



AFRICAN BIRD CLUB RESEARCH STUDY REPORT

Preliminary Assessment of the Southern Ground Hornbill (*Bucorvus leadbeateri*)
in and around Vwaza Marsh Wildlife Reserve, Malawi.

By

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ABSTRACT

The study was conducted in Vwaza Marsh Wildlife Reserve (VMWR) to assess the conservation status of Southern Hornbill Ground (*Bucorvus leadbeateri*), focussing population status, distribution, and conservation threats. Data was collected between September and November, 2023 using ground surveys. While habitats were surveyed on foot, all drivable roads were surveyed using a four-wheel vehicle drive (a 4×4). Field and observational data was analysed statistically as well as spatially. Findings revealed only 3 groups of *B. leadbeateri* occurring in the south-central section of the reserve with another group reported outside. Observations from the field suggest habitat conditions to be moderate. Wildfires, however, seemed to be a potential conservation threat for the species in the reserve. It is thus recommended that further studies and monitoring be continued so as to get enough data that can yield thorough results to be used into serious pragmatic conservation action plan for the species.

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TABLE OF CONTENTS

ABSTRACT.....	i
ACKNOWLEDGEMENTS	ii
LIST OF TABLES AND FIGURES.....	iv
LIST OF ABBREVIATIONS AND ACROYNMS	v
1.0 INTRODUCTION	1
1.1 Background of the Study	1
1.2 Objectives	2
1.2.1 General Objective	2
1.2.2 Specific Objectives	2
1.3 Significance of the Study	2
2.0 METHODOLOGY	3
2.1 Study Area	3
2.2 Survey Design	3
2.3 Data collection	4
2.4 Data analysis	4
3.0 RESULTS AND DISCUSSION	5
3.1 Population Size and Abundance <i>B. leadbeateri</i> in VMWR	5
3.2 Distribution and Extent of <i>B. leadbeateri</i> in VMWR	6
3.2.1 Within the Reserve	6
3.2.2 Outside the Reserve	6
3.3 Habitat Status and Potential Nesting Sites of <i>B. leadbeateri</i> in VMWR	8
4.0 CONCLUSION AND RECOMMENDATION.....	9
4.1 Conclusion	9
4.2 Recommendation	9
5.0 REFERENCES CITED.....	10

LIST OF TABLES AND FIGURES

Table 1: Site distribution of <i>B. leadbeateri</i> in VMWR.....	5
Figure 1: Map of the study area	3
Figure 2: Visual description of all the locations where <i>B. leadbeateri</i> were recorded; Chinyawima hill valley – a large open glade of grassland (top), Zaro pool area – a wetland (middle), Chalepweteka valley – a mixed brachystegia woodland with scattered acacia sp.(bottom).	7

LIST OF ABBREVIATIONS AND ACROYNMS

Abbreviation	Meaning
<i>et al.</i>	<i>et alii</i> , and others
DNPW	Department of National Parks and Wildlife
GPS	Global Positioning System
IBA	Important Bird Area
IUCN	International Union for Conservation of Nature
Km	Kilometre
SHG	Southern Hornbill Ground
UNESCO	United Nations Educational, Scientific and Cultural Organizations
UTM	Universal Transverse Mercator
VMWR	Vwaza Marsh Wildlife Reserve
WGS	World Geodetic System

1.0 INTRODUCTION

1.1 Background of the Study

The Southern Ground Hornbill, *Bucorvus leadbeateri*, is one of the two species (the other being the Northern/Abyssinian Ground Hornbill, *Bucorvus abyssinicus*) in the genus *Bucorvus*, family *Bucorvidae*, which are both found solely within Africa, and is the largest species of hornbill worldwide (**Botha et al., 2011**). Throughout its range, *B. leadbeateri* occurs in habitats broadly classified as grassland and savannah (but is absent from arid semi-deserts and extensive forests), favouring open areas where prey is easily detected (**Botha et al., 2011; Kemp, 2005**). Based on its large charismatic-sized body, *B. leadbeateri* serves as tourism flagship species for biodiversity conservation and acts as a bio-indicator species for savannah biomes (**Engelbrecht et al. 2007; Verissimo et al. 2009**). As the species is on the IUCN red-list of threatened species as ‘Vulnerable’ species with a declining population (**BirdLife International, 2022**), it has attracted much attention by the ornithologists towards its conservation globally. Summarized detailed information on *B. leadbeateri* can be found on the International Environmental Library Consortium (IELC) website https://ielc.libguides.com/srch.php?q=Southern+Ground+Hornbill&group_id=0&guide_id=0.

