Conservation aspects of the Blue Crane in Namibia

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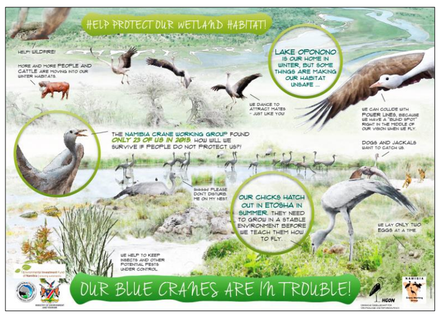
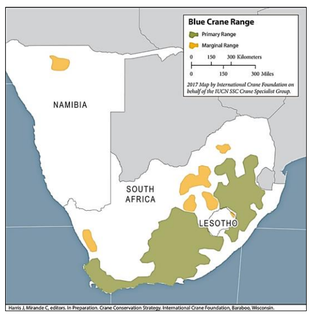




A genetic and conservation puzzle

The Blue Crane *Anthropoides paradiseus* (Lichtenstein 1793) is the most range-restricted of the world's 15 crane species. It occurs mainly in South Africa, with a total population of around 25,000, and is classed as Globally Vulnerable.

A curious and highly isolated breeding population also occurs in Namibia, within the Etosha National Park and on the grasslands to the north. This population is apparently in decline, and the species is regarded as Critically Endangered in this country (Simmons, Brown, Kemper 2015).

Due to concerns about the conservation of our cranes, a Namibia Crane Action Plan was compiled and implemented by the Namibia Crane Working Group of the Namibia Nature Foundation in 2004. The Namibia Blue Crane Project was launched in 2006.

Key questions

- How can Blue Cranes remain in Etosha with apparently very little intermixing with South African cranes? And,
- What is special about these grasslands, and how do the cranes survive in a hot and semi-arid, predator-rich environment such as Etosha?

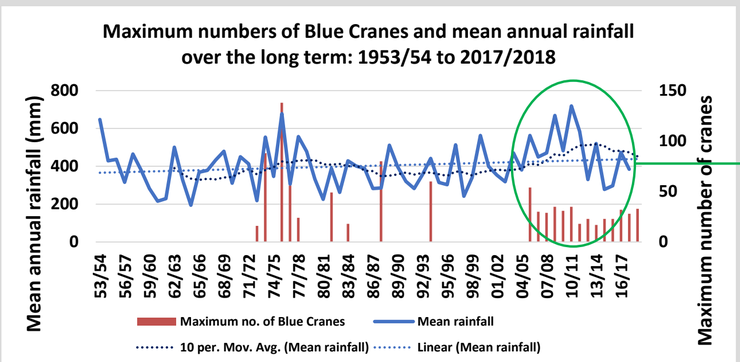
Aims: to determine

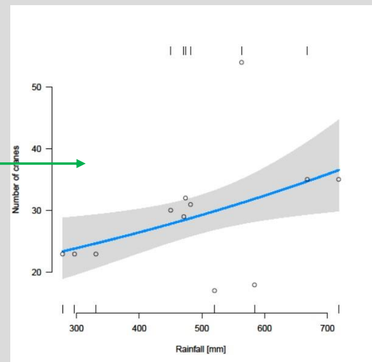
- Long term trends in Blue Cranes numbers in Namibia, and how these relate to rainfall
- Trends in breeding success, and how these relate to rainfall
- Distribution, habitat use and annual/seasonal movements
- Limiting factors and threats to continued survival
- Further proposed research and conservation actions

Methods

- In collaboration with many partners, the Namibia Crane Working Group has conducted annual wet season and dry season crane counts since April 2006
  - ground surveys; aerial surveys; opportunistic counts; plus available historical data
- 35 cranes fitted with standard metal ring and green plastic ring with unique alphabetical code: many ring resightings obtained; VHF radio and GPS satellite tracking
- Ongoing outreach and awareness play important part in obtaining data and promoting conservation: Namutoni Environmental Education Centre plays a pivotal role
  - Investigative/awareness study in Omadhiya Lakes area by NUST student (2011)

