



WINDHOEK, February 29th 2024



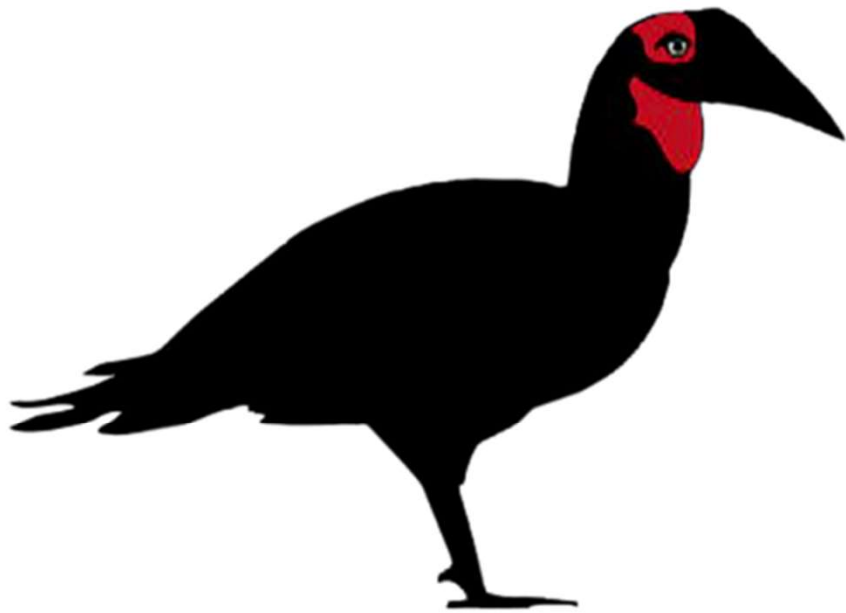
Dr Lucy Kemp

Mabula Ground Hornbill Project

Chair SA SGH Action Group

Chair IUCN SSC Hornbill Specialist Group (Africa)





Dr Lucy Kemp
Project Manager



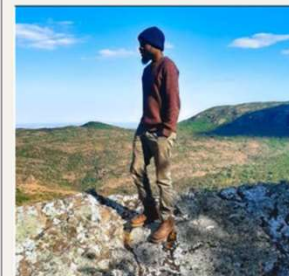
Dr Kyle-Mark Middleton
Senior coordinator



Sandiswa Kula
Operations



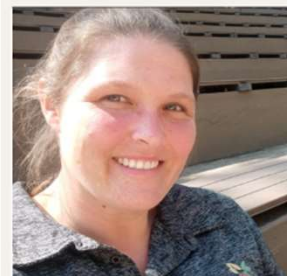
Nthabiseng Monama
Education



Winders Chauke
Reintroduction



Lerato Mahlaela
Tech



Elaine Reeve
Ex-situ Coordinator/ BAOBAB



Katleho Mahlophe
Monitoring



Themba
Love generator

In situ

Ex situ



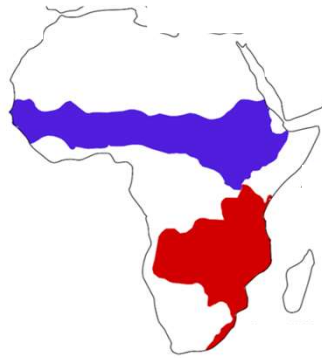
RESEARCH:



Bucorvus leadbeateri

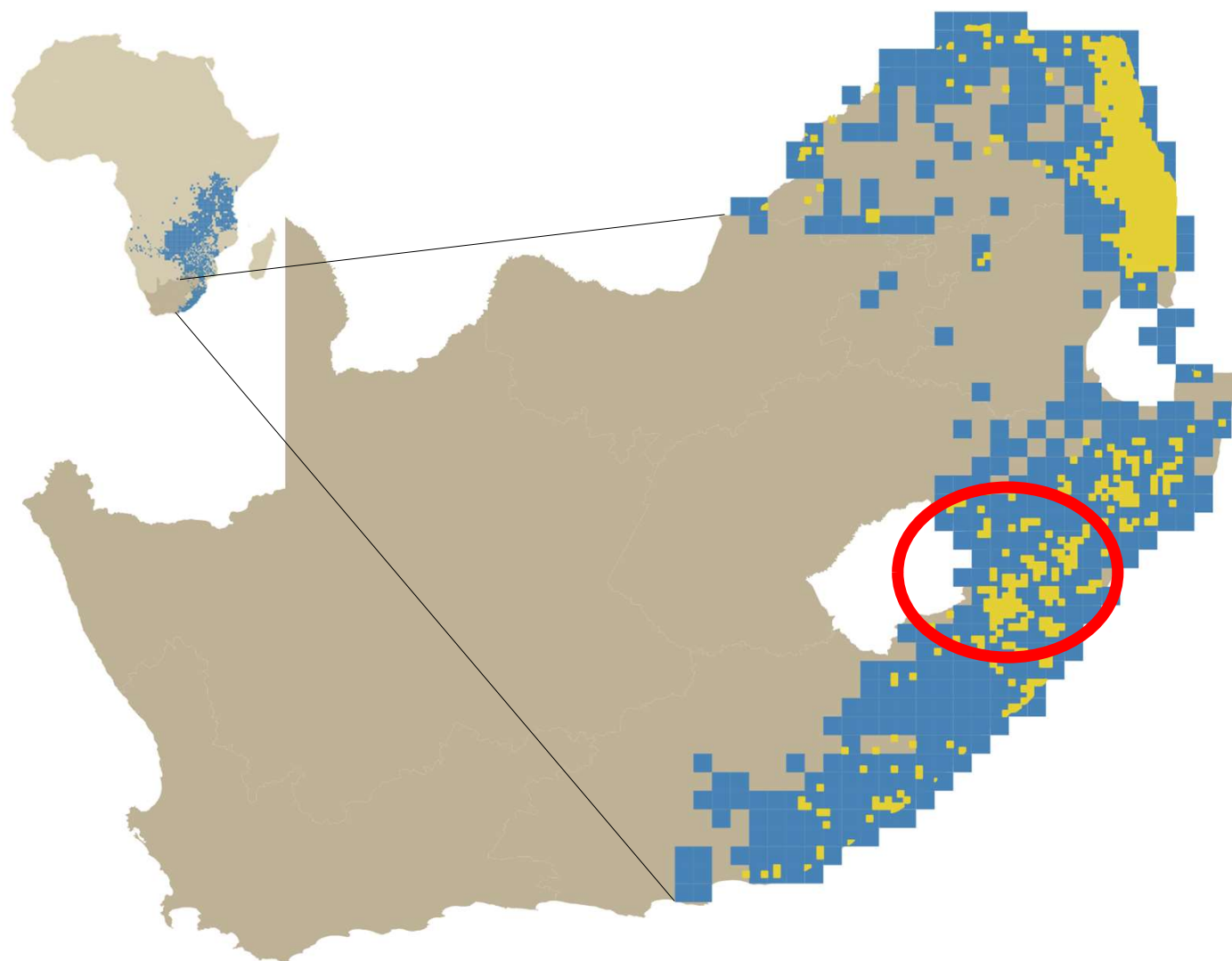


Top-order predator
Culturally important
Umbrella/ Flagship species



Bucorvus abyssinicus

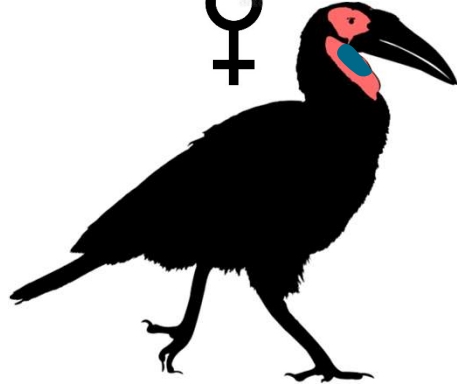








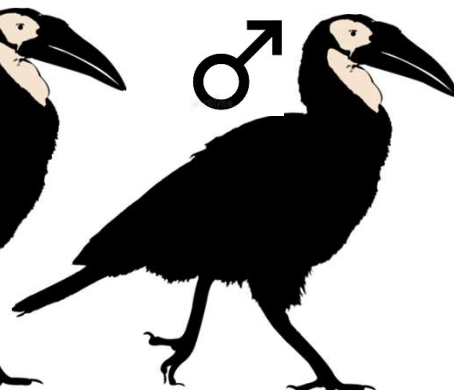
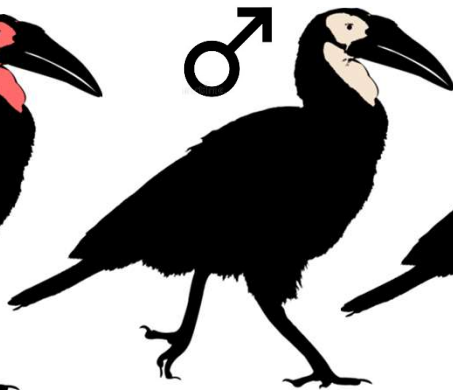
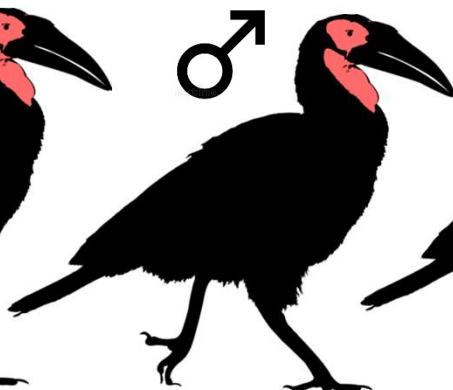
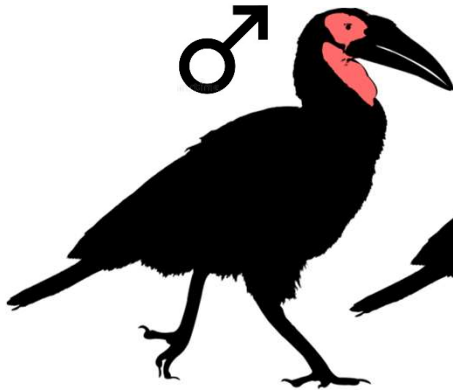
Skewed mortality



