

Further surveys at a globally important staging site for migrating Sociable Lapwings *Vanellus gregarius* in Turkmenistan and Uzbekistan

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Sociable Lapwings *Vanellus gregarius* historically bred in steppes and semi-deserts between Ukraine and Western China (Dolgushin 1962, Kamp *et al* 2010). A rapid population decline at the end of the 20th century (Eichorn & Khrokov 2002) led to the species being categorised as Critically Endangered in 2004 (BirdLife International 2017). The Sociable Lapwing now primarily breeds in the steppes of Kazakhstan, where its breeding biology is well studied (Kamp *et al* 2009, Sheldon *et al* 2013). Satellite-tagging since 2006 has identified a number of globally important staging sites along its western migratory route (Field *et al* 2007, Bircik 2009). Until recently, very little was known about the eastern route connecting the breeding grounds with the wintering areas of Sociable Lapwings in India and Pakistan.

In 2010, two Sociable Lapwings satellite-tagged on the breeding grounds in Kazakhstan stopped for several weeks in an area on the Turkmenistan and Uzbekistan border, known as Tallymerjen (Turkmenistan) and Talimarzhan (Uzbekistan) (site names follow Donald *et al* 2016). This area has subsequently become known as the most important documented staging site along the eastern migratory route. In 2010 the first flock of 200 individuals was recorded there (Golder Associates 2011). The spring and autumn surveys that followed in 2012 and 2013 could not fully clarify the species' numbers and distribution in this area as surveys were short-term and not coordinated (Kashkarov *et al* 2012). Only in autumn 2015, thanks to coordinated counts by two teams on both sides of the international border, large congregations of between 6000–8000 Sociable Lapwings were discovered there for the first time (Donald *et al* 2016). At the beginning of April 2016, in spring, the Turkmen part of the same region was surveyed, but no birds were located (Iankov 2016).

In autumn 2016 further transboundary surveys were conducted by us at this important stopover site. The main aim was to continue monitoring numbers of staging birds and to collect information on their distribution and habitat use on both sides of the Uzbek/Turkmen border. The data collected should contribute to long-term monitoring of the species' population size and assist in development of site management plans for the areas where a large proportion of the population of this threatened bird is spending a significant amount of time during autumn migration.

METHODS

Surveys were carried out in autumn 2016: between 8–18 October by a team of three observers in Turkmenistan and 9–17 October by a team of four observers in Uzbekistan. As in 2015, the areas and timing of surveys were chosen based on information received from the satellite-tagged birds together with previous experience. The most recent data on flock location were received by the teams from two birds, 'Tesfaye' and 'Maysa', tagged in Kazakhstan in summer 2015. With the help of mobile internet, location data was downloaded from Movebank (<https://www.movebank.org/>) and sent to the Turkmen team using Line messenger, with the latter system also being used by both teams to coordinate surveys.

Survey area

The area surveyed is located in southeastern Turkmenistan and southwestern Uzbekistan and represents a transboundary territory 120–130 km long south–north and 50–60 km wide west–east. This territory covers low foothills (adyrs) of the Kugitang-Gaurdak mountain system, slowly turning into a piedmont plain, typically consisting of a mosaic of elevated sand-loess and undulated clay areas. Most of the areas with clay substrate are either cultivated or are used for private cattle grazing. Livestock breeding is also practised on adyrs, with parts used for rain-fed agriculture during wetter years.

On the Turkmen side surveys were carried out predominantly within the borders of the 'Tallymerjen' IBA (167 701 ha), which includes agricultural areas (southern part) and clay-loess desert (with northern part bordering Uzbekistan). Surveys were conducted at three sites: a) irrigated areas northwest of Dovletli village, located in the centre of the IBA; b) adyrs two km southeast of Dovletli village; c) desert in the northern part of the IBA, adjacent to the southern border of the IBA 'Talimarzhan reservoir' in Uzbekistan (Rustamov *et al* 2009).

