Photos Tara Massad

Waterbird colony count at Lake Urema, Parque Nacional da Gorongosa Mozambique, March and April 2019

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Summary

- A detailed count of the waterbird colony at the edge of Lake Urema was conducted on 12 March and on 16 April 2019. The count was conducted in the same area and according to the same procedures as a previous count on 7 April 2014.

- To date, only three systematic counts of this waterbird colony have been documented.

- The colony was located at the south-east corner of Lake Urema (Fig.1) and extended across a distance of 1.6 km from 18.89996 S; 34.49986 E to 18.91015 S; 34.51075 E (covering approximately 15 ha).

Fig. 1. Map of Gorongosa National Park, Moçambique, showing the location of Lake Urema and the waterbird breeding colony (Stalmans et al. 2014).

Summary - continued

- On 14 March, Cyclone Idai, a category 2 cyclone, made landfall along the coast of Beira, Moçambique felling trees and causing widespread flooding within Gorongosa National Park (GNP). Satellite images show the increase in surface area of Lake Urema and overflow of connected rivers.

- This report compares the results of the pre- and post-cyclone counts conducted in 2019, March and April respectively. It also compares the recent count with the earlier count of April 2014.

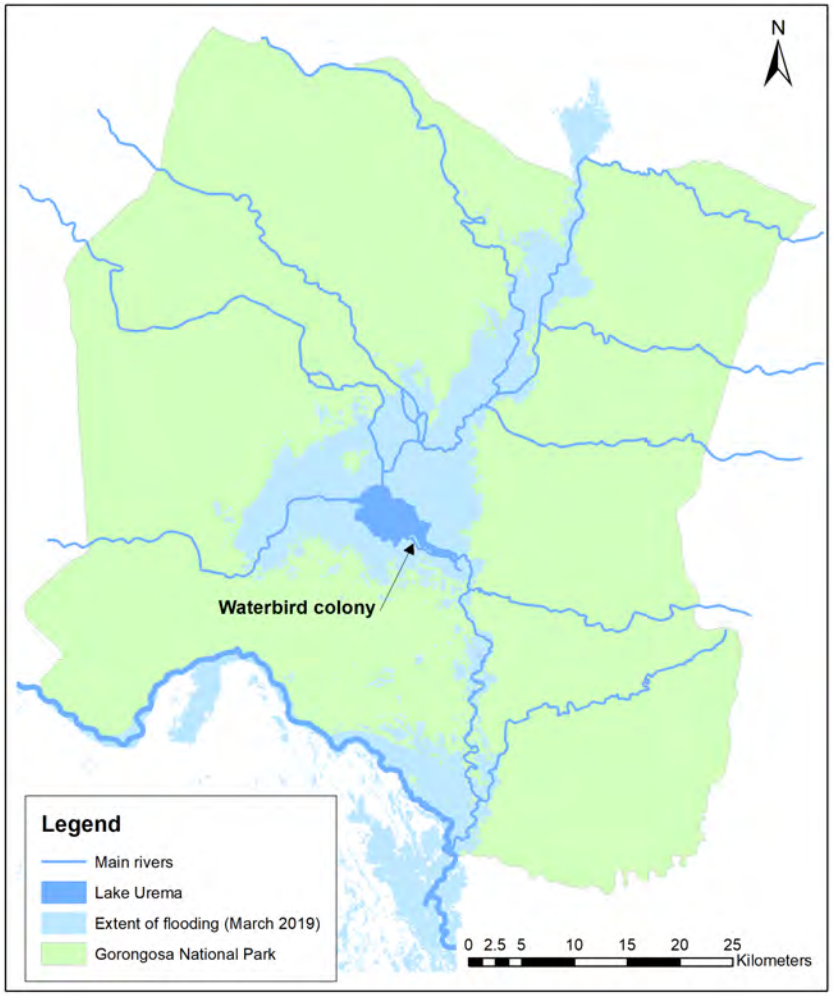


Fig. 2. Satellite detected waters extents, as of 19 and 20 March 2019 over Sofala province, GNP and Lake Urema (sources: Atmospheric and Environmental Research & African Risk Capacity & UNOSAT).