NB

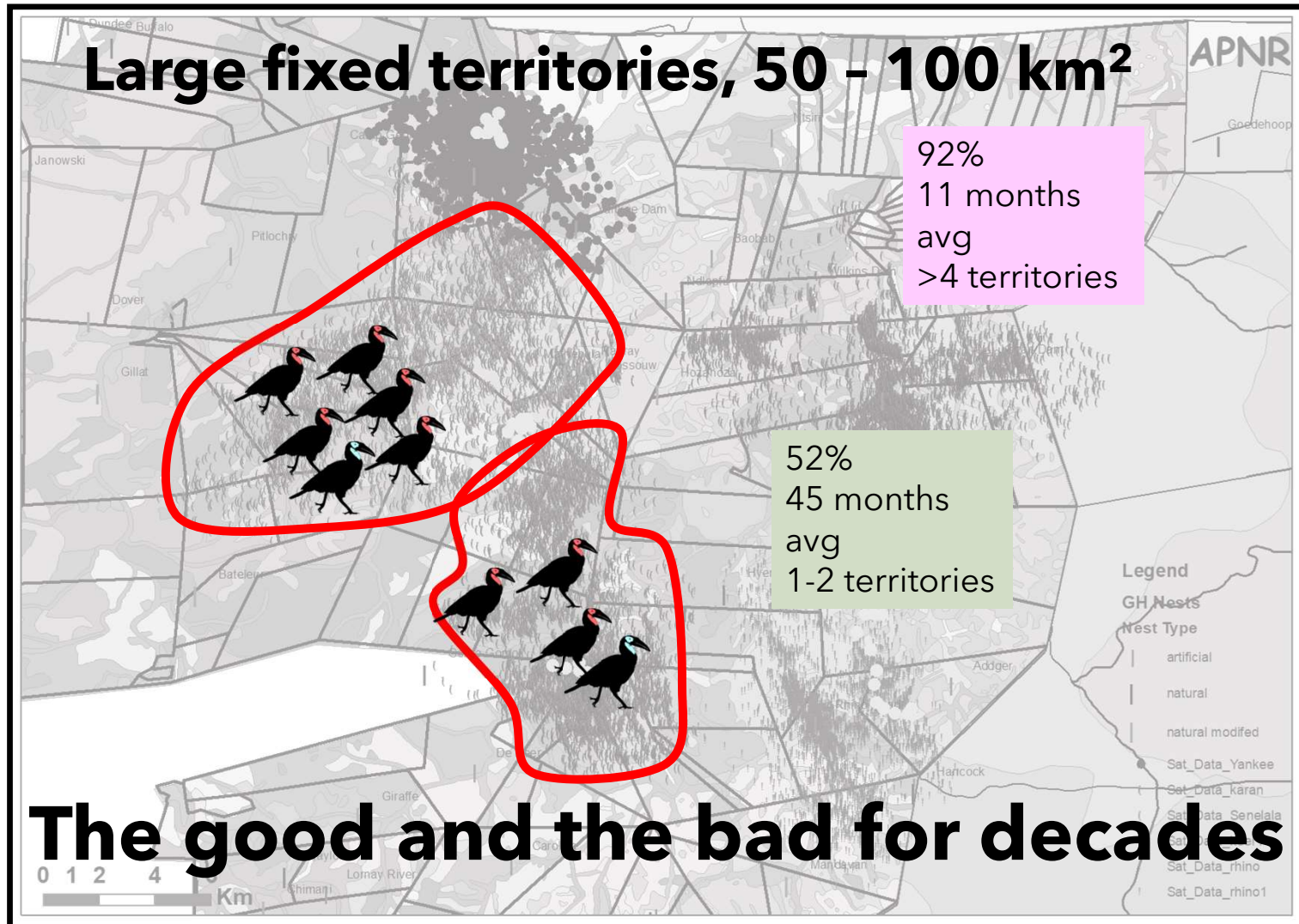


Blue males



Defend territory, provision female and chick

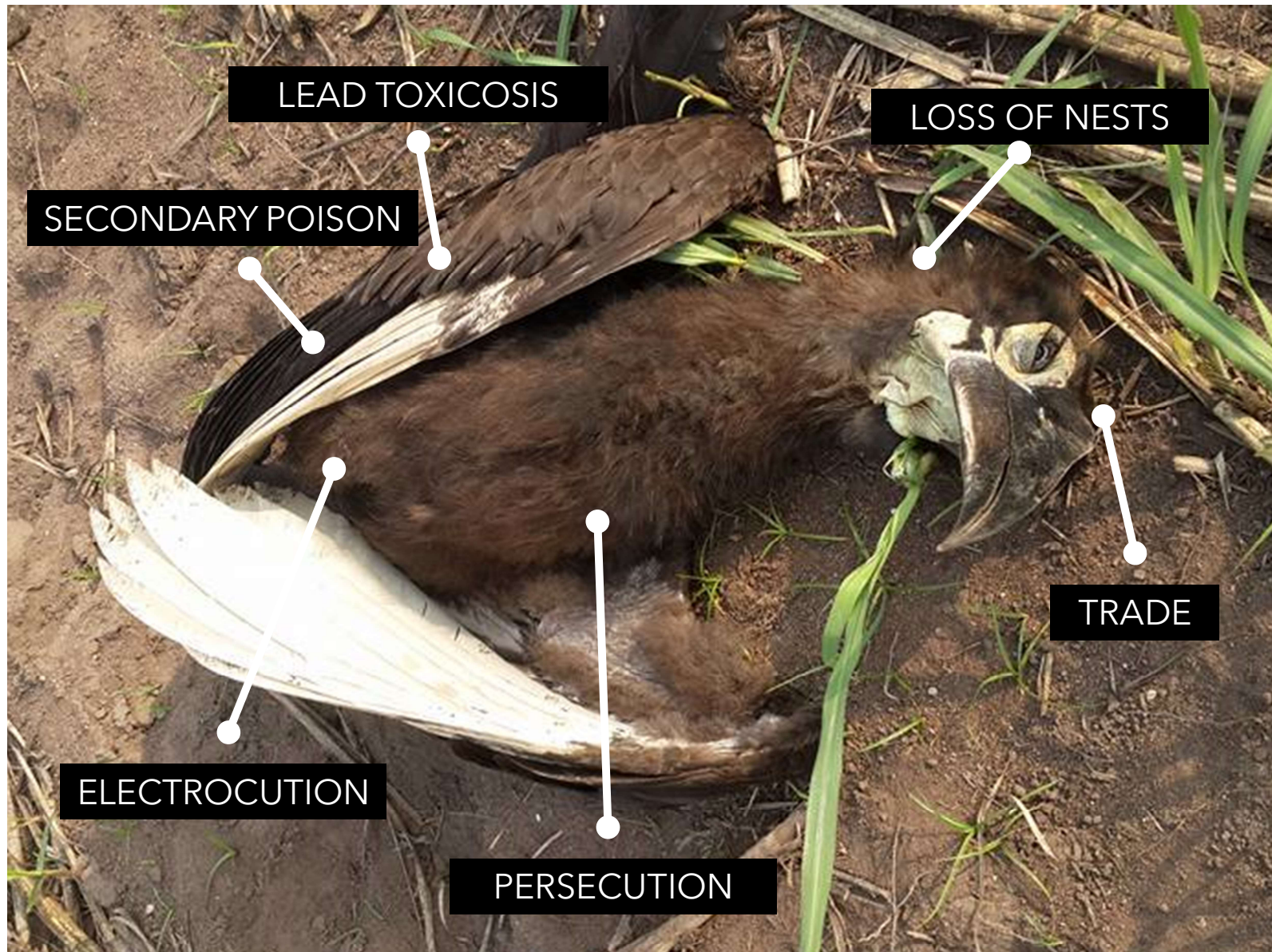




Carstens 2018, Zoghby et al 2016, Wilson & Hockey 2013, Wyness 2011, Theron et al 2013.

THE PROBLEM: US & THEM







TIME + SPACE

life history strategies

Long lifespan	~ 70 years
Large body size	1m tall
Low productivity	Max 1 per group per year
Late maturity	~10 in captivity - later in wild
Large spatial requirements	Average 80 - 100 km ²
High parental investment	Extensive learning phase 3 - 5 years
Low natural mortality	<1% after 5 years
Cooperative breeding	Alpha pair + male helpers
Group living	2-12

**BIG
PICTURE**
slow & then
reverse the
decline



**PROTECT
WHAT WE
HAVE**

**FIX THE
THREATS**

**PUT THEM
BACK
WHERE
THEY ARE
LOST**

**LAUNCH
YOUNG
AFRICAN
CONSERVATIONISTS**

**SHARE WINS
AND LOSSES
WITH ALL
RANGE STATES**

**THREAT FIXED
HELPS
MULTITUDE OF
OTHER
SPECIES**



6 MULTI-DISCIPLINARY PILLARS

01

MONITOR

What do we have
and where

02

MITIGATE

Fix all known
threats

03

RESTORE

Reintroduction
and restoration

04

COMMUNITY

The thread that
binds it all

05

RESEARCH

Make sure
everything we do
is based on
sound science

06

IMPROVE

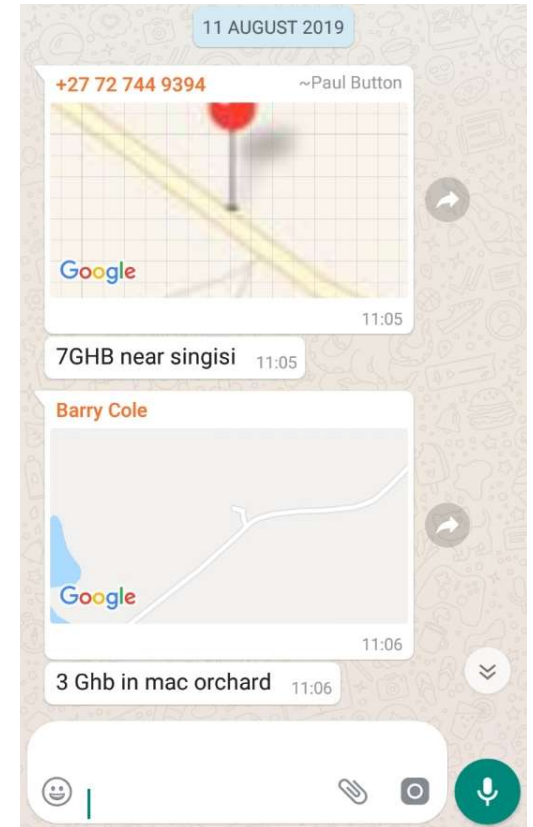
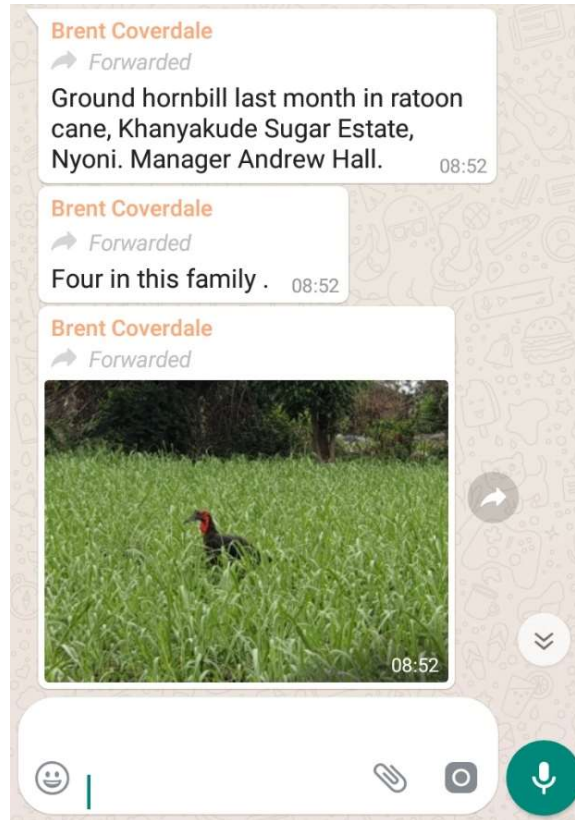
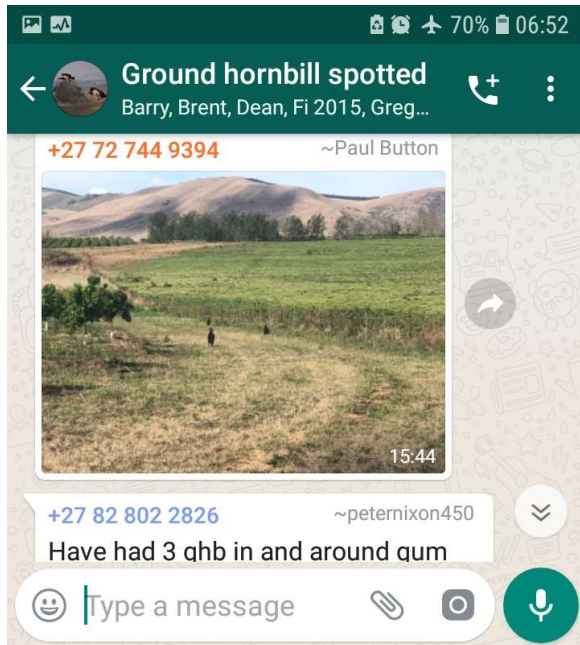
Ensure we are
doing our best
for these birds
and our team and
our communities

