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REVIEW OF THE GLOBAL CONSERVATION STATUS OF THE ASIAN HOUBARA BUSTARD (*CHALMYDOTIS MACQUEENII*)

Summary:

This report describes the current conservation status of the Asian Houbara Bustard (*Chlamydotis macqueenii*), now considered to be a separate species from the African Houbara Bustard (*Chlamydotis undulata*) and classified as Vulnerable in the IUCN Red List. It presents up-to-date information on the scope, severity and impact of threats throughout the species' range, and assesses the extent to which recent and ongoing activities contribute to the conservation and use of the species.

Review of the global conservation status of the Asian Houbara Bustard *Chlamydotis macqueenii*

Report by BirdLife International to the Convention on Migratory Species Office – Abu Dhabi



Review of the global conservation status of the Asian Houbara Bustard *Chlamydotis macqueenii*

October 2014

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Executive summary

[1] This report examines the conservation status of Asian Houbara Bustard *Chlamydotis macqueenii*, as distinct from the African Houbara Bustard *C. undulata*, with which it was previously considered conspecific.

[2] The information made available for this report indicates a population of between 79,000 and 97,000 individuals globally. It must be emphasised, however, that accurately establishing the global population size of this species is extremely challenging, and that this figure should therefore be treated as a tentative best estimate. More generally, the population size is expected to lie within the broader band of 50,000 to 100,000 individuals.

[3] The information made available for this report indicates a rapid and ongoing population decline. As the Red List Authority for birds on the IUCN Red List, BirdLife has recommended to IUCN that the Asian Houbara be classified as Vulnerable under Criterion A4acd, owing to an estimated population reduction of between 30% and 49% over a period of three generations, starting in the past and projected into the future. However, rates of population decline are approaching levels that would qualify for classification as Endangered, and if hunting pressure is not reduced, the species could soon warrant uplisting. Conversely, if ongoing reintroduction and reinforcement strategies succeed in stabilising the population, the species could potentially be downlisted in the future.

[4] The population has been in steady decline since the early 20th century. Overexploitation remains the foremost threat to the species, primarily as a result of unsustainable levels of hunting and poaching (chiefly for falconry purposes). Recent satellite tracking confirms that the greatest cause of adult mortality is offtake by hunters and poachers. Disturbance and the loss and degradation of suitable habitat are likely to have exacerbated the decline in many areas.

[5] At present, captive breeding and reintroduction is being pursued as the primary conservation response. Whilst remarkable technical progress has been made in Houbara husbandry, and the capacity now exists to rear and release tens of thousands of Asian Houbara each year, it is important that all reintroductions are conducted in full accordance with existing IUCN guidelines.

[6] The most urgently needed conservation measures are those that will reduce exploitation to a biologically sustainable level. This will require precautionary and scientifically determined limits on the number of birds that can be hunted legally and stricter enforcement to combat illegal forms of hunting and trade.



Introduction

This report provides a comprehensive review of the global conservation status of Asian Houbara Bustard *Chlamydotis macqueenii* (hereafter Asian Houbara). As well as a full consideration of recent published and unpublished literature, the report incorporates feedback from a wide consultation of experts, researchers and conservation practitioners. The information collated through this review informed the 2014 IUCN Red List assessment of this species, and a full justification for its classification as Vulnerable is included here.

Asian Houbara is an iconic inhabitant of steppe and semi-desert in Central Asia and the Middle East. A highly terrestrial bird, capable of going long periods without taking flight, it is nonetheless a true long-distance migrant, with some individuals travelling more than 7,500 km over the course of a single year (Combreau *et al.* 2011, Islam *et al.* 2014). As with other members of the family Otidae, the enduring ornithological appeal of Asian Houbara lies in the elaborate courtship displays with which male birds entice their mates. They are also of considerable economic and cultural importance, primarily as a result of being the most-prized quarry in Arabian falconry. The species has experienced a long trajectory of population decline due to an array of threats, including ongoing overexploitation.

Seventeen years have passed since the last comprehensive review of the species' global conservation status (Goriup 1997). In the intervening years, our scientific understanding of the species' ecology, distribution and migratory behaviour has been much enhanced, not least through the work of the National Avian Research Center (NARC; now part of the International Fund for Houbara Conservation, Abu Dhabi, UAE), and this review relies heavily on the data and insight that they have amassed. In addition to summarising current knowledge on the species' conservation status, this report also seeks to document and assess the conservation measures that are currently being implemented.

Method

The compilation of this report involved an initial desk study of the published scientific literature, followed by an expert consultation. Key quantitative and qualitative data, germane to the geographical range and population ecology of Asian Houbara, were collated and then distributed to more than 60 experts for their appraisal and update. Those invited to contribute included academics and researchers, conservation practitioners (including all relevant BirdLife Partners) and Range State representatives. Contributors were also presented with the IUCN classification scheme for threats and asked to assess the impact of these threats on the species in countries with which they were familiar. Contributors were then asked to evaluate the extent to which the conservation actions and research needs outlined in a draft Action Plan developed by the Convention on Migratory Species (UNEP-CMS 2005) have so far been implemented across the various range states.



Taxonomy

This review deals exclusively with Asian Houbara *Chlamydotis macqueenii*. The conventional treatment of the 'Houbara' group recognised a single species comprising three subspecies groups—*Chlamydotis undulata fuertaventurae* from the eastern Canary Islands, *C. u. undulata* in North Africa and *C. u. macqueenii* from the Middle East and Asia (Pitra *et al.* 2006). However, the application of recently published quantitative criteria for species delimitation, as outlined in Tobias *et al.* (2010), suggests that the 'Houbara' group is better treated as two species—African Houbara Bustard *Chlamydotis undulata* (comprising *C. u. undulata* and *C. u. fuertaventurae*) and Asian Houbara Bustard *Chlamydotis macqueenii*. This new taxonomy has been adopted by the BirdLife Taxonomic Working Group and is followed in the recent HBW-BirdLife Illustrated Checklist of the Birds of the World (del Hoyo and Collar 2014).

Distribution

The contemporary range of Asian Houbara extends east from Egypt's Nile Valley, through the Middle East and Central Asia, to the Mongolian and Chinese Gobi desert (see Map 1). Disjointed and highly fragmented resident populations exist across the Middle East into Pakistan, most notably in Iran, Egypt and Israel. Resident Asian Houbara once occurred throughout the Arabian Peninsula, but populations have greatly diminished following decades of sustained human pressure, and today small and dwindling populations persist only in Oman, Saudi Arabia and Yemen. Migratory northern populations constitute the last stronghold of this species, with breeding grounds stretching from the north of Iran through Central Asia to north-western China and Mongolia. The largest population occurs in southern Kazakhstan, which accounts for more than half of the total global population. Historically, migrant Asian Houbara wintered throughout the Middle East in large numbers. Today, ever-diminishing numbers reach Arabia, and the majority of wintering birds occur in Iran, Pakistan and Afghanistan, with smaller numbers in Iraq and India.

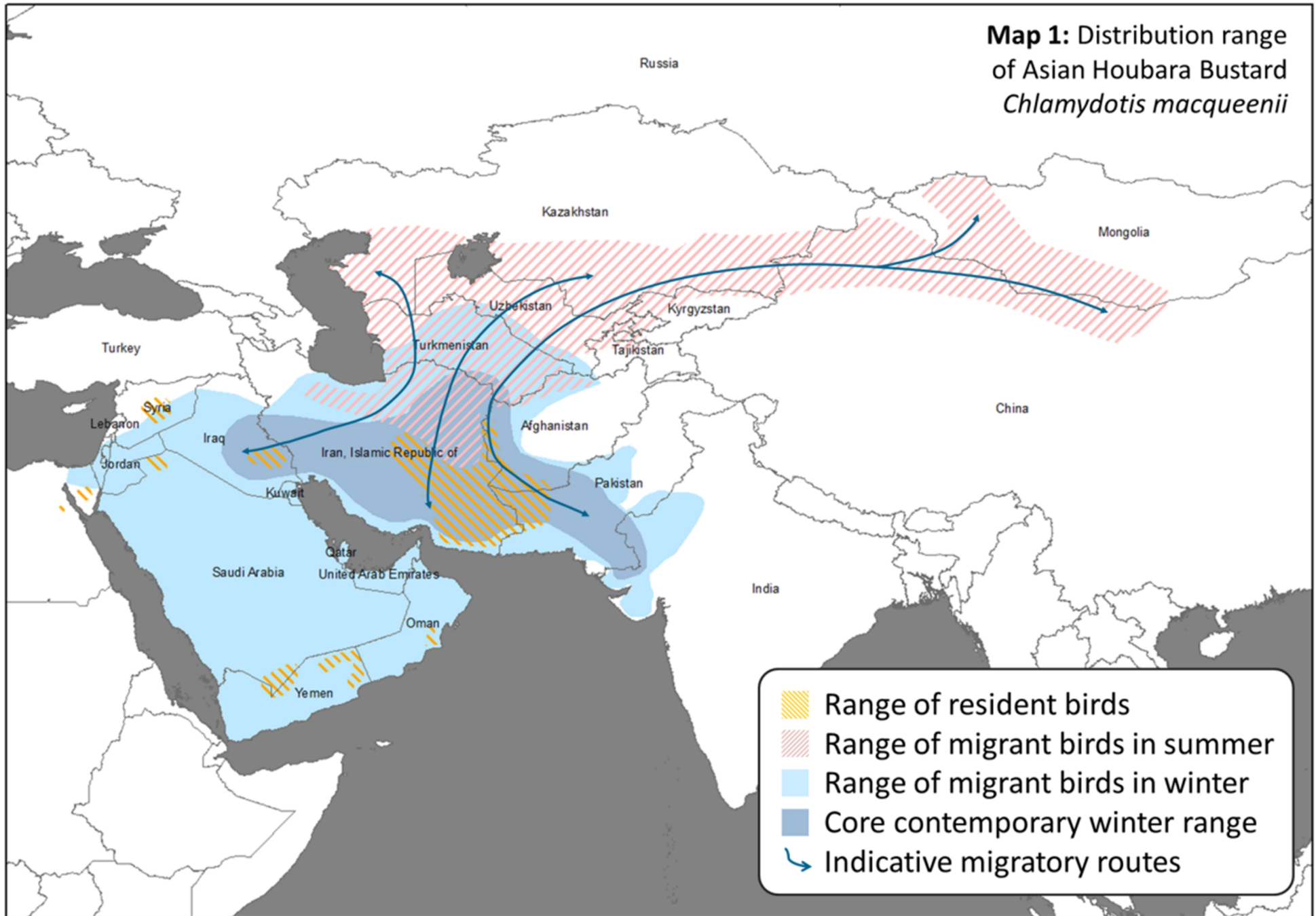
The present-day distribution extends across 24 countries (see Table 1; full accounts for each range state are presented in Annex I). In addition to these, there may still be limited or sporadic occurrence of the species in Azerbaijan and Armenia, and perhaps also in southern Russia and Turkey (Goriup 1997). As the population has declined, extralimital vagrancy has become extremely rare; in the past, however, vagrant birds were recorded as far afield as Sweden, the United Kingdom and Germany (Axell 1964, Sangster 1996, Jobson and Small 2004).



