas, could ensure the sustainability of the species' return to Kyrgyzstan.

INTRODUCTION

Over the last 30 years, a continuous decline in Little Bustard *Tetrax tetrax* populations around the Iberian peninsula has coincided with a partial recovery of the species in its eastern range following the collapse of the Soviet Union and its intensive agricultural practices (Kamp *et al* 2011). North-western Kazakhstan and southern Russia now host a majority of the world's breeding Little Bustards, most of which probably migrate south to winter in Azerbaijan, passing through the famous Beshbarmag observation point (Farajli 2025). In Central Asia, the Little Bustard's breeding densities are highest in the northern steppes, wet pastures and low-intensity agricultural zones, and gradually drop towards the south as aridity increases (Potapov & Flint 1987).

Nevertheless, breeding populations also exist much further south and east, in eastern as well as southern Kazakhstan and Kyrgyzstan along the foothills of mountain ranges, notably the Tian Shan. In these countries, Little Bustards seem to prefer a mosaic of irrigated agricultural lands, steppe pasturelands and rain-fed cereal fields (Koshkin *et al* 2025). The migration of these populations of Little Bustards is poorly understood, but they are likely to be the birds overwintering in Uzbekistan, eastern Turkmenistan, eastern Iran and potentially as far south as Pakistan. Even more so than birds breeding further north, these populations suffered during the time of the Soviet Union and all but disappeared; small groups may have survived unseen in remote areas, but the species was declared extinct as a breeder in southern Kazakhstan by the 1960s (Shakula *et al* 2017) and in Kyrgyzstan by the 1970s, with very few observations during migration (Kataevskiy 2006).

In Kyrgyzstan, Yanushevich *et al* (1959) reported that agricultural intensification in the 1950s led to a noticeable decline in numbers of breeding Little Bustards, leaving only small populations along the Talas valley and in the north of the Chuy valley, where 20 years earlier they were considered numerous (Figure 1). At both sites, Little Bustards survived in unplowed steppe areas near the border with Kazakhstan. Yanushevich *et al* (1959) assumed the species was still breeding in the Suusamyr valley, which for them included the Toktogul area. Indeed, the Toktogul Forestry Department (pers comm to LPC 2023) confirmed that illegal hunting caused Little Bustards to disappear from the cultivated foothills that surround the Toktogul reservoir only in the last few decades, so a small

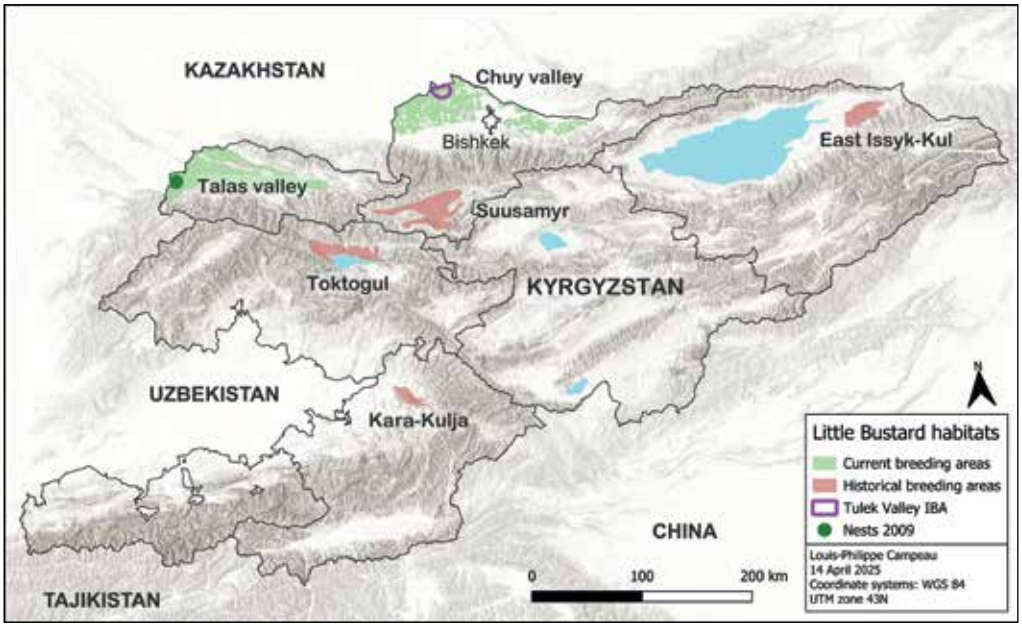

Figure 1. Current and historical breeding areas of the Little Bustard in Kyrgyzstan.

breeding population may indeed have survived there through the Soviet period. Since that time, the only record from this vicinity of which we are aware is of a single bird near the reservoir on 30 September 2024 (M Koshkin, ebird). Finally, Yanushevich *et al* (1959) noted a spring record in the Kara-Kulja valley in the Osh region in 1958, which is the last known record from the south of Kyrgyzstan; they also mentioned an extirpated population in the Novo-Voznessenovski area (east Issyk-Kul region).

If the declining breeding populations of the 1950s managed to survive the late Soviet period, it was in small enough numbers to avoid detection. Shukurov (1981) suggested that none had been seen since the early 1970s, while the 2006 Red Book of Kyrgyzstan declared the species extinct, stating that it had probably not bred in the country over the previous 30–40 years (Kataevskiy 2006).

In southern Central Asia, Little Bustards seem to have recovered more slowly after the Soviet collapse than further north, although by 2000 they were being seen in most of their previous territories in southern Kazakhstan (Gubin 2007). The first signs of recovery in Kyrgyzstan came in 2009 when four nests were found within 300–700 m of each other, south-west of Kaynar village in the Talas region near the Kazakhstan border (Davletbakov & Ostashchenko 2009; Figure 1), across which Little Bustards were already known to breed (Shakula *et al* 2017). The Talas valley comprises mostly agricultural land and is surrounded by foothills of steppe pastureland, but although it could currently support a relatively large breeding population, no further research has been conducted there. In 2019, a nest was found by a farmer about 15 km east of Bishkek airport, representing the first indication of the re-establishment of a breeding population in the Chuy valley. We investigated this phenomenon and documented the return of breeding Little Bustards to the region (Campeau & Kulagin 2022). Moreover, another Little Bustard population came to light thanks to a chance encounter with ranger Evgeniy Kolganov of the Chumysh ChBOR (Chuy-Bishkek Society of Hunters and Fishermen) near Milyanfan, north-east of Bishkek. Local tractor drivers had reported this 'new bird' to him in early summer of 2021 and with their help he found four destroyed nests in intensive cultivation in the Chuy valley on the border with Kazakhstan.

Despite its seeming disappearance as a breeding species in the later twentieth century, the Little Bustard continued to be encountered on migration in the Chuy valley, albeit rarely. Flocks of up to 100–150 birds from Kazakhstan had historically gathered and fed in fields of alfalfa and liquorice *Glycyrrhiza* sp from early September until early November (Yanushevich *et al* 1959). Small migrating flocks continued to be seen in the valley: 40 birds in November 1975, seven in September 1985 and one in 'north-west Kyrgyzstan near the Kazakh border' in 1999 (Kataevskiy 2006). Ranger Kolganov, who sadly passed away in early 2022, also mentioned a 400-strong post-breeding flock in his area during the late summer of 2021. Our own discussions with local hunters in 2021 revealed that they were well aware of the species' migratory habits and had been for many years. The species has never been recorded in the country in winter.

The limited literature available therefore shows that historically there were five main breeding populations of Little Bustards in Kyrgyzstan. Those of the Chuy and Talas valleys have now resumed breeding, while the smaller one stretching from the Suusamyr valley to Toktogul reservoir probably remains extirpated. The last observation from the south of Kyrgyzstan dates from 1958 and that for east Issyk-Kul was earlier (Figure 1). The Little Bustard is currently a protected Red Book species of Category VI, Near Threatened and officially considered to be a scarce migrant (Kataevskiy 2006), although recent research has found it to be recovering in the north and west of the country (Campeau & Kulagin 2022). Using new survey data, we investigate this recovery and aim to provide a population estimate for the species in Kyrgyzstan.

METHODS

Field observations

We undertook breeding surveys in May 2021 and May–June 2023, supported by funding from the Ornithological Society of the Middle East, the Caucasus and Central Asia (OSME) (Campeau & Kulagin 2022). This was supplemented with opportunistic visits in 2022, 2024 and 2025. The May 2021 survey was principally aimed at proving renewed breeding and focused on the Tulek Valley Important Bird and Biodiversity Area (IBA) in the north-west of the Chuy valley near the Kazakhstan border (Plate 1).

The May–June 2023 survey continued our systematic monitoring of the Tulek Valley IBA, but this time we used our experience to fix the position of our displaying male Little Bustard listening points in advance, ensuring that they covered a variety of local landscapes. In total, 53 points located 500–600 m apart were monitored over four weeks, three days a week. With the Milyanfan area less than an hour's drive away from Bishkek, we also decided to conduct seven repeat surveys of eight listening points (Plate 2).

It can be misleading to extrapolate localised results to a larger area when dealing with a lekking species like the Little Bustard, as some places can show high concentrations of displaying males while other promising areas will not (Traba *et al* 2022). To allow for this and determine whether these breeding populations were part of a larger re-occupation of the landscape, we aimed to cover larger portions of the Chuy valley during four one-off surveys. These one- to two-day exploratory surveys were completed with opportunistic listening points in previously uninvestigated but potentially suitable habitats. Two such surveys sampled areas similar to that of the Tulek Valley IBA, with the other two focused on other types of potentially suitable land use, particularly pastures in dry foothills and riverine floodplains. We tried to keep a distance of 500–600 m between points and these listening stations were not repeated (Ligue pour la Protection des Oiseaux 2020). The results of both survey methods, as well as other occasional sightings, are presented in Figure 2.

Finally, information on migrant numbers presented below is based on opportunistic encounters with flocks as well as discussions with local people and especially hunters.

Plate 1. Displaying male Little Bustard in the Tulek Valley IBA, 1 May 2021. © *Karen Wykurz*

Plate 2. Male Little Bustard displaying by Bishkek's ring road, 3 May 2023. Little Bustards can be quite tolerant of human presence during the breeding season. © *Pavel Isayenko*

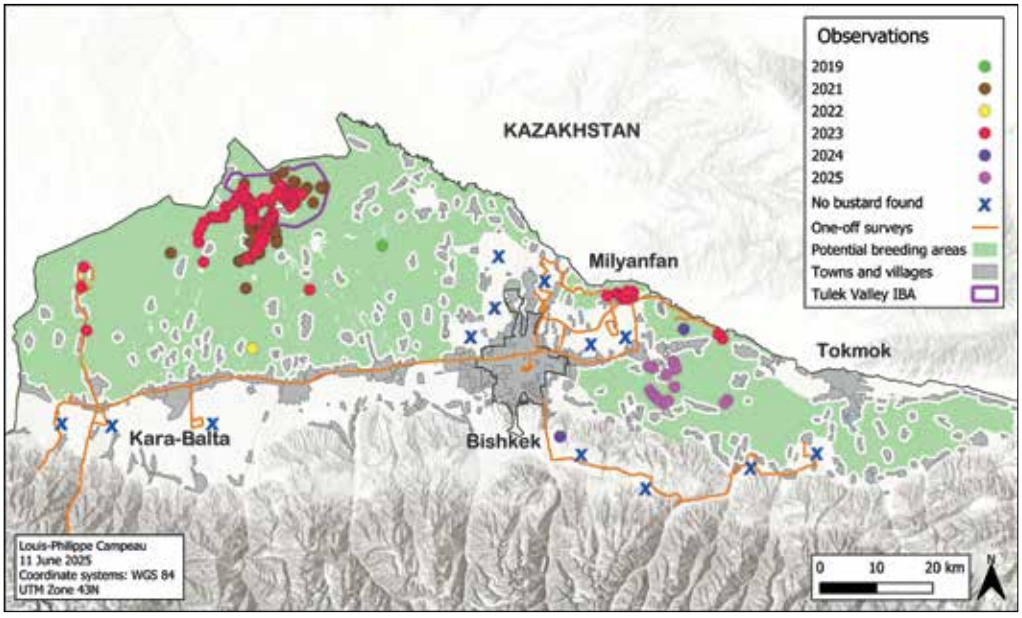

Figure 2. Recent May–June observations of displaying male Little Bustards (circles), one-off survey routes (orange lines) and the mask of suitable breeding zones (green) used for population estimation in the Chuy valley, Kyrgyzstan, 2019–2025.

Population estimates

First, we estimated male densities based on our survey results. To do so, we divided the average number of males detected per week by the area driven and buffered by 400 m, representing the distance that a displaying male could be heard from the car. The area covered was 36.0 km² for the Tulek Valley IBA and 4.47 km² for Milyanfan.

We then used this information to map male Little Bustard densities for the Chuy valley as a whole using QGIS. The second step involved plotting suitable breeding zones. All areas between the foothills of the Ala-Too range and the main east–west road running west of Bishkek, a very urbanised belt where no birds were found during our one-off surveys, were removed. Inhabited zones were buffered by 600 m (based on our observations of the distance from habitations at which Little Bustards begin to be encountered) and then excluded as unlikely habitats; so were bodies of water. We also removed other seemingly suitable areas where our one-off surveys did not reveal the presence of Little Bustards (Figure 2), as well as locations near Bishkek with no breeding period records that are frequently visited by birdwatchers. The result is the green mask in Figure 2.

Third, we buffered all encounters with Little Bustards from 2019 to 2025 by 1 km, a number aimed at accounting for parts of leks inaccessible by car. The result was then dissolved into a layer representing all real observations of lekking birds. The area covered by this layer was assigned the exact male density obtained in the first step; we only used the higher density of the Milyanfan area for sightings made between the Chuy river and the main highway going east from Bishkek.

Finally, we extrapolated our result to the rest of the Chuy valley. We lowered the male breeding densities obtained from the surveyed areas (x males per km²) by 33% and 50% respectively to form the upper and lower limits of our Little Bustard population estimates for north Kyrgyzstan. These lower densities are based on the clustering habits of Little Bustards and the improbability that all available niches were occupied in the ongoing

population recovery, as well as our assumption that the mosaic of crops and low human population densities in the Tulek Valley IBA may be more suited to the species than other areas with higher human population densities.

Our survey methods were not designed to detect females. However, in a study of the Spanish and French populations, the sex ratio is revealed to be male-biased due to a higher mortality rate of nesting females from agricultural machinery (Serrano-Davies *et al* 2022), a threat we have also witnessed (Campeau & Kulagin 2022). We therefore tentatively use the results from Serrano-Davies *et al* (2022) for two regions of Spain, where the mix of pastures and dry agriculture is somewhat similar to Kyrgyzstan, to form our estimates. In the declining population of Extremadura, only 23.3% of all Little Bustards were thought to be female, while in La Mancha, where the species is still considered viable, the ratio rose to 43.7%. The lower and higher ratios were used to establish our minimum and maximum population number.

We also assessed the type of landscapes present within the displaying males' surroundings, applying the same methodology as in 2021 to our 2023 survey results. To do so, we buffered each displaying male's location by 500 m in GIS and correlated the area obtained with a land use layer we built and updated from 2023 satellite imagery.

RESULTS

Field observations

In 2023, over four weeks surveying our 53 listening points, the average number of displaying males detected was 20. Once divided by the area investigated (36 km²), we find a density of 0.55 male birds per km² within the Tulek Valley IBA. This is lower than the 1 bird per km² that we measured across the lek in 2021, but our latest survey encompasses a larger area that is more representative of the general landscape. Density may still have been increasing as our surveys ended, as an opportunistic visit by a member of our organisation in mid-June covering only 20 of our listening points, but focusing on those known to have had sightings, found 26 displaying males.

In 2023, we also covered an area near Milyanfan which showed a much higher displaying density. Between 5 and 11 males were recorded per week during the eight listening points over an area of 4.47 km², with an average over seven weeks of 7.74 males. Male density in the area thus averages 1.73 bird per km². However, we are less confident of this number, as it is based on a much lower sample of listening points than the one for the Tulek Valley IBA and may have covered only the very centre of a lek.

We also found Little Bustards outside of these two studies areas during our one-off surveys. When exploring habitats similar to either the Tulek Valley IBA or the Milyanfan irrigated plains, six sightings were obtained (Figure 2). However, we did not find birds in pastures in either dry foothills or riverine floodplains.

Population estimates

The results of our mapping exercise can be found in Table 1. With male displaying densities of 0.55 bird per km² in the Chuy valley and 1.73 in Milyanfan, the lekking areas immediately around observed Little Bustards were extrapolated to hold 92 birds for the former and 33 for the latter. For the extrapolation to the whole Chuy valley, we lowered the male densities by 33% (high population estimate) and 50% (low population estimate). This meant 0.37/0.28 males per km² for the Chuy and 1.15/0.86 per km² for Milyanfan, for a total of 939 to 1211 displaying males.

After applying the sex ratios from Serrano-Davies *et al* (2022) to our 939–1211 male range, we suggest that there could be 1224–1579 (Extremadura ratio) or 1668–2151 (La

Mancha ratio) Little Bustards in the Chuy valley of Kyrgyzstan. Taking the average from both ranges gives a total estimated population of 1446–1865 birds (Table 2).

It is more difficult to provide an estimate for the Talas valley, as the only reported observation is that of the four nests found in 2009. Nevertheless, it is an area with a similar landscape to the Tulek Valley IBA and there is a known breeding population across the border in Kazakhstan (Shakula *et al* 2017). We tentatively suggest a population of 50–100 birds there.

Table 1. Number and density of displaying male Little Bustards in the Chuy valley.

Chuy valley (except Milyanfan area)				**Milyanfan area**			
	Males/km²	**Area (km²)**	**# of males**		**Males/km²**	**Area (km²)**	**# of males**
Observed presence	0.55	166	92	Observed presence	1.73	19	33
Extrapolation (high)	0.37	2657	984	Extrapolation (high)	1.15	88	102
Extrapolation (low)	0.28	2657	738	Extrapolation (low)	0.86	88	76
Total for the area: 830–1076				Total for the area: 109–134			
Total for the Chuy valley: 939–1211							

The number of migrating Little Bustards that use the Chuy valley is also harder to estimate. Our own observations reveal Little Bustards using similar habitats in the period August–November as they do during the breeding season, with maybe an even greater bias towards alfalfa. We have counted flocks of up to 200 birds, and 2–3 large flocks can be encountered in a single 50-km drive. As noted above, Ranger Kolganov counted over 400 Little Bustards in one observation near the border in September 2021, while hunters from Tulek village reported groups of more than 500. These records are opportunistic and difficult to synthesise, so we assign a low-quality estimate of 2000–5000 birds (Table 2).

Table 2. Population estimates and trends for the Little Bustard in key areas of Kyrgyzstan. N/A = not applicable. Arrows indicate growth, stability or decrease. 'Migration' covers pre-migratory gatherings and stopover flocks. Quality of estimate: 1 = low, 5 = high. † = extirpated.

Region	**Season**	**Number of birds**	**Important sites**	**Quality of estimate**	**Population trend**			
					1950–1990	**1990–2020**	**2020–2023**	**1950–2023**
Chuy valley	Breeding	1446–1865	2	4	↘	↗	↗?	↗
	Migration	2000–5000	2	2	↘	↗	→?	↗
Talas valley	Breeding	50–100	1	1	↘	↗?	?	↗?
	Migration	Unknown	Unknown	1	↘	↗?	?	↗?
Suusamyr valley	Breeding	Presumed extirpated	N/A	1	†	N/A	N/A	N/A
Totals for Kyrgyzstan	**Breeding**	**1496–1965**	**3**	**Average 3**	↘	↗	**→?**	↗

DISCUSSION

Threats and conservation actions

Agricultural practices are probably the main threat to Little Bustards in Kyrgyzstan. Our 2021 survey revealed a sharp shift from their usage of alfalfa to cereal fields by the end of May, when the former was harvested and the latter reached a suitable height for cover (Table 3). This trend was not repeated in 2023, which we argue was due to the weather. A severe drought in 2021 delayed the growth of cereal crops and severely reduced the carrying capacity of pastures, whereas 2023 had a much wetter summer and arguably allowed Little Bustards to use more habitats.

