



## Minimum Population Size and Distribution of Grey Crowned Cranes in Rwanda

### Aerial and Ground Survey

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# 1. INTRODUCTION

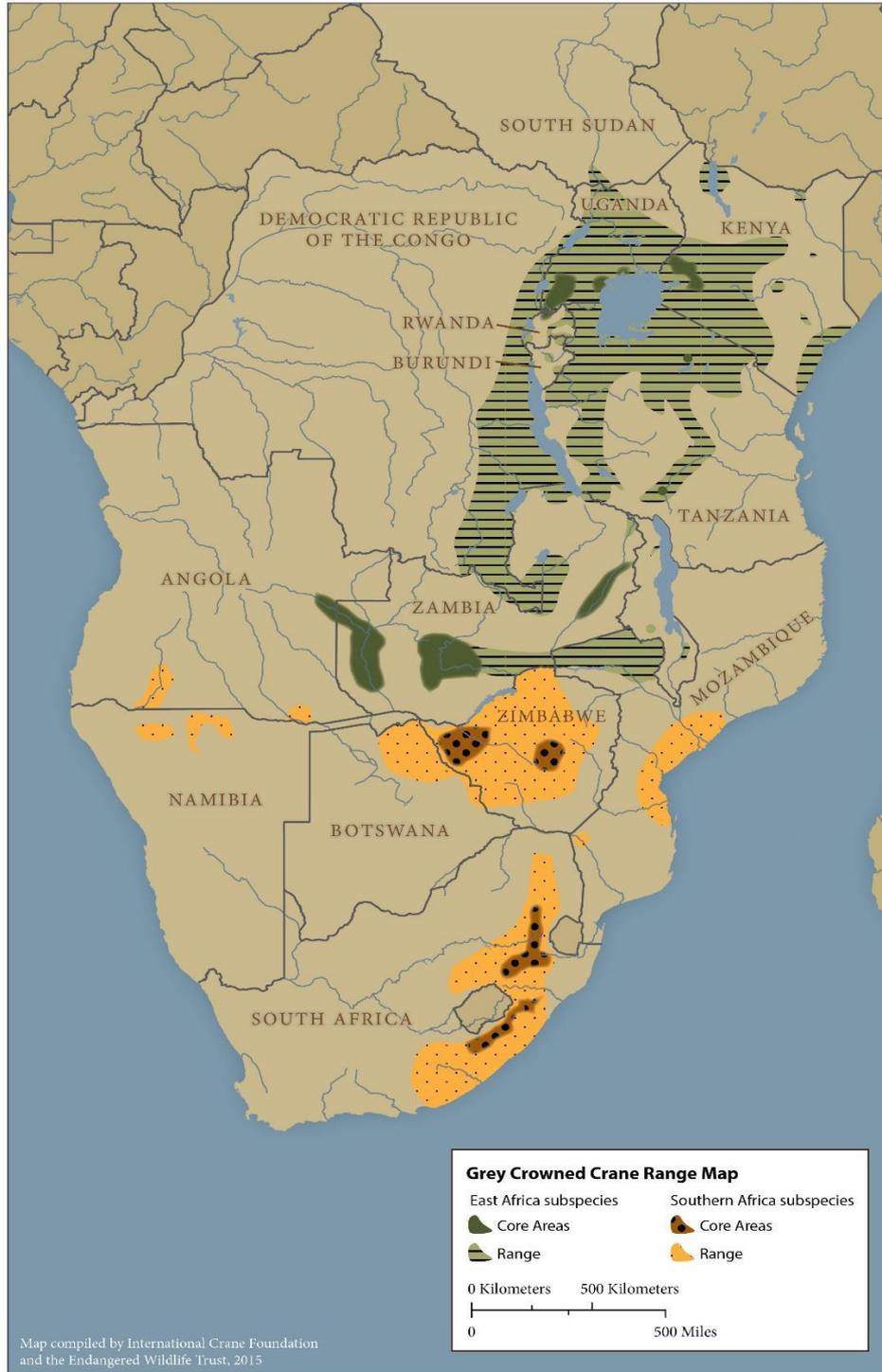
## 1.1 Grey Crowned Cranes

The Grey Crowned Crane (*Balearica regulorum*) is currently listed as 'Endangered' on the IUCN red list for endangered species (IUCN, 2017). Although considered as icons of Africa's wetlands and savannahs, this species is a victim of its beauty and is hunted for the captive trade market (Morrison, 2015). The decline is also attributed to the loss of their wetland habitat which they depend on for food and reproduction (Kanyamibwa, 1996; Olupot, 2014; Morrison, 2015; Olupot, 2016). Of the two sub-species, the Southern African Grey Crowned Crane (*B.r. regulorum*) in the south and East African Grey Crowned Crane (*B.r. gibbericeps*) to the north, the latter is known to have had a long-term population decline. In fact, the Grey Crowned Crane has been up listed from 'least concerned' to 'vulnerable' in 2009 and from 'vulnerable' to 'endangered' in 2012 on the IUCN red list for endangered species, suggesting an enduring long-term decline and an increase of its threats (Beilfuss et al., 2007; Morrison, 2015).

Once thought the most common crane in Africa, the Grey Crowned Crane has experienced a shocking decline over the past 5 decades with the global population declining by up to 80% (Beilfuss et al., 2007). The current global population is estimated to be between 26,500 and 33,500 (Morrison, 2015) while it was estimated to be more than 100,000 in 1985 (Urban, 1988). Although South Africa and the floodplains of Zambia are known to have stable populations of this species, other range countries (see figure 1) continue to suffer large scale declines due to the demand for pet trade, fragmenting habitats and quickly shrinking area of occupancy (Morrison, 2015).

The recent Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) workshop focussed on the development of the International Single Species Action Plan for the Conservation of the Grey Crowned Crane (Morrison, 2015). Participants analysed all threats to the Grey Crowned Crane. Table 1 summarises those threats under different classifications and the significance to each sub-species of Grey Crowned Crane.

The Grey Crowned Crane is the only species of crane in Rwanda and despite being a symbol of wealth and longevity in Rwandan culture, as in other range countries, it faces increasing threats due to habitat reduction and a growing illegal trade (Harris & Mirande, 2013; Morrison, 2015). Rwanda is a small country with an incredible variety of biodiversity, yet it is challenged by high population density and extreme poverty. This results in resources and land being overstretched and high competition between people and wildlife. Grey Crowned Cranes are threatened by human factors often driven by conditions of poverty, livelihood disadvantage and lack of conservation awareness as well as people and animals competing for the same habitat. Additionally, Grey Crowned Cranes have been kept in captivity by hotels and by wealthy families who are unaware of the environmental consequences of doing so. These captive cranes are usually stressed, malnourished, have their wings broken to prevent them flying, don't breed and die prematurely.



