The Little Bustard *Tetrax tetrax* in Turkmenistan: an analysis of status, 1880–2024

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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.

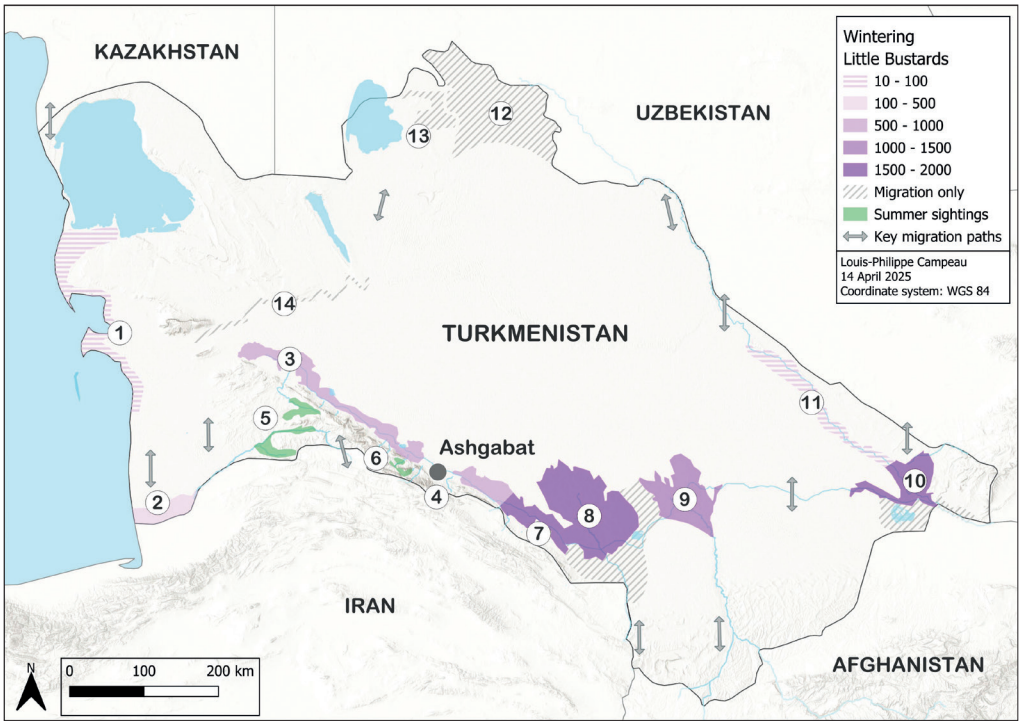

Figure 1. Turkmenistan, showing the 14 areas in which the Little Bustard has been recorded. Numbers, arranged anti-clockwise from the Caspian seaboard, correspond to those given in Table 1.

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.

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