

## The Ingula Partnership



## Ingula Nature Reserve Species Action Plan:

### Wattled Crane *Bugeranus carunculatus*



Howard 2014

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2015

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2020



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## The Ingula Partnership



## Ingula Species Action Plan

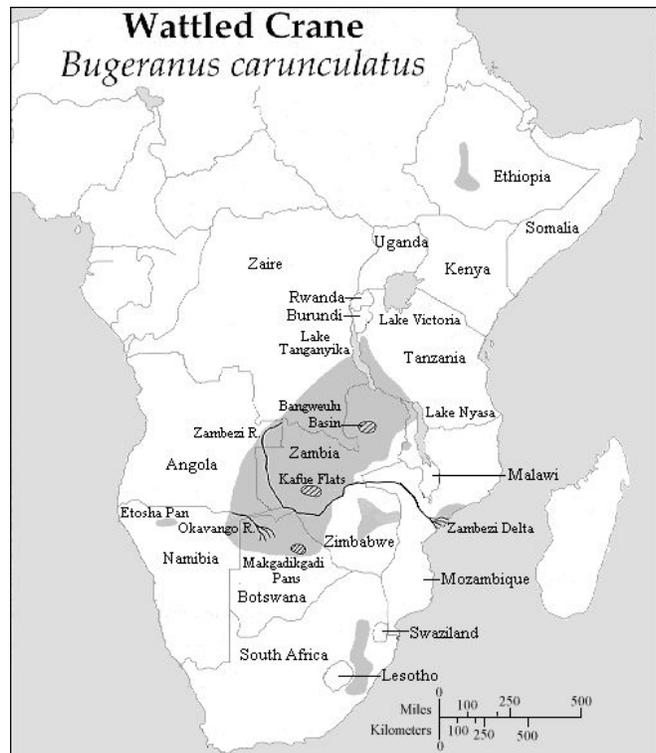
### Wattled Crane – *Bugeranus carunculatus*

#### Species Overview

##### Introduction

The Wattled Crane (*Bugeranus carunculatus*) is the largest, rarest and most threatened of the six crane species occurring in Africa (Coverdale & McCann 2005). The species is endemic to the African continent and occurs in three distinct subpopulations: namely south-western Ethiopia, south-central Africa and South Africa (BirdLife International 2020, Coverdale & McCann 2005, Savy 2003) (Figure 1). Additionally, it is the most wetland-habitat dependant crane species in Africa and moreover displays a high sensitivity to disturbance, subsequently leading to it being highlighted as a potential indicator of wetland habitat quality (McCann *et al.* 2001).

Wattled Crane are listed as *Vulnerable* (Vu) according to the global IUCN Red List Criteria. The current population is estimated at  $\geq 9000$  individuals (Morrison *in litt.* 2016), equating to 6000-6300 mature individuals that could contribute to the breeding population. The global population trend is in decline



(*Bugeranus carunculatus*), occurring in three subpopulations across Africa (Meine & Archibald 1996).

due to habitat loss and degradation as a result of wetland alteration, intensified agriculture, mining, drainage, and invasive species encroachment on suitable habitat (BirdLife International 2020).

### Regional Status and Population Trend

Within South Africa Wattled Crane occupy a small and significantly restricted range within the eastern parts of the country (Figure 2). The population largely occurs within the Mpumalanga Highlands and south-central KwaZulu-Natal, with an approximated 80% of the population occurring outside of protected areas (McCann 2001).

The species is regionally (South Africa) listed as *Critically Endangered* (CR), largely attributed to a significant range reduction and population decline between 1986 and 1994 (McCann 2000). The estimated population size in 2000 was 234 individuals, a significant decline from the estimated 380 individuals in 1980. Of the estimated 234 individuals, 84% occurred within KwaZulu-Natal.

Species summary: Crane, Wattled (*Bugeranus carunculatus*)

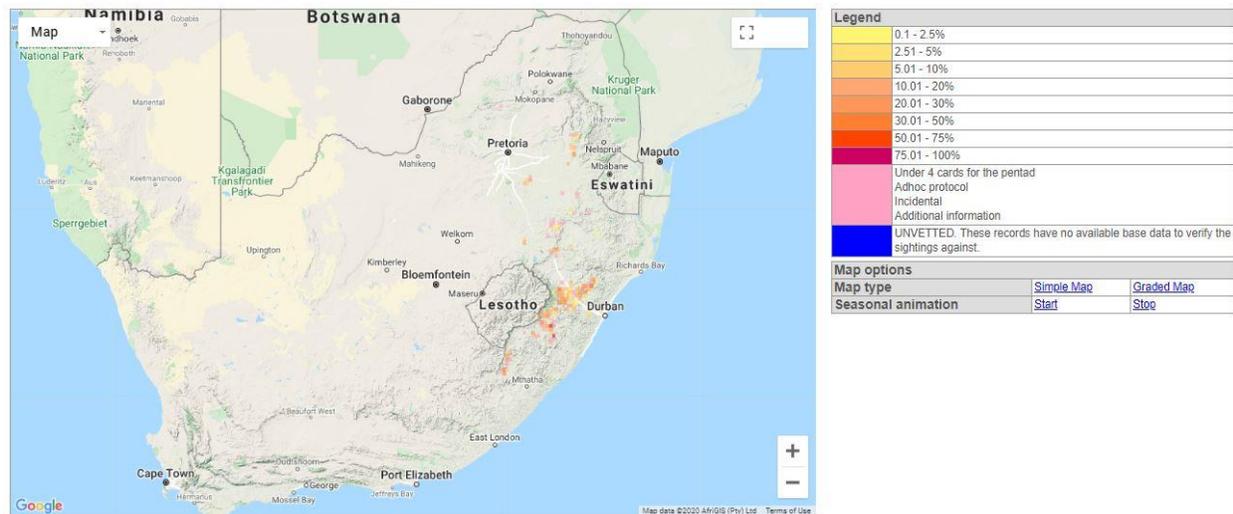


Figure 2: Confirmed presence records of Wattled Crane within South Africa, as per the Second South African Bird Atlas Project (SABAP2; <http://sabap2.birdmap.africa/species/215>).

