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The status of cranes in Africa in 2005

Richard D Beilfuss¹*, Tim Dodman² and Emil K Urban³

¹ International Crane Foundation, PO Box 447, Baraboo, WI 53913, USA

² Wetlands International, Hundland, Papa Westray, Orkney, KW17 2BU, UK

³ Department of Biology, Augusta State University, 2500 Walton Way, Augusta, GA 30904, USA

* Corresponding author, e-mail: rich@icrfoundation.org

Of the six species of cranes occurring in Africa, the Black Crowned Crane (*Balearica pavonina*) is Near-threatened, the Wattled Crane (*Grus carunculatus*) and Blue Crane (*Anthropoides paradiseus*) are Vulnerable, the Grey Crowned Crane (*B. regulorum*) is rapidly declining, and the Atlas Mountain population of Demoiselle Crane (*A. virgo*) may be Extinct. Over the past decade, intensive coordinated surveys have resulted in significant revisions to the population estimates for Africa's cranes. The total population of Wattled Crane, previously estimated at 13 000–15 000 birds, now numbers less than 8 000 individuals and the species is in decline in as many as nine of 11 countries in its range. The *B. p. pavonina* population is highly fragmented and has been reduced to approximately 15 000 birds, whilst it is likely that the *B. p. ceciliae* population is also in decline. The East African population of Grey Crowned Crane (*B. r. gibbericeps*) has been reduced to 43 000–55 000 birds, an almost 50% decline in the past 20 years. The estimated population of Blue Cranes (>25 580) reflects a slight increase over previous estimates but is substantially lower than historical levels. Crane numbers are seriously affected by degradation and disturbance of breeding grounds and capture for domestication and trade.

Introduction

The cranes (family Gruidae) are among the world's most threatened families of birds. Of the six species occurring in Africa, the Black Crowned Crane (*Balearica pavonina*) is Near-threatened, the Wattled Crane (*Grus carunculatus*) and Blue Crane (*Anthropoides paradiseus*) are Vulnerable (BirdLife International 2004), the Grey Crowned Crane (*B. regulorum*) is declining, and the Atlas Mountain population of Demoiselle Crane (*A. virgo*) may be Extinct. Over the past decade, considerable effort has focused on accurately assessing the status, distribution and threats of each of the crane species in Africa, towards effective science-based conservation planning. Intensive coordinated surveys and outreach programmes have resulted in significant revisions to the population estimates for several species. Because cranes serve as a flagship species for wetland and grassland conservation throughout many parts of Africa, their long-term status has important implications for regional biodiversity conservation. In this paper, we provide an overview of the population and distribution of the six crane species occurring in Africa, emphasising results from recent surveys and research, and discussing trends in crane populations, especially with respect to previous estimates by Urban (1988, 1996). We also provide an overview of the principal threats facing crane populations in Africa and highlight recent crane research and conservation programmes.

Species accounts

Eurasian Crane (*Grus grus*)

Three Palaearctic populations of Eurasian Crane spend the northern winter in Africa. One population breeds in northwestern Europe (estimated at 150 000 and increasing)

and winters in France, the Iberian peninsula and Morocco, crossing the Strait of Gibraltar (Mewes *et al.* 2003). It is a regular visitor to Africa from mid-October to March, distributed from the Tangier Peninsula south to the Plains of Morocco, along the Mediterranean Sea to Algeria and to the Prérif, Haouz and Souss regions in the west as far as 30°N. Counts since the 1960s show that the number reaching Morocco varies annually between 500 and 2 500 (Thévenot *et al.* 2003) (Table 1).

Eurasian Cranes breeding in northeastern and central Europe (estimated population 100 000, stable) are abundant visitors to Algeria and Tunisia from mid-October to March (Wetlands International 2002, Mewes *et al.* 2003). In Algeria, they occur north of the High Plateau with a few reaching the Sahara at Biskra (about 35°N). Algerian numbers vary annually from 1 000 to 4 000, likely arriving via Tunisia rather than Morocco (Isenmann and Moali 2000). In Tunisia, Eurasian Cranes occur from Cap Bon and Kelbia south to Gabès, Medenine and Bihret El Bibane, at the frontier with Libya. Numbers in Tunisia vary annually from 8 000–15 100 with main concentrations in the Kelbia region (Isenmann *et al.* in prep.). Most arrive and leave Tunisia at Cap Bon, migrating via Sicily, the Italian Peninsula and Hungary to their nesting grounds in Poland, the Baltic countries and Finland. In Libya, a few hundred (300?) were recorded in the northwestern coastal area during the 1980s (Urban 1988), but there are no recent reports.