**Figure 1:** *The distribution of the two sub-species of Grey Crowned Crane (Source: Morrison, 2015).*

**Table 1: Threat classification and their significance to each sub-species of Grey Crowned Crane**

		Significance	
		<i>East African sub-species</i>	<i>Southern African sub-species</i>
Threats causing reduced adult and juvenile survival / increased functional loss of birds (removal from the wild)	1. Illegal trade (domestic and international)	High	Medium
	2. Power line collision and electrocution	Potentially high	Medium
	3. Poisoning	Medium	Medium
	4. (Potential) International legal trade in wild birds	Medium	Low
	5. Hunting and Trapping	Medium	Low
	6. Diseases	Unknown	Low
	7. Domestic legal trade in wild birds	Low	Low
	8. Collision with telecommunication infrastructure	Low	Low
	9. Predation by dogs	Low	Low
Threats causing reduced breeding success and reproductive rates	1. Human disturbance	High	Medium
	2. Illegal trade (Domestic and International)	High	Medium
	3. Flooding and drought	Medium	Medium
	4. Diseases	Unknown	Low
	5. Natural predation	Low	Low
	6. Trampling by livestock	Low	Low
	7. Egg collection	Low	Low
	8. Predation by dogs	Low	Low
	9. Fire	Low	Low
Threats causing a high degree of habitat loss, fragmentation and degradation	1. Agriculture	High	Medium
	2. Eucalyptus afforestation in wetlands	Medium	High
	3. Mining (brick making, peat, coal, gold, oil (potential))	Medium	High
	4. Change of hydrological regime	Medium	High
	5. Siltation	High	Medium
	6. Drainage	Medium	Medium
	7. Livestock herding	Medium	Medium
	8. Infrastructure development (renewable energy –wind and solar, urbanisation, roads, industry)	Medium	Medium
	9. Subdivision of land	Medium	Medium
	10. Pollution	Medium	Low
	11. Invasive alien plants ( <i>Mimosa pigra</i> etc)	Medium	Low
	12. Fire	Low	Low
	13. Fish production	Low	Low
	14. Natural vegetation succession	Low	Low

## **1.2 Population Estimates for Rwanda**

For a long time, it has not been clear exactly how many Grey Crowned Cranes are left in the wild in Rwanda. The population has previously been estimated to be between 300-500 Grey Crowned Cranes (Kabanguka, 2013). Morrison and Baker (2012) estimated the population of Grey Crowned Cranes in Rwanda to be between 50-500 individuals. Based on these estimations, it is obvious that the country has lost more than the half of its population which was estimated to be over 1000 before 1985 (Urban, 1988). In Rwanda, the threats to the Grey Crowned Cranes have increased (mainly the removal of Grey Crowned Cranes from the wild for pet trade) and the population could be wiped out in the next few years if it was not for the current ongoing joint conservation efforts to save this species.

## **1.3 National Crane Census 2017**

Although estimations are helpful to track the changes in population numbers, they are infrequent and not completely accurate. For such a small population of Grey Crowned Cranes in Rwanda that are facing a rapid decline, it is important to carry out regular surveys to track the changes in population numbers and determine the population trends over a number of years. Thus, a first national complete census of Grey Crowned Cranes was carried out to serve as a base line and to increase the accuracy of the previous estimations.

Due to the concerning decline in Grey Crowned Cranes in Rwanda, Rwanda Wildlife Conservation Association (RWCA) and its partners have been working to eliminate the illegal trade and boost the population numbers through reintroduction of captive cranes and working with local communities to reduce poaching. RWCA plan to regularly repeat the census to assess the population trend as well as to see whether conservation activities within Rwanda are having a positive effect or not. This in turn, will provide information for the evaluation and adaptation of conservation strategies.

## **2. METHODOLOGY**

Over three days in August 2017, RWCA conducted a national census of Grey Crowned Cranes in Rwanda using both aerial and ground surveys. A Direct Count methodology was used (Bibby, Burgess, Hill & Mustoe, 2000) where all visible birds are counted at selected sites. For the ground surveys binoculars and a telescope were used. For both the ground and aerial surveys, photos were taken of larger flocks as an additional method of counting.



**Photo 1:** *Aerial sighting of Grey Crowned Cranes*

## 2.1 Aerial Survey

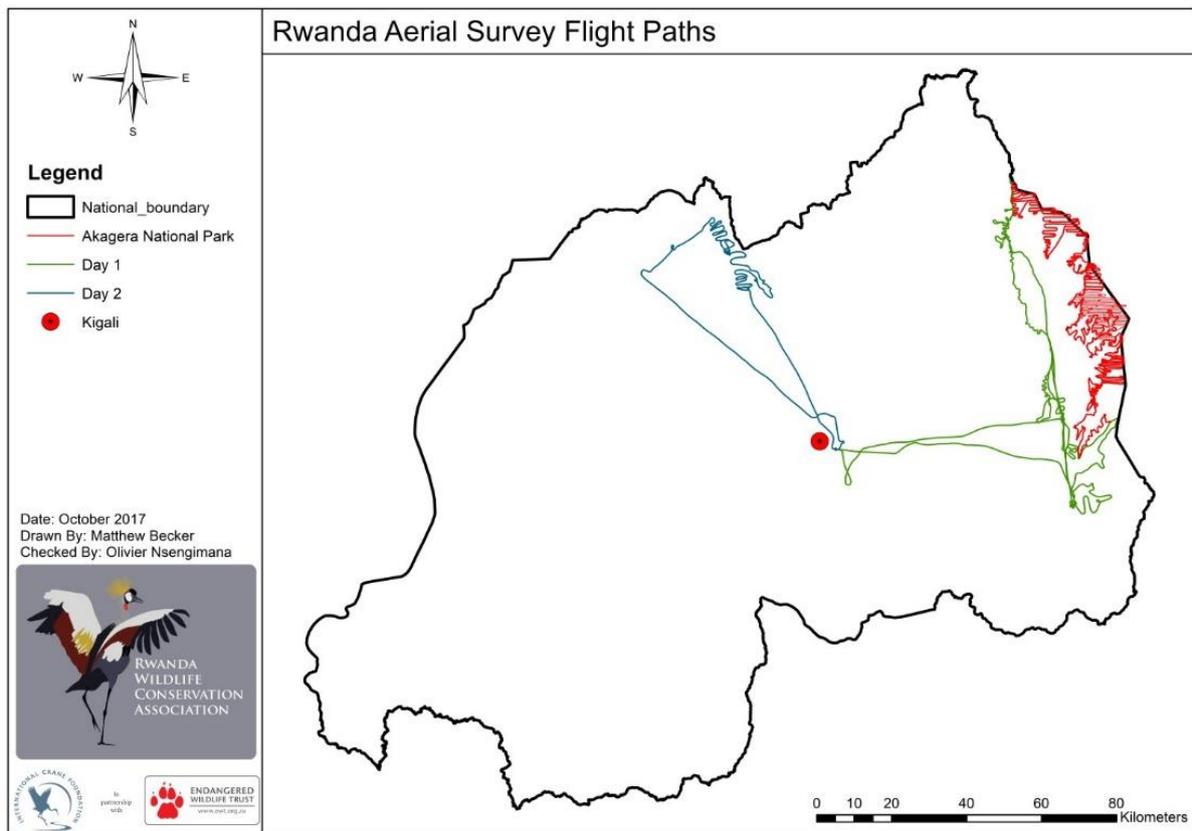
An aerial survey took place over two of the key habitats known to host Grey Crowned Cranes. Day 1 consisted of two simultaneous aerial surveys over Akagera National Park. We partnered with Akagera Management Company who conduct an aerial census of their park every two years. Simultaneously, we conducted an aerial survey around the perimeter of the park along adjacent wetlands and farmland. Day 2 involved an aerial survey of Rugezi marshland and its surrounding area. (See table 2 for more information).