In Malawi, rapid deforestation for agriculture has restricted southern ground-hornbills to national parks, wildlife, and forest reserves (**Kalamira 2005**). The status of Southern Ground Hornbills in Malawi’s protected areas is not explicitly detailed in the provided context by **Kalamira, (2005)** and there is no available published population estimate to date. Speculatively, they could be in hundreds countrywide owing to their rareness and **Kalamira, (2005)** the suggests an ongoing effort to understand and manage hornbill populations, including the Southern Ground Hornbill, within specific protected areas.

Vwaza Marsh Wildlife Reserve (VMWR), located in the north, is one of the reserves where presence of Southern Ground Hornbill (*Bucorvus leadbeateri*) has been reported (**Engel, et al., 2012; Dowsett-Lemaire, 2014**). Classified as one of the Important Bird Areas (IBA) (**Dowsett-Lemaire et al. 2001**) and also as part of the UNESCO World Heritage Sites (see <https://whc.unesco.org/en/tentativelists/5605/>), the reserve is a home to other several bird species as well (see **Dowsett-Lemaire, 2014; Engel et al., 2012**).

However, listed as ‘Vulnerable’ on the IUCN Red List (**BirdLife International, 2022**), conservation of *B. leadbeateri* is of very high priority not only in Vwaza but also across its range

worldwide. Although this is the case, there has been no detailed study of the *B. leadbeateri* in VMWR despite the species reportedly facing myriad threats (including habitat loss, persecution and accidental poisoning elsewhere (**Chiweshe 2007; Botha *et al.*, 2011; Hulley and Craig 2007; Coetzee *et al.*, 2014**). Consequently, scientific information regarding the species is insufficient to permit any serious conservation action. With only speculative reports on both the status of the species' population and habitat, it is difficult to inform managers on the pertinence of taking deliberate action towards management of the species' habitat. More so, it is equally difficult to inform pragmatic action towards conservation of the species if the underlying factors influencing degradation of its habitat are not well understood.

Thus, this study was proposed to fill this information gap towards conservation of this globally threatened species.

1.2 Objectives

1.2.1 General Objective

The overall objective of this study was to assess the conservation status of *B. leadbeateri* in Vwaza Marsh Wildlife Reserve.

1.2.2 Specific Objectives

- i) To estimate the population size and abundance of *B. leadbeateri* in Vwaza Marsh Wildlife Reserve.
- ii) To determine the distribution and extent of *B. leadbeateri* occurrence in Vwaza Marsh Wildlife Reserve.
- iii) To identify and assess the habitat status/conditions as well as potential nesting sites of *B. leadbeateri* in Vwaza Marsh Wildlife Reserve.

1.3 Significance of the Study

The study will provide essential baseline data to start addressing conservation issues for *B. leadbeateri* in the reserve. The information generated will help conservation managers in identifying and understanding underlying potential threats for *B. leadbeateri* and assists them in developing a working systematic monitoring plan as well as pragmatic conservation strategies for the species. The study also has a significant positive implication on science as it will form a platform from which more advanced studies aimed at improving *B. leadbeateri* conservation in Vwaza may be inferred and conducted.

2.0 METHODOLOGY

2.1 Study Area

The study area, Vwaza Marsh Wildlife Reserve, is a State-owned natural wildlife reserve situated in northwest of Malawi, bordering with Zambia to the west (**Figure 1**). Gazetted as a Reserve in 1977 and expanded in 1985 (**Mephram et al., 1992**), it covers an area of 986 km² (in Rumphi district) with a varying altitude range of 1100 – 1600 m above sea level (**McShane & McShane-Caluzi, 1988**). Mean annual rainfall is about 800-1100 mm across the reserve, falling from November to April (**Anon., 2016**).

