

Bird records from south-central Uzbekistan, 2010–2013

THOMAS EDWARD MARTIN, VALENTIN NIVET-MAZEROLLES,
CECILE LANDSMANN, MATHIEU GUILLEMIN, JÉRÔME DUBOS,
FRÉDÉRIC VALLEJO & VALÉRY DOMBROVSKI

South-central Uzbekistan supports a diverse range of ecosystems and a rich avifauna, but much of the region remains ornithologically poorly known. We present here records of incidental bird sightings made in the under-explored semi-arid 'steppe' ecosystems of southern Navoi and far western Samarkand provinces during the conduct of fieldwork supporting the conservation of Macqueen's Bustard *Chlamydotis macqueenii* in this area. We also report opportunistic records made in other habitats occurring in the study region.

Our fieldwork seasons ran for approximately three to four months February–June each year, 2010–2013, with a single six week autumn season running September–October 2013. Bird records were obtained from a combination of formal fieldwork based on unlimited-radius circular plot point counts (c5346 survey hours) and c8454 person-hours of opportunistic observational data. Formal fieldwork effort was concentrated in two main areas: the Karnabchul steppe area to the south of the city of Navoi, and a large tract of steppe close to southeastern margins of the Kyzylkum desert to the north of Navoi. Opportunistic data was also gathered from these two areas as well as three other sites—the far western and southern shore of lake Aydarkul, the eastern shore of lake Tudakul, and the low mountains of Sarmysh nature park (Figure 1). In total, 270 species were detected in the region, including one regional endemic and 17 species considered by IUCN to be globally threatened or near threatened. A total of six species we recorded are not currently noted as occurring here, in the more accessible literature at least, and on global species databases. We present an account of our records from south-central Uzbekistan, which we consider to be among the most extensive from this region to date.

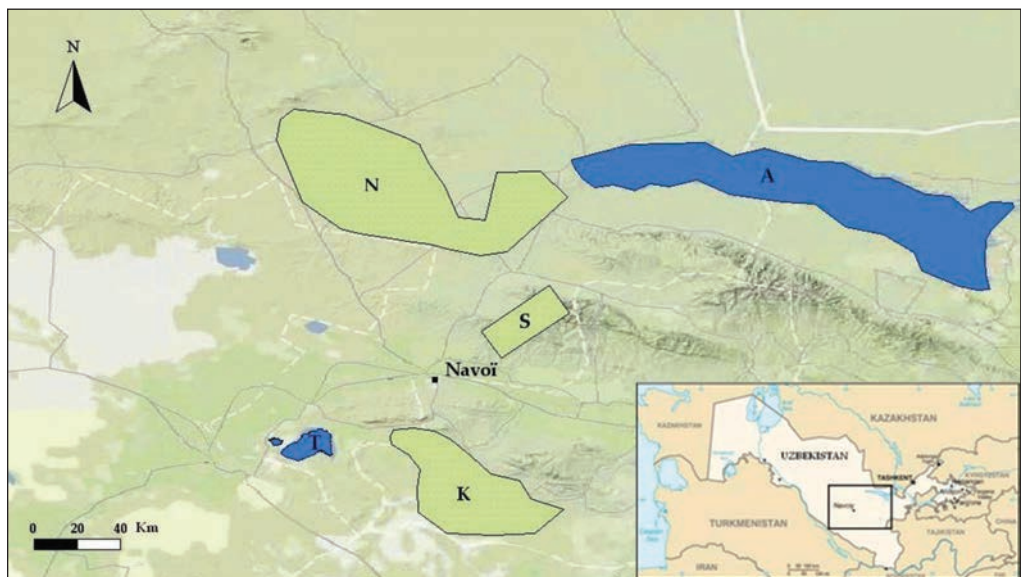


Figure 1. Map showing our study areas within south-central Uzbekistan: K Karnabchul steppe, N northern steppe areas, S Sarmysh nature park area, T lake Tudakul area, A lake Aydarkul area. Note that observations at lake Tudakul and lake Aydarkul were restricted to the eastern shore and far western and southern shores respectively. Inset shows location of our study region within Uzbekistan.



Plate 1. Flat, semi-arid 'steppe' typical of the Karnabchul and northern steppe study areas, Uzbekistan, April 2013.
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STUDY REGION

Our fieldwork in south-central Uzbekistan was conducted in southern Navoi province and a small section of far-western Samarkand province, 39° 49'–41° 23' N, 64° 80'–65° 87' E (Figure 1). This region is dominated by flat, semi-arid grassland habitats (World Wildlife Fund 2013). Strictly these habitats are classified as semi-desert due to the low annual precipitation they receive (Ayé *et al* 2012), but they are most commonly referred to colloquially as 'steppe' in the literature and everyday terminology, and as such we use this term throughout this study. In addition to large expanses of steppe, the region also has areas of low mountains, human settlements, irrigated cultivation, extensive sand dune areas, wetlands and lakes. Three of BirdLife International's important bird areas are located within our study region: Karnabchul steppe IBA UZ018, the eastern section of the Tudakul and Kuymazar 'reservoirs' UZ015 and Sarmysh nature park UZ013 (BirdLife International 2013c–e). A fourth IBA, the northern shore of Aydarkul lake UZ029 (BirdLife International 2013b), borders the northern extremity of our study area. Altitude ranges from 230 m asl along the shore of lake Tudakul to 1993 m asl at the highest peak of the mountainous Sarmysh area, although the flat steppe which constitutes most of the region typically varies from 300–380 m asl.

The region has a continental climate characterised by hot dry summers, a cool wet autumn and cold winters with frequent thaws (Glazirin *et al* 1999). Temperature ranges from an average of 33°C in July to 1.9°C in January. Average annual rainfall in the area is 126 mm, with c32 mm falling in February, the wettest month, and <1 mm in July, the driest month (unpublished data 2007–2013 Emirates Centre for the Conservation of Houbara).