On the Uzbek side surveys covered two main sites of Sociable Lapwing congregations: a) the eastern part of the IBA 'Talimarzhan reservoir' (85 989 ha), including areas along the shore of the reservoir and adyrs to the east and west (Kashkarov *et al* 2008). This area borders the third Turkmen site and is where most of the surveys carried out by the Uzbek team in 2015 were concentrated; b) adyrs, surrounded by agricultural fields, close to Seirak, Hanabad and Sherali villages, 15 km east of Karshi town. This site is located 55 km to the north of the first site, was not surveyed in 2015, and was prioritised for surveys in September 2016 thanks to the satellite-tagged bird Tesfaye which had arrived in the area some time before surveys began (Figure 1).

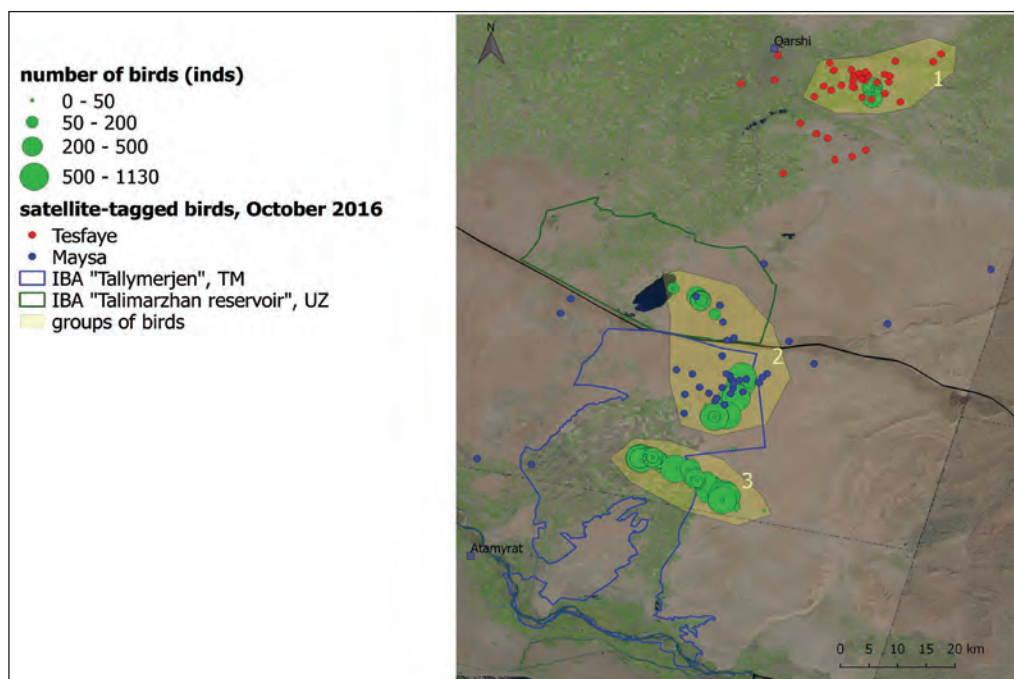


Figure 1. Distribution of observations of Sociable Lapwings within the study area in Turkmenistan and Uzbekistan in October 2016. Groups of birds (green circles) were seen in the Karshi (1), Talimarzhan (2) and Dovletli (3) areas. Blue (Maysa) and red (Tesfaye) dots show locations of two satellite-tagged individuals (all Argos location quality classes), transmitted during October 2016.



Plate 1. Night roosting site for part of the 'Dovletli group' of Sociable Lapwings *Vanellus gregarius*. © P Iankov



Plate 2. Sociable Lapwings *Vanellus gregarius* from the 'Dovletli' group flying over their feeding site. © P Iankov

Survey methods

Using off-road vehicles survey teams conducted regular visits to key sites identified in October 2015 and checked new areas following location data received from the two satellite-tagged birds. Surveys usually began at sunrise and continued until dusk (c05.30–19.00 h local time), driving through the area and making regular stops to survey areas from vantage points using $\times 10$ binoculars and $\times 20$ – 60 telescopes. In a few instances, roosting areas were also checked after sunset. To identify new congregation sites (night roosting or feeding) and daily flight routes survey teams often divided effort to cover more ground, with observers positioned at a distance of 2–5 km from each other along or perpendicular to a potential flight route. When a flock was recorded on the ground, birds were counted at least twice, especially if found feeding in taller vegetation. When conditions allowed, birds were counted down to single individuals; however in flying

flocks birds were often counted in groups of 5 or 10 birds. All necessary precautions were taken to avoid disturbance to the birds.