Summary- continued

- On 12 March 2019 a total of 2,432 nests of 7 different species were counted.
- On 16 April 2019, a total of 3,791 nests of 7 different species were counted.
- This represents an increase in 1,359 nests from the earlier March count despite the impacts of Cylone Idai's landfall in the region.

Table 1: side-by-side comparison of the numbers of waterbird nests in the same colony between March and April of 2019.

Species	Mar-19	Apr-19
African Darter *Anhinga rufa*	722	671
Reed Cormorant *Phalacrocorax africanus*	191	741
White-breasted Cormorant *P. lucidus*	189	308
Great Egret *Egretta alba*	112	99
Black-headed Heron *Ardea melanocephala*	9	0
Grey Heron *A. cinerea*	0	42
African Sacred Ibis *Threskiornis aethiopicus*	0	0
African Openbill *Anastomus lamelligerus*	581	1034
Yellow-billed Stork *Mycteria ibis*	628	896
Total nests (all species)	**2432**	**3791**

Summary - continued

- However, there were 1,212 fewer birds counted in April 2019 compared to April 2014 with the lower numbers mostly the result of fewer Reed Cormorants being present.

- In April 2014 there were 5,003 nests counted in 463 trees compared to the 3,791 nests found in 382 trees during the April 2019 count.

- The most numerous species observed in 2019 were the African openbill, while in 2014 there were far more Reed cormorant than any other species.

- The waterbird colony on Lake Urema continues to represent one of the most important conservation values of Gorongosa National Park. The early-season flooding as well as the subsequent additional flooding caused by the cyclone have created excellent conditions for a successful breeding season.

Table 1: side-by-side comparison of the numbers of waterbird nests in the same colony between April 2014 and April 2019.

Species	Apr-14	Apr-19
African Darter *Anhinga rufa*	547	671
Reed Cormorant *Phalacrocorax africanus*	2276	741
White-breasted Cormorant *P. lucidus*	230	308
Great Egret *Egretta alba*	330	99
Black-headed Heron *Ardea melanocephala*	0	0
Grey Heron *Ardea cinerea*	82	42
African Sacred Ibis *Threskiornis aethiopicus*	24	0
African Openbill *Anastomus lamelligerus*	531	1034
Yellow-billed Stork *Mycteria ibis*	983	896
Total nests (all species)	**5003**	**3791**

1. Survey methodology

All nests were individually counted per nesting tree and per species to the extent possible. In some cases trees were grouped together when difficult to discern the differences between nests on branches within close proximity to each other. Nests were counted from a boat within ca 20 – 100 m of the colony. A team of 5 observers were used in both the March and April counts.

Fig.3. Boat used to visit waterbird breeding colony with flooded *Faidherbia* trees in the background (photo Jason Denlinger)

Fig. 4. Representative view of the Lake Urema waterbird breeding colony. Species pictured include Openbill stork, Yellow-billed stork, and Great egret (photo Jason Denlinger)

2. Results

2.1 Numbers of nests recorded

Table 3. Results of count of colonial waterbirds breeding at Lake Urema, Gorongosa National Park, on 12 March, 2019.

Species	No. of nests	No. of trees with nests	Average nests/tree	Max. nests per tree
African Darter *Anhinga rufa*	722	126	5.7	44
Reed Cormorant *Phalacrocorax africanus*	191	21	9.1	45
White-breasted Cormorant *P. lucidus*	189	49	3.9	21
Great Egret *Egretta alba*	112	45	2.5	10
Black-headed Heron *Ardea melanocephala*	9	6	1.5	3
Grey Heron *A. cinerea*	0	0	0	0
African Sacred Ibis *Threskiornis aethiopicus*	0	0	0	0
African Openbill *Anastomus lamelligerus*	581	138	4.2	31
Yellow-billed Stork *Mycteria ibis*	628	147	4.3	29
Total (all species)	**2432**	**340**	**7.2**	**45**

Table 4. Results of count of colonial waterbirds breeding at Lake Urema, Gorongosa National Park, on 16 April, 2019.