The Endangered Wildlife Trust – African Crane Conservation Program (EWT-ACCP) initiated various species-specific initiatives to contribute to the population recovery of Wattled Crane within South Africa, including the Wattled Crane Recovery Programme (WCRP), annual aerial monitoring of breeding and non-breeding populations, and assisted by the IUCN’s Conservation Breeding Specialist Group (CBSG), a Wattled Crane Population and Habitat Viability Assessment (PHVA) (Jordan and Morrison 2010).

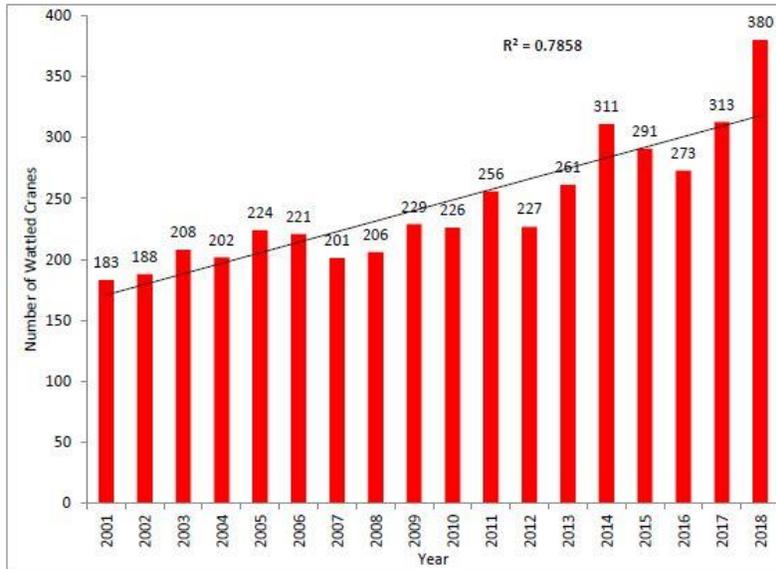


Figure 3: The minimum number of Wattled Cranes in KwaZulu-Natal, as recorded during the annual KZN crane aerial survey between 2001 and 2018 (Rennie *et al.* 2018).

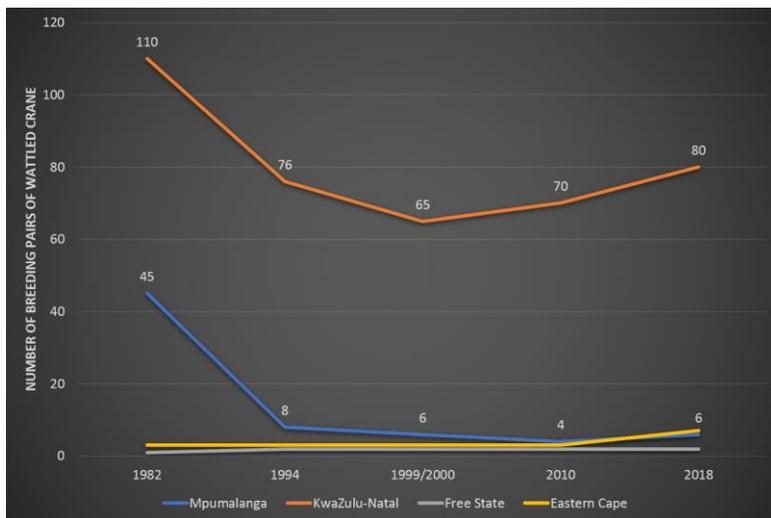


Figure 4: The numbers of breeding pairs of Wattled Cranes for the KwaZulu-Natal, Mpumalanga and Free State sub-populations (McCann *et al.* 2001, Rennie *et al.* 2018, and EWT-ACCP, *pers. comm.*).

Monitoring between 2000-2010 suggests that the population within KwaZulu-Natal has experienced an increased trend over the respective decade, whilst breeding populations elsewhere in South Africa have largely remained the same or declined (Figure 3 and 4). Population data collected during annual aerial surveys during 2010-2018 have followed the subsequent trend, with South Africa’s population estimated

at 380 individuals during the 2018 survey (Rennie et al. 2018), increased from an estimated population of 300 in 2014. Unfortunately, the aerial survey could not be completed during 2019.

### **Species Ecology and Habitat Requirements**

Although Wattled Crane are the most wetland dependant crane species in Africa (Aticho *et al.* 2018), wetland habitat can constitute a relatively small component of their total territory. The average home range size recorded within KwaZulu-Natal was 16.62km<sup>2</sup>, which was comprised of predominantly open grassland, whilst the wetland habitat constituted only 2.3% of the total territory (McCann and Ben 2006, Fakarayi *et al.* 2016). A habitat preference exhibited throughout the global distribution range includes large floodplain wetlands with predominantly sedge-based vegetation (Burke 1996), and a strong association with *Cyperus esculentus* in Zimbabwe (Fakarayi *et al.* 2016). Locally within South Africa, Wattled Crane exhibit a preference for high-altitude palustrine wetlands with adjacent open grassland (Coverdale 2005).

Wattle Cranes are often closely associated with large ungulate grazers (Konrad 1981), because grazing and trampling increases the accessibility of *Eleocharis* tubers, a preferred food item for the cranes (Konrad 1981; Bento et al. 2007). Owing to the reduction and/or absence of large grazers at Ingula NR, fire replaces grazing by thinning out dense wetland vegetation and increasing the accessibility of tubers (Bento et al. 2007). Avoiding high frequency burning and particularly spring burns (i.e. promoting less frequent burns only in winter) and creating a mosaic of grazer intensities across management units, is likely to be the best strategy to meet the conservation requirements of all grassland birds (Colyn et al. In Prep).