The geology of the region is highly heterogeneous and complex due to its location on a tectonic collision zone (Hendrix & Davis 2001). Mineral resources are abundant and a variety of large-scale mining operations occur locally; uranium, gold, and natural gas extraction being the most economically important (F Andrianova pers comm). Sandy, semi-consolidated soils with low organic matter and mineral nutrient contents predominate (Makhmudovich 2006). Vegetation in the region varies between habitats. Steppe ecosystems are dominated by grasses, with the most abundant non-grass species being shrubs of the genus *Artemisia*. Other assemblages of psammophytic and ephemeral semi-shrub vegetation types also occur (Makhmudovich 2006). The most important of



Plate 2. A pair of Ruddy Shelducks *Tadorna ferruginea* on the shore of lake Tudakul—one of two large lakes in our study area, Uzbekistan, May 2013. © Mathieu Guillemin

these other psammophytes is perhaps Black Saxaul *Haloxylon ammodendron*. Extensive plantations of this species were established in the Karnabchul area in the 1950s by the Soviet authorities as a means to reduce soil erosion. Much of the plantation area has since been lost due to over-exploitation as a fuel resource, but several large saxaul tracts still remain (BirdLife International 2013c). The mountainous areas of the study region possess an Irano-Turanian vegetation assemblage characterised by small hardy shrubs and trees such as those of the genera *Prunus* and *Pistacia* (Ayé *et al* 2012). Agricultural activity in the steppe and mountains is largely confined to rough pastoral grazing, although cultivation in irrigated areas is diverse. Important crops include wheat, cotton, and a variety of fruits including apples, grapes, apricots and melons (F Andrianova pers comm).



Plate 3. Low rocky mountains of the Sarmysh nature park area, Uzbekistan, May 2011. © Tom Martin

STUDY SITES

Our records come from the five areas shown in Figure 1. Formal records come from the Karnabchul region south of the city of Navoi (K) and the steppe areas north of Navoi (N). Both these areas are dominated by semi-arid steppe habitats (Plate 1), but are also represented by villages, small patches of wetlands, sand dunes, and low mountains. Opportunistic records were also made in these areas, along with three others: the far western and southern shores of lake Aydarkul (A), the eastern shore of lake Tudakul and its surroundings (T), and the Sarmysh nature park area (S). The first two are lake and wetland habitats (Plate 2), and the Tudakul area also has extensive areas of wet irrigation and cultivated land. Sarmysh is dominated by low, dry mountains with some areas of rocky steppe (Plate 3).

PREVIOUS STUDIES

Several ornithological surveys have been conducted previously in our study region. The last intensive large-scale bird survey in the vicinity was completed over 45 years ago by Salikhbaev *et al* (1967) in neighbouring Karshi province, to the south of the Karnabchul steppe. Records from the region have been reported in several national and regional scale ornithological studies focusing both on avifauna as a whole (Mitropolsky *et al* 1987, 1990) and on individual species or avian sub-groups (Kreuzberg-Mukhina *et al* 2001, Kreuzberg-Mukhina 2008). Smaller scale, more localised surveys have also been completed at each of the IBAs within our study region and some other locations. Results from some of these can be found in hard copy publications (Korshunova 2006, Turaev & Shernazarov 2006, Kreuzberg-Mukhina 2000, 2001) and on online databases (Birdlife International 2013b–e). These references summarize the more accessible recent studies in this area, although a number of other Russian-language publications also exist, most notably those produced in association with the Uzbekistan Society for the Protection of Birds (UzSPB 2013), which we were not able to obtain. To our knowledge though, the northern steppe areas in our study region have never been subject to a detailed ornithological survey.

METHODS

Bird records were collected over the course of four three-to-four month fieldwork seasons running from variable dates between late February and early June, 2010–2013. A single autumn fieldwork season ran 11 September–25 October 2013. Fieldwork was conducted by all the authors, each having between five and twenty-three years of experience conducting scientific bird surveys. Records were obtained in two ways: via formal survey work conducted as part of the ongoing *Chlamydotis macqueenii* monitoring programme, and informal observations made during periods of travel between survey work areas and during the authors' free time. Formal survey work was conducted by completing unlimited radius circular plot point counts (Bibby *et al* 2002) using telescopes and binoculars at both predetermined and opportunistically selected sites throughout the Karnabchul and northern steppe areas. Counts were carried out only in areas of good potential *C. macqueenii* habitat and between 05.00–11.00 and 15.00–20.00 h. Each of these circular counts was completed by two fieldworkers, and the time limit was highly variable depending on topography and visibility. Formal survey work was not done in rain, snow, heavy winds or during dust storms. Informal observations were made by simply recording birds observed at any time when formal counts were not being conducted, whether with binoculars, telescope or the naked eye. These informal observations were carried out in all habitats occurring in our five study areas.

Once survey work was completed, we created a list of bird species detected in our study areas using OSME regional checklist taxonomy (Blair *et al* 2010). We also recorded the conservation status of each species following the most recent IUCN Red List (IUCN 2013). We also assigned categorical abundance estimates for each species based on frequency of sightings. Designated categories were: abundant (typically recorded multiple times per day in suitable habitat); common (typically recorded at least once per day); fairly common (typically recorded at least once per week); locally common or locally fairly common (usually recorded daily/weekly, but restricted to specific habitats or spatially small areas); uncommon (recorded less than ten times in a season); and rare (recorded only once or twice). We then noted whether each species was resident, or a summer, winter or passage migrant or a vagrant based on data from BirdLife International (2013a) and Ayé *et al* (2012). We also noted those species for which we observed evidence of breeding in our study areas (based on observations of nests, chicks or eggs). We classed species as newly

recorded for the region if sightings were not noted in the results of the surveys completed by Salikhbaev *et al* (1967), Mitropolsky *et al* (1987, 1990), Kreuzberg-Mukhina (2000, 2001, 2008), Kreuzberg-Mukhina *et al* (2001), Turaev & Shernazarov (2006) or Korshunova (2006), were not noted in BirdLife International's IBA records (BirdLife International 2013b–e), or not indicated as occurring in the region by the species distribution maps in Ayé *et al* (2012), or those produced by BirdLife International (2013a).

RESULTS

Our combined total survey effort in the study region corresponded to c5346 person-hours of formal survey work and c8454 person-hours of opportunistic observational data. A total of 270 species was recorded, including one regional endemic and 10 species considered to be threatened (VU vulnerable, EN endangered or CR critically endangered). Seven near threatened species were also detected. We recorded 40 species for which we observed evidence of breeding. Six species were recorded which are not noted as occurring in the region in the above literature and for which our data may well indicate range extensions worthy of further attention. Table 1 presents an annotated checklist of all species recorded by us. The following list provides further information on the more notable species.

Marbled Duck *Marmaronetta angustirostris* VU. Typically recorded at least once or twice per year along the eastern shore of lake Tudakul. Seen individually, in pairs, or in small flocks of up to eight birds. We did not record evidence of this species breeding on the lake, although breeding has been recorded here previously by Kreuzberg-Mukhina (2001b), and there are also recent records of breeding sites at Dengizkul lake (LUKOIL 2012) which lies to the southwest of our study region in Bukhara province.