As birds were often arriving or taking off in small groups, the following measures were taken to avoid double counting in a given area at a given period of time. When assessing numbers of a more or less stationary group at a feeding or roosting site, the maximum number of birds counted during a short period of time was used. When counting flying birds during their daily movements (usually moving in small flocks), the total number of birds flying past an observer during a relatively short period of time was recorded. Registration of time and direction of flight allowed the avoidance of double counting when merging data from different observers. In all cases, numbers presented below constitute minimum estimates as some birds could remain undetected due to undulating adyr terrain. For each flock detected, date, time, GPS coordinates, number of individuals, flight direction, type of habitat, presence of colour rings and type of birds' activity were recorded on a standard registration form.

Weather conditions most of the time were very favourable (warm temperatures, daytime max 20–30°C, good light conditions, lack of strong wind) and allowed the effective use of telescopes for searching and counting birds. Visibility was significantly worse only during early morning and afternoon haze and during the afternoon of 13 October due to a dust storm.

RESULTS AND DISCUSSION

A total of 303 flocks of Sociable Lapwings was recorded by the Turkmenistan and Uzbekistan teams during the surveys. Based on their location, three relatively independent groups of Sociable Lapwing were identified (Figure 1) and which are subsequently referred to using the name of the nearest settlement. All groups of birds discussed below should not be considered completely independent, as it is not possible to exclude exchange of individuals among them. Overall, the largest combined simultaneous count was 3474 individuals on 9 October (Figure 2). No colour-ringed birds were recorded during the surveys, with the exception of the observation of one of the satellite-tagged birds. Tesfaye, a male, was observed in a flock of feeding Sociable Lapwings at one of the sites east of the

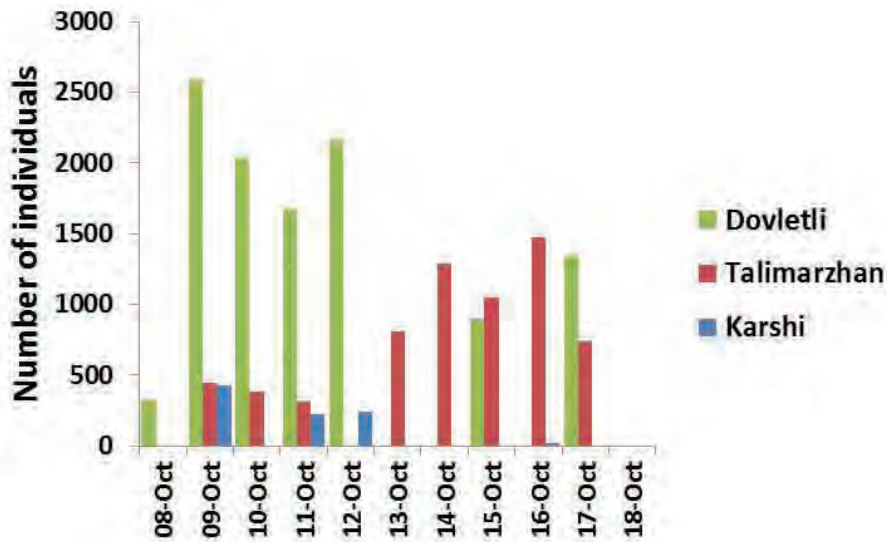


Figure 2. Number of Sociable Lapwings in three groups recorded on each day of surveys in October 2016.

town of Karshi, normally used by the birds of this group. The colour ring combination could be read using a telescope and the tag antenna was visible; the bird appeared to show no adverse behavior due to the satellite tag. As during the previous season, in autumn 2016 Tesfaye was using areas exclusively on the Uzbek side of the border, whereas the female Maysa, with rare exceptions, was transmitting from Turkmenistan.

