

Original Research Article

A Survey of Birds in Kabale Municipality, South western Uganda

Abstract

Collection of baseline data is a crucial component ~~for of~~-monitoring the effects of habitat changes on biodiversity. A rapid survey to document common bird species present in Kabale municipality was conducted over a period of 3 months. A total of the 67 bird species (1770 individuals) were recorded, including an Endangered species: Grey Crowned Crane *Balearica regulorum*, and the Vulnerable species: Woolly-necked Stork *Ciconia episcopus*. This information will serve as a benchmark for monitoring of changes in species composition over time. In addition, the list of birds will be useful to residents of the area and the many ecotourists who visit Kabale town.

Keywords: Survey, Kabale municipality, Endangered, Vulnerable, ecotourists

Introduction.

Kabale municipality is located in Kabaledistrict of the Kigezi sub-region, approximately 420kms (260 miles), ~~by road~~, southwest of Kampala city. It lies at 1° 14' S, 29° 58' E; 2,000m (6,600 ft) ~~as above sea level~~. ~~This sub-region~~ ~~And~~ is composed of three (3) administrative units/divisions: Northern, Southern and Central Divisions. Being part of Kabaledistrict, the municipality experiences an average annual temperature of 17.2 °and a precipitation of about 1018 mm per year [1]. The municipality is located about 42 km from the famous Bwindi Impenetrable Forest via Kabale- Kisoro road and 7km from Lake Bunyonyi, both of ~~them, which are~~ biodiversity hotspots. Kabale municipality has been gazetted as a city, and as a result, huge infrastructure developments within and around the town are anticipated. ~~Habitat changes resulting from such developments impact on biodiversity including birds.~~ ~~Therefore, t~~ The main goal of this survey was ~~therefore~~ to generate baseline data on the birds in Kabale municipality considering that birds have been known to be indicators of other biodiversity [2]. The list should also be useful to residents of the area and the many ecotourists who visit Kabale town.

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Study area

Data was collected from 3 sites within the municipality namely: Kabale University main campus located at Kikungirihill in central division; White horse Inn located at Makanga hill in central division; and Uganda Christian University, Bishop Burham campus located on Rugarama hill. Currently, all these places have mainly exotic vegetation dominated by silk oak (*Grevillea robusta*), Pine (*Pinus* spp) and eucalyptus (*eucalyptus* spp). Land use around and within the municipality includes, small gardens mainly of mixed agriculture and the major cultivated crop species were banana/plantain (*Musa* spp), sorghum *Sorghum bicolor*. L, peas *Pisum sativum*. L, beans *Phaseolus vulgaris*, potato *Solanum tuberosum*. L and sweet potatoes *Ipomea batatas*. Minor crops grown include Yams *Dioscorea* spp, cassava *Manihot esculenta*, sugar cane *Saccharum officinarum* L, maize *Zea mays* L, fruits and Vegetables.

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Methods

Over the course of 6 field days, I conducted a general avian survey in Kabale municipality between 20th November 2019 and 20th January 2020, in six days using stationary point counts 200 m apart and opportunistic observations across. These observations were from structured walks within the three study sites. I spent 15 minutes at each point (visited twice), using binoculars [3] and registered visually and/or acustic birds. Every individual bird heard or seen and flying over was documented. I spent 15 minutes at each point and used using binoculars for viewing and [3] for referencing. Points were spaced at least 200 m apart. Each of these points were surveyed twice. Surveys were conducted between 06:00 (sunrise) and 12:30, and no surveys were conducted during avoiding heavily cloudy or rainy days.

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Results

A total of the 67 bird species (1770 individuals) were recorded, including: an Endangered species: Grey Crowned Crane (*Balearica regulorum*) Endangered species, and the Vulnerable species: Woolly-necked Stork *Ciconia*

episcopus Vulnerable species [4]. Majority of the Most bird species (98%) recorded are of Least Concern. (Table 1) includes a rough estimate of abundance given the short time spent at the different sites. Non passerines as were the most abundant with the Bronze Mannikin *Spermestes cucullata* and the African Firefinch *Lagonosticta rubricate* comprising slightly more than a quarter of the overall abundance. The birds species recorded are also included in the online checklist [5]. There was evidence of the Black-headed Heron breeding within the centre of Kabale municipality (Plate 1 and 2).

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Table 1. Bird species recorded within Kabale Municipality, South western Uganda. Families, common names, and scientific names follow [3]. Status follows IUCN REDLIST Category [6]: EN = Endangered, VU = Vulnerable, Least Concern = LC. B = signs of breeding recorded in this survey.