Glossy Ibis *Plegadis falcinellus*. An uncommon species that was observed singularly or in small groups of up to six birds along the eastern shore of lake Tudakul, the far-western edge of lake Aydarkul and near small pools of water in the northern steppe areas. The species is known to breed at lake Tudakul (Turaev & Shernazarov 2006) and has also been recently reported from lake Ayakaghytma in neighbouring Bukhara province (Ten *et al* 2012), but we could not find any published records of its occurrence at Aydarkul and the northern steppe areas. The status of this species at Aydarkul is unclear. It very possibly breeds here, given the records from Tudakul, although we did not find evidence of breeding, and the birds we have observed may have been passage migrants.

Dalmatian Pelican *Pelecanus crispus* VU. A common passage migrant and winter visitor on lake Tudakul. It was also recorded fairly regularly in open steppe habitats during migration, usually in mixed flocks with Great White Pelicans *Pelecanus onocrotalus*, which are typically more numerous than *P. crispus*.

Egyptian Vulture *Neophron percnopterus* EN. A fairly common breeding migrant. A number of nesting sites were found in mountainous areas across the region, and birds were quite often observed in steppe areas adjacent to these mountains and, less commonly, in more open steppe.

Greater Spotted Eagle *Aquila clanga* VU. An uncommon passage migrant with an average of around five sightings per fieldwork season. It is possible, though, that some birds were overlooked or mistaken for other more common eagles. Most of the individuals (both adults and juveniles) recorded were seen in late March and April.

Table 1. Bird species recorded by us in our south-central Uzbekistan study areas (see text), 2010–2013. All taxonomy follows Blair *et al* (2010). The six species with RE after the English name are those for which our data indicate a range extension. A T after the English name indicates threatened and NT near threatened (IUCN 2013). The status column presents species abundance estimates (the first set of letters before the backslash) and residency status (the second set of letters). A abundant, La locally abundant, C common, Lc locally common, Fc fairly common, Lfc locally fairly common, U uncommon, Lu local and uncommon, R rare. Residency status: R resident, B breeding migrant, Pm passage migrant, Wv winter visitor, Vag vagrant. The abundance estimate for Macqueen's Bustard is qualified in the text. Residency status with an asterisk indicates a species for which we have observed evidence of breeding in the study area. Species with unclear residency status have a question mark. In the zones column, letters indicate that the species was detected by us at A Aydarkul lake, K Karnabchul steppe, N northern steppe area, S Sarmysh nature park, T Tudakul lake.

Family	English name	Scientific name	Status	Zones
Phasianidae	Chukar Partridge	<i>Alectoris chukar</i>	Lc/R*	KNS
	Common Quail	<i>Coturnix coturnix</i>	Fc/Pm	KN
	Common Pheasant	<i>Phasianus colchicus</i>	Lc/R*	KT
Anatidae	Bean Goose	<i>Anser fabalis</i>	R/Wv?	KN
	Greylag Goose	<i>Anser anser</i>	Lc/R	AT
	Greater White-fronted Goose	<i>Anser albifrons</i>	U/Wv	NT
	Mute Swan	<i>Cygnus olor</i>	Lfc/R	AT
	Common Shelduck	<i>Tadorna tadorna</i>	Lc/B	AT
	Ruddy Shelduck	<i>Tadorna ferruginea</i>	Lfc/R	KT
	Gadwall	<i>Anas strepera</i>	Lc/Wv?	ANT
	Eurasian Wigeon	<i>Anas penelope</i>	Lc/Wv	NT
	Mallard	<i>Anas platyrhynchos</i>	La/R	ANT
	Northern Shoveler	<i>Anas clypeata</i>	Lc/Wv?	ANT
	Northern Pintail	<i>Anas acuta</i>	Lc/Wv	T
	Garganey	<i>Anas querquedula</i>	Lfc/Pm?	T
	Eurasian Teal	<i>Anas crecca</i>	La/Wv	NT
	Marbled Duck T	<i>Marmaronetta angustirostris</i>	U/B	T
	Red-crested Pochard	<i>Netta rufina</i>	Lc/R*	ANT
	Common Pochard	<i>Aythya ferina</i>	La/Wv, Pm	NT
	Ferruginous Duck NT	<i>Aythya nyroca</i>	U/B	N
	Tufted Duck	<i>Aythya fuligula</i>	Lfc/Wv	T
	Greater Scaup	<i>Aythya marila</i>	R/Wv	T
	Common Goldeneye	<i>Bucephala clangula</i>	U/Wv	T
	Smew	<i>Mergellus albellus</i>	U/Wv	T
	Goosander	<i>Mergus merganser</i>	R/Wv	T
	Red-breasted Merganser	<i>Mergus serrator</i>	R/Wv	T
Podicipedidae	Little Grebe	<i>Tachybaptus ruficollis</i>	U/R*	N
	Great Crested Grebe	<i>Podiceps cristatus</i>	Lfc/R	T
	Black-necked Grebe	<i>Podiceps nigricollis</i>	R/Wv	N
Phoenicopteridae	Greater Flamingo	<i>Phoenicopterus roseus</i>	U/Pm	NT
Ciconiidae	Black Stork	<i>Ciconia nigra</i>	R/Pm	T
Threskiornithidae	Glossy Ibis RE	<i>Plegadis falcinellus</i>	Lu/B?	ANT
	Eurasian Spoonbill	<i>Platalea leucorodia</i>	U/Pm?	T
Ardeidae	Eurasian Bittern	<i>Botaurus stellaris</i>	R/Pm?	NT
	Little Bittern	<i>Ixobrychus minutus</i>	R/B	K
	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	R/B	NT
	Grey Heron	<i>Ardea cinerea</i>	Lc/R	AT