A third population of Eurasian Cranes breeds in northeastern Europe and western Russia (estimated population 35 000, declining) and spends the northern winter in Turkey, the Middle East and northeastern Africa, especially Ethiopia (Wetlands International 2002). In recent years,

Eurasian Crane numbers appear to be increasing significantly in the Rift Valley of Ethiopia, from 3 000 in the early 1990s to an estimated 12 000 in 2004. More than 9 000 Eurasian Cranes were observed roosting on Chelekleka marsh in February 2004, with large numbers also at Akaki wetlands and Cuba Lake (Beilfuss 2004). The increase may be due in part to a southerly shift in the seasonal population from Egypt, where numbers have declined from several thousand in the 1980s to fewer than 10 in recent years. During dry years, the birds may still remain further north, however — in February 2005 less than 1 000 Eurasian Cranes were observed in the Ethiopian Rift Valley Lakes (RD Beilfuss pers. obs.).

Farmers in Ethiopia, who have reported increasing conflict over crop depredation when the cranes arrive in October, have been observed cracking whips to chase birds off their roosting sites. Crane deaths due to collisions with electric utility lines may also be significant near roost sites. A villager reported 30–40 cranes killed during the winter of 2003–2004 by a single span of lines at the Akaki wetland (RD Beilfuss pers. obs.).

Demoiselle Crane (*Anthropoides virgo*)

Three populations occur in Africa, with distinct separate breeding areas in northwestern Africa, the Black Sea and Kalmykia. However, there is no recent information on the occurrence of the Demoiselle Crane in northwestern Africa and the population may well be extinct. In Morocco this species nested in the Middle Atlas Mountains south of Azrou and north of Boulemane from the mid-1960s to the 1980s, and in the Central Plateau at Oued Grou near Sidi Lamine in the early 1930s. There has been no certain record of this

crane in Morocco since the mid-1980s (Thévenot *et al.* 2003). There are old breeding records from the 19th century and beginning of the 20th century from the Ksar-El-Boukhari region in Algeria, where the bird is now considered extinct (Isenmann and Moali 2000), and from the 1930s in the Kelbia region of Tunisia (Isenmann *et al.* in prep.). Meine and Archibald (1996) considered it likely that this population spent the northern winter further south in the Sahel zone.

Nearly all of the main Palaearctic population wintering in Africa occurs in Sudan (Table 2). These birds breed in Kalmykia between the Black and Caspian Seas (estimated population 30 000–35 000, stable). There is insufficient data to assess the current status of this population in Africa, although survey efforts with the Wildlife Administration in Khartoum are planned. The main wintering area in mid-southern Sudan is east of the Nile, whilst it is common on passage in the northern part of Sudan (Nikolaus 1987).

A small breeding population from the Black Sea region (estimated at 450–510 birds, declining) also spends the northern winter in sub-Saharan Africa, probably from Lake Chad to Ethiopia. The population has declined steadily since the 1950s, however, and there are very few recent records from West Africa. The last record from northern Nigeria is of one adult at Hadejia-Nguru in 1988/1989 (Elgood *et al.* 1994), whilst Scholte (1996) recorded a group of 24 in the Sahelian zone of Chad in October 1991. There are no recent records from Ethiopia.

The demise of the breeding Demoiselle Crane population in northwestern Africa is attributed to grazing, mining and other human disturbances (Brahim 1996). Hunting is likely the most significant threat to the large wintering flocks in Sudan.

Table 1: Estimate by country of Eurasian Crane (*Grus grus*) wintering in Africa, 1985–2004. The species is considered a vagrant in Djibouti, Mauritania, Niger and Nigeria

	1985	1994	2004
Algeria	Low 1 000s	Low 1 000s?	100–4 000
Egypt	Many 1 000s	1 000s passage migrant	Passage migrant?
		<100 wintering	<10 wintering
Eritrea	50–100?	50–100?	50–100?
Ethiopia	3 000	3 000–3 500	>12 000
Libya	Few 100s	?	?
Morocco	Low 1 000s	2 000–3 000	500–2 500
Sudan	Several 1 000s	Several 1 000s	Several 1 000s
Tunisia	Several 1 000s	12 000–15 000	8 000–15 100
Total	30 000–50 000	>30 000	>30 000

Table 2: Estimate by country of Demoiselle Crane (*Anthropoides virgo*) resident and wintering in Africa, 1985–2004. The species is considered a vagrant in Djibouti and Kenya, and was previously extirpated as a breeding species from Algeria and Tunisia

	1985	1994	2004
Chad	Several 100 wintering	100s wintering	100s wintering?
Ethiopia	? wintering	? wintering	? wintering
Morocco	20–30 breeding	10–12 breeding	Probably extirpated
Nigeria	<50 wintering	<50 wintering	? wintering
Sudan	Several 1 000s wintering	10 000–20 000 wintering	10 000–20 000 wintering
Total	20–30 breeding	10–12 breeding	0 breeding
	10 000–20 000 wintering	10 500–20 500 wintering	10 500–20 500 wintering

