

## CONFERENCE REPORT:

### The 15<sup>th</sup> Pan African Ornithological Congress, 21-25 November 2022 – A vulture perspective.

*Clive Slater<sup>1</sup> and Josephine Mundava<sup>2</sup>*

<sup>1</sup> Research Associate, Norwich Castle Museum, Norfolk Museum Services, Norfolk, UK

<sup>2</sup> Lecturer, Department of Forest Resources and Wildlife Management, Faculty of Environmental Science, National University of Science & Technology, Bulawayo, Zimbabwe

Correspondence: slaterclive@hotmail.com ; josephine.mundava@nust.ac.zw

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## Introduction

The 15th Pan-African Ornithological Congress (PAOC15) took place from 21-25 November 2022 at Victoria Falls in Zimbabwe after being postponed from November 2020 as a result of the COVID-19 pandemic. The hard work of the PAOC Committee and the Local Organising Committee, BirdLife Zimbabwe, came to fruition at the excellent Elephant Hills Conference Centre in Victoria Falls and attracted around 300 delegates from 60 nations including 33 African countries (Figure 1). As might be expected with a normal congress cycle of every four years, this time extended to six years, the topics covered by the presentations and discussions was wide-ranging and reflected the diverse interests of many researchers both professional and amateur.



**Figure 1:** Welcome banner at PAOC15, Victoria Falls, Zimbabwe.

The programme included six plenaries plus 26 symposia running in four parallel sessions amounting to more than 220 talks, together with 13 round table discussions and about 30 poster presentations. The middle day of this heavy programme was available for morning excursions. With so many talks and meetings to potentially attend, it was necessary for delegates to plan their programme carefully, but fortunately for those wanting to focus their attention on vultures, this was fairly easy to do. In fact, due to the large number of vulture-related talks, some delegates were overheard to refer to this event as the “Pan-African Vulture Congress”. Even the complimentary congress T-shirt featured an image of a vulture!

### **Plenary presentations**

The six plenary presentations were of broad, cross-cutting interest to ornithologists but did not include direct reference to vultures and details are therefore not included here, other than to list the titles and presenters as follows:

**Plenary 1.** *Raptors in a changing world: understanding the response of predators to increasing urbanisation.* Petra Sumasgutner.

**Plenary 2.** *Sustainable agriculture in a period of unprecedented biodiversity loss.* Hope Ovie Usieta.

**Plenary 3.** *The fortunes of migratory birds from Eurasia: being on a tightrope in the Sahel.* Leo Zwarts.

**Plenary 4.** *Climate change leadership in ornithology and habitat preservation in a changing environment.* Pioneer Taashwa Gamundani.

**Plenary 5.** *Differing priorities in the timing of annual life history events.* Chima Josiah Nwaogu.

**Plenary 6.** *Behaviour and the impacts of climate change on desert birds.* Susan J. Cunningham.

### **Overview of vulture themes**

**Symposia:** Of the 26 symposia, vulture presentations featured in four symposia as follows.

**Symposium 8.** *CMS Vulture Multispecies Action Plan: implementation in sub-Saharan Africa – an assessment of progress.* Convened by Andre Botha. 22 presentations (Figure 2).

The CMS Vulture Multi-species Action Plan for African-Eurasian Vultures (Vulture MsAP) was adopted by all 124 Range States at CMS CoP12 at Manilla in the Philippines in October 2017. This symposium focused on feedback from various presenters from across Africa about progress made with regard to the implementation of the actions in the Vulture MsAP in their countries/regions and what challenges and opportunities were identified during the first three years since the MsAP was adopted. Participants reflected on what more can and must be done to further promote and accelerate implementation across the range in Africa.



**Figure 2:** Vulture symposium delegates.

See Appendix 1 for abstracts and comments on all 22 presentations.

**Symposium 13. *Vulture Safe Zones*. Convened by Hanneline Smit-Robinson. 6 presentations.**

The catastrophic decline of vultures across Asia and Africa from the mid-1990s onwards spurred conservation groups across the globe to work on innovative ideas for conserving the species. This session looked at one such innovation – the establishment of Vulture Safe Zones (VSZs). In Asia, the main goal of VSZs has been the complete removal of diclofenac – a non-steroidal anti-inflammatory drug - thereby removing the risk of poisoning. This goal was achieved successfully through concerted advocacy and education efforts. Telemetry data pooled from 163 individual vultures from 11 sites in African countries showed that the concept of VSZs in Africa needs to include vast tracts of lands which includes both protected areas and overlaps outside of protected areas. This therefore warrants broad spatial and legislative efforts to address declines. One very important aspect of these efforts would be the inclusion of private landowners and communally-held landscapes; particularly pushing towards the establishment of self-governing volunteer vulture guardians.

See Appendix 2 for abstracts and comments on all 6 presentations.

**Symposium 18. *Poison response training for bird conservation: developing best practices*. Convened by Corinne Kendall. 8 presentations.**

Poisoning has become a significant threat to Africa's birds, particularly vultures, cranes, and waterfowl. Several groups are using poison response training with communities, rangers, government officials, and law enforcement as a strategy to address this important issue. This session covered different approaches to poison response training and other techniques for addressing the threat of pesticide poisoning to birds throughout Africa with a focus on lessons learned, challenges, and development of best practices. Speakers covered different strategies that have been tried as well as their strengths and weaknesses in relation to responding to and reducing the threat of poisoning. Also covered were ranger-focused trainings, community-focused trainings, making the link to human

health, and treatment of affected birds. The goal of the session was to use current experience and practices in poison response training from a number of different countries to work towards best practices for poison response trainings in the future.

See Appendix 3 for abstracts and comments on all 8 presentations.

**Symposium 22. *Innovation in vulture conservation: a socio-environmental perspective.***  
**Convened by William Bowerman and Linda van den Heever. 6 presentations.**

The “African Vulture Crisis” describes the long decline in populations of most Old World vulture species in Africa that have recently been reclassified as Critically Endangered or Endangered using IUCN criteria. Multiple human-caused stressors have been linked to vulture mortality including: poisoning, directly and in association with elephant poaching; indirectly and in association with secondary impacts from poisons used for human-wildlife conflict; harvesting for trade in vulture parts for traditional medicine and beliefs; alteration of habitat through changes in land use; lead poisoning from big game hunting; drowning in farm dams; and, collisions with electrical power infrastructure, amongst other threats. The U.S. National Science Foundation funded National Socio-Environmental Synthesis Center (SESYNC) was developed to produce actionable conservation outcomes working through teams of social and environmental scientists tackling real world problems. For five years, over 20 scientists and policy makers have been working together on this problem. Reported here were novel approaches including the use of the One Health framework; conservation ethics; conservation criminology; human-vulture relationships; the role of vultures in disease; and, community conservation.

See Appendix 4 for abstracts and comments on all 6 presentations.

**Round-table discussions:** Of the 13 round table discussions, vultures featured in two as follows:

**Round Table Discussion 5: *Vulture Conservation Forum and Vulture Safe Zones* – Convened by Salisha Chandra and Hanneline Smit-Robinson.**

*Vulture Conservation Forum*

Over the last 50 years, populations of African vultures have declined by 80-97% (over 92% for five species). Stopping and reversing these declines is one of the biggest challenges in conservation in Africa. This is a hugely complex issue because the threats to vultures vary from sub-region to sub-region and are part of the bigger picture of the continuing challenge of poaching, unsustainable resource use, cultural attitudes and beliefs, and the absence of safeguards for biodiversity in many development plans.

Given the cross-cutting and diverse threats vultures face and the varied skillsets and resources required to address them, collaborative and inclusive approaches are essential to making a difference. In tackling the crisis in South Asia, a collective response network ‘Saving Asian Vultures from Extinction’ (SAVE) demonstrates what organisations can achieve when they come together with a

united vision.

This Round Table discussed the opportunities and challenges of developing a similar consortium in Africa. Our overall goal was to foster collaborative and coordinated conservation action to halt and hopefully reverse declines of this majestic group of birds.

### *Vulture Safe Zones (VSZs)*

Old World vultures are widely considered to be one of the most threatened functional guilds in the world. To stem the tide of losses, landscape-level conservation initiatives are needed, not only in our nature reserves and national parks, but also on privately-owned land that supports vulture populations. First conceptualised and applied in Asia, where vulture numbers were decimated by the veterinary drug diclofenac, Vulture Safe Zones (VSZs) cover vast stretches of privately-owned land that are managed in ways that are conducive to vulture survival. This includes, but is not limited to, implementing poison response protocols, protecting breeding birds from disturbance, implementing mitigation measures on powerlines to prevent collisions and electrocutions and ensuring that food provided at supplementary feeding sites is free of lead and other contaminants. The Multi-species Action Plan to Conserve African-Eurasian Vultures (Vulture MsAP) has now brought this initiative to Africa, where it is being adapted to address the unique and multi-faceted challenges facing the continent's vultures. The presentations and panel discussions helped participants to interrogate the concept of VSZs, what it takes to establish them, key lessons learnt and challenges still to be overcome in this fight to save one of the most threatened groups of birds in the world. The presentations deliberated on the foci of several questions which included the interrogation on the applicability of VSZs in Africa and the experiences from current VSZ projects and the local factors that may alter the approach. Discussions touched on the various contexts and threats across the sub-regions in Africa and on whether a sub-region approach would be more effective. Additionally, the benefits that could be had from upscaling collaboration within these sub-regions were discussed. In conclusion, it was agreed in discussions that looking at the benefits that would only apply to vultures would be difficult, and that it would be beneficial to ride on existing schemes of other species and existing concepts including Important Bird and Biodiversity Areas (IBAs) and Other Effective area-based Conservation Measures (OECMs).