Table 3. Land use within 500 m of displaying male Little Bustards around the Tulek Valley IBA.

Land use around displaying males	Alfalfa/Fallow		Other crops		Dry cereal		Steppe/Pasture	
	2021	2023	2021	2023	2021	2023	2021	2023
Week 0 (01.05.2021)	29%	n/a	18%	n/a	38%	n/a	15%	n/a
Week 1 (07.05.21, 05.05.23)	20%	32%	20%	20%	41%	24%	19%	24%
Week 2 (14.05.21, 12.05.23)	10%	32%	11%	7%	56%	30%	24%	30%
Week 3 (21.05.21, 19.05.23)	11%	30%	12%	18%	61%	22%	15%	31%
Week 4 (28.05.21, 26.05.23)	12%	33%	9%	21%	60%	23%	19%	23%

Nevertheless, females are much more tied than males to denser vegetation where they nest and feed their young (Traba *et al* 2022). Alfalfa offers such cover and this dependency makes them vulnerable to mechanised agricultural practices. Indeed, our 2021 satellite imagery analysis showed that the alfalfa harvest peaked in mid-June, overlapping the main period when females lay or incubate their eggs. Although we did not witness it directly, our observations of destroyed nests from both 2021 and 2023, and the high temporal overlap we have noted between alfalfa harvest and the Little Bustard nesting period, indicate that it is likely to be common for both clutches and females to be lost to agricultural machinery (Campeau & Kulagin 2022). This is slightly mitigated by the fact that a few alfalfa fields are kept for seeds and thus cut later in the season, but our satellite analysis reveals these to constitute less than 10% of the total. Late-breeding birds and replacement clutches may have more success as they can use less disturbed dry agricultural areas which are harvested later. On the other hand, second clutches consist of fewer eggs (1–2 instead of 3–5) and food availability for chicks tends to be lower later in the season (Ryabitsev *et al* 2019).

If the threat of agricultural machinery in alfalfa and other crops is the main limiting factor for the Little Bustard population of the Chuy valley, pastures do not always provide safe habitats either. In 2021, during the drought, the majority of them were so overgrazed that the grass was barely a few centimetres high; even in less grazed areas, they were open enough for a sheepdog to find and destroy a nest (shepherd pers comm to LPC). Wetter weather during our second season of surveys meant pastures were more commonly used by displaying males, proving that the bird will use them when the habitat is suitable.

Illegal hunting has an impact, although we could not measure this. The presence of the Little Bustard in summer is recent and few people were aware of it, but hunters certainly knew about the large autumn flocks. Fines for killing a Little Bustard could reach 200 000 soms (just under US$2300), but the law is rarely enforced. This threat is likely to grow in importance as poachers realise that Little Bustards are present in spring and summer as well.

Finally, deaths by collisions also affect this population. In the autumn of 2024, at least two Little Bustards were killed by aeroplanes at the Manas international airport near Bishkek (AT Davletbakov pers comm to LPC 2025). Furthermore, as seen across the bird's range, powerlines are likely to be a much greater threat (Silva *et al* 2022). No casualties were found in 2023 when we followed the main powerline crossing the Tulek Valley IBA, but we did not engage in the kind of regular monitoring required to assess powerline casualties robustly. On 13 October 2024 we found the carcasses of two Northern Lapwings *Vanellus vanellus* under a line in the same fields where 130 Little Bustards had been seen two weeks previously. With all bustard species being particularly vulnerable because of their low manoeuvrability in flight and reduced frontal vision fields, collisions are likely to have a population-level impact (Silva *et al* 2022).

The entire area used by the Little Bustard in Kyrgyzstan is devoted to agriculture, with no protected zones. The Tulek Valley IBA is located within this area and is home to the lek we have studied, but no protective measures are afforded the site.

Population estimates

We have taken a conservative approach to population estimates in the surveyed breeding areas and are relatively confident in our results for the Chuy valley. Averages rather than maximum counts were used in calculating densities and, when extrapolating to non-surveyed areas, we precautionarily lowered these further. In 2023, as we widened the scope of our investigation from the Tulek Valley IBA to larger portions of the Chuy valley, we kept encountering Little Bustards, which hints strongly at their ongoing recovery in Kyrgyzstan. Indeed, in June 2024, a lone male was found displaying within 5 km of Bishkek in dry foothills nearer the mountains, an area that we had dismissed after our one-off surveys. This bird displayed alone for almost a month, but this nevertheless indicates that birds are entering new areas (Figure 2).

Outside the Chuy valley, we simply do not know how Little Bustards are faring. The Talas valley is very promising as a breeding location, with plenty of suitable agricultural lands, and could well host a sizeable population; it may also be that the Little Bustard is recolonising areas further south, with the Toktogul region a prime candidate for investigation. Conducting a handful of one-off surveys in these areas during the next breeding season could answer these questions. Trans-border surveys with colleagues from Kazakhstan, both for the Chuy and Talas valleys, could also augment our understanding of local movements. Perhaps more interestingly, we could use such collaboration to evaluate the role played by the border itself in protecting Little Bustards from illegal poaching, as observed in Iran (Yousefi *et al* 2017), as Kyrgyz border guards recently banned hunting near their bases (E Kolganov pers comm to LPC 2021). The higher breeding density reached near Milyanfan is due to a high proportion of alfalfa fields, but it is also likely to reflect this proximity to the border.

Furthermore, the question of the migratory pathway and winter quarters of these birds, and those of the eastern part of the species' Eurasian population in general, remains unanswered. Flocks numbering in the thousands were seen during the winter of 2024–25 in eastern Uzbekistan, indicating a possible destination for the individuals breeding in northern Kyrgyzstan or at the very least migrating through it (Ten *et al* 2025). The inaccessibility of Afghanistan to researchers may also hide the presence of such flocks. More work could be done to monitor post-breeding flocks, although our experience showed that they can be very difficult to locate when feeding. Using telemetry on birds known to have bred in our region would be the single most powerful approach to answering our questions regarding post-breeding and migration movements.

To conclude, on the one hand, the breeding density of around 1/0.55 males per km within/around leks revealed by our 2021 and 2023 studies is similar to that found in the early 2000s in the trans-Ural region of Russia during the early stages of the reoccupation of a steppe/cereal agricultural landscape (Korovin 2014). This hints at the Kyrgyz population still being in a recovery mode. The discovery of birds in 2023 and 2024 in previously unused areas also points in that direction. On the other hand, this recovery now faces two new threats on top of those discussed above. First, agricultural practices are changing quickly, with farmers having more access to pesticides and fertilisers. The mosaic of smallholdings beneficial to the Little Bustard is increasingly being consolidated in the hands of fewer stakeholders who favour larger expanses of commercial irrigated crops such as watermelon, corn, onions and other vegetables, all of which are considerably less suitable or entirely unsuitable for breeding. Second, as people become more aware of the bird's presence, illegal hunting is likely to increase. As in other parts of its range, the post-Soviet period of population recovery may thus begin to plateau. To compensate for this trend, working with local farmers to adapt their practices to conserve biodiversity, with a focus on preserving habitats for Little Bustards and minimising casualties from machinery, may be the way forward. Small measures, such as delaying harvesting in selected fields, reducing harvesting speeds/forcing birds to flush in advance of approaching machinery and controlling overgrazing, could make significant differences in survival rates. Agricultural landscapes in Kyrgyzstan are almost never thought of in terms of their importance for wildlife, with maybe the exception of managing pheasant populations for hunting. Changing this attitude could be attempted initially by promoting the existence and importance of steppe landscape for the survival of vulnerable and iconic species like the Little Bustard.

ACKNOWLEDGEMENTS

This research was made possible by two grants from the Conservation Fund of the Ornithological Society of the Middle East, the Caucasus and Central Asia (OSME). We would also like to thank Karen Wykurz for providing the photograph of a displaying male.

LITERATURE CITED

Campeau, LP & SV Kulagin. 2022. The return of breeding Little Bustards *Tetrax tetrax* to the Tulek Valley IBA, Kyrgyzstan. *Sandgrouse* 44: 360–371.

Davletbakov, AT & AN Ostashenko. 2010. [On the breeding of Little Bustard and Paradise Flycatcher on the territory of Kyrgyzstan.] *Selevinia* 18: 187. [In Russian]

Farajli, Z. 2025. Assessing the wintering population and conservation challenges of the Little Bustard *Tetrax tetrax* in Azerbaijan. *Sandgrouse* 47: 87–101.

Gubin, BM. 2007. [*The Birds of Middle Asia in 5 volume [sic]*.] Almaty. [In Russian]

Kamp, J, MA Koshkin, TM Bragina, TE Katzner, EJ Milner Gulland, D Schreiber & R Urazaliev. 2016. Persistent and novel threats to the biodiversity of Kazakhstan's steppes and semi-deserts. *Biodiversity and Conservation* 25: 2521–2541.

Kataevskiy, VN. 2006. [Little Bustard.] In: Shukurov, EJ & E Kasybekov (eds). [*The Red Data Book of Kyrgyzstan*.] Kyrgyzpoligraphkombinat, Bishkek. [In Russian]

Korovin, VA. 2014. Restoration of the Little Bustard population in the northern steppe Trans-Urals. *Biology Bulletin* 41: 856–861.

Koshkin, MA, R Urazaliyev & BM Gubin. 2025. Populations of Little Bustards *Tetrax tetrax* in Kazakhstan have rebounded following a period of agricultural abandonment. *Sandgrouse* 47: 111–121.

Ligue pour la Protection des Oiseaux. 2013. Protocole d'étude 'Outarde canepetière'. https://outardecanepetiere.fr/IMG/pdf/protocole_suivi_outarde_2013_vf.pdf. [Accessed 5 April 2021]

Ligue pour la Protection des Oiseaux. 2020. Enquête Nationale Outarde (ENO) par point d'écoute. Protocole détaillé Version 2020.

Morales, MB, F Casas, EG de la Morena, A Ponjoan, G Calabuig, J Martínez-Padilla, JT García, S Mañosa, J Viñuela & G Bota. 2014. Density dependence and habitat quality modulate the intensity of display territory defence in an exploded lekking species. *Behavioral Ecology and Sociobiology* 68: 1493–1504.

Potapov, RL & VE Flint (eds). 1987. [*Birds of the USSR. Gruiformes, Galliformes.*] Leningrad. [In Russian]

Ryabitsev, VK, AG Abdulnazarov, OV Belyalov, NN Berezovikov, AF Kovshar, VA Kovshar, SV Kulagin, OV Mitropolskiy & EA Rustamov. 2019. [*Birds of Central Asia*.] Vol 1. Kabinetnyy Uchenyy, Moscow, Ekaterinburg. [In Russian]

Serrano-Davies, E, J Traba, B Arroyo, F Mougeot, F Cuscó, S Mañosa, G Bota, N Faria, A Villers, F Casas, C Attié, P Devoucoux, V Bretagnolle & MB Morales. 2023. Biased adult sex ratios in Western Europe populations of Little Bustard *Tetrax tetrax* as a potential warning signal of unbalanced mortalities. *Bird Conservation International* 33: e40.

Shakula, VF, SV Shakula & GV Shakula. 2017. [Little Bustard – is a natural component of agricultural earth in southern Kazakhstan.] *In:* AV Vinober (ed), [*Biosphere Management and Sustainable Development of Agricultural Territories*]. Ottisk, Irkutsk, pp23-25. [In Russian]

Shukurov, EZh. 1981. [Birds of Kirgizia in two parts. Part 1.] Mektep, Frunze. [In Russian]

Silva, JP, AT Marques, J Bernardino, T Allinson, Y Andryushchenko, S Dutta, M Kessler, RC Martins, F Moreira, J Pallett, MD Pretorius, HA Scott, JM Shaw & NJ Collar. 2022. The effects of powerlines on bustards: how best to mitigate, how best to monitor? *Bird Conservation International* 33: e30.

Traba, J, MB Morales, JP Silva, V Bretagnolle, & P Devoucoux. 2022. Habitat selection and space use. *In:* Bretagnolle, V, J Traba & MB Morales (eds). *Little Bustard: Ecology and Conservation*. Springer Nature, Switzerland, pp101-121.

Yanushevich, AI, PS Tyrin, ID Yakovleva, A Kydyraliev & NI Semenova. 1959. [*Birds of Kirgizia*.] Academy of Sciences, Frunze. [In Russian]

Yousefi, M, A Kafash, S Malakoutikhah, A Ashoori, A Khani, Y Mehdizade, F Ataei, SS Ilanloo, HR Rezaei & JP Silva. 2017. Distance to international border shapes the distribution pattern of the growing Little Bustard *Tetrax tetrax* winter population in northern Iran. *Bird Conservation International* 28: 499–508.

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Warming temperatures and reduced snow cover are associated with new wintering grounds for the Little Bustard *Tetrax tetrax* in Uzbekistan

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Summary: Little Bustards *Tetrax tetrax* historically wintered in large numbers across the plains of southern Uzbekistan, but by the late 20th century their populations had greatly declined. In the early 2000s, winter flocks were still being recorded in Surkhandarya and Kashkadarya provinces. Recent observations (2018–2025) indicate that the species is wintering farther north in Uzbekistan than historically noted, shifting into Jizzakh and Syrdarya provinces. Since 2023, a number of large congregations have been noted near Dashtobod (Syrdarya province), with one reaching around 6500 birds in January 2025. Analysis of climatic trends in Uzbekistan indicates a warming pattern, likely facilitating this northward shift by improving habitat conditions and food availability. However, habitat degradation, poaching and the risk of collisions with powerlines still pose serious threats.

INTRODUCTION

The Little Bustard *Tetrax tetrax* inhabits open grasslands, steppes and semi-deserts across a wide range from western Europe to Central Asia and western China (BirdLife International 2018). Populations migrating through Uzbekistan primarily breed in Kazakhstan's extensive steppe and semi-desert habitats (Gavrilov & Gavrilov 2005), and typically appear from late March to early May and again from mid-August to November (11 stopover sites marked in Figure 1), although some birds remain throughout the winter (from December to February; authors' unpubl data). Breeding has also been documented in Uzbekistan's piedmont plains, although only on a few occasions: in 1990 in the foothills of the Turkestan range (Jizzakh province), and in May 1998 in the low Aktau foothills (Navoi province, south of Nurata) (Kreuzberg-Mukhina 2003). Historically, large winter congregations occurred regularly in southern Uzbekistan, where thousands of birds were observed in the early 20th century. However, from the mid-20th century onwards, these congregations declined sharply to hundreds, then to mere dozens of birds, with only sporadic sightings thereafter (Kreuzberg-Mukhina & Lanovenko 2003, Kreuzberg-Mukhina *et al* 2003). This decline has been attributed largely to poaching, agricultural intensification and other anthropogenic pressures.

In February 2001, significant winter congregations of the Little Bustard were rediscovered in agricultural areas of Surkhandarya province, near the border with Afghanistan. Surveys conducted in winters 2002–2004 confirmed regular flocks ranging from 15 to over 600 individuals (Kreuzberg-Mukhina & Lanovenko 2003, Kreuzberg-Mukhina *et al* 2003). Later observations (2006–2007) indicated even larger flocks of up to 1500 birds (E Lanovenko pers comm). Despite their cautious behaviour, however, Little Bustards faced significant threats from local poaching and trapping, raising conservation concerns. The status of the species in Uzbekistan was most recently evaluated as Vulnerable (Lanovenko & Filatova 2019), and the species is protected from hunting.

We investigate the winter status of the Little Bustard throughout Uzbekistan from 2011 to the present day, explore climatic factors which may influence its current distribution, and describe threats to the species in this territory.

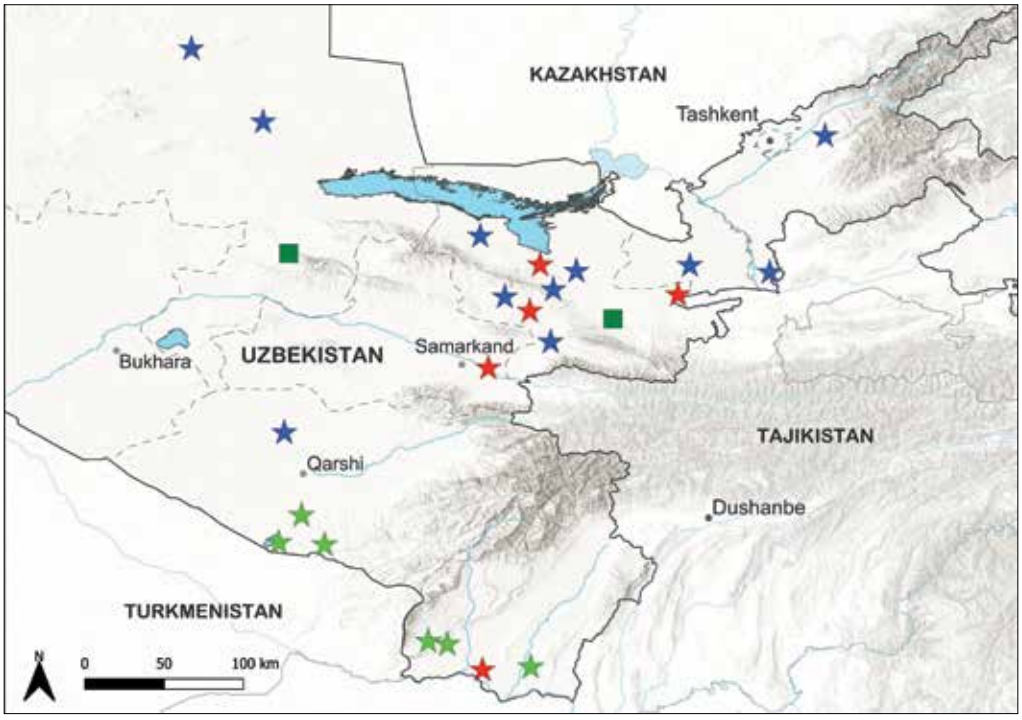

Figure 1. Historical and recent distribution of Little Bustard in Uzbekistan. Historical migration stopover sites (pre-2000) are marked with blue stars, historical wintering sites (2000–2010) with green stars, and recent wintering sites (2018–2025) with red stars. Known breeding events (1990s) are marked with dark green squares.

METHODS

In southern and central Uzbekistan, open dry steppe and semi-desert landscapes form the core habitats for Little Bustards, featuring sparse sagebrush *Artemisia* and saltwort *Salsola* communities, plus fallow fields and rain-fed cereal crops. Intensive grazing, farming and infrastructure projects influence habitat condition and availability. Surkhandarya province in the south has traditionally supported most winter Little Bustard flocks, whereas central provinces, including Syrdarya, Jizzakh and Samarkand, were until recently used mostly during migration.

Records of wintering Little Bustards in Uzbekistan from 2011 to early 2025 were compiled from field notes by local ornithologists, local birdwatchers and citizen-science platforms (birds.uz, eBird), with verification via photographs or independent reports whenever possible. Historical context was obtained from earlier literature and the Red Data Book of Uzbekistan (2019). Wintering grounds were defined as sites where groups of Little Bustards remained for two or more weeks during the core winter period, defined as December–February.