MONITOR 01



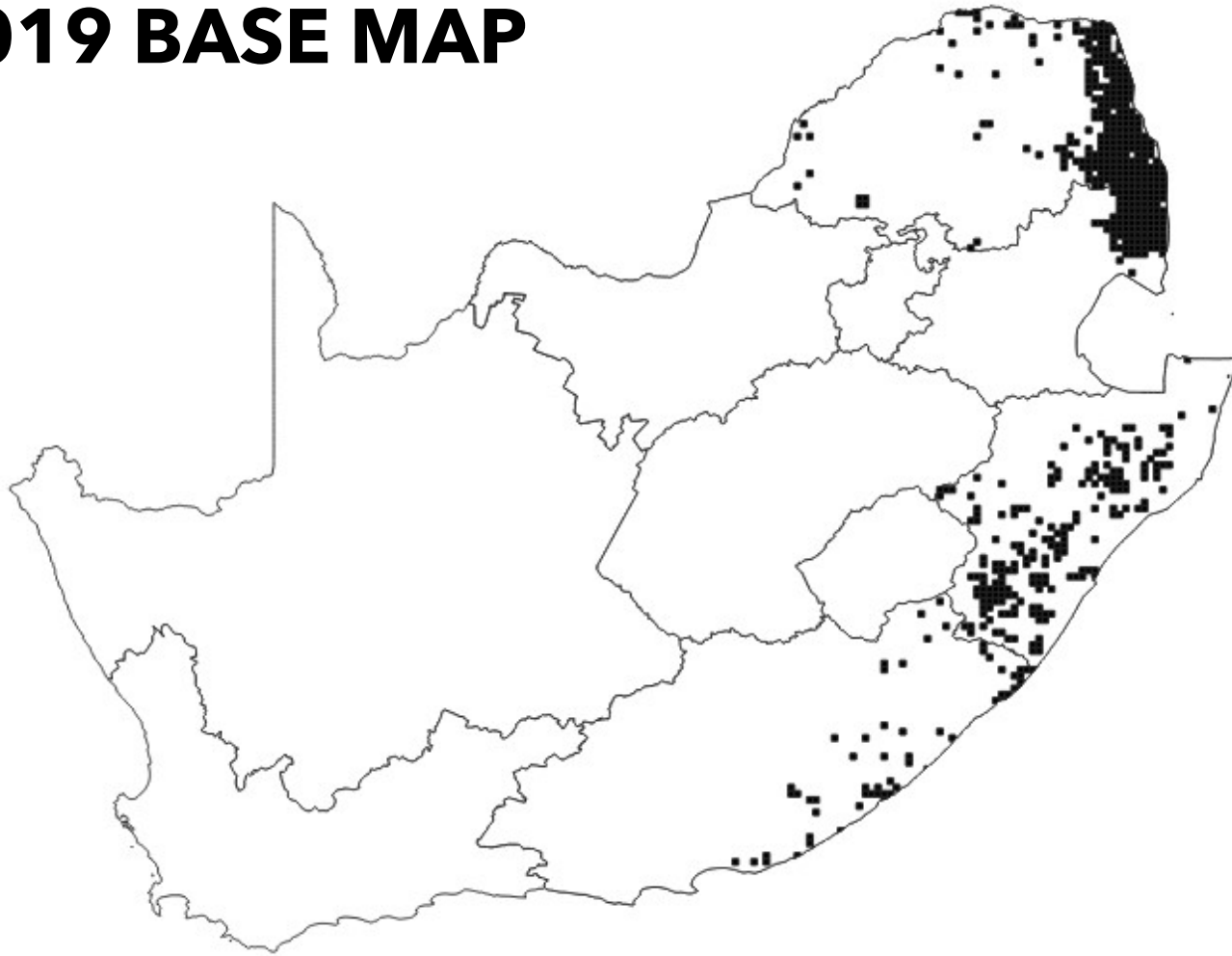
CURRENT DEMOGRAPHICS DO NOT COVER WHERE WE NEED





86 WHATSAPP GROUPS

2009 - 2019 BASE MAP



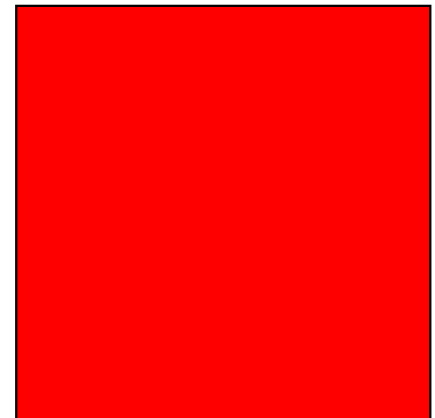
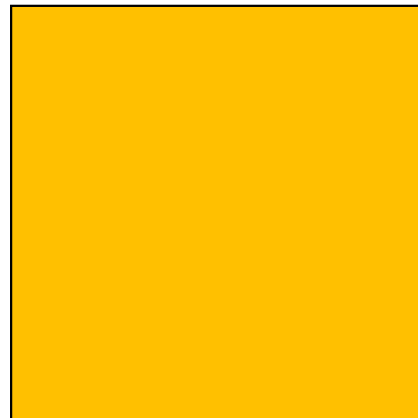
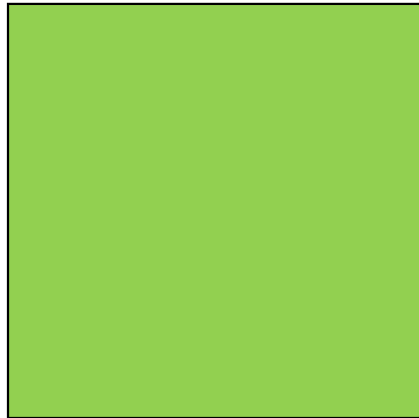
621 pentads = $3.6 * 621 = 2035$ individuals —

PRESENCE (NOT ABSENCE)

- At this stage no. groups is more NB than no. individuals.
- Assume a pentad to represent a group.
- 4 years cycle, repeated for trends (long-term).

FOUR-YEAR CYCLE

Pentad X



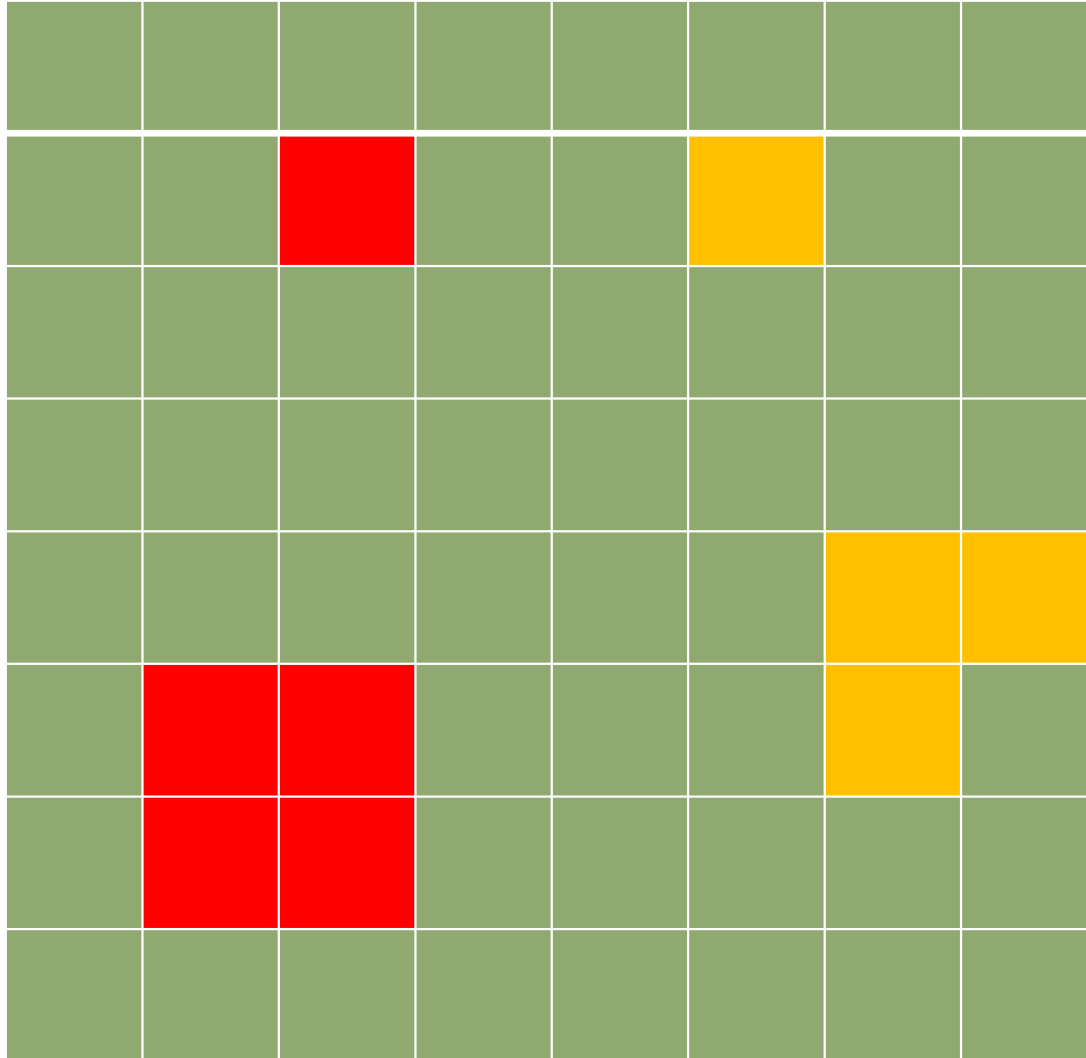


Year	1	2	3	4
Pentad A				

Year	1	2	3	4
Pentad B				

Year	1	2	3	4
Pentad C				

Year	1	2	3	4
Pentad D				



SEEN A THUNDERBIRD? WE NEED YOUR HELP!

SOUTHERN GROUND-HORNBILL *Bucorvus leadbeateri*

This bird is now Endangered in South Africa, eSwatini and Namibia. They are revered across Africa for their ability to kill large snakes and for being associated with good summer rains.

Every sighting you report yields valuable information to help us monitor the population status, health and allow us to find new groups and keep them safe.

SUBMIT YOUR SIGHTINGS:



EMAIL: RESEARCH@GROUND-HORNBILL.ORG.ZA



WHATSAPP: +27 (0)79 754 6234



BIRDLASSER APP (say YES to Mabula Ground Hornbill Project as a cause)

INFORMATION REQUIRED:

Date, location and group size. Any photos are always welcome but ideally a portrait of each individual in the group is more helpful.

If Southern Ground-hornbills share your land then you are very privileged! Become a Custodian to keep them safe. Every group counts!