### **Round Table Discussion 10: *Going, going, gone: tackling the illegal killing of birds for belief-based use.* Convened by: Salisha Chandra and Darcy Ogada**

The trade of avian body parts for belief-based use has been identified as one of the most significant anthropogenic causes of avian mortality and population decline. Belief-based use includes the use of whole birds, either alive or dead, or their body parts for traditional or spiritual purposes. These include traditional medicine, both preventative and therapeutic, and for spiritual healing including of folk illnesses, for spiritual protection, clairvoyance, or to bring success or misfortune to others. While this practice is widely known from West Africa, it is prevalent throughout every region of the continent. Belief-based use is one of a number of wild animal uses that collectively make up the wildlife trade and evidence from Africa suggests that it is interlinked with the trade in bushmeat and live-birds, and they are likely interdependent. Given the severity of trade for belief-based use, and particularly among

species groups that already occur at low densities such as raptors and hornbills, it is likely to be a significant contributor to declines within these groups in Africa. Case studies across Africa were shared in this RTD and all pointed to the need to collaborate across Africa and share experiences; particularly on methodologies of effective conservation.

This Round Table discussed ways to markedly increase both local and international awareness about the seriousness of this threat to Africa's birds, and shared experiences about the best ways to tackle it. Our overarching goal was to bring a collective focus on this growing and significant threat affecting many taxa that we hope will foster much needed collaborative conservation action.

**Poster presentations:** There were about 30 posters of which four featured vultures and two are highlighted below.

**Poster No. 5. *First observation of Cinereous Vulture *Aegypius monachus* in Burkina Faso adds to a recent increase in records in sub-Saharan West Africa.***

Clément Dabone (email:dabepxi@yahoo.fr)

Daboné, C.<sup>1,2</sup>, Nana, A.<sup>3</sup>, Hamidou, M.<sup>3</sup>, Idrissa S.<sup>3</sup> and Housseini, Y.<sup>3</sup>

<sup>1</sup>University Center of Tenkodogo/University Thomas Sankara, Agronomic and environmental sciences. <sup>2</sup>Laboratory of Animal Biology and Ecology of University Joseph Ki-Zerbo, Animal Biology and Ecology. <sup>3</sup>Fondation des Amis de la Nature, NATURAMA, Ouagadougou, Burkina Faso.

We present the first observation of Cinereous Vulture in Burkina Faso, which is the 13<sup>th</sup> recent record in sub-Saharan West Africa, raising questions about a possible change in the migratory status of this species. A review of recent observations shows clearly recurrent long-distance winter movements of immature Cinereous Vultures from southern Europe (France and Spain) across northern Africa towards the Strait of Gibraltar to sub-Saharan West Africa (Senegal, Niger, Nigeria, Mali, Mauritania, Burkina Faso).

**Poster No. 11. *Critically Endangered vultures: the preliminary survey in Cameroon and conservation implications.***

Irene Blondelle Kenfack (email:blondekenf@gmail.com)

Kenfack, I.B.<sup>1</sup>, Kamdoum, N.A.S.<sup>2</sup> and Taku A.<sup>1</sup>

<sup>1</sup>Department of Animal Biology, Faculty of Science, University of Dschang, PO Box 67, Dschang, Cameroon. <sup>2</sup>Tropical Forest and People Research Centre, University of the Sunshine Coast, Sippy Downs, Queensland, Australia.

There is increasing evidence to suggest that retaliatory killings and persecution by people, hunting for trade, and deliberate poisoning are among the major threats to the conservation of vultures in Africa and elsewhere globally. However, there are still countries where basic information is not very well-known despite the critically endangered status of many African vulture species. Through standardised vulture survey methodologies, we identified around protected areas the first hotspots of the White-backed Vulture *Gyps africanus*, and identified its main habitat requirements and their nests in

Cameroon, but also recorded a few observations of Hooded Vulture *Necrosyrtes monachus* in remote protected areas. Local awareness and more intensive monitoring appears to be the most important priorities in Cameroon for vultures conservation. See Figure 3.

# CRITICALLY ENDANGERED VULTURES: PRELIMINARY SURVEY IN CAMEROON AND CONSERVATION IMPLICATIONS

Mentack, I.B., Kamdoum, N.A.S. and Taku A.  
 1. Department of Animal Biology, Faculty of Science, University of Dschang, P.O. Box 67, Dschang, Cameroon  
 2. Tropical Forest and People Research Centre, University of the Sunshine Coast, Sippy Downs, QLD, Australia




Figure 1. Landscape of studies area

### Background

Vultures are important scavengers, providing essential ecosystem services by feeding on carcasses and, thus reducing the risks of diseases transmission. Unfortunately there is an increasing evidence to suggest that retaliatory kills and persecutions by people, hunting for trade, and deliberate poisoning are among the major threats to the conservation of vultures in Africa and, elsewhere globally. However there still countries where basic information on species is not very well-known despite the decline and the critically endangered status of main African vultures' species. Aims to get the preliminary information in Cameroon vultures where a lot need to be do, we have bring out first helpful data which will be used to lightening the conservation strategy.

### Objectives

- Provide preliminary detailed information on vulture species in Cameroon
- Assess perceptions and attitudes of locals towards vultures species

### Methods

A vulture survey was conducted from January to March 2021 by road and feeding count of vantage points combine with road survey transects. Existing tracks ways inside hunting zones were used for road transect survey, two observers with each other always looking one side of road. Point counts in a fifteen villages around the parks and an estimate cumulative distance of 1000 km for road transects were records.

We administered questionnaires in 30 villages bordering Benoue and Bouba Njida National parks. 30 focus-group discussions with a maximum of 10 persons per group were conducted. Focus groups were made of old hunters, pastoralists or agriculturalists men.




Figure 2. Study area, surrounding of Benoue and Bouba Njida National parks, North Cameroon

### Vultures survey

We recorded a total of 16 observation point of White-backed Vulture (*Gyps africanus*) observed in bushes (hunting zones) for about fifty individuals. We noted the presence of three white-backed Vulture nests near Benoue with no signs of breeding activity. One observation point of one individual of Egyptian vulture was registered near river surround Benoue national park. No presence of Rüppell's Vulture *Gyps rueppellii* and White-headed Vultures *Trigonoceps occipitalis* were recorded during survey. Two Hooded Vulture (*Necrosyrtes monachus*) was registered in abattoirs faraway of hunting zones.

The number of whitebacked vultures' record during survey varies from 1 to 6 individuals per survey points. Vultures congregated near river with a high presence of African fan palm. The main habitat characteristic of White-backed Vulture *Gyps africanus* are constitute of African fan palm *Borassus aethiopum* set out the long of rivers. These habitat characteristics harbour White-backed Vulture hotspots which were identified in the region. The few hotspots found harbour at least fifteen individuals of whitebacked vulture.

### Results

Species identified	Observation	Observability of identified parts	Remarks
Whitebacked Vulture	16	Head, neck, wings	15
Rüppell's Vulture	0	None	0
Hooded Vulture	2	Head, neck	2
Egyptian Vulture	1	Head, neck	1

Table 1. Number and observability of observed vulture species parts recorded during survey and hotspots. Data are represented according to the first observation.




Figure 3. Number of white backed vulture per survey points




Figure 4. Hotspots of white backed vulture

### Conclusion

Our study implied a low encounter rate and a low abundance of vulture's species, and the only presence of white backed vultures in hunting zones. Locals knowledge suggest a critically decline of vultures populations in north Cameroon, with a trend cause attributes to indirect poisoning with drugs originates from local cotton firm. More regions need to be cover to get the current national richness and population size of species and to confirm if the poisoning is the only main causes that explain vultures decline observed in Cameroon. Regardless wrong local practices and misunderstanding in area, educative and awareness campaigns of local communities are the urgent measures for vultures' species survival and others animals target.

### Locals perceptions


According to focus group exchange with local communities, vulture species have drastically declined in northern Cameroon in the past thirty years. Decline of hooded vulture are more obvious with some villages where they are locally extinct. Rüppell's Vulture (*Gyps rueppellii*) and White-headed Vultures (*Trigonoceps occipitalis*) currently absent were observed years ago. Among the four vultures species percept as present by locals people the White backed vultures was the principal vulture's species sight. Indigenous communities' attitudes vultures decline to accidental poisoning indeed their principal targets species were fishes trapped for human consumption but also big cats indicated to kill their livestock in bush.

Attitude and perception of communities towards vulture group suggested a necessity of real locals people engagement for conservation especially since vultures species populations decline are closely link to big cats voluntary poisoning and rivers poisoning. Educative and awareness campaigns conducted reduce the negatives perceptions of local towards vulture's species, so locals make themselves recommendation measures to ensure the protection of current vulture.