Country/territory ¹	Resident populations	Migratory populations		
		Breeding	Wintering	Passage
Afghanistan	✓	✓	✓	✓
Bahrain			✓	✓
China		✓		✓
Egypt	✓		✓	
India			✓	
Iran, Islamic Republic of	✓	✓	✓	✓
Iraq	✓	?	✓	✓
Israel	✓			
Jordan	?		✓	
Kazakhstan		✓		✓
Kuwait			✓	✓
Kyrgyzstan				✓
Mongolia		✓		
Oman	✓		✓	✓
Pakistan	✓		✓	✓
Palestine	?			
Qatar			✓	✓
Saudi Arabia	✓		✓	✓
Syrian Arab Republic	✓		✓	✓
Tajikistan		?		
Turkmenistan		✓	✓	✓
United Arab Emirates			✓	✓
Uzbekistan		✓	✓	✓
Yemen	✓		✓	

¹ The geographic designations referred to in this report do not imply the expressions of any opinion whatsoever on the part of the United Nations Environment Programme, the Convention on Migratory Species or BirdLife International concerning the legal status of any country, territory or area, or area of its authorities, or concerning the delineation of its frontiers or boundaries.





Map based on BirdLife's species distribution data adapted following Riou *et al.* 2012 and feedback from expert contributors.

Global population assessment

Table 2: Estimates for the population of Asian Houbara (individuals).

^a Estimates for the migratory population during the breeding season are extrapolated from density estimates from surveys across southern Kazakhstan, China and Mongolia and estimations of suitable habitat (O. Combreau *in litt.* 2014).

^b Estimates for the migratory population during the non-breeding (wintering) season are derived from knowledge of the winter distribution provided by satellite tracking studies (O. Combreau *in litt.* 2014).

^c Estimates of the resident population originate from a number of published and unpublished sources (Goriup 1997, O. Combreau *in litt.* 2014) and confirmed by expert review.

Migratory population

Breeding ^a

Individuals

Mongolia and China

Jungar Basin

6,100 - 8,140

Great Lakes Depression and Gobi Desert

4,920 - 5,740

West Kazakhstan and west Turkmenistan

3,265 - 3,730

East Kazakhstan, Uzbekistan, east Turkmenistan

Karakum Desert

1,220 - 1,420

Bedpak-Dala

17,785 - 20,750

Kyzylkum Desert

16,800 - 19,200

Balkash area

23,940 - 27,360

Northern Iran

3,130 - 6,260

77,160 - 92,600

Wintering ^b

Uzbekistan

660 - 900

Turkmenistan

3,500 - 4,500

Afghanistan

16,500 - 19,200

Pakistan

23,000 - 27,000

India

3,000 - 3,500

Iran

26,000 - 31,000

Iraq

4,500 - 6,500

Arabian Peninsula

very few

77,160 - 92,600

Resident population

Egypt

300

Iran

1,000 - 3,000

Israel

200 - 300

Arabian Peninsula

100 - 400

Pakistan

100

Iraq

100

Other

40 - 100

1,840 - 4,300

Total population

79,000 - 96,900



The information made available for this review indicates a population of between 79,000 and 97,000 individuals globally (Table 2). It must be emphasised, however, that accurately establishing the global population is extremely challenging, and this figure should be treated as a tentative best estimate. Asian Houbara are highly cryptic and occur only at low densities across a vast and often inaccessible range. In most range states, systematic population censuses have not been carried out and information on the precise distribution remains incomplete. Population estimates are therefore contingent on incomplete datasets. Calculations for the migratory breeding population are based on largely unpublished density estimates from a handful of large-scale studies in the northern breeding grounds applied to crude estimates of the extent of suitable habitat (O. Combreau *in litt.* 2014). The winter distribution of this population is then inferred from satellite tracking data (O. Combreau *in litt.* 2014). Very little is known about most of the remaining resident populations, and these estimates are largely a matter of informed guesswork. In light of these caveats, the global population can be confidently expected to fall within the broad band of 50,000 to 100,000 individuals. The population estimates reported do not include figures for recently reintroduced individuals, as it is not yet clear that these have formed self-sustaining populations.

Population trend and conservation status

Determining the current global population trend for Asian Houbara is extremely difficult, as few large-scale censuses have been conducted. Of those, few have been repeated sufficiently regularly or with consistent methodologies to allow population trends to be accurately inferred. The most robust long-term data come from extensive population studies carried out by the Kazakh Scientific Centre for Quarantine and Zoonotic Diseases (KSCQZD) in collaboration with the National Avian Research Center (NARC). Since 1998, KSCQZD has undertaken biannual surveys across the five principal population centres in southern Kazakhstan (Tourenq *et al.* 2004, 2005, Riou *et al.* 2011). Given that this country hosts a significant proportion (>50%) of the global population and is the source of most migrants to Arabia, Pakistan and Iran, where hunting pressures are most intense, information from here provides a valuable insight into the health and conservation status of the global population.

The initial published analysis of the first four years of data (1998-2002) suggested alarming declines across all five regions, most severely in the vicinity of the Kyzylkum Desert (Tourenq *et al.* 2004, 2005). Subsequent assessment of 10 years of survey data from 2000 to 2009 by Riou *et al.* (2011) confirmed ongoing declines in some regions, but also suggested stabilising and even increasing populations in others (see Table 3). Steep declines were observed in the region north-east of the Caspian Sea and in the Karakum Desert area east of the Aral Sea. After a sharp decline in the first year, the population in the Kyzylkum Desert stabilised, while the sizeable populations that occur in the Betpak-Dala region and surrounding Lake Balkash were either increasing or largely stable. Assessed collectively, the Kazakh population as a whole declined by 36%; however, if the atypically steep decline in the Kyzylkum Desert observed between 2000 and 2001 is omitted, the overall decline drops to 26% (Riou *et al.* 2011).



Table 3. Change in adult Asian Houbara relative density within five breeding populations in southern Kazakhstan, 2000–2009 (adapted from Riou *et al.* 2011).

Region	Trend 2000 - 2009	Annual trend	Projected 20 year trend	Trend description
North-east Caspian	-93%	-25%	-99.7%	Steady decline.
Karakum Desert	-54%	-8.3%	-82.2%	Major decline in the last 3 years of the study.
Betpak-Dala	42%	4%	119%	Steady increase.
Kyzylkum Desert	-82%	-17.3%	-92.8%	Declined by 82% between 2000 and 2001, remaining stable thereafter.
Balkash Lake area	-21%	-2.6%	-41%	The slight decrease in relative densities was not significant.
All Kazakhstan	-36%	-4.8%	-62.6%	Including data from Kyzylkum in year 2000.
	-26%	-3.3%	-49%	Excluding data from Kyzylkum in year 2000.

Neither the geographical range size nor overall population size of Asian Houbara approach levels meriting classification as globally threatened on the IUCN Red List (i.e. 20,000 km² and 10,000 mature individuals, respectively). The critical factor to assess is therefore the rate of population decline (relevant to criterion A), which is measured over three generation periods (IUCN 2001), equating to 20 years for the Asian Houbara, given its generation length of 6.6 years (BirdLife International, unpublished data). If the population trend reported by Riou *et al.* (2011) is extrapolated to 20 years (i.e. projected to the year 2020), the Kazakh population is forecast to decline by between 49% and 63% (again, depending on whether the atypically steep decline in the Kyzylkum Desert observed between 2000 and 2001 is included). If applied to the global population, a decline of this magnitude is sufficient to consider categorisation as Endangered; however, given the highly variable nature of the population trends in Kazakhstan, both across time and between regions, and the lack of corroborating data from the wider population, a cautious interpretation is advised. Indeed, if populations outside Kazakhstan are stable, then the global decline after 20 years would be between 40% and 54%. Consequently, as the Red List Authority for birds on the IUCN Red List, BirdLife has recommended to IUCN that the Asian Houbara be classified as Vulnerable under Criterion A4acd, owing to an estimated population reduction of between 30% and 49% across a period of three generations, starting in the past and projected into the future. Should more accurate trend data become available, future reassessment as Endangered may prove warranted. Conversely, potential population increases driven by expanding captive breeding and release programmes could alternatively necessitate future downlisting.



Ecology

Asian Houbara are birds of open, arid and sparsely vegetated steppe and semi-desert (Launay *et al.* 1997, Osborne *et al.* 1997, Mian 2003, Yang *et al.* 2003). They favour scattered shrubby vegetation typically comprising xerophytic or halophytic plants (Collar 1996). Those wintering in Iran have been shown to prefer more densely vegetated bush-steppe to sparser shrub-steppe; however, within those bush-steppe habitats they favour areas with reduced vegetation cover (Aghanajafizadeh *et al.* 2010). Bush-steppe is thought to contain a higher abundance of food sources such as *Salsola* spp. and arthropods (Yang *et al.* 2003, Aghanajafizadeh *et al.* 2010, 2011). Birds wintering in Iran also routinely visit neighbouring farmland where alfalfa and salad rocket is grown, but avoid pistachio crops (Aghanajafizadeh *et al.* 2010). Although dense vegetation may provide a sanctuary from danger, as well as thermal protection when overnight temperatures drop in winter (Aghainajafizadeh *et al.* 2010), more open, unvegetated areas are often favoured as night-time roosts in order to minimise the risk of ambush by nocturnal predators (Combreau and Smith 1997). On the breeding grounds, nesting females may also favour sites away from vegetation patches, which could provide cover for predators (Yang *et al.* 2003, Aghanajafizadeh *et al.* 2012). Asian Houbara feed throughout the day, but are most active at dawn and dusk (Combreau and Launay 1996). They have an eclectic diet, mainly comprising plants and invertebrates (especially ants Formicidae and beetles Tenebrionidae: Tigar and Osborne 2000), but also including vertebrates such as rodents, lizards, small snakes and even young birds (Collar 1996, Tourenq *et al.* 2003).

Male Asian Houbara attract their mates with an extravagant courtship display, which they perform at the same site each year. The display begins with a period of strutting and culminates with the male retracting his head within an ornamental shield of erected neck feathers and then running at speed in either a straight or curved line. The display is often accompanied by a series of low-frequency booming calls (Gaucher *et al.* 1996). Males play no part in rearing the young, and a brood may contain young sired by several different individuals. Females create a shallow scrape in the ground in which they typically lay 3-4 eggs, and occasionally up to six eggs in long-distance migrants (Collar 1996, Combreau *et al.* 2002). The incubation period is typically 23 days, whilst fledging takes around 30 to 35 days (O. Combreau *in litt.* 2014). Satellite tracking has revealed that females and their young separate after three to four months and that pre-migration groups in autumn comprise birds of all ages and sexes (O. Combreau *in litt.* 2014).



Threats

Following consultation with expert contributors, the direct threats impacting Asian Houbara have been identified and assessed using the IUCN-Conservation Measures Partnership (CMP) Unified Classification of Direct Threats (Salafsky *et al.* 2008; see Figure 1). The classification includes broad ‘Level 1’ threat categories (e.g. Agriculture) and associated ‘Level 2’ sub-categories (e.g. Nomadic grazing or Agro-industry farming). The timing, scope and severity of these threats have been assessed in order to determine the level of impact. High-impact threats affect the majority of the population and cause rapid declines, while low-impact ones affect the minority and cause slower, albeit still significant, declines. For more detailed information on threat classification and how threat impact scores are calculated, see www.birdlife.org/datazone/info/spcthreat.

The most commonly identified Level 1 threat—affecting 19 of the 24 range states—is biological resource use, and more specifically hunting. In the majority of range states (12), the impact of this activity is unknown; however, in six countries the impact of hunting is deemed to be high or medium, and consequently likely to be contributing to notable national declines. Agriculture, in particular grazing, is the next most widespread threat, reported in 14 range states. Other threats include energy production and mining (identified in 11 countries), human disturbance (10 countries), climate change and severe weather (9 countries), residential and commercial development (3 countries), transportation and service corridors (3 countries), pollution (2 countries) and natural system modifications (1 country).