**Table 2:** *Details of the aerial survey flights*

	<b>Day 1 (Tues 15<sup>th</sup> Aug)</b>	<b>Day 1 (Tues 15<sup>th</sup> Aug)</b>	<b>Day 2 (Wed 16<sup>th</sup> Aug)</b>
	<b>Akagera National Park shoreline and wetlands</b>	<b>Perimeter of Akagera National Park and Surrounds</b>	<b>Rugezi marshland and surrounds</b>
<b>Aircraft Type</b>	Aerospatiale AS 350 B3 “Ecureuil” (Squirrel) helicopter	R44 helicopter	R44 helicopter
<b>Average Speed</b>	81km/hour	60km/h	60km/h
<b>Average Height</b>	100 feet above land	100 feet above land	100 feet above land
<b>Flight Time</b>	6 hours	4.5 hours	2 hours

<b>Pilot</b>	Nico Jacobs	Celestin Kazungu	Celestin Kazungu
<b>Front Seat Observer &amp; Data Recorder</b>	Derek McPherson	Matthew Becker	Matthew Becker
<b>Rear Seat Observers</b>	Jes Gruner & Olivier Nsengimana	Richard Muvunyi & Deo Ruhagazi	Olivier Nsengimana & Jean Ferus Niyomwungeri

On each flight, the front seat observer was the data recorder, noting down each sighting and a GPS coordinate. The rear seat observers called out any sightings, dividing up the left and the right of the aircraft.



**Figure 2: Aerial survey flight paths**

## 2.2 Ground Survey

The ground survey took place over three consecutive days (Tues 15<sup>th</sup>-Thurs 17<sup>th</sup> August) at the same time as the aerial survey. Each day concentrated on a different region of the country to minimise any repeat counts. The sites visited were selected from prior observations and knowledge of Grey Crowned Cranes within the country. We also used community informants to provide knowledge on recent sightings. (See table 3 for more information).

Prior to the census, two days training took place with the RWCA team and Matthew Becker. Using his experience of crane censuses in South Africa, he worked with the team to standardise data collection methods for the ground census and to develop the 'cyber tracker' app for use on the smart phones. He also made sure that there was a common understanding among all participants about definitions used and how to record habitat.

**Table 3: Details of the ground surveys**

	<b>Day 1 (Tues 15<sup>th</sup> Aug)</b>	<b>Day 2 (Wed 16<sup>th</sup> Aug)</b>	<b>Day 2 (Wed 16<sup>th</sup> Aug)</b>	<b>Day 3 (Thurs 17<sup>th</sup> Aug)</b>
<b>Region</b>	a)Nyabarongo wetland and lakes  b)Suburbs of Kigali City	Eastern Province	Northern Province	Akanyaru wetland
<b>Areas</b>	Musenyi Rweru lake Cyintambwe - Rweru Kabuye - Jabana	Kagitumba Matimba Musheri – Nyamenge Rwempasha – Kazaza Gasiga, Rwempasha – Rukoto Karangazi	Rulindo Nyakinama	Rwabusoro Nyarugenge Mututu – Kibirizi Mamba Gakoma – Mamba Muganza Ndaro Mutobo
<b>Team 1</b>	Matthew Becker, Richard Muvunyi, Deo Ruhagazi, Jean Ferus Niyomwungeri, Bernard Ndayisaba, Joyeuse Imigambi, Olivier Ngabonziza	Jean Ferus Niyomwungeri, Olivier Ngabonziza, Veronika Ferdinandova	Emmanuel Rukundo, Joyeuse Imigambi, Maurice Uwineza	Deo Ruhagazi, Emmanuel Rukundo, Veronika Ferdinandova, Georgina Barnes
<b>Team 2</b>	N/A	Bernard Ndayisaba, Eric Ishimwe Kanyamibwa, Cecile Kayitanitwa	N/A	Olivier Ngabonziza, Bernard Ndayisaba, Providence Uwanyirigira

### 2.3 Information Recorded

For both the aerial surveys and ground surveys, the following information was recorded:

- Number of individuals (age class if possible)
- Activity (e.g. breeding, nesting, foraging)
- Type of habitat
- GPS coordinate

## **2.4 The Team**

The crane census required the collaboration and participation of a number of organisations and a wide range of people. It also relied heavily on volunteers, mainly recent graduates keen to learn and gain experience of conservation work. The team is detailed below.

### **Pilots**

Celestin Kazungu – Akagera Aviation  
Nico Jacobs - private

### **Akagera Management Company**

Jes Gruner – Park Manager  
Derek McPhereson - Consultant

### **Rwanda Wildlife Conservation Association**

Dr. Olivier Nsengimana – Executive Director  
Dr. Deo Ruhagazi – Field Veterinarian  
Jean Ferus Niyomwungeri – Community Conservation Officer  
Bernard Ndayisaba – Field Officer  
Dr. Eric Ishimwe Kanyamibwa - Volunteer  
Dr. Providence Uwanyirigira – Volunteer  
Cecile Kayitanitwa – Volunteer  
Maurice Uwineza – Volunteer  
Veronika Ferdinandova – Volunteer  
Georgina Barnes - Volunteer

### **Endangered Wildlife Trust / International Crane Foundation Partnership**

Matthew Becker – Field Officer (South Africa)  
Dr. Richard Muvunyi – Rwanda Country Coordinator  
Olivier Ngabonziza – Field Assistant, Rugezi  
Joyeuse Imigambi – Field Assistant, Nyabarongo wetland  
Emmanuel Rukundo – Field Assistant, Akanyaru wetland

### 3. RESULTS

#### 3.1 Total Grey Crowned Cranes Sightings

Table 4 shows the numbers of Grey Crowned Cranes sighted during the aerial and ground survey and a breakdown of the population structure.