### Recommendations

Locals' conservation measures proposed to stop ongoing vultures decline in Cameroon:

- Intensely educative and awareness campaign as we noted presence of wrong practices.
- Reduce access to poisonous drugs used to kill wild animals which comes from Cotton firms; develop alternative activities amongst locals to reduce hunting pressure and illegal hunting on vulture populations.
- Create local vigilante committee in villages holding vultures' species hotspots and led them by religious and traditional authorities for monitoring of anti-poaching activities.



White-backed Vulture (*Gyps africanus*) record.

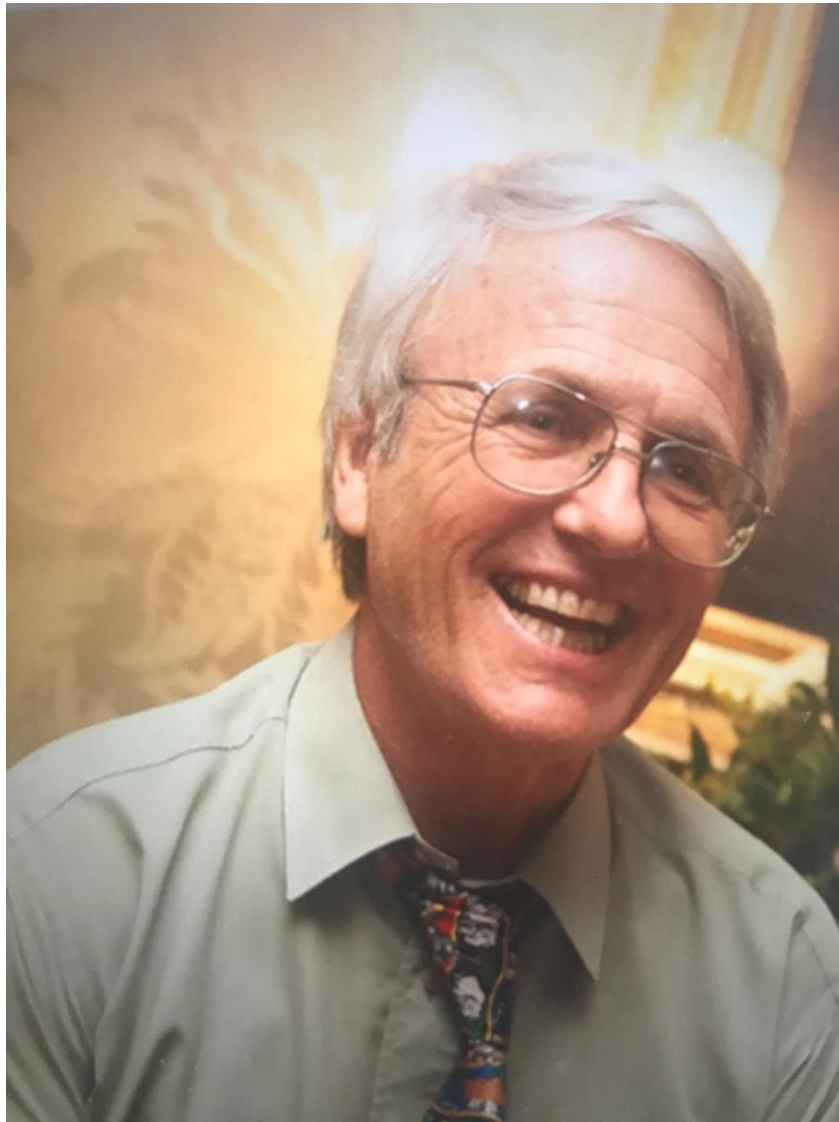
### Acknowledgements

The survey was conducted with the financial support of The National Foundation of the North Region, traditional and administrative authorities of north region for their facilities and also for the local communities who freely take part to the focus group discussion.

Figure 3: Critically endangered vultures in Cameroon poster.

**Summary and concluding remarks**

The 15<sup>th</sup> Pan-African Ornithological Congress made great strides towards the conservation of vultures, with the largest number of presentations for one guild of species. This gave a platform for sharing ideas, making contributions, and working towards effective conservation drives for vultures. Many of the threats to vulture populations are common across countries and continents, but the array of programmes being researched, tried and tested as reported in this congress is impressive and bodes well that solutions can be found with wide application. Excitingly, the congress had a great number of young students in attendance – giving a hope for the future conservation of vultures and other species. On a sad note, one of Africa's greatest vulture biologists, Professor Peter Mundy (Figure 4), could not make it to the congress due to health issues. His great contributions to the conservation of vultures in Africa was mentioned in both the opening and concluding remarks of the Congress; particularly his passion for training and mentoring young people in conservation. Peter Mundy sadly passed away on the 3<sup>rd</sup> of February 2023. May he rest well, and soar with the vultures.



**Figure 4:** Professor Peter Mundy (1941-2023).



## **Acknowledgements**

We would like to thank the PAOC15 Organising Committee and Local Organising Committee of BirdLife Zimbabwe for their unstinting commitment to making this congress happen and for allowing us to utilise the conference materials which form the backbone of this report. We are especially indebted to Professor Peter Mundy for encouraging us to attend this congress with a view to submitting a report to *Vulture News* – a task we welcomed as a small but lasting tribute to him.

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**Appendix 1: CMS Vulture Multispecies Action Plan.** (22 presentations)**S08-01 *The CMS Multi-species Action Plan for African-Eurasian Vultures - a pan-African context***  
**André Botha (email:andreb@ewt.org.za)**Botha, A.J.<sup>1</sup><sup>1</sup>Endangered Wildlife Trust, Midrand, South Africa.

The Multi-species Action Plan for African-Eurasian Vultures was unanimously adopted by all 128 range states at the CMS Conference of Parties in Manila, Philippines in October 2017. The Plan suggests the implementation of 124 individual actions that can be implemented across the range to halt and ultimately reverse the decline in 15 Old World vulture species within a time-frame of 12 years (2017-2029). This talk reviewed the rationale and process followed in the development of the plan and highlighted the seventeen essential actions considered critical in terms of implementation to bring about the achieved objectives of the MsAP. This presentation provided background for the review of the progress, challenges and achievements resulting from the implementation of the MsAP on the African continent to be presented by the other speakers during the symposium.

**S08-02 *Progress, achievements and challenges of the MsAP implementation by the BirdLife Africa Partnership*****Salisha Chandra (email:salisha.chandra@birdlife.org)**Chandra, S.<sup>1</sup>, Sebele, L.<sup>1</sup>, Tukai, J.M.<sup>1</sup>, Bourass, K.<sup>2</sup>, Gacheru, P.<sup>3</sup>, van den Heever, L.<sup>4</sup>, Onoja, J.<sup>5</sup> and Moumadou, A.<sup>6</sup>

<sup>1</sup>BirdLife International, P. O. Box 3502 - 00100 GPO, Nairobi, Kenya. <sup>2</sup>GREPOM, Résidence Oum Hani IV, Imm 22, Apt 3, 11160 Salé, Morocco. <sup>3</sup>Nature Kenya, PO Box 44486-00100, Nairobi, Kenya. <sup>4</sup>BirdLife South Africa, Private Bag X16, Pinegowrie, 2123, South Africa. <sup>5</sup>Nigerian Conservation Foundation, Km 19 Lekki - Epe Expy, Lagos 106104, Lekki, Nigeria. <sup>6</sup>L'Association Nature Communautés Développement (NCD), Cité Technopole, Immeuble Yaye Djinda - Pikine, Sénégal.

In 2016, the BirdLife International Partnership defined vulture conservation as one of its top priorities for species conservation and developed a 10-year vulture strategy that sought to coordinate efforts and resources and unite the BirdLife Africa Partnership of NGOs around a shared and agreed programme of work to help mobilise wider support to influence national and international policy, and initiate behavioural changes at grassroots levels to combat threats. This strategy is well-aligned with the CMS Multi-species Action Plan for African-Eurasian vultures that was adopted in 2017. Over the last 5 years, the BirdLife Africa Partnership along with other key stakeholders has implemented a suite of actions in 16 of the range states progressing several of the 12 MsAP objectives in every subregion. This talk provided an overview of the implementation progress to-date, highlight key achievements, shared challenges and proposed solutions.

**S08-03 *Addressing Rüppell's Vulture conservation in the Mediterranean region: a contribution to the implementation of the CMS Multi-species Action Plan for African-Eurasian vultures*****José Rafael Garrido López (email:jrafael.garrido@juntadeandalucia.es)**

Garrido, J.R.<sup>1</sup>, Martin-Martin, J.<sup>2</sup>, Numa, C.<sup>3</sup> and Clavero, H.<sup>3</sup>

<sup>1</sup>Environment and Water Agency, Regional Ministry of Agriculture, Livestock Production, Fisheries and Sustainable Development of the Autonomous Government of Andalusia (Junta de Andalucía), Seville, Spain. <sup>2</sup>Environmental consultant, Seville, Spain. <sup>3</sup>International Union for Conservation of Nature - Centre for Mediterranean Cooperation (IUCN-Med), Malaga, Spain.

The Rüppell's Vulture (*Gyps rueppelli*) is classified as Critically Endangered at both North African regional and global levels. Current recommended actions in the CMS Multi-species Action Plan for African-Eurasian vultures (MsAP) are focused on traditional breeding areas in Sahel. In the last 15 years, the species seems to be extending its range to the Mediterranean region. This talk presented the results of the joint efforts of African and European organisations for improving knowledge about flyways and threats from Europe to West Africa and explored the need for developing a regional Action Plan for the Mediterranean which can be integrated to the CMS MsAP.