Hunting

Falconry is an ancient pastime, inscribed by the United Nations Education, Scientific and Cultural Organisation (UNESCO) on its Representative List of Intangible Cultural Heritage of Humanity (UNESCO 2014). The activity is particularly important within Arabian culture. For hundreds of years, the inhabitants of the region have used wild-caught and carefully trained falcons to hunt quarry such as Cape Hare *Lepus capensis*, Eurasian Thick-knee *Burhinus oedicnemus*, Sandgrouse *Pterocles* spp. and, most sought after of all, Asian Houbara (Bailey *et al.* 1998). Long before it developed into a sport, falconry was a means of supplementing the often restricted diets of desert-dwelling communities. Asian Houbara was the most prized source of food, and early falconers regarded their influx each autumn as a reward from the “Almighty” to those who had endured the summer heat (Bailey *et al.* 1998). Today, falconry is first and foremost a sport; however, Asian Houbara remains the most favoured quarry—their size, strength, endurance and escape manoeuvres make them a challenging prey that demands a skilful falconer and a well-trained falcon (Al Kharusi & Al Ameri 2011). Saker Falcon *Falco cherrug* are a favourite of falconers, and a large number of wild falcons are trapped each year as they migrate through Arabia. In the wild, these birds would rarely, if ever, hunt prey as large as an adult Houbara; however, the falconers develop their falcon’s skills and confidence gradually, through practice on injured or otherwise incapacitated birds.

Traditional falconry, undertaken by small hunting parties on camel back, existed as a largely sustainable and ecologically benign practice for centuries. However, technological changes from the mid-twentieth century onwards have radically changed the pastime. Camels have been



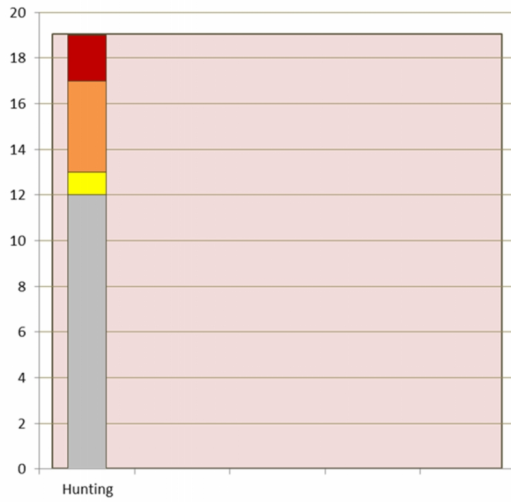
replaced by fleets of all-terrain vehicles, and human trackers equipped with sophisticated communications equipment are now routinely employed. With fewer and fewer Houbara wintering in Arabia, falconers have begun to travel further afield in pursuit of their quarry. In the last 35 years, hunting parties from the Gulf States (Qatar, Kuwait, Saudi Arabia, UAE and Bahrain) have paid regular visits to the breeding grounds of the former USSR, to Iran and Iraq, and to the Pakistani wintering grounds (Newby 1990, Bailey *et al.* 1998, Combreau 2007, Judas 2009b, Salim 2013). In Pakistan especially, the activities of foreign hunting parties are a growing cause of concern (Bhagwandas 2013, 2014, Boone 2014; see also Dawn.com; DailyTimes.com). In addition to falconry, the species is also hunted with firearms. As with falconry, the precise impact of shooting parties is difficult to assess; however, together these activities contribute to a level of exploitation that is unsustainable and seemingly increasing. Recent satellite tracking confirms that the greatest cause of adult mortality is offtake by hunters and poachers (O. Combreau *et al.* 2001). As well as a geographical expansion in hunting, Asian Houbara are now subject to exploitation year-round, with hunting taking place for the duration of the non-breeding season and even during the early breeding season (Tourenq *et al.* 2005).

In addition to direct hunting pressure, Asian Houbara are also threatened by widespread poaching for the purpose of training falcons. In Pakistan and Iran in particular, large numbers of adult birds, chicks and eggs are smuggled to Arabia despite international legislation prohibiting such trade (Bailey *et al.* 1999, Combreau 2007, S. Zadeqan *in litt.* 2014). Poaching is also an increasingly common practice in Iraq where roosting birds are targeted by poachers using high-powered flashlights and portable batteries. One poacher has reported collecting 22 Houbara in just one night using this method (Salim 2009). As well as further impacting the wild population, this practice also risks spreading diseases to the indigenous Houbara population in the Arabian Peninsula (Combreau 2007). There are no authoritative figures on the regional scale of the poaching problem. The National Avian Research Center (NARC) in Abu Dhabi receives live Houbara confiscated by customs authorities in the UAE. There were 133 Houbara specimens (live and other forms) confiscated between 2009 – 2013 (A. Al Hashmi - UAE Ministry of Environment and Water *in litt.* 2014). Analysis of satellite-tracking data and ring recoveries of birds originating from breeding grounds in Kazakhstan and China revealed that more than 70% of the observed mortality on the wintering grounds could be caused by hunting and poaching pressure (Combreau *et al.* 2001, Islam *et al.* 2014). The true extent of exploitation is hard to gauge—poaching is by definition clandestine, whilst hunting parties typically maintain strict secrecy. It is likely, however, that over the years tens of thousands of Asian Houbara have been taken by falconers and poachers in Pakistan alone (Goriup, 1997, Bailey *et al.* 1998) and that unsustainable exploitation is by far the biggest factor contributing to the global population decline.