**Table 4:** Total Grey Crowned Crane sightings

REGION	Singles	Pairs	Pair +1 juv	Pair +2 juv	Flocks	Total
Nyabarongo wetlands & lakes	0	2	0	0	0 (0 flock)	<b>4</b> (0.8%)
Kigali city suburbs	0	1	0	0	10 (1 flock)	<b>12</b> (2.5%)
Akagera National Park & surrounds	3	16	4	4	72 (3 flocks)	<b>135</b> (27.7%)
Eastern Province – Nyagatare & Kagitumba	0	11	2	1	56 (2 flocks)	<b>88</b> (18.1%)
Rugezi marshland	3	15	1	0	35 (4 flocks)	<b>71</b> (14.6%)
Northern Province – Rulindo	0	1	0	0	0	<b>2</b> (0.4%)
Akanyaru wetland	0	4	1	1	160 (6 flocks)	<b>175</b> (35.9%)
<b>TOTAL</b>	<b>6</b>	<b>50</b> (100 cranes)	<b>8</b> (24 cranes)	<b>6</b> (24 cranes)	<b>16 flocks</b> (333 cranes)	<b>487</b>

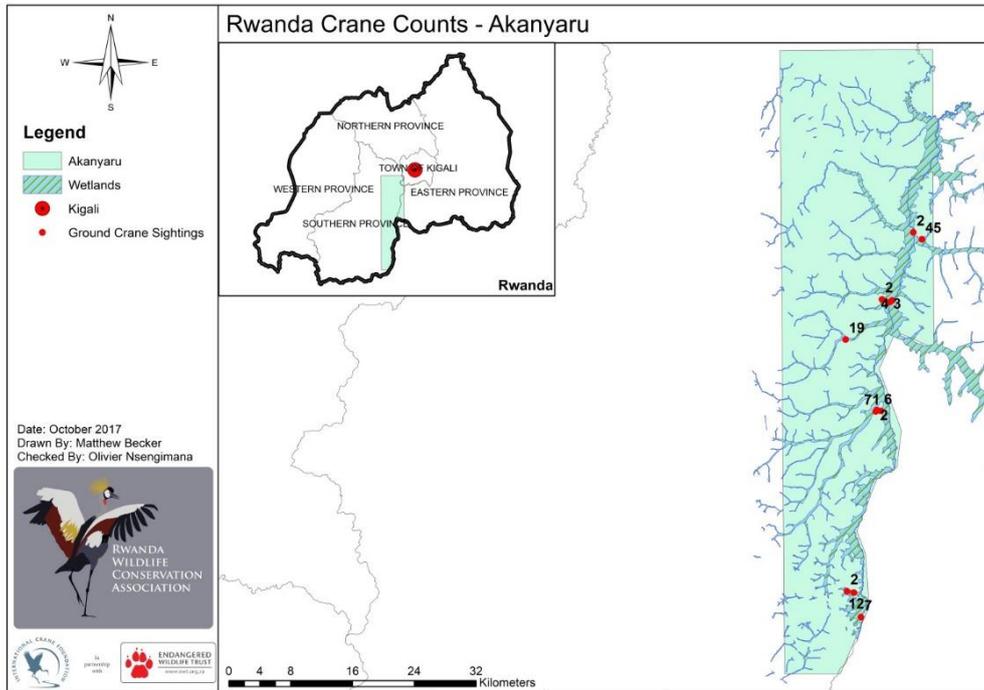
A total of 487 Grey Crowned Cranes were sighted during the 2017 crane census. A total of 68.4% of the population were found in 16 different flocks. A flock was recorded when 5 or more birds were sighted. The average flock size recorded was 20.8 individuals with the smallest being 5 and the largest being 71 individuals. The largest flock was recorded at Akanyaru Wetland close to the border with Burundi. Akanyaru wetland had the highest count (175 cranes) followed by Akagera National Park & surrounds (135 cranes). This was followed by Nyagatare in the Eastern Province (88 cranes), Rugezi marshland (71 cranes), Kigali City suburbs (12 cranes), Nyabarongo wetlands & lakes (4 cranes) and lastly, Rulindo in the Northern Province (2 cranes).

The survey was conducted in the non-breeding season, however 20 cranes (4.1%) of the total count were juveniles at the age of fledging.

### 3.2 Grey Crowned Crane sightings by Region

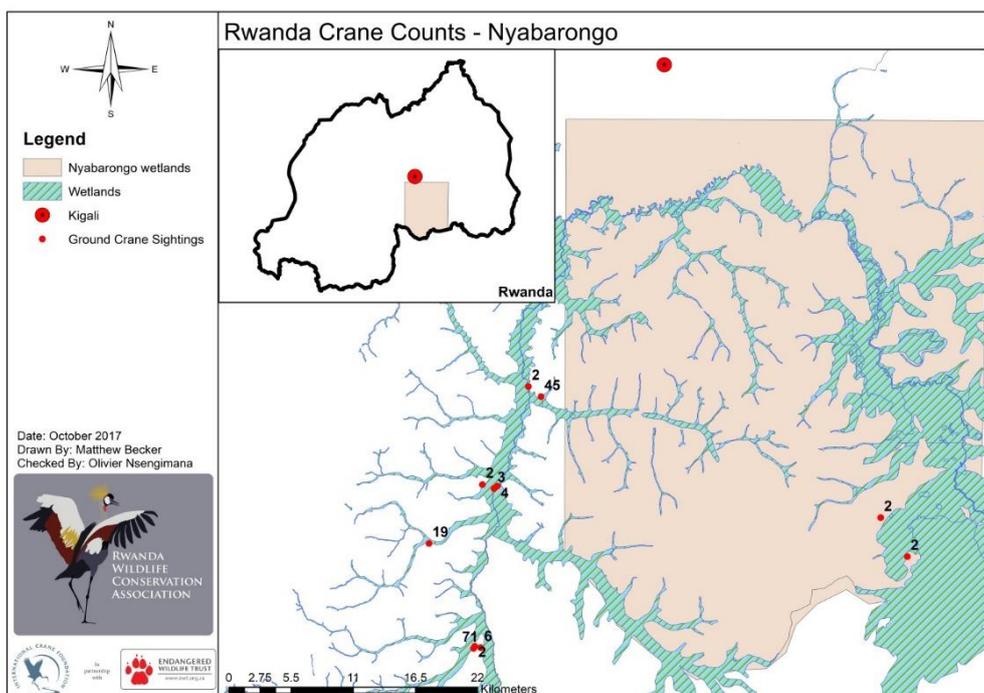
The following maps show the distribution of Grey Crowned Crane sightings in different regions:

The highest number of cranes in one region (175) was sighted at Akanyaru wetland.