#### **S08-04 Vulture research and conservation in Morocco: assessment of progress**

**Mohamed Amezian (email:amezian.grepom@gmail.com)**

Amezian, M.<sup>1</sup>, El Khamlichi, R.<sup>2</sup>, Rousselon, K.<sup>3</sup>, Amhaouch, Z.<sup>4</sup>, Bourass, K.<sup>1</sup> and El Hamoumi, R.<sup>1,5</sup>

<sup>1</sup>GREPOM/BirdLife Morocco, Résidence Oum Hani IV, Imm 22, Apt 3, 11160 Salé, Morocco.

<sup>2</sup>GREPOM/BirdLife Morocco, Tanger-Tétouan section, c/o Jbel Moussa Vulture Rehabilitation Centre, Fnideq, Morocco.

<sup>3</sup>Moroccan Association for the Protection of Raptors (AMPR), Centre National de Récupération et de Réhabilitation des Rapaces – Bir Lahmer, Morocco. <sup>4</sup>National Agency for Water and Forests, Parks and Nature Reserves division, 3, Rue Harroun Errachid, Rabat-Agdal, Morocco.

<sup>5</sup>University Hassan II of Casablanca, Faculty of Sciences Ben M'sik, Ecology and Environment Laboratory, Hydrobiology and Animal Ecology Team, Casablanca, Morocco.

The presentation summarised the main research and conservation actions that have been undertaken in favour of vultures in the framework of Morocco's efforts to implement the CMS Multi-species Action Plan for African-Eurasian vultures (Vulture MsAP). A supplementary feeding station was established in 2017 at Jbel Moussa, northern Morocco. The first purpose of the station was to provide food to the large number of vultures that concentrate there during their northward migration. Reintroduction of Griffon Vulture at Jbel Moussa started in 2020. Reintroductions take several years until a stable breeding population is formed, and the results obtained so far are generally within the norms of previous experiences elsewhere. GPS-tracking of Rüppell's Vultures in northern Morocco has shown an increasing number of Rüppell's are dispersing northward from the Sahel, along with the wintering Griffon Vultures, and the objective of this project is to better understand their movement ecology and detect any potential threats.

#### **S08-05 Trade in vulture parts in West Africa: Burkina Faso may be one of the main sources of vulture carcasses**

**Clément Dabone (email:dabepxi@yahoo.fr)**

Dabone, C.<sup>1,2</sup>, Oueda, A.<sup>2</sup>, Thompson, L.J.<sup>3</sup>, AdjaKpa, J.B.<sup>4</sup> and Weesie, P.D.M.<sup>5</sup>

<sup>1</sup>University Center of Tenkodogo, University Thomas SANKARA, 12 BP 417 Ouagadougou 12, Burkina Faso.

<sup>2</sup>Laboratory of Biology and Animal Ecology (LBEA), UFR/SVT, University Joseph Ki-Zerbo, 03 BP 7021 Ouagadougou 03, Burkina Faso. <sup>3</sup>Endangered Wildlife Trust, 27 and 28 Austin Road, Glen Austin AH, Midrand, 1685, South Africa. <sup>4</sup>Laboratory of Research in Applied Biology, University of Abomey, B.P: 526 Abomey-Calavi, Cotonou, Benin. <sup>5</sup>Integrated Research on Energy, Faculty of Sciences and Engineering, University of Groningen, Nijenborgh 4, 9747 AG Groningen, The Netherlands.

To find out more about the key threats to vultures in West Africa, the authors assessed the main anthropogenic causes of vulture mortality in Burkina Faso. They analysed incidents of mass vulture mortality based on interviews conducted in 2016 with local butchers, veterinarians, foresters and abattoir watchmen at 44 sites across the country. A total of 730 interviews revealed that poisoning was the main cause of mortality of vultures in Burkina Faso (20 of the 23 mass mortality incidents). Intentional poisoning of vultures with poisoned baits (15 out of 23 mass mortality incidents) produced the highest number of victims (577 out of 879 dead vultures). The number of vultures killed by poisoned baits was higher closer to the borders than elsewhere in Burkina Faso and we believe these recent occurrences of intentional vulture poisoning events in Burkina Faso were intended to meet the growing demand for vulture body parts in West Africa.

### ***S08-06 Breeding success of Cape Vultures (*Gyps coprotheres*) at colonies in the Tswapong Hills, Botswana***

**Tsaone Goikantswemang (email:tsaoneraptorsbotswana@gmail.com)**

Goikantswemang, T.<sup>1,2</sup>, Reading, P.R.<sup>2,3</sup>, Maude, G.<sup>2</sup>, Selebatso, M.<sup>2</sup>, Hancock, P.<sup>2</sup>, Borello, D.W.<sup>4</sup>, Borello, M.R.<sup>4</sup> and Perkins, S.J.<sup>1</sup>

<sup>1</sup>Department of Environmental Science, University of Botswana, Private Bag UB 0022, 4775 Notwane Road, Gaborone, Botswana. <sup>2</sup>Raptors Botswana, PO Box 25650, Gaborone, Botswana. <sup>3</sup>Department of Research & Conservation, Butterfly Pavilion, 6252 West 104th Avenue, Westminster, CO 80020 USA. <sup>4</sup>PO Box 603, Gaborone, Botswana.

The globally vulnerable Cape Vulture (*Gyps coprotheres*), a southern African endemic, breeds on precipitous cliffs. In Botswana, out of six breeding sites studied in the Tswapong Hills complex from 1992 to 1999, only two large colonies near the villages of Goo-Moremi (Bonwalenong) and Goo-Tau (Manong Yeng) still hold breeding vultures. In 2017 and 2018 the researchers used direct observations to estimate the breeding population and breeding success of Cape Vultures at the two colonies, and compared their findings with data from the 1990s. They identified and monitored 261 nests in 2017 and 362 nests in 2018. Breeding success at the two sites differed significantly between 2017 and 2018. However, breeding success at Manong Yeng in 2017–2018 did not differ significantly from that documented in the earlier study (1992–1999). Their results also suggested relatively stable numbers of breeding pairs in the Tswapong Hills between 1992–1999 and 2017–2018.

### ***S08-07 Feeding ecology of African vultures and attitudes and perceptions of rural and urban communities towards vultures***

**Domingas Matlombe (email:domyguilherme@gmail.com)**

Matlombe, D.G.G.<sup>1</sup>

<sup>1</sup>Casa n. 83, Q.3, Maputo, Mozambique.

A holistic research approach is crucial to saving vultures. Understanding the social and ecological landscape where vultures are being protected will result in effective conservation planning and interventions. This study on the feeding ecology and aspects of community attitudes towards vultures was carried out in Gorongosa National Park. The results show feeding dynamics and feeding behaviour not yet described in four species of African vultures: White-backed Vulture (*Gyps africanus*), White-headed Vulture (*Trigonoceps occipitalis*), Hooded Vulture (*Necrosyrtes monachus*), Lappet-faced Vulture (*Torgos tracheliotos*). The researcher studied the nature of human threats related to beliefs, perceptions and attitudes of rural and urban communities towards vultures, around Gorongosa. This research has provided a better understanding of the feeding behaviour of vulture species and how dominance networks are formed. Furthermore, the study suggests that vultures are facing threats beyond the park's boundaries, mainly related to the collection of vulture body parts for traditional medicine, and more studies of this nature were recommended.

**S08-08 Comoé National Park, a refuge for critically endangered vulture species in West Africa?**

**Volker Salewski (email:Volker.Salewski@NABU.de)**

<sup>1</sup>Salewski, V.

<sup>1</sup>Michael-Otto-Institut im NABU, 1 Goosstroet, Bergenhusen, 24861, Germany.

Vultures have declined rapidly in Africa in recent decades and four of ten species breeding on the continent are Critically Endangered. The declines are especially pronounced in West Africa and some species only survive in large protected areas. Data about numbers, densities and trends of most vulture species in West Africa are, however, lacking. Between 2017 and 2020, researchers searched for vulture nests in the south-west Comoé National Park in Côte d'Ivoire during January and early February. In total, 52 nests of White-backed Vultures *Gyps africanus*, four nests of White-headed Vultures *Trigonoceps occipitalis*, and six nests of Hooded Vultures *Neophron monachus* were discovered. Although the density of vulture nests were relatively high, the status of the park as a refuge for these species may be threatened. There are hints that vultures were more abundant in the 1990s, and between 2017 and 2020 the number of active nests declined.

**S08-09 Population density and reproductive habitat suitability of critically endangered vultures in Mole National Park, Ghana**

**Sandra Goded (email:sandra.goded@birdpartners.org)**

Goded, S.<sup>1</sup>, Annorbah, N. D.<sup>2</sup>, Boakye, S.<sup>1,3</sup>, Zébigou, K.<sup>4</sup>, Rosamond, K.M.<sup>1,5</sup>, Mahama, A.<sup>6</sup> and Arcilla, N.<sup>1,7</sup>

<sup>1</sup>International Bird Conservation Partnership, 980 Cass St., Monterey, CA 93940, USA. <sup>2</sup>Department of Biological, Physical and Mathematical Sciences, University of Environment and Sustainable Development, PMB Somanya, Eastern Region, Ghana. <sup>3</sup>University of Ghana, Legon, PO Box LG 25, Legon, Accra, Ghana. <sup>4</sup>IBCP Togo, s/c de la Mission Catholique de Lotogou, B. P. 61, Dapaong, Togo. <sup>5</sup>Department of Biology, University of Missouri - St. Louis, St. Louis, MO 63121, USA. <sup>6</sup>Wildlife Division, Forestry Commission, Accra, Ghana. <sup>7</sup>Center for Great Plains Studies, University of Nebraska – Lincoln, Lincoln, NE, USA.

