

VulPro: an overview of Africa's vulture conservation centre.

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Summary

VulPro is a non-profit organisation based in the North West Province, South Africa, dedicated to African vulture research and conservation. Over the last 14 years, VulPro has grown into an internationally recognised organisation that conducts vulture rehabilitation, conservation breeding for supplementation programmes, education, and research regarding population trends, movement ecology, threat mitigation, and the integration of captive-bred fledglings. The VulPro team of eight full-time staff now cares for over 250 non-releasable vultures of six African species. VulPro's research has resulted in over 40 peer-reviewed publications and its conservation work spans across species and countries, ultimately impacting conservation actions across the continent and globe.

History and accomplishments

VulPro was founded in 2007 after the Vulture Study Group (VSG), a group of vulture-focused researchers and conservationists, was dissolved and amalgamated into the Birds of Prey Working Group of the Endangered Wildlife Trust. The disbanding of the VSG created a major gap in the conservation of southern Africa's vultures. Any focus that wildlife conservation organisations placed on the group of birds was often overshadowed by other more charismatic species such as cheetah, lion, elephant, rhino and even Martial Eagles etc. VulPro, therefore, aimed to place vultures in the

spotlight and focus conservation actions on species-specific threats.

VulPro was founded under the umbrella of the newly formed Rhino and Lion Wildlife Conservation non-profit organisation (NPO); because wild vulture captures were undertaken at the Rhino and Lion Nature Reserve in Kromdraai, a UNESCO World Heritage site located between Krugersdorp and the Magaliesberg, South Africa. This site was ideal as hundreds of vultures from the Magaliesberg, Botswana and the Kruger National Park (known from sightings of tagged and ringed vultures) had been using the established vulture feeding site for over 15 years.

All rehabilitation and captive vulture activities were undertaken on privately owned land, owned by VulPro's founder and CEO, Kerri Wolter, to avoid 'ownership' of the birds by the Rhino and Lion Nature Reserve, keeping the birds away from any possible wildlife trade. Over several years, the captive facilities grew and became widely recognised, leading to finally separating VulPro to establish its own entity in January 2011.

As VulPro gained its own wings to fly, the facilities were moved to a more stable property 20 km east, near the town of Hartbeespoort at the base of the Magaliesberg. This new location offered easier public access and opportunities for international volunteer housing. VulPro's first focus was the Cape Vulture *Gyps coprotheres*, a species endemic to southern Africa with a gradually diminishing breeding range. To focus solely on these imperiled birds, efforts began with only one small aviary and two captive non-releasable

vultures. In 2011, three enclosures and two species were moved from the original facility, and now VulPro boasts over 11 enclosures with six African vulture species, as well as some American vultures, and continues to grow.

Over the last 14 years, VulPro has grown from one woman's vision into the teamwork it is today: an internationally recognised organisation that conducts vulture rehabilitation, conservation breeding for supplementation programmes, education, and research regarding population trends, movement ecology, threat mitigation, and the integration of captive-bred fledglings. VulPro is the only vulture-focused facility in Africa. The small team of eight full-time staff members now cares for over 250 non-releasable vultures of six African species: Cape, White-backed *Gyps africanus*, Lappet-faced *Torgos tracheliotos*, White-headed *Trigonoceps occipitalis*, Palm-nut *Gypohierax angolensis*, and Hooded Vultures *Necrosyrtes monachus*. VulPro's facility also houses several New World vultures which are highlighted in educational programmes: three Andean Condors *Vultur gryphus* and one King Vulture *Sarcoramphus papa*. This is the largest collection of African vultures worldwide.

As efficient scavenging clean-up crews, vultures fulfil a unique and critical niche in every continent except Antarctica and Australia (Mundy *et al.* 1992). In the mid-2000s the world was made aware of vultures' importance as the Indian sub-continent experienced the devastating ecological and human health consequences of dramatic vulture declines during the Asian Vulture Crisis. An increasingly common veterinary non-steroidal anti-inflammatory drug (NSAID), diclofenac, was entering the vultures' food chain through treated livestock and was proving to be acutely toxic to the birds (Swan *et al.* 2006b). Within a few years, Asian vulture populations crashed from millions to thousands; over 99% of vulture populations were wiped out. VulPro's facility and African *Gyps*