Black Crowned Crane (*Balearica pavonina*)

Two subspecies are recognised, although their biogeographical separation near the Chad/Sudan border is unclear. The West African population of Black Crowned Crane (*B. p. pavonina*), once widespread and abundant from the Senegal Delta, south to Guinea and eastwards across the Sahel zone to northern Nigeria and the Lake Chad Basin, has become highly fragmented and reduced over the past 50 years. During 1999–2001, Wetlands International and the International Crane Foundation coordinated the first range-wide surveys of this crane in 20 African nations. The survey employed a combination of ground surveys, aerial surveys, questionnaires, interviews and records to assess as accurately as possible the population size, distribution and habitats of the species and the threats it faces (Williams *et al.* 2003). Thirty-eight distinct crane areas are recognised. These are grouped together into six regional subpopulations. The Lake Chad Basin (an estimated 9 000 birds) is the stronghold for *B. p. pavonina*, although numbers there have declined since the 1960s. An estimated 3 500 birds also occur in the coastal rice-growing zone from the Casamance region of Senegal to Guinea. This population was likely underreported in previous surveys. *B. p. pavonina* appears to be stable in central Niger (950 birds), but has declined dramatically in the Inner Niger Delta of Mali, where perhaps as few as 50 birds now occur in this former stronghold (Kone *et al.* 2007). Declines

are also evident in the Senegal Delta and eastern Mauritania (about 700 birds remaining) and the Sahelian zone of eastern Mali/Burkina Faso/Togo/western Niger (fewer than 350 birds). Our estimate of 15 000 *B. p. pavonina* (Table 3) falls within the lower end of the range given by Urban (1988, 1996) and suggests that the alarming rate of decline observed during the 1960s and 1970s (first reported by Fry 1987) may have slowed in recent years.

The status of *B. p. ceciliae* is less well-known than that of *B. p. pavonina*. Urban (1988, 1996) estimated the population of *B. p. ceciliae* at 55 000–60 000 based largely on an aerial count of 36 823 from the Sudd swamps of Sudan in 1979 (Mefit-Babtie 1983). There is no reliable update or recent confirmation of this figure, due to the difficult political situation in southern Sudan in recent decades. Ground surveys by Tirba (2000, *in litt.* in Williams *et al.* 2003) suggest that *B. p. ceciliae* is still common south of a belt extending from Darfur to the western parts of Kordofan, although estimated numbers (11 000 in Darfur, 3 000 in Kordofan and 1 000 in the Dinder floodplains) are lower than those recorded in the 1970s. Substantial numbers of *B. p. ceciliae* also occur in Ethiopia, including an estimated 1 000 around Lake Tana and at least 100 in Ethiopia's southern Rift Valley (Williams *et al.* 2003). Recent surveys of the Omo River Basin between Kenya and Ethiopia suggest a population of some 415 cranes, including an estimated 250 resident birds in northern Kenya (Gichuki 2004).

Table 3: Estimate by country of Black Crowned Crane (*Balearica pavonina*), 1985–2004. *B. p. ceciliae* is considered a vagrant in Eritrea and may occur in the Central African Republic and Chad, but its status there is uncertain

	1985	1994	2004
<i>B. p. pavonina</i>			
Benin	50?	50?	50
Burkina Faso	100?	100?	50
Cameroon	2 000	2 000–3 500	3 000
Central African Republic	Several 100s	Several 100s	500
Chad	Few 1 000s	3 500–5 000	5 500
Congo	600–700	0?	0
Côte d'Ivoire	–	Vagrant?	<30
The Gambia	?	100	100
Ghana	50	50	<50
Guinea	–	–	200
Guinea-Bissau	0?	?	1 500
Mali	7 000–8 000	3 000–3 500	100
Mauritania	200	200	500
Niger	Several 100s	<1 000	1 300
Nigeria	Few 100s	<100	20
Senegal	1 000	1 000–2 000	1 900
Togo	50	50	50
Sub-species total	15 000–20 000	11 500–17 500	15 000
<i>B. p. ceciliae</i>			
DR Congo	–	–	Occasional visitor
Egypt	–	Vagrant?	0
Ethiopia	Few 1 000s	Few 1 000s	2 500
Kenya	Few 100s	100s	250
Sudan	50 000	50 000	25 000–52 000
Uganda	500	500	50
Subspecies total	50 000–70 000	55 000–60 000	28 000–55 000
Species total	65 000–90 000	66 500–77 500	43 000–70 000

Gichuki notes that *B. p. ceciliae* are highly mobile in East Africa and large numbers of transient birds are not unusual. These surveys suggest an overall population of at least 18 000 *B. p. ceciliae* in addition to the Sudd population, which is estimated at between 10 000 and 37 000. Based on these data, the *B. p. ceciliae* population estimate is 28 000–55 000 and likely declining.