In addition to being a monogamous species, Wattled Crane pair for life and will only replace the partner in the event of death (Meine & Archibald 1996). Like most crane species, Wattled Crane establish and maintain pair bonds with intricate and synchronised dancing displays (Morrison 1998). Wattled Crane have the longest incubation period of all African crane species, ranging between 33 and 40 days (Abrey 1992 and Burke 1996). They also have the smallest clutch sizes of all cranes with one to two eggs being laid, but only one chick is ever reared to fledging age (Burke 1996). Furthermore, the fledging period is the longest of all crane species as well, ranging between 90 and 130 days. It is however, during this fledging period, that the majority of first year mortalities are recorded (Abrey 1992 and Burke 1996). Shared facilitation is exhibited by both parents during the incubation and feeding periods, as well as teaching the chick foraging and survival skills.



Figure 5: A Wattled Crane nest structure in marsh wetland habitat within the Bedford area, Ingula (Colyn 2014).

## Wattled Crane Breeding Season

Laying months - South Africa

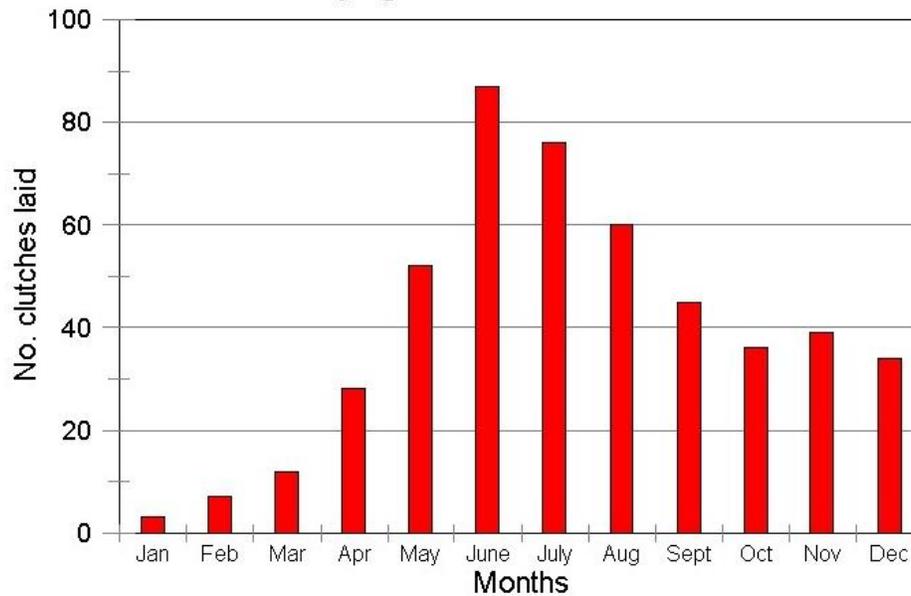


Figure 6: Peak breeding season as expressed by clutches laid per month (McCann et al. 2000).

The nest structure is generally comprised of a mound of vegetation with a surrounding moat of water (Tarboton 1984) (Figure 5). The moat offers protection from both fire and potentially terrestrial predators. Although Wattled Crane have been recorded breeding all year round, the peak breeding period is between May and August, with the highest laying months being June and July (Figure 6).

## Site-specific Population Dynamics

Currently within Ingula, Wattled Crane distribution is restricted to the upper Bedford – Chatsworth wetlands and adjacent grassland, which forms part of IBA043 (Figure 8 - 9). As noted by McCann 2000, Wattled Crane, a wetland habitat specialist, is a flagship species for several other priority species occurring in wetland habitats. This is evident as a host of other avian species, including at least two other priority species, breed in the Ingula wetlands (Figure 7 and 9). Other priority species include

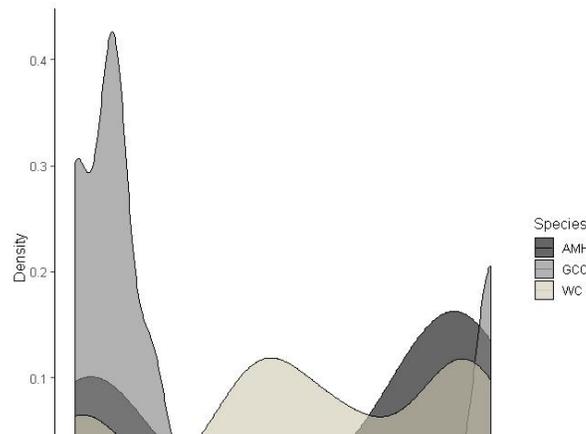


Figure 7: Breeding season for wetland breeding threatened species on Ingula NR, showing the peaks in Wattled Crane (WC) breeding season compared to African Marsh Harrier (AMH) and Grey Crowned Crane (GCC). Source: Colyn et al. (In Prep.)

*Endangered* African Marsh Harrier *Circus ranivorus* and *Endangered* Grey Crowned Crane *Balearica regulorum*.

The Ingula Wattled Crane population is thought to be predominantly between two and four individuals (1-2 pairs), but a total of six individuals have been confirmed within and surrounding the Ingula boundaries (P. Nelson *pers comm.*, C. Coetzer *pers obs*). At least one of the two respective pairs have been recorded attempting to breed since 2006, with three known nesting structures being located thus far (Figure 9). Field observations have noted that pairs alternated between the known nesting sites depending on the season. Nesting success has increased during the last five breeding seasons, with successfully fledged chicks recorded in 2008, 2012, 2015, 2016, 2018 and 2019.

An additional pair is often observed just outside the Ingula boundary utilising the wetland located on a privately owned property called Strathmorn (Figure 9). This pair is frequently observed in the broader area and subsequently monitored as part of the Ingula Wattled Crane breeding surveys. Since monitoring commenced, one successful breeding event was recorded in 2018 and yielded one fledged chick. Although more than one pair has been observed foraging within the boundaries of INR, only one pair has ever been recorded to breed on the reserve at any given time. Therefore, including the Strathmorn site located on the periphery of the reserve, suggests that the current breeding capacity of the reserve is 1-2 pairs.