vulture residents became a key component in the race to prove diclofenac's toxicity (Swan *et al.* 2006b, Pain *et al.* 2009). VulPro housed several toxicity trials, and later clinical safety trials of several NSAID drugs (Swan *et al.* 2006a, Naidoo *et al.* 2008b, Naidoo *et al.* 2010a, Naidoo *et al.* 2010b, Fourie *et al.* 2015, Naidoo *et al.* 2018, Galligan *et al.* 2021). These trials provided the necessary evidence of toxicity for all NSAIDs tested except meloxicam which was proven safe for use in vultures (Naidoo *et al.* 2008b) and approved by the Animal Use and Care Committee of the University of Pretoria. VulPro's willingness to provide captive, non-releasable birds in their care for the benefit of the entire population allowed research to be initiated quickly and spared the capture of free-ranging, wild, endangered individuals. These trials and subsequent publications were elemental to forming policies banning veterinary diclofenac in four Asian countries and developing meloxicam as a vulture-safe alternative. Publications with VulPro's involvement were instrumental in saving Asian vultures from extinction, and contributions to this research have also illuminated the threat of veterinary NSAIDs to African vultures (Naidoo *et al.* 2009).

VulPro's facility has grown to house a robust vulture rehabilitation programme that now admits an average of 100 birds per year (Naidoo *et al.* 2011, Monadjem *et al.* 2014, Howard *et al.* 2020; Table 1). Most injured vultures come to VulPro after negative interactions with electrical infrastructure and many of these birds are not releasable (Phipps *et al.* 2013b, Howard *et al.* 2020, Aspenström *et al.* in prep.). Through VulPro's *ex situ* initiatives, non-releasable birds are still allowed to contribute to their species' conservation through research regarding avian veterinary medicine (Naidoo *et al.* 2008a, Turnbull *et al.* 2008, Naidoo & Wolter 2016), vulture anatomy and physiology (Wolter *et al.* 2013, Hirschauer *et al.*

2019, Adawaren *et al.* 2020, Havenga *et al.* 2020), and emerging threats to the species and other scavengers (Naidoo *et al.* 2012, Naidoo *et al.* 2017).

With over a decade of rehabilitation experience, VulPro developed specific protocols for best practices in vulture rehabilitation (Wolter *et al.* 2019), and published protocols for mass capture, handling and fitting visual markers and tracking devices on large-bodied birds (Wolter *et al.* 2018).

These protocols, readily available on VulPro’s website (<https://vulpro.com/publications/>), advise researchers across the world and, in collaboration with the South African government and other NGOs, attempt to standardise marking schemes and advocate for the safe application of markers (Hirschauer *et al.* 2019, Curk *et al.* 2021). VulPro constantly scrutinises its practices and modifies its protocols to focus on vulture welfare.

Table 1: The number of African vultures rescued and released by VulPro from 2010 to 2020.

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Vultures	Rescued	30	39	58	46	72	75	73	108	120	93	81	795
	Released	13	15	31	24	15	21	16	72	48	40	17	312
Other avian species	Rescued	14	17	15	13	8	22	9	24	14	59	20	215
	Released	4	7	6	7	9	12	3	2	4	37	6	97

Table 2: A summary of VulPro’s conservation breeding programme growth and success, from inception to time of publication, in terms of numbers of breeding pairs in captivity, number of eggs laid and number of captive-bred individuals released to the wild.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Breeding pairs												
Cape Vulture	10	10	11	10	14	16	12	18	15	25	31	
White-backed Vulture	-	-	-	-	1	1	4	3	4	3	4	
White-headed Vulture	-	-	-	-	-	-	-	-	1	1	-	
Lappet-faced Vulture	-	-	-	-	-	-	-	-	1	-	1	
Palm-nut Vulture	-	-	-	-	-	-	-	-	-	1	1	
Eggs laid												
Cape Vulture	8	9	11	11	15	22	25	32	30	37	38	
White-backed Vulture	-	-	-	-	1	1	5	3	6	5	6	
White-headed Vulture	-	-	-	-	-	-	-	-	1	1	-	
Lappet-faced Vulture	-	-	-	-	-	-	-	-	1	-	1	
Palm-nut Vulture	-	-	-	-	-	-	-	-	-	1	1	
Released												
Cape Vulture	0	2	2	3	5	7	8	5	10	4	15	
White-backed Vulture	-	-	-	-	-	-	2	2	1	2	1	
White-headed Vulture	-	-	-	-	-	-	-	-	0	0	-	
Lappet-faced Vulture	-	-	-	-	-	-	-	-	0	-	0	
Palm-nut Vulture	-	-	-	-	-	-	-	-	-	0	1	