VISIT WWW.GROUND-HORNBILL.ORG.ZA
FOR MORE INFORMATION

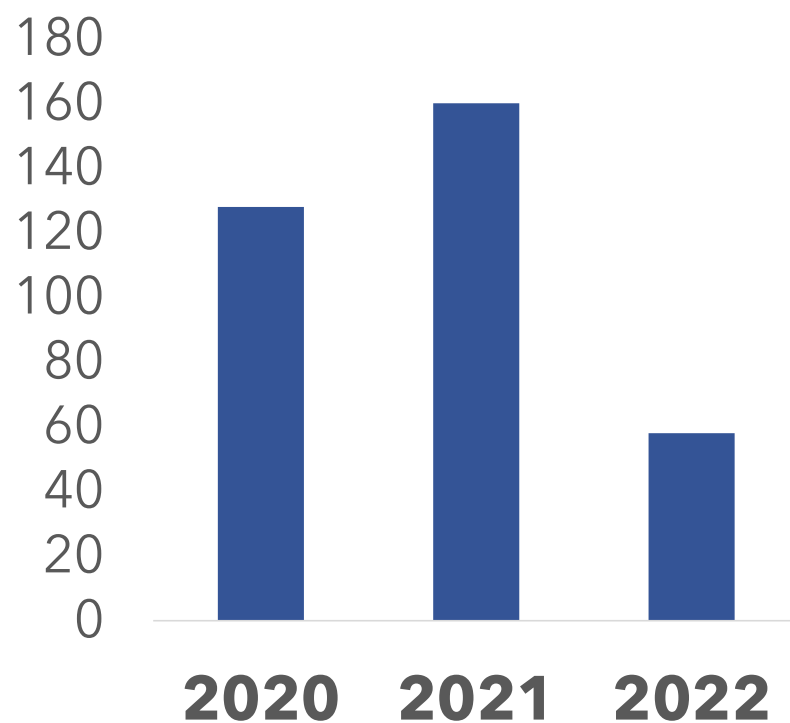


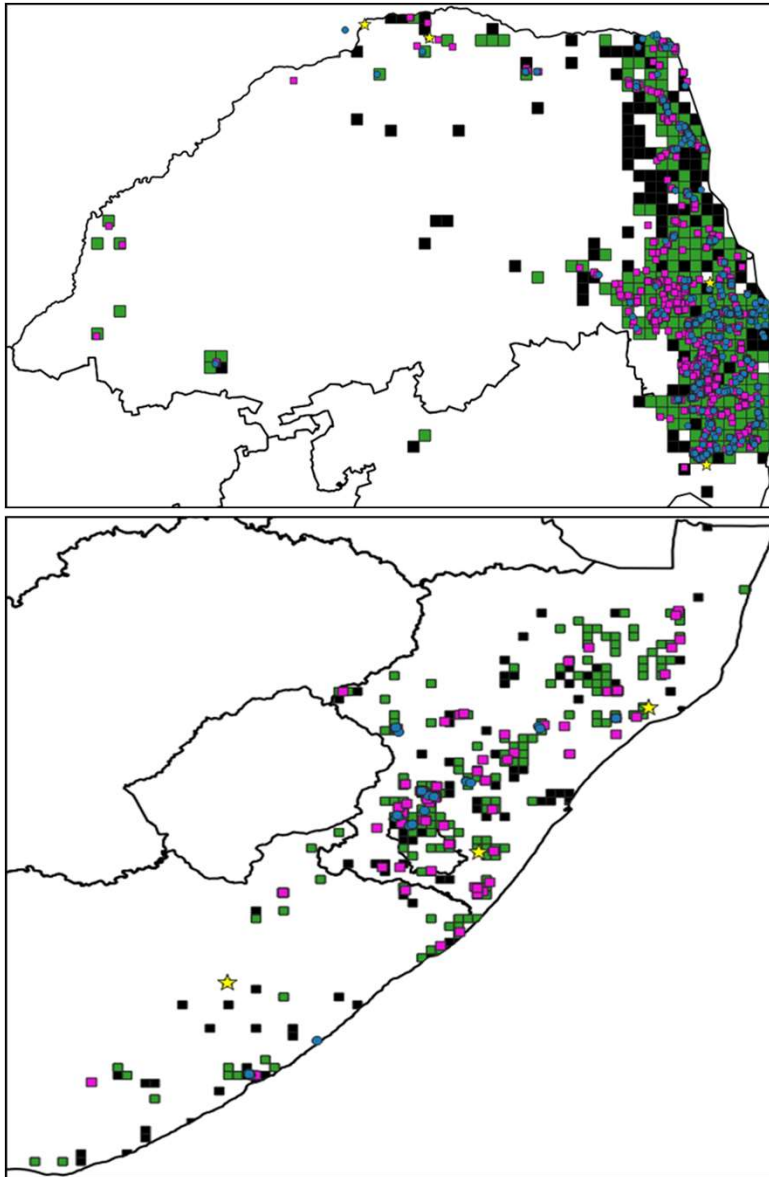
2020	2021	2022	2023

= 346 new pentads
= >50% of original data

967 pentads = $3.6 * 967 = 3\,481,2$ individuals

Number of new pentads





because of you
we have already had
resightings in **48.92%** of the
national pentads/ groups



sighting champion
march 2021

This past month the **ECOTRAINING** Custodian group,
led by Sean Matthewson, reported the most sightings
to the national database. THANK YOU.



Assess juvenile mortality





ADULT FEMALE: Facial skin red with violet blue below the bill.



ADULT MALE: Facial skin entirely red.



SUB-ADULT: Facial skin entirely red, still white on the bill.



IMMATURE 2: Facial skin red, white/cream at the edges, white on the bill (~2-3 years)



IMMATURE 1: Facial skin still pale with some colouring (~1-2 years)



JUVENILE: Pale facial skin (grey then cream) (~0-1 years)

Assess juvenile survival



Habitat use & behaviours





Find new nests



Resightings - rings and tattoos = lifespan and dispersals





Monitor nest activity

STRATIFIED SUB-SAMPLING

- Commercial farmland (20)
- Protected area (40)
- Communal grazing (20)
- Mixed mosaic (20)



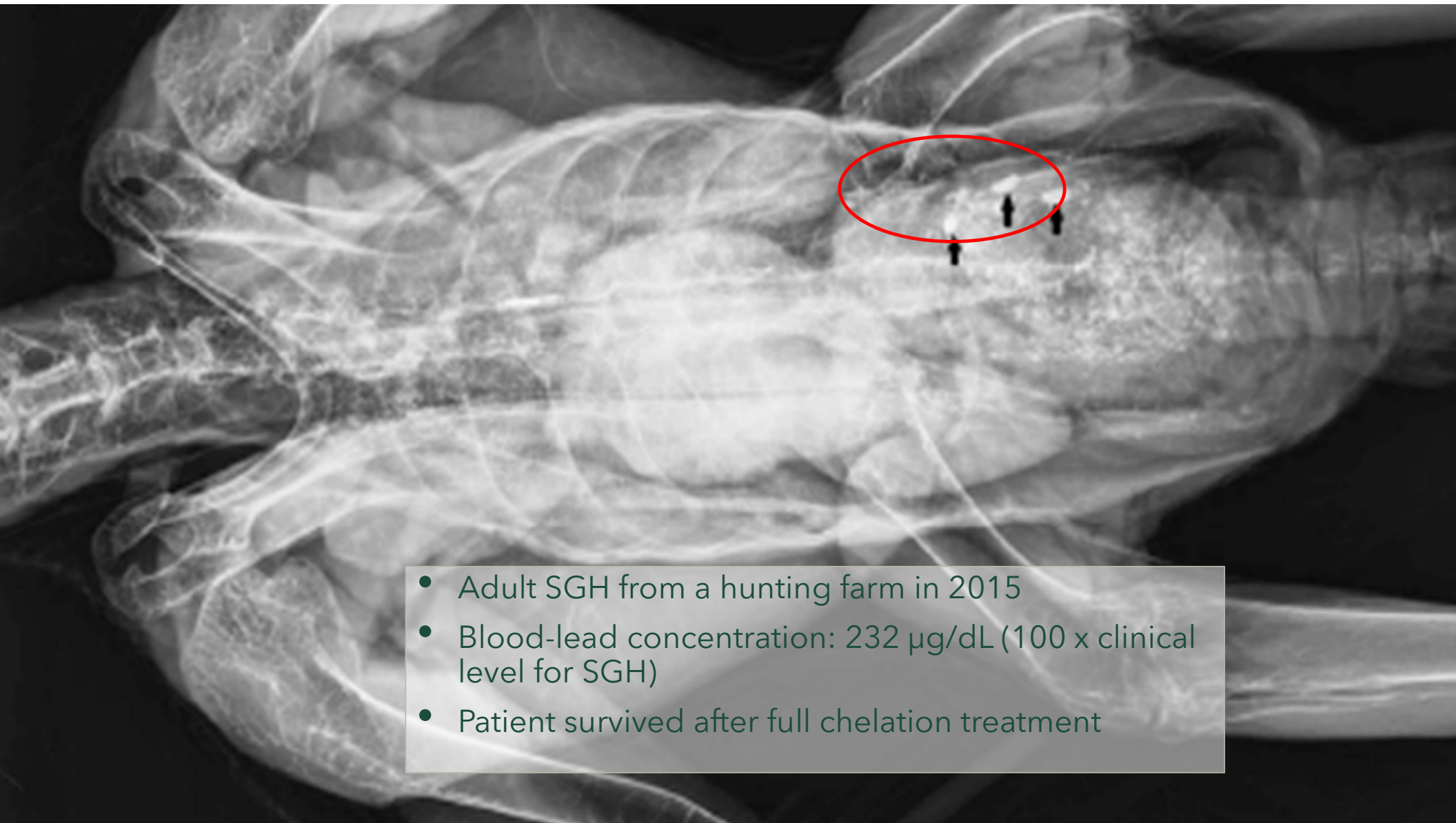
Assessing nest/ group productivity



MITIGATE 02







- Adult SGH from a hunting farm in 2015
- Blood-lead concentration: 232 $\mu\text{g}/\text{dL}$ (100 x clinical level for SGH)
- Patient survived after full chelation treatment

Source and acknowledgement:

Warner, J. K., Combrink, X., Myburgh, J. G., & Downs, C. T. (2016). Blood lead concentrations in free-ranging Nile crocodiles (*Crocodylus niloticus*) from South Africa. *Ecotoxicology*, 25(5), 950-958.



Fishing sinkers

WHAT ARE THE EFFECTS OF LEAD?

LEAD IS A NEUROTOXIN

other neurotoxins include

- botulism
- tetanus (lockjaw)
- mercury
- arsenic
- and the venom of scorpions, cobras, mambas and black widow spiders!

If a large amount of metallic lead is ingested, death can be rapid (acute poisoning); if a small amount of lead is ingested, death may occur after several weeks of chronic ill-health.

NO LEVEL OF EXPOSURE TO LEAD IS CONSIDERED SAFE!!



LEAD ACCUMULATES OVER TIME, DOES NOT DEGRADE AND CAN REMAIN POISONOUS FOR THOUSANDS OF YEARS.

Lead exposure has been associated with lower intelligence scores, poor school performance in children, shortened concentration spans and lowered lifetime earnings.



Lead can cause loss of libido and fertility in men, and menstrual disturbances and spontaneous abortion in woman.

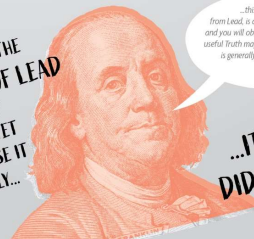


LESS SEXY AND LESS SMART! NOW WHO WANTS THAT?!!!

LEAD HAS ALSO BEEN LINKED WITH:

- AGGRESSION
- HYPERACTIVITY
- VIOLENT BEHAVIOUR
- STUNTED GROWTH IN CHILDREN

WE'VE KNOWN ABOUT THE DANGERS OF LEAD FOR AT LEAST 300 YEARS. YET STILL WE USE IT RECKLESSLY...



...this mischievous Effect from Lead, is at least above Sixty Years old and you will observe with Concern how long a useful Truth may be known, and exist, before it is generally received and practised on.

...IT'S TIME WE DID SOMETHING ABOUT IT!