Distribution, number and habitat use

'Karshi group'

This previously unknown site, located 15 km east of Karshi town and 55 km to the north of Talimarzhan reservoir (Figure 1) was discovered thanks to GPS locations transmitted by Tesfaye. The distance (c50 km) between the Karshi group and the northern part of the Talimarzhan group and fidelity of the tagged bird to the area close to Karshi town suggests stronger isolation of this group of birds from the other groups.

The Karshi group was using a relatively small area of adyr (c30 km²), surrounded by irrigated fields. The adyr itself largely represented old abandoned fields, previously used for crops in wet years and at the time of surveys overgrown with camel thorn *Alhagi pseudalhagi*, *Bromus* sp and *Cousinia* sp (Plate 3). Here Sociable Lapwings were regularly observed feeding in the mornings and afternoons. In two instances, flocks of Sociable Lapwings (including the largest flock observed of the Karshi group, 431 birds) were recorded feeding in the morning and resting in the afternoon on an unploughed part of the adyr. All of the territory of the adyr was used mainly for sheep and goat grazing, however a small number of cattle was also present. Visits to other sites nearby used by Tesafye (evidence from satellite tag fixes) showed that most of these were irrigated fields: some fallow, some recently ploughed, some grazed. Vegetation height and structure on most of the fields was suitable for Sociable Lapwings, however the small size of the fields and/or low abundance of invertebrate prey could explain why flocks were constantly



Plate 3. Typical Sociable Lapwing *Vanellus gregarius* feeding site on an abandoned field overgrown with camel thorn, near Karshi. © M Koshkin

moving from one field to another and were not detected here by the observers. During a visit to another adyr located 15 km to the northeast from the first one, which according to good quality transmissions was visited by Tesfaye at least twice, no Sociable Lapwings were found. This area was much larger than the first one, but had a substantially more degraded soil and almost complete absence of vegetation. At the same time, some parts of the area were cultivated at the time of the visit and attracted large numbers of larks and raptors, including 30 Steppe Eagles *Aquila nipalensis* on one recently ploughed field. Previously, at a stopover site in Stavropol region of southern Russia, Sociable Lapwing flocks were watched feeding by MK on freshly ploughed fields, sometimes even following tractors' ploughs presumably to collect invertebrates. Perhaps Sociable Lapwings were visiting this latter adyr to feed on the fields. It was not possible to locate night roosting areas of the Karshi group, first of all due to a network of irrigation canals which limited access to different parts of the area and due to the very mobile behaviour of the flocks. Most likely, one of the roosting areas was located to the west of the feeding sites, possibly to the west of Karshi town.

'Talimarzhan group'

Flocks belonging to the Talimarzhan group were found at the same sites where Sociable Lapwings were recorded in large numbers in autumn 2015, *ie* on adyrs to the east of the reservoir on the Uzbek side of the international border and in the desert to the southeast of the same reservoir, on the Turkmen side. Regular connectivity between these two sites was confirmed by observations of the direction of flocks' departure and arrival on both sides of the border.

Unlike in 2015, in 2016 birds were congregating on the Uzbek side of the area only for night roosting and left to feed in a southeasterly direction, towards the area along the border and possibly further (Figure 3). Two substantially different night roosting sites were found close to the reservoir. The first one, daily supporting 100–200 birds,

