

Short Communication

Volunteer survey effort for high-profile species can benefit conservation of non-focal species

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Summary

The last irrefutable record of the Critically Endangered Slender-billed Curlew *Numenius tenuirostris* came from 1995. The range of the species is poorly known, but between 2009 and 2011, volunteer observers surveyed more than 680 sites in 19 countries, with additional search effort in a further 12 countries. Although there were no definite sightings (two birds that might have been Slender-billed Curlew were reported), there were other benefits. These included increased knowledge of species distributions and populations in seldom visited areas (over 500,000 birds of over 400 species were observed), the identification of threats to at least 10 Important Bird and Biodiversity Areas, the identification of sites that could qualify as Important Bird and Biodiversity Areas, and capacity building and education through involvement with local survey teams and observers and finally recommendations for future surveys. Thus, these surveys demonstrate the potential benefits of volunteer field surveys for non-focal species.

Introduction

The Slender-billed Curlew *Numenius tenuirostris* is a 'Critically Endangered' bird (IUCN 2011). It was already rare by the beginning of the last century, during which it continued to decline, probably due to a combination of habitat loss and hunting (Gretton 1991). The only verified nest area was discovered in the early 20th century near Omsk in south-western Siberia (Gretton 1991), from which there are just a handful of records. The majority of the approximately 900 records of the species are split between putative passage and wintering areas. Passage records come from the countries (especially Kazakhstan and Ukraine) between the breeding areas and the areas where the bird wintered around the Mediterranean basin, where Merja Zerga in Morocco was the last known regular wintering area (Gretton 1991, Buchanan *et al.* 2010). The last irrefutable record was in February 1995 at Merja Zerga, Morocco, although there have been reports of possible birds (Buchanan *et al.* 2010). The balance of breeding records to passage and winter records, and the inaccessibility and size of the potential breeding areas suggest surveys of non-breeding sites with previous records might offer the greatest chance of re-discovering the species. These areas are still extensive, covering countries from Kazakhstan and Ukraine through the Middle East and Red Sea to the Mediterranean, making a fully funded survey using professional surveyors prohibitively expensive.

Citizen science, through which volunteers collect data, can make a valuable contribution to conservation (Dickinson *et al.* 2010). Tulloch *et al.* (2013) divided the benefits from such surveys into eight categories, namely informing of management actions, increasing public awareness, increasing education, serendipitous benefits such as unexpected discoveries, recreation, social and

economic research, increasing ecological knowledge and improvement of methods. The potential for using skilled and motivated volunteers in undertaking bird surveys is well recognised (e.g. the UK and US Breeding Bird Surveys; Noble *et al.* 2001, Robbins *et al.* 1989, respectively). Volunteers can be a cost-effective way to search extensive areas for threatened species and provide coverage of much more extensive areas than would be possible by paid, skilled observers, at a fraction of the cost. The potential of non-professional birders in rediscovering lost species is illustrated by the rediscovery of the Cebu Flowerpecker *Dicaeum quadricolor* in 1992 (Dutson 1993). The skills of observers may be important considerations when asking them to survey species that present particular identification challenges. This is particularly the case with the Slender-billed Curlew, which can easily be confused with other *Numenius* species (e.g. Svensson *et al.* 1999). Here we aim to describe the methods used to undertake coordinated surveys and the benefits to conservation from dedicated Slender-billed Curlew surveys.

Technological advances mean a search is now viable. First, high quality optical equipment that is appropriate for surveying large areas (high magnification power) is now readily available to volunteers. Secondly, satellite tags of a weight suitable to fit on to Slender-billed Curlew are now available. These tags could enable this migratory wader to be tracked to locate key sites including breeding grounds. Thirdly, digital photographic and mobile communications equipment necessary to enable rapid confirmation of identification is now widely available.

Methods

Between 2009 and 2011, in a coordinated effort, over 50 expeditions searched for Slender-billed Curlew. The search for the Slender-billed Curlew was coordinated by the RSPB and BirdLife International through the Slender-billed Curlew Working Group (SBCWG), which was established in 1997 in the framework of the 1994 Memorandum of Understanding concerning Conservation Measures for the Slender-billed Curlew under the United Nations Convention on Migratory Species.