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✓ Biyamati
Firebreak



✓ doispane



✓ Gonomdwana



✓ hamiltons



✓ hornibill clearing



✓ Jasons Nest



✓ Lower Mlondozi



✓ Mangake



✓ Marthly



✓ Matjulu



✓ Mjejane



✓ S110



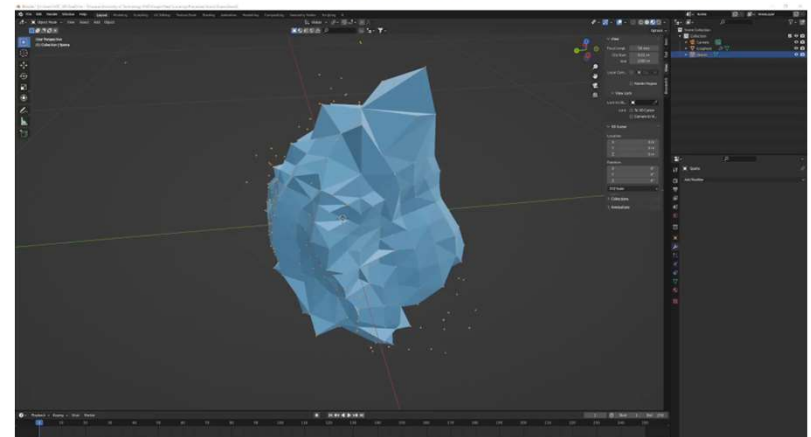
✓ Shabalala



☁ Shaw

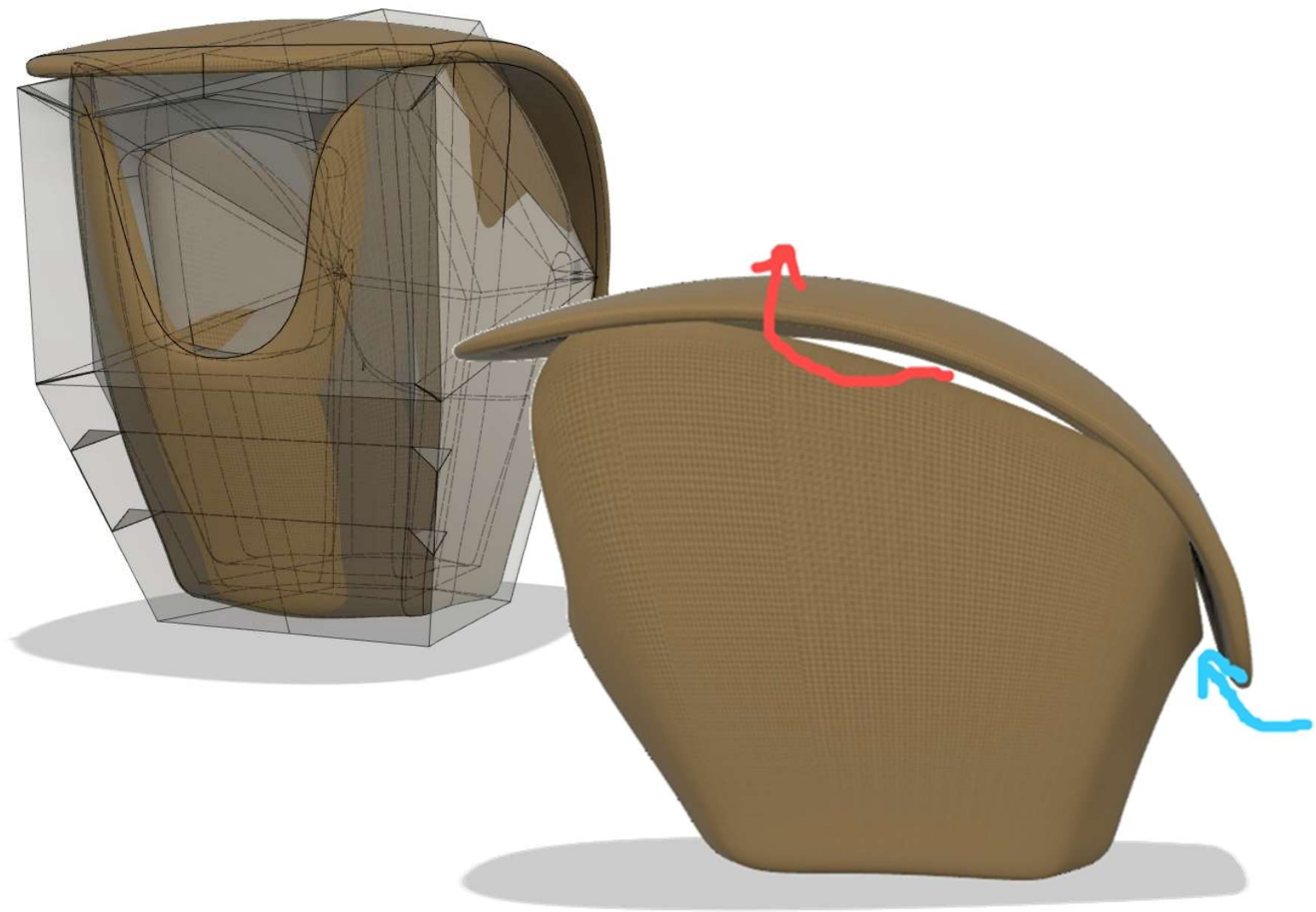


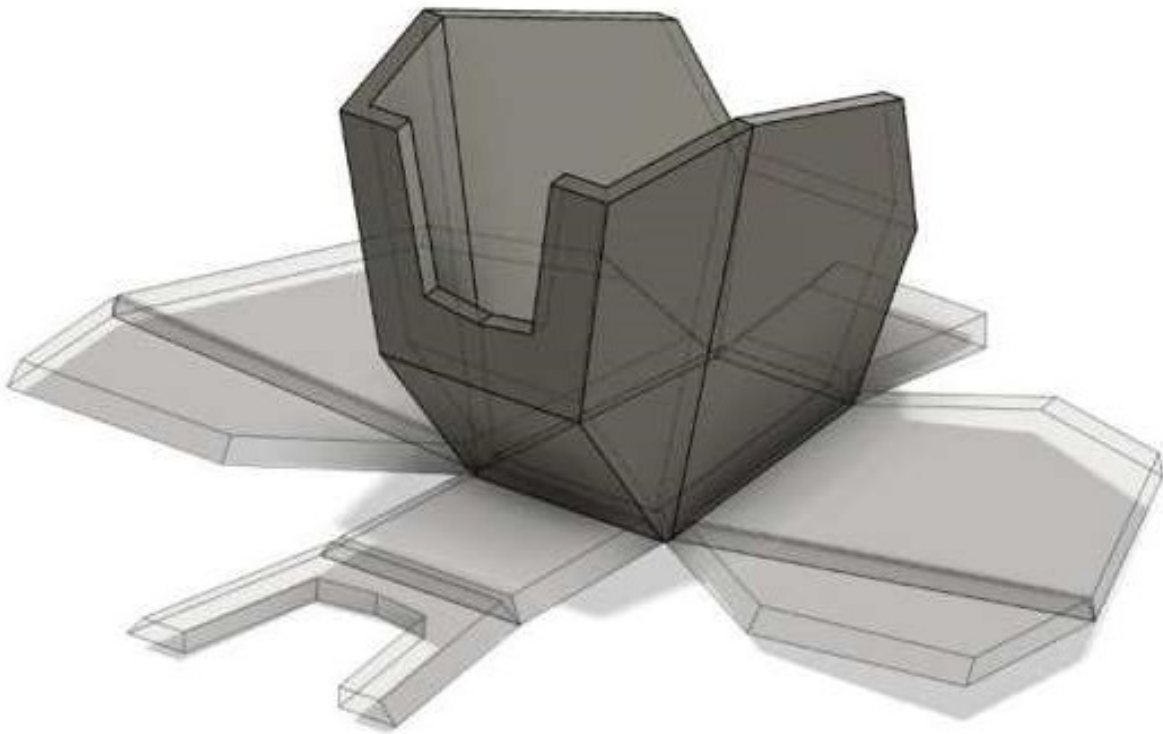
☁ Sparta

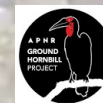
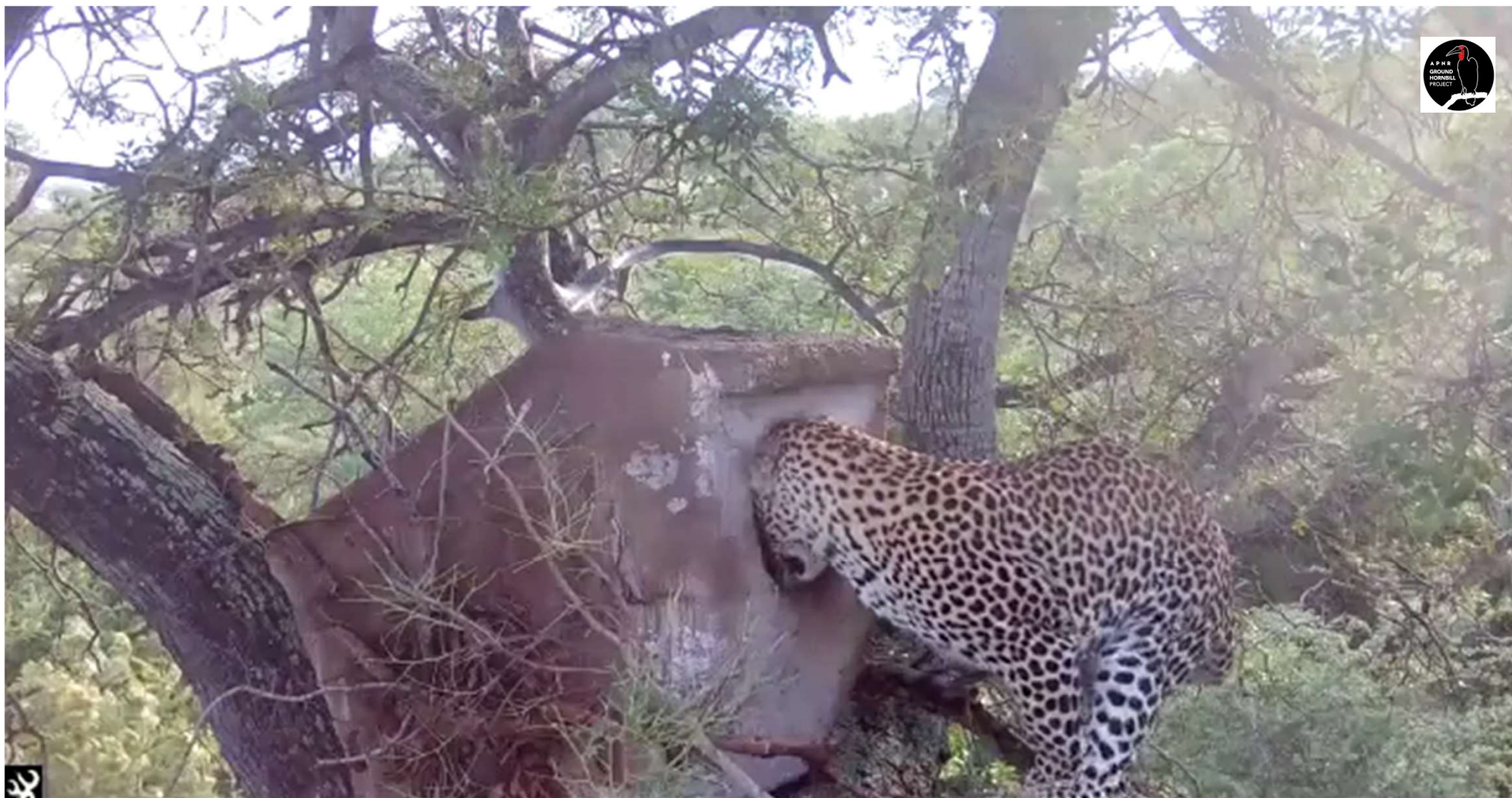