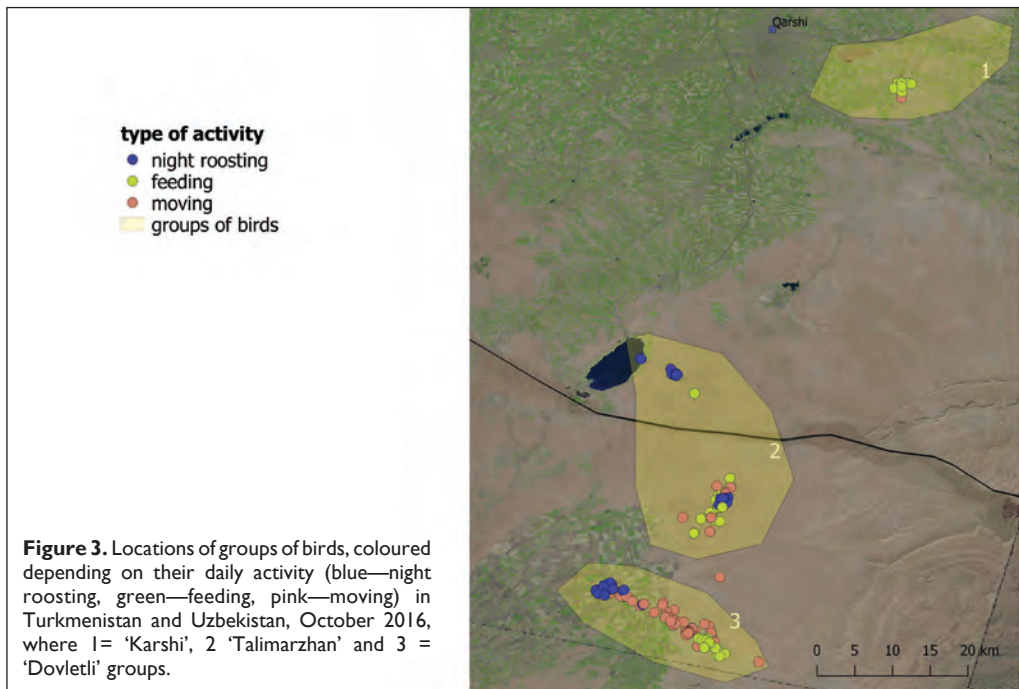




Plate 4. A flock of Sociable Lapwings is landing at its roosting site, next to a flock of sheep and goats. This photo illustrates the contrast between the green area along the Talimarzhan reservoir overgrown with camel thorn and the barren overgrazed adyrs beyond. © M Koshkin

represented a 300 m × 300 m area within dense camel thorn (c10–15 cm tall) growing along most of the reservoir's shore (Plate 4). Every evening Sociable Lapwings returned to this particular small patch of relatively sparse camel thorn, although there were many areas with similar vegetation density and height along the shore. The second night roosting site where 250–450 were recorded for every visit, represented a relatively flat depression with clay substrate, located among adyrs, 6 km to the east of the reservoir. Most of the area was completely devoid of vegetation with the exception of the roosting location itself, where some dry annual *Salsola* sp and ephemeral vegetation were present. All the adyrs around the second roosting site were under high grazing pressure which increased during morning and evening hours when sheep flocks were driven towards the reservoir and back. During the day most of the livestock were kept at the shore, within the belt of camel thorn described above.

Despite regular surveys of the reservoir's shore during the middle of the day, 12.00–16.00 h, no large flocks were located. The situation was very different during the first week of October 2015, when Sociable Lapwings were regularly recorded during the hottest part of the day on the shore of the reservoir where they spent time drinking, bathing and resting (Donald *et al* 2016). Comparing daytime temperatures between the two years shows that in October 2016 it was less hot and therefore Sociable Lapwings most likely did not need to rest by the water during the day (Figure 4). Donald *et al* (2016) reported that during the second week of October birds stopped visiting the reservoir once days became noticeably cooler, preferring to rest on their feeding sites instead.

From both roosting sites located close to the reservoir birds were leaving at sunrise (c06.00 h), sometimes earlier, and flew in a southeasterly direction and returned at sunset (c18.00 h). Closer to the end of the survey period, with an approaching full moon, the birds' behaviour at roosting sites changed substantially. At sunset, as earlier in the season, birds