To assess the role of climate, we reviewed Uzbekistan's meteorological data (2010–2025; Hydromet 2025, Zoï Environment Network 2018), comparing winter temperatures and precipitation from the 2010s with the early 2020s. To visualise shifts in distribution, we conducted geographic mapping of historical and recent wintering grounds in QGIS 3.0 (Figures 1 and 2).

Table 1. Population estimates for the Little Bustard in Uzbekistan. *The 1000–2000 birds in southern Uzbekistan up to 2023 may all be a subset of the 6500 in Dashtobod in 2025; we compromise by only counting the lower number for southern Uzbekistan in this total; ** in Jizzakh province; *** in Navoi province. Quality of estimate: 1 = low, 5 = high.

Season	Number of birds	Important sites	Quality of estimate	Population trend			
				1950–1990	1990–2020	2020–2023	1950–2023
Breeding	2–10 individuals	Turkestan range**, Aktau foothills***	1	↘	↘	↘	↘
Wintering	6500–7500 in 2025*	2	3	↘	↗	↗	↗
Dashtobod	6500 in 2025			N/A	N/A	↗	↗
Southern Uzbekistan	1000–2000 up to 2023			↘	↗	→ ?	↗

RESULTS

As described in the Introduction, the Little Bustard historically wintered primarily in southern Uzbekistan (Table 1), but winter observations became scarce by the late 20th century owing to habitat loss. However, from the early 2000s, regular wintering was again confirmed in Surkhandarya and Kashkadarya provinces, where numbers appear stable at around 1000–2000 individuals, and in March 2023 a single flock of 2000 was recorded there (authors' unpublished data). More recently, since 2018, much smaller numbers ranging from single birds to several dozen have been recorded at four sites further north, in Jizzakh and Samarkand provinces, suggesting a gradual northward shift, although a fifth site, Kampyrtepa near the Amu Darya river floodplain, involved 100 birds on 21 January 2018 and 70 birds on 17 February 2021, in the more traditional wintering zone (Figure 1).

In 2019, single birds and small groups were noted in the northern piedmont plains of the Nuratau range (Jizzakh province), while in 2024, 30–50 birds were observed on the range's southern piedmont. On 18 January 2023, a flock of 53 was seen in Zarafshan National Park (Samarkand province), where it remained for about a week in agricultural fields interspersed with tamarisk shrubs. These observations point to a continued northward expansion, including a major new wintering site, located approximately 5.6 km north-east of Dashtobod town centre in Syrdarya province, near the border with Jizzakh province and the international frontier with Tajikistan (Figure 2).

The new Dashtobod site

The site north-east of Dashtobod represents a shift some 200–300 km north of any previously documented wintering sites. Multiple large flocks have been recorded here, starting with 500 birds on 1 December 2023 (AR pers obs), then in 2024, 2500 on 18 January (TA, MM pers obs), 4000 on 21 January (MG, E Salimov pers obs), 6000 on 10 February (TA, E Fejes pers obs), 800 on 22 February (TA pers obs), and in January 2025 6500 (R Granovskaya, V Egorov pers obs; Plate 1), the largest single flock reported in Uzbekistan to date.

Information about the Little Bustard's wintering flocks at this site initially came from local hunters. Field observations by a group of birdwatchers (*birds.uz*) revealed that the birds largely congregated around a farm using centre pivot sprinkler irrigation (Figure 3). This farm is partially fenced, offering a degree of security from disturbance. However, hunters' accounts raise concerns that systematic poaching may persist in the region.

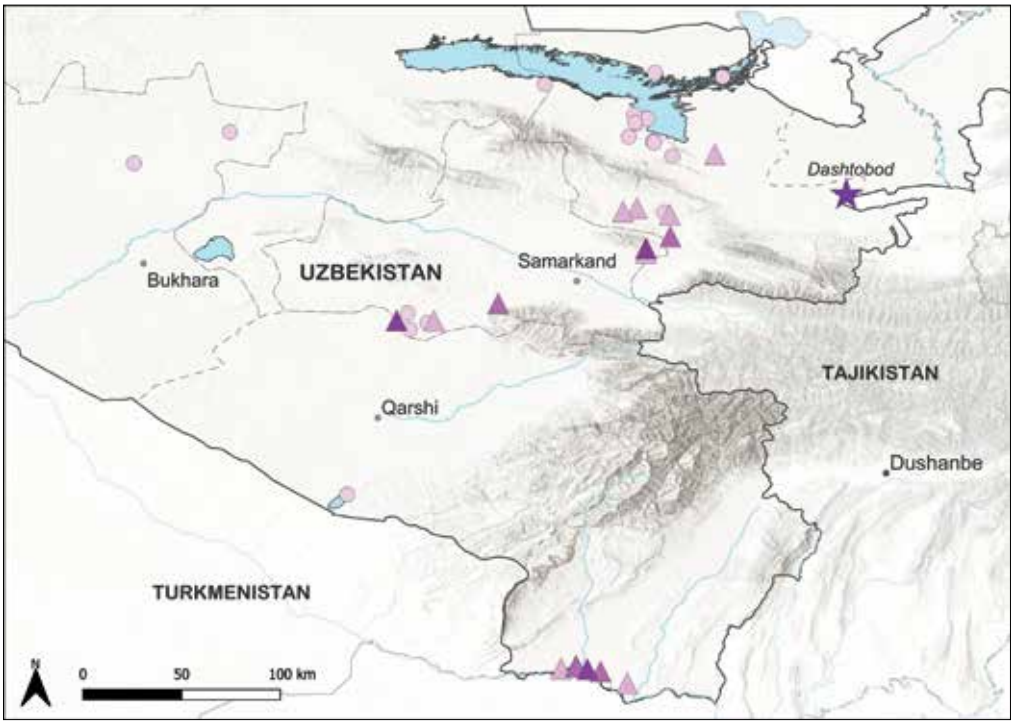

Figure 2. Recent distribution and size of Little Bustard wintering aggregations in Uzbekistan (2018–2025). Pale circle = 1–10 birds; triangles from pale to dark = 10–50; 50–100; 100–1000 birds; star = 6500 birds (Dashtobod).

Climatic trends

All areas of Uzbekistan exhibit a winter warming of about 0.2 to 0.5°C per decade (around 0.3°C overall), consistent with broader climatic changes in Uzbekistan, where mean annual temperatures have increased by roughly 1.6°C since 1880 (IISD 2025). Southern provinces (Kashkadarya, Surkhandarya) display notably milder winters, with fewer severe frosts (Hydromet 2025) and more frequent positive temperature anomalies. Several winters since 2018 rank among the warmest on record, with January averages near 0°C (compared to historical −2 to −3°C).

Although total winter precipitation varied between 70 and 130 mm with no distinct upward or downward trend, higher winter temperatures mean a growing proportion of precipitation falls as rain rather than snow, leading to briefer and rarer snow cover (Hydromet 2025).

Threats

Most reports regarding novel wintering grounds for Little Bustards in Uzbekistan initially came from responsible local hunters who passed on information on ongoing illegal hunting that they obtained through their networks. Field observations near Dashtobod by the birds.uz team indicate that the Little Bustards tend to gather around a partially fenced farm, which offers some measure of security from disturbance. However, systematic poaching of Little Bustards persists in the area.

On 14 November 2024, a nature-oriented Telegram channel (Ecolog.uz) criticised posts shared by another Telegram channel (Mokhir ovchilar; in Uzbek: 'Skilled Hunters') which featured images of 4–5 injured and killed Little Bustards (Plate 2). This incident highlights the continued vulnerability of the species to poaching, despite legal protection.

Plate 1. Little Bustards at Dashtobod, Jizzakh, Uzbekistan, 12 January 2025. © *Relisa Granovskaya*

DISCUSSION

Recent observations of Little Bustards in Uzbekistan have come primarily from incidental records by birdwatchers and researchers conducting work unrelated to the species. Dedicated, species-specific surveys are needed to verify population trends, define habitat preferences, evaluate threats and inform targeted conservation measures. Despite these data gaps, field observations during the winters of 2023, 2024 and 2025 clearly suggest a northward expansion of the Little Bustard's wintering range. Syrdarya, Jizzakh and Samarkand provinces—historically known primarily as migratory corridors—now host regular winter flocks. This shift appears tied to warmer winter temperatures (averaging +0.3°C/decade) and reduced snow cover, which may facilitate suitable foraging conditions, including access to waste grains and green shoots. Sites such as Dashtobod reflect these favourable conditions, although the flocks can disperse rapidly under adverse weather. The dramatic drop from 6000 to around 800 birds in mid-February 2024 followed heavy snowfall, underscoring the unpredictability of conditions on these new wintering grounds.

Plate 2. Evidence of illegal poaching of Little Bustards in Uzbekistan (social media post, source: Ecolog.uz). *Anon*

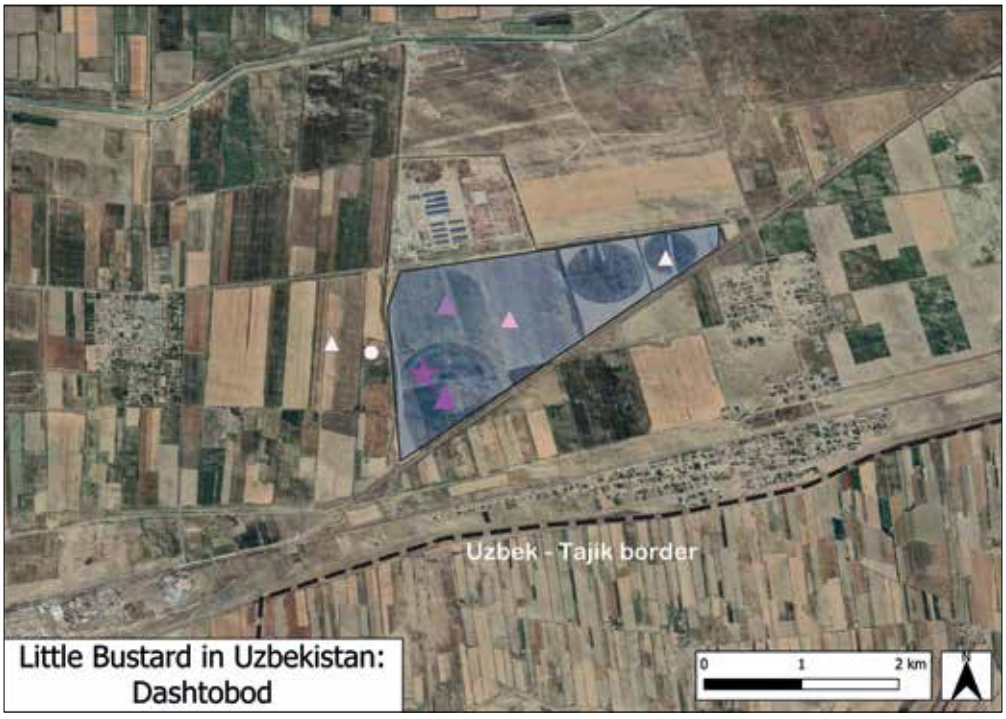

Figure 3. Satellite imagery showing the new (partially fenced) wintering area (grey-blue triangle with large dark circles of pivot irrigation) near Dashtobod, Syrdarya province. The pale circle represents the 2023 observation (500 birds); triangles those of 2024 (from pale to dark: 300-800, 2500, 4000 and 6000 birds respectively); the star for 2025 (6500 birds).

Defining 'wintering' sites as locations where groups of Little Bustards remain for multiple weeks helps distinguish them from late-migrating flocks. However, the line between migration and wintering can be blurred: mild weather can prompt birds to stay, while severe cold and snow may trigger further migration to the south. Even so, the consistent reappearance of winter flocks in the fenced agricultural fields of Dashtobod and elsewhere in central Uzbekistan suggests that local factors—low snow cover, irrigated farmland, roosts with lower levels of disturbance—can facilitate over-wintering.

New wintering sites create both opportunities and challenges. On the one hand, aggregations of up to several thousand birds present opportunities for focused conservation: if well protected, these flocks could help sustain the regional population. On the other, illegal hunting can easily target these large conspicuous flocks. Infrastructure hazards, notably the risk of collisions with overhead powerlines, may also pose a significant threat; for instance, at Dashtobod the railway borders the wintering site, and the overhead contact line could be dangerous for Little Bustards. Collaborations with local communities, as well as measures such as the creation of seasonal ornithological refuges, could mitigate these pressures.

The significant northward shift of Little Bustard wintering grounds into central Uzbekistan—evidenced by flocks of up to 6500 birds—underscores the species' adaptability amid changing climatic conditions. While this shift may signal a partial population recovery, continued threats such as habitat degradation and poaching could negate these gains. In addition, overhead powerlines pose collision risks for large wintering flocks. Urgent measures, including habitat protection, stricter poaching regulation and ongoing surveillance, are essential to safeguard these birds. If effectively managed, Uzbekistan's

expanding winter range could offer a significant contribution to the conservation of this species across Central Asia.

ACKNOWLEDGEMENTS

The authors thank all the ornithologists and birdwatchers from the birds.uz team who have shared their field observations. We also thank Relisa Granovskaya for providing photographs, and Louis-Philippe Campeau for making the figures.

LITERATURE CITED

BirdLife International. 2018. Species factsheet: Little Bustard *Tetrax tetrax*. Downloaded from https://datazone.birdlife.org/species/factsheet/little-bustard-tetrax-tetrax on 15/03/2025.

Birds.uz. 2025. Little bustard. https://birds.uz/map?species_id=132. [Accessed March 2025]

eBird.org. 2025. *eBird Basic Dataset* (Version Jan-2025). Cornell Lab of Ornithology.

Ecolog.uz. 2024. *Latest news on environmental topics from Uzbekistan.* Telegram group, t.me/ekologuzru. [Accessed 14 November 2024]

Gavrilov, EI & AE Gavrilov. 2005. [*The Birds of Kazakhstan*.] Tethys, Almaty, Kazakhstan. [In Russian]

Hydromet.uz. 2025. Uzbekistan Hydrometeorological Service – Official source of meteorological data and press releases. http://www.hydromet.uz/**.** **[**Accessed March 2025**]**

IISD.org. 2025. Resource for climate change data and climate policy analysis. https://www.iisd.org/. **[**Accessed March 2025]

International Union for Conservation of Nature. 2023. The IUCN Red List of Threatened Species. Version 2023. www.iucnredlist.org [Accessed 10 March 2025].

Kreuzberg-Mukhina, EA. 2003. [Contemporary status of bustard species in Uzbekistan.] *In:* Khrustov, AV (ed) [*Bustards of Russia and Adjacent Territories*.] Volume 2. Saratov University Press, Saratov, pp64–75. [In Russian]

Kreuzberg-Mukhina, EA & EN Lanovenko. 2003. [On the wintering of the Little Bustard in Uzbekistan.] *Strepet* 1: 5–9. [In Russian]

Kreuzberg-Mukhina, EA, EN Lanovenko, ESh Shernazarov, AK Filatov & A Ten. 2003. [Expansion of the wintering range of Little Bustard in Uzbekistan.] *Strepet* 2: 90–91. [In Russian]

Lanovenko, EN & EA Filatova. 2019. [Little Bustard - *Tetrax tetrax* (Linnaeus, 1758).] *In*: Azimov, JA (ed). *Red Book of the Republic of Uzbekistan*. Chinor ENK, Tashkent. [In Uzbek and Russian]

Zoï Environment Network, Mountain Partnership. 2012. *Central Asia Mountains*. University of Central Asia, GRID-Arendal. https://zoinet.org/wp-content/uploads/2018/02/Central-Asia-Mountains-onepager-zoi-EN.pdf. [Accessed 10 March 2025]

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The Little Bustard *Tetrax tetrax* in Turkmenistan: an analysis of status, 1880–2024

ELDAR ANVEROVICH RUSTAMOV & ALEXANDER ALEXEYEVICH SHCHERBINA

Summary: We used data from field surveys since 1970 and literary sources to analyse the historical and current distribution, seasonality and relative numbers of the Little Bustard *Tetrax tetrax* in the most important parts of its range in Turkmenistan. Between 1930 and 1960, the total number during autumn migration was estimated at 690–1120 individuals, with 260–390 wintering birds recorded in the same period. In 1961–1990, these figures dropped to 15–50 and 40–80 individuals, respectively, indicating a 20- to 40-fold decrease of migrating birds and 5- to 6-fold reduction of the wintering population. In 1991–2020, the total number of birds recorded during autumn migration was 1915–3680 individuals, of which 1290–2190 stayed in the country for the winter. The current Little Bustard population across Turkmenistan numbers 4360–7560 in autumn and 5440–9470 in winter. Threats in Turkmenistan contributing to these fluctuations include both anthropogenic factors such as poaching and natural factors, such as harsh winters (eight in the last 65 years) and predation. Scarcity of data renders this analysis and assessment preliminary. Lacking a comprehensive study, Turkmenistan has yet to develop a national action plan to conserve the species.

INTRODUCTION

In the first half of the 20th century, the Little Bustard *Tetrax tetrax* was a migratory, breeding and wintering species in Turkmenistan. It bred in the steppe-like areas of the Kopet Dag, although only sporadically and in small numbers (Zarudny 1896, Shestoperov 1937). On migration it was also recorded in the Kopet Dag and its foothills (Shestoperov 1928), along the valleys of the Amu Darya, Murgab (including its tributaries Kushka and Kashan) and Tejen rivers (Dement'ev 1952), as well as along the Caspian shore and the western portion of the Uzboi, the ancient riverbed of the Amu Darya (Isakov & Vorob'ev 1940, Dement'ev *et al* 1955). The species sporadically migrated through the Karakum desert (Rustamov 1954) and internal part of the Badhyz plateau (Sukhinin 1989). In winter, it was found in the lower reaches of the Atrek river (Zhitnikov 1900) and on the adjacent plain in the extreme south-west of the country (Dement'ev *et al* 1955). Wintering birds were also recorded in the southernmost area, in the Kushka valley (Geptner 1956, Ataev *et al* 1978). At that time, the species' abundance was described in non-numerical terms such as 'large flocks', 'big migration the following day' and so on; very few reports involved numbers ('every flock consisted of 2–3, rarely 30–40 birds').

After around 1950, the total area of potential Little Bustard habitats in Turkmenistan increased significantly as a result of the large stretches of wetlands and meadows (including the Kelif lakes) created by the huge Karakum canal, the development of agricultural fields in the Tejen and Murgab deltas and the interfluve between these rivers (Khankhovuz oasis), as well as along the Amu Darya (Shahsenem and Tallymerjen areas). Despite this, a population crash throughout its Eurasian range in the three decades after 1960 rendered the species very rare in Turkmenistan both on migration and in winter (Rustamov 1985). Nevertheless, this considerable expansion of potential habitat for Little Bustard on migration and especially in winter continued to take place on the Kopet Dag piedmont plain after 1990 as cash crops were replaced by cereals.

Currently, the Little Bustard in Turkmenistan is once again a migratory, regularly wintering and sporadically breeding species. The population growth that started two decades ago continues. Its migration routes lie along the Caspian shore, foothills and river valleys, as well as over wetlands along irrigation canals in the desert. It breeds in small numbers in the Kopet Dag and its foothills. In winter, the birds congregate at oases and on fields in the southern parts of the country.