Species	No. of nests	No. of trees with nests	Average nests/tree	Max. nests per tree
African Darter *Anhinga rufa*	671	108	6.2	25
Reed Cormorant *Phalacrocorax africanus*	741	76	9.8	41
White-breasted Cormorant *P. lucidus*	308	56	4.3	19
Great Egret *Egretta alba*	99	37	2.7	6
Black-headed Heron *Ardea melanocephala*	0	0	0	0
Grey Heron *A. cinerea*	42	37	1.1	4
African Sacred Ibis *Threskiornis aethiopicus*	0	0	0	0
African Openbill *Anastomus lamelligerus*	1034	147	7	27
Yellow-billed Stork *Mycteria ibis*	896	187	4.8	29
Total (all species)	**3791**	**382**	**9.9**	**70**

Table 5. Results of count of colonial waterbirds breeding at Lake Urema, Gorongosa National Park, on 7 April 2014.

Species	No. of nests	No. of trees with nests	Average nests/tree	Max. nests per tree
African Darter *Anhinga rufa*	547	118	4.6	25
Reed Cormorant *Phalacrocorax africanus*	2276	219	10.4	53
White-breasted Cormorant *P. lucidus*	230	54	4.3	22
Great Egret *Egretta alba*	330	131	2.5	12
Black-headed Heron *Ardea melanocephala*	0	0	0	0
Grey Heron *A. cinerea*	82	66	1.2	3
African Sacred Ibis *Threskiornis aethiopicus*	24	4	6	12
African Openbill *Anastomus lamelligerus*	531	112	4.7	13
Yellow-billed Stork *Mycteria ibis*	983	259	3.8	23
Total (all species)	**5003**	**463**	**10.8**	**58**

2.2 Species-by-species results

African darter nests were the most numerous in March, but by April 2019 had been outnumbered by several other species.

However, the darter nests decreased only slightly between March and April while others increased more significantly. The presence of numerous nearly fledging darter chicks indicate that these nests were mostly not negatively affected by the cyclone

There were 124 more darter nests in 2019 than in 2014 representing a 23% increase.

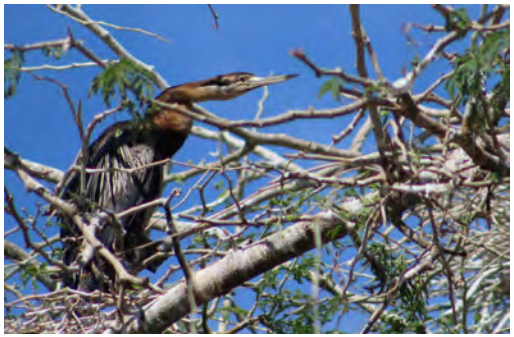
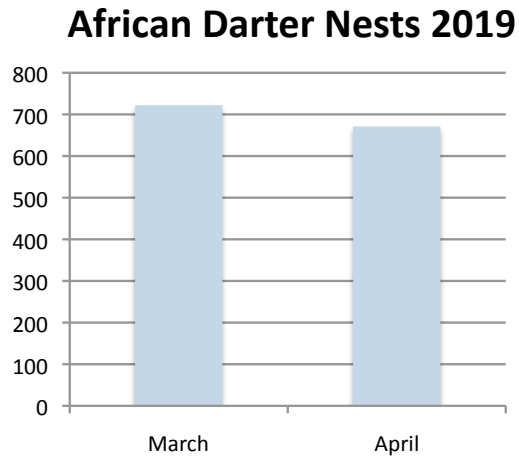
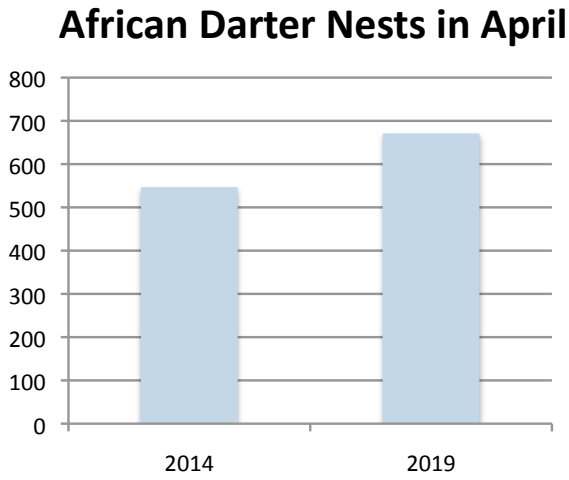


Fig.5. African darter (photo Tara Massad)





There were almost four times as many Reed cormorant nests present in April than March of 2019.