Family	English name	Scientific name	Status	Zones
	Purple Heron	<i>Ardea purpurea</i>	U/B	NT
	Great Egret	<i>Ardea alba</i>	Lc/R	T
	Little Egret	<i>Egretta garzetta</i>	Lfc/B	T
Pelecanidae	Great White Pelican	<i>Pelecanus onocrotalus</i>	Lc/Pm?	KNT
	Dalmatian Pelican T	<i>Pelecanus crispus</i>	Lc/Wv	KT
Phalacrocoracidae	Pygmy Cormorant	<i>Microcarbo pygmeus</i>	Lc/R?	T
	Great Cormorant	<i>Phalacrocorax carbo</i>	Lc/R?	T
Accipitridae	Osprey	<i>Pandion haliaetus</i>	Lfc/Pm	ANT
	European Honey Buzzard	<i>Pernis apivorus</i>	R/Pm	T
	Black Kite	<i>Milvus migrans</i>	U/Pm	KN
	White-tailed Eagle	<i>Haliaeetus albicilla</i>	Lfc/Wv	KT
	Lammergeier	<i>Gypaetus barbatus</i>	U/R	NS
	Egyptian Vulture T	<i>Neophron percnopterus</i>	Lfc/Br*	KNS
	Eurasian Griffon Vulture	<i>Gyps fulvus</i>	Lfc/R*	KNS
	Cinereous Vulture NT	<i>Aegypius monachus</i>	Lfc/R*	KNS
	Short-toed Snake Eagle	<i>Circus gallicus</i>	Fc/Br*	KN
	Western Marsh Harrier	<i>Circus aeruginosus</i>	A/R*	AKNT
	Hen Harrier	<i>Circus cyaneus</i>	Fc/Wv	KN
	Pallid Harrier NT	<i>Circus macrourus</i>	Fc/Pm	KN
	Montagu's Harrier	<i>Circus pygargus</i>	Fc/Pm	KN
	Shikra	<i>Accipiter badius</i>	Fc/B	NT
	Eurasian Sparrowhawk	<i>Accipiter nisus</i>	Fc/Wv	KN
	Northern Goshawk	<i>Accipiter gentilis</i>	R/Wv	K
	Common Buzzard	<i>Buteo buteo</i>	Fc/Wv	KN
	Long-legged Buzzard	<i>Buteo rufinus</i>	A/R*	KNS
	Greater Spotted Eagle T	<i>Aquila clanga</i>	U/Pm	KNT
	Steppe Eagle	<i>Aquila nipalensis</i>	C/Pm	KN
	Eastern Imperial Eagle T	<i>Aquila heliaca</i>	U/Wv	KNS
	Golden Eagle	<i>Aquila chrysaetos</i>	Lfc/R*	KN
	Booted Eagle	<i>Aquila pennata</i>	U/B	AKN
Falconidae	Lesser Kestrel	<i>Falco naumanni</i>	U/B	KN
	Common Kestrel	<i>Falco tinnunculus</i>	C/R*	KNS
	Merlin	<i>Falco columbarius</i>	C/Wv	KNT
	Eurasian Hobby	<i>Falco subbuteo</i>	U/B	KN
	Saker Falcon T	<i>Falco cherrug</i>	Lfc/R*	KNS
	Peregrine Falcon	<i>Falco peregrinus</i>	U/Wv	N
Otididae	Great Bustard T	<i>Otis tarda</i>	R/Pm	K
	Macqueen's Bustard T	<i>Chlamydotis macqueenii</i>	C/B*	KN
	Little Bustard	<i>Tetrax tetrax</i>	C/Pm	KN
Rallidae	Water Rail	<i>Rallus aquaticus</i>	U/R	NT
	Baillon's Crake	<i>Porzana pusilla</i>	R/B	N
	Spotted Crake	<i>Porzana porzana</i>	R/Pm	N
	Common Moorhen	<i>Gallinula chloropus</i>	Lfc/B	NT
	Eurasian Coot	<i>Fulica atra</i>	Lc/R	AT
Gruidae	Demoiselle Crane	<i>Anthropoides virgo</i>	Fc/Pm	KNT
	Common Crane	<i>Grus grus</i>	Fc/Pm	KN
Burhinidae	Eurasian Stone-curlew	<i>Burhinus oedicnemus</i>	U/B*	KN

Family	English name	Scientific name	Status	Zones
Haematopodidae	Eurasian Oystercatcher	<i>Haematopus ostralegus</i>	R/Pm	KT
Recurvirostridae	Black-winged Stilt	<i>Himantopus himantopus</i>	Lc/B*	NT
	Pied Avocet	<i>Recurvirostra avosetta</i>	U/Pm	T
Charadriidae	Northern Lapwing	<i>Vanellus vanellus</i>	Lfc/Pm	KT
	Sociable Lapwing T (Plate 4)	<i>Vanellus gregarius</i>	U/Pm	KN
	White-tailed Lapwing	<i>Vanellus leucurus</i>	Lfc/B*	ANT
	Grey Plover	<i>Pluvialis squatarola</i>	R/Pm	N
	Common Ringed Plover	<i>Charadrius hiaticula</i>	R/Pm	N
	Little Ringed Plover	<i>Charadrius dubius</i>	Lfc/B	NT
	Kentish Plover	<i>Charadrius alexandrinus</i>	Lfc/B	NT
	Greater Sand Plover	<i>Charadrius leschenaultii</i>	Fc/B*	AKN
	Caspian Plover	<i>Charadrius asiaticus</i>	U/Pm	KN
Scolopacidae	Jack Snipe	<i>Lymnocyptes minimus</i>	U/VVv, Pm	KN
	Common Snipe	<i>Gallinago gallinago</i>	Fc/VVv, Pm	NT
	Black-tailed Godwit NT	<i>Limosa limosa</i>	Lfc/Pm	NT
	Bar-tailed Godwit	<i>Limosa lapponica</i>	R/Pm	T
	Whimbrel	<i>Numenius phaeopus</i>	R/Pm	T
	Eurasian Curlew NT	<i>Numenius arquata</i>	U/Pm	KN
	Spotted Redshank	<i>Tringa erythropus</i>	U/Pm	T
	Common Redshank	<i>Tringa totanus</i>	Lfc/Pm	NT
	Marsh Sandpiper	<i>Tringa stagnatilis</i>	U/Pm	NT
	Common Greenshank	<i>Tringa nebularia</i>	Lfc/Pm	NT
	Green Sandpiper	<i>Tringa ochropus</i>	Lfc/Pm	NT
	Wood Sandpiper	<i>Tringa glareola</i>	Lfc/Pm	KNT
	Terek Sandpiper	<i>Xenus cinereus</i>	R/Pm	T
	Common Sandpiper	<i>Actitis hypoleucos</i>	Lfc/B?	KNT
	Little Stint	<i>Calidris minuta</i>	Lfc/Pm	NT
	Temminck's Stint	<i>Calidris temminckii</i>	U/Pm	NT
	Curlew Sandpiper	<i>Calidris ferruginea</i>	U/Pm	ANT
	Dunlin	<i>Calidris alpina</i>	U/Pm	NT
	Broad-billed Sandpiper	<i>Limicola falcinellus</i>	R/Pm	T
	Ruff	<i>Philomachus pugnax</i>	Fc/Pm	NT
	Red-necked Phalarope	<i>Phalaropus lobatus</i>	U/Pm	KNT
Glareolidae	Collared Pratincole	<i>Glareola pratincola</i>	Fc/B	NT
	Black-winged Pratincole NT	<i>Glareola nordmanni</i>	U/Pm	NT
Laridae	Slender-billed Gull	<i>Chroicocephalus genei</i>	Lfc/R?	AT
	Common Black-headed Gull	<i>Chroicocephalus ridibundus</i>	La/R?	AKNT
	Little Gull	<i>Hydrocoloeus minutus</i>	R/Pm	A
	Mediterranean Gull	<i>Larus melanocephalus</i>	R/Vag	A
	Great Black-headed Gull	<i>Larus ichthyaetus</i>	U/VVv	AT
	Common Gull	<i>Larus canus</i>	U/VVv	T
	Steppe Gull	<i>Larus barabensis</i>	Fc/Pm	KN
Sternidae	Gull-billed Tern	<i>Gelochelidon nilotica</i>	Lfc/B	NT
	Caspian Tern	<i>Hydroprogne caspia</i>	U/B	AT
	Little Tern	<i>Sternula albifrons</i>	Lfc/B	NT
	Common Tern	<i>Sterna hirundo</i>	Lfc/B	NT
	Whiskered Tern	<i>Chlidonias hybrida</i>	Lfc/B?	NT

