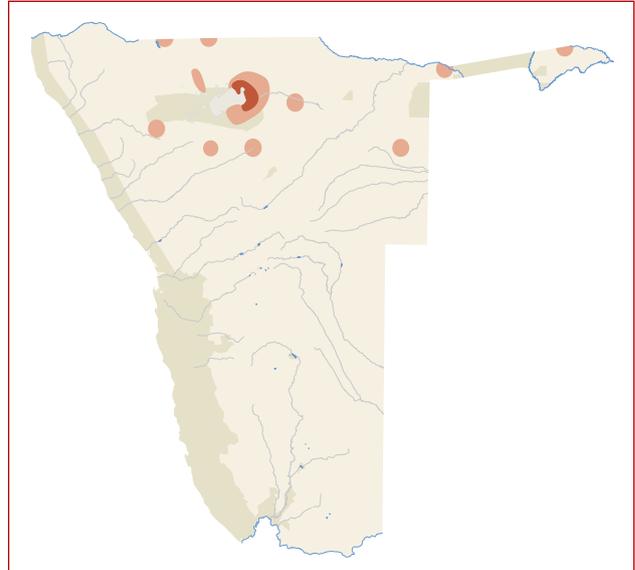


# BLUE CRANE | *Grus paradisea* (*Anthropoides paradiseus*)

RE Simmons | Reviewed by P Cunningham; H Kolberg; K McCann; HA Scott; D Young



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<b>Conservation Status:</b>	Critically Endangered
<b>Southern African Range:</b>	North-central Namibia, southern Botswana, South Africa
<b>Area of Occupancy:</b>	24,000 km <sup>2</sup>
<b>Population Estimate:</b>	35 birds (up to 12 pairs)
<b>Population Trend:</b>	Apparently in decline
<b>Habitat:</b>	Wet grasslands and pans
<b>Threats:</b>	Fragmented and genetically isolated population, human encroachment, long-term changes in water availability



## DISTRIBUTION AND ABUNDANCE

The Blue Crane is endemic to southern Africa, with the smallest range of all of the world's cranes (del Hoyo *et al.* 1996). The main population is found in South Africa, centred on the Overberg-Swartland region of the Western Cape Province, the central Karoo in the northern part of the Eastern Cape Province, and the area that incorporates the north-eastern Free State, Mpumalanga and KwaZulu-Natal provinces (Allan 1997i, McCann 2000a). There is no known movement between these three areas and they are treated as three separate subpopulations (McCann *et al.* 2001). The latest accurate estimate of the total South African population is 25,120 birds (McCann 2002, K Morrison pers. comm.), of which 48% occur in the Western Cape grain belts.

In Namibia, a tiny subpopulation is found only within the eastern parts of Etosha National Park and in the grasslands centred on the Omadhiya lakes, about 70 km north of the park (Allan 1997i, Simmons *et al.* 2006a). The cranes are distributed mainly in the wetter parts of this rather arid region. Within the park, the cranes use the area from Twee Palms and Fischer's Pan westwards along the main pan to Salvadora/Sueda in the Halali area at present, with only one recent sighting further westwards (at Newbrownii in November 2009). In the northern parts of the park they occur from Ekuma River in the west to Andoni in the east. The single most important site where birds assemble to roost is the Andoni gravel pit, when it holds water, where up to 35 birds may be recorded. There are a few more widely scattered historical records, including one of at least one crane at Stampriet in July 1960 (Brown 1992b, W Tarboton pers. comm.), one record of about 25 cranes in the Balyerwa Conservancy in September 2007 (D Alberts pers. comm.), and a sighting of six cranes at Nkasa Rupara (Mamili) National Park in 2009 (S Braine, K Sharpe pers. comm.). Elsewhere, potential crane habitat in southern Angola has been identified (J Mendelsohn unpubl. data), but an aerial survey over the south-western parts of the country by the Namibia Crane Working Group in September 2007 produced no cranes. In Botswana, a flock of Blue Cranes was recorded at Lake Ngami in 1976 (CJ Brown pers. comm.). Although they used to occur elsewhere in Botswana (eastern

Makgadikgadi and the Good Hope area), there are no recent reports of the species (P Hancock pers. comm.).