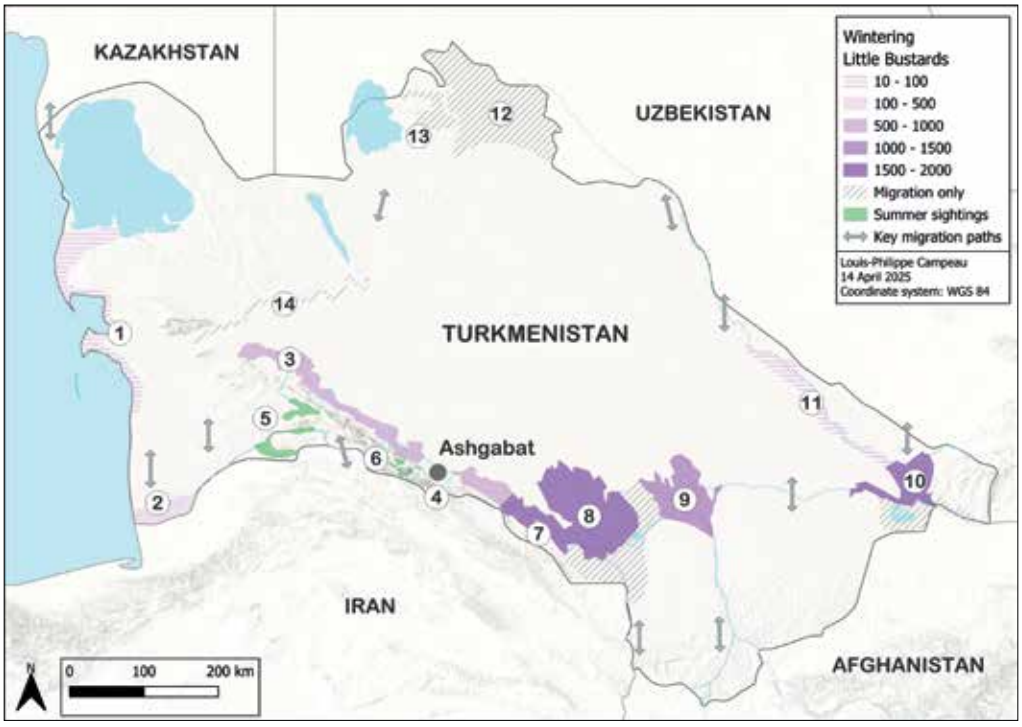

Figure 1. Turkmenistan, showing the 14 areas in which the Little Bustard has been recorded. Numbers, arranged anti-clockwise from the Caspian seaboard, correspond to those given in Table 1.

METHODS

Overview of historical materials

In our research we used all available published data (28 sources in total) on the Little Bustard in the region going back over 100 years. We used both published and unpublished primary sources on the Kopet Dag, which occupies 15% of the territory of Turkmenistan (Figure 1, areas 5 & 6). We exclude works citing these primary sources in order to avoid repetition and misinterpretation.

Surveys

Transect surveys (on foot and by car) were the main method to study the distribution and numbers of the Little Bustard, as part of surveys of other bird species and/or wildlife in general. AAS collected material in 1970 (data from a nature reserve logbook) and in 1971–2023 along the eastern shore of the Caspian Sea and adjacent deserts (Figure 1, areas 1 & 2). On transects with a total length of 4220 km (each transect ranging 1–60 km in length, 5.4 km on average), he conducted 808 surveys and recorded 4611 Little Bustards (with numbers per survey ranging from 1 to 1000 individuals, 5.7 on average). He usually made his research trips in the hunting season, between early autumn (August–September) and early spring (February–March), and again in spring (April–early May). In addition, he regularly monitored the littoral parts of the Khazar (Krasnovodsk) Nature Reserve.

EAR conducted surveys from 1976 to 2005, in all seasons, covering all other lowlands in Turkmenistan, including foothills, river valleys, oases and agricultural landscapes (Figure 1, areas 3, 4, 7–14). He observed open landscapes from a car, driving at 60–70 km/h

(Cheltsov-Bebutov 1959, Vernander *et al* 1959, Rustamov 1988, 1994). From 2006 to 2024, he conducted regular observations and surveys in the foothills of the central Kopet Dag.

During our surveys we did our best not to count flocks we had already recorded in order to obtain a more objective estimate of the numbers. The results are based on data collected at different times in various places, because no targeted research, including our own surveys, has yet been conducted into the Little Bustard in Turkmenistan.

Analysis

We divide our analysis into five historical periods: 1880–1930, 1931–1960, 1961–1990, 1991–2020 and after 2020. Works covering the first period are scanty and contain only the fragmentary data that were gathered by early naturalist explorers (Radde & Walter 1889, Zaroudnoï 1890-91, 1896, Zhitnikov 1900, Loudon 1910–1911, 1911, Shestoperov 1928, Isakov & Vorob'ev 1940, Dement'ev 1952 [observations by Ptushenko & Tishkin]). Since these researchers had access to only a few of the sites inhabited by the Little Bustard, no accurate assessment can be made of the species' distribution or numbers in that period. As abundance was described qualitatively, we have no data from the first period to include in Table 1. Nevertheless, we have attempted to analyse later data and provide a retrospective assessment of the remaining four periods (Table 1). We used a five-grade system to rate the quality of the estimations for different regions and periods (1 lowest, 5 highest). We can only be completely confident of grades 4 and 5, where the estimates are based on personal expert surveys or reliable published data. Other grades are based on general conclusions and our personal field experience, as well as our knowledge of the Little Bustard's actual and potential habitats.

RESULTS AND DISCUSSION

Non-breeding distributions and populations

The 14 regions where the Little Bustard has been recorded in Turkmenistan almost entirely encircle the Karakum desert, which dominates the great majority of the country. We map them anti-clockwise from the Caspian seaboard in Figure 1, and list them in Table 1 with their estimated and known numbers of birds for the last four review periods.

During migration, the species occurs unevenly across Turkmenistan, especially in the last three decades. The unevenness is the result not only of climatic changes but also of anthropogenic factors, which increasingly impact the natural environment through agricultural expansion and new tree plantations. Spring migration generally occurs from mid-February to late April. Little Bustards stop to forage in fields but do not stay long. Autumn migration lasts from early September to late November, with birds more often recorded in the same places where they winter, making short-distance movements. Most of the numerical estimates we provide are based on autumn records.

1931–1960

Fragmentary data on migratory birds in areas far from the Caspian seaboard (Figure 1, areas 3–14) in the second period (1931–1960), particularly in the 1940s (Dement'ev 1952, Dement'ev *et al* 1955, and others) indicate a wider distribution of the species during migration. Little Bustards usually migrated along the northern foothills of the Kopet Dag and the valleys of lowland rivers (Tejen, Murgab, Kushka and Amu Darya, as well as the Amu Darya's former riverbed, the Uzboi). They rarely travelled into the desert, such as up to the Uchaji station (now Bagtyyarlyk), as was noted by Zarudny (1896).

The earliest estimate of the species' numbers was made in the late 1930s in the south-eastern Caspian region, including the littoral zone and lower reaches of the Atrek

(Figure 1, area 2), where 200–300 Little Bustards wintered regularly (Isakov & Vorob'ev 1940). However, these figures concerned certain flocks, and it is difficult now to specify the number of such flocks and the total number of wintering birds. We assume up to 1000 individuals wintered there annually at that time, which is indirectly supported by data from a later period (1973–2006), when on average 573 Little Bustard individuals were recorded on winter surveys.

Compared to the Caspian area, other regions of Turkmenistan (Figure 1, areas 3–14) hosted significantly lower Little Bustard numbers in 1931–1960, especially in winter. This was because the area under winter crops and fallows, which are good habitats for the species, was extremely small.

The total number of autumn migrants and wintering birds in Turkmenistan between the 1930s and 1960s was estimated at 690–1120 and 260–390 respectively.

1961–1990

The distribution of Little Bustard records in Turkmenistan remained largely the same over the following decades (1961–1990), but the overall numbers experienced a marked decline, in the context of catastrophic declines on breeding grounds over the previous fifty years.

In the Caspian region the number of birds never exceeded 20 individuals during autumn migration and 70 in winter (Table 1). In the south of the country, stationary surveys of diurnal bird migrations conducted between 1966 and 1975 recorded the species only three times in autumn, never more than 20 individuals (Ataev *et al* 1978). In the Tejen–Murgab interfluve and adjacent deserts large-scale year-round surveys of various bird species, 1976–1979, failed to record this bird at all. The same negative result was obtained in the Sarykamysh lake area in the north of the country in the 1980s, when monitoring was conducted in spring, summer and autumn (Antipov *et al* 1990).

The total numbers of autumn migrants and wintering birds in Turkmenistan in 1961–1990 dropped to 15–50 and 40–80 individuals, respectively, indicating a 20–40-fold decrease in migrants and 5–6-fold decrease in winterers.

1991–2020

In this period the Little Bustard population recovered on its breeding grounds in the north of its range, and its numbers also grew noticeably in Turkmenistan, but only locally and depending on the dynamics of habitats, in particular in areas 3, 4, 8, 10 & 13 (Figure 1). In these areas, notably the Kopet Dag piedmont plain (Figure 1, areas 3, 4 & 7) and some river valleys (Figure 1, areas 8–10), industrial crops (cotton) were replaced by cereals (barley, wheat) and/or fodder plants (clover, alfalfa, sorghum), creating considerable habitat for migrant and wintering Little Bustards (Yankov 2017, EAR pers obs). By contrast, in the Caspian region the degradation of wetland habitats caused by the drying of the Atrek river led to a strong decline in fallow and winter fields, leaving the numbers of Little Bustards wintering in the south-east of the region (Figure 1, area 2) 2–3 times lower than in the late 1930s.

Migrant birds began to form significant aggregations in the mid-2000s. We recorded one of the first such flocks of about 1200 individuals on 26 November 2006, in the foothills of the central Kopet Dag, in fields 15 km north-east of the village of Yashlyk.

On average, between 1991 and 2020, some 500–1000 individuals were recorded in autumn in this area (Figure 1, area 4), with 300–500 in winter (Table 1). Such numbers had never been registered before.

Agricultural landscapes also expanded in the deltas and interfluve of the Tejen and Murgab rivers (Khankhovuz oasis), as well as along the Amu Darya (Shahsenem and Tallymerjen areas) and Karakum canal (fields on the site of the silted Kelif lakes). For this reason, in recent decades Little Bustards have increasingly used these relatively food-rich areas during migration and in winter. This means that these areas in the southern half of the country have become new wintering grounds for the species.

From 1991 to 2020, the total number of birds recorded during autumn migrations ranged from 1915 to 3680 individuals, of which 1290–2190 birds stayed in the country for the winter.

Post-2020

The numbers continue to grow and have by now reached a total of 4360–7560 individuals in autumn and 5440–9470 individuals in winter (Table 1), which is, respectively, 2.0–2.5 and 2.6–3.4 times higher than in 1991–2020.

Breeding evidence

In the late 19th century, the Little Bustard nested 'in considerable numbers in some parts of the steppe-like hilly areas along the Chandyr and Sumbar' in the western Kopet Dag (Figure 1, area 5) (Zarudny 1896). In the 20th century, the species bred extremely rarely in Turkmenistan. There is only one reliable record, made over a century ago, in mid-May 1923, in the Sulukly area (central Kopet Dag, Figure 1, area 6), involving displaying males. No females were observed on that occasion, apparently because they were already hatching their eggs (Shestoperov 1928). On this basis the Little Bustard was included in the list of birds breeding in the central Kopet Dag (Shestoperov 1928, 1937, Dement'ev 1952, Mishchenko 1986), while some ornithologists (Ataev *et al* 1978) even wrote that the species was 'common in the breeding grounds' in the Kopet Dag. Nevertheless, although the bird fauna of this mountainous region is quite well known (Mishchenko 1984, Sopyev *et al* 1988, Efimenko 2009 and others), there is no other evidence indicating the breeding of the species. NN Efimenko of the Kopet Dag Nature Reserve, who comprehensively researched and regularly monitored the avifauna of the central Kopet Dag in different seasons between 1983 and 2016, never encountered this conspicuous bird. SP Fateev, who visited these mountains, in particular Dushak, twice a month starting from 1977, also failed to record it. Consequently, by the late 20th century this species was either no longer included in the list of birds (Polozov 1982) or was considered only a non-breeder (Bukreev 1995, 1997) or migrant (Bukreev & Veprintseva 2009).

Nevertheless, summer records of the Little Bustard by KhI Khodjamuradov, who conducts regular monitoring in the western Kopet Dag, testify to the species breeding in the area. In June 1986, a single bird was recorded in the Khojakala valley; on 17 April 2002 two individuals were observed (keeping to the same area, flying from one point to another and allowing observers to approach to 300 m) in the Eshekmeidan area, 15 km north-west of the village of Khojakala and the same distance south of the city of Kyzylarvat (Gyzylarbat); and on 5 August 2004 a brood of 8 was recorded in a wheatfield 28 km west of the village of Khojakala, near the low Torgoi range in the Shukur area. Moreover, in August 2023, SP Fateev recorded a brood of Little Bustards in a fallow field in the foothills of the central Kopet Dag, near the northern edge of Ashgabat.

These facts, together with the ongoing population increase throughout the species' range, including Turkmenistan, suggest that the Little Bustard has a potential not only to increase in number in the Kopet Dag and its foothills in the summer period, but also to settle in other nesting habitats in the south of the country.

Threats and conservation measures

In the second half of the 1950s the conversion of huge areas of steppe, the main breeding habitat of the Little Bustard, produced a sharp decrease of the population and the fragmentation of its range in the Russian Federation and Kazakhstan (Isakov & Flint 1987). The most detrimental effects were caused by the cultivation of virgin lands (meadows and steppes), the use of agricultural machinery, and cattle grazing, which led to the loss of nests and affected reproductive success.

In Turkmenistan, poaching has always affected Little Bustard numbers, especially in areas where they congregated on migration and in winter. This factor dominated until 2018, but now its significance has decreased owing to a *de facto* restriction on hunting in the country due to tightened controls on firearms. However, poachers practise other methods. They arrange fishing nets in places where Little Bustards roost and then flush them into the nets at dusk. They also soak grain in soporific agents, such as wine alcohol or grape vinegar, spreading it in a known foraging area and later collecting the drowsy birds. Poachers have told EAR they even use fox or wolf traps, wrapping the jaws in cloth so that they do not snap off the birds' legs and allow them to fly away.

Unusually cold winters in 1968/69, 1971/72, 1973/74, 1976/77, 1981/82, 1983/84, 2006/07 and especially in 2007/08, resulting in mass mortality of birds including Little Bustards, were another negative factor. While warming of the climate is noted generally in Central Asia, it is not so obvious in the Caspian region, where over the past two years the air temperature in the littoral area (Figure 1, area 1) has not been very different from that in previous periods and has not exceeded 40 C. We have not recorded any mass die-offs from other natural causes (starvation, epidemics) or anthropogenic factors (chemical poisoning). There have been single cases of predation by raptors (Saker Falcon *Falco cherrug*, Northern Goshawk *Accipiter gentilis* and Long-legged Buzzard *Buteo rufinus*) and terrestrial mammals (fox, jackal and large herding dogs).

In the Caspian region, Little Bustard habitats have also been affected by the fall in the level of the Caspian Sea and the drying of the coastlands. This phenomenon is facilitating the development of coastal infrastructure (industrial, transport, military and recreational) and afforestation projects, resulting in the conversion of natural desert landscapes and additional disturbance for the species.

No special measures or action plans have been developed to preserve the species in Turkmenistan. There have been no awareness-raising activities among hunters and other groups in Little Bustard habitats. Indirect conservation steps are taken in national protected areas, especially the Hazar, Gaplangyr and Kopet Dag (Mane-Cache Sanctuary) nature reserves. The species will most likely resume breeding in the Kopet Dag, so the Kopet Dag and Sunt-Hasardag nature reserves will play a key role. Potentially, the species can be protected in Important Bird Areas (IBAs) in Turkmenistan, especially on flatlands.

The Little Bustard was listed in the first three editions of the Red Data Book of Turkmenistan (1985, 1999 and 2011). Unfortunately, although the species is present in the IUCN Red List, on which the fourth edition (2024) is based, as Near Threatened, it was not included in the latest version of the Red Data Book of Turkmenistan (see below).

Table 1. Expert estimate of the number of Little Bustards *Tetrax tetrax* historically and currently in certain areas of

Region	Approximate number of most important sites	Species life cycle
1. Eastern Caspian region	3–4, depending on level of sea and of disturbance (poaching)	Migration
		Wintering
2. South-eastern Caspian region, including lower reaches of Atrek	3–4, depending on sea level	Migration
	5–6, depending on availability of winter crops	Wintering
3. Piedmont plain in north-western Kopet Dag	20–25, depending on area of cereal and fallow fields	Migration
		Wintering
4. Piedmont plain in central Kopet Dag		Migration
		Wintering
		Breeding
5. Valleys and upland steppes in western Kopet Dag	10–20, depending on level of grazing and other disturbances	Migration
		Breeding
6. Upland steppes in central Kopet Dag		Migration
		Breeding
7. Piedmont plain in eastern Kopet Dag	20–30, depending on agricultural dynamics	Migration
		Wintering
8. Lower reaches (delta) of Tejen, including agricultural landscape of Khauzkhan		Migration
		Wintering
9. Lower reaches (delta) of Murgab and its agricultural landscapes	15–20, depending on area of cereal fields	Migration
		Wintering
10. Upper reaches of Amu Darya and Karakum canal, including adjacent wetlands and agricultural landscapes	20–25, depending on agricultural dynamics	Migration
		Wintering
11. Amu Darya valley	20–25	Migration
		Wintering
12. Lower reaches (delta) of Amu Darya	30–35, depending on agricultural dynamics	Migration
13. Plains and agricultural landscapes around Sarykamysh		Migration
14. Uzboy, ancient bed of Amu Darya	3–4	Migration
Total	150–190 sites	Migration
		Wintering

Turkmenistan.'Migration' covers pre-migratory gatherings and stopover flocks. Quality of estimate, 1 = low, 5 = high.

Average annual estimates and population trend							
1930–1960	Quality of estimate	1961–1990	Quality of estimate	1991–2020	Quality of estimate	Current	Quality of estimate
Stable		Decreasing		Increasing		Increasing	
20–30	3	10–20	3	30–40	4	30–40	3
20–30	2	up to 10	3	10–20	3	20–40	3
20–30	4	up to 20	4	20–40	2	20–40	2
200–300	4	40–70	4	100–120	3	300–500	4
20–30	2	0	4	50–100	3	800–1000	4
10–20	3	0	4	30–50	3	300–700	4
100–200	2	0	5	500–1000	3	1000–2000	5
30–40	2	single	5	300–500	4	500–1000	5
0	2	0	5	0	4	single	5
10–20	2		3	30–50	3	50–100	3
single	3	single	5	0	5	single	5
10–20	2	0	5	0	4	0	4
single	3	0	5	0	5	0	5
20–30	2	single	4	500–1000	3	1000–2000	3
0	4	0	5	300–500	3	1000–2000	3
20–30	2	single	5	300–500	3	500–800	3
0	4	0	5	100–300	3	1000–2000	4
20–30	2	single	5	200–400	3	400–700	3
0	2	0	5	150–200	3	800–1200	3
100–150	2	0	4	100–300	3	300–500	2
single?	2	0	4	300–500	3	1500–2000	4
50–100	2	0	5	150–200	3	200–300	2
single?	2	0	5	single?	2	20–30	2
100–150	2	0	4	10–15	3	20–25	2
100–150	2	0	4	10–15	3	20–25	2
100–150	2	single	1	15–20	2	20–30	3
690–1120	Ave 2.2	15–50	Ave 4.0	1915–3680	Ave 3.0	4360–7560	Ave 3.0
260–390	Ave 2.8	40–80	Ave 4.4	1290–2190	Ave 3.0	5440–9470	Ave 3.5

Recommendations for future work

Our preliminary research suggests that numbers of Little Bustards in Turkmenistan show a short-term upward trend. For more objective current assessments, additional research is needed in less studied areas, specifically on the wintering grounds, with a focus on agricultural landscapes, flooded desert grasslands and the drying Caspian coast.