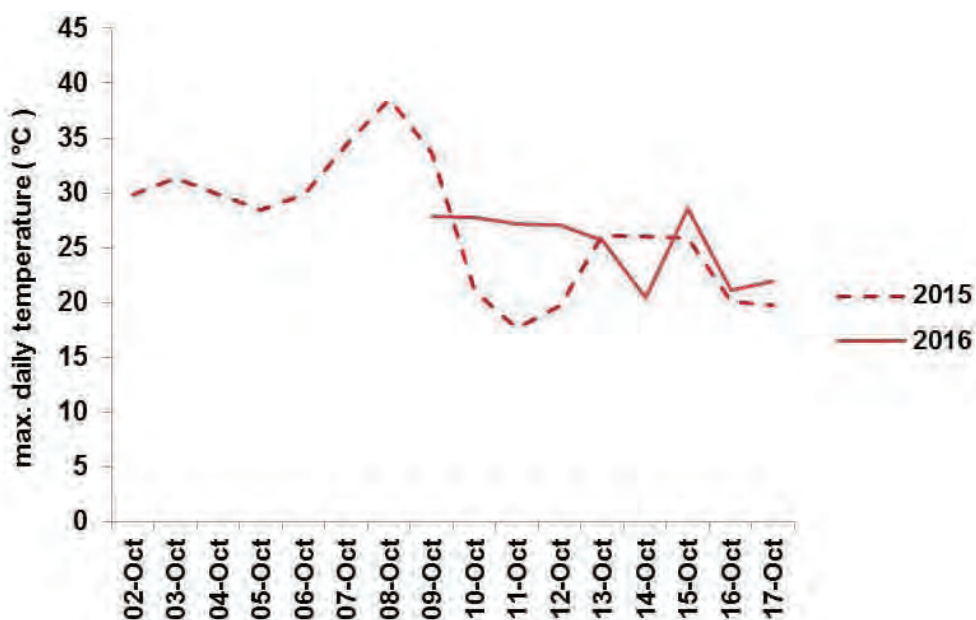


Figure 4. Maximum daily temperatures during surveys in 2015 and 2016, based on data from Karshi weather station, Kashkadarya province, Uzbekistan (<https://gis.ncdc.noaa.gov/map/viewer/#app=clim&cfg=obs&theme=ghcn>).

were gathering in relatively compact groups, however during the night they split into smaller groups, most likely to feed during the night, so that by the morning only a small proportion of birds remained at the place of evening concentration. Similar behaviour was also observed in October 2015 (Donald *et al* 2016). The largest number of birds in one flock recorded for the Talimarzhan group was 448 individuals observed on 9 October at the site located 6 km east of the reservoir.

On the Turkmen side, to the south and southeast of the reservoir, Sociable Lapwings were first discovered on 13 October, after multiple visits to the area where large flocks were found in 2015 and after locations received from Maysa confirmed the use of the area in 2016 (Figure 1). Here birds were found feeding in sandy-loess desert, with large clay depressions where birds sometimes stayed overnight. The loess substrate was used only for short periods of time whereas unconsolidated sands were completely avoided. Limited data suggest that birds were leaving night roosting sites in Uzbekistan and Turkmenistan to feed, most likely, at the same site located at the border. Unfortunately, due to limited access to the border area, it was not possible to clarify this.

The maximum number of birds recorded on the Turkmen side was 1225 individuals on 16 October. As shown in Figure 1, Sociable Lapwings were using a large area outside the current borders of the Tallymerjen IBA, supporting the need for revising the IBA's borders to include these key feeding areas. Across the whole area used by the Talimarzhan group vegetation was degraded due to overgrazing by domestic livestock, with the exception of a strip of habitat along the border.

'Dovetli group'

The third group of Sociable Lapwings was found on arable fields in the proximity of Dovletli village, where birds were not recorded in October 2015 (Donald *et al* 2016). During the survey period birds of the Dovletli group were using arable fields to the northwest of Dovletli village as their night roost, arriving there daily in small groups between 16.00–