The largest numbers of Blue Cranes in Namibia were counted during the 1970s (Table 2.1). During the period 1966 to 1979, the Etosha area had good rains, averaging 417 mm per year, with a peak of 678 mm during 1976. Rainfall during the following decade was comparatively poor, averaging 197 mm per year (H Berry, C Berry pers. comm.). In 1988, all likely areas for the Etosha Blue Crane population were surveyed, arriving at an estimate of not more than 80 birds (Brown 1992b). When the population decline in South Africa became apparent (Allan 1994b), a follow-up assessment was conducted in 1994, including aerial surveys of the northern grasslands associated with the Ekuma River and Omadhiya lakes (Simmons *et al.* 1996). The maximum number of Blue Cranes associated with grasslands inside and outside Etosha National Park in 1994 was about 60 birds, of which 11 were yearlings (Table 2.1). This represented a 25% decline in six years.

The Namibia Crane Action Plan was developed by the Namibia Crane Working Group in 1994, and in March 2006, a project was initiated to assess the population status and conservation aspects of Etosha's Blue Cranes (Kolberg *et al.* 2006, Simmons *et al.* 2006a, Brain 2007, Scott & Scott 2007, Scott *et al.* 2008, 2009, 2011). Annual activities include aerial/ground surveys and breeding assessments, captures for ringing/fitting of telemetry and blood sampling, and surveys in winter to determine the use of critical habitats inside and outside Etosha National Park. The first such census in April 2006 yielded 54 adults and six chicks/fledglings, with concentrations around Fischer's Pan, as well as at the flooded Ekuma River and Omadhiya lakes (Simmons *et al.* 2006). Subsequent totals declined by half

between 2006 and 2007, however, and up to March 2012 have never exceeded 35 individuals (Table 2.1).

Counts done during the dry season are normally larger than those done during the wet season. This indicates that not all birds are present or are counted during the wet season, and that only the breeding birds and a small non-breeding group remain within the park. It is currently not known which other areas are used by the remaining cranes during the wet season. Cranes were not recorded at the Omadhiya lakes area during the wet-season aerial surveys from September 2007 to August 2010. Except for 2007, very good rain seasons were experienced from 2006 to 2012, resulting in flooding in the pan and areas to the north. These conditions may have created new areas for the cranes to move to during the wet season.

There is some uncertainty as to the degree of isolation between the Namibian and South African populations. Evidence from studies of movements in South Africa shows that no colour-ringed birds from any one of its three subpopulations have ever been found to move to another subpopulation (K McCann *in litt.*); the furthest movement by 27 birds recovered from 65 ringed birds was 426 km, and within one subpopulation (McCann *et al.* 2001). Birds tracked with satellite tags have stayed virtually stationary over a two-year period (McCann *et al.* 2001).

By March 2012, 24 of the 38 chicks recorded in Etosha and three adults had been fitted with rings with an alpha-numerical code. Movements of up to 120 km have been recorded for ringed individuals, mainly between Chudop/Salvadora and Andoni/Omadhiya lakes. Since 2007, five birds have been fitted with radio transmitters and three birds with solar-powered satellite telemetry devices (GPS PTTs).

**TABLE 2.1:**

Maximum numbers of Blue Cranes observed in the Etosha area, including Etosha National Park and the Omadhiya lakes (Namibia Crane Working Group *in litt.*).

Year	Wet season			Dry season	Reference
	Adults	Chicks	Total	Adults and juveniles	
1970s			107		R Miller pers. comm.
1976			138		Berry 1984
1988			80		Brown 1992
December 1994			60		Simmons <i>et al.</i> 1996
2006	54	6	60	29	Namibia Crane Working Group
2007	21	1	22	30	
2008	9	7	16	29	
2009	19	7	26	35	
2010	30	2	32	31	
2011	24	8	32	35	

Good results have been obtained from the radio telemetry, but the satellite tracking devices have produced limited results to date, due to the death or disappearance of the bird, or due to problems associated with the device. Recent genetic evidence suggests that Etosha's Blue Cranes are isolated and that they can indeed be differentiated from South African populations (M Wink *in litt.*). The potential for inbreeding is thus high for this small population.



## ECOLOGY

The Blue Crane is found primarily in dry grassland habitat where water regularly occurs (McCann 2000a). In the arid grasslands of Etosha National Park, the perennial springs around the pan edge and isolated waterholes in grassy plains such as Andoni are favoured areas (Brown 1992b, Simmons *et al.* 1996). These springs supply water for drinking and cooling off and, more importantly, provide safe roosting sites in the larger perennial pans (Brown 1992b, Hines 1996b, Simmons *et al.* 1996). Blue Cranes are usually found in pairs or family groups of three to four individuals, but also in larger groups. Pre-breeding groups of up to about 30 birds may be seen at Andoni during the dry season.