The volunteer surveyors fell into the following categories: regular International Waterbird Census counters, taking extra care to look out for potential Slender-billed Curlew; birdwatchers searching for the bird in their own countries; birdwatchers travelling to assist the search in countries with insufficient experts to achieve national coverage on their own. Volunteer surveyors were recruited through calls for participation in articles in the birdwatching media, profile at birdwatching fairs and especially via specialist ornithological conferences and web fora and through individuals linked to the SBCWG.

Winter records in the Mediterranean basin peak between November and February (Buchanan *et al.* 2010). Searches for wintering birds were generally organised to fall within this period. Additionally, most Middle Eastern countries had some level of coverage together with some other countries of the Red Sea. No moulting site for Slender-billed Curlew has ever been identified. Analysis of museum skins (unpublished), and the geographic and temporal distribution of records (unpublished) suggested they may moult relatively early in July in Kazakhstan and Ukraine. Consequently, potential autumn moult sites around the Black Sea, especially in Ukraine, and Kazakhstan were considered. Spring passage sites also had some coverage, especially in the Adriatic, although many of these surveys were not directly coordinated by the SBCWG and most were undertaken by resident birdwatchers.

Surveyors were advised to visit each wetland complex for at least two days and include a morning and evening visit to potential roosting sites or, if appropriate, a visit to a high-tide roost. Scans were made of sites from vantage points, during which observers were requested to count all birds seen. Observers were encouraged not only to rely on use of telescopes when confronted with extensive steppe or salt marsh vegetation, but to walk the area too. An identification leaflet (www.slenderbilledcurlew.net) with details of how to report any sighting and a search protocol were developed to maximise the chance of finding any Slender-billed Curlew and ensure consistency of methods. Observers were also encouraged to note the state of sites, and any threats to sites,

although this was not obligatory, so as not to burden volunteers. Contingency plans for actions following the confirmation of a record were established prior to surveys. The Slender-billed Curlew International Verification Panel consisting of experts on the identification of this species was established to assess potential records. A team of experts was established and practiced catching and satellite tagging methods on Whimbrel *Numenius phaeopus* in preparation for the discovery of a Slender-billed Curlew.

Coordinated expeditions visited at least 680 sites in 19 countries between November 2009 and February 2011 (Figure 1), with additional search effort in a further 12 countries. The area surveyed extended 7,500 km east-west and 300 km north-south. Over 75% of sites where the species has been recorded were surveyed, although inaccuracies in coordinates of previous reports makes a definitive assessment difficult. The wintering area surveys covered 11 countries (Figure 1), with