Many West African vulture populations have exhibited precipitous declines. Between 2019 and 2022, we conducted surveys for vultures and other raptors in Ghana's Mole National Park. We quantified

the abundance and breeding ecology of three Critically Endangered vulture species: Hooded Vulture (*Necrosyrtes monachus*), White-backed Vulture (*Gyps africanus*), and White-headed Vulture (*Trigonoceps occipitalis*). High counts of Hooded Vultures exceeded 70 individuals and 90 for White-backed Vultures, while the highest count of White-headed Vultures was only seven individuals. The study documented 18 active nests of all three species. Hooded and White-backed Vulture nests were located in riparian woodland in a single species of palm tree (*Borassus akeassii*). Hooded Vulture's nests were closer to human settlements and roads compared to White-backed Vultures. Mole National Park appears to provide vital foraging and breeding habitat for populations of three critically endangered vulture species and numerous other wildlife species that have been extirpated elsewhere.

### **S08-10 Halting decline of African vultures in Niger and Chad**

**Violeta Barrios (email:violetab@saharaconservation.org)**

Barrios, V.<sup>1</sup> and Pourchier, C.<sup>2</sup>

<sup>1</sup>SaharaConservation, 53 rue Bourdignon, Saint-Maur-des-Fossés, 94100, France.

<sup>2</sup>SaharaConservation, Villa N°7146 I, Cite Stin, Niamey, YN-121, Niger.

In Africa, vultures have declined by 70%-97% over three generations with the highest rates of decline in West Africa, but virtually little knowledge exists about the status of vulture populations in Niger and Chad. One of the major drivers for this decline is the illegal taking of vultures for a wide range of medical and personal uses (e.g. treatment of insanity, stroke, against evil spirits, for luck). One way to combat this threat efficiently is to understand and engage conjointly with the different stakeholders involved in such practices with intent to break the supply chain. SaharaConservation has implemented initiatives such as vulture nest monitoring in specific areas in Niger and Chad and capacity building and awareness raising work led in Niger in the framework of the Egyptian Vulture New LIFE project. However, the regional scale of the illegal trafficking of vultures was proven, and only a regional approach can have a lasting positive impact.

### **S08-11 Declines in scavenging by endangered vultures in the Horn of Africa.**

**Evan Buechley (email:buechley.evan@peregrinefund.org)**

Buechley, E.R.<sup>1</sup>, Murgatroyd, M.<sup>1</sup>, Daka-Ruffo, A.<sup>2</sup>, Bishop, R.C.<sup>3</sup>, Christensen, T.<sup>3</sup>, Marra, P.P.<sup>4</sup>, Sillett, T.S.<sup>5</sup> and Şekercioğlu, Ç.H.<sup>3</sup>

<sup>1</sup>HawkWatch International, 2240 South 900 East, Salt Lake City, UT 84106, USA. <sup>2</sup>Alazar Daka Ruffo, Addis Ababa University, Faculty of Natural Science, Department of Zoological Sciences, Ethiopia.

<sup>3</sup>School of Biological Sciences, University of Utah, 257 S 1400 E Salt Lake City, UT 84112, USA. <sup>4</sup>Department of Biology and McCourt School of Public Policy, Georgetown University, 37th and O Streets NW, Washington, DC 20057, USA. <sup>5</sup>Migratory Bird Center, Smithsonian Conservation Biology Institute, National Zoological Park, MRC 5503, Washington, DC 20013-7012.

This study worked on vertebrate scavenger ecology at 6 abattoirs in Ethiopia with time-lapse photography and in-person surveys from 2014–2019. At the start of the study, vultures contributed 57% of carrion removal provided by vertebrate scavengers. Detections of Critically Endangered *Gyps* vultures declined by 73% and Critically Endangered Hooded Vultures declined by 15% over the study period. Simultaneously, the detection of dogs more than doubled. Using estimates of species-specific

carrion consumption rates from the literature, coupled with changes in scavenger detection in our study, we estimated a 12% (54 kg/day) reduction in carrion consumption, or nearly 20,000 kg less carrion consumed per year by the end of the study at these 6 abattoirs. The study recommended that improving fencing around abattoir facilities could help restrict access by feral dogs, increasing foraging by vultures, and, therefore, increasing overall carrion removal rates.

### ***S08-12 Human perceptions of and threats to vultures in Ethiopia***

***Alazar Daka Ruffo. (email:alazar.ruffo@gmail.com)***

Ruffo, A.D.<sup>1</sup>, Bekele, A.<sup>1</sup>, Afework, B.<sup>1</sup> and Buechley, E.R.<sup>2</sup>

<sup>1</sup>Addis Ababa University, PO Box 1176, Ethiopia. <sup>2</sup>HawkWatch International, 2240 South 900 East, Salt Lake City, UT 84106, USA.

Ethiopia is regarded as an important stronghold for vultures. To understand the human perceptions and threats to vultures, 353 questionnaires were conducted in the country. There were 220 male and 133 female respondents whose age group was between 16 - 70 years old from different professions, ethnic and religious groups. A total 98% of the respondents replied that vultures are useful in cleaning the environment. Only 2% of the respondents replied that some parts of the vulture are used for medicinal values. Out of the 353 respondents, 126 replied that vultures are found dead and about 43.6% of the vulture mortality was because of electric power lines. The vulture mortality related to poisoning of feral dogs was 21.8%, and 34.5% of vulture deaths was from roadkill, being killed by children and death through old age. The result showed that human perception is positive but that there are threats to vultures in the country.

### ***S08-13 Identifying priority high risk areas for anti-poison work for the conservation of endangered vultures***

***Natasha Peters (email:peters.natasham@gmail.com)***

Peters, N.<sup>1</sup>, Kendall, C.J.<sup>2,3</sup>, Mgumba, M.<sup>4</sup>, Bracebridge, C.<sup>2</sup> and Beale, C.<sup>1,5</sup>

<sup>1</sup>Department of Biology, University of York, York, UK. <sup>2</sup>North Carolina Zoo, Asheboro, NC, USA

<sup>3</sup>North Carolina State University, Raleigh, NC, USA. <sup>4</sup>Department of Research, Ecology and Monitoring; Wildlife Conservation Society, Tanzania. <sup>5</sup>York Environmental Sustainability Institute, University of York, York, UK.

Vultures are declining worldwide and poisoning is the greatest threat in Africa. This study estimated the exposure, threat, and risk of poisoning to vultures in southern Tanzania. Exposure to poisoning was defined as the areas that vultures use and where carcasses are likely to be found by a given individual, and was calculated using GPS tracking data from 33 vultures and capture-recapture modelling. Threat of poisoning was a proxy of human footprint and thus areas where poisoning was possible. Risk of poisoning was determined by areas with an overlap of exposure and threat. Similar to other studies, the results support that vultures are highly efficient at finding the carcasses where they spend time foraging. Risk areas identified using the risk assessment framework covered a smaller geographic area than simple spatial buffers. The inference from these findings were to prioritise anti-poisoning interventions to reduce the risk of vultures encountering poisoned carcasses.

**S08-14 Saving Kenya's vultures: what's being done and what lies ahead.****Darcy Ogada (email:ogada.darcy@peregrinefund.org)**Ogada, D.<sup>1</sup> and Odino, M.<sup>1</sup><sup>1</sup>The Peregrine Fund-Africa, PO Box 1629-00606 Nairobi, Kenya

Kenya's vultures have declined: -88% Hooded, -75% White-backed, -65% Lappet-faced, and -20% Rüppell's over the past 40 years, while numbers of Egyptian, White-headed and Bearded Vultures are too few to be analysed. Declines are due to poisoning related to human-carnivore conflict, while habitat destruction and food shortage are likely additional threats. Since 2018, the Coexistence Co-op has undertaken a community-based training and conflict management programme to reduce livestock losses to carnivores and to stop retaliatory poisonings. Monitoring of three of the largest breeding colonies of Rüppell's Vultures is undertaken twice per year, while studies involving tagged vultures are ongoing. National compilation of vulture mortality is ongoing through collaboration with multiple stakeholders. A vulture feeding station has been proposed. Important gaps are a lack of local knowledge, including breeding success, and specific threats to most of Kenya's vulture species, particularly tree-nesting species.

**S08-15 Using vultures to establish an early warning system for wildlife poisonings in Zambia.****Tom Riffel (email:tom@c4cfund.org)**Riffel, M.<sup>1,2</sup>, Riffel, T.<sup>1</sup>, Ludwigs, J.-D.<sup>2</sup>, Willems, F.<sup>3</sup>, Malasa, M.<sup>3</sup>, Phiri, D.<sup>3</sup> and Botha, A.<sup>4</sup>

<sup>1</sup>Caring for Conservation Fund gGmbH, Hoelderlinstr. 20 Hirschberg 69493 Germany. <sup>2</sup>RIFCON GmbH, Goldbeckstr. 13, Hirschberg 69493 Germany. <sup>3</sup>Birdwatch Zambia, 25 Joseph Mwilwa Rd, Lusaka, Zambia. <sup>4</sup>Endangered Wildlife Trust, 25-27 Austin Rd, Glen Austin AH, Midrand 1685, Gauteng, South Africa.