For example, VulPro shifted from fitting patagial tags and moved towards using plastic leg bands (Curk *et al.* 2021) and shifted from backpack-mounted GPS harnesses to pelvic mounts. Demand for rehabilitation services is increasing as VulPro's education campaigns reach more communities and threats continue. The large number of releasable and non-releasable vultures in VulPro's care has provided up-close observations of nuanced, species-specific morphometrics (Mabhikwa *et al.* 2017, Hirschauer *et al.* 2018) and behaviours (Hirschauer & Wolter 2017), contributing novel insights into the species' ecology and facilitating future research.

A growing number of birds are marked and released from successful rehabilitation to contribute to our understanding of ranging patterns and social behaviours (Bartels *et al.* 2007, Phipps *et al.* 2013a, Wolter *et al.* 2014, Jobson *et al.* 2020, Howard *et al.* 2020, Kane *et al.* 2022). VulPro's marking programmes are ongoing and integrate with many of VulPro's other conservation, research, and outreach activities (Kane *et al.* 2016). For example, vulture restaurants are a conservation tool implemented across southern Africa, providing safe (toxin-free) food for wild individuals (Brink *et al.* 2020a, Brink *et al.* 2020b). VulPro maintains a vulture restaurant at the facility, feeding hundreds of local Magaliesberg Cape Vulture residents daily, and consults with landowners across southern Africa to establish and properly manage their own vulture feeding sites.

VulPro's successful conservation breeding programme was hatched in 2011 from a comprehensive awareness of proper vulture husbandry. Non-releasable Cape and White-backed Vultures at VulPro are allowed to exhibit natural behaviours (Wolter *et al.* 2015), and now over 40 breeding pairs have chosen their own mates and formed captive breeding colonies. VulPro's captive White-backed Vultures began pairing in 2015, with the first captive-bred individual released in 2017

(Table 2). VulPro's vulture breeding programme now includes six species total: three species have successfully raised chicks (Cape, White-backed, and Palm-nut Vultures) and three species have paired but have yet to raise a chick (Lappet-faced, White-headed and Hooded Vultures). The programme is a leader in the field and remains the only facility on the African continent contributing to the reintroduction and supplementation efforts of these species. A protocol for captive breeding for population supplementation for African vultures has therefore been set up by VulPro and assists in informing other facilities, who are guided by VulPro's hard work, on best practices for a successful captive breeding programme for population supplementation (Wolter *et al.* 2015). Birds bred and parent-reared in the programme are released and monitored to contribute to our understanding of species' behaviours (Jobson *et al.* 2020; Figure 1; Table 2). Through mortalities of tracked, released birds this population is also, unfortunately, providing evidence of the severity and number of threats faced in the wild.

The Cape Vulture breeding programme, which began in 2011, adapted its release goals and protocols after two main milestones. First, a pilot study assessed the behavioural integration of released captive-bred Cape Vultures through body condition, competitive behaviours, and foraging behaviours post-release (Hirschauer 2015). Birds released through this study at VulPro's facility, which also hosts a wild vulture feeding station, failed to adequately range beyond the facility. Subsequently, in 2017, VulPro constructed a release enclosure on top of Nooitgedacht, one of two remaining Cape Vulture colonies in the Magaliesberg, in Gauteng Province. Juvenile captive-bred birds released from this remote facility were independent and displayed foraging behaviours like their wild counterparts. Secondly, after the method of removing individuals from the breeding facility for release proved successful,

VulPro initiated a programme in 2019 to transport birds to the Eastern Cape Province for release, supplementing a less studied and smaller population.

The VulPro team's tireless efforts in building a world-class facility and *ex situ* research programme are reflected in their *in situ* field research. VulPro championed wild population monitoring early in the organisation's history with monitoring of Cape Vulture colonies, vulture restaurants and power lines at vulture colonies. Subsequently, this led to the setting up of appropriate protocols for this work and led the way for other organisations to conduct similar monitoring (Wolter *et al.* 2007, Whittington-Jones *et al.* 2011, Wolter *et al.* 2013,

Wolter 2018a, Wolter 2018b). Now, VulPro's longitudinal breeding surveys cover an estimated 44 to 48% of the global Cape Vulture population (Wolter *et al.* 2016, Hirschauer *et al.* 2020). Surveys documented the extirpation of the Roberts' Farm colony in the Magaliesberg and the species' overall range contraction (Wolter *et al.* 2016), alongside stable or increasing population growth within the core of the species' range (Hirschauer *et al.* 2020), stability which may be attributed in part to VulPro's increasing conservation actions in the region. No other research programme has assessed Cape Vulture population trends at such a large temporal and spatial scale.