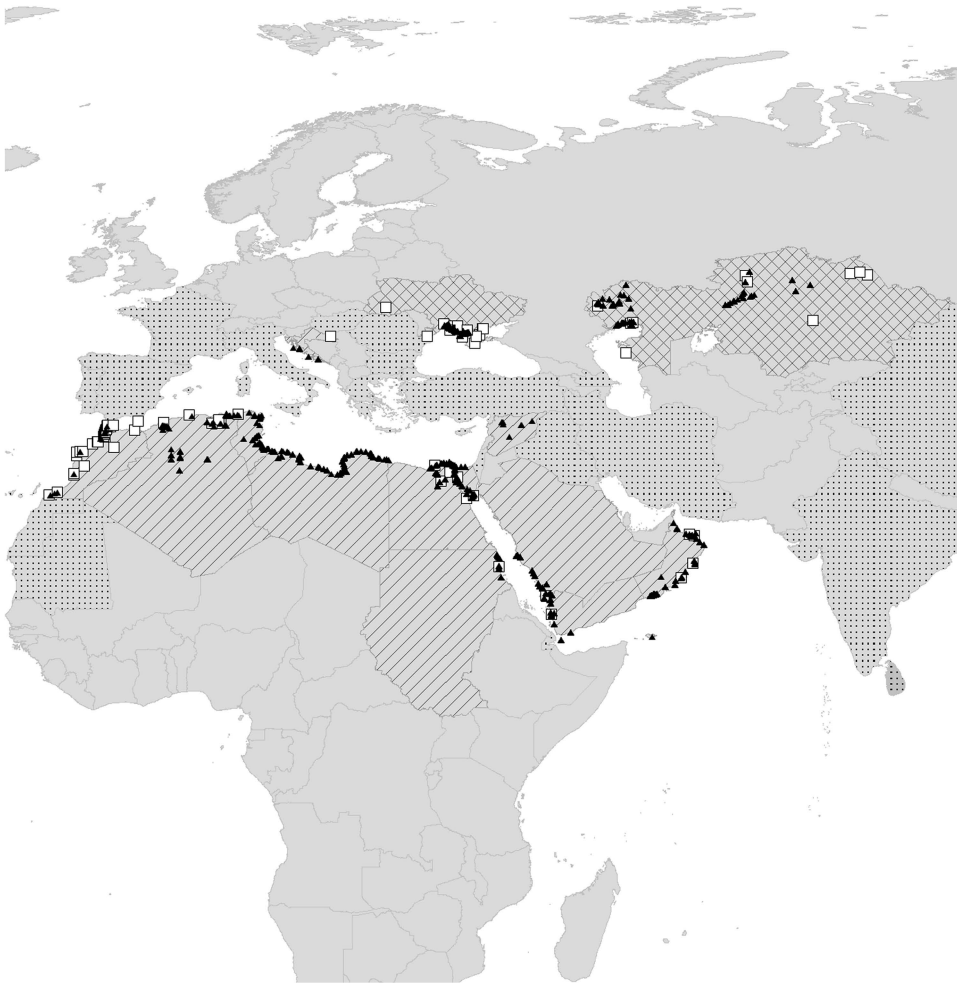


Figure 1. Countries in which searches for Slender-billed Curlew were carried out between 2009 and 2011 are shown in stippling. Countries visited by expeditions looking for Slender-billed Curlew in winter (diagonal hatch) and moulting areas (cross hatch), show sites visited within these countries (triangles) overlain on accepted historic records within these countries (squares). Not all historical records are shown due to lack of coordinates, including Libyan records.

at least 351 sites visited. Morocco, Tunisia, Algeria and Egypt received considerable coverage with multiple expeditions visiting each. Many sites along the coast of Libya were also covered, albeit by one expedition. Surveys of potential moulting areas covered 308 sites in Ukraine and Kazakhstan (Figure 1). Details of the unpublished survey reports are listed in Appendix S1 in the online supplementary material.

Results

None of the surveys recorded the presence of a confirmed Slender-billed Curlew, although two teams on the northern shore of the Black Sea around Karkinit's'ka and Dzharlygats'ka Bays Important Bird and Biodiversity Area (IBA) in Crimea, Ukraine (about 70 km apart) in August 2010 independently reported possible Slender-billed Curlew. In one case on the Kinburn's'kyj Peninsula, a small *Numenius* with a short grey bill was observed in an area where other unidentified small curlews had already been observed. Nearby, some three weeks later on 25 August 2010, a *Numenius* that appeared 25–30% smaller on the ground than the four Eurasian Curlew *Numenius arquata* was observed to feed in a manner different to the Eurasian Curlew, in quick movements and with sudden changes in direction, picking invertebrates from grass tussocks. There have been no subsequent reports from these areas but the level of survey effort is unknown.

Even though no definite Slender-billed Curlew were recorded, the surveys did bring multiple benefits. Here we divide them into the appropriate categories of Tulloch *et al.* (2013).