Black Crowned Cranes face serious threats throughout their range. Direct threats to adult birds and chicks include egg removal, disturbance of nests, human-ignited bush fires, subsistence hunting and capture for trade and domestication (Williams *et al.* 2003). The principal threats facing crane habitats are the conversion and over-exploitation of wetlands and other forms of wetland degradation, including overgrazing, agricultural drainage and the cutting of roost trees. Drought and population growth have forced people to migrate to relatively moist, less-populated regions in Burkina Faso, Nigeria and Chad, which contain prime crane habitat. In Sudan, the major threats to crane habitat include overgrazing of livestock, agricultural expansion in the Sudd wetlands, the planned Jonglei Canal to drain the Sudd, and oil exploration in and near wetlands (Eljack 1996).

Live trapping may pose the most significant threat to the species. Black Crowned Cranes are trapped and sold to local, regional and international markets for considerable profit. Many local traditions encourage domestication of cranes within West Africa and there is considerable demand for the birds in North Africa, the Middle East, Europe and China. Black Crowned Cranes are currently listed in Appendix 2 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973), which allows limited trade of the species, provided that it is not detrimental to the survival of the species in the wild. There is, however, strong evidence that both legal and illegal international trade continue to deplete the population in the wild. Apparently, legal export figures from Tanzania, where the species does not even occur, are particularly alarming, with 852 exported in 1993 and 1 840 in 1994. The majority are exported to the Netherlands. Other African countries where export occurred between 1993 and 2002 were Guinea, Mali and Sudan (CITES 2004). This species is also commonly traded on the black market in Guinea (Clemmons 2003). Kone *et al.* (2007) demonstrate that market trading of Black Crowned Cranes is having a tremendous impact on the species in the Inner Niger Delta of Mali. In this region, there are now more cranes in captivity than in the wild and the species is close to becoming locally extirpated. In Nigeria, where Black Crowned Cranes have been extirpated from most of the country, there is still a market for live birds and body parts (Boyi 2001).

Ongoing conservation programmes for Black Crowned Cranes include sustainable management of the zone of freshwater wetlands, mangroves and rice fields in coastal West Africa, an area that supports one of the few remaining viable populations of the species (Dodman *et al.* 2004). Conservation planning is also underway in the Senegal Delta (Sidibé *et al.* 2002) and Inner Niger Delta (Kone and Fofana 2002) to address the impact of wetland conversion for agriculture and capture for trade, respectively. Ongoing monitoring is coordinated through the African Waterbird Census (e.g. Dodman and Diagona 2003).

Grey Crowned Crane (*Balearica regulorum*)

There are two subspecies of Grey Crowned Crane, with a generally-recognised biogeographical separation following the Zambezi River valley. The East African subspecies *B. r. gibbericeps* has declined significantly across its range in recent years, including all nations within its range where surveys have been recently conducted. Muheebwe (2004), using results from roadside transect counts, determined that there may be as few as 13 200 birds remaining in Uganda, a decline of 62% since 1985 (Table 4). Crane numbers may be declining similarly in Kenya (N Gichuki, *in litt.* to RD Beilfuss). In Tanzania, Baker (1996) reported this crane was widespread in wetlands but with far fewer large flocks than in previous years, such as at Usangu Flats, where an estimated 10 000 birds have occurred in the past. Total losses to the wild bird trade are in the tens of thousands, and this bird is now far less common in Tanzania than in the 1980s (Baker and Baker 2004). In Zambia, large numbers occur in the Liuwa Plain (>500), Busanga Swamp (>200) and Luangwa Valley (perhaps 1 500), but the cranes were absent from many of the other large floodplains that have been surveyed (Kamweneshe *et al.* 2003, Beilfuss *et al.* 2004), including the Barotse Plain, where they were historically common (Katankwa 1996). In Malawi, nationwide surveys covering the historic range of *B. r. gibbericeps* revealed only a few individuals scattered across Nyika National Park, Vwaza Wildlife Reserve, Zomba plateau, Kasungu National Park, and the Elephant and Ndingi marshes (Kaliba and Nhlane 2003). In Mozambique, a flock of 20 crowned cranes was observed at Gorongosa National Park, with a few scattered pairs also reported from the Zambezi Delta region. Parker (1999) did not record any crowned cranes in southern Mozambique and there is no evidence elsewhere to indicate the existence of a population of more than low hundreds. In Rwanda, Kanyamibwa (1996) reported a steady decline in *B. r. gibbericeps* prior to the civil war and the species is unlikely to have fared well there, or in Burundi or DR Congo during recent armed conflicts. Based on these records, the *B. r. gibbericeps* population is estimated at 43 000–55 000, a decline of perhaps more than 50% in the past 20 years.