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#	Common Name	Species Name	Family	Status	Abundance	% Abundance
1	Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae	LC	30	1.69
2	Black-headed Heron	<i>Ardeamelanocephala</i>	Ardeidae	LC (B)	20	1.13
3	Woolly-necked Stork	<i>Ciconia episcopus</i>	Ciconiidae	VU	6	0.34
4	Open-billed Stork	<i>Anastomus lamelligerus</i>	Ciconiidae	LC	35	1.98
5	Marabou Stork	<i>Leptoptilos crumeniferus</i>	Ciconiidae	LC	32	1.81
6	Hammerkop	<i>Scopus umbretta</i>	Scopidae	LC	6	0.34
7	Hadada Ibis	<i>Bostrychia hagedash</i>	Threskiornithidae	LC	10	0.56
8	Sacred Ibis	<i>Threskiornis aethiopicus</i>	Threskiornithidae	LC	15	0.85
9	African Spoonbill	<i>Platalea alba</i>	Threskiornithidae	LC	6	0.34
10	Black-shouldered Kite	<i>Elanus axillaris</i>	Accipitridae	LC	5	0.28
11	African harrier Hawk	<i>Polyboroides typus</i>	Accipitridae	LC	2	0.11
12	Long crested Eagle	<i>Lophaelagus occipitalis</i>	Accipitridae	LC	3	0.17
13	Grey-crowned Crane	<i>Balearica pavonina</i>	Gruidae	EN	60	3.39
14	African green Pigeon	<i>Treron calvus</i>	Columbidae	LC	25	1.41
15	Red-eyed Dove	<i>Streptopelia semitorquata</i>	Columbidae	LC	12	0.68
16	Ring-necked Dove	<i>Streptopelia capicola</i>	Columbidae	LC	3	0.17
17	Brown-headed Parrot	<i>Poicephalus cryptoxanthus</i>	Psittacidae	LC	18	1.02
18	Eastern Grey Plantain Eater	<i>Crinifer zonurus</i>	Musophagidae	LC	5	0.28
19	White-browed Coucal	<i>Centropus superciliosus</i>	Cuculidae	LC	4	0.23
20	Barn Owl	<i>Tyto alba</i>	Strigidae	LC	2	0.11
21	White-rumped Swift	<i>Aerodramus podiceps</i>	Apodidae	LC	50	2.82

22	Little swift	<i>Apus affinis</i>	Apodidae	LC	25	1.41
23	Speckled Mouse bird	<i>Colius striatus</i>	Coliidae	LC	39	2.2
24	Woodland King fisher	<i>Halcyon senegalensis</i>	Alcedinidae	LC	8	0.45
25	Little Beaeater	<i>Meropspusillus</i>	Meropidae	LC	6	0.34
26	Black and White Casqued Hornbill	<i>Bycanistessubcylindricus</i>	Bucerotidae	LC	8	0.45
27	Grey-headed wood pecker	<i>Picuscanus</i>	Picidae	LC	2	0.11
28	Barn Swallow	<i>Hirundorustica</i>	Hirundinidae	LC	13	0.73
29	Mosque Swallow	<i>Cecropis senegalensis</i>	Hirundinidae	LC	15	0.85
30	House martin	<i>Delichonurbicum</i>	Hirundinidae	LC	32	1.81
31	African Pied wagtail	<i>Motacillaaguimp</i>	Motacillidae.	LC	25	1.41
32	Common bulbul	<i>Pycnonotus barbatus tricolor</i>	Pycnonotidae	LC	44	2.49
33	Heuglins Robin Chat	<i>Cossyphaheuglini</i>	Muscicapidae	LC	16	0.9
34	White-browed Robin chat	<i>Cossyphaheuglini</i>	Muscicapidae	LC	12	0.68
35	African Thrush	<i>Turdus pelios</i>	Turdidae	LC	24	1.36
36	Garden Warbler	<i>Sylvia borin</i>	Sylviidae	LC	7	0.4
37	Winding Cisticola	<i>Cisticola marginatus</i>	Cisticolidae	LC	12	0.68
38	Tawny-flanked Prinia	<i>Prinia subflava</i>	Cisticolidae	LC	14	0.79
39	Grey-backed Cameroptera	<i>Camaroptera brevicaudata</i>	Cisticolidae	LC	10	0.56
40	African Dusky Fly catcher	<i>Muscicapaadusta</i>	Muscicapidae	LC	14	0.79
41	African Paradise flycatcher	<i>Terpsiphoneviridis</i>	Muscicapidae	LC	6	0.34
42	African Blue Flycatcher	<i>Elminialongicauda</i>	Muscicapidae	LC	4	0.23
43	Bronze Sunbird	<i>Nectariniakilimensis</i>	Nectariniidae	LC	30	1.69
44	Red-chested Sunbird	<i>Cinnyriserythroceru</i>	Nectariniidae	LC	22	1.24
45	Collared Sunbird	<i>Hedydipnacollaris</i>	Nectariniidae	LC	4	0.23