Further, the reserve is classified as a Ramsar Site, one of the Important Bird Area (IBA) (**Dowsett-Lemaire et al. 2001**), and also a part of the World UNESCO heritage site (see <https://whc.unesco.org/en/tentativelists/5605/>).



Figure 1: Map of the study area

2.2 Survey Design

Fieldwork was done in the dry season between September and November 2023. Dry season period was preferred mainly for three reasons;

- 1) to coincide with the reported breeding season of *B. leadbeateri* which is September – December (the main egg laying period across its range), (**Vernon & Herremans, 1997**).
- 2) to maximize visibility of *B. leadbeateri* as most of vegetation in VMWR shed off leaves during this period; and
- 3) to allow ease accessibility of the study area as some areas become impassable during the rainy season.

Data was collected primarily using ground surveys carried out randomly in all the reserves' habitat types as defined by **McShane & McShane Caluzi, (1988)**. Ground surveys were preferred as Southern Ground Hornbills are carnivorous and mostly hunt on the ground where they find majority of their food. While all habitat landscapes were surveyed on foot, all drivable roads were surveyed using a four wheel-drive vehicle driven slowly at range speed of 15 – 40 km/h. Surveys were repeated for at least 5 times in all habitat types and roads. GPS and compass direction were used for field navigation and recording geographical coordinates.

2.3 Data collection

Collected data includes total count of *B. leadbeateri* or nests spotted, GPS coordinates for spot observation (in WGS 84 datum), bird activity (e.g. feeding, flying, perched etc.), nest status (defined as occupied, unoccupied, or unknown) and condition (classified as good, fair, poor, remnant, or unknown), habitat descriptive data as well as other endangered bird species listed on the IUCN Red Data List.

2.4 Data analysis

Data was analysed both statistically and spatially in order to determine the occurrence of *B. leadbeateri* in VMWR and their distribution respectively. Further complicated analysis could not be performed due to the data loss the project suffered.

3.0 RESULTS AND DISCUSSION

3.1 Population Size and Abundance *B. leadbeateri* in VMWR

A total of three (3) groups of *B. leadbeateri*, totalling 15 individuals altogether, were observed and recorded in different locations as shown in **Table 1** below. Although Zaro Pool area recorded the highest with 40% and Chalepweteka valley area the least with 26%, this does not mean that Zaro has a high occurrence (abundance) of *B. leadbeateri* as each percentage represents abundance per group sighted. Also, as all the 3 sites are within reach, each group can as well traverse all the sites. Thus, the percentages do not necessarily reflect abundances per site.

Table 1: Site distribution of *B. leadbeateri* in VMWR

Site/Location Name	GPS Coordinates			Total No. of <i>B. leadbeateri</i> Sighted per Group	Activity	Other (Observed) Endangered Bird Species
	Latitude	Longitude	Altitude (m)			
Chalepweteka Valley Area	0558594	8770626	1037	4 (26.7%)	Flying	Martia eagle <i>Polemaetus bellicosus</i> (EN) Tawny Eagle <i>Aquila rapax</i> (VU)
Zaro Pool Area	0551365	8762265	1091	6 (40.0%)	Wandering	
Chamawiya Hill Valley Area	547078	8769495	1097	5 (33.3%)	Wandering	Bateleur <i>Terathopius ecaudatus</i> (EN)
Total				15		Hooded Vulture <i>Necrosyrtes monachus</i> (CR)

NB: Coordinates are in UTM zone 36, WGS84: The percentages do not necessarily reflect abundances per sites but rather per group: Abbreviations - EN = Endangered, CR = Critically endangered, VU = Vulnerable

3.2 Distribution and Extent of *B. leadbeateri* in VMWR

3.2.1 Within the Reserve

B. leadbeateri were mostly observed in the dambo floodplains and some pediments areas in the south-central section of the reserve (**Figure 2**), with some pre-dawn vocalization being heard as far north and eastern region of the reserve. Common in Vwaza, dambo floodplains are largely characterised mostly by mixed brachystegia woodlands with scattered acacia sp. interspersed with sparse shrub layer, large open glades of grassland as well as wetlands/valleys.