To make a long-term forecast, studies are needed to clarify the current factors in each of the 14 areas (Figure 1), which may result in revised boundaries of these areas and the creation of a new, more detailed map showing migrating, wintering and breeding habitats. This should take into account the global and local movements of the Little Bustard and their relation to the network of protected areas and IBAs. This will represent the most effective approach to combating and reducing threats and make it possible to develop a national action plan for the conservation of the species in Turkmenistan.

The reason behind the Little Bustard's exclusion from the latest edition of the national Red Data Book is its 'relative stability' compared to other species. Nevertheless, we consider this action premature and contradictory. The absence of the Little Bustard in the Red Data Book of Turkmenistan suggests its exclusion from the lists of species for which hunting is prohibited. At the same time, the species is listed in Appendix I of the Convention on Migratory Species, to which Turkmenistan is a party. This puts an obligation on the Ministry of Environmental Protection of Turkmenistan to prohibit the hunting of the Little Bustard in its annually updated orders on hunting terms and conditions.

ACKNOWLEDGEMENTS

The authors sincerely thank their colleagues for the provided information, in particular KhI Khodjamuradov, NN Efimenko, SP Fateev, JS Saparmuradov, AS Veyisov, YaB Taganov and B Taganov. Translation of the Russian version of this paper was provided by Shamil Gareev.

LITERATURE CITED

Antipov, SM, VYu Chernov & VP Shubenkin. 1990. [Birds of the Sarykamysh depression and adjacent territories. Wildlife and natural environment of the deserts in northern Turkmenistan.] [*Index – Deposited Research Papers (Natural and Exact Sciences, Technology)*.] Moscow, VINITI, 7(225): 45–74. [In Russian]

Ataev, K, VI Vasilev, RI Gorelova, AA Karavaev, AF Kekilova, O Sopyev & A Eminov. 1978. [Materials on rare and endangered bird species in the fauna of Turkmenistan.] *Bulletin of the Academy of Sciences of the Turkmen SSR*. Biological studies series 4: 70–80. [In Russian]

Belyalov, OV. 2014. [Materials on the avifauna of Mangyshlak and Ustyurt.] *Selevinia* 22: 122–130. [In Russian]

Bukreev, SA. 1995. [Birds of the Sunt-Hasardag Nature Reserve and adjacent territories in Kopet Dag (fauna, zoogeography, conservation issues).] Abstract from a PhD thesis in biology. Moscow, pp1–39. [In Russian]

Bukreev, SA. 1997. [*Ornithogeography and Conservation in Turkmenistan*.] Moscow, TsODP SoES: 1–156. [In Russian]

Bukreev, SA & OD Veprintseva. 2009. [Ornithofaunistic phenoperiodization of the year in southwestern Kopet Dag (Turkmenistan).] *Palearctic Ornithogeography: Current Problems and Prospects*. Makhachkala, pp240–262. [In Russian]

Cheltsov-Bebutov, AM. 1959. [*Practice of Counting Avian Populations in Open Landscapes*.] Ornithology. 2. Moscow, Moscow University Press, pp16–27. [In Russian]

Dement'ev, GP. 1952. [*Birds of Turkmenistan*.] 1. Ashgabat, Academy of Sciences of the Turkmen SSR, pp1–546. [In Russian]

Dement'ev, GP, MK Karaev & NN Kartashev. 1955. [Birds of southwestern Turkmenistan.] *Materials on the Fauna of Southwestern Turkmenistan*. Moscow, Moscow University Press Scientific Notes. 171. Biology, pp53–172. [In Russian]

Efimenko, N. 2009. Dushakarekdag, Kurtusuv-Khovudan & Gurykhovudan. [*Important Bird Areas of Turkmenistan*.] Ashgabat, pp112–114, 117–119, 121–122. [In Russian]

Gavrin, VF. 1962. [Order Otides.] [*Birds of Kazakhstan*.] Volume 2. Academy of Sciences of Kazakh SSR. Almaty, pp5–38. [In Russian]

Geptner, VG. 1956. [*Fauna of Vertebrates in Badhyz (Southern Turkmenistan)*.] Academy of Sciences of the Turkmen SSR, Ashgabat, pp1–335. [In Russian]

Gubin, BM. 2015. [Birds of the deserts of Kazakhstan.] *Birds of Mangyshlak, Ustyurt and Buzachi Peninsula*. Almaty, pp382. [In Russian]
Isakov, YU & KA Vorob'ev. 1940. [Overview of the wintering and migration of birds in the southern Caspian region.] *Proceedings of the Hassan-Kuli All-Union Ornithological Reserve. 1. Wintering of Birds in the Southern Caspian Region*. Moscow, pp5–159. [In Russian]
Isakov, YuA & VE Flint. 1987. [Family Otididae.] *In: Birds of the USSR. Galliformes, Gruiformes*. Nauka, Leningrad, pp465–502. [In Russian]
Loudon, H. 1910–1911. Meine dritte Reise nach Zentral-Asien und ihre ornithologische Ausbeute. *Journal für Ornithologie* 57: 505–573; 58: 1–90. [In German]
Loudon, H. 1911. Meine vierte Reise nach Zentral-Asien und Talysch. Januar–Marz 1908. *Verhandlungen des V Internationalen Ornithologen-Kongresses in Berlin*. Berlin, Deutsche Ornithologische Gesellschaft: 335–369. [In German]
Mishchenko, YuV. 1984. [Avifauna of Kopet Dag and its zoogeographic analysis.] Abstract from a PhD thesis in biology. Kiev, pp1–25. [In Russian]
Mishchenko, YuV. 1986. [Species composition and altitudinal biotopic distribution of birds in central Kopet Dag.] *Nature of Central Kopet Dag*. Ylym, Ashgabat, pp120–162. [In Russian]
Polozov, SA. 1982. [Birds of western Kopet Dag.] *Nature of Western Kopet Dag*. Ylim, Ashgabat, pp158–202. [In Russian]
Radde, G & A Walter 1889. Die Vogel Transcaspiens. *Ornis* 5: 1–128, 165–279. [In German]
Rustamov, AK. 1954. [*Birds of the Karakum Desert*.] Academy of Sciences of the Turkmen SSR, Ashgabat, pp1–344. [In Russian]
Rustamov, AK. 1985. [Birds.] *Red Data Book of the Turkmen SSR*. Ashgabat, Turkmenistan, pp106–208. [In Russian]
Rustamov, EA. 1988. [*Bird population in the Tejen–Murgab interfluve and adjacent deserts (cartographic analysis)*.] Ylym, Ashgabat, pp1–210. [In Russian]
Rustamov, EA. 1992. [Ecological structure of bird populations in arid regions (using Central Asia as an example).] – Abstract of a doctoral thesis in biology. Moscow, pp1–52. [In Russian]
Rustamov, EA. 1994. Ecological structure of the bird population in the Transcaspian Region – cartographic analysis and problems of conservation. *Biogeography and Ecology of Turkmenistan*. Kluwer Academic Publishers, pp265–280.
Shestoperov, EL. 1928. [Notes on avifauna.] *Turkmen Studies* 2. 5/6: 61–75. [In Russian]
Shestoperov, EL. 1937. [*Guide to Vertebrate Animals in the Turkmen SSR (Fish, Amphibians, Reptiles, Birds, Mammals)*.] 4. Birds. Ashgabat-Baku, pp1–331. [In Russian]
Sopyev, OS, AV Solokha, TP Bozhko & IA Kaidun. 1988. [Species composition, distribution and nesting of birds in central Kopet Dag.] *Rare and Little Studied Animals of Turkmenistan*. Ylym, Ashgabat, pp39–64. [In Russian]
Sukhinin, AN. 1989. [Species composition of birds in Badhyz.] *Nature Conservation in Turkmenistan* 5. Ylym, Ashgabat, pp36–45. [In Russian]
Vernander, TB, SV Viktorov, AG Voronov, TI Dybskaya, NP Osadchaya & AM Cheltsov-Bebutov. 1959. [Experience of medium-scale biogeographic mapping.] *Geography of Terrestrial Animal Populations and Methods of their Study*. Moscow, pp33–44. [In Russian]
Yankov, P. 2017. [Materials on the birds of eastern Turkmenistan.] *Ornithological Bulletin of Kazakhstan and Central Asia* 4: 265–275. [In Russian]
Zaroudnoï, N. 1890-1891. Recherches zoologiques dans la contree transcaspienne. *Bulletin de la Société imperiale des naturalistes de Moscou* NS 3: 128–160, 740–842; 4: 288–315. [In French]
Zarudny, NA. 1896. [*Ornithological Fauna of the Transcaspian Region (Northern Persia, Transcaspian Region, Khiva Oasis and flatland Bukhara)*.] Materials for the study of the fauna and flora in the Russian Empire. 2. Moscow, pp1–555. [In Russian]
Zhitnikov, MK. 1900. [Ornithological observations on the Atrek river (winter 1898 and spring 1899).] *Dog and Rifle Hunting* 10: 1–16; 11: 17–32; 12: 33–57. [In Russian]

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Slight increase in the number of wintering Little Bustards *Tetrax tetrax* in Tajikistan

RUSTAM MURATOV

Summary: Until the late 20th century, the Little Bustard was an extremely rare migratory and wintering bird in Tajikistan and occurred in the country only sporadically. In the early 21st century, it began to be recorded in southern and central Tajikistan more often, sometimes even in large numbers. Currently, the species regularly occurs in the country, with small flocks of 10–50 individuals wintering in southern areas bordering Afghanistan (Panj river valley, Panj village). The most serious threats are the development of virgin and fallow lands and livestock grazing within the bird's habitats, and especially poaching. There is an urgent need to map permanent wintering grounds in the country and ensure their seasonal protection via temporary nature reserves. The impetus for these actions is provided by the listing of the Little Bustard in the new edition of the Red Data Book of Tajikistan.

INTRODUCTION

According to current literature, the Little Bustard *Tetrax tetrax* is a rare migratory and wintering bird in Tajikistan. In the early 20th century, single individuals were occasionally reported from the south of Tajikistan, in particular in the Chubek area, near the village of Panj and in the Hissar valley (Ivanov 1940) (Figure 1). Popov (1959) did not list the Little Bustard among birds he recorded on the Karategin ridge of the Hissar range between 1947 and 1959, when he collected 1017 specimens of various bird species. However, a wintering flock of 12–14 individuals was observed in the south on 27 November 1963, again near the village of Panj (Abdusalyamov 1971). There are no further records of the Little Bustard from the 20th century, despite field research during spring and autumn migration conducted throughout almost the entirety of Tajikistan from 1973 to 1991.

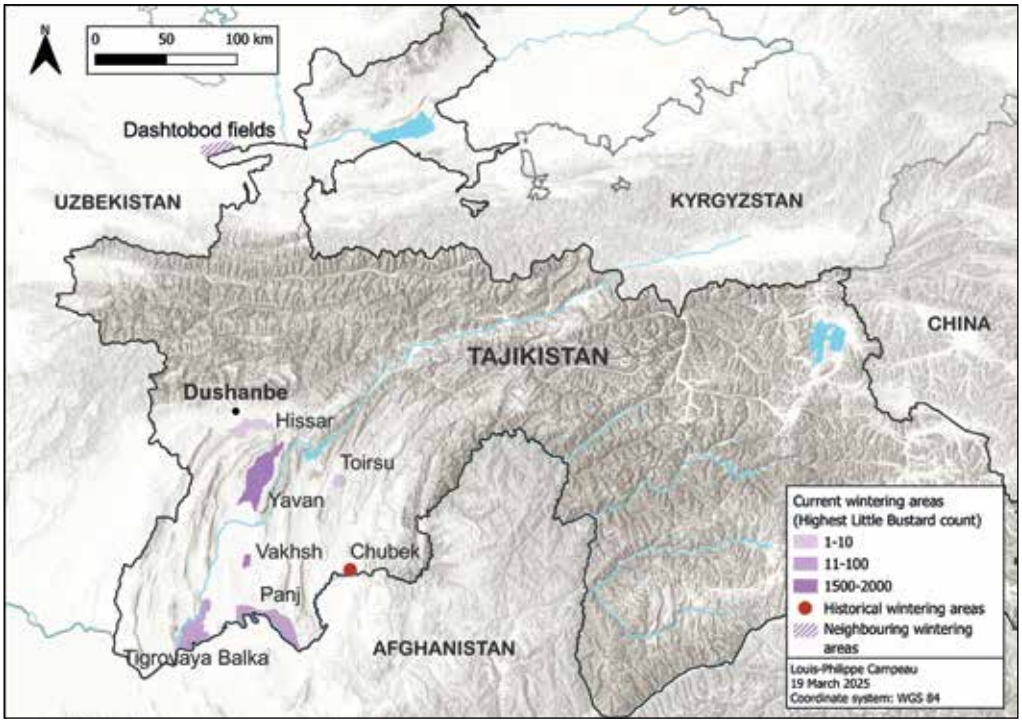

Figure 1. Map of the Little Bustard's wintering areas in Tajikistan.

METHODS

Research covering the period from 1970 to the present has been conducted as a programme of the National Academy of Sciences of Tajikistan and the country's Ministry of Environmental Protection. Most of the data were collected through stationary surveys on main bird migration routes all over Tajikistan, as well as in wintering grounds in central and southern Tajikistan, including the Tigrovaya Balka Nature Reserve, listed as an important bird area (IBA). The research team visited all parts of the country in every season. These visits were a mixture of major expeditions 2–3 months long and shorter excursions. Tigrovaya Balka was studied several times a year. Here I provide a synthesis of records from historical sources and the results of this long-term research.

RESULTS AND DISCUSSION

The Little Bustard in Tajikistan remains a rare species which regularly migrates through and winters in the country. Numbers vary greatly from season to season and from year to year. Migrating Little Bustards avoid mountains, travelling along intermontane plains. They prefer to stop over in flatlands, in wild areas or more rarely in winter crop fields and, especially, in harvested cotton fields. Wintering Little Bustards formed particularly large aggregations (up to 2000 individuals) in the Yavan valley from winter 2004/5 to 2008 (Tables 1 & 2). In warm winters, the species may remain in the country until April, while in particularly cold weather it migrates further to the south, to Afghanistan and Pakistan.

There are currently four key Little Bustard areas in Tajikistan (Figure 1). Most of them are regular or irregular wintering grounds and stopover sites, where birds form large or small flocks. They prefer the remotest parts of those areas, where they are least disturbed.

1. **Yavan valley**. This area, an intermontane clayey plain that experiences warm winters, was well-known during the last century for wintering Great Bustards *Otis tarda* and Asian Houbara *Chlamydotis macqueenii*. Over the past 20 years, much of it has been turned into agricultural fields, making it largely unsuitable for those two species (Muratov & Talbonov 2022). However, these land use changes coincided with the first records of large wintering flocks of Little Bustards. In the years 2005–2008, 1500–2000 individuals were observed from mid-November to April, with lower numbers in the high hundreds encountered until 2012. However, the numerous hunters who once visited the valley to hunt bustards (Muratov & Talbonov 2022) presumably prevented the continued use of the Yavan valley by Little Bustards, whose numbers plummeted with no observations in subsequent years. Nevertheless, more recently the area has been visited annually by 70–150 Little Bustards and irregularly by Asian Houbara.

2. **Hissar valley.** The valley was a regular wintering ground between the 1940s and 1970s (Ivanov 1969). Subsequently, however, the area experienced major land-use changes, and currently almost entirely consists of human settlements and farmlands. Little Bustards visit it only rarely and in small groups. The latest records were in 2020 at Dushanbe airport (flock of 9 birds on the runway), and in spring 2022 (3 individuals).

3. **Tigrovaya Balka Nature Reserve.** This is the oldest nature reserve in Tajikistan, consisting of *tugai* (salt-tolerant shrub) riparian forest (75%) and desert and semi-desert (25%) (Plates 1 & 2). After 2007, the site regularly hosted 12–70 Little Bustards in winter, although in recent years development of the desert as agricultural land has reduced the regularity of the visits. On 30 January 2025, a flock of 23 individuals was observed on passage over a portion of the reserve's remaining desert habitat. Reserve employees had observed flocks consisting of 2–8 individuals over the prior week, confirming the species' use of habitat within the reserve during winter.

Plate 1. Little Bustard habitats in the Tigrovaya Balka Nature Reserve, Kashkakum Desert, summer 2022. © *RSh Muratov*

Plate 2. Little Bustard wintering grounds in the Tigrovaya Balka Nature Reserve, Polvontugai area, autumn 2022. © *AN Butorin*

4. **Panj valley (Panj village area).** In November 1963, Abdusalyamov (1971) observed a flock of 12–14 Little Bustards near Panj village and described the area as a wintering site. The landscape is a clayey desert covered with saxaul, tamarisk and saltworts, with some parts being used for winter livestock grazing. In recent years (2014–2023), flocks of 30–100 Little Bustards have been observed wintering irregularly in the area, and a flock of 1500 was observed less than 50 km to the north in the Vakhsh valley in 2016 (Table 2).

In the winter of 2024/5, thousands of birds were recorded near Dashtobod in Uzbekistan, very close to the border with Tajikistan (Ten *et al* 2025). It seems likely that these birds also use fields in the same valley in Tajikistan, but this needs confirmation.

Threats and conservation measures

Overall, since the early 21st century the Little Bustard population has slightly increased across the country, mainly through wintering birds. This trend continues. The main threat to wintering Little Bustards in Tajikistan is probably uncontrolled poaching in the Yavan valley, where the once-largest wintering population has been almost completely destroyed. Moreover, despite the addition of the Tigrovaya Balka Nature Reserve to

the UNESCO World Natural Heritage List in 2023 and the resultant enhancement of its protection, the conversion of its buffer zone into agricultural fields has made it harder for the Little Bustard to winter there. Overall, the ongoing development of agriculture is having a negative impact on habitats for the species throughout the country.

Table 1. Assessment of Little Bustard numbers in key regions of Tajikistan. N/A = not applicable. 'Migration' covers pre-migratory gatherings and stopover flocks. Quality of estimate: 1 = low, 5 = high.

Geographical region	Season	Number of birds	Important sites	Quality of estimate	Population trends			
					1950–1990	1990–2020	2020–2023	1950–2023
Hissar valley	Migration	10	1	4	↘	N/A	N/A	↘
	Wintering	15–20	1	4	↘	N/A	N/A	↘
Yavan valley	Migration	Absent	–	–	–	–	–	–
	Wintering	300–2000	1	5	N/A	↗, then major ↘	Stable	Slight ↗
Tigrovaya Balka Nature Reserve	Migration	20	1	1	N/A	N/A	N/A	N/A
	Wintering	20–50	1	4	N/A	↗	↘	Irregular ↗
Panj village area	Migration	Absent	–	–	–	–	–	–
	Wintering	200	1	4	↘	↗	↗	↗
Totals in all areas	Migration	c100	2	Average 2.5	N/A	↗	↘	↗
	Wintering	535–2270	4	Average 4.5	↘	↗	↘	↗

Table 2. Records of the Little Bustard in Tajikistan over the past 20 years.