46	Black-headed Bushshrike	<i>Laniuserythrogaster</i>	Malaconotidae	LC	12	0.68
47	Tropical Boubou	<i>Laniarius major</i>	Malaconotidae	LC	4	0.23
48	Common Fiscal	<i>Laniuscollaris</i>	Laniidae	LC	10	0.56
49	Pied Crow	<i>Corvus albus</i>	Corvidae	LC	60	3.39
50	Black Kite	<i>Milvus migrans</i>	Accipitridae	LC	10	0.56
51	African Drongo	<i>Dicrurusadsimilis</i>	Dicruridae	LC	2	0.11
52	Long-tailed glossy Starling	<i>Lamprotorniscaudatus</i>	Sturnidae	LC	23	1.3
53	Grey-headed Sparrow	<i>Passer griseus</i>	Passeridae	LC	32	1.81
54	Black-headed Weaver	<i>Ploceusmelanocephalus</i>	Ploceidae	LC	22	1.24
55	Fan-tailed widowbird	<i>Euplectesaxillaris</i>	Ploceidae	LC	6	0.34
56	Cardinal Quelea	<i>Quelea cardinalis</i>	Ploceidae	LC	3	0.17
57	Red-billed Quelea	<i>Quelea quelea</i>	Ploceidae	LC	100	5.65
58	Red-billed Firefinch	<i>Lagonostictasenegala</i>	Estrildidae	LC	2	0.11
59	African Firefinch	<i>Lagonostictarubricata</i>	Estrildidae	LC	200	11.3
60	Red-cheeked Cordonbleu	<i>Uraeginthusbengalus</i>	Estrildidae	LC	60	3.39
61	Common Waxbill	<i>Estrildaastrild</i>	Estrildidae	LC	150	8.47
62	Pin-Tailed Whydah	<i>Vidua macroura</i>	Viduidae	LC	4	0.23
63	Bronze Mannikin	<i>Spermestescucullata</i>	Estrildidae	LC	300	16.9
64	Yellow-fronted Canary	<i>Crithagramozambica</i>	Fringillidae	LC	4	0.23
65	Grey-green Bush Shrike	<i>Chlorophoneusbocagei</i>	Malaconotidae	LC	8	0.45
66	Augur Buzzard	<i>Buteo augur</i>	Accipitridae	LC	2	0.11
67	Grey-backed Fiscal	<i>Laniusexcubitoroides</i>	Laniidae	LC	15	0.85



Plate 1. Closer view of the Nesting tree *Cassia sp*



Plate 2. Full view of the nesting tree *Cassia sp*

Discussion

It is possible that certain species were consistently silent or cryptic during the transect walks. However, I am fairly confident that a significant majority of the birds that were present during the limited field work season were detected. The abundance of the Grey-crowned Crane may have also been underestimated considering that their numbers have been recorded to be increasing [7]. This observation is probably because this study limited itself to the municipality within which are no wetlands. Birds such as African Paradise flycatcher *Terpsiphone viridis*, African Dusky Flycatcher *Muscicapa adusta*, and Yellow-fronted Canary *Crithagra mozambica* that have been recorded in Bwindi forest were also recorded within the municipality. This is probably because they are forest edge species, well adapted to riverine and open forests, woodlands or savannah habitats, and are regularly found in cultivated gardens in highly populated areas [3]. Although the Black-headed Heron was recorded breeding in town, it appears to be foraging in habitats outside of the municipality.

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Conclusion

It is imperative to conduct monthly surveys to take care of some migrant bird species. Documenting bird species local or indigenous names will be beneficial to the local communities in adopting ecotourism. Extending the survey to the bigger part of the municipality to include all habitat types is also highly recommended.

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References

1. (<https://en.climate-data.org/africa/uganda/western-region/kabale-29827/#>).

2. Mekonen, S. Birds as Biodiversity and Environmental Indicator. *Journal of Natural Sciences Research*. 2017 (7): 28-34
3. Stevenson, T. and J. Fanshawe 2002. *Birds of East Africa: Kenya, Tanzania, Uganda, Rwanda, and Burundi*. 2002. Princeton: Princeton University Press.
4. *BirdLife International* (2016). "*Balearica regulorum*". *IUCN Red List of Threatened Species*. 2016: e.T22692046A93334893.
5. (<https://avibase.bsc-coc.org/checklist>)
6. IUCN 2020. The IUCN Red List of Threatened Species. Version 2020-2. <https://www.iucnredlist.org>. Downloaded on 09 July 2020.
7. Mugerwa, F. Community conservation agreements a lifeline for Uganda's Grey Crowned Crane. 2019 <https://news.mongabay.com/2019/12/community-conservation-agreements-a-lifeline-for-ugandas-grey-crowned-cranes/>