28.58 inHg - 34°C 12/11/2019 02:01PM KYLE3

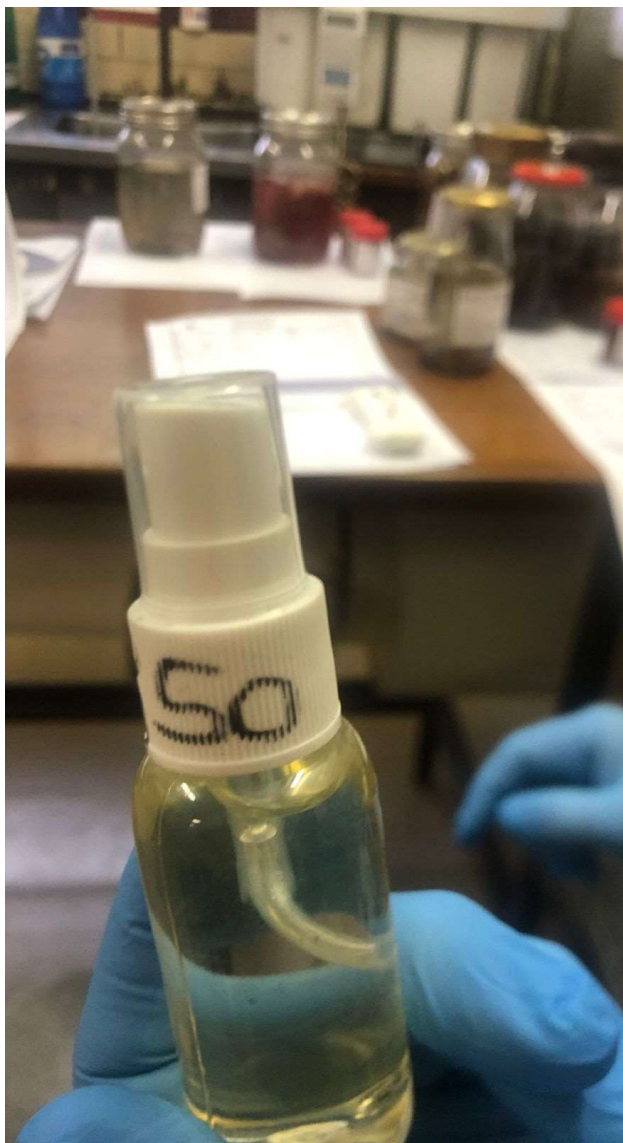






28.70 inHg ↑ 21°C 01/22/2022 05:57AM ELITE02



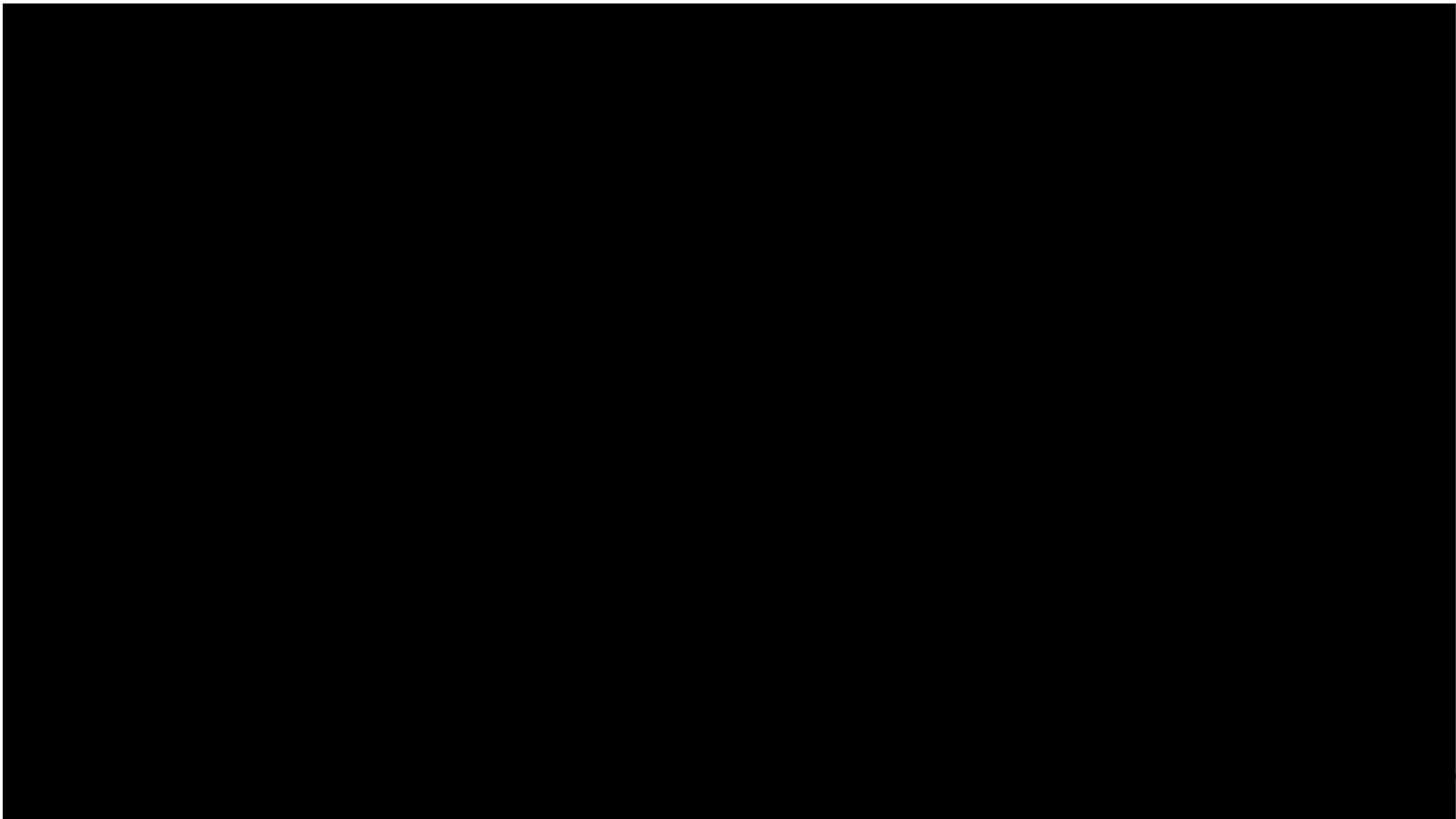


RESTORE 03











COMMUNITY 04



~ Hunting and Diet ~

SOUTHERN GROUND-HORNBILL

Southern Ground-Hornbills spend most of their time **walking and foraging**. They are predominantly a ground dwelling bird and obtain the majority of their food from the ground.

DIET
They are **omnivorous** and their diet mainly consists of:

- ARTHROPODS** (insects and arachnids)
- REPTILES** (snakes, lizards and tortoises)
- AMPHIBIANS** (frogs and toads)
- SMALL BIRDS AND MAMMALS** (up to the size of hares)

Occasionally cacti, fruits, nuts and seeds.


TERRITORIES
Southern Ground-Hornbill groups occupy **year-round territories** of 50-100 km². Within this territory they **hunt and feed**. During breeding seasons they will travel less as they forage closer to their nests. The adults in the group will actively defend their territory using vocalisations, aerial chases and co-operative defence.

GIFTING
To help define social status they often **give and receive food** items between individuals. Although this takes place amongst the whole group, it is most often seen with the alpha pair.

FEEDING
Once they have their food item in their beaks, they use a **jerked motion** of the head to toss food back into their throat.

SPECIAL SIGHT
The end of their bill can be seen in their **field of view**. This is thought to help with precisely picking up food items.

STRENGTH
As in all hornbills, the first two neck vertebrae are **fused** together to provide more **stability** to carry their heavy bill.



~ Environment and Habitat ~

SOUTHERN GROUND-HORNBILL


Southern Ground-Hornbills are **endemic** to sub-equatorial Africa. They can be found at sea level to altitudes of 3000 metres across the biomes they inhabit: **savanna, open woodland and grasslands**.

GRASSLANDS
Grasslands make up 28% of the terrestrial surface area of southern Africa. They are dominated by a **single vegetation layer**, mainly grasses, with little to no tree cover and summer rainfall. The topography ranges from flat plains to undulating hills, valleys or escarpments with an altitude range of around 300-3500 m. The climate is generally cooler than savannas.

THUNDER OR RAIN BIRDS
Southern Ground-Hornbills are often associated with **deep booming calls** and **good summer rains**. They synchronise their breeding with the first good summer rains.

OPEN WOODLAND
Woodlands are areas that are composed of up to 70% **woody vegetation** (scattered trees and bushes) with well-spaced canopies that still allow light to reach the ground. Trees such as leiselos, marula and the African baobab are important to Southern Ground-Hornbills for **nest cavities** and as high, safe places to **roost**. Southern Ground-Hornbills tend to only tolerate areas with less than 40% bush cover.

SAVANNA
Savannas make up the **largest biome** in southern Africa and contain a high diversity of plant and animal species. They are characterised by **both a grassy and woody layer** of vegetation. They are warm and relatively dry environments with summer rainfall, interspersed by periods of drought and dry seasons.



~ Threats and Conservation ~

SOUTHERN GROUND-HORNBILL

Southern Ground-Hornbills are **Vulnerable** worldwide and **Endangered** in South Africa. They face an array of threats, which make their conservation challenging but vital for their survival.

HABITAT LOSS
Approximately **65%** of their historical habitat in South Africa is **no longer occupied** by SGHs. This is due to alteration of their open savanna and grassland habitats by factors such as human expansion, agriculture, and climate change. **Suitable large nest trees are in decline** due to wood harvesting, strong winds, fire, and elephant impact.

SECONDARY POISONING
This can occur when they feed on carcasses that have been intentionally **laced with poison** to target various carnivore species. If they consume an animal that has been shot with a lead bullet, this can result in **lead toxicosis**. This can be fatal for the hornbill. **Pesticides** - poison aimed at crop-eating birds can also harm the hornbill if it consumes the carcass of a targeted bird.

RELIEF-BASED MEDICINE
They are sometimes opportunistically **hunted** and used in traditional rituals and medicine.

REPRODUCTION RATE
Low reproduction rate, compounded with other threats, leaves them especially vulnerable to extinction risk.

WINDOW BREAKING
Their territorial behaviour causes them to attack their reflection on shiny surfaces, such as mirrors and windows. They **mistake their own reflection** for an intruding bird. This can result in injury to birds, damage to property, and this can sometimes result in their persecution.

CONSERVATION MEASURES
Different conservation initiatives are vital to slow the decline of the species. Some of these include:

- Mitigation** of known threats.
- Reintroducing** redundant second-hatched chicks raised in captivity into suitable areas in the wild.
- Supplying **artificial nests**.
- Public **education and awareness**.
- Research** into species behaviour to inform conservation management.
- Promoting **sustainable and environmentally** conscious living choices by co-inhabitants.



~ Breeding and Life Cycle ~

SOUTHERN GROUND-HORNBILL

Southern Ground-Hornbills breed on average **once a year** in summer from **September to December**. The majority of their eggs are laid in late **September**.

BREEDING RATES
They have very low breeding and low recruitment rates.

Eggs laid:
1-3 eggs per group every 2-9 years.


Fledging:
Maximum of 1 chick per group.

SOCIAL STRUCTURE
Southern Ground-Hornbills are **co-operative** breeders. They have one **alpha breeding pair** and non-breeding helpers that assist in looking after the female and chick. The dominant alpha female is the only female tolerated in the group; the helpers are mainly composed of immature and young adult males. The helpers will care for and provide food for both the female and chick. The adult males will provide nest lining of soft dry leaves.

NESTING
Nesting takes place in **natural holes and cavities** such as tree cavities, rocky cliffs and earth banks. Unlike other hornbill species the Southern Ground-Hornbill does not seal herself into the nest or moult during this time.

INCUBATION
The female incubates her eggs for **42 days** followed by 30 days of brooding. During these periods the female leaves the nest. The female will lay **13 eggs** which hatch around 5 days apart. The first chick hatched will become larger and gain more attention from the adults, being fed more often. This means that the younger chick will be neglected and it will not survive. It is thought that this is an **insurance policy** in case the first hatched chick does not survive.