Ecological knowledge and serendipitous observations: observers recorded over half a million birds (615,465) from 414 species. Some 19 species of conservation concern (threatened or near threatened species based on the IUCN 2011 Red List) were recorded in the wintering area (Table 1). These were generally found at a small number of sites, but Eurasian Curlew was recorded at almost 200 sites. Similarly, the total counts were frequently small, although over 10% of the global estimate of Socotra Cormorant *Phalacrocorax nigrogularis* was recorded at Wadi Ash Shuwaymiyyah in Oman. One 'Critically Endangered' species (Sociable Lapwing *Vanellus gregarius*) was recorded at two sites in Syria, while in Sudan a new colony of the vulnerable Lappet-faced Vulture *Torgos tracheliotos* was located. The surveys for the passage areas (autumn) recorded 15 species of conservation concern. Again, these were generally found at only a small number of sites (Table 1). Eurasian Curlew was recorded at 137 sites while a total of 97 Sociable Lapwings were recorded at three different sites in Kazakhstan. The surveys logged the second record of Large-billed Warbler *Acrocephalus orinus* in Kazakhstan, as well as expanding the current breeding range of a further 34 species.

Management: serious threats were noted to at least 10 IBAs, including loss to development of around 1 ha per week of mudflats at Lake Qarun, Fayoum, Egypt, and in Morocco, the Oued Moulouya and Sebkha Bou Areg from which there are previous records of Slender-billed Curlew are under increasing pressure from development. In addition to the existing IBAs that were visited, and hence a contribution made to their monitoring, 12 potential IBAs were identified in Kazakhstan based on the A1 (populations of species of conservation concern) and A3 (biome restricted species assemblages) criteria. These were Lakes Kambak, Koshkar, Tlikhshe and Ajdyn, Sorajdyn (A1), Tlikhshe, reservoirs between Ashchyozek River and Kaztalovka (A1), Sewage pond Atyrau West (A1), Tuchlaya Balka (A1), Caspian Sea shore between Volga and Ural River Deltas (A1, A3), Ural River Valley (A1), Reservoir west of Uralsk (A3) and Bitik Reservoir on the Kyshym river (A1). Three more potential IBAs were identified in Saudi Arabia on the A4 criterion. These were Sabya sewage ponds, Lalmuwassam mudflats and Wadi Alassahbah/Al Lith.

Awareness: observer records, many of which come from areas with sparse ornithological survey coverage, make a useful contribution to conservation. In particular, the storage and collation of

Table 1. The globally threatened and Near Threatened species recorded by surveyors, together with total count and number of sites on which species were recorded.

Species	Status 2011	Winter		Passage area		
		Total count	No. Sites	Total count	No. Sites	
Sociable lapwing	<i>Vanellus gregarius</i>	CR	49	2	97	3
Egyptian vulture	<i>Neophron percnopterus</i>	EN	114	7	-	-
White-headed duck	<i>Oxyura leucocephala</i>	EN	70	2	105	5
Dalmatian pelican	<i>Pelecanus crispus</i>	VU	-	-	388	28
Eastern imperial eagle	<i>Aquila heliaca</i>	VU	21	10	4	3
Great knot	<i>Calidris tenuirostris</i>	VU	9	1	-	-
Greater spotted eagle	<i>Aquila clanga</i>	VU	33	13	-	-
Lappet-faced vulture	<i>Torgos tracheliotos</i>	VU	6	4	-	-
Lesser kestrel	<i>Falco naumanni</i>	VU	-	-	10	5
Lesser white-fronted goose	<i>Anser erythropus</i>	VU	6	1	-	-
Marbled teal	<i>Marmaronetta angustirostris</i>	VU	23	6	-	-
Socotra cormorant	<i>Phalacrocorax nigrogularis</i>	VU	30371	6	-	-
Saker falcon	<i>Falco cherrug</i>	VU	-	-	12	9
Yemen thrush	<i>Turdus menachensis</i>	VU	1	1	-	-
Yemen warbler	<i>Sylvia buryi</i>	VU	1	1	-	-
Audouin's gull	<i>Larus audouinii</i>	NT	471	16	-	-
Black-tailed godwit	<i>Limosa limosa</i>	NT	1374	25	7504	89
Black-winged pratincole	<i>Glareola nordmanni</i>	NT	-	-	1750	34
Eurasian curlew	<i>Numenius arquata</i>	NT	8086	190	1865	137
Ferruginous duck	<i>Aythya nyroca</i>	NT	137	19	19	9
Great snipe	<i>Gallinago media</i>	NT	-	-	2	1
Lesser flamingo	<i>Phoeniconaias minor</i>	NT	396	4	-	-
Little bustard	<i>Tetrax tetrax</i>	NT	-	-	172	19
Pallid harrier	<i>Circus macrourus</i>	NT	9	8	27	15
Red-footed falcon	<i>Falco vespertinus</i>	NT	-	-	122	26
European roller	<i>Coracias garrulus</i>	NT	-	-	95	22
White-eyed gull	<i>Larus leucophthalmus</i>	NT	1690	14	-	-