Figure 8: Marsh wetland (background) and grassland (foreground) habitat mosaic within the upper Bedford area at Ingula (Colyn 2014).

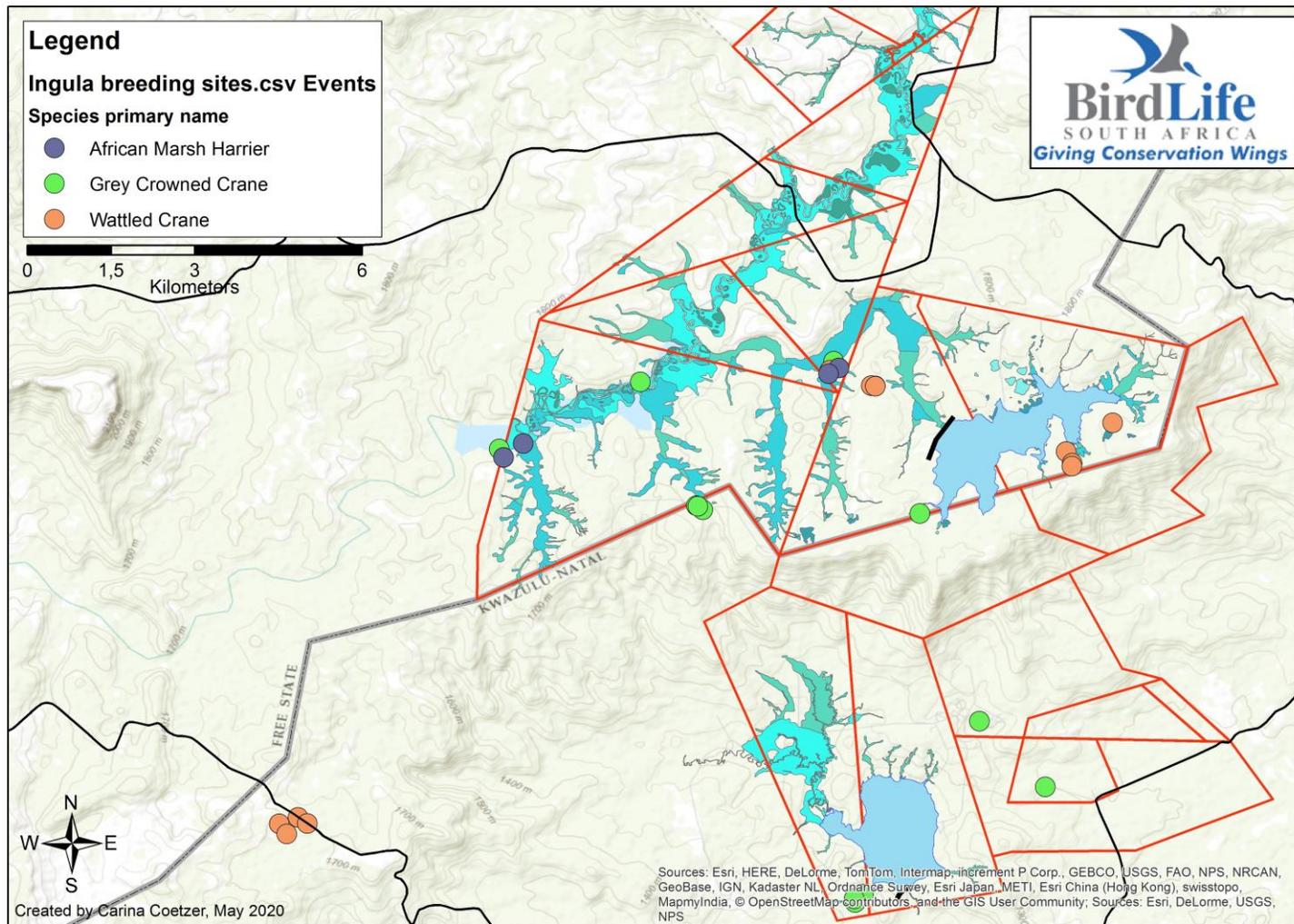


Figure 9: All known nesting locations for Wattled Crane and other priority threatened species utilizing wetlands for breeding activities, i.e. Grey Crowned Crane and African Marsh Harrier (Coetzer 2020).