Date	Coordinates	Number of birds	Location	Observer
Winter 2005–2012	38°15'N 69°00'E	700–2000	Yavan valley	RSh Muratov, M Vohidov
Autumn–winter 2007	37°15'N 68°30'E	12–70	Tigrovaya Balka Nature Reserve	RSh Muratov
Winter 2025		2–23		
Autumn 2014–2023	37°15'N 69°07'E	30–100	Panj valley	M Vohidov
Spring 2016	37°40'N 68°50'E	1500	Vakhsh valley	M Vohidov
Spring 2020	38°33'N 68°46'E	9	Dushanbe Airport, Hissar valley	M Vohidov
Spring 2022		3		
Autumn 2023	38°09'N 69°34'E	1	Dangara, Toirsu valley	M Vohidov

The Little Bustard has been included in the new edition of the Red Data Book of Tajikistan (Anon 2024), where it is listed as a near-threatened species among other IUCN-listed birds which do not breed but rarely winter in or migrate through the country. The Tigrovaya Balka Nature Reserve is an Important Bird Area (BirdLife International 2025). There are no wind farms or solar parks in Tajikistan, so this type of infrastructure does not threaten the Little Bustard. New transmission lines to Afghanistan and Pakistan are being built but take into account known bird migration routes, and to date no dead bustards have been found under the lines.

RECOMMENDATIONS

It is necessary to continue monitoring the Little Bustard population in Tajikistan. This includes important wintering sites such as the Yavan valley and Tigrovaya Balka Nature Reserve. A transboundary survey across the borders with Afghanistan and Uzbekistan during migration and in winter would provide a better understanding of the situation.

The development of virgin and fallow lands and, especially, poaching in the wintering grounds have the most serious impact on the Little Bustard population. One of the ways to combat illegal hunting is to establish temporary nature reserves in the known wintering areas, especially the Yavan valley.

ACKNOWLEDGEMENTS

I am deeply grateful to my mentee Mansuru Vohidov for his contribution of observations of Little Bustard in southern Tajikistan. Translation of the Russian version of this paper was provided by Shamil Gareev.

LITERATURE CITED

Abdusalyamov, IA. 1971. [*Fauna of the Tajik SSR*. Vol 19. Part 1. Birds.] Donish Publishing, Dushanbe. [In Russian]

Anon. 2024. *Red Data Book of the Republic of Tajikistan*. *Part II. Animals*. Donish, Dushanbe.

BirdLife International 2025. Site factsheet: Tigrovaya Balka Nature Reserve. Downloaded from https://datazone.birdlife.org/site/factsheet/tigrovaya-balka-nature-reserve on 2 March 2025.

Ivanov, AI. 1940. [*Birds of Tajikistan*.] Academy of Sciences of the USSR. [In Russian]

Ivanov, AI. 1969. [*Birds of the Pamir-Alai*.] Nauka, Leningrad. [In Russian]

Muratov, RSh & KhM Talbonov. 2022. The near-extirpation of the Great Bustard *Otis tarda* as a wintering and breeding species in Tajikistan. *Sandgrouse* 44: 80–83.

Popov, AV. 1959. [*Birds of the Hissar-Karategin*.] Publishing House Tajik SSR, Stalinabad. [In Russian]

Ten, A, E Kreuzberg, T Abduraupov, M Gritsina, M Mitropolskiy & A Raykov. 2025. Warming temperatures and reduced snow cover are associated with new wintering grounds for the Little Bustard *Tetrax tetrax* in Uzbekistan. *Sandgrouse* 47: 133–139.

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Status of the Little Bustard *Tetrax tetrax* in Afghanistan

STEPHANE OSTROWSKI

Summary: From the 19th century the Little Bustard *Tetrax tetrax* was reported as a winter visitor in the north-west, north and south-east of Afghanistan. Nowadays, limited detection efforts do not allow us to update its distribution and status, although given its impact on other cursorial species, hunting is likely to be the main threat to the species in Afghanistan.

INTRODUCTION

Little information has been published on the ornithology of Afghanistan, and a complete account of the birds of the country is impossible to undertake given current knowledge. Historically, several compilations attempted to indicate which species were known to be present and what information was available on their status. The first of these syntheses brought together material about the ornithology of Afghanistan from the mid-19th century until 1937 (Whistler 1944, 1945a,b,c,d). It was followed, almost 15 years later, by Knut Paludan's 'On the Birds of Afghanistan' (Paludan 1959), long considered the best reference on the Afghan avifauna as it enriched Whistler's lists with collections and direct observations made throughout the country in 1947–1948. Finally, Sayer & van der Zon (1981) comprehensively updated the previous lists with information collected and occasionally published during the 1970s.

The collection of ornithological information did not resume until the twenty-first century, after the military intervention of the Soviet armed forces and the successive civil wars which plunged Afghanistan into institutional chaos for 25 years. The most up-to-date compilation available is the monumental two-volume 'Birds of South Asia – The

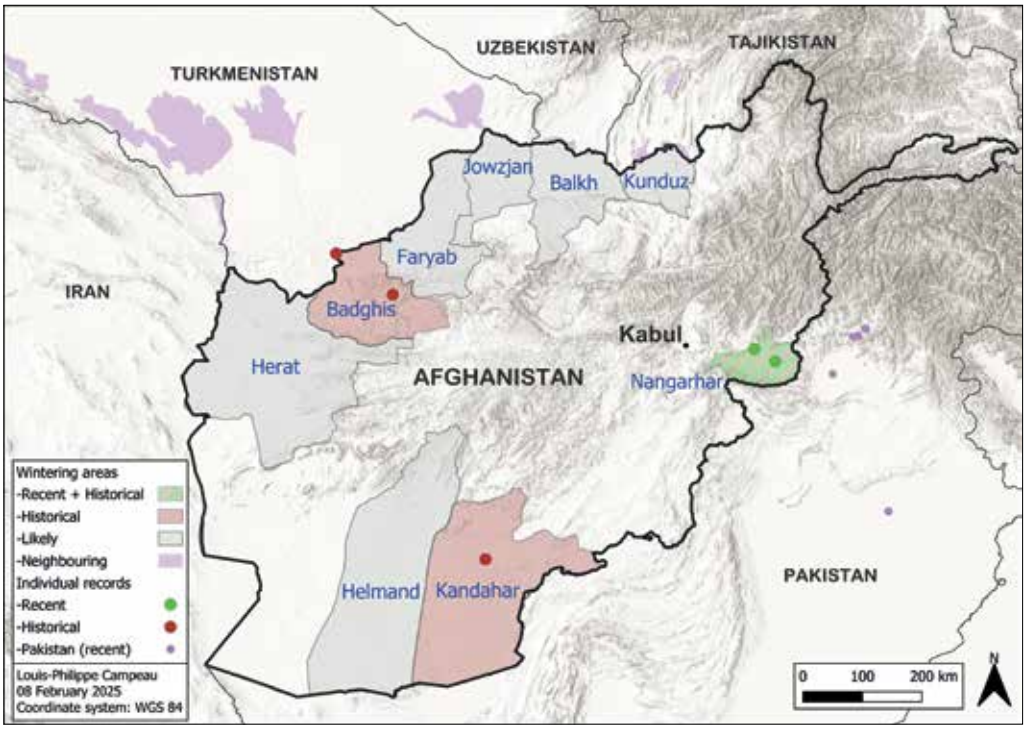

Figure 1. Historical and recent Little Bustard sightings in Afghanistan.

Ripley Guide' (Rasmussen & Anderton 2012). The checklist proposed by these authors is probably the most reliable to date because it is largely based on museum specimens and confirmed field observations.

The Wildlife Conservation Society (WCS) began its involvement in Afghanistan in the early 2000s and has had a permanent presence there since 2006. That year, it set up an internal database on birds where it logged observations made by its staff and several external consultants. To be included in this database, records must involve (a) clear identifications made by experienced observers, (b) identifications by less experienced observers providing sufficient details, or (c) observations supported by extant specimens, photographs or details establishing specific identities.

METHODS

To determine the past and current presence of the Little Bustard in Afghanistan, I examined the previously mentioned literature as it relates to the current political boundaries of Afghanistan. I enriched this bibliographic research with information published since 2003 in peer-reviewed journals, unpublished reports and grey literature, but only including well-corroborated records. I also searched for sightings of Little Bustards in Afghanistan and neighbouring countries posted online on the eBird platform up to November 2024.

RESULTS

There are five confirmed records of Little Bustard in Afghanistan dating to the mid and late 19th century, two from Badghis in the north, two from Kandahar in the south, and one unclearly located from Nangarhar or Kunar in the east (Table 1). I found only two recent records of Little Bustard in Afghanistan, both from the WCS bird database, of which only one could be properly confirmed (Table 1). Both sightings were made in winter in Nangarhar province, eastern Afghanistan, bordering the Khyber district of Khyber Pakhtunkhwa province of Pakistan, where the species is a rare and erratic winter visitor (Grimmett *et al* 2008).

Table 1. Known records of Little Bustard *Tetrax tetrax* in Afghanistan. ASB (formerly) = specimen registered in the Asiatic Society of Bengal catalogue but now missing from the Zoological Society of India, Kolkata; NHMUK = Natural History Museum, UK.

Date	Description	Confirmation element	Source
(winter?) 1840	One, unsexed, collected in Koolsei near Khujah, Nangarhar province (locality is unclear and could also be in adjoining valleys of lower Kunar River)	Specimen in NHMUK	W. Griffith cited in Whistler (1945d)
October 1878 – April 1881	He 'saw several specimens shot by sportsmen at Kandahar', and 'shot one 12 miles south of Kandahar in April.'	Visual observation	St John (1889)
November 1880	One, female, collected in Kandahar province	Specimen in NHMUK	C. Swinhoe cited in Whistler (1945d)
12 March 1884/85	One, unsexed, collected in Maruchak near Murghab, Badghis province	Specimen in ASB (formerly)	C. E. Yates cited in Whistler (1945d)
December 1884/85	One, unsexed, collected in Chaman-e-Bed, Badghis province	Specimen in ASB (formerly)	C. E. Yates, cited in Whistler (1945d)
14 December 2008	Two, unsexed, flying west of Darunta Lake, Nangarhar province	Visual observation	WCS Afghanistan database
3 February 2013	One, unsexed, shot near Barikav, Nangarhar province	Photo seen but not shared	WCS Afghanistan database

DISCUSSION

Historical information suggests that the species was a winter visitor to Afghanistan, although the few surveys and an April sighting near Kandahar (St John 1889) cannot rule out the possibility that individuals remained in the country after winter. These old data are too few to be able to deduce the past abundance of this species in Afghanistan. Nowadays, and despite the absence of recent studies in most suitable areas, the species is probably a rare winter visitor to the open plains of the north-west, south and east of the country.

However, the paucity of recent ornithological reports does not necessarily indicate the rarity of the Little Bustard in Afghanistan. The country has received very little attention from ornithologists in recent years because of chronic insecurity. Historical data suggest that the wintering grounds of the species in Afghanistan would stretch across the provinces of Badghis, Balkh, Faryab, Helmand, Herat, Jowzjan, Kandahar and Nangarhar (Rasmussen & Anderton 2012), where security conditions have been poor for the past two decades. Of the 644 eBird lists collected in these provinces, more than 80% were collected on military bases and less than 5% during winter (November–February). None of these lists contained sightings of Little Bustards. Similarly, since 2006 WCS field teams worked only on few occasions in Balkh, Herat and Nangarhar provinces, and never visited the provinces of Badghis, Faryab, Helmand and Jowzjan.

Difficulties in accessing international border areas in Afghanistan also limit surveys in areas of interest for Little Bustards. Kreuzberg-Mukhina (in Balmer & Betton 2002) reported flocks of up to 150 Little Bustards in the Sukhandarya region of Uzbekistan, in green grain fields along the Amudarya river, only a few kilometres from similar habitats across the river in the Balkh province of Afghanistan. In Tajikistan, a flock of 23 birds was photographed on 30 January 2025, in the Tigrovaya Balka protected area bordering Afghanistan (Muhammadsoleh Oev pers comm). In Iran, Yousefi *et al* (2017) determined that the main wintering grounds of Little Bustards in the north-east of the country are in the border regions adjoining Turkmenistan and Afghanistan. Wintering Little Bustards in Iran use agricultural land, grazed meadows and halophilic shrub steppes associated with wetlands (Sehhatisabet *et al* 2012) and all these habitats are present in the neighbouring Afghan province of Herat. It is therefore plausible that the species visits suitable habitats (*eg* agricultural lands) in the border areas of Balkh, Kunduz and Herat provinces (Figure 1), which are only a few kilometres from the confirmed wintering areas in south Uzbekistan, Tajikistan and eastern Iran.

Although the current security situation makes it easier to visit certain remote regions of Afghanistan, the country remains difficult to explore. Satellite telemetry could enable this exploration 'from the office'. As with the wintering of the Asian Houbara *Chlamydotis macqueenii*, this technology (Combreau *et al* 2011) deployed on pre-migratory birds in Central Asia could reveal a much greater use of Afghanistan by Little Bustards in the winter than the current lack of information seems to indicate.

In contrast to what is observed across most its eastern range (Collar *et al* 2017), the Little Bustard is probably less affected by agricultural intensification and linear infrastructure in Afghanistan than in other countries. However, this respite could prove short-lived as large projects are in progress for agriculture development and irrigation, involving the expansion of powerlines, especially from Turkmenistan (Sabory *et al* 2022) and *eg* the 285-km-long Qosh Teppe Canal planned to divert waters from the Amudarya river (Rudenshiold 2023). This could add to pressures on Little Bustards wintering in north and north-west Afghanistan. Also, while the species does not seem to be targeted by the live bird trade, which is very popular in Afghanistan (Ostrowski *et al* 2014), hunting is likely to

Plate 1. Black-bellied Sandgrouse *Pterocles orientalis* and Calandra Larks *Melanocorypha calandra* hunted in 'the north' of Afghanistan and sold as food by street vendors in Kabul, 24 November 2013. © *WCS Afghanistan*

be the most serious threat to the species in Afghanistan. That is unlikely to diminish in the near future, given the economic and cultural importance of the practice, the proliferation of shotguns and ammunition, and poor environmental law enforcement (Bashari 2014, Mostafawi *et al*. 2017, Mostafawi & Poya Faryabi 2021). Partridges and sandgrouse are commonly sold as food by street vendors in large towns in late autumn and winter (Plate 1). Just like cranes, which occasionally appear in street markets, Little Bustards, although very rare in Nangarhar, are said to be choice eating (anonymous hunter, pers comm).

ACKNOWLEDGEMENTS

Gopinathan Maheswaran and Anindya Naskar kindly searched the collection of the Zoological Survey of India, Kolkata, for the two Yates specimens mentioned in Table 1, but concluded they were lost in a flood that long ago destroyed much material inherited from the Asiatic Society of Bengal.

LITERATURE CITED

Balmer, D & K Betton (compilers). 2002. Around the region. *Sandgrouse* 24: 80.

Bashari, M. 2014. *Study of wildlife poaching and the illegal wildlife market in Afghanistan: impacts of poaching and illegal markets on the condition of Afghanistan's wildlife*. M.Sc. thesis, North Carolina State University. https://repository.lib.ncsu.edu/bitstream/handle/1840.16/9944/etd.pdf?sequence=2.

Collar, NJ, HS Baral, N Batbayar, GS Bhardwaj, N Brahma, RJ Burnside, AU Choudhury, O Combreau, PM Dolman, PF Donald, S Dutta, D Gadhavi, K Gore, OA Goroshko, C Hong, GA Jather, RRS Jha, YV Jhala, MA Koshkin, BP Lahkar, G Liu, SP Mahood, MB Morales, SS Narwade, T Natsagdorj, AA Nefedov, JP Silva, JJ Thakuri, M Wang, Y Zhang & AE Kessler. 2017. Averting the extinction of bustards in Asia. *Forktail* 33: 1–26.

Combreau, O, S Riou, J Judas, M Lawrence & F Launay. 2011. Migratory pathways and connectivity in Asian Houbara Bustards: evidence from 15 years of satellite tracking. *PLoS ONE* 6: e20570.

Grimmett, R, TJ Roberts & T Inskipp. 2008. *Birds of Pakistan*. Christopher Helm/A&C Black Publishers Ltd, London.

Mostafawi, SN, J Naseri & S Ostrowski. 2017. Hunting for the wealthiest threatens migrating cranes in Afghanistan. *Oryx* 51: 583–584.

Mostafawi, SN & S Poya Faryabi. 2021. *Hunting and trading of migratory birds in Parwan and Kapisa provinces, Afghanistan*. WCS Afghanistan unpublished report.

Ostrowski, S, H Noori & AM Rajabi. 2014. *Monitoring of birdlife trade in Ka Farushi, Kabul, 2007–2013*. WCS Afghanistan unpublished report.

Paludan, K. 1959. The 3rd Danish Expedition to Central Asia. Zoological results 25. On the birds of Afghanistan. *Videnskabelige Meddelelser Dansk Naturhistorisk Forening* 122: 1–332.

Rasmussen, PC & JC Anderton. 2012. *Birds of South Asia. The Ripley Guide, 1&2*. Second edn. National Museum of Natural History (Smithsonian Institution), Michigan State University and Lynx Edicions, USA/Barcelona.

Rudenshiold, E. 2023. *Is it too late to save Central Asia?* Caspian Policy Center unpublished report. https://api.caspianpolicy.org/media/ckeditor_media/2023/12/14/is-it-too-late-fopr-central-asia.pdf.

Sabory, NR, AM Ershad, MSS Danish & T Senjyu. 2022. Improving the criteria for transmission line routing beyond the techno-economics: the case of Afghanistan. *Sustainability* 14: 14933.

Sayer, JA & APM van der Zon. 1981. *National parks and wildlife management, Afghanistan. A contribution to a conservation strategy*, Vol 2: Appendices. UNDP/FAO unpublished report.

Sehhatisabet, ME, F Abdi, 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: 279–287.

St John, RE. 1889. XIII.—On the birds of southern Afghanistan and Kelát. *Ibis* (6)1: 145-180.

Whistler, H. 1944. Materials for the ornithology of Afghanistan. Part I. *Journal of the Bombay Natural History Society* 44: 505–519.

Whistler, H. 1945a. Materials for the ornithology of Afghanistan. Part II. *Journal of the Bombay Natural History Society* 45: 61–72.

Whistler, H. 1945b. Materials for the ornithology of Afghanistan. Part III. *Journal of the Bombay Natural History Society* 45: 106–122.

Whistler, H. 1945c. Materials for the ornithology of Afghanistan. Part IV. *Journal of the Bombay Natural History Society* 45: 280–302.

Whistler, H. 1945d. Materials for the ornithology of Afghanistan. Part V. *Journal of the Bombay Natural History Society* 45: 462–485.

Yousefi, M, A Kafash, S Malakoutikha, A Ashoori, A Khani, Y Mehdizade, F Ataei, SS Ilanloo, HR Rezaie & JP Silva. 2017. Distance to international border shapes the distribution pattern of the growing Little Bustard *Tetrax tetrax* winter population in northern Iran. *Bird Conservation International* 28: 499–508.

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Status of the Little Bustard *Tetrax tetrax* in Pakistan based on historical and recent sighting records

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Summary: The Little Bustard *Tetrax tetrax* occurs in Pakistan both as a rare passage migrant and a scarce winter visitor. Records cluster in 23 localities, 14 in the north (1 in Gilgit-Baltistan, 12 in Kyber Pakhtunkhwa, 1 in northern Punjab) and 9 in the south (4 in Balochistan, 5 in Sindh); 13 localities reflect historical (pre-1990) records and 10 reflect recent (post-1990) records. Most recent records were obtained from hunters we interviewed or found on social media; their collective testimony suggests that the species wintered in good numbers locally in Khyber Pakhtunkhwa several decades ago. More focused efforts would clarify various aspects of the species' migration and wintering habitat in addition to threats from hunting pressure and habitat degradation.