data in central databases (e.g. www.worldbirds.org) means these records can be accessed in the future. Such records could be useful in population monitoring (e.g. Snäll *et al.* 2011). Observers were also encouraged to submit records to the International Water Bird Census, coordinated by Wetlands International (www.wetlands.org).

Education and recreation: most of the international observers were from western and central European countries, but by working with individuals within the countries being surveyed, the capacity of many individuals and organisations was developed, and some involved began to routinely survey wader flocks (R. Sheldon pers. comm.).

Discussion

The experience with the Slender-billed Curlew surveys suggests that expert observers (for all who took part were very experienced in bird identification) are eager to spend their own time surveying abroad in pursuit of a challenging species. Using this effort in searches for other species could make a considerable contribution to conservation of species and sites.

Finally, through these surveys we are able to make some recommendations relating to future surveys of this type. In particular, a central coordinator able to direct volunteers to particular countries ensured a wide coverage. Additionally, preparation and planning meant the coordinator was ready to respond if a Slender-billed Curlew was recorded. Planning also enabled standardised methods to be followed, and data collated into once central database as well as entered into online databases for sharing.

Although no Slender-billed Curlew were recorded, it is premature to give up on the species. The example of the Sociable Lapwing, a species which breeds close to the putative breeding areas of the Slender-billed Curlew (Buchanan *et al.* in press), might indicate that the Slender-billed Curlew remains undiscovered. Until recently, the world population of the Sociable Lapwing was thought to be around 200 birds. Following extensive field surveys in Kazakhstan during the breeding and autumn migration seasons, the number of birds counted indicated that the global population of the species might be perhaps two orders of magnitude higher than the 200 birds previously estimated (Sheldon *et al.* 2006). Also within Slender-billed Curlew range, a new breeding colony of Northern Bald Ibis *Geronticus eremita* was found in Syria (Serra *et al.* 2004). There are other examples of populations of a species remaining undiscovered for some time despite dedicated searching. In Madagascar, a considerable effort was put into searching for Madagascar Pochard *Aythya innotata* by non-professional birdwatchers and dedicated professional search teams alike before a colony was discovered in 2006 (de Roland *et al.* 2007).

Sociable Lapwing, Northern Bald Ibis and Madagascar Pochard are all easily identified. By comparison, Slender-billed Curlew could be overlooked amongst flocks of the similar Eurasian Curlew or Whimbrel. Additionally, the potential non-breeding range includes substantial suitable habitat which has been inaccessible to birdwatchers. Consequently, despite the increasing time since the last sighting with irrefutable evidence, it is still too soon to declare the species extinct. If funding and volunteer will is available again, surveys should be targeted at the two sites in Crimea at which possible birds were reported. Searches should also be targeted at a number of areas which were not surveyed fully or areas which the survey teams identified as potentially suitable, including Isle Kneiss in Tunisia, Merja Zerga, Oued Tahadart, Sidi Moussa-Oualidia and Khnifiss in Morocco, the southern end of Sabkhat al Jabbul in Syria, Eastern banks of Great Bitter Lake, Zaraniq Protected Area and Hamata - Red Sea Coast in Egypt. Such searches should be, again, coordinated centrally by the SBCWG.