Long term trends in crane numbers in relation to rainfall

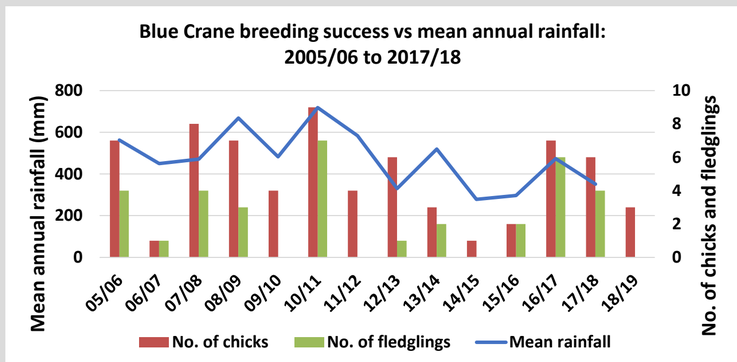


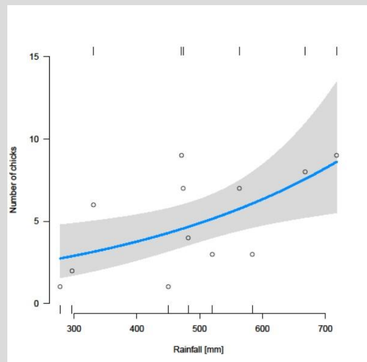


*Annual rainfall data (July – June; Namutoni, Halali and Okaukuejo): Etosha Ecological Institute

- Preliminary statistical analysis indicates that the number of cranes is positively related to rainfall (2006-2018).
- Earliest documented reference to Blue Cranes in Namibia: 1871 (Andersson).
- Highest numbers on record for Etosha: 107 and 138 in 1970s; thereafter declined to 80 birds in 1992 (Brown 1992) and 60 in 1994 (Simmons *et al*. 1996).
- Apart from 54 in 2006, regular counts have not exceeded 35 from this time: overall trend is still declining.
- Counts normally higher during dry season than during wet (breeding) season.
- Largest groups of cranes recorded at Andoni, usually before and/or after the breeding season.

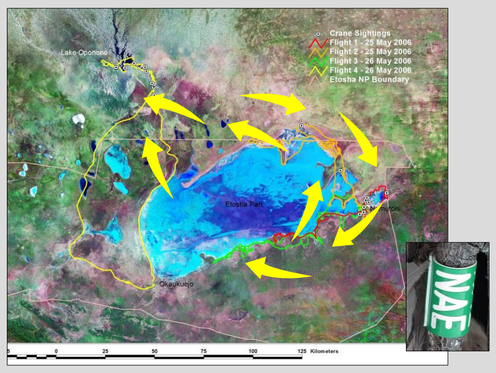
Breeding success in relation to rainfall





- Preliminary statistical analysis indicates that number of chicks is also positively related to rainfall (2006-2018).
- There is a trend for breeding success (fledglings per chick) to increase with rain, although this is not significant.
- Laying mainly Dec - Feb (Brown et al. 2015), later than in South Africa (Oct - Dec; Allan 2005).
- Despite the low numbers of adult birds, successful breeding is continuing – 49% chick-to-fledging success; two fledglings common for one pair.
- Blue Cranes become sexually mature at 3-5 years; age at first breeding (in captivity) is 5-8 years for males, and 4-7 years for females. Nest sites at Etosha are being occupied by birds as young as three years old. Known-age breeding birds 4-12 years old.

Crane distribution, habitat use and movements



Distribution map for May 2006 census by Holger Kolberg (MET DSS), also showing extrapolated annual /seasonal crane movements

What annual/seasonal movements do the cranes make?

- At end of dry season (Aug-Oct) the cranes arrive in the Park.
- Once the rains start, they move into the seeps and nest sites.
- During the rainy season the cranes occupy their nest sites for 3-4 months: Nebrownii, Salvadora, Charitsaub, Rietfontein east, Halali Seep, Springbokfontein, Chudop/Doringdraai, Namutoni causeway, Twee Palms and (2017) Andoni.
- At the end of the rainy season the chicks fledge and the cranes all move up to Andoni (Jul-Aug, or sooner).
- The cranes then move to the north (e.g. Omadhiya Lakes/Lake Oponono) for a few months; then repeat the cycle.
- Movements of up to 120 km recorded by VHF radio/ringing: between breeding sites on the Pan/Andoni/Lake Oponono.
- Fledgling fitted with leg-mounted GPS PTT in 2016 moved 49 km north-west up to the Ekuma River mouth from Charitsaub.

Where else could the cranes be?

- No movements of Blue Cranes recorded between Namibia/SA.
- Blue Cranes seen at Balyerwa Conservancy (2007) and Mamili (2009-10) in N Namibia; and Lake Ngami in Botswana (1976).
- No cranes found in Bushmanland; nor in aerial (2007) and ground (2014) surveys in southern Angola.