INTRODUCTION

Over most of its range in Europe and Asia, the Little Bustard *Tetrax tetrax* is in decline owing to various drivers including hunting and habitat loss (Roberts 1973), leading to its current IUCN status of Near Threatened (BirdLife International 2018). A monotypic species within the family Otididae, the Little Bustard is a medium-sized Palearctic steppe species that breeds in dry open grasslands and cold steppe in Russia and Central Asia and migrates south to the Caucasus and similar latitudes, so is only a scarce winter visitor to Pakistan (Hume & Marshall 1879, Morales *et al* 2013). This study focuses on finding and assembling the evidence of the Little Bustard's occurrence in Pakistan.

METHODS

To assess the Little Bustard's status in Pakistan we used four main sources. First, we reviewed the historical records from the jurisdiction of the Islamic Republic of Pakistan. Second, we analysed recent sightings on the Global Biodiversity Information Facility (GBIF), as Khan *et al* (2024) found an increasing trend in the reporting of bird sightings to GBIF in Pakistan. Third, we collected information through emails and social media messaging apps from key wildlife officials in the country. We anticipated obtaining more recent information about the bird's presence, especially since there is a strong focus on research into the Asian Houbara *Chlamydotis macqueenii* as a key species hunted by Arab Sheikhs in Pakistan (Mian 1986, Ata *et al* 2019). Finally, we gathered records from hunters in personal communications or via social media.

RESULTS

Historical records

Historical records and observations (here treated as up to 1990 when large-scale land-cover changes were observed in the Little Bustard's breeding ground following the collapse of the Soviet Union) suggest that the Little Bustard in Pakistan occurs from Lasbela on the Makran coast to Gilgit in the Hindu Kush Himalayas (Figure 1). Mirza (2012) considered the species a 'very rare, irregular winter visitor' to the country's north-east and south. Indeed, almost all historical records come from either the northern provinces of Khyber Pakhtunkhwa and Punjab or the very south of the country in Balochistan and Sindh.

Biddulph (1881) reported collecting a male specimen on 27 March (probably 1878 or 1879) and seeing another on a stony plain around six miles from Gilgit. McMohan (1901) mentioned that JM Johnson collected two specimens between Malakand and Mardan in Khyber Pakhtunkhwa between December and April 1894, as mentioned by Sharpe (1894).

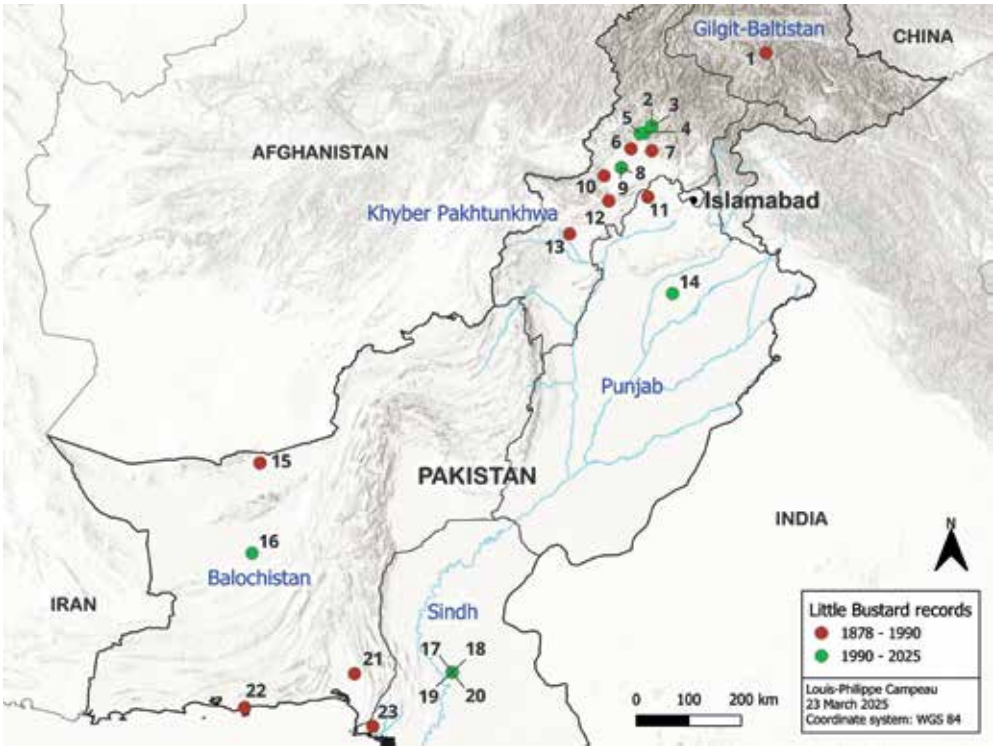

Figure 1. Historical and recent records of the Little Bustard from Pakistan. Numbers refer to sites listed in Table 1.

These are preserved in the British Natural History Museum (NHMUK). According to Oates (1898), while it could sometimes be found in India, the Little Bustard was more frequent west of the Indus and in the North West Frontier (now the Punjab and Khyber Pakhtunkhwa provinces). Whitehead (1909) recorded the species from around Kohat and Bannu (Khyber Pakhtunkhwa) in the early 1900s. Baker (1921) referred to it as the 'Butterfly Houbara', with sufficient numbers wintering in Balochistan and north-west India (currently Pakistan's Khyber Pakhtunkhwa province) for a hunter to bag a dozen in a day's hunt; he suggested it was a popular amusement to hunt Little Bustards with Saker Falcons *Falco cherrug*. Ali & Ripley (1980) further validated its occurrence in north-west Pakistan. Finally, Roberts (1991) mentioned two birds recorded by Rohail Nana from the Kala Chitta Range in Punjab in 1976. Roberts (1991) also suggested that the Little Bustard occurred in the sandy, grassy stretch of northern Swabi district, between Buner in Swat and the Gobati canal.

The second important area is on the south coast of Pakistan, in Balochistan and Sindh. In Balochistan it is called *charaz* in Balochi, while in Punjab it is called *Chota tilur* (Baker 1921). According to Roberts (1991), a bird was collected by WD Cummins in 1904 at Ormara, Balochistan (its wings are preserved in NHMUK), and another was shot in Lasbela in the mid-1960s by J Anderson. Further inland, Afsar Mian reported a single bird near Yakmuch in the Chagai desert in December 1985 (Roberts 1991). In neighbouring Sindh, a museum specimen of a juvenile was recorded by Abdulali (1969). Two other undated records mentioned by Roberts (1991) are from near Karachi and the Jamrud plain near Peshawar, while the species is listed among the birds found in Peshawar district (Gazetteer of Peshawar 1931).

Plate 1. Little Bustard shot in Udigram, Swat, 10 February 2021. *Anon*

Plate 2. Little Bustard killed in Gado Dagay, Swat, on 12 November 2024 (left) is preserved on a wall of trophies (right) by an anonymous hunter.

Recent records

There are only three records in the GBIF database for Pakistan, all of birds hunted in the north. These comprise one from December 2020 on the outskirts of Sargodha city in Punjab and two from Khyber Pakhtunkhwa: one from Kota, Swat district, in November 2020, and the other from Thana, Malakand district, in February 2021.

Direct communications with hunters revealed more records. In addition to the bird shot in Thana mentioned above, Zoor Talab Khan (pers comm) confirmed the shooting of a Little Bustard in Udigram, Swat, and an anonymous hunter from the same locality confirmed the killing of another bird on the same day (Plate 1). Information from local hunters confirmed the shooting of two other Little Bustards out of a flock of four in the same locality during February 2021. The most recent record from Swat is of a bird killed in Gado Dagay on 12 November 2024 by a hunter who withheld his identity (Plate 2). Finally, Mr Muhammad Tahir Khan (2025 and pers comm) mentioned hunting one on 2 March

2025 near Sardaryab, Charsadda, Khyber Pakhtunkhwa (Plate 3) and reported that another hunter had killed one in 2008 in the same area. These records support the testimony of other hunters and knowledgeable individuals that wintering birds occurred locally in good numbers in Khyber Pakhtunkhwa several decades ago.

Plate 3. Facebook record of Little Bustard caught alive in Charsadda on 2 March 2025. *Anon*

Hunters and local wildlife officers whom we contacted through emails, WhatsApp and social media platforms reported no recent observations from the southern part of the country. Large-scale Asian Houbara surveys also failed to reveal the presence of Little Bustards in these areas, although they tended to focus on drier, less appropriate habitats. However, two Facebook posts, most likely from Sindh, revealed records from the south of Pakistan: Mr Zafar Khan (2015) referred to two kills of Little Bustard, one by himself on 8 January 2015, the other by his friend Mr Sajjad Solangi in 1990, while another hunter, Mr Adeel Solangi (2017), posted pictures of a bird he killed on 9 January 2017 (Plate 4). Yet another Facebook post revealed that Mr Farooq Baloch killed two birds while another hunter killed one on 15 November 2024 in the Washuk area of Balochistan (Baloch 2025; Plate 5).

Plate 4. Facebook records of Little Bustard hunting probably in Sindh. Left (Sajjad Solangi in 1990 in Khan (2015)); centre (Zafar Khan 2015) and right (Adeel Solangi 2017).

Plate 5. Facebook record of Little Bustard kill, probably in Washuk, Balochistan, on 15 November 2024. *Anon*

Table 1. Historical and recent records of Little Bustard in Pakistan. Numbers in column 2 refer to sites mapped in Figure 1.

Date of observation	Map reference	Number of birds	Age/sex of bird	District & location	Province	Citation
Historical records (1878–1990)						
27 March 1878 or 1879	1	2	1 male	Gilgit Baltistan	Gilgit	Biddulph (1881)
1894	6	2		Mardan	Khyber Pakhtunkhwa	McMohan (1901) & Sharpe (1894)
1900	12	1		Kohat / Bannu	Khyber Pakhtunkhwa	Roberts (1991)
1900	13	1		Bannu	Khyber Pakhtunkhwa	Roberts (1991)
1904	22	1		Ormara	Balochistan	Roberts (1991)
Mid-1960s	21	1		Lasbela	Balochistan	Roberts (1991)
1969	17	1	Juvenile		Sindh	Abdulali (1969)
1976	11	2		Kala Chitta Range	Punjab	Roberts (1991)
1985	15	1		Yakmuch, Chagai	Balochistan	Roberts (1991)
1990	18	1	Female		Sindh?	Facebook post (Zafar Khan)
Undated	7			Swabi	Khyber Pakhtunkhwa	Roberts (1991)
Undated	10			Jamrud	Khyber Pakhtunkhwa	Roberts (1991)
Undated	23			Karachi	Sindh	Roberts (1991)
Recent records (post-1990)						
2008	8	1		Charsadda	Khyber Pakhtunkhwa	pers comm
8 January 2015	19	1	Female		Sindh	Facebook post (Zafar Khan)
9 January 2017	20	1	Female?		Sindh?	Facebook post (Adeel Solangi)
November 2020	4	1		Kota, Swat	Khyber Pakhtunkhwa	GBIF
December 2020	14			Sargodha	Punjab	GBIF
February 2021	5	1		Thana, Malakand	Khyber Pakhtunkhwa	GBIF
10 February 2021	3	4	1 female	Udigram, Swat	Khyber Pakhtunkhwa	pers comm.
12 November 2024	16	3		Washuk	Balochistan	Facebook post (Farqooq Baloch)
15 November 2024	2	1	Juvenile	Gado Dagay	Khyber Pakhtunkhwa	pers comm
2 March 2025	9	1	Juvenile	Charsadda	Khyber Pakhtunkhwa	pers comm

DISCUSSION

Hunting in general—and in arid regions in particular, being a key habitat for wintering Little Bustard—might have played a significant role in the decline of its population (Maydon 1937). This is borne out by the fact that recent evidence in Pakistan is derived from hunting reports. The human population of Pakistan has increased by over 1600% since 1800 and has seen an associated expansion of land under cultivation (Roberts 1991), presumably with negative consequences for Little Bustards. The grazing of ever higher numbers of livestock could also reduce habitat quality and cause disturbance to the species. Moreover, climate change impacts are increasing the likelihood of unseasonal extreme weather and pose a threat to the survival of many species.

On recent evidence, the Little Bustard still occurs, albeit very sparsely, in most of its perceived range over the winter (Table 1). However, the data are far too few to assess where the species might occur regularly and which areas might therefore be given protection. More information might be collected through interviewing a larger sample of hunters and knowledgeable locals and officials. Such an enquiry could identify a suite of areas for targeted surveys. This would enable us to profile the Little Bustard's current status and distribution in Pakistan and suggest priority actions for its conservation, including on the problem of hunting. Even a small-scale satellite telemetry project could yield valuable information about the visiting birds' origins, migration patterns and habitat use. All such knowledge could be fed to wildlife officials as a first step towards an effective conservation programme in the country.

ACKNOWLEDGEMENTS

We are thankful to all who provided information and guidance for this paper. In particular, we thank Mr Fazal Maula and Mr Zoor Talab Khan for sharing their experience and records, the unknown persons who provided information with pictures of their recently killed Little Bustards in Udigram and Gado Dagay, Swat, and Messrs Adeel Solangi, Zafar Khan, Muhammad Tahir Khan and Farooq Baloch for sharing their hunting records on Facebook. We extend our thanks to Louis-Philippe Campeau and Nigel Collar for editing the article and for mapping the Little Bustard records from Pakistan.

LITERATURE CITED

Abdulali, H. 1969. A catalogue of the birds in the collection of the Bombay Natural History Society – 5. *Journal of the Bombay Natural History Society* 66: 542–559.

Ali, S & SD Ripley. 1980. *Handbook of the Birds of India and Pakistan*. Volume 2. Second Edition. Oxford University Press, Delhi, India.

Ata, S, B Shahbaz, MA Watto & MT Siddiqui. 2019. Short-term land acquisition, long-term impacts: the case of houbara bustard hunting in south Punjab, Pakistan. *Journal of Asian and African Studies* 54: 390–408.

Baker, ECS. 1921. *The Game-birds of India, Burma, and Ceylon* (Vol. 2). Bombay Natural History Society.

Baloch, F. 2025. https://www.facebook.com/photo.php?fbid=9432470580132991&set=p.9432470580132991&type=3.

Biddulph, M. 1881. On the birds of Gilgit. *Ibis* 5(1): 35-102.

BirdLife International. 2018. Species factsheet: Little Bustard *Tetrax tetrax*. Downloaded from https://datazone.birdlife.org/species/factsheet/little-bustard-tetrax-tetrax on 30/10/2024.

Gazetteer of Peshawar. 1931. N.W.F. Province Gazetteers: Peshawar District (vol. A). Civil and Military Gazette Ltd., Lahore.

GBIF.org (28 October 2024). GBIF Occurrence Download: https://doi.org/10.15468/dl.dv74bp.

Hume, AO & CHT Marshall. 1879. *The Game Birds of India, Burmah, and Ceylon*. Regents of the University of Minnesota.

Khan, BU, A Ahmad, A Farooq, MB Zia, HU Din & MA Majeed. 2023. Quantifying pattern of recorded biodiversity observations in Khyber Pakhtunkhwa from GBIF database. *Pakistan Journal of Forestry* 73: 94-102.

Khan, MT. 2025. https://www.facebook.com/photo/?fbid=3896081617326164&set=pcb.3355666974576228.

Khan, Z. 2015. https://www.facebook.com/photo?fbid=839598562774056&set=pcb.839601062773806. [Accessed 28 January 2025]

Maydon, H. 1937. *Big Game of India*. New York, C. Scribner's Sons. India. Retrieved from https://coilink.01. Notes on fauna of Dir and Swat. *Journal of Asiatic Society of Bengal* 70(II): 7-12.

Mian, A. 1986. Ecological impact of Arab falconry on Houbara Bustard in Pakistan. *Environmental Conservation* 13: 41-46.

Mirza, ZB. 2012. *A Field Guide to Birds of Pakistan*. WWF Pakistan.

Morales, M, J Traba, MP Delgado & E García de la Morena. 2013. The use of fallows by nesting Little Bustard *Tetrax tetrax* females: implications for conservation in mosaic cereal farmland. *Ardeola* 60: 85-97.

Oates, EW. 1898. *A manual of the game birds of India. Part I: Land Birds*. AJ Combridge & Co, Bombay.

Rasmussen, PC & JC Anderton. 2005. *Birds of South Asia: the Ripley Guide*. Smithsonian Institution, Michigan State University & Lynx Edicions, Washington, DC, Michigan & Barcelona.

Roberts, TJ. 1973. Conservation problems in Baluchistan with particular reference to wildlife preservation. *Pakistan Journal of Forestry* 23: 117-127.

Roberts, TJ. 1991. *The Birds of Pakistan, vol. I. Non-Passeriformes*. Oxford University Press, Karachi.

Sharpe, RB. 1894. *Catalogue of the Fulicariae and Alectorides in the Collection of the British Museum*. British Museum (Natural History), London.

Silva, JP, JM Palmeirim & F Moreira. 2010. Higher breeding densities of the threatened little bustard *Tetrax tetrax* occur in larger grassland fields: implications for conservation. *Biological Conservation* 143: 2553-2558.

Solangi, A. 2017. https://www.facebook.com/photo/?fbid=1406646682713725&set=pcb.1406647166047010. [Accessed 28 January 2025]

Whitehead, CHT. 1909. On the birds of Kohat and Kurram, northern India. With an introduction by Major H. A. F. Magrath. Part II. *Ibis* (9)3: 214-284.

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Differential migration of Little Bustard *Tetrax tetrax* at the fringes of its eastern range

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Summary: Although differential migration is widely observed in birds, including other species of bustards, it has not yet been described in the Little Bustard *Tetrax tetrax*. Using photographic evidence from 2008 to 2025, we investigate differential migration within the eastern population of Little Bustards as they move through and overwinter in countries beyond the limits of their usual wintering range in Azerbaijan, eastern Georgia and northern Iran. We find a high likelihood that these birds are of female-type plumage (*ie* adult females or juveniles of either sex) during both regular and irruptive winters, such as that of 2024/25. Using a more limited dataset of photographs in which the age of individuals is discernible, we find that this differential migration is both sex-based and age-based, with adult females and juveniles undertaking the most distant migratory movements in a 40:60 ratio. Likely increased female mortality during these journeys is expected to impact population demographics.

INTRODUCTION

Following a series of national extinctions in central and eastern Europe in the 19th and 20th centuries, the range of the Little Bustard *Tetrax tetrax* is now split between a mostly resident western population centred on the Iberian peninsula and southern France (with a small migratory population in north-west France), and a mostly migratory eastern one ranging from the Black Sea to the west of Xinjiang, China (with a small resident population in Crimea). To the best of our knowledge, different migration patterns between sexes and age classes have not been described in any Little Bustard population exhibiting migratory behaviour. Little Bustards from the eastern population have been assumed to form mixed post-breeding flocks towards the end of the summer before migrating south and congregating in larger groups on wintering grounds (Potapov & Flint 1987). In their comprehensive edited volume on the Little Bustard, Morales *et al* (2022) hinted at this knowledge gap, writing that 'although much of what we know from their movements [is] based on tagged males, there is no evidence of differential migration of the sexes, as described for other bustard species'. Indeed, in species such as the Great Bustard *Otis tarda*, which exhibits a high degree of sexual dimorphism, the much larger males are observed to winter further north than females, giving them an advantage in returning early to their breeding grounds (Wang *et al* 2023). Male Little Bustards, however, are on average only slightly heavier than the females (Bretagnolle *et al* 2022).