In addition to lost species that have not been recorded for a number of years (e.g. Himalayan Quail *Ophrysia superciliosa* in Asia and Pohnpei Starling *Aplonis pelzelni* in Micronesia) there are a number of other species (including many Critically Endangered species) for which the full distribution remains unknown. Coordinated volunteer survey effort could be targeted towards these species, potentially resulting in appropriate conservation action and rapid improvements in their situation. The contribution of volunteer observers to finding species in remote areas (e.g. Madagascar Pochard), indicates that volunteer surveys are not necessarily limited to areas which are accessible or close to home countries. Undertaking these surveys in collaboration with local conservation organisations (e.g. BirdLife Partners) could help develop the capacity of conservationists in these underfunded areas while collecting data on non-focal species that could be valuable for their conservation.

Supplementary Material

To view supplementary material for this article, please visit <https://doi.org/10.1017/S0959270916000186>

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References

- Buchanan, G., Crockford, N. and Gretton, A. (2010) The Slender-billed Curlew *Numenius tenuirostris* in Africa. *Bull. Afr. Bird Club* 17: 202–206.
- Buchanan, G.M., Bond, A.L., Crockford, N.J., Kamp, J., Pearce-Higgins, J.W. and Hilton, G. The potential breeding range of Slender-billed Curlew *Numenius tenuirostris* identified from stable-isotope analysis. (in press) *Bird Conserv. Internatn.* doi:10.1017/S0959270916000551
- de Roland, L.-A. R., Sam, T. S., Rakotondratsima, M. P. H. and Thorstrom, R. (2007) Rediscovery of the Madagascar Pochard *Aythya innotata* in northern Madagascar. *Bull. Afr. Bird Club* 14: 171–174.
- Dickinson, J. L., Zuckerberg, B. and Bonter, D. N. (2010) Citizen science as an ecological research tool: challenges and benefits. *Annu. Rev. Ecol. Evol. Syst.* 41: 149–72.
- Dutson, G. (1993) Rediscovery of the Cebu Flowerpecker *Dicaeum quadricolor* confirmed. *OBC Bull.* 17: 14.
- Gretton, A. (1991) *The ecology and conservation of the Slender-billed Curlew*. Cambridge, UK: International Council for Bird Preservation.
- IUCN (2011) *IUCN Red List of Threatened Species*. Version 2011.1. <www.iucnredlist.org>. Downloaded on 17 June 2011.
- Noble, D. G., Raven, M. J. and Baillie, S. R. (2001) *The breeding bird survey 2000*. Thetford, UK: British Trust for Ornithology. (BTO Research Report No. 265).
- Robbins, C. S., Sauer, J. R., Greenberg, R. S. and Droege, S. (1989) Population declines in North American birds that migrate to the Neotropics. *Proc. Natl. Acad. Sci.* 86: 7658–7662.
- Serra, G., Abdallah, M., Assaed, A., Abdallah, A., Al Qiam, G., Fayad, T. and Williamson, D. (2004) Discovery of a relict breeding colony of Northern Bald Ibis *Geronticus eremita* in Syria. *Oryx* 38: 106–108.
- Sheldon, R., Grishina, K., Kamp, J., Khrokov, V., Knight, A. and Koshkin, M. (2006) Revising the breeding population estimate and distribution of the Critically Endangered Sociable Lapwing *Vanellus gregarius*. *Wader Study Group Bull.* 111: 30–31.
- Snäll, T., Kindvall, O., Nilsson, J. and Part, T. (2010) Evaluating citizen-based presence data for bird monitoring. *Biol. Conserv.* 144: 804–810.
- Svensson, L., Grant, P. J., Mullarney, K., Zetterstrom, D. and Christie, D. (1999) *Collins Bird Guide*. London, UK: Collins.
- Tulloch, A. I., Possingham, H. P., Joseph, L. N., Szabo, J. and Martin, T. G. (2013) Realising the full potential of citizen science monitoring programs. *Biol. Conserv.* 165: 128–138.

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