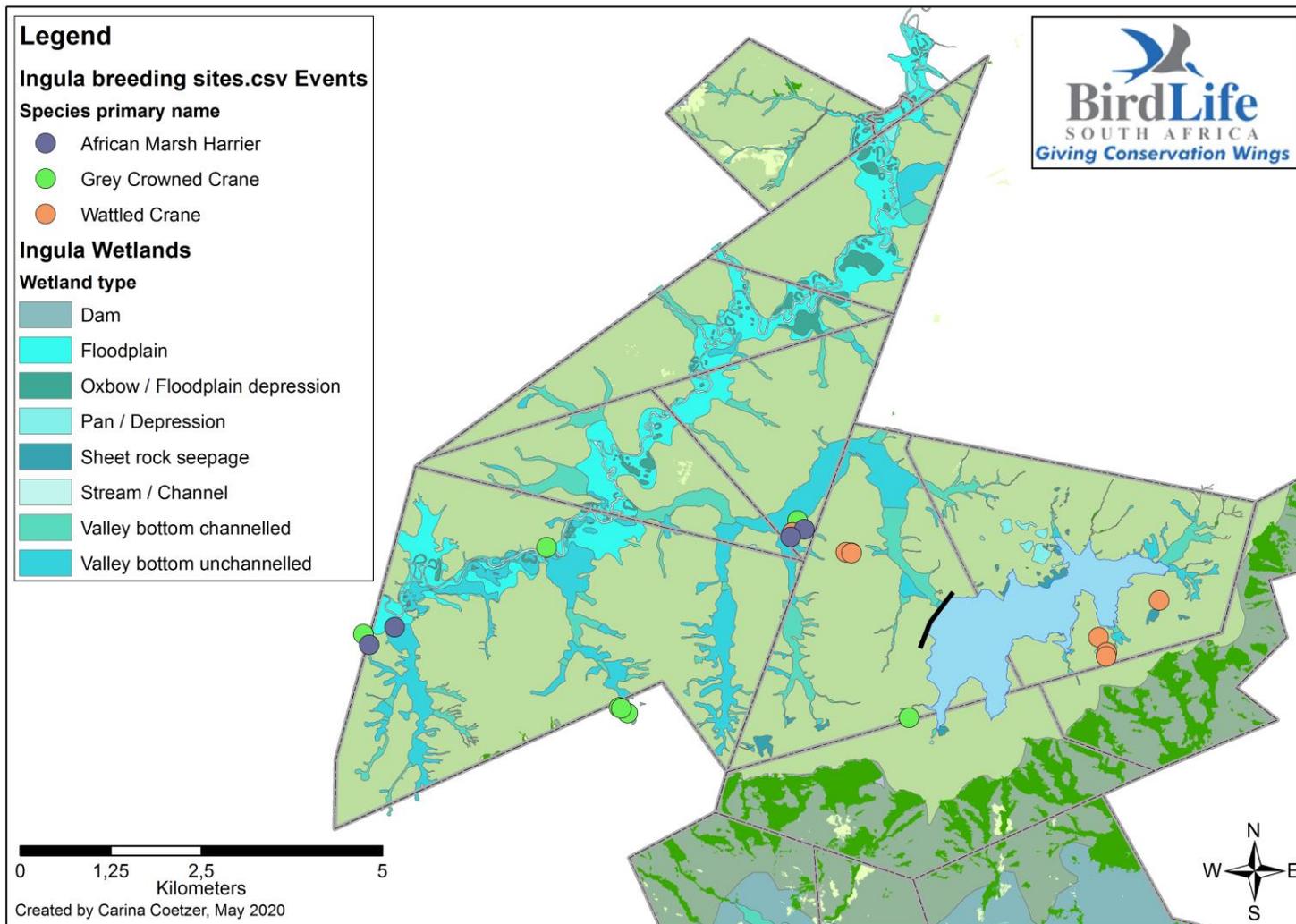


Figure 10: The Chatsworth-Bedford wetlands (IBA043) within Ingula host a number of priority breeding species, including Wattled Crane, Grey Crowned Crane and African Marsh Harrier (Coetzer 2020).

## Habitat viability analysis

Wattled Crane habitat suitability was estimated using ArcMAP in 2014 by overlaying numerous key environmental layers including:

1. Broad-scale (i.e. National) vegetation and wetland layers cropped for the Ingula area.
2. Fine-scale wetland habitats present within Ingula.
3. Fine-scale wetland vegetation communities present within Ingula (Figure 11).

The product of overlaid layers was then filtered according to known Wattled Crane habitat preferences as per Burke 1996 and Coverdale 2006. The result was a digitised map depicting the estimated suitability of wetland habitat for breeding Wattled Crane (Figure 11). This result clearly indicates a relatively large quantity of optimal breeding (red) and foraging (red and pink) habitat for Wattled Crane within the Ingula boundary.

Additionally, average Wattled Crane territory size as determined by McCann and Benn (2006), was buffered and included in the digitisation to provide an estimate of the potential carrying capacity of the Ingula wetlands. These buffers (i.e. 16.6km<sup>2</sup>) were focused around two known nesting sites (Figure 12). Buffers (purple circles) weren't centred on the respective breeding sites (blue dots) as the majority of habitat east of the Bedford nest site is not suitable for Wattle Crane, that being predominantly Northern Afrotemperate Forest on steep escarpment slopes. The result indicates that according to average territory size estimated by McCann and Ben 2006, Ingula has the definite potential to host two Wattled Crane pairs. Additionally, when combined with the distance between the two respective nests sites, as well as the numerous observed sightings of two pairs within these areas, it further confirms the possible residency of two pairs in these respective wetlands.

Approximately 250 ha (2.5km<sup>2</sup>) of the Bedford wetland and grassland habitat was lost to flooding as the upper Ingula dam became operational (Figure 13). This undoubtedly affected the available foraging habitat for the Bedford Wattled Crane pair and possibly necessitated the need to forage further east into the Chatsworth area since the development of these maps in 2014. The remaining wetland conditions have not changed dramatically since 2014, and therefore the exercise was not repeated for the current review.