However, seeing as the results are from a preliminary survey, it cannot be certainly concluded that the current distribution of *B. leadbeateri* is thorough. Despite being recorded in some parts of the reserve; field observations suggest *B. leadbeateri* as one of the rare bird to be found there (in Vwaza) owing to its uncommonness.

3.2.2 Outside the Reserve

Findings from some locals, neighbouring VMWR, revealed the presence of *B. leadbeateri* outside the reserve in one estate located about 15 km south of the reserve. The estate is reported to have remained idle for so many years (over 20yrs) (Per. com). Although this revelation came from informal interviews, it had justification as those better interviewed were able to characterize the species very correctly. Again, they added to say that the site has some rock cavities within it where *B. leadbeateri* hid, an indication that it is really a habitat site as the species is reported to use caves sometimes for nesting (**Msimanga, 2004**).

Regrettably, this site was not visited due to limited resources even though arrangements were already made with those contacted. Nevertheless, there are continued efforts to visit and assess the site soon or later as this might be another site worth protecting.

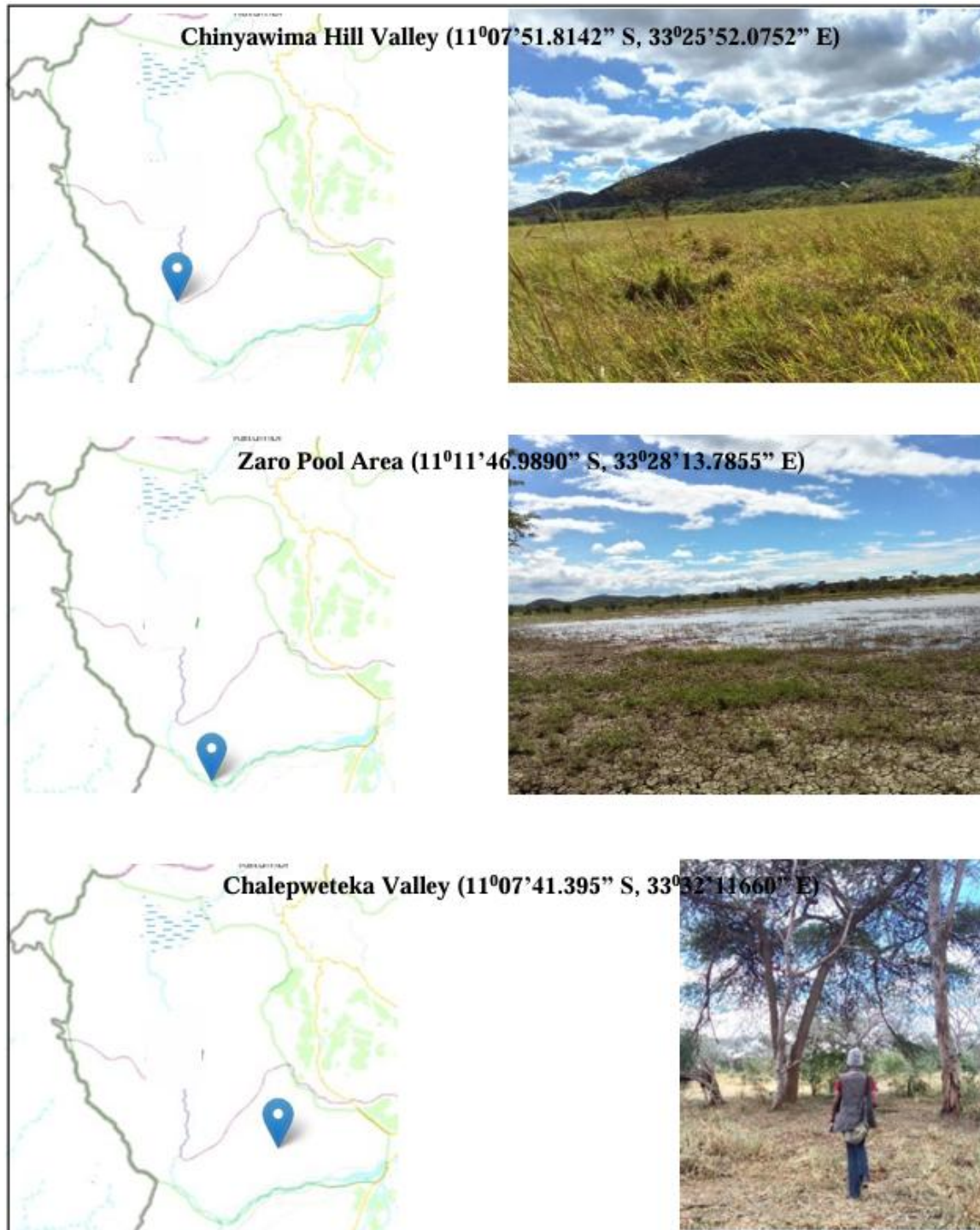


Figure 2: Visual description of all the locations where *B. leadbeateri* were recorded; Chinyawima hill valley – a large open glade of grassland (top), Zaro pool area – a wetland (middle), Chalepweteka valley – a mixed brachystegia woodland with scattered *acacia* sp.(bottom).

3.3 Habitat Status and Potential Nesting Sites of *B. leadbeateri* in VMWR

In general terms, vegetation characteristics and physiognomy contribute to determining the range of occupancy of a particular species (**Beyer et al., 2010**). For *B. leadbeateri*, it occurs in habitats broadly classified as grassland and savannah (but is absent from arid semi-deserts and extensive forests), favouring open areas where prey is easily detected (**Botha et al., 2011**).

Noticeably, all the sites where *B. leadbeateri* were sighted conformed to such environments (**Figure 2**), an indication that the sites are indeed the habitats for the species. Quick field observations were, thus, made to give a general overview of the habitat status.

1. Although not even a single nest was identified, some natural cavities (both in trees and rocks with an internal cavity diameter $\geq 40\text{cm}$) are apparent in the field, suggesting potential nesting sites as *B. leadbeateri* nests in large cavities (**Msimanga, 2004**).