Poisoning is by far the most frequent cause of fatalities among vultures. In July 2020, more than 800 vultures were killed in a single mass poisoning event in Luambe NP in Eastern Zambia. To track poisoning incidents, researchers set up a movement-monitoring system by equipping vultures with GSM and GPS satellite tags in order to use the data as a real-time early warning system. For a pilot study, nine vultures were tagged in August 2021 in Luambe NP with GSM tags. As a result, most of the vultures stayed within the Luangwa valley from August 2021 until May 2022. In a second attempt, researchers aimed to tag vultures at three sites in Zambia with satellite tags in August 2022. The collected data will be used to set up the early warning system and to support the identification of poisoning hotspots followed by the implementation of appropriate intervention measures.

**S08-16 Social information transfer facilitates detection of large carcasses – a case study using White-backed Vultures.****Teja Curk (email:curk@izw-berlin.de)**Curk, T.<sup>1</sup>, Rast, W.<sup>1</sup>, Portas, R.<sup>1</sup>, Shatambu, G.<sup>2</sup>, Aschenborn, O.<sup>1</sup> and Melzheimer, J.<sup>1</sup><sup>1</sup>Leibniz Institute for Zoo and Wildlife Research, Alfred-Kowalke-Straße 17, Berlin, 10315, Germany.<sup>2</sup>Ministry of Environment, Forestry and Tourism, Okaukuejo, 14011, Namibia.

Investigating the advantages of social information use for individuals is fundamental to understanding the emergence of collective behaviour. Several studies have assessed the importance of social



foraging, however, it remains unknown how the individual preference for prey size and the role of social information changes with the scavenger density, prey density and proportion of large prey in the environment. Using high-resolution tracking data of 32 White-backed Vultures, researchers developed an AI classification algorithm to identify carcass locations and sizes. Their preliminary results confirmed vulture's preference for large carcasses and a decrease in social information with smaller carcasses. Finally, agent-based model simulations predicted that with increased carcass density, vulture density and a higher proportion of large carcasses, the use of social information increases until an optimal point when the effect reverses. These findings have conservation applications since they provide an estimation of the optimal vulture and carcass density in the environment needed for a healthy vulture population.

**S08-17 Using GPS tracking data to explore diet of African Vultures in Botswana. Charles, Mpofo (email:mpfcha005@myuct.ac.za)**

Mpofo, C.<sup>1,2</sup>, Amar, A.<sup>2</sup>, Maude, G.<sup>3</sup> and Tate, G.<sup>4</sup>

<sup>1</sup>Department of Wildlife and National Parks, P O Box 11 Maun, Botswana. <sup>2</sup>Percy FitzPatrick Institute of African Ornithology, Department of Biological Sciences, University of Cape Town, Private Bag X3, Rondebosch, 7701, South Africa. <sup>3</sup>Raptors Botswana, PO Box HA 33 HAK, Maun, Botswana.

<sup>4</sup>Endangered Wildlife Trust, Postnet Suite # 027, Postnet Suite 002, Private Bag X08, Wierda Park 0149, Gauteng, South Africa.

Vultures play a pivotal role in the environment by feeding on carrion, leading to a healthier ecosystem. Understanding their diet composition in the wild and location of their feeding sites would play a major role in influencing wildlife conservation decision-making. To monitor their diet a total of eleven vultures were fitted with GPS backpack trackers within Botswana. Using a predefined algorithm to differentiate activities the bird might be engaged in, locations considered as feeding sites were ground-truthed to identify the carcass to species level. Most of the investigated sites were in northern Botswana. Wildlife was noted as the major contributor to the vulture's diet. This might have been influenced by the ongoing hunting occurring in wildlife concessions bordering the protected areas. This study will lay the baseline for wild occurring vulture diet studies in Africa.

**S08-18 Poaching, trade and role of critically endangered vulture species in traditional medicine in Côte d'Ivoire (West Africa).**

**Armel Asso (email:armelasso93@gmail.com)**

Asso, A.A.<sup>1,2</sup> and Salewski, V.<sup>3</sup>

<sup>1</sup>National Park Ecology Research Station of Comoe, Bouna, 847 Abidjan 28, Côte d'Ivoire. <sup>2</sup>Nangui Abrogoua University, 02 BP 801 Abidjan 02, Abidjan, 801 Abidjan 02, Côte d'Ivoire. <sup>3</sup>Michael-Otto-Institut im NABU, 1 Goosstroot, Bergenhusen, 24861, Germany.

Vultures provide important ecosystem services by feeding on the carcasses of large mammals, thereby reducing the spread of disease. Across Africa, vultures have been declining rapidly over the past few decades. Some populations have declined by more than 90% in three generations. The last strongholds are the large reserves but, even there, vultures are threatened by poaching. The objective of this study is to assess the threats to vultures in Côte d'Ivoire. The study assessed the abundance of the trade, the poaching pressure generated by the demand for traditional medicine, identify the marketing circuit

and assess the socio-economic value. The methodological approach is based on ethnozoological surveys. Sampling consisted of randomly selecting villages in the vicinity of Comoé National Park, visiting rural and urban markets to assess the extent of trade in vultures and/or vulture parts, and places (slaughterhouses, garbage dumps) where interactions between vultures and humans could be found.

### **S08-19 Vultures and belief-based use in Zimbabwe**

**Josephine Mundava-Maringa**

**(email: [jmundava@gmail.com](mailto:jmundava@gmail.com))** Mundava, J.<sup>1</sup> and Mundy, P.J.<sup>1</sup>

<sup>1</sup>Department of Forest Resources and Wildlife Management, National University of Science and Technology, Corner Cecil Avenue and Gwanda Road, Bulawayo, Zimbabwe.

Traditional healers and traders in Zimbabwe were interviewed on their use of vultures in traditional medicine. Use was belief-based, ranging from provision of clairvoyant powers, gambling, foresight, intelligence, and ceremonial. Brains and feathers were the most preferred parts. Other species used included other raptors and passerines. The underlying beliefs are based on the behaviour of the birds, which users believe can be passed on, making their use more spiritual not chemical or physical. Users and traders are unaware of how birds were obtained by their suppliers. Most respondents were not concerned if bird parts used were poisoned as these are not consumed, but are used for smoking and skin applications. Users and traders were aware of legislation protecting vultures, but these were not highly regarded. Declines in vultures' numbers were blamed on commercialisation of traditional healing and mass harvesting. Suggested methods for species protection included the potential use of herbal equivalents if available.

### **S08-20 Breeding ecology and resource selection of Critically Endangered vultures in Gorongosa National Park, Mozambique.**

**Rebecca Bishop (email: [rebeccabishop@u.boisestate.edu](mailto:rebeccabishop@u.boisestate.edu))**

Bishop, R.<sup>1,2,3</sup>, Carlisle, J.<sup>1,3</sup>, Cruz, J.<sup>1</sup>, Kaltenecker, G.<sup>1,3</sup>, Katzner, T.<sup>4</sup> and Monadjem, A.<sup>5</sup>

<sup>1</sup>Department of Biological Sciences, Boise State University, Boise, Idaho, USA. <sup>2</sup>Raptor Research Center, Boise State University, Boise, Idaho, USA. <sup>3</sup>Intermountain Bird Observatory, Boise State University, Boise, Idaho, USA. <sup>4</sup>U.S. Geological Survey, Boise, Idaho, USA. <sup>5</sup>University of Eswatini, Kwaluseni, Eswatini.

Nature's carrion removal system hangs in the balance with the continued, drastic decline of global vulture populations. Africa is home to 11 vulture species, the majority of which are now threatened with extinction. Filling of existing ecological and geographical knowledge gaps is urgently needed to target conservation action across the vast African continent, and ideally halt further decline. The purpose of this ongoing project is to focus on two Critically Endangered vulture species – the White-backed Vulture (*Gyps africanus*) and the poorly understood White-headed Vulture (*Trigonoceps occipitalis*) - in one of the most understudied countries, Mozambique, and from the lens of a protected area, Gorongosa National Park (GNP). For both species, formal documentation of breeding densities, breeding success, and basic nest site characteristics is extremely limited within Mozambique. To

further explore the breeding ecology of these vultures, and to complement an on-foot approach, we employed a novel survey method using remote sensing technology (Unmanned Aerial Vehicle, or drone) to survey, collect data and map nest sites over two subsequent field seasons. Nest site characteristics of interest included: nest tree species, nest tree height, crown spread, nest height, nest position, and habitat association. Preliminary findings suggest, at a minimum, tree species and tree height are important factors for nesting vultures in GNP. Additionally, using data collected from the first season, conducting drone surveys in the second season became an efficient method in discovering new nesting locations, which ultimately revealed a higher density of breeding vultures than expected. Drone access to nest sites also enabled the detection of nest building and initiation, courtship behaviours, and juvenile development. The second component of this study aims to better understand the ecology of the rare White-headed Vulture. Utilising individual movement data, we are conducting the first-ever resource selection analysis for the species.