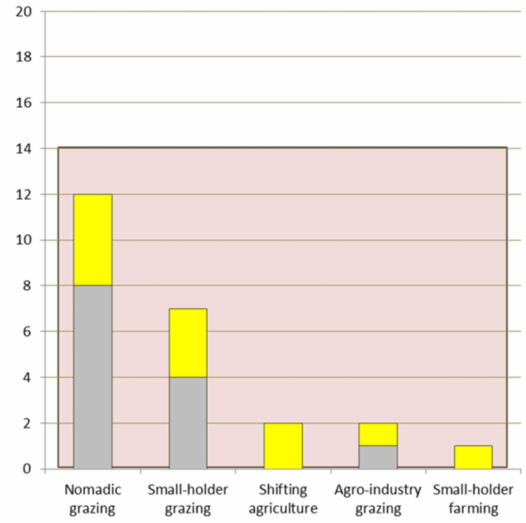


Range States

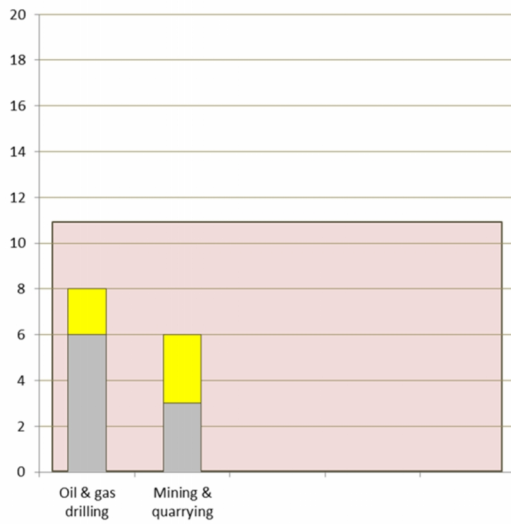
Biological resource use



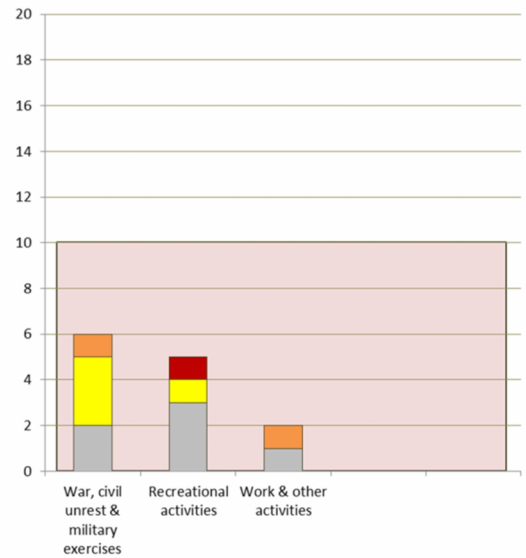
Agriculture



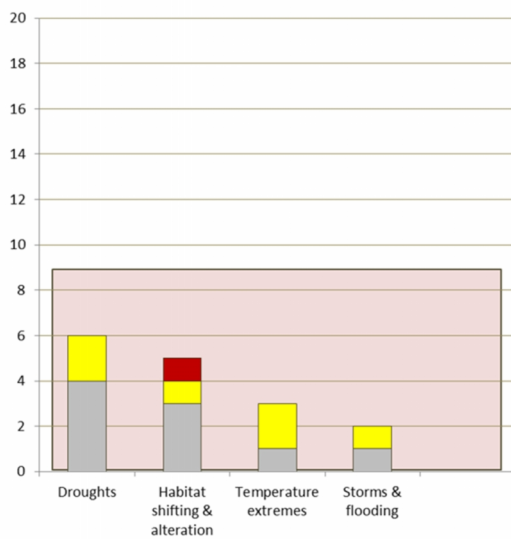
Energy production & mining



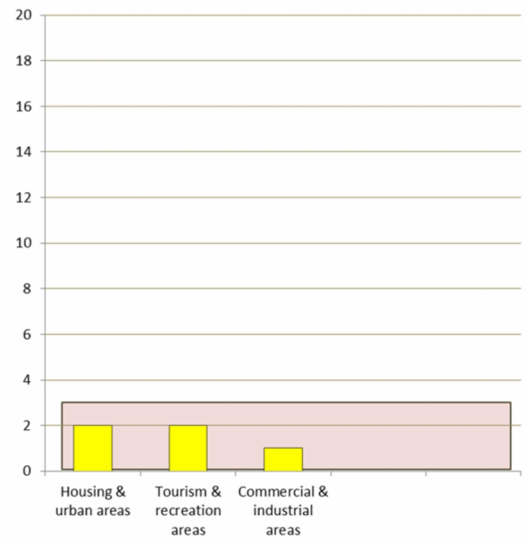
Human intrusions & disturbance



Climate change & severe weather



Residential & commercial development



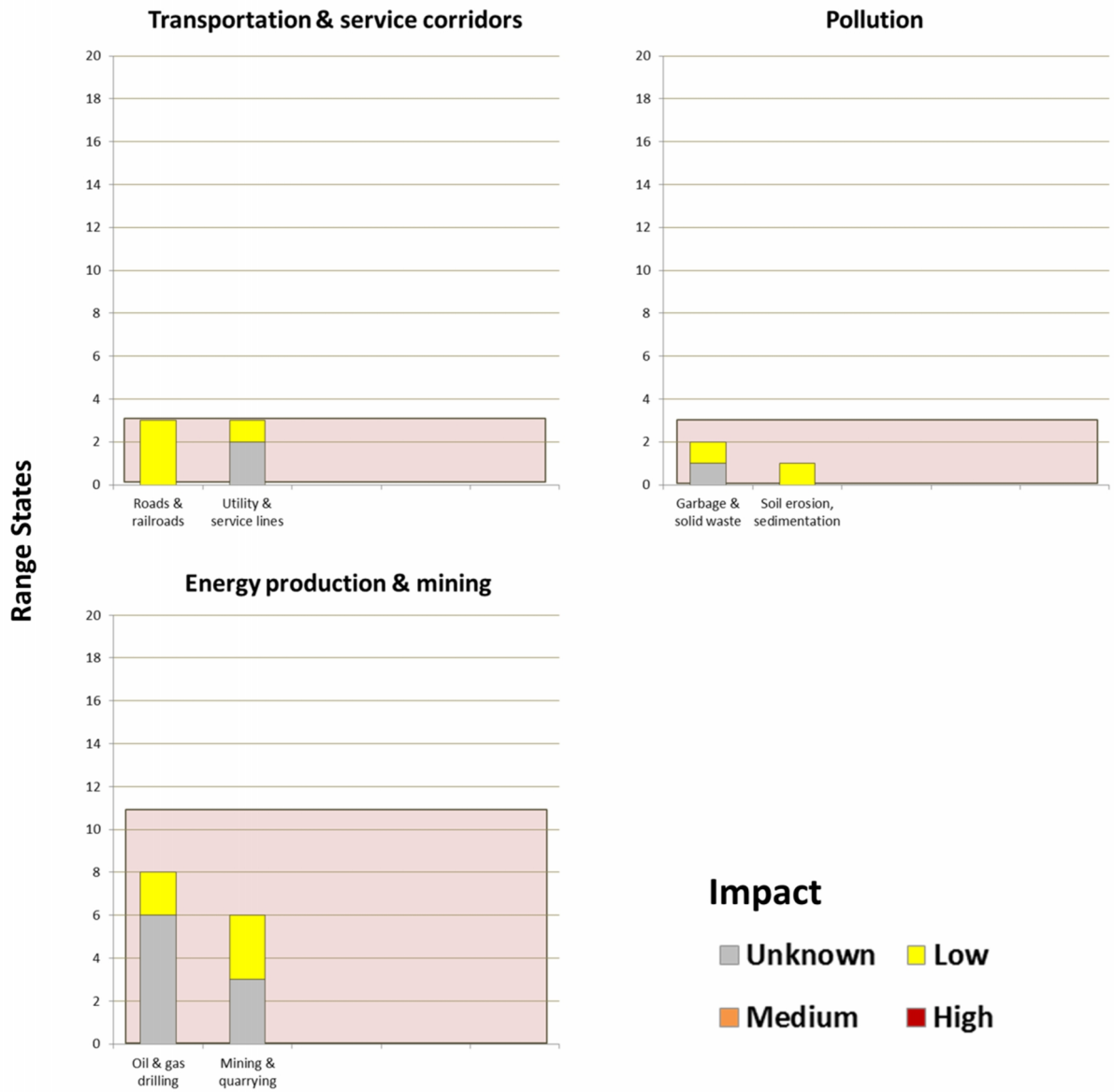


Figure 1. Threats to Asian Houbara. Impact is derived from scores for timing, scope and severity of each threat.

Agriculture and other threats

After hunting, the threat judged to be most severe is agriculture, and more specifically, livestock grazing (nomadic grazing was reported as a threat in 12 countries, small-holder grazing in 7 countries and large-scale industrial grazing in 2 countries) and to a lesser extent the conversion of natural habitat through shifting agriculture (2 countries) and small-holder farming (1 country). Several studies have also cited grazing as a key threat (e.g. Lavee 1988, Mansoori 2006, Laghai *et al.* 2012). Livestock grazing is reported to have a negative impact on Asian Houbara both indirectly, by degrading the desert vegetation on which birds rely for food and concealment, and directly, through the trampling of nests and disturbance of nesting females (Lavee 1988). Recent research on the effects of pastoralism on Asian Houbara in the Kyzylkum Desert in Uzbekistan, however, has found that low intensity livestock grazing may not widely degrade rangelands at a landscape scale (Koshkin *et al.* 2014). In Iran, loss of habitat to croplands, mainly through the planting of pistachio, has been adjudged a significant threat (Mansoori 2006); however, it has also been found that Asian Houbara exploit other crops such as alfalfa and salad rocket (Aghanajafizadeh *et al.* 2010). In Israel, the intensification of agriculture has facilitated the spread of predatory species such as Golden Jackal *Canis aureus*, Carrion Crow *Corvus corone* and Brown-necked Ravens *Corvus ruficollis*, and there has also been the occasional incidence of pesticide poisoning identified through toxicology analysis (O. Hatzofe *in litt.* 2014).

Undoubtedly, in parts of the region, fast-paced development related to the growth of the petroleum industry has reduced the availability of undisturbed habitats and further exacerbated the species' decline. Oil exploration, road building, oil and water pipelines, mining and quarrying activities, powerlines and the general disturbance caused by four-wheel drive vehicles have all been identified as significant auxiliary threats.

Review of conservation actions

The Asian Houbara is listed in the Appendices of two international conventions: the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

By virtue of being listed in Appendix I of CITES, all international trade in wild-caught Asian Houbara is prohibited except in exceptional licensed circumstances, and all trade in captive-bred birds must be accompanied by an authorised permit. All the range states and territories of the Asian Houbara are contracting parties to CITES, except Tajikistan, Turkmenistan and Palestine.

The Asian Houbara is listed in Appendix II of CMS, which covers migratory species that need or would significantly benefit from international cooperation. The following 14 range states are CMS Contracting Parties—Egypt, India, Iran, Israel, Jordan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Saudi Arabia, Syrian Arab Republic, Tajikistan, Uzbekistan and Yemen. A draft range-wide legally binding agreement developed under the aegis of CMS was proposed in 2004, along with an integral Action Plan (UNEP/CMS 2005). It was further considered by the CMS Conference of the Parties in 2008; however, to date the agreement has not been opened for signature. To evaluate the extent to which conservation activities are already being implemented, Asian Houbara experts and



representatives from all range states were asked to review the measures outlined in the draft Action Plan (summarised in Table 4) and assess the current state of implementation. The results of this consultation are presented in Annex II.

Table 4. Summary of main conservation activities outlined in the Action Plan (2005) to the draft CMS Agreement on the Convention of the Asian Houbara.

1. Species Conservation

- 1.1 Legal Measures to Conserve Wild Populations
- 1.2 Emergency Measures
- 1.3 Captive breeding and reintroduction
- 1.4 Captive Collections

2. Habitat Conservation

- 2.1 Habitat Inventories
- 2.2 Habitat Conservation and Management
- 2.3 Habitat Rehabilitation and Restoration

3. Management of Human Activities

- 3.1 Hunting and Falconry
- 3.2 Eco-tourism
- 3.3 Other Human Activities
- 3.4 Use of Economic Measures

4. Research and Monitoring

5. Training, Education and Information

As indicated in Annex II, it is clear that, although conservation activities are progressing in some countries, some actions pivotal to safeguarding the species globally remain unimplemented in many others. The greatest progress has been made in the area of captive breeding and reintroduction.

Captive breeding and reintroduction

The first captive breeding programme was established at the National Wildlife Research Center at Taif in western Saudi Arabia (Seddon *et al.* 1995, Islam *et al.* 2012, 2013). Between 1986 and 1988, fertile eggs were collected from a resident population in Baluchistan, Pakistan, and by 1989, through the use of artificial insemination and incubation, the first captive-bred chicks were hatched (Saint Jalme *et al.* 1994). Following further refinement to the breeding techniques, the number of chicks hatched at the facility has steadily increased, and by the early 2000s, more than 3,000 chicks had been successfully reared (Islam *et al.* 2012).

The first releases were made in Mahazat as-Sayd Protected Area in central Saudi Arabia in 1991 (Combreau and Smith 1998). In 2001, releases also began at the neighbouring Saja Umm Ar-Rimth Protected Area (Islam *et al.* 2010). A ‘soft release’ technique has been practised, with birds spending a transition period in pre-release enclosures to allow for their acclimatisation. Since 1993, the majority of released birds in Saudi Arabia have been radio-tagged (Islam *et al.* 2010). Initially, very high levels of mortality were experienced by released birds, primarily due to predation by



Red Fox *Vulpes vulpes* and other mammalian predators (Combreau and Smith 1998). These were subsequently reduced through the control of foxes and feral cats in the vicinity of the release enclosures (Combreau and Smith 1998), but mortality rates remain high, and 60% of captive-bred Houbara typically die within one month of release (Islam *et al.* 2012).

The first incidence of introduced birds breeding in the wild was recorded at Mahazat as-Sayd in 1995 (Gelinaud *et al.* 1997), and breeding has subsequently occurred sporadically in years of favourable weather conditions. Between 1991 and 2010, a total of 970 captive-bred birds were successfully released at Mahazat as-Sayd (Islam *et al.* 2012). By May 2010, fewer than 150 could still be located via their radio transmitters, and the population was estimated to number 250–300 individuals (Islam *et al.* 2012). In total, 256 Asian Houbara were released at Saja Umm Ar-Rimth up until May 2010; however, of those released between 2003 and 2009, only around 34 individuals were thought to survive (Islam *et al.* 2012, 2013). In May 2010, a third release site was identified at the Taysiyah Protected Area in the north-east of Saudi Arabia near the Iraqi border (Islam *et al.* 2012, 2013).

The International Fund for Houbara Conservation (IFHC) was set up in 2006 to further the conservation of both Asian *C. macqueenii* and African Houbara Bustard *C. undulata*. Through its network of breeding facilities in the United Arab Emirates (UAE), Morocco and Kazakhstan, IFHC has a long-term goal to produce 15,000 African Houbara and 35,000 Asian Houbara each year for reintroduction into the wild (IFHC 2014b). The facilities are managed on behalf of the IFHC by Reneco Wildlife Consultants LLC, a private company providing design and management services for Houbara conservation projects. At present, IFHC's captive breeding operation is spread across the National Avian Research Center (NARC) and Sheikh Khalifa Houbara Breeding Center in Abu Dhabi, the Emirates Centre for Wildlife Propagation in Morocco, and the Sheikh Khalifa Houbara Breeding Center in Kazakhstan.

The National Avian Research Center (NARC) in Sweihan, Abu Dhabi, was established in 1989 and produced its first captive-bred chicks in 1996. In 2004, 447 chicks were produced and the first five captive-bred Houbara were released into the wild at a site in UAE (IFHC 2014c). Reintroduced Houbara were first recorded breeding in UAE in 2007 (IFHC 2014c). The 2012 breeding flock numbered 3,403 individuals (956 males and 2,445 females) and included birds bred in captivity and those originating from the wild in Pakistan, Iran, Kazakhstan and Yemen (IFHC 2012a). In order to maintain genetic diversity, eggs were periodically taken from the wild, with nearly 50 taken from Iran and Yemen in 2012 (IFHC 2012a). During the 2011–2012 season, 1,292 Houbara were released at eight sites in UAE, bringing the total released across the country since 2004 to over 4,400 individuals (IFHC 2012a, IFHC 2012b). The survival rate at one year after release of those birds released in UAE to date is 53% (IFHC 2012a). Breeding in the wild is now regular, and between 2007 and 2011, 44 nests containing 69 chicks were observed (IFHC 2012a). A second facility has recently been constructed at Saih Al Salam in Abu Dhabi. The Sheikh Khalifa Houbara Breeding Center (Abu Dhabi) should be fully operational by the end of 2014 and will aim to produce and release 5,000 Houbara chicks per year (IFHC 2014d). In 2012, a total of 13,105 Asian Houbara were bred at the two facilities in UAE (IFHC 2014c).