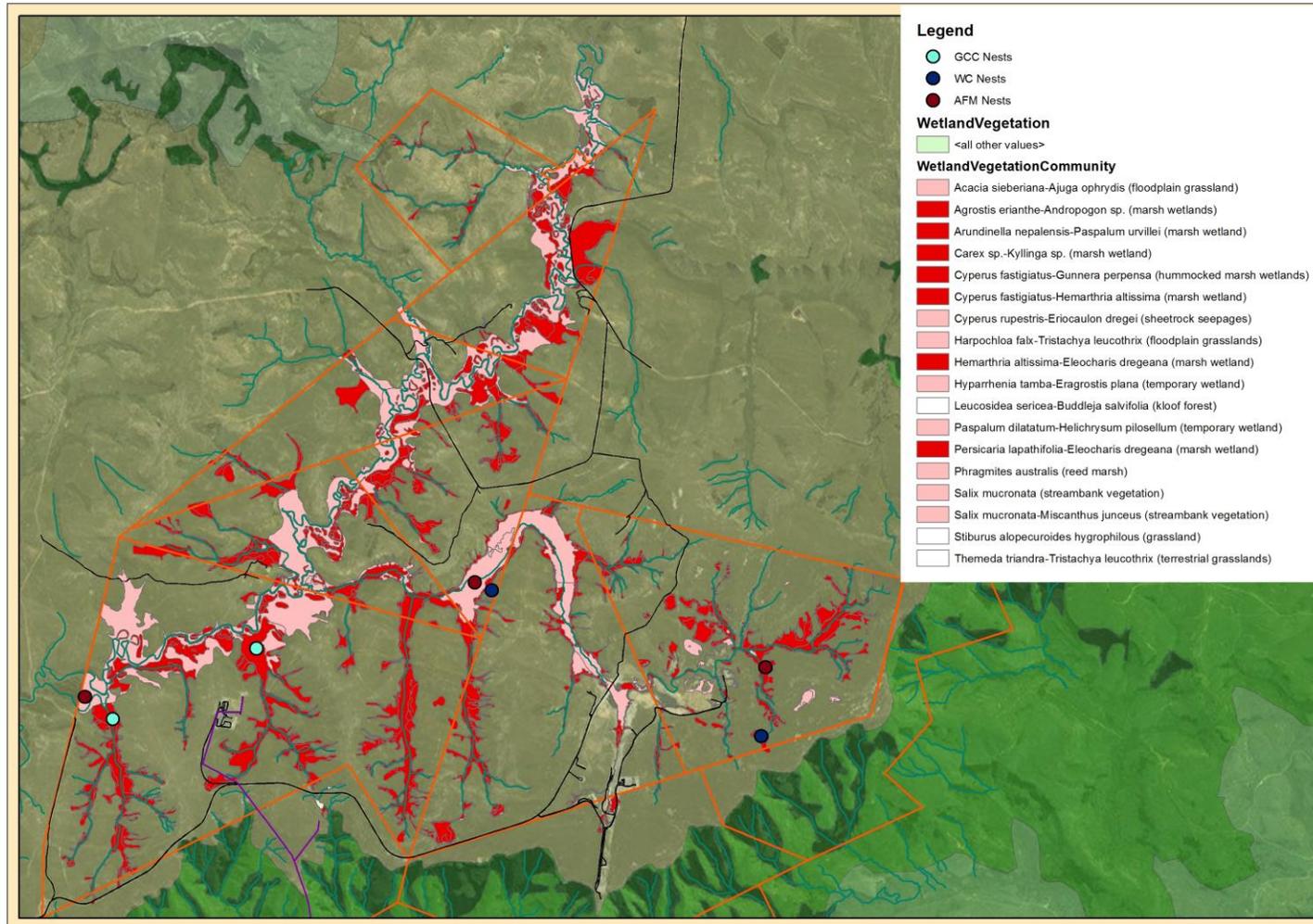


Figure 11: Optimal Wattle Crane breeding (red) and foraging (red and pink) habitat present within Ingula as depicted according to wetland type and respective vegetation community (Colyn 2014).

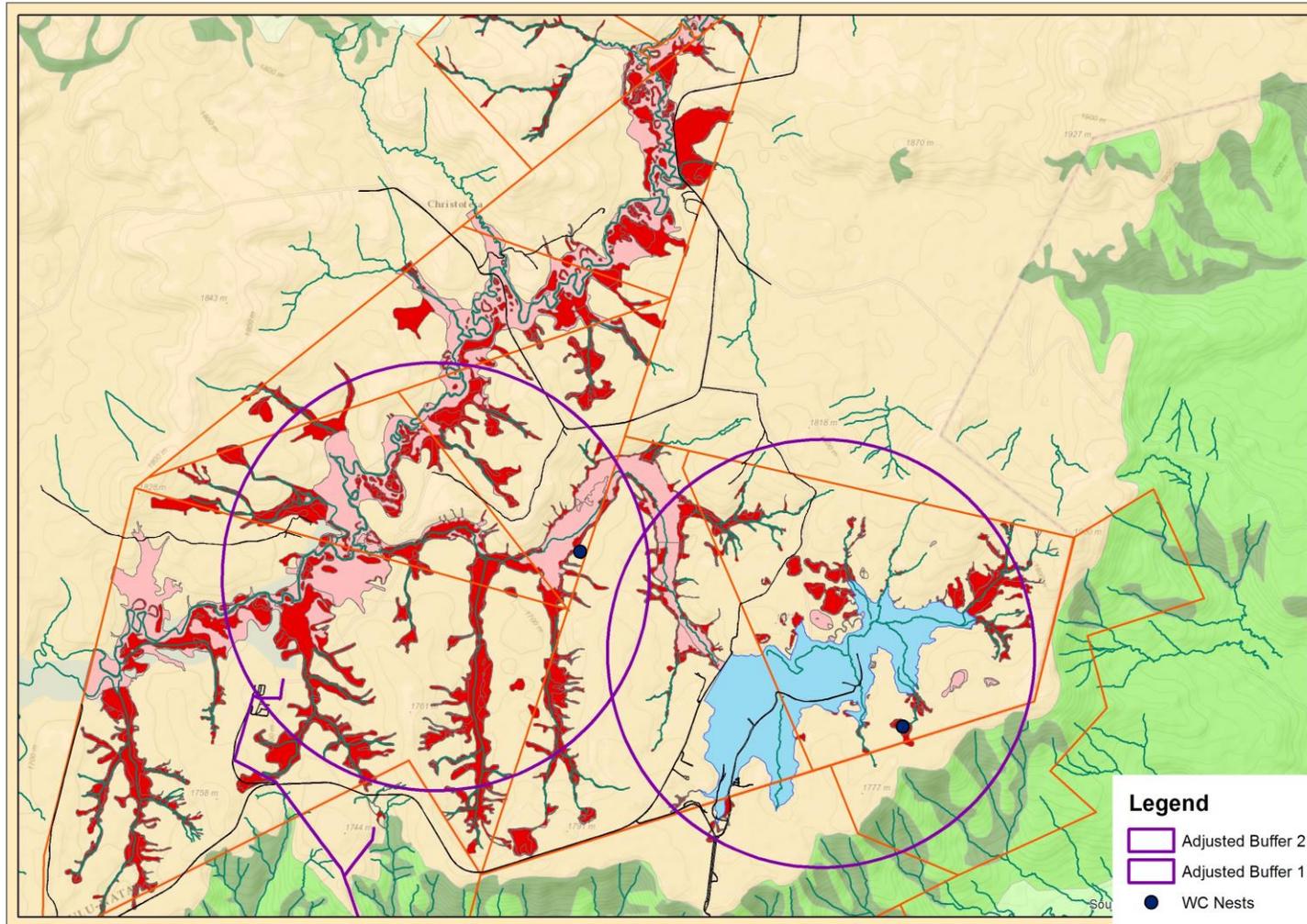


Figure 12: Average Wattle Crane territory size surrounding the Bedford and Chatsworth nest sites (blue dots). Territory buffers (purple circles) were shifted to accommodate suitable habitat (Colyn 2014).