Despite this, there were 1,535 fewer Reed cormorant nests in April 2019 when compared to April 2014.

This species alone makes up for the overall decrease in nests between 2014 and 2019; with 5003 and 3791 nests respectively.

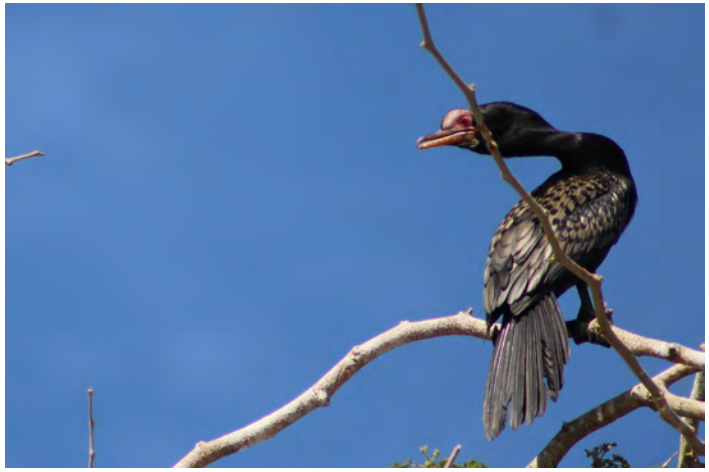
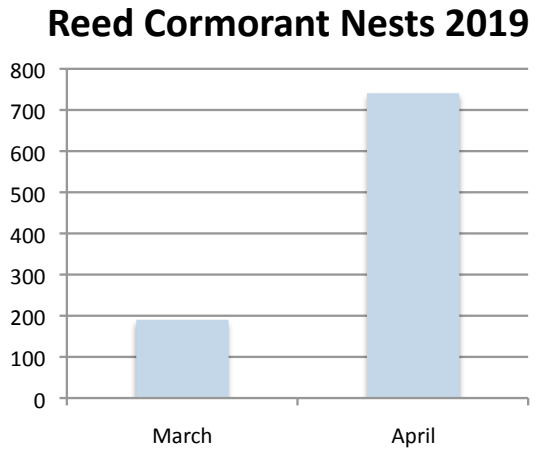
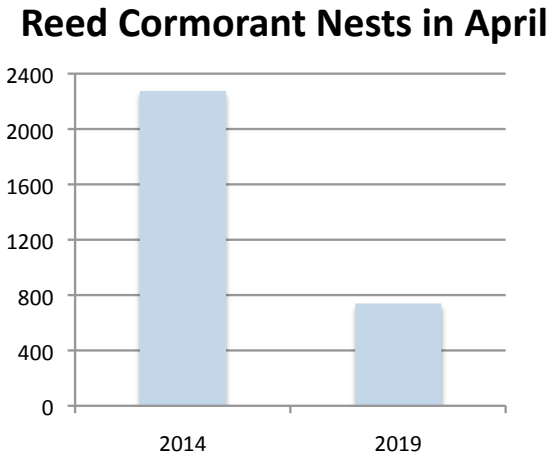


Fig.6. Reed cormorant (photo Tara Massad)