The southern population of Grey Crowned Crane (*B. r. regulorum*) appears to be more stable. Surveys by the South African Crane Working Group suggest an increasing nationwide population of >4 000 birds. *B. r. regulorum* is also widespread in Zimbabwe and is regarded by some as a pest species (O Mabhachi *in litt.* to RD Beilfuss). Elsewhere in southern Africa, *B. r. regulorum* numbers are low. The bird is considered to be rare in Botswana and Namibia, probably numbering less than 20 birds in each country (McCann 2004, C Brown *in litt.* to RD Beilfuss). Grey Crowned Cranes were not observed during recent surveys in southern Angola (J Mendelsohn *in litt.* to RD Beilfuss). We estimate the total population of *B. r. regulorum* as 7 000–9 000. The population overall of the species is estimated at 50 000–64 000.

Grey Crowned Cranes were considered the most secure of Africa's resident cranes (e.g. Meine and Archibald 1996), but recent reports suggest that this is no longer the case. Threats to Grey Crowned Cranes include the conversion

Table 4: Estimate by country of Grey Crowned Crane (*Balearica regulorum*), 1985–2004

	1985	1994	2004
<i>B. r. gibbericeps</i>			
Burundi	400–600	100s	100s?
DR Congo	5 000	5 000	5 000?
Kenya	35 000	35 000	20 000–25 000
Malawi	100s	50–100	<50
Mozambique	100s to 1 000s	100s to 1 000s	<200
Rwanda	500–1 000	100s?	100s?
Tanzania	Low 1 000s	Several 1 000s	Low 1 000s
Uganda	35 000	<30 000	13 000–20 000
Zambia	Several 1 000s	5 000	<3 000
Subspecies total	>90 000	77 000–83 000	43 000–55 000
<i>B. r. regulorum</i>			
Angola	100	100	100?
Botswana	100	100	<20
Mozambique	?	?	0?
Namibia	100	40	<20
South Africa	Low 1 000s	<4 000	>4 000
Zimbabwe	Several 1 000s	3 000–5 000	3 000–5 000?
Subspecies total	10 000	8 000–12 000	7 000–9 000
Species total	>100 000	85 000–95 000	50 000–64 000

and degradation of wetland breeding grounds for agriculture and livestock (especially the reclamation of papyrus swamps in the Lake Victoria catchment of Kenya and Uganda) and capture for trade. Although East Africa does not have the same tradition of domesticating birds for private households as does West Africa, Grey Crowned Cranes are highly valued as ornamental birds for private collections throughout the world. During 1992–2002, at least 4 854 were officially exported from Tanzania (CITES 2004), with untold higher numbers killed in capture or transit, or exported illegally.

A number of conservation programmes have been launched within the last 10 years that are addressing some of these threats. The Kipsaina Wetlands Conservation Group in northwestern Kenya (Wanjala 1996) and Wildlife Clubs of Uganda under NatureUganda (Muheebwe and Beilfuss 2007) have developed community-based conservation programmes for cranes and wetlands in the Lake Victoria basin. They reach schools, churches and other institutions through workshops, seminars, debates, plays and choir performances, and engage thousands of children and young adults in wetland monitoring, conservation and awareness activities. Site-specific educational materials draw from the traditional knowledge and experiences of local people, using the Grey Crowned Crane as a flagship species for conservation. Farmer education programmes promote alternative agricultural practices near wetlands, including fish farming, livestock grazing, agroforestry, vegetable farming and beekeeping. However, despite these far-reaching actions, crane numbers have continued to decline and additional measures are also required, such as focused attention on stopping trade.

Wattled Crane (*Grus carunculatus*)

The Wattled Crane ranges across 11 countries, from

Ethiopia to South Africa, the majority occurring in the extensive floodplain systems of southern Africa's large river basins (especially the Kafue, Okavango and Zambezi). They are also found in smaller wetlands (*dambos*) throughout their range. Isolated populations occur in Ethiopia and South Africa, although presently they are not considered separate subspecies.