In their review of the status of the Little Bustard in Iraq, Syria, Lebanon and Jordan, Aidek *et al* (2025) noted that all records of hunted Little Bustards in Syria seemed to be of females or juveniles ('female-type' birds). The winter of 2024/25 saw a large irruption of Little Bustards from their eastern range with many records from outside the species' current wintering areas, from Romania and Greece to Türkiye and Israel (ebird, Özgencil *et al* 2025, Perlman 2025). The causes of these longer-than-usual movements remain unclear. A sudden change in weather patterns could account not only for irruptions but also for the record observation of 101 530 Little Bustards at the Beshbarmag bottleneck observation site in Azerbaijan on 22 October 2024 (Farajli 2024). Alternatively, high breeding productivity could account for both phenomena; if extremely low percentages of the total population occasionally reach distant wintering grounds, a greater population size would increase the numbers of birds observed there. While more research will be needed to explain these irruptions, we used the opportunity to investigate and compare sex and age ratios of overwintering Little Bustards between irruptive and non-irruptive winters, and between typical winter range states and extralimital areas.

Plate 1. Left: A juvenile Little Bustard, characterised by the contrastingly darker head-cap and scapulars against the paler beige median coverts bearing an '*x*' pattern. © *Mark Easterbrook*. Upper right: A typical adult female, uniformly darker than the juvenile, lacking the '*x*' pattern, and with a streaked breast. © *Gültekin Yazıcıoğlu*. Lower right: Adult male Little Bustard in flight, 5 May 2025, Bouches-du-Rhône, Provence-Alpes-Côte d'Azur, France. © *Yann Muzika*

METHODS

LPC systematically reviewed all photographic records of Little Bustards from a series of citizen science platforms for the winters of 2008 (the first in which photographic records were available) to 2025, including ebird.org, inaturalist.org, rombird.ro, azerbaijan.birding.day, kz.birding.day, russia.birding.day, uzbekistan.birding.day and uabirds.org. We also invited authors of papers submitted to Kessler *et al* (2025a) to share photographs (Aidek *et al* 2025, Ashoori *et al* 2025, Campbell & Kessler 2025, Özgencil *et al* 2025, Khan *et al* 2025, Ten *et al* 2025). Extralimital migrating and wintering birds were defined as those observed from October to March beyond the areas of Little Bustard mass overwintering in Azerbaijan, eastern Georgia, northern Iran, Turkmenistan and Uzbekistan. In total, 136 extralimital and 71 intralimital records were reviewed, taking care to avoid double-counts. From these, 381 extralimital (including 24 hunted) and 2320 intralimital birds were photographed with sufficient detail to characterise them as adult male or female-type.

Even in non-breeding plumage, adult male Little Bustards on the ground can be identified by a combination of finer vermiculation on their backs, clear-cut delimitation between brown chest and white belly, and larger necks/heads (Jiguet & Wolff 2000). In flight, male Little Bustards show a conspicuously shorter 7th primary, which produces a whistling sound when flying and remains surprisingly visible on photographs of large flocks in the air. Males only acquire this characteristic in July or August of their second year, well outside the seasonal range of this study. While these criteria make the separation of adult males from female-type birds relatively straightforward, differentiating between

adult females and juveniles (of both sexes) during the winter season is more difficult, with only a handful of high-quality photos showing the juvenile characters of darker head-cap and scapulars contrasting with paler face and covert feathers, combined with the distinctive 'x' pattern on the median coverts of the closed wings (Plate 1). It is almost impossible to distinguish between male and female juveniles in winter. As the quality of the photograph permitted, individuals were identified as (adult) male, female-type or unknown. A separate tally was kept for the smaller number of cases in which females and juveniles were distinguishable.

For each country, records were summed and those from winter 2024/25 totalled separately to examine patterns in ratio of males to female-type Little Bustards during that winter's remarkable irruption (Table 1). Pearson Chi-square tests with Yates's continuity correction were conducted in R (base package, v4.2.1) to assess differences in the ratio of males to female-type Little Bustards (1) between intralimital and extralimital countries during typical winters; (2) between typical and irruptive winters in extralimital areas; and (3) in intralimital areas.

RESULTS

Overall, of the 381 extralimital birds from all winters for which a determination could be made, 27 were adult males and 354 were female-types, a 0.076 male per female-type ratio (Table 1). Of these 27 males, 7 were recorded alone, with all others mixed among female-type birds. This contrasts sharply with the intralimital range, where this ratio is 0.62, based on analysis of 2320 individuals. Our analyses of the data in Table 1 yield three statistically significant results:

1. During typical winters, a bird wintering outside the species' core winter range is significantly more likely to be of female-type than one wintering within the usual limits (χ^2= 34.44, *df* = 1, *P* = <0.0001). Excluding Crimea, due to the presence of a small sedentary population, ratios in the extralimital areas during normal winters vary from a maximum of 0.43 males per female to as low as 0.077, or even 0 in many cases where males were not recorded. In contrast, during typical winters in Azerbaijan, eastern Georgia, and northern Iran—areas that regularly host large wintering flocks—we find strikingly similar ratios of between 0.66–0.7 male to female-type Little Bustards. The male to female-type ratio is lower (0.39) in Uzbekistan, in the south of which Little Bustards have only in the last two decades resumed wintering in good numbers, and to the north of which the species has only recently expanded its wintering range (Ten *et al* 2025).
2. During the irruptive winter 2024/25, the ratio of adult male to female-type Little Bustards in extralimital areas was more extreme than in typical winters (χ^2= 13.38, *df* = 1, *P* <0.0005). Moreover, decreasing ratios of adult male to female-type birds are observed in more southerly extralimital range states. Most extreme are Greece and Türkiye during the 2024/25 irruption, with 2 males recorded each for 65 and 86 female-type respectively, as well as Israel where none of the 22 Little Bustards was an adult male. Extralimital records from the irruptive winter from southern Iran and Pakistan are scarce; nevertheless, an observation in February 2025 at the Kamjan International Wetland in southern Iran was of a female-type, as are all 11 twenty-first century records of hunted Little Bustards in Pakistan (Khan *et al* 2025).
3. During the irruptive winter 2024/25, there were relatively more female-type birds on the wintering grounds in intralimital states than during typical winters (χ^2= 8.38, *df* = 1, *p* <0.01). Ratios during the irruptive winter in intralimital wintering grounds of Azerbaijan and eastern Georgia were 0.37 and 0.54, respectively. In comparison, the

ratios in the same states in typical winters were 0.66, and similar ratios were observed in northern Iran and Kazakhstan.

Table 1. Number and ratio of adult male and female-type Little Bustards per country, based on photographic evidence. Records were collected from the months October to March during the years 2008–2025. Data from winter 2024/25, an irruption year, are presented separately. Ins data = There were insufficient records to calculate a ratio. *Others include one female-type each for Austria, Croatia and Cyprus, one male for Saudi Arabia (a bird captured in unclear circumstances; Campbell & Kessler 2025), one male and one female-type for the Czech Republic, two female-types for Russia (Black Sea coast) and the United Arab Emirates and one male and three female-types for mainland Ukraine. **Crimea is reported to have a very small resident population (Kessler *et al* 2025b), but we include data from the 2024/25 irruption when Crimea received a large influx of wintering birds. ***Kazakhstan had its first winter record of a flock of 141 birds on 14 January 2024. Its population is otherwise entirely migratory.

Country	Number of records	Males		Female-types		M/Female-type ratio	
		Pre-2024	2024-5	Pre-2024	2024-5	Pre-2024	2024-5
Extralimital states							
Romania	21	5	3	33	17	0.15	0.18
Bulgaria	6	0	0	5	1	0	0
Albania	2	0	0	1	9	0	0
Greece	19	4	2	20	65	0.2	0.031
Türkiye	33	2	2	26	86	0.077	0.023
Georgia (Black Sea)	4	0	0	3	9	0	0
Syria	4	No data	0	No data	8	Ins data	0
Israel	15	2	0	12	22	0.17	0
Iran (south)	3	0	1	2	1	0	Ins data
Pakistan	10	0	0	8	3	0	0
Others*	13	3	0	7	4	0.43	0
Crimea**	6	3	0	1	11	N/A	0
Intralimital states							
Azerbaijan	16	159	44	241	120	0.66	0.37
Georgia (east)	25	481	52	730	96	0.66	0.54
Iran (north)	16	114	2	164	1	0.7	Ins data
Uzbekistan	14	27	0	69	4	0.39	Ins data
Kazakhstan***	1	7	No data	9	No data	0.78	Ins data

Discrimination of adult females from juveniles

The category 'female-type' includes not only females but also juvenile (first-winter) males. To test whether the differential migration described above occurs on the basis of age or sex, it is necessary to use the more limited set of photographs that contain sufficient level of detail to age the birds as juveniles or adults. Only 54 of the 354 female-type Little Bustards photographed across the extralimital range could be aged with a good degree of confidence. Of these, 21 were adult females and 33 were juveniles. On the intralimital wintering grounds, there is a lack of good quality photographs allowing reliable identification of age.

DISCUSSION

Through this review of photographic evidence, we find that within the eastern range, Little Bustards observed on extralimital wintering grounds are mostly female-type. Data from a smaller subset of photographs indicate that roughly 40% of these female-type birds are adult females. The trend towards female-type bias on extralimital wintering grounds was exaggerated during the irruptive winter of 2024/25. These demographic patterns are consistent with observations of differential migration and irruption in other bird species, in that males and adults typically overwinter closer to breeding sites (Gauthreaux 1982). Similar patterns are observed in other bustard species in Eurasia, *eg* longer-distance migration by female than male Asian Houbara *Chlamydotis macqueenii* (Combreau & Al Baidani 2015) and Great Bustard *Otis tarda* (Streich *et al* 2006, Wang *et al* 2023), and bias in irruptive movements in Great Bustard (Streich *et al* 2006).

Three major hypotheses, relating to physiology, dominance and spring arrival times, have been posited to explain differential migration (Cristol *et al* 1999). Because male and female Little Bustards are of similar size, the physiological hypothesis, which argues that larger individuals are better able to endure a period of cold and food scarcity, is not supported. The dominance hypothesis contends that dominant (typically larger) individuals monopolise winter food resources, forcing less dominant classes to migrate. However, Little Bustard winter food resources are neither scarce nor easily defensible. The arrival-time hypothesis proposes that individuals arriving earliest on breeding grounds will overwinter closer to breeding grounds. This explanation is most compelling for Little Bustards, as lekking males arrive well before females to establish display territories.

During an irruption winter, even on intralimital wintering grounds we observe a decrease in the ratio of male to female-type birds (ratios 0.37–0.54). This suggests that a greater number of juveniles were present during the irruption winter than in other years. Studies of avian irruption ecology have largely focused on boreal seed and fruit-eating species, and on raptors (Newton 2006). In contrast, the Little Bustard's diet consists primarily of invertebrates and ground vegetation, resources that are subject to less interannual variation in winter (Cabodevilla *et al* 2024). Nevertheless, in his multi-decadal study of the steppe birds of northern Kazakhstan, Ryabov (1949) noted high interannual variation in Little Bustard populations, which he attributed to low reproductive success in years of drought. It may be possible that in 2024, beneficial conditions resulted in high breeding productivity in some parts of the Little Bustard's eastern range. Of note, the 2024 growing season in northern Kazakhstan was marked by above-average rainfall (https://ipad.fas.usda.gov). The high levels of primary productivity which resulted in high wheat crop yields (ibid) could also have supported higher invertebrate densities for growing chicks.

The issue of where adult males winter is unresolved. There was no site at which the number of adult males was greater than the number of female-types. Seven lone adult males were recorded at extralimital sites, and four at intralimital. The largest male-only flock consisted of six birds and was recorded in January 2024 in Georgia. Males were most commonly observed in mixed flocks containing female-type birds. Of individual records we reviewed (208 in total), none from extralimital wintering sites, and only five from intralimital wintering sites, reported more adult males than female-type birds (male:female-type ratios from 1.2–2.3). Although our study excluded records from most of Kazakhstan and Xinjiang as non-wintering areas, there were few records from winter months, and those we scrutinised did not contain large numbers of males. Systematic and comprehensive winter surveys, and satellite telemetry can help to answer this question, and may reveal other aspects of differential sexual migration in the eastern population of Little Bustards.

Increased risks, including powerline collisions and hunting, are encountered by Little Bustards migrating longer distances (Aidek *et al* 2025, Cambell & Kessler 2025, Kessler *et al* 2025b, Khan *et al* 2025). Such mortality could contribute to a higher female mortality rate, with negative demographic implications for this lekking species, in which females are already disproportionally killed during the breeding season by agricultural machinery (Campeau & Kulagin 2022). In contrast, we are not aware of reports of male-biased winter mortality, nor of specific high-mortality factors at more northern overwintering sites (*eg* northern Caucasus & Uzbekistan; Oparin *et al* 2025, Ten *et al* 2025). However, mass mortality of birds at one of the southern wintering sites (Turkmenistan; Rustamov & Shcherbina 2025) was reported in years of harsh winter weather, and as discussed above, the wintering areas used by male Little Bustards are not well understood.

ACKNOWLEDGEMENTS

We are very grateful to everyone who contributed photographs of Little Bustards, as without them this study could not have happened (listed alphabetically): Ahmad Aidek, Abbas Ashoori, Nika Budagashvili, Oscar Campbell, Ahmad Khan, Dimitris Kokkinidis, İ Kaan Özgencil, Alexandru Pintilioaie and Anna Ten. We appreciate the contribution of Mark Easterbrook, Gültekin Yazıcıoğlu and Yann Muzika for use of their photographs to illustrate the characteristics of juvenile, female and male Little Bustards. Our sincere thanks to Matthew Toomey for discussions about data analysis. Special thanks to Guillaume Bruneau for his assistance with the literature.

LITERATURE CITED

Aidek, A, KM Ararat, S Awad, S Azar, F Itani, F Khoury & G Ramadan-Jaradi. 2025. The Little Bustard *Tetrax tetrax* in Iraq, Syria, Lebanon and Jordan. *Sandgrouse* 47: 38–47.

Ashoori, A, FH Tayefeh & LP Campeau. 2025. Iran's Little Bustards *Tetrax tetrax* show the first signs of a renewed decline: an updated status, 2016–2024. *Sandgrouse* 47: 102–110.

Bretagnolle, V, S Mañosa & MB Morales. 2022. Natural history of the Little Bustard: morphology, biometry, diet, sexual dimorphism, and social and breeding behaviour. *In:* Bretagnolle, V, J Traba & MB Morales (eds). *Little Bustard: Ecology and Conservation*. Springer Nature, Switzerland, pp29–56.

Cabodevilla X, ME Ortiz-Santaliestra, M Fernández-Tizón, J Zurdo, MJ Madeira, D Giralt, F Sardà-Palomera, MJ Fernández-Benéitez & F Mougeot. 2024. Dietary DNA metabarcoding reveals a trophic niche partitioning among sympatric Iberian sandgrouses and bustards. *Science of the Total Environment* 933: 172989.

Campbell, O & M Kessler. 2025. Wild vagrants and intentional releases? Records of Little Bustard *Tetrax tetrax* in the Arabian peninsula. *Sandgrouse* 47: 52–58.

Campeau, LP & SV Kulagin. 2022. The return of breeding Little Bustards in the Tulek Valley IBA, Kyrgyzstan. *Sandgrouse* 44: 360–371.

Combreau, O & MS al Baidani. 2015. *A Natural History of the Asian Houbara Bustard*. International Fund for Houbara Conservation, Abu Dhabi, UAE.

Cristol, DA, MB Baker & C Carbone. 1999. Differential migration revisited: latitudinal segregation by age and sex class. *In*: Nolan Jr, V (ed) *Current Ornithology* Vol. 15. Kluwer Academic, New York, USA, pp33-88.

Farajli, Z. 2024. Exciting and spectacular October at Besh Barmag bottleneck! https://birdingazerbaijan.org/2024/10/31/exciting-and-spectacular-october-at-besh-barmag-bottleneck/. [Accessed 23 March 2025]

Gauthreaux Jr, SA. 1982. The ecology and evolution of avian migration systems. *In*: Farner DS, JR King & KC Parkes (eds). *Avian Biology. Vol VI.* Academic Press, New York, USA. pp93–168.

Jiguet, F & A Wolff. 2000. [Ageing and sexing Little Bustard in autumn.] *Ornithos* 7: 30–33. [In French]

Kessler, M, LP Campeau & NJ Collar. 2025a. The status of the eastern population of Little Bustard *Tetrax tetrax*: editors' preface. *Sandgrouse* 47: 3–5.

Kessler, M, LP Campeau & NJ Collar. 2025b. Recovery at risk: a flyway-level population assessment of the Little Bustard *Tetrax tetrax* in its eastern range. *Sandgrouse* 47: 6–25.

Khan, A, NUH Khan, S Uddin & A Karam. 2025. Status of the Little Bustard *Tetrax tetrax* in Pakistan based on historical and recent sighting records. *Sandgrouse* 47: 160–166.

Morales, MB, S Mañosa, A Villers, EL García de la Morena & V Bretagnolle. 2022. Migration, movements, and non-breeding ecology. *In:* Bretagnolle, V, J Traba & MB Morales (eds). *Little Bustard: Ecology and Conservation*. Springer Nature, Switzerland, pp123–150.

Newton, I. 2006. Advances in the study of irruptive migration. *Ardea* 94: 433–460.

Oparin, ML, OS Oparina, AA Abushin, VN Fedosov & AA Nefedov. 2025. Status of Little Bustard *Tetrax tetrax* in Russia based on assessments in four key regions. *Sandgrouse* 47: 59–72

Özgencil, IK, QH Mueen, KE Yavuz, M Sözen, A Karataş, İ Uysal, ÖF Şahin, AA Çekici, K Kaplan, MM Karataş, M Erturhan, A Uslu, B Hatinoğlu, AC Tinaz, DM Özoy, KA Boyla, S İsfendiyaroğlu, S Ekşioğlu & F Akarsu. 2025. Türkiye's Little Bustards *Tetrax tetrax* in decline: assessing distribution, population trends and threats. *Sandgrouse* 47: 26–37.

Perlman, Y. 2025. Decline in Little Bustard *Tetrax tetrax* numbers wintering in Israel since the 1980s. *Sandgrouse* 47: 48–51.

Potapov, RL & VE Flint (eds). 1987. [*Birds of the USSR. Gruiformes, Galliformes.*] Nauka, Leningrad. [In Russian]

Rustamov, EA & AA Shcherbina. 2025. The Little Bustard *Tetrax tetrax* in Turkmenistan: an analysis of status, 1880–2024. *Sandgrouse* 47: 140–149.

Ryabov, AF. 1949. [On the ecology of steppe birds of northern Kazakhstan through observations in Naurzum Zapovednik.] *Works of the Naurzum Government Nature Reserve* 2: 153–232. [In Russian]

Streich, WJ, H Litzbarski, B Ludwig & S Ludwig. 2006. What triggers facultative winter migration of Great Bustard (*Otis tarda*) in Central Europe? *European Journal of Wildlife Research* 52: 48–53.

Ten, A, M Gritsina, T Abduraupov, E Kreuzberg, M Mitropolskiy, N Marmazinskaya & A Raykov. 2025. Warming temperatures and reduced snow cover are associated with new wintering grounds for the Little Bustard *Tetrax tetrax* in Uzbekistan. *Sandgrouse* 47: 133–139.

Wang, Y, G Purev-Ochir, A Gungaa, B Erdenechimeg, O Terbish, D Khurelbaatar, Z Wang, C Mi & Y Guo. 2023. Sex-dependent migration of eastern great bustard (*Otis tarda dybowskii*) in northeast Asia. *Journal of Ornithology* 164: 341–352.

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