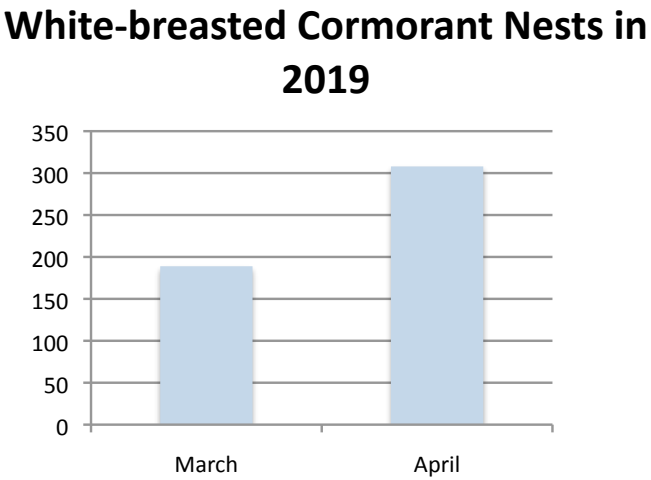


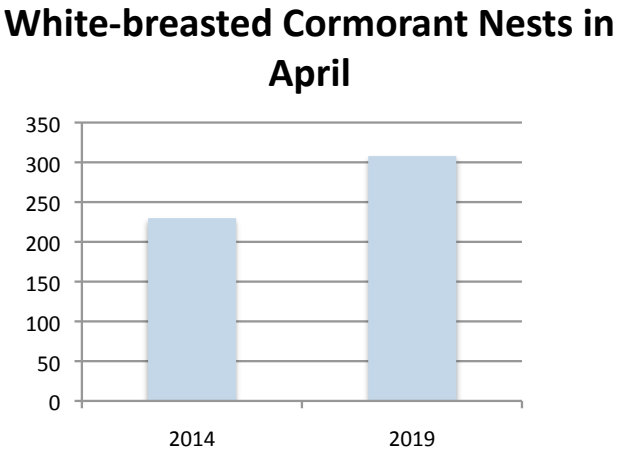
The number of White-breasted cormorant nests did not fluctuate greatly between March and April of 2019 nor when comparing years 2014 and 2019.

However, there was an increase by 63% from March to April of 2019.

There were 34% more White-breasted cormorants in April 2019 than April 2014.

Fig.7. White-breasted cormorants (photo Tara Massad)

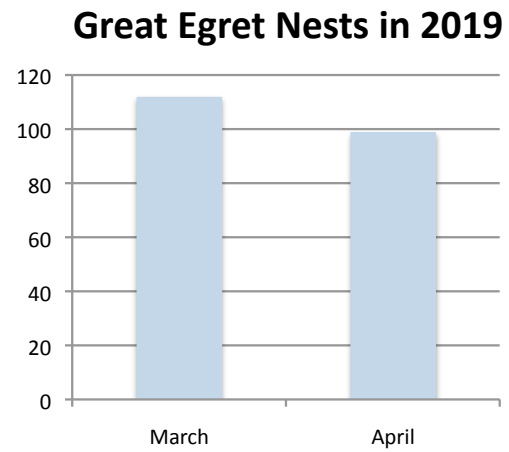


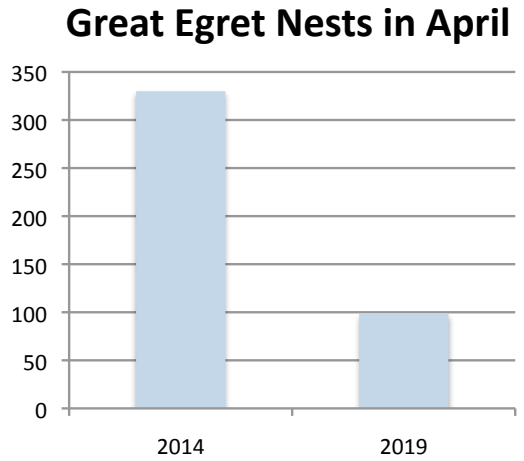


Only 13 more Great egret nests were observed in March than April of 2019.

The number of Great egret nests counted in 2014 were almost three times as many as in 2019.

Fig.8. Great egrets (photo Tara Massad)





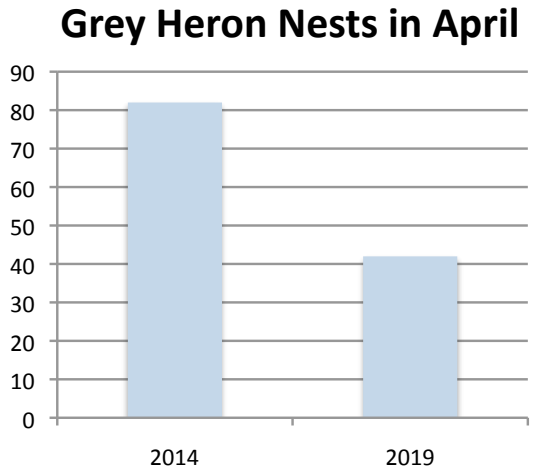
During the 2014 survey there were no Black-headed heron nests observed. In March of 2019 there were nine nests of this species observed. However, upon returning again in April 2019 there were no longer any nests of this heron species.