Namibia's Blue Cranes breed and rear their chicks within Etosha during the wet season. Nests occur on the ground in open (grassy) areas, not far from water, such that chicks may be led to water to drink and escape predators. Forty-eight records of active nests (Brown *et al.* 2015) indicate that eggs were laid in December (17 records), January (15), February (14) and March (2). Eggs hatch after an incubation period of about 30 days. Eggs are laid mainly in October to December in South Africa (Allan 1993, 1997i, Tarboton 2011), about two months earlier than the breeding season in Namibia.

Nests were recorded previously from the Halali Plains, Batia (Namutoni), Chudop, Twee Palms (commonly), the Andoni Plains and Fischer's Pan, including a nest on an island in Fischer's Pan (Jarvis *et al.* 2001, TO Osborne pers. obs.). At present, the most regularly used sites are Salvadora, Halali Plains (two sites), Springbokfontein, Chudop Namutoni Causeway, the north-eastern parts of Fischer's Pan and at Twee Palms, including on an island there. Average clutch size in Namibia, recorded from 26 nests, was 1.8, with five clutches of one egg each and 21 of two eggs. Brood size varied from one to three, with broods of two (n=12) more common than broods of one (n=8) or three (n=1) (Jarvis *et al.* 2001, Brown *et al.* 2015).

Despite the small number of adult birds (maximum probably 10 to 12 pairs at present), breeding is successful, with 38 chicks recorded between 2006 and 2012, an average of 5.4 chicks per year. The first bird ringed as a chick in 2006 attempted to breed in 2009 and produced single chicks in 2010 and 2011. Blue Cranes become sexually mature at three

to five years, although breeding may start only from the fourth year onwards. In captive birds, females first bred at four to seven years, males at five to eight years (Walkinshaw 1963, Johnsgard 1983, Allan 1997i). In 2010, a second bird, ringed in 2006, was recorded breeding with a mate ringed in 2007. In 2011, at least six ringed, relatively young birds bred (of a total of nine pairs) and at least three ringed birds (of five pairs) bred in 2012. These findings indicate that at least one third of the breeding population now consists of younger birds.

The Blue Crane feeds on seeds and flowers from grasses, on insects and other invertebrates, and on frogs, small reptiles and fish. In Etosha, they have been seen to turn over African Elephant *Loxodonta africana* and ungulate dung to consume dung beetles and other insects (RE Simmons pers. obs.). During the breeding season, cranes need both animal and plant matter, which is readily available around the pan area, for feeding chicks. During dry conditions, the cranes dig up and eat the corm-like buds ('uintjies') of a sedge, *Cyperus fulgens*. These buds appear to be a significant food item and are present among the roots of well-grazed grass *Sporobolus spicatus* at Andoni and Lake Oponono, and also on similar veld outside the park, north of King Nehale gate.



## THREATS

In South Africa, loss of habitat due to afforestation and agricultural ploughing has been cited as one of main contributory factors to the population decline of Blue Cranes (Allan 1997i, McCann 2000a). In northern Namibia, expanding human populations and the encroachment of local people with cattle into the grasslands north of Etosha may eventually drive cranes from these areas. Lake Oponono, for example, with its fresh water, is a focal point for cattle and people who may place snares in many trees and other roost areas to capture and eat birds (W Versfeld pers. obs.). An investigative and awareness project in 2011 in the area north of Etosha reported an increase in human population there over the last eight years, and an associated increase in permanent structures such as buildings (Ntinda *et al.* 2012). The study suggested that increased human activities (farming, burning, fencing, hunting, snaring and fishing) could be destroying the cranes' habitat and so contribute to driving them away.

The study by Ntinda *et al.* (2012) also confirmed that Blue Cranes play a role in local tradition, as they are used as food, medicine and to predict a good harvest. The feathers are also used for arrows and as decoration. As its medicinal value depends on the bird being caught alive, it is reportedly hunted by a painful but successful method, using insects on fish hooks as bait. This illegal hunting of Blue Cranes is cause for concern, and the matter has been referred to the relevant authorities at the Ministry of Environment and Tourism to follow up as a matter of urgency.