Since 2000, the International Crane Foundation and the Endangered Wildlife Trust have coordinated a comprehensive survey programme to assess simultaneously the status and distribution of Wattled Cranes throughout their range. Results from intensive aerial surveys in all the major floodplain systems in Zambia where Wattled Cranes are known to occur suggest a significant decline over the past 20–30 years. The decline in the Kafue Flats, where the bird is considered a flagship species, is particularly alarming. In the early 1970s, Douthwaite (1974) estimated a population here of about 3 000 individuals, including 300 breeding pairs. Subsequent surveys by Howard and Aspinwall (1984), Howard (1989) and Malambo and Chabwela (1989) placed the Kafue Flats population at 2 500–3 300 birds, whilst Dodman (1996) estimated 1 150 birds in 1993 based on three aerial surveys. The current estimate of <1 200 birds on the Kafue Flats is based on four aerial surveys covering the wet and dry seasons of 2001–2002 and 2002–2003 (Kamweneshe and Beilfuss 2002a, Kamweneshe *et al.* in prep). This suggests that the population here has remained stable over the last 10 years. In the Bangweulu Swamps, Kamweneshe *et al.* (2003a) estimate 1 030 Wattled Cranes, lower than previous estimates of 1 453 in 1993 by Kamweneshe (1996) and 1 718 by Howard and Aspinwall (1984). Over 1 000 were recorded in the Liuwa Plain in November 1997 (Leonard and Peters 1998), but surveys in 2001 and 2003 yielded an estimate of only 533–700 birds in this large floodplain in the Western

Province (Kamweneshe *et al.* 2003b, Beilfuss *et al.* 2004). Other survey results suggest the following: <300 Wattled Cranes in the Chambeshi swamps; <20 in and around Kasanka National Park; <50 at Lukanga Swamps; <20 in the Barotse Plain; <200 in the Busanga Swamps and *dambos* of Kafue National Park; <300 cranes in the scattered *dambos* of the Northern and Luapula Provinces; <300 in the Western Province; <100 in southwestern Zambia near the Angola border; and <50 in scattered wetlands of Southern Province (Dodman 2002, Kamweneshe and Beilfuss 2002b, Beilfuss *et al.* 2004, Kamweneshe *et al.* 2004, P Leonard *in litt.* to RD Beilfuss). We therefore estimate <4 500 birds for Zambia as a whole, down from an estimated 11 000 cranes in 1985 (Table 5) and 7 000–8 000 in 1994 (T Dodman *in litt.* in Urban 1996).

Intensive aerial surveys of the Okavango Delta in Botswana in 2001–2003 suggest a population there of $1\,209 \pm 190$ Wattled Cranes, with about 50% single birds (Motsumi *et al.* 2003, 2007). This is close to the estimate of Gibson *et al.* (2002) of $1\,300 \pm 290$. Previous estimates suggested as many as 3 000–3 500 Wattled Cranes in Botswana (Collar and Stuart 1985, Urban 1996), but these probably included previously-counted birds that had moved seasonally or occasionally between the delta, the Makgadikgadi Pans and other wetland systems in the region. The Savuti marsh and wetlands around Lake Ngami and Chobe, and the Linyati, Khwai and Boteti Rivers, are unlikely to support more than a total of 100 birds.

Annual surveys from 1995–2001 in the Zambezi Delta and the adjacent escarpment of central Mozambique revealed a small breeding population of about 300 Wattled Cranes (Beilfuss and Allen 1996, Beilfuss and Bento 1998, Bento 2002). Goodman (1992) reported approximately 2 500 birds during aerial surveys of the Delta in 1990, noting many breeding pairs. Urban (1996) used this number to revise his estimate for Mozambique to 2 500–2 800. However, no large numbers were recorded in any historical accounts from Mozambique and, except for a few breeding birds at Banhine National Park and São Sebastião floodplain in the south, the species does not occur in significant numbers elsewhere in the country. Thus, the large numbers reported in 1990 likely included

birds from elsewhere in southern Africa. Given that southern Africa suffered its worst drought of the century between the late 1980s and early 1990s, it is plausible that these cranes migrated from other large floodplain systems when the floods failed and the ground became too hard to probe for food (Bento *et al.* 2007). Observations of the Kafue Flats during the drought of 2002, for example, revealed that Wattled Cranes quickly abandoned their territories and concentrated in large numbers in the few remaining wet areas on the floodplain (M Bokach *in litt.* to RD Beilfuss). A more severe drought, such as occurred a decade earlier, may have resulted in the desiccation and abandonment of an even more widespread area.