In 1995, the Emirates Centre for Wildlife Propagation opened in Missour, Morocco. A second breeding facility opened in nearby Enjil in 2006 (IFHC 2014e). The main focus of these



Moroccan facilities is the production of African Houbara; however, the Asian species has also been bred in order to augment the captive breeding programmes in UAE and Kazakhstan. In March 2012, 5,270 Asian Houbara were transferred from Morocco to the new Sheikh Khalifa Houbara Breeding Center in Abu Dhabi (IFHC 2012c). Since then, ECWP has concentrated solely on the production of African Houbara (IFHC 2012a).

In 2008, work began in Kazakhstan on a facility for breeding and monitoring migratory Asian Houbara. When operating at full capacity, the Sheikh Khalifa Houbara Breeding Center (Kazakhstan) near Shymkent is designed to produce between 5,000 and 10,000 birds per year. In 2012, the centre produced 303 chicks and a further 129 chicks were hatched from eggs collected from the Caspian Sea region (IFHC 2012a). The first experimental release of captive-bred Houbara in Kazakhstan involved seven juveniles released near the Caspian Sea in 2009 (IFHC 2012a). In 2011–2012, nearly 100 captive-bred birds of either Kazakh or Pakistani origin were released within the Betpak-Dala region of Kazakhstan (IFHC 2012a). Of the 27 whose satellite tags were still working at the end of 2012, only three had remained close to the release site; the rest migrated distances ranging from 100 km to 2,100 km, with some reaching as far as Iran (IFHC 2012a). In April 2014, a further 2,000 captive-bred Asian Houbara were flown from Abu Dhabi to Kazakhstan and released into protected areas in Kyzylkum, Betpak-Dala and Mangystan (IFHC 2014a). Two captive breeding centres, the Emirates Bird Breeding Center for Conservation and Emirates Center for Conservation of Houbara, are now operational in Uzbekistan, and in the past two years the first releases of captive-bred birds have been trialled (K. M. Scotland *in litt.* 2014, NARC *in litt.* 2014).

In total, IFHC's breeding programme produced 30,670 Houbara (African and Asian) in 2012, a 50% increase on the previous year (IFHC 2012a). This included 13,105 Asian Houbara bred at the two centres in Abu Dhabi (IFHC 2012a). Introductions continued at sites across the Arabian Peninsula in 2013, with 4,405 Houbara released in UAE, 1,000 in Qatar, 250 in Kuwait and 200 in Yemen (IFHC 2013). In 2014, 1,065 Asian Houbara were provided to the Rawdat Al Faras Houbara Breeding Centre to help establish a captive breeding programme in Qatar (IFHC 2014g) and releases took place for the first time in Jordan (NARC *in litt.* 2014). As part of a bilateral agreement signed with Qatar, a captive breeding facility is now being constructed in Iran (S. Zadegan *in litt.* 2014).

Remarkable progress has been made in developing techniques for rearing and releasing Asian Houbara, and captive breeding and reintroduction will undoubtedly play a central role in reversing the species' fortunes. As with all such reintroduction programmes, it is vital that releases are conducted in full accordance with the *IUCN Guidelines for Reintroduction* (2013). These state that 'there should generally be strong evidence that the threat(s) that caused any previous extinction have been correctly identified and removed or sufficiently reduced' (IUCN/SSC 2013). Therefore, it is crucial that the threats impacting Asian Houbara, including unsustainable levels of hunting and poaching, are adequately addressed concurrent with any reintroduction programme. Present levels of exploitation remain high across much of the species range, and thus current reintroduction and reinforcement programmes risk simply replenishing populations in a manner akin to that of gamebird restocking, rather than establishing viable natural populations.

The following aspects of the reintroduction guidelines are particularly pertinent, and better documentation of the current reintroduction programmes to demonstrate their compliance



is desirable. First, 'any source population should be able to sustain removal of individuals, and removal should not jeopardise any critical ecological function, except in the case of an emergency or rescue removal' (IUCN/SSC 2013). Many wild populations of Asian Houbara, especially isolated remnant breeding populations such as those in Yemen, are now critically small and restraint should be exercised in the removal of eggs from these populations. Second, captive-bred 'individuals should be from populations with appropriate demographic, genetic and behaviour' characteristics (IUCN/SSC 2013). Research has found significant genetic differentiation between different Arabian populations, particularly the one from Yemen, and those in Asia (Riou *et al.* 2012). Efforts should be made to avoid intraspecific hybridisation and therefore maintain the genetic distinctiveness of existing populations. In addition, it is vital that reintroduction projects fulfil all regulatory compliances (e.g. CITES), adequately safeguard against the risk of disease and pathogen transfer, and are accompanied by effective post-release monitoring (IUCN/SSC 2013).

The most urgently needed conservation measures are those that will reduce exploitation to a biologically sustainable level. This will require precautionary and scientifically determined limits on the number of birds that can be harvested legally and stricter enforcement to combat illegal forms of trade and hunting. It is vital, however, that stricter regulation on the hunting of Asian Houbara does not displace hunting activities onto the African Houbara, and consequently similar measures need to be taken for this species. To achieve this, range state cooperation is essential.



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Annex I. Accounts for range states and territories

Arabian Peninsula

Asian Houbara were once resident over much of the Arabian Peninsula, except for the vast Rub' al Khali desert and the mountains of western Saudi Arabia (O. Combreau *in litt.* 2014). Today, just a few remnant populations remain in northern Saudi Arabia, western and central Oman, and eastern and northern Yemen. Migrants, chiefly from Iran, Kazakhstan and the Mongolian plateau, previously arrived in large numbers. Birds would start to appear in eastern and northern Arabia in September, with most arriving in October and November, and depart in March or April (O. Combreau *in litt.* 2014). Today, very few migrants reach the Arabian Peninsula and the species is best regarded as an increasingly rare vagrant across most of the region. Considerable effort has been put into captive breeding in recent decades, and reintroductions have taken place in Saudi Arabia, UAE, Qatar, Kuwait, Jordan and Yemen (Seddon *et al.* 1995, IFHC 2013, NARC *in litt.* 2014).

Bahrain

A rare and declining passage migrant and winter visitor.

It is unknown whether the species ever bred in Bahrain. As elsewhere in Arabia, it has declined considerably as a winter visitor. In the last decades of the 20th century it was anecdotally reported that several tens of Asian Houbara were still being killed each winter, with up to 60 birds rumoured to have been taken during an influx in November and December 1988 (Nightingale and Hill 1993, Hirschfeld 1995). Today, it is probably best considered an increasingly infrequent vagrant.

Kuwait

A rare and declining passage migrant and winter visitor.

A few breeding records exist from the early decades of the 20th century, although it is unlikely that breeding persisted beyond the 1930s (Gregory 2005, M. Jennings *in litt.* 2014). As elsewhere in Arabia, the species was once a common winter visitor but declined sharply over the course of the 20th century. It is still recorded annually in varying numbers: Kuwaiti hunters and falconers report one or two in some winters and 'many' in others (Gregory 2005).

Oman

A scarce resident and rare winter visitor.

Previously described by Goriup (1997) as 'an uncommon breeding resident numbering several hundred to a few thousand birds, and a passage migrant and winter visitor from August to March in small, irregular numbers', the remnant breeding population is now thought to persist only within the Arabian Oryx Sanctuary on the Jiddat al-Harasis plateau in central Oman. Tourenq *et al.* (2005) found that the species' relative abundance and density at this site decreased by 50% and 75% respectively between 1999 and 2002. Contemporaneous records include up to 15 seen together in the area on 16th January 1998 (Eriksen & Sargeant 2000). In 2002, the population density across the Jiddat al-Harasis plateau was estimated at just one bird per 14–29 km² (Tourenq *et al.* 2005), and



Jennings (2010) suggests a total breeding population of perhaps only 100 breeding females. Although the peak of breeding activity occurs in spring, with most eggs being laid in March, breeding activity has been observed in every month except July and August (O. Combreau *in litt.* 2014). This differs from northern migratory populations, which are thought to breed exclusively in spring. It appears that resident Asian Houbara may respond to the unpredictability of rainfall in the Omani desert by laying more frequently in years of high precipitation, when two laying peaks, one in March–April and one in October–November, can be observed. Conversely, in years of drought, breeding may not take place at all (O. Combreau *in litt.* 2014). It is believed that Oman is still visited by wintering migrants that may mix with resident birds; however, as elsewhere in Arabia their numbers are undoubtedly much reduced from previous levels.

Qatar

A rare and declining passage migrant and winter visitor.

It is unknown whether the species ever bred here. As elsewhere in Arabia, it has declined considerably as a passage migrant and winter visitor. A captive breeding facility has recently been established (IFHC 2013).

Saudi Arabia

A very rare or extinct resident and declining passage migrant and winter visitor.

Saudi Arabia was previously home to a sizeable resident population ranging south of the Iraqi border, through the Nafud Desert, as far as Ha'il in the south-west and Riyadh in the south-east (O. Combreau *in litt.* 2014). These resident birds were likely to have been joined by thousands of migratory birds each winter between October and March. By the last decades of the 20th century, however, the Asian Houbara was described as a rare breeding resident with probably fewer than 500 birds, and a regular winter visitor in variable but unknown numbers (Goriup 1997). By the 1990s, the breeding range was restricted to the Harrat al Harrah Reserve in the extreme north of the country. Although Jennings (2010) reported that a small population—of perhaps 30 breeding females—may persist at Harrat al-Harrah, there have been no recent observations, and it is possible that the resident population has now expired (M. Jennings *in litt.* 2014, O. Combreau *in litt.* 2014). Wintering birds continue to occur irregularly in suitable habitats throughout the country—albeit in much smaller numbers than previously. Saudi Arabia has pioneered large-scale captive breeding through insemination and the reintroduction of Asian Houbara, and more than 1,000 free-ranging birds of Pakistani and Iranian origin have been successfully introduced to Mahazat As-Sayd and Saja/Umm Ar-Rimth protected areas (Seddon *et al.* 1995, Islam *et al.* 2012, 2013). Further reintroductions are planned to take place at the At-Taysiyah protected area near the Iraqi border in late 2014 (M. Zafar-ul Islam *in litt.* 2014).

United Arab Emirates

A very occasional breeder and declining passage migrant and winter visitor.

Asian Houbara visiting UAE between September and February are thought to be allied to the wintering population in southern Iran. The influx of birds into UAE via the Straits of Hormuz is probably triggered by a combination of deteriorating environmental conditions in southern Iran and favourable winds, and is thus highly variable from year to year (O. Combreau *in litt.* 2014). Although numbers have, therefore, always fluctuated, in the past much larger numbers of Houbara



crossed the straits to winter in UAE, Oman and the south of Saudi Arabia. Today, perhaps just a few hundred do so (O. Combreau *in litt.* 2014). Breeding is thought to have occurred occasionally in the south of the country, possibly involving vagrant birds from Yemen (O. Combreau *in litt.* 2014). A reintroduced population is now established, following the release of more than 9,000 birds between 2004 and 2014 (NARC *in litt.* 2014). Breeding is reported in years of good winter rainfall, with 62 nests located in spring 2014 (NARC *in litt.* 2014).

Yemen

A very rare resident and uncommon winter visitor.