**S08-21 Vulture conservation: a perspective in Gorongosa National Park.**

**Diolinda Felix Mundoza (email:diolinda.mundoza@gmail.com)**

Mundoza, D.F<sup>1</sup>

<sup>1</sup>Chitengo Gorongosa National Park, Science Department, PO Box 1983, Beira, Sofala, Mozambique

Mozambique Gorongosa National Park (GNP) is located in central Mozambique on the southern end of the Great Rift Valley. It has diverse habitats, high biodiversity and importantly, five species of vultures: White-headed Vulture, African White-backed Vulture, Hooded Vulture, Lappet-faced Vulture and Palm-nut Vulture. In 1994, after the civil war, researchers did an inventory of the Park and reported very little life, and very few birds. At the beginning of the park's restoration project (2005 to 2007), vultures were rare, due to lack of predators and food. The re-introduction of ungulates and predators have resulted in the growth of vulture populations. Regional and international researchers from the Endangered Wildlife Trust, Boise State University, the Hawk Conservancy Trust and Wageningen University have collaborated with Gorongosa National Park in vulture research. Studies involving tagging, movement ecology, breeding ecology and feeding ecology have been done to understand their population growth within the Gorongosa Restoration Project.

**S08-22 White-backed Vultures nesting on the Highveld in Zimbabwe.**

**Josephine Mundava-Maringa (email:jmundava@gmail.com)**

Mundava, J.<sup>1</sup>, Mundy, P.<sup>1</sup>, Chiweshe, N.<sup>1</sup>, Matsvimbo, F.<sup>2</sup>, Huruba, R.<sup>1,3,4</sup> and MacFadyen, D.<sup>4</sup>

<sup>1</sup>National University of Science and Technology, Box AC939, Ascot, Bulawayo, Zimbabwe. <sup>2</sup>BirdLife Zimbabwe, 35 Clyde Road, Eastlea, Harare, Zimbabwe. <sup>3</sup>Shangani Ranch, Shangani, Zimbabwe. <sup>4</sup>E Oppenheimer & Son (Pty) Limited, Parktown, South Africa.

In southern Africa, vultures are in decline with many species being Critically Endangered or Endangered. Vultures are currently mostly found in protected areas, and in some cases, they can be found on large commercial ranches. Outside of protected areas, human activities present an ever-tightening noose on vultures with increased mortalities threatening the viability of populations. Large livestock and wildlife ranches present a potential haven for breeding and foraging vultures. The study explored the use of the holistically-managed Shangani Ranch (Midlands, Zimbabwe) by nesting

White-backed Vultures. Results showed the ranch to support more than 40 nesting pairs of vultures over five successive breeding seasons, with numbers increasing each year and new nesting areas being utilised. This shows the importance of working ranches towards the success of breeding and foraging critically-endangered vultures outside of protected areas. It also shows the importance of holistic management toward conservation success.

## **Appendix 2: Vulture Safe Zones.** (6 presentations)

### **S13-01 Declaration of world's first genuinely safe Vulture Safe Zone in Nepal.**

**John W. Mallord (email:john.mallord@rspb.org.uk)**

Mallord, J.W.<sup>1</sup>, Bhusal, K.P.<sup>2</sup>, Joshi, A.B.<sup>2</sup>, Rana, D.B.<sup>2</sup>, Chaudhary, I.P.<sup>2</sup>, Chapagain, D.<sup>2</sup>, Paudel, K.<sup>2</sup>, Bowden, C.G.R.<sup>3</sup>, Galligan, T.H.<sup>1</sup>, Cuthbert, R.J.<sup>1</sup> and Green, R.E.<sup>4</sup>

<sup>1</sup>RSPB Centre for Conservation Science, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK. <sup>2</sup>Bird

Conservation Nepal, PO Box 12465, Lazimpat, Kathmandu, Nepal. <sup>3</sup>RSPB, Apartment 201, Sobha Jade, 2nd Floor, Block B, Jakkur, Yelahanka Hobli, Bangalore, North Taluk, Karnataka, 560 064, India.

<sup>4</sup>Conservation Science Group, Department of Zoology, University of Cambridge, Downing Street CB2 3EJ, UK.

Following the catastrophic decline of Asia's vultures from the mid-1990s onwards, due to accidental poisoning by the non-steroidal anti-inflammatory drug (NSAID) diclofenac, the concept of the Vulture Safe Zone (VSZ) was established. A VSZ was defined as an area of 100 km radius, centred on an extant vulture breeding colony, which 1) corresponded to a vulture's foraging range, and 2) provided an area not too large in which to focus conservation action. Criteria for assessing the safety of a VSZ included 1) the removal of diclofenac from the environment, 2) no incidences of mortality due to NSAID poisoning, and 3) a stable or increasing vulture population. This talk described how these goals were achieved in Nepal through advocacy and education, and confirmed by undercover pharmacy surveys, monitoring of GPS-tagged wild White-rumped Vultures, and road transect surveys. The area was declared a genuinely safe Vulture Safe Zone in December 2021.

### **S13-02 Home range and Vulture Safe Zones: a continent-wide perspective on three Gyps vultures.**

**Corinne Kendall (email:corinne.kendall@nczoo.org)**

Kendall, C.<sup>1</sup>

<sup>1</sup>North Carolina Zoo, 4401 Zoo Parkway, Asheboro NC 27025 USA

African vulture telemetry studies provide key insights into ecology and conservation. A team of 35 researchers pooled telemetry data from 11 African study sites and 163 individuals of three Gyps species to assess regional variation in home range size and protected area use. Even using the conservative Brownian bridge model, annual home range estimates were larger than 23,500km<sup>2</sup> for all three species, suggesting that Vulture Safe Zones in Africa will need to be large. Across all species, immature vultures had larger home ranges and greater use of unprotected areas than adults, particularly breeding individuals. Overlap with existing protected areas was lowest for Cape Vultures (23%) and highest for White-backed Vultures in eastern Africa (70%), suggesting challenges for

using existing protected area networks in southern Africa as Vulture Safe Zones. Insights from this study for implementation of the MsAP were discussed.

**S13-03 *The Vulture Safe Zone initiative - creating safe havens for endangered vultures: successes and lessons learnt in Zambia.***

**Mary Malasa (email:mary.malasa@birdwatchzambia.org)**

Malasa, M.<sup>1</sup>, Kashulwe, S.<sup>1</sup>, Mkandawire, K.<sup>1</sup>, Lufwino, C.<sup>1</sup>, Phiri, C.<sup>1</sup>, Ndangnga, K.<sup>2</sup>, Chandra, S.<sup>2</sup> and Sebele, L.S.<sup>2</sup>  
<sup>1</sup>BirdWatch Zambia, 25 Joseph Mwilwa Road, PO Box 33944, Lusaka, 10101, Zambia. <sup>2</sup>BirdLife Africa Regional Office, Westcom Point Building, 6th Floor, Mahiga Mairu Avenue off Waiyaki Way, Westlands, Nairobi, Kenya.

Vulture Safe Zones (VSZs) are a key conservation action within the CMS Multi-species Action Plan to conserve African-Eurasian Vultures (Vulture MsAP). VSZs are areas where concerted efforts are made to make areas free from the threats to vultures (e.g., poisoning, persecution, deforestation) by encouraging and supporting key stakeholders such as land managers/ landowners and local communities to adopt vulture-friendly activities. Zambia became the first country among range states in Africa to adapt the concept from Asia and remains committed to expanding its network of VSZs. This talk highlighted how BirdWatch Zambia pioneered the concept of VSZs in Africa, key lessons learnt and challenges still to be overcome in this fight to save the most endangered group of birds in the world.

**S13-04 *Priority areas for vulture conservation in the Horn of Africa largely fall outside the protected area network.***

**Evan Buechley (email:buechley.evan@peregrinefund.org)**

Buechley, E.R.<sup>1</sup>, Girardello, M.<sup>2</sup>, Santangeli, A.<sup>3</sup>, Ruffo, A.D.<sup>4</sup>, Ayalew, G.<sup>5</sup>, Abebe, Y.D.<sup>6</sup>, Barber, D.<sup>7</sup>, Buik, R.<sup>1</sup>, Bildstein, K.<sup>8</sup>, Mahamued, B.A.<sup>9</sup>, Neate-Clegg, M.H.C.<sup>10</sup>, Ogada, D.<sup>1</sup>, Marra, P.P.<sup>11</sup>, Sillett, T.S.<sup>12</sup>, Thiollay, J.M.<sup>13</sup>, Wikelski, M.<sup>14</sup>, Yaworsky, P.<sup>15</sup> and Şekercioğlu, C.H.<sup>10</sup>

<sup>1</sup>The Peregrine Fund, 5668 West Flying Hawk Lane, Boise, ID, USA. <sup>2</sup>CE3c – Centre for Ecology, Evolution and Environmental Changes / Azorean Biodiversity Group and Universidade dos Açores – Faculty of Agriculture and Environment, Rua Capitão João d'Ávila, São Pedro, PT-9700-042 Angra do Heroísmo, Terceira, Açores, Portugal. <sup>3</sup>The Helsinki Lab of Ornithology, Finnish Museum of Natural History, FI-00014, University of Helsinki, Finland. <sup>4</sup>Addis Ababa University, Faculty of Natural Science, Department of Zoological Sciences, Ethiopia. <sup>5</sup>Ethiopian Wildlife Conservation Authority, Addis Ababa, Ethiopia. <sup>6</sup>P. O. Box 18112, Addis Ababa, Ethiopia. <sup>7</sup>Acopian Center for Conservation Learning, Hawk Mountain Sanctuary, 410 Summer Valley Road, Orwigsburg, PA 17961, USA. <sup>8</sup>116 Village Drive, Blandon, PA, 19510, USA. <sup>9</sup>Kotebe Metropolitan University, Addis Ababa, Ethiopia. <sup>10</sup>School of Biological Sciences, The University of Utah, 257 South 1400 East, Salt Lake City, UT 84112, USA. <sup>11</sup>Georgetown Environment Initiative, Georgetown University, 37th and O Streets NW, Washington, DC 20057, USA. <sup>12</sup>Migratory Bird Center, Smithsonian Conservation Biology Institute, National Zoological Park, MRC 5503, Washington, DC 20013-7012. <sup>13</sup>2 rue de la Rivière, 10220 Rouilly Sacey, France. <sup>14</sup>Department of Migration, Max Planck Institute of Animal Behavior, 78315 Radolfzell, Germany. <sup>15</sup>Department of Anthropology, University of Utah, 260 Central Campus Drive, Salt Lake City, Utah, 84112, USA.