In Tanzania, 71 Wattled Cranes were counted during an aerial survey of the Malagarasi-Moyowosi Ramsar site during the wet season of June 2003. The survey team estimated the population at 648 ± 254 (Tanzania Wildlife Research Institute 2003), but others contend that this number is too high (N Baker *in litt.* to RD Beilfuss). Previous reports from western Tanzania suggest slightly lower numbers, with 506 reported from this region in 1992 (Baker and Baker 2002). It is unknown whether numbers are decreasing at Moyowosi, but Wattled Cranes have been nearly extirpated from their remaining historic range in Tanzania, including Usangu, Rukwa floodplain, Mufindi grasslands and Ufipa (D Moyer *in litt.* to RD Beilfuss). In southeastern DR Congo, Demey and Louette (2001) report that Wattled Cranes are fairly common in Upemba and Kundelungu National Parks. Ground surveys conducted by wildlife scouts in the two parks during 2002 and 2003 revealed scattered pairs on *dambos*, with an estimated regional population in the low hundreds (B Fautechi *in litt.* to RD Beilfuss). In Malawi, Wattled Cranes may be nearly extirpated. Periodic surveys of nesting territories in Nyika National Park over the past 40 years suggest a long, slow decline from an estimated 49 birds in 1969 to only 11 birds observed in 2002 and nine in 2003 (Kaliba and Nhlane 2003). There are no recent records of the species elsewhere in Malawi. In Zimbabwe, Chiweshe (2004) observed 138 Wattled Cranes on the Dreifontein grasslands. O Mabachi and C Chirara (*in litt.* to RD Beilfuss) estimate the country-wide population at <200 (stable, however).

Table 5: Estimate by country of Wattled Crane (*Grus carunculatus*), 1985–2004. The species was apparently recorded in Guinea-Bissau in the 1940s (Hazevoet 1997)

	1985	1994	2004
Angola	500	500?	<200
Botswana	200	1 400–3 500	1 400
DR Congo	Several 100s	100s	<300
Ethiopia	100	100s	<200
Malawi	250	50	<20
Mozambique	150	2 500–2 800	350
Namibia	300	200–300	60
South Africa	Several 100s	250–300	250
Tanzania	Several 100s	100s	500
Zambia	11 000	7 000–8 000	<4 500
Zimbabwe	Few 100s	250	200
Total	13 000–15 000	13 000–15 000	<8 000

In southern Angola, J Mendelsohn (*in litt.* to RD Beilfuss) observed no Wattled Cranes during aerial surveys of the Cubango, Cwebe, Cutato, Longa, Cuito and Cuembo River floodplains. M Chase (*in litt.* to RDB) also found none during surveys of the floodplain corridor between the Kwando and Zambezi Rivers in southwestern Angola. Although further surveys are needed, it is increasingly evident that few Wattled Cranes remain from the historic numbers and past distribution reported for Angola (Rosa Pinto 1983). Brown *et al.* (2004) counted only 10 pairs during surveys of northeastern Namibia covering the Okavango River, the entire length of the Kwandu-Linyanti-Lake Liambezi-Chobe system including the Mamili National Park, and the Zambezi River along its entire length on Namibia's border, including parts of the adjacent East Caprivi floodplains. They estimate no more than 30 breeding pairs in Namibia (occasionally none in years of drought). Most cranes reported in Namibia are seasonal visitors (generally February–April), corresponding to the period when the Okavango Delta is driest and when many floodplains in Zambia are in deepest flood.

The population of Wattled Cranes in South Africa has declined by 36% over the past three decades, with a dramatic restriction in range. With more than 95% of the population directly counted on an annual basis, the current South African population is accurately known to be 242 individuals, which includes 80 breeding pairs (McCann *in press*).

Wattled Crane surveys in Ethiopia resulted in the recent discovery of 51 pairs (107 birds) at Boyo wetland (Beilfuss 2004), the largest concentration ever reported in Ethiopia, with the area now considered to be the major breeding ground in the country. Scattered pairs have also been recorded at eight other sites in Ethiopia, including Fogera Plains, Bahir Dar-Lake Tana, the Finchaa and Chomen swamps, Berga Floodplain, Dilu Meki (Tefki), Koffe Swamp and Bale Mountains National Park (Ethiopian Wildlife and Natural History Society 1996). The extent of seasonal movement between these areas is unknown. The Ethiopian population is estimated at <200 with status uncertain (Y Abebe *in litt.* to RD Beilfuss).

There may also have been a relict population in West Africa with records from two sites in Guinea-Bissau from 1948 (Dodman *et al.* 2004).

We estimate the total *Grus carunculatus* population as <8 000 — approximately half of the population reported as recently as Urban (1996), but similar to the estimate in 2002 of 8 000 (Dodman 2002, Wetlands International 2002). This downward revision is undoubtedly due in part to improved survey coverage and understanding of seasonal movements, but numbers are evidently decreasing in several range countries and in some of the large floodplain systems. There is little doubt that the population has declined significantly since the 1980s and is still in decline in some areas.