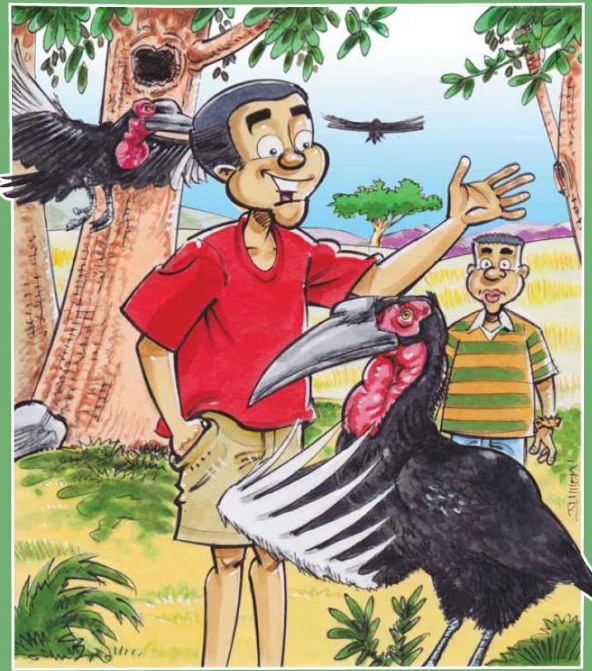
FLEDGING
A maximum of one chick per group fledges in **March** after around **87 days** in the nest.



AN EDUCATIONAL COMIC BOOK ON THE PLIGHT OF THE SOUTHERN GROUND HORNBILL

Vusa

THE GROUND HORNBILL GUARDIAN



Volume 1. First edition - 2019

MABULA GROUND-HORNBILL PROJECT

SOUTHERN AFRICAN CONSERVATION TRUST
BIOLOGICAL DIVERSITY
www.sactrust.org

The Thunderbird



Healing song - calling on ground-hornbills to connect you to your ancestors when you are in need of healing - Khwe people, Bwabwata National Park



RESEARCH 05



Short Communication | [Published: 08 April 2022](#)

Through the eyes of a hunter: assessing perception and exclusion performance in ground-hornbills

[Samara Danel](#) , [Nancy Rebout](#) & [Lucy V. Kemp](#)

[Animal Cognition](#) **25**, 1665–1670 (2022) | [Cite this article](#)

Original Paper | [Published: 17 October 2022](#)

Assessing sex differences in behavioural flexibility in an endangered bird species: the Southern ground-hornbill (*Bucorvus leadbeateri*)

[Samara Danel](#) , [Nancy Rebout](#) & [Lucy Kemp](#)

[Animal Cognition](#) **26**, 599–609 (2023) | [Cite this article](#)

[Published: 01 March 2022](#)

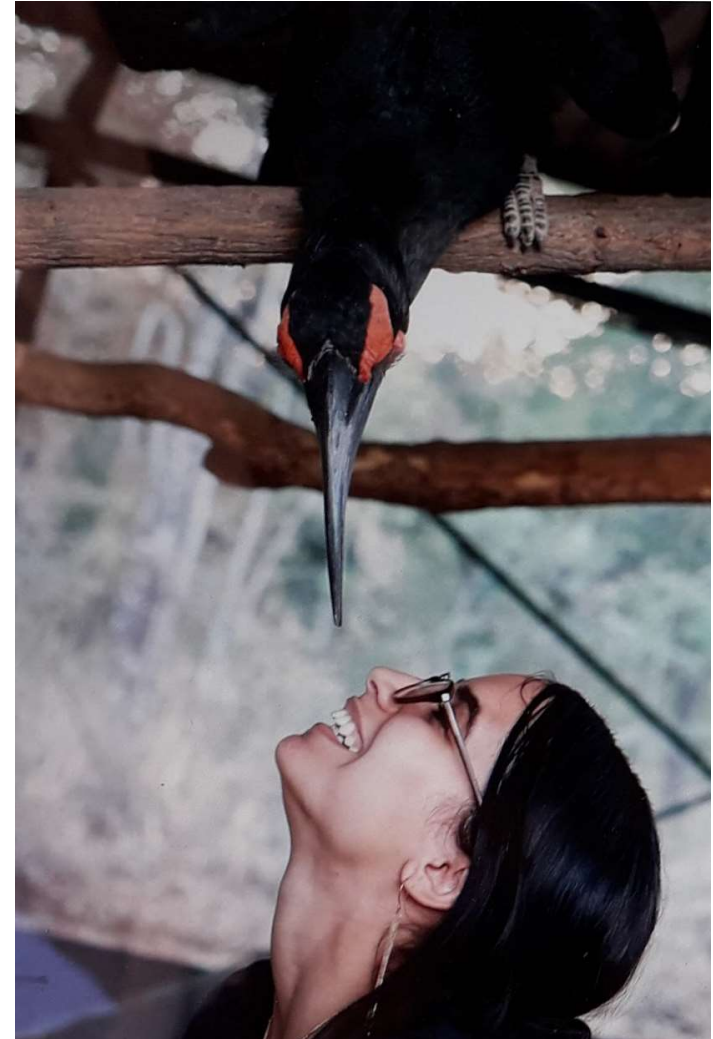
Social diffusion of new foraging techniques in the Southern ground-hornbill (*Bucorvus leadbeateri*)

[Samara Danel](#) , [Nancy Rebout](#) & [Lucy Kemp](#)

[Learning & Behavior](#) **51**, 153–165 (2023) | [Cite this article](#)

Assessing the spontaneous use of human-given cues in ground-hornbills

[Samara Danel](#) ^{a b} , [Nancy Rebout](#) ^c, [Lucy Valeska Kemp](#) ^{b d}



20 October 2020

Immunogenicity of Newcastle Disease Vaccine in Southern Ground-hornbill (*Bucorvus leadbeateri*)

Katja N. Koepfel, Lucy V. Kemp, Louis H. Maartens, Peter N. Thompson

CASE REPORT

Complication with re-sedation in southern ground hornbills (*Bucorvus leadbeateri*) following partial reversal of two orally administered sedation protocols

Liesel L. Laubscher ✉, Katja Koepfel, Robert Campbell, Sarah Chabangu, Lucy V. Kemp

First published: 16 December 2021 | <https://doi.org/10.1002/vrc2.250>

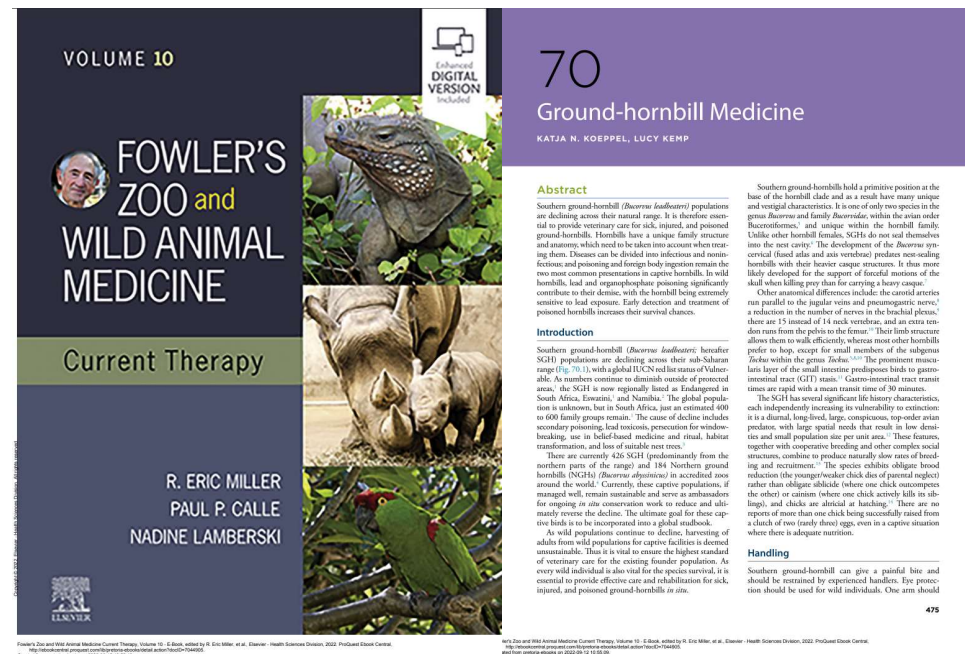
1 December 2015

Lead Toxicosis in a Southern Ground Hornbill *Bucorvus leadbeateri* in South Africa

Katja N. Koepfel, Lucy V. Kemp

A retrospective review of the histopathology of captive hornbill chicks

EP Mitchell,^{1,2} L Kemp,^{3,4} K Koepfel,⁵ AP Guiot^{1,6}



Fowler's Zoo and Wild Animal Medicine: Current Therapy, Volume 10. © Book, edited by R. Eric Miller, et al., Elsevier, Health Sciences Division, 2022. Published Elsevier Company. <https://doi.org/10.1016/j.xvt.2022.100000> Content not peer-reviewed by Cambridge Scientific Data. Content not peer-reviewed by Cambridge Scientific Data.

WVZ Zoo and Wild Animal Medicine: Current Therapy, Volume 10. © Book, edited by R. Eric Miller, et al., Elsevier, Health Sciences Division, 2022. Published Elsevier Company. <https://doi.org/10.1016/j.xvt.2022.100000> Content not peer-reviewed by Cambridge Scientific Data. Content not peer-reviewed by Cambridge Scientific Data.

Abstract

Southern ground hornbill (*Bucorvus leadbeateri*) populations are declining across their natural range. It is therefore essential to provide veterinary care for sick, injured, and poisoned ground hornbills. Hornbills have a unique family structure and anatomy which need to be taken into account when treating them. Diseases can be divided into infectious and non-infectious and poisoning and foreign body ingestion remain the two most common presentations in captive hornbills. In wild hornbills, lead and organophosphate poisoning significantly contribute to their demise, with the hornbill being extremely sensitive to lead exposure. Early detection and treatment of poisoned hornbills increases their survival chances.

Introduction

Southern ground hornbill (*Bucorvus leadbeateri*; hereafter SGH) populations are declining across their sub-Saharan range (Fig. 70.1), with a global IUCN red list status of Vulnerable. As numbers continue to diminish outside of protected areas, the SGH is now regionally listed as Endangered in South Africa, Eswatini, and Namibia.¹ The global population is unknown, but in South Africa, just an estimated 400 to 600 family groups remain.² The cause of decline includes secondary poisoning, lead toxicosis, persecution for window-breaking, use in belief-based medicine and ritual, habitat transformation, and loss of suitable nest trees.³

There are currently 326 SGH (predominantly from the northern parts of the range) and 184 Northern ground hornbills (NGHs) (*Bucorvus abyssinicus*) in accredited zoos around the world.⁴ Currently, these captive populations, if managed well, remain sustainable and serve as ambassadors for engaging in situ conservation work to reduce and ultimately reverse the decline. The ultimate goal for these captive birds is to be incorporated into a global studbook.

As wild populations continue to decline, harvesting of adults from wild populations for captive facilities is deemed unsustainable. This is vital to ensure the highest standard of veterinary care for the existing founder population. As every wild individual is also vital for the species survival, it is essential to provide effective care and rehabilitation for sick, injured, and poisoned ground hornbills *in situ*.

Southern ground hornbills hold a primitive position at the base of the hornbill clade and as a result have many unique and vestigial characteristics. It is one of only two species in the genus *Bucorvus* and family *Bucconidae*, within the avian order *Bucconiformes*, and unique within the hornbill family. Unlike other hornbill females, SGHs do not seal themselves into the nest cavity.⁵ The development of the *Bucorvus* syncervical (fused atlas and axis vertebrae) predates nest-sealing hornbills with their heavier casque structures. It thus must likely developed for the support of forceful motions of the skull when killing prey than for carrying a heavy casque.⁶

Other anatomical differences include: the carotid arteries run parallel to the jugular veins and pneumogastric nerves,⁷ a reduction in the number of nerves in the brachial plexus,⁸ there are 15 instead of 14 neck vertebrae, and an extra tendon runs from the pelvis to the femur.⁹ Their limb structure allows them to walk efficiently, whereas most other hornbills prefer to hop, except for small members of the subgenus *Tockus* within the genus *Tockus*.^{10,11} The prominent muscular layer of the small intestine predisposes birds to gastro-intestinal tract (GIT) stasis.¹² Gastro-intestinal tract transit times are rapid with a mean transit time of 30 minutes.