The Yemeni population is believed to have declined rapidly since the late 1980s, when the demise of the communist regime in South Yemen led to the opening up of the country to visiting falconers (O. Combreau *in litt.* 2014). Surveys carried out by NARC in the early 2000s suggested a small and disjointed resident population, comprising perhaps as few as 60 individuals (Judas *et al.* 2009a). Satellite tracking suggests that the population is largely sedentary; however, one bird has been tracked from East Yemen to north-east Oman—a distance of 800 km—suggesting that dispersal between the remnant Arabian breeding populations is possible (O. Combreau *in litt.* 2014). However, despite this, the resident Yemeni population has been shown to be genetically distinct from all other Asian populations (Judas *et al.* 2009a). The species is also an increasingly uncommon migrant and winter visitor. Migrants are known from the Socotra Archipelago. Efforts are currently underway to reinforce the remnant population in eastern Yemen with captive-bred birds, and releases took place in 2013 and 2014 (IFHC 2013, NARC *in litt.* 2014).

Rest of the Middle East and Egypt

Much of the area north of the Arabian Peninsula, comprising Iraq, Syria, Jordan, Israel and Egypt east of the Nile, is climatically favourable for resident Asian Houbara, and historically the species is likely to have been widespread (O. Combreau *in litt.* 2014). However, from the 1940s onwards these resident populations have contracted sharply in the wake of overexploitation, development and agricultural change (O. Combreau *in litt.* 2014). More recently, the number of migrants visiting the region has also declined. Whereas prior to the 1980s considerable numbers wintered down through Syria and Jordan as far as Egypt, today few birds do so.

Egypt

A rare resident and very rare migrant.

A remnant breeding population persists east of the Nile within the region of Nekhel in the centre of the Sinai Peninsula and possibly still within the Eastern Desert (Saleh 1989). Goriup (1997) estimated that fewer than 300 birds remained in the Sinai population; however, the current status is unknown. Migratory Asian Houbara are thought to have visited Egypt up until the mid-1980s, but overwintering birds this far west are now exceptional (O. Combreau *in litt.* 2014).

Iraq

A scarce resident and a common but declining passage migrant and winter visitor.

Goriup (1997) described a resident population comprising a small number of pairs and, although the current status is poorly documented, breeding is frequently reported by hunters in southern and western Iraq (Salim *et al.* 2012). There may also have been a migratory breeding population



shared with neighbouring Syria that wintered in Egypt, Jordan and Saudi Arabia; however, this is now likely to have died out (O. Combreau *in litt.* 2014). Significant numbers of passage and winter migrants, perhaps numbering 4,500 to 6,500 individuals, continue to visit, mostly from breeding populations located east of the Caspian Sea and in northern Iran (O. Combreau *in litt.* 2014, Salim *et al.* 2012).

Israel

A rare resident.

Resident across parts of the Negev Desert and Arava Valley. Radio and satellite tracking studies suggest that some individuals from Sinai, Egypt overwinter in northern Negev (O. Hatzofe *in litt.* 2014). According to national counts conducted annually since 1987 the population is stable or slightly decreasing in the Negev Desert (200–300 individuals), whilst few observations, and no records of breeding, are known from the Arava Valley (Israel Nature & Parks Authority reports). Radio and satellite telemetry reveals that the resident population migrates internally within Israel. Breeding takes place in the southern Negev Desert and is highly dependent on the incidence of precipitation. In areas, such as the Arava Valley, where there has been a notable decline in rainfall over recent decades, no breeding has been reported for 20 years (O. Hatzofe *in litt.* 2014). Males return to their “territories” in October–November and begin to display in December. After which, the males, and those females that have failed to breed, disperse north to grassland steppes for the summer months, leaving behind the females with chicks (O. Hatzofe *in litt.* 2014).

Jordan

A very rare or possibly extinct resident and rare vagrant.

Historically, Asian Houbara were distributed widely across the Jordanian desert, but following the 1930s they declined drastically (Andrews 1995). The last confirmed records date from the 1970s when, between 1975 and 1979, there were 21 sightings of a total of 48 birds from the vicinity of the Shaumari Wildlife Reserve, in the Azraq region (Andrews 1995). Although unconfirmed reports from this area continue, it is likely that the resident population has died out (Eid *et al.* 2013). Until the mid-1980s migrant birds were still wintering, but today the species is described as a rare vagrant (Eid *et al.* 2013). Releases of captive-bred birds took place for the first time in 2014 (NARC *in litt.* 2014).

Palestine

A very rare resident.

Very little is known about the current status, and despite a resident population occurring in the Negev Desert of neighbouring Israel, there is no evidence that a population persists in Palestine.

Syrian Arab Republic

A rare resident, passage migrant and winter visitor.

Although still considered quite numerous as a resident in the 1960s (Collar 1980), by the end of the century the species was described as scarce (Roshier 1995). Today, resident populations may persist at Jabal al-Bishri, Jabal Sis, Sabkhat al-Jabbul and Wadi al-Azib; however, they are likely to be very small and the majority of recent records from these areas relate to passage migrants (O. Combreau *in litt.* 2014, N. Asswad *in litt.* 2014). There may also have been a migratory breeding population shared with neighbouring Iraq that wintered in Egypt, Jordan and Saudi Arabia; however,



this is now most likely extinct (O. Combreau *in litt.* 2014). Migrants were still regular prior to the mid-1980s; today the species is an occasional vagrant (O. Combreau *in litt.* 2014).

Central Asia including Iran and Afghanistan

The region hosts approximately 85% of the migratory breeding population—primarily in southern Kazakhstan—as well as the largest remaining resident population in south-east Iran. Almost the entire migratory population passes through Uzbekistan and Turkmenistan during autumn and spring passage. A large and—as the numbers reaching the Middle East have dwindled—growing proportion winter in the region, with more than 50% of the migratory population overwintering in Iran and Afghanistan.

Afghanistan

A suspected resident and confirmed migrant breeder in small numbers and an abundant passage migrant and winter visitor.

In the past, the species' status in this vast country has proven difficult to assess. However, recent satellite tracking studies have established Afghanistan's importance for migratory Asian Houbara, and many thousands of birds are now believed to stop over on migration and/or to overwinter (O. Combreau *in litt.* 2014). Migrants appear to avoid crossing the Hindu Kush and central highlands (although very occasionally individuals may choose to take a shortcut and make stopovers in Bamyan or south of Kabul), and instead prefer to travel across the country's western plains (O. Combreau *in litt.* 2014). Asian Houbara migrate through large swathes of the country, and all areas running from Mazar-e-Sharif to the north through to Kandahar in the south and circumventing the Hindu Kush to the west may be visited by migrant birds (O. Combreau *in litt.* 2014). Those overwintering in Afghanistan do so primarily in the south-west provinces of Herat, Farah, Nimruz, Helmand and Kandahar, although some have been observed on the northern plains north of Sheberghan and Mazar-e Sharif (O. Combreau *in litt.* 2014). Asian Houbara overwintering in Afghanistan mostly originate from central and eastern Kazakhstan and from the Mongolian Plateau (O. Combreau *in litt.* 2014). Satellite tracked birds have been observed all through the breeding season in a number of northern provinces, strongly suggesting that northern Afghanistan hosts regular breeders. These breeders are thought to be migrants that vacate the country in winter; however, it is likely that sedentary populations also occur in the west, contiguous with known resident populations in neighbouring Iran (O. Combreau *in litt.* 2014).

Iran

A resident and migrant breeder and an abundant passage migrant and winter visitor.

Situated at the approximate midpoint of the species' range, Iran occupies a critical junction for migratory Asian Houbara. A sizeable proportion of those from the breeding grounds of Central Asia, China and Mongolia either overwinter in southern Iran or, whether destined for the Middle East or the Indian subcontinent, move through the country on passage. In total, an estimated 30,000 non-breeding Asian Houbara may visit Iran each winter (O. Combreau *in litt.* 2014). Significant numbers also breed across northern and south-central Iran. Breeders in the north were previously thought to be resident, but recent satellite tracking reveals that they are short-distance migrants that move to wintering grounds in the south of the country, as well as eastern Iraq and the Arabian Peninsula (O. Combreau *in litt.* 2014). Those occupying south-east Iran are most likely sedentary and



probably connected with resident populations in neighbouring Afghanistan and Pakistan. In total, as many as 10,000 Asian Houbara may breed in Iran (O. Combreau *in litt.* 2014). Comparing population densities in 2006 from the region of Yazd with those recorded in the 1990s by Mansoori (2006), Aghanajafizadeh *et al.* (2012a) suggested that, in this area at least, the breeding populations had remained stable. As part of a bilateral agreement signed with Qatar, a captive breeding facility is now being constructed in Iran (S. Zadegan *in litt.* 2014).

Kazakhstan

A locally common summer visitor and passage migrant

Kazakhstan is by far the most important range state for the Asian Houbara. With over a million square kilometres of suitable breeding habitat, it hosts the majority of the global migratory population. The largest breeding populations are found in the regions of Betpak-Dala, Balkash and the Kazakh section of the Kyzylkum desert. Other significant breeding populations occur in the Karakum Desert east of the Aral Sea and in the area east of the Caspian Sea in western Kazakhstan. Satellite tracking indicates that birds breeding in the west of the country winter in Iran and Iraq, whilst those from further east move to Uzbekistan, Turkmenistan, Afghanistan, Pakistan, India and the Arabian Peninsula (Combreau *et al.* 1999, 2011a). Using data from ground and aerial surveys conducted in the 1980s in the Kyzyl Kum desert (Gubin 1992), Goriup (1997) estimated a breeding population of between 30,000–40,000 individuals. However, more recent surveys conducted across southern Kazakhstan by the National Avian Research Center (NARC) of Abu Dhabi, in collaboration with the Kazakh Scientific Centre for Quarantine and Zoonotic Diseases (KSCQZD), suggest a population closer to 49,000 (Riou *et al.* 2011). The surveys carried out by NARC revealed alarming declines in all Kazakh breeding populations between 1998 and 2002 (Tourenq *et al.* 2004, 2005). More recent surveys confirm ongoing declines in many areas, but also identify important regional differences—with some significant populations, such as those in Betpak-Dala, seemingly stable or increasing (Riou *et al.* 2011). In addition to the breeding population, migrants from China and Mongolia pass through the east of the country each spring and autumn. Overwintering birds are occasionally reported from the Kyzyl Kum desert (O. Combreau *in litt.* 2014).

Kyrgyzstan

An occasional vagrant.

Asian Houbara are thought to be an occasional vagrant or irregular passage migrant to Kyrgyzstan, with only a handful of sporadic records from the north-western province of Issyk Kul (S. Kulagin *in litt.* 2014). The last documented record is from 1991 (S. Kulagin *in litt.* 2014). There is no evidence of breeding activity.

Tajikistan

A very rare summer visitor, although breeding never confirmed and now unlikely.

According to Goriup (1997), the Asian Houbara is a rare summer visitor to north-west Tajikistan, known only from the lower reaches of the Kafarnihon River and the southern side of the Syr Darya River. However, it is now likely that most of the suitable habitat in these areas, as elsewhere in Tajikistan, has gone, and if the species did previously breed it is unlikely to do so still (R. Ayé *in litt.* 2014).



Turkmenistan

Uncommon migrant breeder and winter visitor and locally common passage migrant.

With the exception of those breeding in Iran, the entire migratory population of Asian Houbara, numbering tens of thousands, passes through Turkmenistan twice each year. In spring, northward migrants start to arrive from late February, with the bulk passing through in March. Satellite tracking reveals that some make the crossing in a single day whilst others take up to 17 days. On average, spring migrants spend 4 to 5 days in the country (O. Combreau *in litt.* 2014). In autumn, birds are observed between late August and late November, with the majority arriving in the second half of October. Autumn migrants typically linger slightly longer, with an average stay of approximately 6 to 8 days (O. Combreau *in litt.* 2014). Satellite tracking also shows that small but significant numbers of migrants winter in south-eastern Turkmenistan. It is thought that the number doing so varies in accordance with the severity of winter weather (O. Combreau *in litt.* 2014). Little is known about the breeding status; however, much of the country appears climatically suitable, and Goriup (1997) estimated a breeding population of >500 individuals. Satellite tracking has revealed that some of the birds breeding in Turkmenistan winter in UAE (O. Combreau *in litt.* 2014).