Family	English name	Scientific name	Status	Zones
Pteroclididae	White-winged Black Tern	<i>Chlidonias leucopterus</i>	U/Pm	NT
	Black Tern	<i>Chlidonias niger</i>	U/Pm	T
	Pallas's Sandgrouse	<i>Syrrhaptes paradoxus</i>	R/Wv	N
	Pin-tailed Sandgrouse	<i>Pterocles alchata</i>	U/Wv?	K
Columbidae	Black-bellied Sandgrouse (Plate 5)	<i>Pterocles orientalis</i>	A/R	KN
	Rock Dove	<i>Columba livia</i>	La/R*	KN
	Stock Dove	<i>Columba oenas</i>	U/Pm	K
	Yellow-eyed Pigeon T (Plate 6a,b)	<i>Columba eversmanni</i>	R/B	K
	Common Woodpigeon RE	<i>Columba palumbus</i>	U/R?	KNT
	European Turtle Dove	<i>Streptopelia turtur</i>	U/B	KT
	Oriental Turtle Dove	<i>Streptopelia orientalis</i>	R/Pm	KNT
	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	Lfc/R	KNT
Cuculidae	Laughing Dove	<i>Spilopelia senegalensis</i>	La/R*	KN
	Common Cuckoo	<i>Cuculus canorus</i>	Fc/B	KT
Strigidae	Eurasian Eagle Owl	<i>Bubo bubo</i>	U/R*	KN
	Little Owl (Plate 7)	<i>Athene noctua</i>	C/R*	KNS
	Long-eared Owl	<i>Asio otus</i>	R/R	K
Caprimulgidae	Short-eared Owl	<i>Asio flammeus</i>	U/Wv	KN
	European Nightjar	<i>Caprimulgus europaeus</i>	C/B	AKN
	Egyptian Nightjar	<i>Caprimulgus aegyptius</i>	U/B	N
Apodidae	Alpine Swift	<i>Tachymartus melba</i>	U/B	S
	Common Swift	<i>Apus apus</i>	C/B	KNS
Coraciidae	European Roller NT	<i>Coracias garrulus</i>	C/B	KN
Alcedinidae	Common Kingfisher	<i>Alcedo atthis</i>	U/B	AT
Meropidae	Blue-cheeked Bee-eater	<i>Merops persicus</i>	Fc/B*	AKNT
	European Bee-eater	<i>Merops apiaster</i>	Fc/B*	AKNT
Upupidae	Eurasian Hoopoe	<i>Upupa epops</i>	C/B	KNT
Picidae	Eurasian Wryneck	<i>Jynx torquilla</i>	U/Pm	KN
	White-winged Woodpecker	<i>Dendrocopus leucopterus</i>	R/R*	T
Laniidae	Red-backed Shrike	<i>Lanius collurio</i>	U/Pm	NK
	Daurian Shrike	<i>Lanius isabellinus</i>	Fc/Pm	KTN
	Turkestan Shrike	<i>Lanius phoenicuroides</i>	C/B	KTN
	Long-tailed Shrike	<i>Lanius schach</i>	U/B	KNT
	Lesser Grey Shrike	<i>Lanius minor</i>	U/B	KNS
	Great Grey Shrike	<i>Lanius excubitor</i>	R/Wv	N
	Asian Grey Shrike	<i>Lanius lahtora</i>	C/Pm	KNS
	Eurasian Golden Oriole	<i>Oriolus oriolus</i>	U/B	KNT
Monarchidae	Asian Paradise Flycatcher	<i>Terpsiphone paradisi</i>	R/B	S
Corvidae	Eurasian Magpie	<i>Pica pica</i>	La/R	KN
	Pander's Ground Jay RE	<i>Podoces panderi</i>	R/R	N
	Western Jackdaw	<i>Coloeus monedula</i>	U/R	KNS
	Rook	<i>Corvus frugilegus</i>	C/R	K
	Carrion Crow	<i>Corvus corone</i>	U/R	KN
	Hooded Crow	<i>Corvus cornix</i>	Lc/Wv	KN
	Northern Raven	<i>Corvus corax</i>	R/R	KN
	Turkestan Tit	<i>Parus bokharensis</i>	Lfc/R	ST
Remizidae	European Penduline Tit	<i>Remiz pendulinus</i>	R/Wv	NT