Figure 1: A Cape Vulture parent and chick in VulPro's captive breeding colony.

Photograph: VulPro

With over a decade of data set up through a thorough monitoring protocol (Wolter 2018a), VulPro is now illuminating issues only visible with long-term data sets, such as the threat of climate change (Phipps *et al.* 2017), or behaviours like philopatry which are only witnessed with several years of monitoring (Hirschauer *et al.* 2017b), and rarely documented ranging patterns (Hirschauer *et al.* 2017a). VulPro facilitates all of these studies to increase our knowledge of species' biology, ultimately implementing robust conservation strategies reducing threats (Venter *et al.* 2019, Aspenström *et al.* in prep.).

With many vulture species at risk of extinction, VulPro conducts breeding surveys and monitoring programmes for tree-nesting White-backed and Hooded Vultures and has published and updated protocols for this work (Wolter *et al.* 2020). VulPro further plans to extend its research efforts to Lappet-faced and White-headed Vultures. The research with these less-studied species is now filling knowledge gaps regarding species' baseline preferences and behaviours (Phipps *et al.* 2013a, Monadjem *et al.* 2016, Thompson *et al.* 2020) as well as emerging threats (Naidoo *et al.* 2017). Further, this collection of data over the years will become part of a thorough analysis into the habitat suitability of White-backed Vulture across southern Africa in the PhD thesis for VulPro employee, Ms Caroline Grace Hannweg. Ms Hannweg's thesis seeks to explore the movement ecology and breeding biology of White-backed Vultures in southern Africa, and thereby use these data over the years to map habitat and breeding suitability.

Electrocutions and collisions with electrical infrastructure are the leading causes of injury for birds in VulPro's care. VulPro places a substantial amount of its energy into tackling this issue, including walking surveys of powerline structures in 'hot spot' areas where birds are most likely to encounter dangerous structures, namely colonies and vulture restaurants (Wolter 2018b, Aspenström

et al. in prep.). VulPro staff and volunteers walked almost 200 km of power lines from 2018 and 2020, with all injuries and fatalities reported to notify the utility providers (e.g., Eskom) to inform the implementation of mitigation measures.

VulPro passes on the knowledge it spent years gathering and refining. This is evident throughout VulPro's educational programmes by distributing valuable information and upskilling local communities and landowners to live in harmony with these magnificent creatures in the same landscape. Further, information is continuously shared across its social media platforms and the bi-annual newsletter to the general public. VulPro is also continuously engaging by presenting its work at international and local conferences, in addition to discussing the importance of vultures to schoolchildren and other groups, either at VulPro or at their own facilities. Volunteer and training programmes at VulPro offer individuals the opportunity learn rehabilitation, husbandry, and research skills when they visit, and then return home to contribute to vulture conservation across the world. VulPro routinely mentors local southern African students, namely final year Nature Conservation students, providing them the opportunity to learn new skills while working at VulPro, giving them practical and highly sought-after skills in their field. VulPro frequently works with the National University of Science and Technology (NUST) in Zimbabwe, giving students the opportunity to attend training at its facility, learning more about vulture conservation in southern Africa. VulPro's training opportunities have recently included a partnership with the Department of Science and Innovation-Human Sciences Research Council (DSI-HSRC) Internship Programme, giving young graduates from South African universities the opportunity to find their feet in the research and conservation sector to bridge the gap between tertiary education and the working world.

“How would you save a species from extinction?” VulPro continues to attack this problem with full force, from many angles. Vultures face several anthropogenic threats; each threat individually has the potential to drive them to extinction. VulPro’s success stems from its holistic approach to tackling these many issues simultaneously through various *in situ* and *ex situ* programmes. VulPro’s collaborative research has produced a credible platform for outreach actions and has helped (via positions on the South African National Vulture Specialist Group, South African Lead Task Force and the South African Poison Working Group, among others) form policies safeguarding vultures in South Africa and abroad.