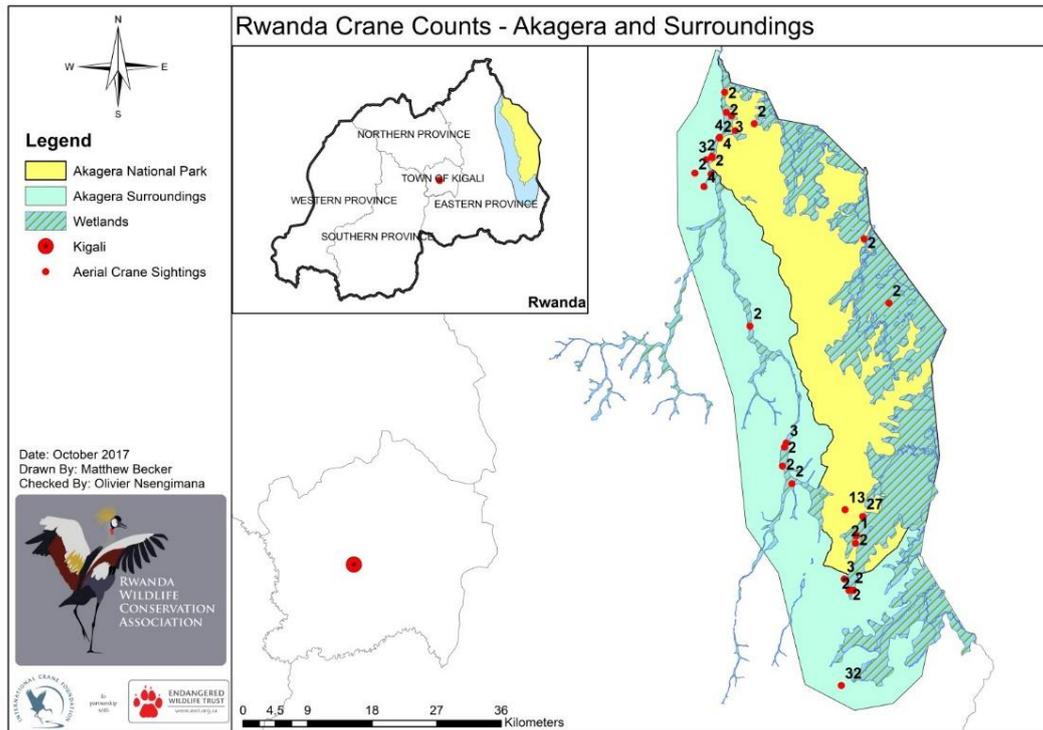
**Figure 3: Grey Crowned Cranes counts – Akanyaru wetlands**

Four cranes were sighted within the Nyabarongo wetlands although this map shows many more in the adjacent Akanyaru wetlands as highlighted above.



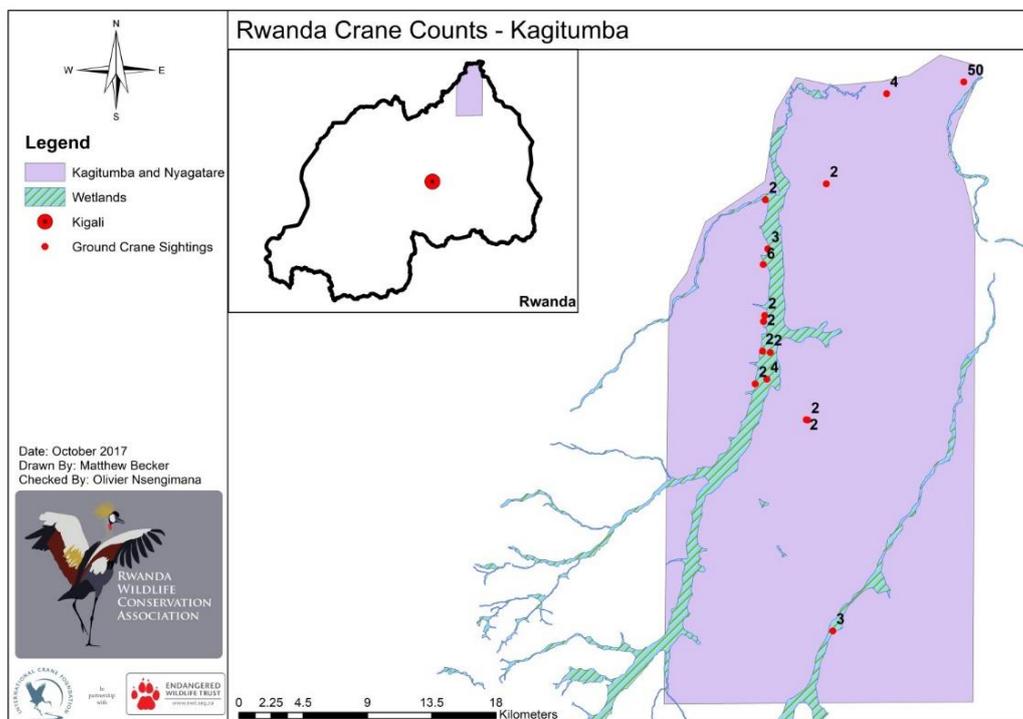
**Figure 4: Grey Crowned Cranes counts – Nyabarongo wetlands**

135 cranes were sighted at Akagera National Park and its surrounds. This was the second highest count after Akanyaru.



**Figure 5: Grey Crowned Cranes counts – Akagera National Park and surroundings**

88 cranes were sighted in the Eastern Province around Nyagatare and Kagitumba.



**Figure 6: Grey Crowned Cranes counts – Eastern Province, Kagitumba**



Rugezi is the only protected wetland that is outside of a designated protected area in Rwanda. It still faces many threats and a large number of illegal activities continue. During our aerial survey, we observed a lot of activities in Rugezi marshland and counted those activities. In only one hour during the aerial survey we counted:

- 341 people cutting grass
- 23 boats
- 77 livestock (cows, goat and sheep)

These numbers give an idea of how many people visit the marshland every day for different illegal activities. We also observed many people entering the wetland to collect water and to wash clothes. During our survey we also noticed many pathways across the marshland with people crossing from one end to the other.