Uzbekistan

A locally common summer visitor and passage migrant and an occasional over-winterer.

A large proportion of the population, numbering tens of thousands, migrates through Uzbekistan biannually, and birds can be encountered in most lowland regions each spring and autumn. Northward migration peaks in the second and third weeks of March, whilst southbound birds mostly pass through in mid-October (O. Combreau *in litt.* 2014). Birds have been observed across much of the country in the summer months, and Goriup (1997) estimated a breeding population of between 6,000 and 9,000 individuals. Overwintering has been reported in the Uzbek part of the Kyzyl Kum desert (O. Combreau *in litt.* 2014). Two captive breeding centres are now operational and in the past two years the first releases of captive-bred birds have been trialled (K. M. Scotland *in litt.* 2014, NARC *in litt.* 2014).

East Asia

The breeding range of Asian Houbara extends east to the Mongolian Plateau. Migrant breeders from here are thought to account for the most northerly wintering populations, such as those found in southeast Uzbekistan (Judas *et al.* 2006). By contrast, others are among the most widely travelled, wintering as far south as the Arabian Peninsula and the Thar Desert of India.

China

Uncommon breeding visitor and passage migrant.

The core breeding range is centred on the Jungar (Zungharian) Basin in northern Xinjiang, an area bounded by the Tian Shan Mountains to the south, the Altai Mountains to the north-east and the Tarbagatai Mountains to the northwest. Particularly high concentrations are known from the vicinity of Mori (Combreau *et al.* 2002, Yang *et al.* 2003). Further east, a disjunct population exists across the Chinese Gobi Desert in parts of western Inner Mongolia and northern Gansu. Gao *et al.* (2009) suggest a Chinese breeding population of around 2,000 individuals; however, more recent analysis of suitable habitat suggests that 6,000–8,000 birds may be present in the Jungar Basin alone (O. Combreau *in litt.* 2014). Surveys conducted by the NARC in the Jungar Basin revealed steep



declines in both relative abundance (63%) and density (69%) between 1998 and 2002 (Tourenq *et al.* 2005).

Mongolia

Uncommon breeding visitor.

The known breeding range extends from the Great Lakes Depression east of the Altai Mountains in the north-west, through the Gobi Desert as far east as Galba Gobi Important Bird and Biodiversity Area (IBA) in south-east Ömnögovi Province (Batbayar *et al.* 2011, O. Combreau *in litt.* 2014). The Conservation Action Plan for Mongolian Birds suggests a total national population of less than 300 individuals (Gombobaatar *et al.* 2011); however, recent analysis suggests suitable habitat and conditions may exist for nearer 2,000 birds (O. Combreau *in litt.* 2014).

South Asia

Over 30% of the migratory population winters in South Asia, mostly in the Baluchistan region of Pakistan. This area also hosts a small and declining resident population.

India

Uncommon winter visitor.

A winter visitor to western Rajasthan (Bikaner, Jodhpur, Jaisalmer and Barmer districts) and Gujarat, with regular sightings from the Wild Ass Wildlife Sanctuary and the Kutch Desert Wildlife Sanctuary (Rahmani 2012). Goriup (1997) suggested a population of 2,000–5,000 birds. Asian Houbara wintering in India originate largely from the Mongolian plateau and eastern Kazakhstan (Combreau *et al.* 2011).

Pakistan

Rare and declining resident and locally common but declining winter migrant.

Wintering birds reach Pakistan via Afghanistan, arriving from the second half of September through to the end of the year, with a peak from mid-October to mid-November (O. Combreau *in litt.* 2014). The wintering range extends across most of Baluchistan, Sindh and south and west Punjab. Satellite tracking reveals that individuals wintering in west Baluchistan typically originate from central Kazakhstan, whilst those wintering further east in Punjab's Cholistan Desert tend to come from the Mongolian Plateau (Tourenq *et al.* 2004a, O. Combreau *in litt.* 2014). The wintering population in Punjab has been estimated at 4,854–6,270 individuals (Nadeem *et al.* 2004, 2005), and it is possible that the total population in Pakistan exceeds 25,000 (O. Combreau *in litt.* 2014). Return migration begins in early February, and by the second week of March the majority of migrants have departed the country. A small and declining resident population persists in western Baluchistan, chiefly in the Chagai and Kharan districts. This population is believed to have declined significantly since the 1980s and fewer than 100 individuals may remain (Goriup 1997).



Annex II. Assessment of conservation actions

FI = Fully Implemented; PI = Partially Implemented, IU = Implementation Underway; IP = Implementation Planned; NI = Not implemented; NA = No longer applicable
Country names follow the ISO standard (ISO 3166-1 alpha-3). Those underlined are parties to CMS.

Conservation Actions outlined in the Draft Action Plan (2005)		<u>Global</u>	<u>AFG</u>	<u>BHR</u>	<u>CHN</u>	<u>EGY</u>	<u>IND</u>	<u>IRN</u>	<u>IRQ</u>	<u>ISR</u>	<u>JOR</u>	<u>KAZ</u>	<u>KWT</u>	<u>KGZ</u>	<u>MING</u>	<u>OMN</u>	<u>PAK</u>	<u>PSE</u>	<u>QAT</u>	<u>SAU</u>	<u>SYR</u>	<u>TIK</u>	<u>TKM</u>	<u>UAE</u>	<u>UZB</u>	<u>YEM</u>	
1 Species Conservation																											
1.1 Legal Measures to Conserve Wild Populations																											
1.1.2a	Prohibit any taking of Houbara during their various reproductive and rearing stages and during their return to their breeding grounds if such taking would have an unfavourable impact on the conservation status of the populations concerned.	PI						FI	PI	FI		PI	NA								FI	IP			FI	PI	
1.1.2b	Prohibit trapping of adult and sub-adult Houbara and egg collecting.	PI						FI	PI	FI		PI	IP								IU	IP			FI	PI	
1.1.2c	Regulate methods of harvest.	PI						NI	NI	NA		PI	NI								PI	NA			FI	PI	
1.1.2d	Establish limits on taking, where appropriate.	PI						NI	NI	NA		IP	NA								NI	NA			FI	IP	
1.1.2e	Prohibit the possession, utilisation, transport, exchange or display of or trade in Houbara and their parts and derivatives which have been taken or otherwise obtained in breach of measures established pursuant to this Action Plan.	PI						PI	PI	FI		NI	PI								NI	IP			FI	NI	
1.1.2f	Prohibit international trade in Houbara and their parts and derivatives except where such trade is carried out in accordance with the rules established pursuant to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).	PI						PI	PI	FI		NI	PI								PI	FI			FI	NI	
1.1.2g	Provide adequate controls to ensure that the above prohibitions or restrictions are observed and properly enforced.	PI						PI	NI	FI			PI								IP	IP			FI		
1.2 Emergency Measures																											
	Parties shall, in close cooperation with each other whenever possible and relevant, develop and implement emergency measures, when exceptionally unfavourable or endangering conditions to Houbara occur anywhere in the Agreement Area.	PI						NI	NI	FI			PI								IU	NI			PI		

Conservation Actions outlined in the Draft Action Plan (2005)		Global	AFG	BHR	CHN	EGY	IND	IRN	IRQ	ISR	JOR	KAZ	KWT	KGZ	MMG	OMN	PAK	PSE	QAT	SALU	SYR	TJK	TKM	UAE	UZB	YEM
1.3 Captive Breeding and Re-introduction																										
1.3.1a	Re-introducing Houbara for the purpose of increasing numbers in an area or in a population.	PI	NI	NI	NI	NI	NI	NI	NI	NA	PI	PI	NI	NI	NI	NI	PI	NI	NI	PI	NI	NI	NI	FI	PI	PI
1.3.1b	Re-introducing Houbara for the purpose of returning Houbara to the wild following confiscation and/or rehabilitation.	PI	NI	NI	NI	NI	NI	PI	NI	NA	NI	NI	NI	NI	NI	NI	PI	NI	NI	PI	NI	NI	NI	FI	NI	NI
1.3.1c	Re-introducing Houbara for the purpose of supplementing the numbers of Houbara available for lawful sustainable falconry.	PI	NI	PI	NI	NI	NI	NI	NI	NA	NI	PI	PI	NI	NI	NI	NI	NI	PI	NI	NI	NI	NI	FI	NI	NI
1.3.2	Parties shall endeavour to develop and follow a detailed re-introduction plan or release protocol, as appropriate, based on appropriate scientific studies. Re-introduction plans or protocols shall be integrated, where appropriate, with national and international action plans. Such plans and protocols shall, inter alia, consider the health status and genetic origin of the Houbara to be released, and assess the activity's impact on the environment. They shall be made widely available. The planning and implementation for all re-introduction and release programmes should follow the IUCN Guidelines for Re-introductions. Provision must be made for adequate post-release monitoring to evaluate survival and to guide future releases.	PI	NI	NI	NI	NI	NI	NI	NI	NA	IP	PI	NI	NI	NI	NI	NI	NI	NI	FI	NI			FI	IP	IP
1.3.3	Parties shall endeavour, wherever possible and appropriate, to coordinate such programmes with other Range States to avoid duplication of effort or conflicts of interest.	PI						NI	NI	NA	PI	PI	NI							FI	NI			PI	PI	PI
1.3.4	Parties shall publish or otherwise make available the plans, methods and results of all Houbara re-introductions and release programmes.	PI						NI	NI	NA			NI							PI	NI			PI		
1.4 Captive Collections																										
1.4.1a	Houbara kept in captivity for purposes of scientific research and education.	PI						PI	NI	PI		FI	NI				PI			FI	NA			FI	FI	
1.4.1b	Houbara kept in captivity for purposes of captive-breeding or captive-rearing programmes for re-introduction or release.	PI						IU	NI	NA		FI	NI				PI			FI	NA			FI	FI	
1.4.1c	Houbara kept in captivity for purposes of rehabilitation.	PI						IU	NI	NA		NI	NI							IU	NA			NA	NI	

Conservation Actions outlined in the Draft Action Plan (2005)		Global	AFG	BHR	CHN	EGY	IND	IRN	IRQ	ISR	JOR	KAZ	KWT	KGZ	MMG	OMN	PAK	PSE	QAT	SAU	SYR	TJK	TKM	UAE	UZB	YEM	
1.4.1d	Houbara kept in captivity for purposes of holding or care following confiscation.	PI						PI	NI	NA		NI	NI							IP	NI			NA	NI		
1.4.3	Parties shall establish a registration system for existing and new captive collection facilities.	PI						NI	NI	FI		NI	NI							PI	NI			NI	NI		
1.4.4	Procedures shall be established to close down collection facilities which are unauthorised or which cease to comply with the conditions laid out in the draft Action Plan.	PI						NA	NI	FI		NI	NI							IP	IU			NI	NI		
1.4.5	Parties shall undertake and publish national inventories of all captive collections of Houbara within their territory and regularly make available information on the status of such collections.	PI						NA	NI	NA		NI	NI							IU	NI			NI	NI		
2 Habitat Conservation																											
2.1 Habitat Inventories																											
2.1.1	Parties shall undertake and publish national inventories of the habitats in their territory which are important to Houbara and they shall endeavour to identify all sites of international importance for such populations.	PI						NI	IP	FI		IP	NI							FI	PI			PI			
2.1.2	Parties shall endeavour to compile and publish existing historical records of the former distribution of Houbara within their territory.	PI						NI	IP	FI		PI	NI							FI	IU			PI	PI		
2.2 Habitat Conservation and Management																											
2.2.1	Parties shall endeavour to establish protected areas to conserve habitat important to Houbara and to develop and implement management plans for these areas, enforced by trained staff.	PI						PI	IP	PI		NI								FI	IP			PI			
2.2.2	Parties shall endeavour to take appropriate measures to confer special protection on sites that provide internationally important breeding, wintering and stop-over areas for migrant Houbara or sites that contain resident Houbara.	PI						PI	NI	FI	PI	NI								PI	IU			PI			
2.2.3	Parties shall endeavour to conserve all Houbara habitat in their territory and to avoid its degradation or loss.	PI						PI	IP	PI	IP	NI								PI	IP			PI			
2.2.3a	Promote or restore traditional land-use practices in appropriate areas to maintain habitats favourable to the living requirements of Houbara.	PI						NI	NI	NI	IP	NI								PI	IP			PI			