VulPro, as chronicled above, has markedly and positively impacted vulture conservation. Yet all African vultures are still in dire need of protection across the continent. VulPro will stand for vultures always, materialising the transformation started 14 years ago as it continues to advocate for vultures, intact ecosystems, and their community.

VulPro today: tour of the facility

The conservation facility in North West Province of South Africa is the centre of the action. Upon arrival, you will step into VulPro’s education building to compare your arm-span to a vulture’s wingspan and hold a real Cape Vulture egg (Figure 2). Next, you will take a guided walk for an hour or more, coming face-to-face with several species. The birds generally seem calm and at home; you can observe many natural behaviours as the highly social species are housed communally. Some birds do not have a roof over their heads; a large ‘open’ enclosure houses over 70 one-winged birds, all victims of power line collisions (Figure 3).

VulPro is home to over 250 birds. They all arrived after sustaining various injuries, most of

them the result of human activities. VulPro recently constructed a four-room hospital on site to handle the increasing demand for rehabilitation services. One room is kept clean for surgical procedures, one room for lab work and diagnostics, one room for x-rays, and a consultation room for general treatments. Birds needing intravenous fluids or intensive care are housed in smaller intensive care units (ICUs). When injured birds are strong enough to be housed outside, they graduate to smaller but still large, flight aviaries where they can see the sky and others of their own kind.

Several of the enclosures on site are very large (Figure 4). The largest enclosure is 18 by 40 metres large, 8 metres tall, and contains a sculpted concrete cliff face that mimics natural rock (Figure 5). This houses a Cape Vulture breeding colony and enables all the activities that allow parents to raise their own young. Breeding pairs do most of the hard work of rearing and feeding young themselves. VulPro staff will intervene to artificially incubate an egg if it is at risk of being damaged or, if early in the season, eggs will be collected to increase yields as pairs will lay a second replacement egg. A small indoor captive-breeding facility houses three incubators, one hatcher, and several brooder machines for this purpose, out of public view (Figure 6).

On your tour, you may glimpse a sizeable population of White-backed Vultures, several pairs of Lappet-faced Vultures, a pair of White-headed Vultures, two pairs of Hooded Vultures, and even Palm-nut Vultures. Several vultures from the Americas, evolutionarily distinct from the African and Asian vulture lineage, serve as educational ambassadors as well. Magnificent Andean Condors, prior residents of local zoos, also live on site with their own large enclosures containing artificial cliffs.



Figure 2: VulPro's educational centre. Photograph: VulPro



Figure 3: VulPro's open enclosure. Notice the wild vultures sitting atop other enclosures surrounding the open enclosure. Photograph: VulPro