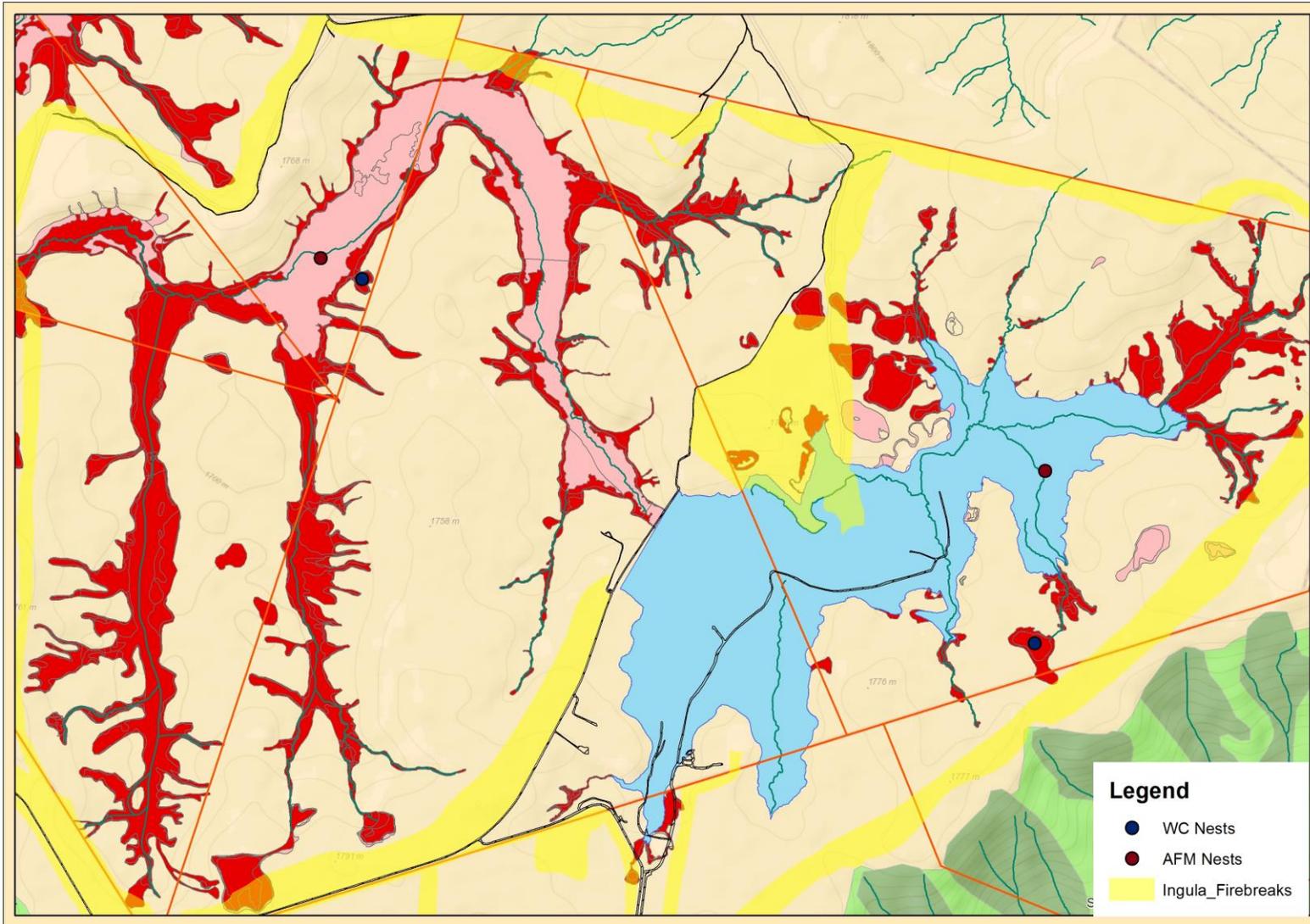


Figure 13: The full supply level of the upper Ingula dam, depicting the resultant habitat loss (250ha) through flooding (Colyn 2014).

## Threat Matrix

| Threat   | Potential Severity |               | Rationale  | Outputs/Actions Required  | Timeline        |                                |
|--|--------------------|---------------|--|---|-----------------|--------------------------------|
|  | National           | Site-specific |  |   | Commencement    | Frequency                      |
| <b>1 Habitat loss</b>                          | High               | Low           | Breeding and foraging habitat largely secured through Nature Reserve declaration. Additionally, the area has an IBA status, and declaration as a Ramsar Wetland of International importance is currently in process. | None  | N/A             | N/A                            |
| <b>2 Habitat alteration and/or degradation</b> | High               | High          | Grazing and fire are key drivers of the respective and/or associated systems. Management needs to account for correct driver frequency and intensity to maintain habitat integrity for Wattled Crane.                | Need for a <b>fire and grazing management plan</b> addressing these drivers in the direct vicinity of Wattled Crane nest sites.   | Short-long term | Working Document               |
|  |                    |               |  | <b>Monitor all fire events</b> (including fire breaks), <b>as well as grazing presence and intensity</b> , in areas near known Wattled Crane nests.   | Immediately     | Monthly during breeding season |
| <b>3 Disturbance:</b><br><br>3.1. Fire         |                    | High          | Both uncontrolled and controlled fires, i.e. block burns and fire breaks, could pose sufficient disturbance to result in a breeding/clutch failure or chick/juvenile mortality.                                      | Manage controlled fires accordingly, particularly when burning near active nest sites (i.e. Bedford nest site in close proximity to firebreak). <b>Avoid burning in nest site areas where possible (Figure 12).</b> | Immediately     | Continuous                     |
|  |                    |               |  | <b>Monitor all fire events</b> (including fire breaks) in areas near known Wattled Crane nests.   | Immediately     | Annually (May-August)          |