The SGH has several significant life history characteristics, each independently increasing its vulnerability to extinction: it is a diurnal, long-lived, large-complexion, top-order avian predator, with large spatial needs that result in low densities and small population size per unit area.¹³ These features, together with cooperative breeding and other complex social associations, combine to produce naturally slow rates of breeding and recruitment.¹⁴ The species exhibits obligate brood reduction (the younger/weaker chick dies of parental neglect) rather than obligate siblicide (where one chick consumes the other) or cainism (where one chick actively kills its siblings), and chicks are altricial at hatching.¹⁵ There are no reports of more than one chick being successfully raised from a clutch of two (rarely three) eggs, even in a captive situation where there is adequate nutrition.

Handling

Southern ground-hornbill can give a painful bite and should be restrained by experienced handlers. Eye protection should be used for wild individuals. One arm should


The beak and unfeathered skin as heat radiators in the southern ground-hornbill

Andries K. Janse van Vuuren, Lucy V. Kemp, Andrew E. McKechnie 

First published: 06 April 2020 | <https://doi.org/10.1111/jav.02457> | Citations: 3

ORIGINAL ARTICLE

Endocrine correlates of gender and throat coloration in the southern ground-hornbill (*Bucorvus leadbeateri*)

Juan SCHEUN  Sophie NELLER, Nigel C. BENNETT, Lucy V. KEMP, Andre GANSWINDT

First published: 06 August 2020 | <https://doi.org/10.1111/1749-4877.12478> | Citations: 3


J.S. and S.N. contributed equally to the manuscript and are joint first authors.

Short Notes

Report of suspected kidnapping in cooperative breeding Southern Ground-Hornbill in South Africa with consequences for conservation reintroductions

Lucy V Kemp  & Paige F Ezzey

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Review of trial reintroductions of the long-lived, cooperative breeding Southern Ground-hornbill

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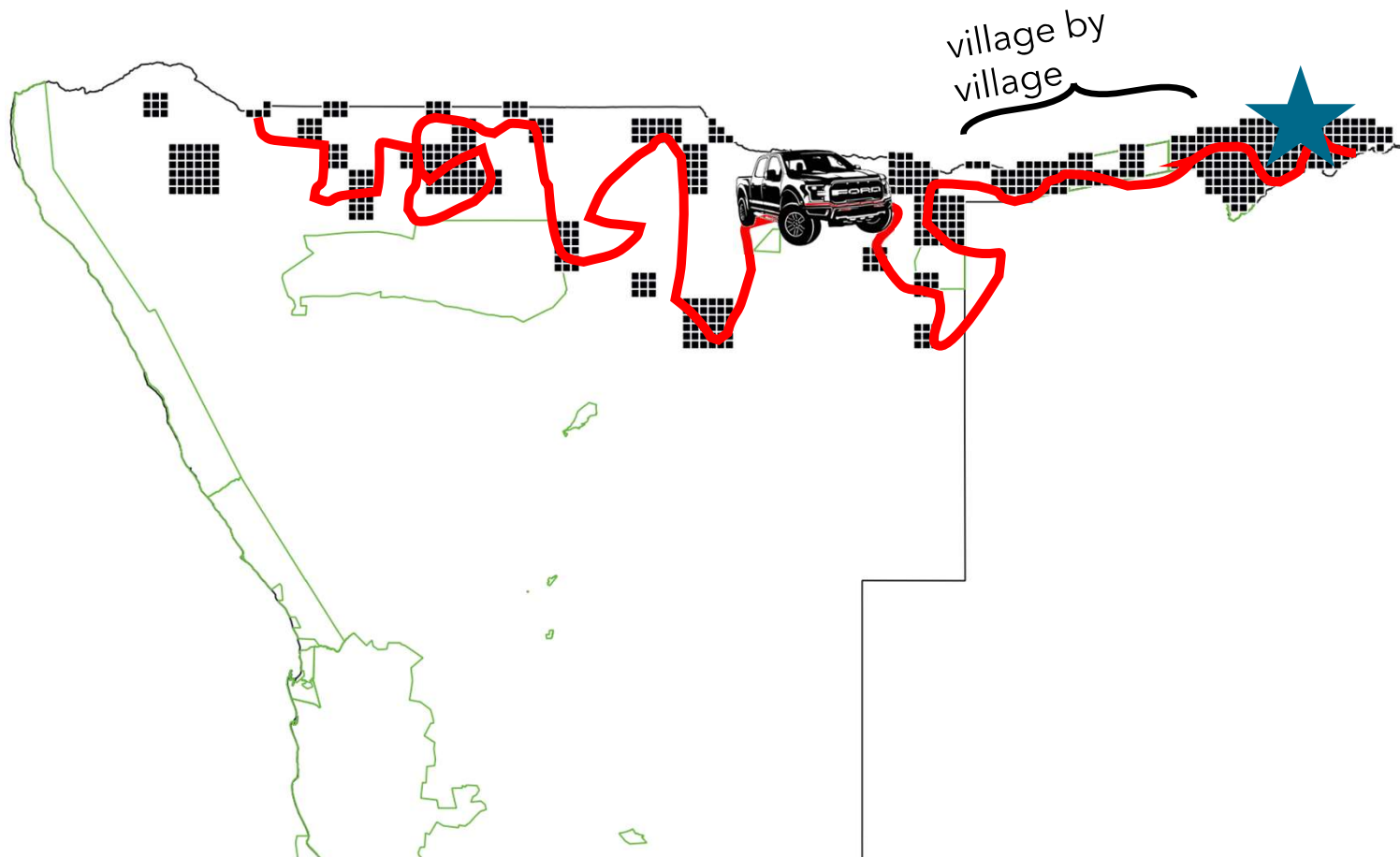
LUCY V. KEMP , ANTOINETTE KOTZE, RAYMOND JANSEN, DESIRÉ L. DALTON,
PAUL GROBLER and ROB M. LITTLE

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06



One year ago.....







Plan for the MEFT awareness programme

Organise meetings between
 regional stakeholders — MEFT
 & traditional authorities — CMC
 — FMC
 — TA
 — NNF

Conduct village-to-village meetings within Conservancies — MEFT
 — CMC
 — FMC
 — TA
 — NNF
 Zambezi, Kavango East & Kavango West regions — MEFT
 — CMC
 — FMC
 — TA
 — NNF
 Engage with traditional healers — MEFT
 — TA
 — NNF
 On alternative use of medicines — MEFT
 — TA
 — NNF

School visits

ACTION	Time	WHO
Awareness at schools on S&H Conservation	Year 1	MEFT UNAF NNF
Meet stakeholders to select targeted schools	Year 1	MEFT UNAF NNF
Write letters to school principals	Year 1	MEFT CMC
Visit schools to talk about S&H conservation	Year 1-5	MEFT UNAF NNF CMC

Invitation — MEFT to stakeholders

Conduct stakeholder meeting in regions — MEFT
 — NCE
 — NNF
 Select draft reps
 appoint nominate technical committees — MEFT
 — CMC
 — TA
 — NNF
 Invitation/meeting — Committee members
 — LAC
 Draft
 Final submission to MEFT
 to be tabled to Parliament

Joint - patrols

ACTION	TIME	WHO
enforcement to patrolling plan	Year 1	MEFT NAMPOL





20 artificial nests installed in Bwabwata



8 community monitors trained





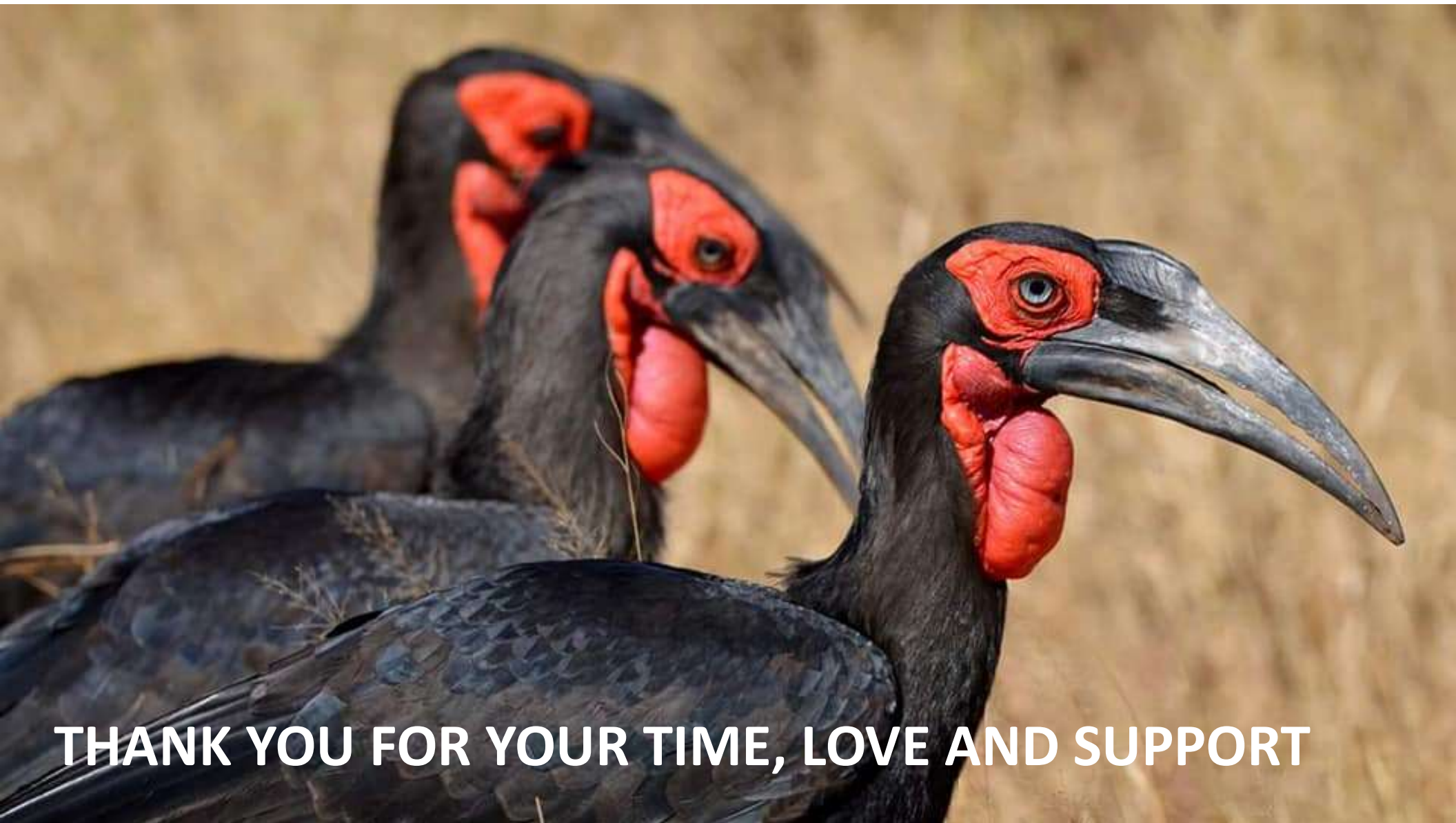
THEY NEED ALL THE HELP THEY CAN GET



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THANK YOU FOR YOUR TIME, LOVE AND SUPPORT

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