**Photo 2:** *Grass cutting in Rugezi marsh*



**Photo 3:** *Grass market around Rugezi marsh*



**Photo 4:** *Walk way though Rugezi marsh*

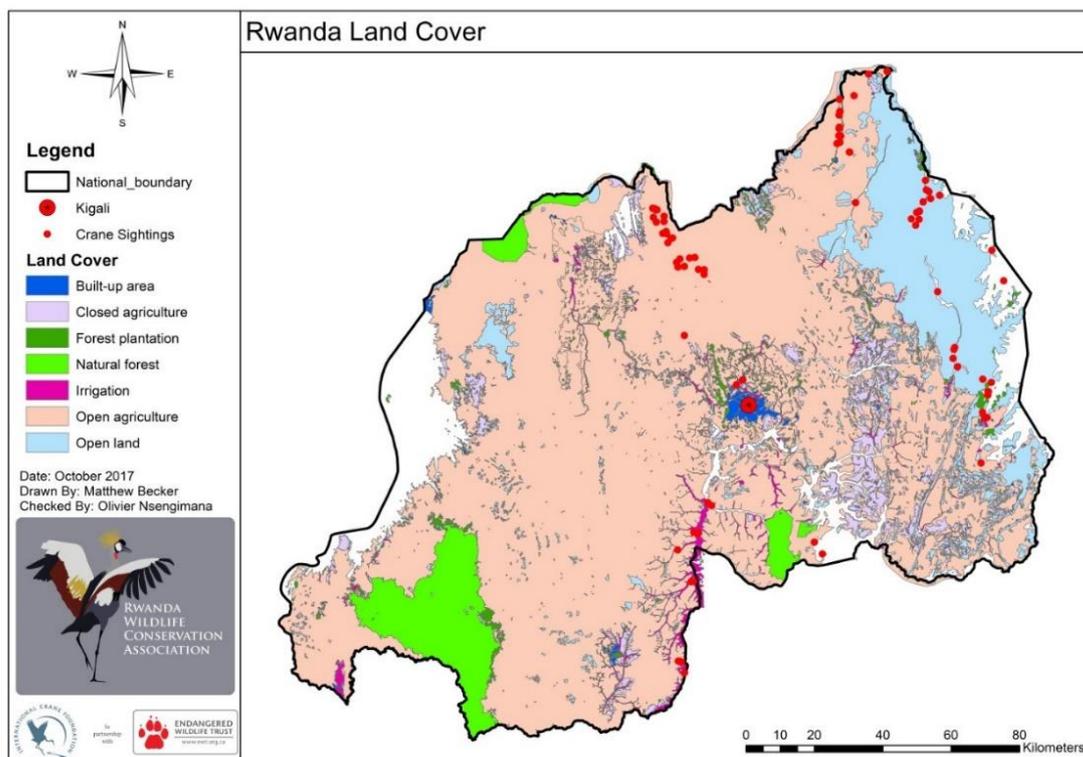
### 3.3 Habitat type

In addition to counting the cranes, we recorded the habitat type that they were frequenting. Table 5 shows the different kind of habitats where cranes were sighted.

**Table 5:** Grey Crowned Crane distribution by habitat type

REGION	Wetland	Water edge	Agriculture	Grassland	N/A (flying)	Total
Nyabarongo wetlands & lakes	0	0	2	0	2	4
Kigali city suburbs	0	0	12	0	0	12
Akagera National Park & surrounds	17	57	34	27	0	135
Eastern Province - Nyagatare	0	2	82	4	0	88
Rugezi marshland	31	0	40	0	0	71
Northern Province - Rulindo	0	0	2	0	0	2
Akanyaru wetland	120	0	49	0	6	175
<b>TOTAL</b>	<b>168</b>	<b>59</b>	<b>221</b>	<b>31</b>	<b>8</b>	<b>487</b>
	<b>34.5%</b>	<b>12.1%</b>	<b>45.4%</b>	<b>6.4%</b>	<b>1.6%</b>	

Half of the Grey Crowned Cranes sighted were on agricultural land. The main crops were rice, maize, soya, wheat and beans.



**Figure 9:** Grey Crowned Cranes sightings and habitat

## 4. DISCUSSION

The total number of Grey Crowned Cranes sighted during the national crane census was 487. This is in line with the estimates made by Morrison and Baker (2012). The total number of cranes in Rwanda may be higher than this number as some may not have been observed, however we can confidently say that there are at least 487 Grey Crowned Cranes in Rwanda. We are currently building up a network of crane conservation volunteers throughout the country and will utilise the knowledge of these volunteers and other local informants during the next census.

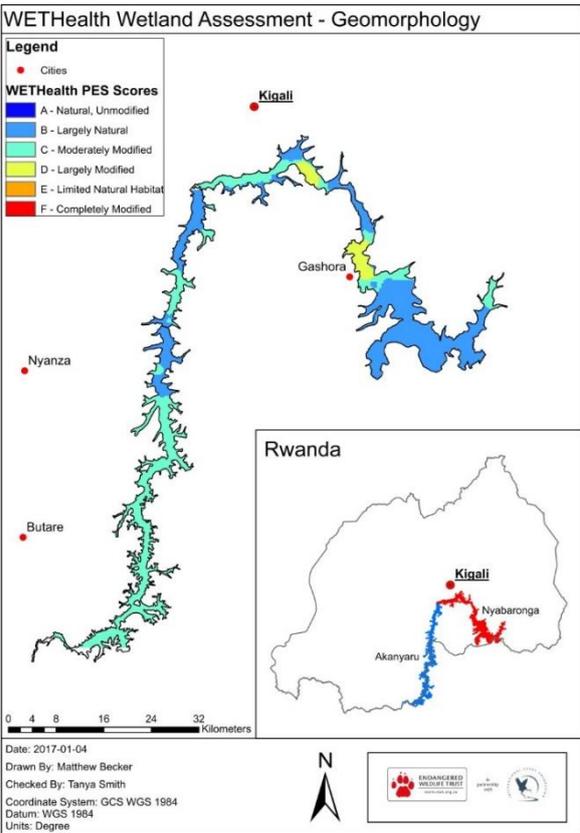
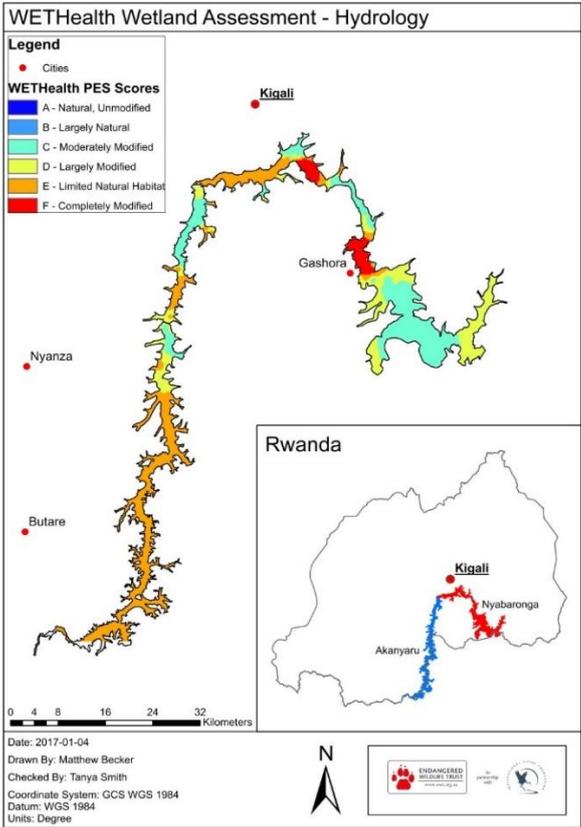
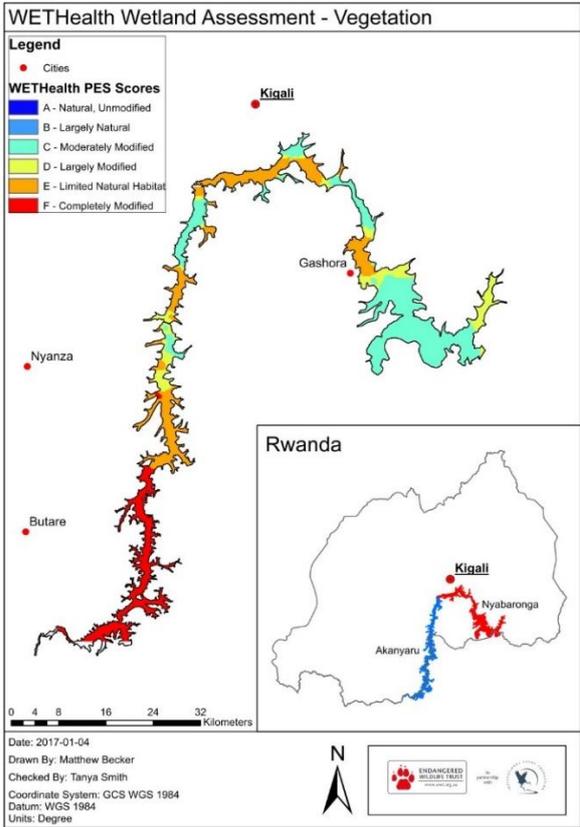
Given we conducted the census outside of the breeding season, the number of juveniles observed provides a great baseline for future surveys. If we were to observe an increase in the percentage of juveniles in future surveys, it would be a great indicator of successful breeding which would also mean that the factors behind breeding failure are reducing.