18.00 h. Birds were roosting at two nearby sites: one was on a dry, recently ploughed field 2 km from the village (Plate 1), the other on a partly irrigated field with young shoots of winter wheat 1.5 km from the village. Both fields were under some level of agricultural activity when birds were using them. In the morning birds started to leave night roosts at c07.00 h, completely vacating the areas by 10.00 h. The maximum counts at these sites reached 1825 individuals on the morning of 12 October, with 740 and 1085 birds on dry and irrigated fields respectively. Sociable Lapwings were often accompanied here by large flocks of larks (mainly Bimaculated Larks *Melanocorypha bimaculata*) and Feral Pigeons *Columba livia*. After departing from roosting sites, Sociable Lapwings flew along the same flight route towards the feeding sites located 10–15 km southeast of Dovletli village (Plate 2). Here birds were feeding mainly on overgrazed pastures in depressions of adyrs, including smaller areas previously (5–6 years ago) ploughed for rain-fed crops and now abandoned and grazed. Sociable Lapwings arrived at the feeding sites by 10.00 h and left the area by 18.00 h to return to roosting sites along a similar flight route. This route was 1–2 km wide and followed one of the irrigation canals. No birds were found staying at the feeding site during the night. The maximum count at the feeding sites was 2585 individuals on 9 October. The sites showed a gradual decrease in numbers towards the end of the surveys: 2163 individuals on 12 October and 1345 individuals on 17 October.

FURTHER DISCUSSION

The transboundary staging area discussed above, with three key staging sites identified so far, is the most important site for Sociable Lapwings migrating along the eastern migration route. It seems that a combination of suitable habitat, food availability and weather create conditions which are able to support large numbers of Sociable Lapwings during a 1–2 month period. Unfortunately, a number of threats may affect populations of this rare wader, as well as other globally threatened species migrating through these sites such as Steppe Eagle, Eastern Imperial Eagle *Aquila heliaca*, Pallid Harrier *Circus macrourus*, Saker Falcon *Falco cherrug* and Lesser White-fronted Goose *Anser erythropus*.

Habitat change

The main threat to the migrating Sociable Lapwings at the sites surveyed in Uzbekistan and Turkmenistan is degradation of clay desert as a result of conversion of pastures to arable land and overgrazing. During surveys large areas were found completely devoid of vegetation, often due to the double effect of wind erosion on abandoned fields and overgrazing. In addition, increased erosion leads to the formation of drifting sands, making habitats unsuitable for Sociable Lapwings.

One of the participants of the 2015 surveys, NA, reported that the annual vegetation on adyrs adjacent to the main night roosting site at the reservoir was, in October 2016, noticeably less dense and tall. Local shepherds reported that both summer and autumn 2016 were less wet compared to the previous season. If in 2015 sheep and goats were brought to the reservoir mainly to access water and were grazing on adyrs, in autumn 2016 most of the livestock were grazing camel thorn along the reservoir's shore. Although the number of sheep and goats decreased compared to 2015, most of them were kept for a long time in a relatively small area. On the Turkmen side additional degradation of the habitat is occurring due to new road infrastructure related to the opening of new gas extraction sites in the area (Plate 5). For example an area located very close to one of the feeding sites of the Talimarzhan group became an open clay quarry for one of these roads, and a new gas extraction point was under construction in the middle of the other key feeding site. It is clear, that if this development continues at such a rate there will be very little habitat left for Sociable Lapwings.



Plate 5. Gas extraction development in the area is likely to affect the survival of Sociable Lapwings *Vanellus gregarius* through habitat loss and disturbance. © P Iankov

Changes in food availability

Changes in vegetation structure and composition due to pasture degradation will, without doubt, affect distribution and availability of food for Sociable Lapwings. If in 2015 a relatively small area adjacent to the Talimarzhan reservoir could support large flocks of Sociable Lapwings (up to 4000 individuals at one time), in 2016 such conditions apparently did not exist. The fact that two relatively large groups of birds used areas adjacent to the reservoir only as night roosts and conducted daily commutes to feeding sites 15–20 km away suggests that the surroundings of the reservoir did not have enough food for them. Similarly, lack of food could have forced Tesfaye, which in 2015 stayed with the majority of birds close to the reservoir, to seek a better area further north around Karshi town in 2016. Indeed, at feeding sites close to Karshi, mass emergence of moths was observed and the area had a high density of active ant hills and termites.