This decline suggests that the population is affected by both poor productivity and adult mortality. Nest destruction and chick mortality due to predation, capture, fire and trampling by wildlife or livestock are widely reported or suspected in many range countries (e.g. Bento 2002, Kaliba and Nhlane 2003, Brown *et al.* 2004). Adult mortality is attributed to predation, hunting, capture for trade and power-line colli-

sions, as well as interactions among factors such as vulnerability to predation or hunting due to loss of cover caused by fire, where the extent and intensity of fire is in turn caused by failed floods (e.g. McCann *et al.* 2000, Bento *et al.* 2007, N Baker *in litt.* to RD Beilfuss, D Moyer *in litt.* to RD Beilfuss). Between 1999 and 2002, 63 Wattled Cranes were 'legally' exported from Tanzania (CITES 2004). Many of the *dambos* and large floodplains that may serve, in part, as Wattled Crane habitats have been degraded due to a variety of human activities (e.g. intensified agriculture, overgrazing, drainage) (Chidumayo 1992). Hydrological degradation of the Kafue Flats and Zambezi Delta due to management of large dams has reduced the carrying capacity of these systems for Wattled Cranes and other species (Kamweneshe and Beilfuss 2002a, Bento *et al.* 2007). The invasive shrub *Mimosa pigra* is rapidly encroaching on feeding areas in the Kafue Flats (M Mumba *in litt.* to RD Beilfuss), as well as the Boyo wetland (Beilfuss 2004). In many countries, breeding and feeding activity is highly correlated with the presence of the preferred food source — tubers of the sedge *Eleocharis* spp. (Beilfuss 2000). Adverse changes in hydrological conditions, fire and grazing intensity affect the productivity and accessibility of tubers and hence habitat suitability (Bento 2002). The potential impacts of warfare (especially in Angola and DR Congo) and land reform (most notably in Zimbabwe) have yet to be assessed.

The African Wattled Crane Programme (AWAC) was launched in 2001 to monitor the status and threats to the survival of Wattled Cranes in each range country and to empower conservation biologists and managers to develop proactive conservation programmes for the management of wetland systems for the benefit of people and wildlife (Beilfuss *et al.* 2003). Key partners include: the BirdLife Botswana Crane Working Group, Nouvelles Approches (a Belgian NGO) and Department of National Parks staff working in southeastern DR Congo, the Ethiopia Wildlife and Natural History Society, Museums of Malawi, the Mozambique Museum of Natural History, the Namibia Crane Working Group, the South African Crane Working Group, the Zambia Crane and Wetland Conservation Programme, and the BirdLife Zimbabwe Crane Working Group.

Blue Crane (*Anthropoides paradiseus*)

The Blue Crane has the most restricted distribution of any crane species, with most of the population occurring in South Africa and a small disjunct population near Etosha Pan in Namibia (Meine and Archibald 1996). Three distinct populations of the Blue Crane are recognised in South Africa: in the eastern grasslands, central Karoo and Overberg/Swartland in the Western Cape. The National Crane Census of 2002 revealed the highest Blue Crane population since the inception of the census in 1998, with a current minimum population size of 25 520 (McCann *et al.* 2007) (Table 6). The majority occur in the Western Cape (12 000) and central Karoo (10 000) regions. McCann *et al.* (2007) note that although the species is considered a grassland endemic, it is adapting to and increasing on recently transformed agricultural lands in the fynbos region of the Western Cape province and decreasing in the natural grasslands of eastern South Africa. The small population of

Table 6: Estimate by country of Blue Crane (*Anthropoides paradiseus*), 1985–2004

	1985	1994	2004
Botswana	Vagrant	Vagrant	–
Namibia	700	80	60
South Africa	10 000–20 000	10 000–21 000	>25 520
Zimbabwe	Vagrant?	Vagrant	–
Total	10 000–20 000	10 000–21 000	>25 580

about 60 birds breeding in Namibia's Etosha Pan has been in decline over the last 10 years (Simmons *et al.* 2001).

Principal threats to Blue Cranes include collisions with utility lines, intentional and inadvertent poisoning and commercial afforestation of grasslands (Meine and Archibald 1996, Anderson and Piper 2004). Blue Cranes have recently adapted to wheatlands in the Overberg of the Western Cape province, but favourable conditions in this area may be short-lived if economics drive agricultural production in this region to a crop unsuitable for Blue Cranes (McCann *et al.* 2007).

Conclusion

As we enter the 21st century, Africa's cranes face an uncertain future. Black Crowned, Grey Crowned and Wattled Cranes have declined precipitously in the last 30 years. Demoiselle Cranes no longer breed in North Africa. The Blue Crane population is stable but the species remains vulnerable to land-use changes. Local and international trade continue to exert major pressures on many populations. The loss of adults from the wild and the degradation and loss of their wetland and grassland habitats may be exacerbated by continued human population growth, economic development and climate change. Some concrete steps can and should be taken immediately, including cessation of international trade in Africa's cranes and protection of important crane areas under the Convention on Wetlands and other agreements. The further development and implementation of Species Action Plans should also be continued. Most actions will require long-term commitment to community-based conservation. Impressive recent efforts to link cranes, wetlands and local communities in Uganda, Kenya, Mozambique, Guinea-Bissau and elsewhere are models for this challenge.

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