AND YET: A Blue Crane ringed at Etosha in April 2011 turned up west of Rundu (Kahenge) in October 2012.

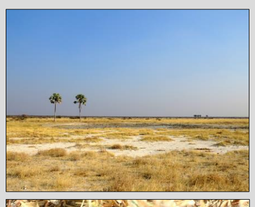
- ○ Are the cranes visiting other areas in southern/south-eastern Angola, possibly in association with Wattled Cranes?
- ○ Are the cranes visiting agricultural (centre pivot) irrigation areas in northern Namibia?

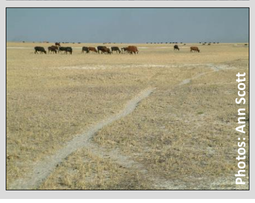
Why do the cranes leave the Park?

- Within the Park, cranes are found mainly in sweet grassveld on lime habitats around Etosha Pan, and on Andoni grassveld.
- At Omadhiya Lakes, cranes found near pans and other sources of water, also on grassveld that is heavily grazed/trampled.
- During wet/breeding season, cranes need animal (e.g. insects/ invertebrates) and plant matter for feeding chicks (Etosha Pan area); the adults also feed on grass seeds after good rains.
- During the dry season, the cranes are usually observed feeding on corms or 'uintjies' (*Cyperus* sp.), found amongst the roots of heavily grazed grass both at Omadhiya Lakes, and at Andoni; the adults also forage amongst elephant dung within the Park.
- ○ Are the corms a key feeding item, especially during the dry season? Is this why the cranes leave the Park at this time?

Is this population genetically distinct?

- Recent genetic studies (Lenahan 2017) show a lack of genetic differentiation and sex-biased gene flow between the South African and Namibian populations; indications of subtle population structure; and that the Namibian population has a significantly lower level of molecular genetic variation.
- The implications are that the two populations can currently be managed together for conservation.



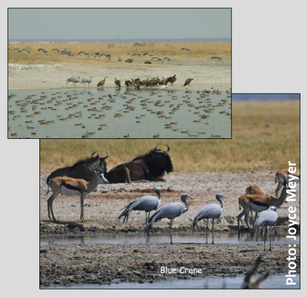


Limiting factors and threats to continued survival

- Blue Cranes are threatened by loss of habitat and increased competition for space and resources, particularly when the birds leave the confines of the Park during the winter months, for areas where numbers of both humans and stock have increased.
- In these arid habitats the cranes are dependent upon water for survival, safe roosting and the rearing of their chicks; any changes in the permanence and reliability of the water regime, including abstraction to the north of the Park, could threaten their survival, particularly during times of severe drought. Andoni is an important gathering place for the cranes, and a sustainable and accessible water supply at this site is critical.
- Apart from natural predation, unnatural mortality is a further threat: illegal and unsustainable hunting for both meat and traditional medicinal uses has been reported when the birds leave the confines of the Park during the winter months.
- Collisions with power lines are a potential threat, particularly in the areas north and east of the Park.
- This small, apparently isolated population could be vulnerable to inbreeding effects in view of its declining numbers and demonstrated lower level of molecular genetic variation.

Limiting factors for nest sites/breeding success

- Adults with chicks recorded only within the Park, suggesting that conditions outside are unsuitable for breeding.
- Within the Park, suitable nest sites are limited - not all waterhole sites are used for breeding; nest sites can dry up, or be flooded.
- Blue Cranes are slow to mature; only two eggs are laid, and second clutches are unusual (but appear to be on the increase).
- Potential for natural predation of eggs and chicks is high.
- During the wet/breeding season, the food supply for chicks (both animal and plant matter) is dependent on rainfall.
- Temperatures are high; proximity to water essential for nesting and nursery sites, for cooling, safe roosting and predator evasion.



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Conclusions and further proposed actions

Natural and anthropomorphic pressures in combination are likely to have cumulative impacts that marginal populations probably cannot sustain. Coupled with catastrophic events such as severe drought under global changes in environmental conditions, Namibia's small population of Blue Cranes could rapidly be pushed to extinction, without further human intervention.

The Namibia Crane Working Group will continue to:

- Track and ring individuals to determine/confirm movements, in order to target areas for conservation actions
- Address habitat threats/modification, including human impacts and (potential) changes in water availability
- Promote awareness about the conservation needs of the cranes
- Monitor numbers and breeding success
- Based on recent genetic findings: investigate the feasibility of reintroductions from the main population?

Special thanks

https://www.nnf.org.na/index.php/projects.html#crane-and-raptor-working-groups

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