Direct threats

During the surveys the team did not find any evidence of direct threats to staging Sociable Lapwings. There were no cases of birds' death or injury, with the exception of one limping bird seen twice. Throughout the survey period the teams found no evidence of hunting of Sociable Lapwings. Informal conversations with people present in the area at the time of surveys (shepherds, farmers, fishermen) suggest that the majority of people do not know the species and do not pay much attention to it. Very few of them own shot guns and those who have think that such a small bird is not worth expending cartridges on. Instead hunters prefer to shoot pheasants and waterfowl. A very small flushing distance of Sociable Lapwing flocks when approached by vehicles (sometimes 20–30 m) also suggests



Plate 6. In some cases Sociable Lapwings *Vanellus gregarius* seem to be quite unaffected by human disturbance, such as this flock gathering for roost next to a working tractor. © P Iankov

that hunting is not a major threat in the area and possibly along the whole of the eastern migration route.

Close to some of the feeding sites there were powerlines, some of which are perpendicular to some of the daily flight routes; this was particularly the case for the Dovletli and Karshi groups. Without doubt, such lines may represent a serious danger for Sociable Lapwings during night flights. No special surveys along powerlines were conducted to check for casualties. During the day birds showed an ability to avoid powerlines even when flying low above the ground. Disturbance to feeding and roosting flocks should be also mentioned here. Some observed cases of disturbance when birds reacted by flying away were related to disturbance from attacks or approach of known and potential predators (*ie* feral dog, Red Fox *Vulpes vulpes*, Peregrine Falcon *Falco peregrinus*, Saker *Falco cherrug*, Steppe Eagle *Aquila nipalensis*, Long-legged Buzzard *Buteo rufinus* and Marsh Harrier *Circus aeruginosus*). Close to Karshi town a large flock of Sociable Lapwings flew 300–400 m away when a pair of Peregrine Falcons flew high above without making any attempt to attack.

It is difficult to estimate the degree of disturbance to Sociable Lapwing flocks from some of the farming activities. At the roosting site of the Dovletli group birds were often flushed by a small plane used to spray defoliant over the arable fields. At the same time birds of the Karshi group did not show any reaction to the small planes that were frequently flying overhead. Similarly, birds of the Dovletli group preparing for an evening roost on fields would often remain calm even when a tractor was ploughing very close to a flock (Plate 6). On the Uzbek side no disturbance from people or livestock was observed,

mostly due to a very low human population density and relatively low density of livestock considering the size of the area.

CONCLUSIONS AND RECOMMENDATIONS

With the absence of direct threats to the survival of the staging Sociable Lapwings, degradation of pastures due to overgrazing remains the main threat to the species at the key stopover sites surveyed. Current rapid development of the gas industry in the area will likely become a serious threat to the staging birds in the near future, primarily due to habitat loss and fragmentation and increased levels of disturbance. At the same time, the very different distribution of flocks in 2016 suggests that the species can be quite flexible in terms of choice of feeding and roosting sites, which may prove to be very important in view of expected habitat changes. It has been suggested by Donald *et al* (2016) that the area of the IBA 'Talimarzhan reservoir' should be increased to include areas key for staging Sociable Lapwings. This has already been done and the newly drawn borders now include most of the areas adjacent to the reservoir where Sociable Lapwings have been observed since 2010. The same should be done for the IBA Tallymerjen in Turkmenistan, to provide maximum coverage of the key sites.

Simultaneous transboundary counts at this most important staging area is clearly the most effective method for long-term monitoring of the Sociable Lapwing population that follows the eastern migratory route.

ACKNOWLEDGEMENTS

We are especially grateful to the Royal Society for the Protection of Birds, particularly Stephanie Ward and Ian Fisher, for fundraising and access to the tracking data and to BirdLife International and Swarovski Optics for funding these surveys. The Uzbekistan Society for the Protection of Birds provided logistical support and equipment; and the State Committee on Environment Protection and Land Resources of Turkmenistan, represented by J Saparmuradov, assisted in organizing fieldwork.

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