Collisions with power lines in the eastern grasslands of Etosha are possible, given that Blue Cranes are known to be highly vulnerable to power line collisions in South Africa (McCann 2000a, Shaw *et al.* 2010a, 2010b). Poisoning (direct and indirect) in agricultural fields in South Africa has been one of the two main contributory factors to the population decline there (Allan 1997i, McCann 2000a); this is not an apparent problem in Namibia. As a ground nester, the Blue Crane is particularly vulnerable to natural predation by predators such as jackals and hyenas.

Below average rainfall in northern Namibia during the late 1980s and early 1990s (Mendelsohn *et al.* 2002) could explain poor recruitment and a population decline during that period (Simmons *et al.* 1996); the effects of long-term changes in rainfall patterns on the local Blue Crane population remain to be seen. The springs around the Etosha Pan are fed by aquifers that drain towards this lowest part of northern Namibia (Christelis & Struckmeier 2001). Increased human population size and borehole drilling in the north, together with such changes in rainfall patterns, may eventually reduce the permanence of these perennial springs, forcing the cranes from the area.

Isolated and small populations can be prone to inbreeding effects if genetic heterogeneity has been lost (Westemeier *et al.* 1998). This could apply to Namibia's Blue Cranes, given the small breeding population, reduced to about 10 to 12 pairs by 2012, and their apparent genetic isolation (M Wink *in litt.*). This, together with the other threats listed here, could push such a small population to extinction within a few generations.



## CONSERVATION STATUS

The Blue Crane is classified as *Critically Endangered* in Namibia because of its tiny population size, the 25% decline in population between the late 1980s and 1994, and an apparent further decline by 50% between 2006 and 2007. In addition it is highly isolated, with the closest breeding populations found in the North West Province of South Africa, over 1,000 km to the south-east. Considering the relatively sedentary nature of Blue Cranes, immigration from elsewhere is unlikely (Underhill *et al.* 1999, McCann *et al.* 2001), and the Namibian population is believed to be self-sustaining. The species' global (IUCN 2012a) population is categorised as *Vulnerable*; in South Africa it has recently been downgraded from *Vulnerable* (McCann 2000a) to *Near Threatened* (Taylor *et al.* in press), given the healthier populations in South Africa. The Blue Crane is listed in Annex 2 of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) and in Appendix II of the Convention for the Conservation of Migratory Species of Wild Animals (CMS). Given its tenuous future in Namibia, the Blue Crane needs to be given

*Specially Protected* status under any updated or future Parks and Wildlife legislation.



## ACTIONS

The following actions are regarded as imperative in order to ensure the survival of the remaining Blue Cranes in Namibia and are based on an assessment and planning workshop held in November 2010 (Scott 2011b). It is vital that annual total population assessments are done during the wet and dry season; Etosha, areas such as the Omadhiya lakes, as well as all other areas in the northern Etosha grasslands should be regularly and systematically searched for cranes. Population size, survival, breeding success and movement need to be determined and monitored, particularly through ringing and satellite telemetry programmes. Satellite telemetry will help to identify critical areas used by Blue Cranes outside Etosha National Park that should be given conservation attention. Power lines to the north-east and east of the park should be monitored for signs of Blue Crane collisions, and appropriately mitigated as necessary.

Possible habitat changes should be investigated by means of mapping/photographs. Changes in wildlife migration patterns because of fences should be investigated, together with fire history and their possible impacts on Blue Cranes. The water supply to critical waterholes (e.g. Andoni and Twee Palms) should be given special attention to ensure that levels are maintained, especially during drought periods. The relationship between population numbers, breeding success and rainfall needs to be thoroughly investigated.

The genetic status of this isolated Blue Crane population needs to be further investigated to determine if inbreeding effects are likely. Further blood samples should therefore be collected and analysed.

The Namibia Crane Working Group has attempted to address the need for conservation at the grassroots level through an awareness and information programme. It has involved several local community leaders from north of Etosha in awareness activities, such as assisting with crane surveys and the capture and ringing of some chicks. This is important for influencing local herdsmen who bring their cattle to Lake Oponono, and whose activities may affect the cranes. Such activities should be developed further, particularly to address the illegal hunting of cranes and other birds outside the park. Reports of Blue Cranes being hunted in areas outside the park need to be followed up and appropriate laws strictly enforced.

A widely distributed newsletter, with regular reports on the progress of the project, is available on website <http://www.nnf.org.na/CRANES/index.htm>, together with other relevant publications and awareness materials.