Family	English name	Scientific name	Status	Zones
	White-crowned Penduline Tit	<i>Remiz coronatus</i>	R/R	T
Paradoxornithidae	Bearded Reedling	<i>Panurus biarmicus</i>	U/R	T
Alaudidae	Calandra Lark	<i>Melanocorypha calandra</i>	A/R*	KN
	Bimaculated Lark	<i>Melanocorypha bimaculata</i>	C/B*	KN
	White-winged Lark RE	<i>Melanocorypha leucoptera</i>	R/Wv	KN
	Desert Lark	<i>Ammomanes deserti</i>	Lc/R	K
	Greater Short-toed Lark	<i>Calandrella brachydactyla</i>	A/R*	KN
	Lesser Short-toed Lark	<i>Calandrella rufescens</i>	Fc/B	KN
	Crested Lark	<i>Galerida cristata</i>	A/R	KN
	Eurasian Skylark	<i>Alauda arvensis</i>	C/Wv?	KN
	Oriental Skylark	<i>Alauda gulgula</i>	Lfc/B	T
Hirundinidae	Sand Martin	<i>Riparia riparia</i>	Lfc/Pm	AKNT
	Barn Swallow	<i>Hirundo rustica</i>	C/B*	KNT
	Common House Martin	<i>Delichon urbicum</i>	Lfc/B	N
	Red-rumped Swallow	<i>Cecropis daurica</i>	U/B	ST
Sylviidae	Cetti's Warbler	<i>Cettia cetti</i>	Fc/R	T
	Willow Warbler	<i>Phylloscopus trochilus</i>	U/Pm	N
	Siberian Chiffchaff	<i>Phylloscopus tristis</i>	C/Pm	KNST
	Greenish Warbler	<i>Phylloscopus trochiloides</i>	U/B?	KNST
	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	La/B	AKT
	Moustached Warbler	<i>Acrocephalus melanopogon</i>	U/B	T
	Paddyfield Warbler	<i>Acrocephalus agricola</i>	Lc/B	KT
	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	C/Pm	KS
	Eurasian Reed Warbler	<i>Acrocephalus scirpaceus</i>	U/Pm	T
	Booted Warbler	<i>Iduna caligata</i>	Fc/Pm	KN
	Skyes's Warbler	<i>Iduna rama</i>	C/B	KN
	Upcher's Warbler	<i>Hippolais languida</i>	U/B	ST
	Savi's Warbler	<i>Locustella luscinioides</i>	Lc/B	T
	Scrub Warbler	<i>Scotocerca inquieta</i>	Lc/R	K
	Barred Warbler	<i>Sylvia nisoria</i>	U/B	KN
	Lesser Whitethroat	<i>Sylvia curruca</i>	C/B	KNT
	Eastern Orphean Warbler	<i>Sylvia crassirostris</i>	Lfc/B	S
	Asian Desert Warbler	<i>Sylvia nana</i>	Fc/B	KN
	Common Whitethroat	<i>Sylvia communis</i>	U/Pm?	KN
	Menetries's Warbler	<i>Sylvia mystacea</i>	U/B	NT
Sittidae	Eastern Rock Nuthatch	<i>Sitta tephronota</i>	Lc/R*	KS
Sturnidae	Common Myna	<i>Acridotheres tristis</i>	La/R*	KN
	Rose-coloured Starling	<i>Pastor roseus</i>	Fc/B	KST
	Common Starling	<i>Sturnus vulgaris</i>	Lc/R	KN
Turdidae	Black-throated Thrush	<i>Turdus atrogularis</i>	U/Wv	KNT
	Redwing	<i>Turdus iliacus</i>	R/Pm	K
	Mistle Thrush	<i>Turdus viscivorus</i>	R/Wv	K
	Bluethroat	<i>Luscinia svecica</i>	Fc/Pm	KNT
	Thrush Nightingale	<i>Luscinia luscinia</i>	U/Pm	N
Muscicapidae	Eastern Nightingale	<i>Luscinia golzii</i>	R/B	NT
	White-throated Robin RE	<i>Irania gutturalis</i>	R/B	K
	Rufous-tailed Scrub Robin	<i>Cercotrichas galactotes</i>	Fc/B	KN

Family	English name	Scientific name	Status	Zones
Passeridae	Eastern Black Redstart	<i>Phoenicurus phoenicuroides</i>	Fc/Pm	KN
	Common Redstart	<i>Phoenicurus phoenicurus</i>	U/Pm	KNT
	Whinchat	<i>Saxicola rubetra</i>	R/Pm	N
	Western Siberian Stonechat	<i>Saxicola maurus</i>	C/Pm	KN
	Pied Stonechat	<i>Saxicola caprata</i>	Lc/B	KNT
	Isabelline Wheatear	<i>Oenanthe isabellina</i>	C/B*	KN
	Northern Wheatear	<i>Oenanthe oenanthe</i>	Fc/B	KN
	Pied Wheatear	<i>Oenanthe pleschanka</i>	C/B	KN
	Desert Wheatear	<i>Oenanthe deserti</i>	C/B	KN
	Finsch's Wheatear	<i>Oenanthe finschii</i>	Fc/B*	K
	Variable Wheatear	<i>Oenanthe picata</i>	Lc/B*	K
	Rufous-tailed Rock Thrush	<i>Monticola saxatilis</i>	Lfc/B*	KN
	Blue Rock Thrush	<i>Monticola solitarius</i>	R/B	NS
	Spotted Flycatcher	<i>Muscicapa striata</i>	C/B	KNST
	Red-breasted Flycatcher	<i>Muscicapa parva</i>	U/Pm	KN
	House Sparrow	<i>Passer domesticus</i>	U/R	K
	Indian House Sparrow	<i>Passer indicus</i>	La/B*	KN
	Spanish Sparrow	<i>Passer hispaniolensis</i>	Lc/B*	KN
	Eurasian Tree Sparrow	<i>Passer montanus</i>	La/R*	KN
	Rock Sparrow	<i>Petronia petronia</i>	Lfc/R?	K
Prunellidae	Black-throated Accentor	<i>Prunella atrogularis</i>	R/Wv	K
Motacillidae	Sykes's Wagtail	<i>Motacilla beema</i>	C/B	KN
	Black-headed Wagtail	<i>Motacilla feldegg</i>	C/B	KN
Fringillidae	Citrine Wagtail	<i>Motacilla citreola</i>	Fc/B	AKNT
	Grey Wagtail RE	<i>Motacilla cinerea</i>	U/B	AKN
	White Wagtail	<i>Motacilla alba</i>	C/R	K
	Masked Wagtail	<i>Motacilla personata</i>	C/R*	KN
	Tawny Pipit	<i>Anthus campestris</i>	Lfc/B	KN
	Meadow Pipit	<i>Anthus pratensis</i>	R/Wv	T
	Tree Pipit	<i>Anthus trivialis</i>	Fc/Pm	KN
	Red-throated Pipit	<i>Anthus cervinus</i>	R/Pm	N
	Water Pipit	<i>Anthus spinoletta</i>	Lc/Wv	KNT
	Common Chaffinch	<i>Fringilla coelebs</i>	Lfc/Wv	KN
Emberizidae	Brambling	<i>Fringilla montifringilla</i>	U/Wv	N
	Eastern Goldfinch	<i>Carduelis caniceps</i>	U/Wv	KS
	Trumpeter Finch	<i>Bucanetes githagineus</i>	R/Pm?	KN
	Mongolian Finch	<i>Bucanetes mongolicus</i>	R/R	KN
	Desert Finch	<i>Rhodospiza obsoleta</i>	Lc/R*	KNS
	Common Rosefinch	<i>Carpodacus erythrinus</i>	U/Pm	KT
	Corn Bunting	<i>Emberiza calandra</i>	Lc/R	K
	White-capped Bunting	<i>Emberiza stewarti</i>	R/B	KS
	Grey-necked Bunting	<i>Emberiza buchanani</i>	Lc/B	KS
	Ortolan Bunting	<i>Emberiza hortulana</i>	U/Pm	KN
Emberizidae	Red-headed Bunting	<i>Emberiza bruniceps</i>	Lc/B	KNS
	Common Reed Bunting	<i>Emberiza schoeniclus</i>	Lc/R	KNT

Eastern Imperial Eagle *Aquila heliaca* VU. An uncommon species recorded late winter and early–mid spring. A juvenile bird was sighted as late as 17 April in 2010. We most often observed this species in open steppe habitats, with only a few records from the region’s mountains. As with *A. clanga*, it is possible that some individuals of this species were overlooked or mistaken for other *Aquila* species.