### 4.1 Akanyaru and Nyabarongo wetlands

Akanyaru wetland had the highest count of cranes (175). These numbers were surprising considering the current level of agricultural activities in this wetland. Despite the challenges of conservation at this site it is obvious that it is an important cranes area in the country. Therefore, there is an urgent need of scaling up conservation efforts to ensure the sustainability of Grey Crowned Cranes.

The counts at Nyabarongo wetlands were very low (4 cranes) and less than we expected. This could be because of different reasons. Nyabarongo wetlands are currently under high agricultural transformation which means it is hard for cranes to find appropriate habitat and there is lots of disturbance. Alternatively, the low count could be because the wetlands are also connected to the Akanyaru wetlands and there is a possibility of the cranes moving between both wetlands. Grey Crowned Cranes are known to have localised movement depending on food availability and other environmental conditions (Gichuki, 1996; 2000; Muheebwa, 2001). Thus, the cranes sighted at Akanyaru wetlands could also include those of Nyabarongo wetlands. Any management strategy should consider a whole Akanyaru and Nyabarongo wetland complex.

The urgent need to promote conservation strategies in this area is supported by a wetland health assessment conducted in both Akanyaru and Nyabarongo wetlands in by Smith et al., (2015). They identified high levels of geomorphological, hydrological and vegetation modification with large sections that are completely modified. (see figure 10). The high level of transformation highlighted on these maps are a result of wetland transformation into agricultural farms. Akanyaru and Nyabarongo have a lot of areas highlighted as important bird areas (BirdLife International, 2017). The level of vegetation and hydrology modification is severe and if no strategy is taken to balance agriculture and conservation, conditions will become hard for birds and other wetland biodiversity and we will soon lose all of those important bird areas.



**Figure 10:** Wetland health assessment at Akanyaru and Nyabarongo wetlands (Source: Smith & Becker, In Press)

## **4.2 Akagera National Park**

Akagera National Park and surrounds had the second highest count of cranes, however the numbers included some of the captive Grey Crowned Cranes that were reintroduced to the rehabilitation facility in the south of the park between January 2015 and August 2017 by RWCA. Most Grey Crowned Cranes were counted outside of the park fence. This might be due to the fact that cranes are most attracted to agricultural land adjacent to the park for food. The fact that the park has a lot of predators also could be a factor that make Grey Crowned Cranes choose to range out of the park. We only counted 68 Grey Crowned Cranes inside the park. This number includes 40 cranes that were counted at the crane rehabilitation facilities. 28 that were counted in other areas of the park is a small number compared to 54 that were counted during Akagera's 2015 park census. The change in the helicopter (from the R44 helicopter in 2013 and 2015 censuses), and/or the poor visibility on the day could be the causes of the low count. It was rainy and hazy while we were counting. It is also important to mention that the count represent the number of Grey Crowned Cranes found at the lakeshore and associated wetlands (the wetland fringe zone). The numbers of Grey Crowned Cranes in grassland habitats (The terrestrial zone) of the park are not included but will be in our future surveys.

## **4.3 Eastern Province**

Kagitumba and Nyagatare wetlands were shown to be other important areas for Grey Crowned Cranes. Due to the scale of farming in this area, there is a need for regular monitoring of Grey Crowned Cranes and ground conservation actions. Numbers of Grey Crowned Cranes at Akagera National Park combined with the numbers counted in the Eastern province are nearly the half of the whole population of Grey Crowned Cranes in Rwanda (45.8%) showing the need of increasing conservation efforts in the Eastern region.

## **4.4 Kigali city**

During the census, Grey Crowned Cranes were sighted within Kigali which is a positive find as Kigali continues its efforts to be green and protect urban wetlands. Grey Crowned Cranes are indicators of healthy wetlands and its presence in Kigali City is definitely a result of current efforts to protect urban wetlands which will also benefit other biodiversity. It will be interesting to monitor the numbers of Grey Crowned Cranes within the city as time passes.

## **4.5 Rugezi marshland**

Rugezi has long been considered the home for the largest remaining Grey Crowned Crane population in Rwanda. However, the sighting numbers during the census were surprisingly small (71), only 14.6% of the total counted population. One possible reason for this is the continued levels of illegal activities in Rugezi including poaching and hunting of Grey Crowned Cranes and other species, cutting grass for livestock and crafts, grazing livestock and other extraction activities. There are also many pathways through the marsh which constitutes a big threat as it causes fragmentation, disturbance, pollution and opportunistic illegal activities for those passing through the marshland. These activities make it hard for Grey Crowned Cranes to successfully breed.