|                                |        |                    |  |   |                                       |   |
|--------------------------------|--------|--------------------|--|---|---------------------------------------|---|
| 3.2. Cattle                    |        | <b>High</b>        | Unrestricted and uncontrolled grazing in terms of grazing intensity as well as relative herd sizes (cattle), could pose sufficient disturbance to contribute to breeding/clutch failure.   | Both intensive grazing and grazing exclusion have adverse impacts on Wattled Crane breeding. Monitor and manage the number of cattle in respective nest site areas. | Immediately                           | Monthly (Particularly May-August, but all year round) |
| 3.3. Human presence            |        | <b>Medium-high</b> | Wattle Crane are susceptible to disturbance related to human presence too close to the respective nest site during the breeding season.  | Prevent, limit and/or control access to the nest site areas during the breeding season where possible.  | Immediately                           | Monthly during breeding season                        |
| <b>4 Collision fatalities:</b> |        |                    |  |   |                                       |   |
| 4.1. Fences                    | Low    | <b>Low</b>         | A fence collision mortality rate of 0,15% of the national population was estimated by the WC PHVA in 2000. The majority of collisions were associated with newly fledged juveniles and young immature birds.   | <b>Monitor and record any mortalities</b> associated with fence line collisions   | Incidentally recorded                 | Continuous  |
| 4.2. Power lines               | Medium | <b>Medium</b>      | A power line collision mortality rate of 1,04% of the national population was estimated by the WC PHVA in 2000. The majority of collisions were associated with 11 and 22kV lines.   | Monitor the on-site impact through existing <b>routine power line searches</b> .  | Existing system – power line searches | Quarterly   |
| <b>5 Poisoning</b>             | Low    | <b>Low</b>         | Poisoning occurs as an indirect incidence linked to agricultural activities (croplands). The recorded incidence is however low, with a known mortality rate of 0,19%.<br><br>Ingula largely constitutes natural grassland, wetlands and some pastures. Croplands with associated use of pesticides and herbicides are limited to adjacent farming areas. | If any carcasses are found with an undetermined cause of mortality, <b>keep/freeze carcass for further analysis</b> .   | Incidentally recorded                 | Continuous  |
| <b>6 Exploitation</b>          | Medium | <b>Medium</b>      | Exploitation through egg/chick collection, hunting, feral dog predation, nest predation, etc.  | This threat would pose the greatest risk to eggs, chicks and juveniles and  | Existing system - Annual breeding     | Monthly during the                                    |

|  |  |   |  |             |                  |
|--|--|---|--|-------------|------------------|
|  |  | Mortality estimates from the WC PHVA ranged between 0.24 - 0.45%, but the group acknowledged that the known estimate was too low and should probably be increased to 10%. | therefore would best be quantified during the breeding season via thorough <b>monitoring/breeding assessments.</b> | assessments | breeding season. |
|--|--|---|--|-------------|------------------|

## Species Action Summary

|   | Target   | Action Required   | Progress  | Priority | Timeline     |             |            | Funding required |
|---|--|---|---|----------|--------------|-------------|------------|------------------|
|   |  |   |   |          | Commencement | Replication | Start date |                  |
| 1 | Monitor the population size at Ingula, particularly the number of breeding individuals.                    | <b>Coordinated monitoring effort</b> during the breeding season   | In Progress   | High     | In Progress  | Annually    | May 2015   | No               |
| 2 | Monitor the breeding status of resident breeding pairs, i.e. nest location, clutch and fledging success.   | <b>Coordinated monitoring effort</b> during the breeding season   | In Progress   | High     | In Progress  | Annually    | May 2015   | No               |
| 3 | Collate and analyse presence and breeding data annually to further understand population dynamics on-site. | <b>Data collation and analyses.</b>                               | In Progress.<br>Breeding results to be published in 2020. | High     | Short term   | Annually    | Aug 2015   | No               |
| 4 | Collaborate with EWT and the African Crane Conservation  | <b>Monitoring and supplying the African Crane Foundation with</b> | In Progress.<br>Two chicks                                | High     | In Progress  | Annually    | Feb 2018   | No               |

|   |  |  |  |        |             |                                      |          |   |
|---|--|--|--|--------|-------------|--------------------------------------|----------|---|
|   | Programme to ring all chicks fledged on Ingula for inclusion into their research and assist with action point 3. | <b>required information to successfully ring chicks.</b>   | ringed in 2018.  |        |             |                                      |          |   |
| 4 | Meet actions required within the Threat Matrix as per listed priority  | High priority ' <b>Threat Matrix</b> ' <b>actions are met</b> in order to effectively mitigate, limit and or prevent the impacts of associated threats on Wattled Crane at Ingula. | Some actions fall under existing processes/systems, whilst other need to be initiated. | High   | Immediately | As per individual action requirement | May 2015 | No  |
| 5 | Further understand the breeding ecology of Wattled Crane at Ingula   | Evaluate dispersal dynamics, recruitment success, feed provisioning at nest sites, nest predation, etc.  | Future project... possibly student project   | Medium | Long Term   | N/A                                  | N/A      | Yes - some aspects can be evaluated via camera traps and visual observations, whilst others require satellite trackers. |

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