Saker Falcon *Falco cherrug* EN. A local fairly-common resident. It is known to breed in several mountainous areas in the region and was also observed fairly regularly in open areas of steppe in close proximity to these mountains.

Great Bustard *Otis tarda* VU. Passes through central Uzbekistan as a passage migrant. It is a rare visitor in our study region, being known only from a male and female seen together in March 2013 near the small town of Sohoba in the Karnabchul steppe.

Macqueen’s Bustard *Chlamydotis macqueenii* VU. Breeds in our study region, with most birds arriving in late February or early March. Despite its description in Ayé *et al* (2012) as being a rare species regionally, *C. macqueenii* appears to be common throughout much of the suitable habitat in our Karnabchul and northern steppe study areas. As our fieldwork protocols were designed specifically to survey this species in its optimal habitat, we presumably over-recorded this species compared to other bird species. However, we typically recorded at least one sighting of this species per day opportunistically, without the use of the telescopes used in our formal work. We therefore class the species as common in Table 1 although this classification should be viewed with some caution considering our survey bias.

Sociable Lapwing *Vanellus gregarius* CR. The most threatened species recorded. It was typically recorded two or three times per year in the Karnabchul steppe region during passage migration in early–mid March (Plate 4). The species was usually observed in small–medium sized flocks, up to a maximum of 35 birds. We also recorded this species once in our northern steppe area, a flock of five birds seen 13 March 2010. It has been reported from lake Tudakul by UzSPB (BirdLife 2013f).



Plate 4. Sociable Lapwing *Vanellus gregarius* on passage in Karnabchul steppe, Uzbekistan, March 2013. © Mathieu Guillemain



Plate 5. Female Black-bellied Sandgrouse *Pterocles orientalis* in the Karnabchul steppe, Uzbekistan, May 2012. An abundant species in central Uzbekistan's steppe habitats. © Tom Martin



Plates 6a & 6b. A Yellow-eyed Pigeon *Columba eversmanni* in cultivated land on the edge of the Karnabchul steppe, Uzbekistan, May 2013. © Mathieu Guillemin

Yellow-eyed Pigeon *Columba eversmanni*. A rare breeding migrant and regional near-endemic. It appears to be rare in our study area, being known only from a single individual sighted in cultivated land near the northwestern edge of the Karnabchul steppe in May 2013 (Plates 6a,b). It may, however, have been under-recorded by our survey efforts. The individual was sighted in an area where feral pigeons and several dove species are common, and as we did not carefully observe each of these we may have overlooked further individuals.

Common Woodpigeon *Columba palumbus*. An uncommon species occasionally seen singly or in pairs near lake Tudakul or in peripheral areas of the steppe, usually in small trees or

resting on roadside telegraph poles. This species was not noted to occur in our study region in the literature mentioned above, and we believe our records indicate a slight western extension of the distribution range described by BirdLife International (2013a) and Ayé *et al* (2012).

Pander's Ground-Jay *Podoces panderi*. The only regional endemic (Ayé *et al* 2012) recorded during our fieldwork. This appears to be a rare species in our study region. It occurred only once in our records: a single sighting in March 2011 of an adult bird in an area of extensive sand dunes in the northern steppe area. The distribution maps of BirdLife International (2013) and Ayé *et al* (2012) both suggest that Pander's Ground-Jay only inhabits more westerly parts of Uzbekistan where more extensive areas of dune habitat occur. It should also be noted that both LUKOIL (2012) and Salikhbaev *et al* (1967) regularly recorded small groups of *P. panderi* in dune habitats in close proximity to lake Dengizkul, to the southwest of our study region near the Turkmenistan border, an area that is also not indicated on the maps of BirdLife International (2013a) and Ayé *et al* (2012) as forming part of this species' distribution range. In likelihood it is probably distributed widely, but locally, in suitable habitat patches across much of central Uzbekistan.

White-winged Lark *Melanocorypha leucoptera*. A rare wintering species that was recorded in both Karnabchul and the northern steppe areas a handful of times, in small groups of c2–3 birds. Records from accessed literature do not note this species as occurring in the region, and our records indicate a southeasterly extension of the distribution range described by Ayé *et al* (2012).

White-throated Robin *Irania gutturalis*. A rare species known only from a few sightings in the low, rocky mountains in the far north of the Karnabchul steppe area. Presumably a breeding migrant, although we recorded no evidence of breeding. Our records reflect a slight westward range extension compared to the distribution map in Ayé *et al* (2012). BirdLife International (2013a) does not report this species as occurring anywhere in central Uzbekistan and no records of *I. gutturalis* are noted in the accessed literature pertaining to our study region.

Grey Wagtail *Motacilla cinerea*. An uncommon species that we recorded along the southwestern shore of lake Aydarkul and close to small pools of water in the northern steppe and Karnabchul steppe areas. Surprisingly this species does not seem to have been previously reported from our study area and our records indicate a considerable westward range extension compared to the distribution maps presented by BirdLife International (2013a) and Ayé *et al* (2012).

DISCUSSION

We believe that the records reported here constitute the most comprehensive account of south-central Uzbekistan's avifauna to date, being based on nearly 14 000 person-hours of observational data, and that the six species for which no previous regional records appear to exist merit particular attention. One limitation of our results is their strong bias towards steppe ecosystems, these being where our bustard conservation work was focused. While we did devote time towards exploring the region's mountains, wetlands (particularly around lake Tudakul) and other habitats, these were not nearly so thoroughly surveyed as the surrounding steppe, and it is probable that several more species inhabit these other ecosystems. This is particularly true of Aydarkul lake and Sarmysh nature park, and we would encourage any future survey work in the region to examine these sites more closely. Additionally, as the bulk of our records come from the spring and early summer months,

our results also have a strong bias towards resident species and breeding migrants. While survey work was regularly conducted at the end of the winter in February and once in autumn, and we do report a good number of wintering species in this paper, the discrepancy of survey effort between spring and autumn/winter is strong, and has probably led to several wintering species being overlooked. Potential wintering species that we may have missed include threatened species such as Pallas's Fish Eagle *Haliaeetus leucoryphus*, which has been recorded in nearby Dengizkul lake (LUKOIL 2012), as well as White-headed Duck *Oxyura leucocephala* and Lesser White-fronted Goose *Anser erythropus* which have been recorded at lake Tudakul (Kreuzberg-Mukhina *et al* 2001a, Turaev & Shernazarov 2006, Birdlife International 2013e). The absence of data from most of the winter months has also facilitated some ambiguity over which of the region's non-breeders are wintering visitors and which are passage migrants. Further work is needed to clarify this. Another source of bias in our records results from our fieldwork being conducted mainly during daylight hours, with little effort being devoted to nocturnal birds. Again, this could have led to some species being overlooked. This is especially true of several owl species; the distribution maps in Ayé *et al* (2012) indicate that Pallid Scops Owl *Otus brucei*, Eurasian Scops Owl *Otus scops*, and potentially Tawny Owl *Strix aluco* could inhabit our study region, although we have not recorded any of these species.