2. Presence of nearby drainage lines and water holes in all the *B. leadbeateri* spotted sites, implies that, though *B. leadbeateri* rarely drinks water (**Kemp & Kemp, 1980**), proximity to water bodies is a significant habitat requirement correlation as discussed in **Kemp et al., (2023)**.
3. Fierce wildfires (often set by poachers) which are often rampant in the reserve appeared to be a potential threat (if not already impacting on the species).

However, to accurately assess habitat status, there is need to understand their habitat preference and ranging behaviour, as these factors can determine habitat quality which is often linked to reproductive and survival through the direct influence of habitat on food availability and can therefore directly inform habitat requirements for the species conservation (**Burgess et al., 2011**).

4.0 CONCLUSION AND RECOMMENDATION

4.1 Conclusion

From the study it is evident that *B. leadbeateri* exist as resident species in VWMR. So far, a total of 3 groups have been observed wondering mostly into the south-central section of the reserve with some pre-dawn vocalization being heard as far north and eastern region of the reserve. The other group has also been reported outside the reserve even though it is yet to be substantiated. In terms of its habitat, the reserve appears to have the required necessary conditions for the species' survival, even though wildfires seem to be a potential threat.

4.2 Recommendation

From the study findings, the following are thus recommended;

- 1) A continuous monitoring plan of *B. leadbeateri* and database be established in which any sightings and other related data (e.g. nests) must be recorded.
- 2) There is need to fit GPS tags to some *B. leadbeateri* in order to track their movements as this will help to truly map and assess its habitat quality within the reserve.
- 3) There is need to intensively survey the northern and eastern Vwaza as these regions were sketchily surveyed due to limited resources and terrain ruggedness.
- 4) More scientific studies are needed to know the true population status, potential nesting sites as well as habitat requirements for *B. leadbeateri* within the reserve.
- 5) Lastly, there is need to assess the suitability of suspected/reported sites outside the reserve as a habitat for *B. leadbeateri*.

Above recommendations are essential to solicit evidence-based solutions for establishing long-term effective conservation strategies for the species.

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