Conservation Actions outlined in the Draft Action Plan (2005)		Global	AFG	BHR	CHN	EGY	IND	IRN	IRQ	ISR	JOR	KAZ	KWT	KGZ	MNG	OMN	PAK	PSE	QAT	SAU	SYR	TJK	TKM	UAE	UZB	YEM	
2.2.3b	Establish in intensively farmed areas set-aside and extensification schemes in order to minimise overgrazing and vegetation clearance.	PI						NI	NI	PI	IP		NI								PI	NI			PI		
2.2.3c	Implement special protection measures for Houbara breeding areas. Farmers and shepherds shall be informed of the presence of Houbara on the land they use and they shall be encouraged to adapt the timing of their agricultural practices to avoid disturbing the birds during the breeding season.	PI						PI	NI	PI	IP		NI								PI	NA			PI		
2.3 Habitat Rehabilitation and Restoration																											
2.3.1	Parties shall endeavour, where feasible and appropriate, to rehabilitate or restore areas of former importance to Houbara, particularly as breeding habitat.	PI						NI	NI	PI			NI								IP	NA			IP		
2.3.2	In degraded areas which are essential for the re-establishment or maintenance of viable Houbara populations, appropriate legal measures shall be taken where practicable to protect such sites and to provide for their restoration.	PI						NI	NI	PI			NI								IP	IP			IP		
3 Management of Human Activities																											
3.1 Hunting and Falconry																											
3.1.1	Parties shall cooperate to ensure that their hunting legislation implements the principle of sustainable use, taking into account the full geographic range of the Houbara populations concerned, their seasonal distribution and life history characteristics.	PI						PI	IP	NA	NI	NI	PI								IP	IU			NI	NI	
3.1.2a	Prohibit any hunting of Houbara during the breeding season (March to June inclusive).	PI						FI	IP	FI	PI	PI	PI								FI	IU			PI	PI	PI
3.1.2b	Prohibit any hunting in strictly protected areas.	PI						FI	IP	FI	PI	PI	FI								FI	IU			PI	PI	
3.1.2c	Prohibit hunting of any populations believed to be in danger of extinction or for which there is insufficient information to reliably assess population status, in accordance with the precautionary principle.	PI						PI	IP	FI	PI	PI	PI								PI	IU			PI	PI	PI
3.1.2d	Prohibit or restrict hunting in sensitive areas or during specified periods, identified in consultation with other Parties, to protect isolated resident Houbara populations or migrant Houbara during stopover or passage.	PI						PI	IP	FI	PI	PI	NI								PI	IP			PI	PI	
3.1.2e	Endeavour to phase out the use of firearms to hunt Houbara.	PI						PI	IP	FI	PI	PI	NI								NI	IU			PI	PI	

Conservation Actions outlined in the Draft Action Plan (2005)		Global	AFG	BHR	CHN	EGY	IND	IRN	IRQ	ISR	JOR	KAZ	KWT	KGZ	MNG	OMN	PAK	PSE	QAT	SAU	SYR	TJK	TKM	UAE	UZB	YEM
3.1.2f	Reduce, and where possible eliminate, illegal taking of Houbara and unlicensed falconry.	PI						PI	IP	FI	PI	PI	PI							NI	IP			PI	PI	
3.1.3	Parties shall cooperate with a view to developing a reliable and harmonised system to collect harvest data to assess the annual harvest of Houbara.	PI						NI	NI	NA	PI	PI	NI							PI	NA			PI	PI	
3.1.4	Parties shall encourage hunters and falconers, at local, national and international levels, to form clubs or organisations to coordinate their activities and contribute to the conservation, including sustainable use, of Houbara, where appropriate by developing codes of conduct or other voluntary measures.	PI						NI	NI	NA			NI							IP	IP			PI		
3.2 Eco-tourism																										
3.2.1	Parties shall encourage sensitive and appropriate eco-tourism development, where appropriate, while avoiding sensitive sites or core zones of protected areas.	PI						PI	NI	PI			NI							IP	IP			PI		
3.2.2	Eco-tourism initiatives shall wherever possible be developed as collaborative management programmes with local communities. Benefits derived from such programmes shall accrue, at least in part, to local communities and to Houbara conservation programmes.	PI						NI	NI	PI			NI							IP	NI			PI		
3.3 Other Human Activities																										
3.3.1	Parties shall ensure, as far as practicable, that sectoral policies, programmes and projects are compatible with the conservation of Houbara and take into account the Houbara's special sensitivity to disturbance and habitat encroachment. Factors which impede Houbara migration shall be identified and, wherever possible, reduced or eliminated.	PI						PI	NI	PI			NI							IP	IP			FI		
3.3.2	Parties shall promote high environmental standards in planning and land management to minimize isolation or fragmentation of Houbara habitats. Infrastructure construction, mining, afforestation, irrigation and conversion of rangelands shall, as far as possible, be avoided in areas of importance to Houbara populations. An environmental impact assessment shall be carried out for potentially damaging projects in accordance with national legislation and viable alternatives shall be considered. Assessment results shall be made publicly available.	PI						PI	NI	PI			NI							IP	IP			PI		
3.3.3	Where projects or activities destroy or damage Houbara habitats or cause long-term disturbance to populations, the competent authorities shall require appropriate compensation to be made.	PI						PI	NI	PI			NI							NI	NI			PI		

Conservation Actions outlined in the Draft Action Plan (2005)		Global	AFG	BHR	CHN	EGY	IND	IRN	IRQ	ISR	JOR	KAZ	KWT	KGZ	MING	OMN	PAK	PSE	QAT	SAU	SYR	TJK	TKM	UAE	UZB	YEM
3.3.4	In cases where human disturbance threatens the conservation status of Houbara, Parties shall endeavour to take appropriate measures to minimise the level of threat. Suitable measures may include establishing disturbance-free zones, especially during breeding season.	PI						NI	NI	PI			NI							IP	NI			NI		
3.4 Use of Economic Measures																										
3.4.1	Parties shall encourage public authorities, political decision-makers at all levels, the private sector and land users, such as farmers, shepherds, landowners and hunters, to cooperate to develop economic activities to support conservation of Houbara and associated biodiversity on which such land users and local communities depend. Activities shall be designed to build support among communities and user groups for Houbara conservation measures and should consider compensation for any significant losses incurred from such measures.	PI						NI	NI	NA			NI							NI	NA			PI		
3.4.2	Parties shall consider establishing a licensing system for exploitation of Houbara in their territory.	IP						NA	NI	NA			NI							NI	NA			NA		
3.4.3	Parties shall endeavour to introduce economic and fiscal measures to discourage activities or practices that damage Houbara habitats or seriously disturb Houbara populations.	NI						NI	NI	NA			NI							NI	NA			PI		
3.4.4	Parties may consider using payments to finance compensatory measures for Houbara conservation, particularly in the areas affected by the damaging projects, activities or practices.	PI						NI	NI	NA			NI							NI	NA			NA		
4 Researches and Monitoring																										
4.1	Parties shall cooperate with competent international and national organisations to support research and monitoring projects on all aspects of Houbara ecology, population dynamics and habitats in order to assess the specific needs of the different populations.	PI						IP	IP	FI	FI	FI	NI							FI	NI			FI	FI	
4.2	Parties shall encourage the establishment, use and sharing of research and monitoring methods. Methods selected shall be standardised, documented, precise and replicable.	PI						IP	NI	FI	PI	PI	NI							PI	NI			PI	PI	
4.3a	Parties shall endeavour to map the distribution, human uses and legal status of Houbara habitats and assess the productivity of and threats to such habitats and the potential for their rehabilitation or restoration.	PI						IP	IP	FI			NI							FI	NI			PI		
4.3b	Parties shall endeavour to conduct field surveys in poorly known areas potentially suitable for breeding populations of Houbara.	PI						PI	IP	FI		PI	NI							PI	IP			FI	PI	

Conservation Actions outlined in the Draft Action Plan (2005)		Global	AFG	BHR	CHN	EGY	IND	IRN	IRQ	ISR	JOR	KAZ	KWT	KGZ	MNG	OMN	PAK	PSE	QAT	SAU	SYR	TJK	TKM	UAE	UZB	YEM	
4.3c	Parties shall endeavour to conduct research into Houbara numbers, distribution, sex-ratio, migration and movements, productivity and breeding success, threats to different populations, health and disease status, annual cycles and characterisation of the different sub-populations (morphometrics and genetic).	PI						PI	NI	FI		PI	NI							PI	IP				PI	PI	
4.3d	Parties shall endeavour to conduct studies on the impact of hunting, trapping and trading and their importance for the local and national economies.	IU						NI	IP	NA		IU	NI							IP	IP				IP	IP	
4.3e	Parties shall endeavour to conduct studies on the collection, compilation and use of traditional knowledge of local communities.	PI						PI	IP	NI			NI							IP	NI				PI		
4.4	Parties shall implement regular, coordinated monitoring schemes for Houbara throughout their range and shall collaborate to improve monitoring methods on the status of Houbara. The results of monitoring activities shall be communicated to relevant international organisations to allow Houbara population status, distribution and trends to be assessed.	PI						PI	IP	FI	PI	PI	NI							IP	IP				PI	PI	
5 Training, Education and Information																											
5a	Parties shall where necessary, arrange for training programmes to ensure that all personnel responsible for this Action Plan's implementation have adequate knowledge to implement it effectively.	PI						NI	IP	PI	IU	IU	NI					PI			IU	NI			IU	IU	
5b	Parties shall cooperate with each other and the Agreement Secretariat with a view to develop training programmes, exchange resource materials and make their training facilities available to others.	PI						NI	IP	FI			NI					PI			IP	NI			PI		
5c	Parties shall endeavour to develop programmes, information materials and mechanisms in the appropriate language to improve the level of awareness of the general public on the problems facing the Houbara.	PI						NI	IP	NA			NI					PI			IP	NI			PI		
5d	Parties shall promote and facilitate the supply and exchange of information between scientists, government agencies, non-governmental organisations, local communities and other interested parties. They shall in particular promote transparency concerning hunting practices.	PI						NI	IP	FI	PI		NI					NI			PI	NI			PI		
5e	Parties shall establish regular contact with the media to raise the profile of the Houbara as an outstanding feature of Asian plains and an invaluable asset to the Asian natural heritage.	PI						NI	IP	NI			NI					PI			IU	NI			FI		