It could be that the Black-headed heron's were displaced by Grey herons which were not present during the March 2019 count. Later in April 2019,42 Grey heron nests were counted.

However, there were nearly half as many Grey heron nests observed in 2019 as were counted in 2014.

Furthermore, no African sacred ibis were observed during either count in 2019, whereas 24 were observed in 2014.

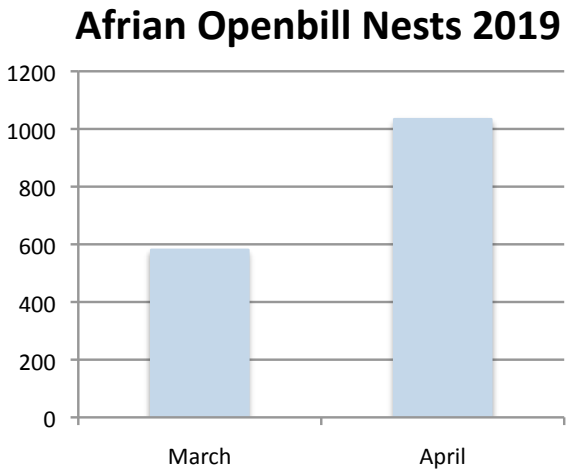
Fig.9. Grey heron (photo Tara Massad)

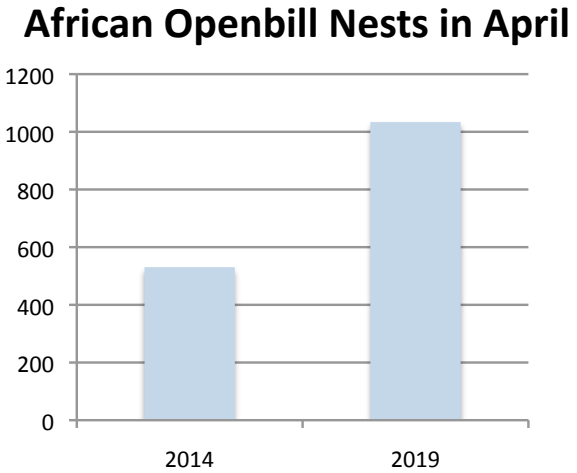


The number of African openbill nests counted in April 2019 nearly doubled compared to those counted in March of 2019.

Openbills showed the greatest increase of all species in 2019 compared to 2014 with almost twice as many nests observed in April 2019.

Fig. 10. African openbills (photo Tara Massad)



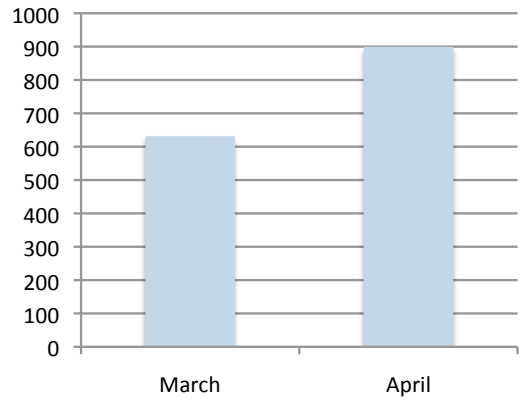


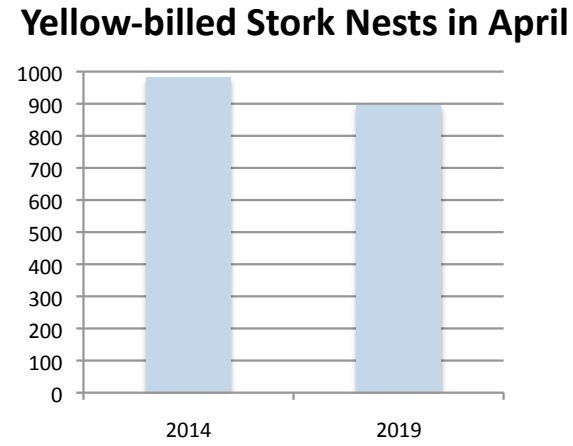
The number of Yelllow-billed stork nests increased approximately 43% from March to April 2019.