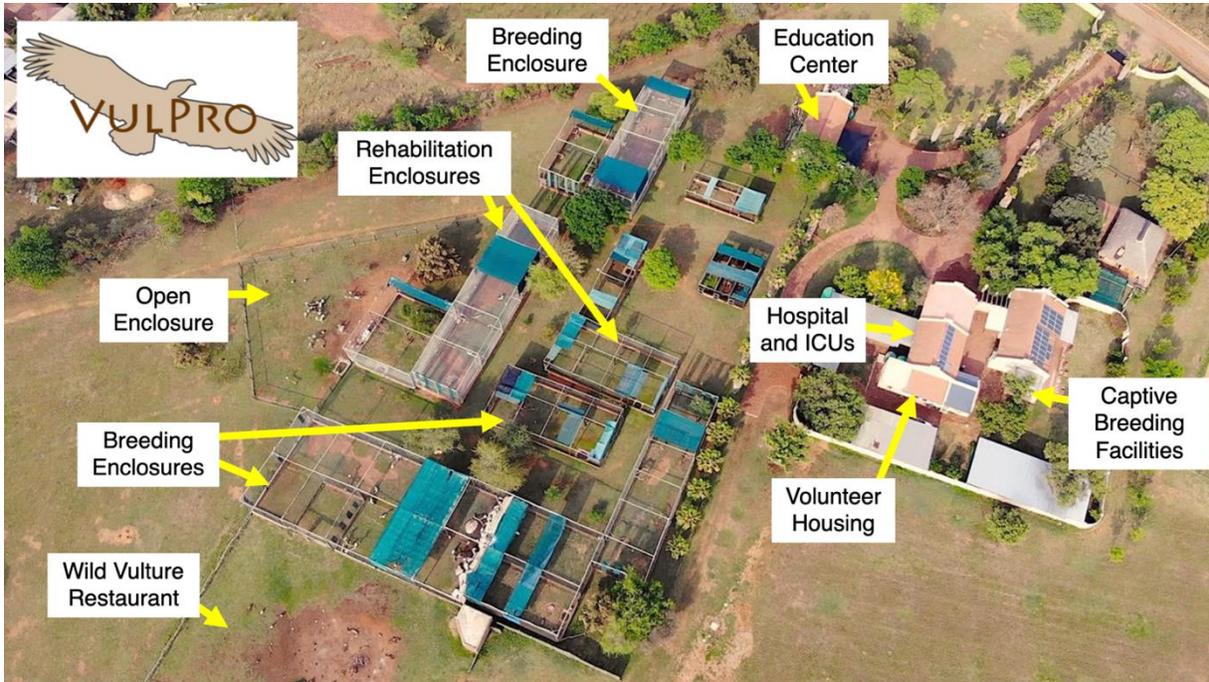


Figure 4: Aerial view of VulPro's facilities.



Figure 5: The artificial south-facing cliff designed for non-releasable breeding Cape Vultures.

Photograph: VulPro

As the sun’s heat increases and temperatures rise, you will be afforded sweeping views of wild, free-flying vultures thermaling overhead, circling lower to land on enclosures and patiently wait their turn to visit VulPro’s vulture restaurant. This supplemental feeding site provides a regular supply of carcasses from local farms which feed hundreds of Cape Vultures from the local Magaliesberg breeding colonies. The presence of these wild birds on top and around the large aviaries, and socialising and feeding among the one-winged birds in the ‘open’ enclosure, brings a sense of security to the captive birds. You may also find individuals of several other species, including wild White-backed and Lappet-faced Vultures (even a Palm-nut Vulture visited once), ibis, crows and several species of kites and storks; they all know the location well. A permanent viewing hide only 5 metres from the restaurant provides a once-in-a-lifetime opportunity to observe and photograph the intense frenzied action (and cacophonous noise)

emanating from hundreds of vultures landing, fighting, and feeding.

VulPro leads by example. It has taken several measures to reduce its carbon footprint, become self-reliant, and provide healthy food for staff and volunteers. The main facilities are solar powered from a network of roof-top solar panels. Garden beds grow several varieties of vegetables between enclosures, making use of precious discarded vulture-bath water in an increasingly drought-stricken ecosystem.

VulPro continues to inspire students across the region and internationally, as witnessed by the increasing number of academics approaching VulPro interested in vulture conservation research. There are several rooms available on site for international volunteers, students, and researchers interested in contributing to daily work, participating in training workshops or symposiums held on-site or conducting their studies.



Figure 6: VulPro’s incubation facilities housing Cape Vulture eggs.

Photograph: VulPro

VulPro believes in influencing change by showcasing and capturing the magnificence of vultures. All too often vultures are showcased in a negative light and popular culture has done this well by showcasing vultures as the ‘evil’ characters, waiting for someone to die or for something bad to happen. To curb this negativity, VulPro produced a vulture coffee table book, entitled “Magnificent Vultures of Africa”, showcasing their beauty with anecdotes and information on each species (Figure 7, VulPro 2020). The photographs are from some of Africa’s top photographers, many of whom have won awards and are internationally recognised for their work. It is well worth owning a copy if you happen to be a vulture fanatic or simply want to support VulPro’s work in changing the perceptions and mindsets of the general population around vultures.

If you care to witness VulPro’s conservation work in action or be part of the fight, you are welcome to join in. African vultures need all hands on deck and all eyes to the skies. To learn more, donate, or help, reach out to info@vulpro.com or visit our website at www.vulpro.com.

You can follow further updates on VulPro on various social media platforms:

Twitter: <https://twitter.com/WeLoveVultures>

Facebook:

<https://www.facebook.com/VulProAfrica/>

Instagram:

<https://www.instagram.com/vulpro.official/>

YouTube:

<https://www.youtube.com/channel/UCGHVAQO-dHhMxInt1UWv2EA>.



Figure 7: VulPro’s vulture coffee table book, entitled “Magnificent Vultures of Africa”, showcasing the beauty of vultures with anecdotes and information on each species.

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