The discussed survey bias may also have influenced our abundance estimates, as low detection rates of some montane, wetland, nocturnal, and winter species may be an artifact of reduced survey effort in these species' habitats rather than an indication of actual rarity. We therefore recommend that the abundance estimates for non-steppe species and winter visitors presented in Table 1 be treated with some caution. We hope to complete further fieldwork in the region focusing on these under-surveyed groups in future fieldwork seasons, which will allow us to add further data to the results reported here.

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REFERENCES

- Ayé, R, M Schweizer & T Roth. 2012. *The Birds of Central Asia*. Christopher Helm, London.
 Bibby, CJ, ND Burgess, DA Hill & SH Mustoe. 2002. *Bird census techniques*. 2nd edn. Academic Press, London.



Plate 7. Little Owl *Athene noctua* perched in the window of an abandoned shepherd's hut in the Karnabchul steppe, Uzbekistan, June 2013. © Tom Martin

- BirdLife International. 2013a. *BirdLife International Datazone*. www.birdlife.org/datazone. [Accessed 20 May 2013]
- BirdLife International. 2013b. *Important Bird Areas factsheet: Northern shore of Aydarkul Lake*. www.birdlife.org. [Downloaded 5 June 2013]
- BirdLife International. 2013c. *Important Bird Areas factsheet: Karnabchul Steppe*. www.birdlife.org. [Downloaded 5 June 2013]
- BirdLife International. 2013d. *Important Bird Areas factsheet: Sarmysh Nature Park*. www.birdlife.org. [Downloaded 5 June 2013]
- BirdLife International. 2013e. *Important Bird Areas factsheet: Tudakul and Kuymazar Reservoirs*. www.birdlife.org. [Downloaded 5 June 2013]
- BirdLife International. 2013f. *The amazing journey: follow the journey of the Sociable Lapwing*. www.birdlife.org/sociable-lapwing. [Downloaded 5 June 2013]
- Blair, M, R Porter, S Preddy & S Aspinall. 2010. *The OSME list of bird taxa*. www.osme.org/orl/orl.shtml. [Downloaded 1 July 2013]
- Glazirin, GE, SC Shanicheva & VE Shub. 1999. *A brief description of the Uzbekistan climate*. 30 Publications, Tashkent.
- Hendrix, MS & GA Davis. 2001. *Paleozoic and Mesozoic tectonic evolution of Central and Eastern Asia*. Geological Society of America, Boulder, CO.
- International Union for Conservation of Nature. 2013. *The IUCN Red List of Threatened Species*. www.redlist.org. [Downloaded 20 May 2013]
- Korshunova, EN. 2006. The Black Vulture in the Nuratau mountains, Uzbekistan. *Raptors Conservation* 5: 50–60.
- Kreuzberg-Mukhina, EA. 2000. The Cormorants and Pelicans in the vicinity of Djeiran ecocentre (SW Kyzylkum). In: Chinor, E (ed). *Conservation of biodiversity in strictly protected territories of Uzbekistan*. Tashkent, pp115–117. [In Russian]
- Kreuzberg-Mukhina, EA. 2001. Records of some rare and poorly known birds in proximity of ecocenter Djeiran. *Proceedings of the reserves of Uzbekistan* 3: 96–101. [In Russian]
- Kreuzberg-Mukhina, EA. 2008. Distribution and population trends of Pygmy Cormorant (*Phalacrocorax pygmaeus*) in Central Asia, with particular reference to the Republic of Uzbekistan. *Podoces* 3: 53–66.
- Kreuzberg-Mukhina, EA, E Lanovenko, A Filatov & S Zagrebin. 2001. Status and Distribution of the White-headed Duck in Uzbekistan. *Threatened Waterfowl Specialist Group News* 13: 46–48.
- LUKOIL (Uzbekistan Operating Company). 2012. *Kahauzak-Shady Biodiversity Action Plan*. LUKOIL, Tashkent.
- Makhmudovich, M. 2006. *Country pasture/forage resource profiles – Uzbekistan*. Food and Agriculture Organisation, Rome.
- Mitropolsky OV, ER Fotteler & GP Tretiakov. 1987. *Birds of Uzbekistan. Volume 1*. UzSSR Institute of Zoology and Parasitology, Tashkent. [In Russian]
- Mitropolsky OV, ER Fotteler & GP Tretiakov. 1990. *Birds of Uzbekistan. Volume 2*. UzSSR Institute of Zoology and Parasitology, Tashkent. [In Russian]
- Salikhbaev, KS, VI Karpenko, DY Kashkarov, MM Ostapenko, AA Petrova, A Zakirov & NA Pirnazarov. 1967. *Ecology, conservation measures and rational utilization of vertebrate animals of the Karshinsk steppe*. UzSSR Institute of Zoology and Parasitology, Tashkent. [In Russian]
- Ten, A, R Kashkarov, G Matekova, I Zholdasova & M Turaev. 2012. Akpetky lakes, Sarykamys lake, Ayakaghytma lake, and their desert surrounds: three new Important Bird Areas in Uzbekistan. *Sandgrouse* 34: 137–147.
- Turaev, M & E Shernazarov. 2006. Nesting birds of Tudakul water reservoir (South-Western Uzbekistan). *Selevinia* 2006: 206–207. [In Russian]
- Uzbekistan Society for the Protection of Birds. 2013. *UzSPB Home*. www.uzspb.uz/index_e.html. [Accessed 20 December 2013]
- World Wildlife Fund. 2013. *Ecoregions*. <http://worldwildlife.org/biomes>. [Accessed 25 June 2013]

Thomas Edward Martin, Valentin Nivet-Mazerolles, Cecile Landsmann, Mathieu Guillemain, Jérôme Dubos, Frédéric Vallejo, Emirates Centre for the Conservation of the Houbara, Urtachol massif, Karmana Shirkat farm, Navoi Region, Republic of Uzbekistan. tom_martin_2010@yahoo.co.uk

Valery Dombrowski, Emirates Centre for the Conservation of the Houbara & APB-BirdLife Belarus, a/c 306, Minsk, BY–220050, Belarus.