Yellow-billed stork nests decreased by less than 10% from 2014 to 2019.

This species has been the 2nd most populous in the colony during each count.

Fig.11. Yellow-billed storks (Photo Tara Massad)





2.2. Additional species observations

19 Southern-masked weaver nests were observed hanging from the trees in March, but absent in April of 2019.

Several Pink-backed pelicans were observed near the colony, but not with nests (Fig.12).

Various raptors including African fish eagles, a Martial eagle (Fig.13), and an African harrier hawk were cause for alarm calls amongst the waterbirds.

Baboons were seen preying upon eggs within nests of the colony (Fig.14). At least one crocodile was seen lurking below waiting for any fledglings that might drop into the waters below.

Fig. 12. Pink-backed pelicans (photo Tara Massad)

Fig. 13. Martial eagle (photo Tara Massad)

Fig.14. Baboon raiding nests (photo Jason Denlinger)

3. Discussion

The birds nested in open, flooded woodland dominated by ana trees *Faidherbia albida*, fever trees *Acacia xanthophloea* and paper-bark acacias *A. sieberana* . Only *F. albida* trees (Fig.15) seemed to be used for nesting (Stalmans et al 2014).

During the most recent survey a maximum of five nesting species were recorded per breeding tree. The maximum number of nests recorded for a single tree was 70, mostly Reed cormorants.

While 51 fewer trees were used for nesting after Cyclone Idai (April 2019) than before the cyclone (March 2019), there was a 56% increase in the overall number of nests counted post-cyclone with over half of the species observed increasing in number. Furthermore, no fallen trees or debris were observed in the area of the colony implying that Cyclone Idai had no direct impact on the overall nesting of the colony.

Table 5. Total waterbird nests and trees with nests counted in each survey for the same colony.

Total (all species) by survey	No. of nests	No. of trees with nests	Average nests / tree	Max. nests per tree
7 Apr-14	5003	463	10.8	58
12 Mar-19	2432	434	5.6	45
14 Mar-19	**Cyclone Idai makes landfall**			
16 Apr-19	3791	383	9.9	70

Fig. 15. Flooded *Faidherbia* trees with nests (photo Tara Massad)

However, there were 24% fewer total nests counted in April 2019 compared to April 2014 with over half of the species counted decreasing in number. While the most recent count revealed far fewer Reed cormorants, the African openbill increased significantly compared to 2014.

Assuming that each nest represented a pair of birds, the Urema colony contained approximately just over 7,500 breeding waterbirds in April 2019 compared to approximately 10,000 in April 2014.

Perhaps this decrease in waterbirds compared to the 2014 count was impacted by the effects of Cyclone Idai or it may be a normal fluctuation caused by other environmental factors. Either way this points to the need and importance of regular counts to evaluate the status of this waterbird breeding colony.

Since the 2014 count two species continue to exceed the 1% Ramsar criterion. The count of African darter nests of 671 (equating to 1,342 birds) exceeds the 1% Ramsar threshold for this species in southern and Eastern Africa (100 birds; Wetlands International 2012). Despite a small decrease in the count of Yellow-billed stork nests to 896 nests (equating to 1,792 birds); this number also exceeds the 1% Ramsar threshold for sub-Saharan Africa (1,000 birds; Wetlands International 2012).

The importance of Gorongosa National Park as a conservation area continues to be highlighted by the presence of this major waterbird breeding colony.

4. References

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5. Acknowledgements

The two waterbird nest counts conducted in 2019 would not have been possible without input and assistance of several people. The authors would like to thank the following:

- Boat captain Test Malunga for his effort in maneuvering the boat around nesting trees while also using his guiding knowledge to count waterbird nests;

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