The number of human activities counted during our aerial survey support the results we gathered from a small study we conducted in 3 schools located at the edge of the marshland (see table 5). We asked 636 students what their family use the marsh for. The results showed that 74% of students use

it for collecting water which shows a huge demand on the marsh with 472 students / families using it to collect water. Half of the students also report using the marsh for collecting grass, fishing and washing clothes.

**Table 5:** Data collected from a survey in 3 schools around Rugezi marsh

	<b>Number of children</b>	<b>Percentage of children asked</b>
<b>Collecting water</b>	472	74%
<b>Collecting grass</b>	360	57%
<b>Grazing cows</b>	248	39%
<b>Cultivating</b>	216	34%
<b>Fishing</b>	349	55%
<b>Hunting</b>	110	17%
<b>Washing clothes</b>	308	48%

In addition to the above, students reported using the marsh to wash, to play football, to find fire wood, to cut trees, to ferment sorghum or to pass through by boat or foot. A few students understood that the marsh is also a source of electricity.

The above results from the Grey Crowned Cranes census at Rugezi marshland and the intensity of illegal activities are worrying and show a need for large scale action and joint efforts between the government and conservation stakeholders to reduce the illegal activities. This would benefit the Grey Crowned Cranes and the whole wetland ecosystem in general, maintaining the integrity of the marshland. We will continue to observe and count the illegal activities in our future surveys with the aim of tracking any reduction on number of those activities as we scale up the conservation efforts at Rugezi marshland.

#### **4.6 Habitat Type**

The habitat type where most cranes were sighted was agricultural farmland. This often results into conflict with farmers where cranes are often reported for crop raiding. It is essential that any successful conservation measure has to involve the engagement of local communities and farmers to insure the safety of Grey Crowned Cranes that often visit their farms.

#### **4.7 Captive Cranes and Reintroduced Cranes**

The registration of illegally kept cranes has identified 262 Grey Crowned Cranes in people's houses and hotels throughout Rwanda. When considering the numbers cranes that die during the process of capturing and transportation for the pet trade and those that die once they are in captivity; it is certain that the number of cranes that have been removed from the wild over the last 20 years is larger than the number of cranes remaining in the wild. Thus, combatting and reducing the trade in Grey Crowned Cranes will have a direct positive impact on the Grey Crowned Crane population in Rwanda.

The efforts to combat the illegal trade in Grey Crowned Cranes by confiscating and reintroducing captive cranes back to the wild has resulted in removing about 196 Grey Crowned Cranes from captivity and the reintroduction of about 140 Grey Crowned Cranes to Akagera National Park. The remaining captive cranes are disabled and will never be able to live in the wild (and have not been included in this census).

At the time of the census, we had already reintroduced 120 Grey Crowned Cranes to Akagera National Park. Some of the reintroduced cranes were counted during the census and shows a contribution of our conservation efforts to the overall population of Grey Crowned Cranes in Rwanda. However due to a lack of good monitoring technology, we are unable to re-sight all cranes that have flown away from the rehabilitation facility. We have evidence of cranes sighted by our team in different parts of the park (both inside and outside of the fence), and reported sightings by tourists and park employees and guides. We have also recorded breeding activities between reintroduced cranes, which resulted into fledged chicks and have now left the rehabilitation facility. Akagera National Park has the largest protected wetlands in Rwanda, which are perfect habitat for Grey Crowned Cranes, and extend over the Akagera River into Tanzania. Our rehabilitation facility is located at Ihema Lake not far from those wetlands. We suspect that some of the reintroduced cranes might be attracted to those wetlands, much of which are inaccessible, and possibly even cross to Tanzania although we do not have evidence to support this. Now that the Akagera Management Company has a helicopter, they will increase the monitoring in these wetlands and in the future, we hope to get more information regarding Grey Crowned Crane numbers to contribute to our monitoring efforts.

## **5. RECOMMENDATIONS**

In addition to the recommendations and conservation considerations mentioned above, the census has highlighted other key recommendations.

More than 70% of the total counted Grey Crowned Cranes were sighted in parts of the country that are very close to the borders with neighbouring countries including Uganda, Tanzania, and Burundi. Grey Crowned Cranes have been sighted on several occasions flying between countries. Thus, there is an urgent transboundary collaboration to insure the safety of these cranes wherever they are in the region. To understand the distribution and movement patterns of Grey Crowned Cranes especially near by the borders, there is a need of establishing an East African scheme of colour marking (using colour bands) for cranes in each country. This would help with the monitoring and differentiating cranes moving between countries.

Despite an obvious increasing need of involving communities in conservation actions, the extent of transformation of wetlands into agriculture farm is worrying not only for Grey Crowned Cranes but for other wetland species such as amphibians, reptiles, insects and other birds. The demand for food needs to be addressed but also not be let outweigh other ecosystem services from wetlands which are also needed and are sustainable in a long term. Therefore, there is a need for consultation between the Ministry of Agriculture, the Ministry of Environment, the Rwanda Environmental Management Authority and the Rwanda Development Board Tourism and Conservation Department before wetlands are transformed into agricultural farmland. Even if decisions are made, there if the consultation is done between those institutions other options such as leaving a wetland section as a wildlife refuge would be one of the strategy that would benefit wetland biodiversity and agriculture in a long term.

## 6. CONCLUSION

The 2017 Grey Crowned Crane survey in Rwanda shows that at least 487 Grey Crowned Cranes occur in Rwanda. A single survey is not enough to determine whether the population is still declining, stable or increasing but it gives a good baseline measure with which to compare in subsequent years.

The survey has also highlighted different challenges for Grey Crowned Crane conservation at different sites and suggests different actions to be taken to ensure the long-term viability of this species and others that occupy the same habitat. Continuous surveys to take place every year are required to be able to determine trends of Grey Crowned Crane populations in Rwanda, monitor the extent of threats and identify priority areas for intervention as time goes on.

Grey Crowned Cranes are iconic species for wetlands and can serve as indicators of wetland conservation (Kanyamibwa, 1996). A reduction in numbers of Grey Crowned Cranes, does not only reflect on the species, but it also suggests that there is a problem with wetland management. It is important to consider human needs but if there is a poor balance between maintaining the integrity of wetlands and their use for agriculture and other exploitation activities, it does not only affect biodiversity, but it also indicates that the agriculture or other activities are not sustainable in the long term. Strong policies on the sustainable use of wetlands must be put in place and be implemented for both the sustainability of wetland biodiversity and wetland uses.

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