Prioritisation of geographic areas for vulture conservation in Africa is urgently needed. To do so, three independent datasets on vulture occurrence from road-surveys were compiled, GPS-tracking,

and citizen science (eBird), and used maximum entropy to build ensemble species distribution models (SDMs) and to identify priority areas in Ethiopia. We show that priorities occur in the highlands of Ethiopia for Bearded (*Gypaetus barbatus*), Hooded (*Necrosyrtes monachus*), Rüppell's (*Gyps rueppelli*) and White-backed (*Gyps africanus*) Vultures, and the lowlands of northeastern Ethiopia for the Egyptian Vulture (*Neophron percnopterus*). One-third of the core distribution of the Egyptian Vulture was protected, followed by the White-backed Vulture at one-sixth, and all other species at one-tenth. Overall, one-fifth of vulture priority areas were protected. Measures of broad spatial and legislative scope will be necessary to address drivers of vulture declines, including poisoning, energy infrastructure, and climate change, while considering the local social context and aiding sustainable development.

***S13-05 Implementing Vulture Safe Zones in southern Africa; gaining ground with landowners to enhance the conservation of the region's declining vultures.***

**Gareth J. Tate (email:garetht@ewt.org.za)**

Tate, G.<sup>1</sup>, Maude, G.<sup>2</sup>, van den Heever, L.<sup>3</sup>, Kelly, C.<sup>4</sup>, Coverdale, B.<sup>5</sup>

<sup>1</sup>Endangered Wildlife Trust, Midrand, South Africa. <sup>2</sup>Raptors Botswana, Hukunsti, Botswana. <sup>3</sup>BirdLife South Africa, Dunkeld West, South Africa. <sup>4</sup>Wildlife ACT, KwaZulu-Natal, South Africa. <sup>5</sup>Ezemvelo KZN Wildlife, Pietermaritzburg, South Africa.

A Vulture Safe Zone (VSZ) is an appropriately-sized geographic area where targeted conservation measures are undertaken to address the key threats relevant to the vulture species present and to sustain viable wild populations. VSZs are developed in southern Africa to complement national and international efforts to reduce the impact of existing and emerging threats to stabilise and promote recovery of existing vulture populations. The VSZ concept arises from the joint CITES/CMS. Multi-species Action Plan for Vultures. In VSZs, conservationists work with landowners, government agencies, and communities to secure large tracts of suitable habitat where land is managed in a vulture friendly manner and the threats to vultures are markedly reduced, so vulture populations can thrive. This presentation discussed the successes, challenges, and lessons learned around the approach and implementation of VSZs from a southern African context.

***S13-06 Vulture Safe Zone implementation in Zimbabwe: lessons from Gwayi Environmental Conservation Area.***

**Fadzai Matsvimbo (email:fadzai@blz.co.zw)**

Matsvimbo, F.<sup>1</sup>

<sup>1</sup>BirdLife Zimbabwe, 35 Clyde Road, Eastlea, Harare, Zimbabwe.

BirdLife Zimbabwe has been working in Gwayi Environmental Conservation Area (ECA) since 2019 with the goal of making it a vulture safe zone (free of threats to vultures). Located in western Zimbabwe, Gwayi ECA lies on the southern border of Hwange National Park. The area is a haven for breeding vultures, with over 120 breeding pairs having been recorded over two breeding seasons. The roll-out of the Vulture Safe Zone concept in Gwayi owes its success to the involvement of the Gwayi community, particularly the Vulture Support Groups. These self-governing volunteer-run groups exist

to support vulture conservation by monitoring vultures during the breeding season, raising awareness on vulture issues, and reporting poaching incidents or wildlife poisoning incidents to appropriate authorities. There are many lessons to draw from the four years of working with these groups ranging from understanding what motivates them, managing community expectations, resolving conflict and building a functional monitoring team.

**Appendix 3: *The illegal killing of birds for belief-based use.*** (8 presentations)

**S18-01 *Using the African Wildlife Poisoning Database and other measures to reduce the impact of poisoning on African vultures and other wildlife.***

**Andre Botha (email:andreb@ewt.org.za)**

Botha, A.J.<sup>1</sup>, Ogada, D.<sup>2</sup> and Roxburgh, L.<sup>1</sup>

<sup>1</sup>Endangered Wildlife Trust, Midrand, South Africa. <sup>2</sup>The Peregrine Fund, Nairobi, Kenya.

Africa's vultures are currently facing a crisis with six of the 10 resident and breeding species on the continent classified as either Endangered or Critically Endangered according to the IUCN Red List of Threatened Species. The most significant threat that drives the decline of vulture populations across the continent is poisoning in various forms that causes large-scale losses exacerbated by the feeding biology and slow reproductive rate of these birds. The Multi-species Action Plan for the Conservation of African-Eurasian Vultures (MsAP) recommends a range of actions that can be implemented by range states to combat wildlife poisoning and to reduce its impact on vulture populations. This includes the establishment and management of relevant databases across the range and focused activities to reduce the impact of poisoning on vultures and other wildlife. The drivers of these acts of poisoning are often diverse and complex and pose a particular challenge to those involved in the reduction of the prevalence and impact thereof on vultures and other wildlife populations. This presentation provided insight into the scale, drivers and methods as well as the impact of poisoning on vultures and other wildlife based on data collected in the African Wildlife Poisoning Database. Also highlight were some of the successful measures, such as wildlife poisoning response training and other intervention measures that have been implemented in 15 African countries to reduce its impact in known poisoning hotspots on the continent.

**S18-02 *Addressing poisoning in southern Tanzania.***

**Claire Bracebridge**

**(email:clairebracebridge@gmail.com)** Bracebridge, C.<sup>1</sup>  
and Kendall, C.<sup>1</sup>

<sup>1</sup>North Carolina Zoo, 4401 Zoo Parkway, Asheboro, North Carolina 27025, USA.

Since 2015, using vulture telemetry studies in southern Tanzania, North Carolina Zoo has been able to track the movements of White-backed Vultures in real-time. As a result, our study allows us to identify mortality events and gain a greater understanding of their causes. We have recorded 21 vulture

mortalities from our telemetry work, several of which are linked to poisoning motivated either by human-wildlife conflict, poaching for trade, or to reduce carcass detection. Causation of other mortalities has been difficult to detect and highlights the need for better field-based testing methods, as well as the challenges of working in vast and remote landscapes. To address these threats, we have worked closely with protected area staff in three key vulture sites to train 270 rangers in appropriate methods for rapid response to poisoning events. These include best practices in evidence collection, care of sick vultures, and carcass disposal.

***S18-03 The Coexistence Co-op: ending wildlife poisoning through community-based training and networking.***

**Darcy Ogada (email:ogada.darcy@peregrinefund.org)**

Odino, M.<sup>1</sup>, Ogada, D.<sup>1</sup>

<sup>1</sup>The Peregrine Fund-Africa, PO Box 1629-00606 Nairobi, Kenya

Poisoning wildlife is a global problem. Human-wildlife conflict is often a root cause, particularly when large carnivores attack livestock. Livestock owners retaliate by lacing carcasses with pesticides, but vultures and eagles are the most impacted. Since 2018, the Coexistence Co-op has undertaken a community-based training and conflict management programme to reduce livestock losses to carnivores and to stop retaliatory poisonings in northern Kenya. Our training involves a two-fold approach: 1) improving livestock husbandry and building predator-proof bomas, and 2) education about the dangers of using poisons to kill wildlife. We have trained 3,375 people who have built 629 predator-proof bomas, which have been 91% effective in reducing night-time carnivore attacks. Trainees have intervened 51 times to prevent poisonings. Other changes in human behaviour include, 1) building predator-proof bomas, 2) proper disposal of suspected poisoned carcasses, and 3) increased knowledge about human safety and use of protective gear.

***S18-04 Community engagement in vulture conservation in the southern rangelands of Kenya.***

**Paul Gacheru Macharia (email:species@naturekenya.org)**

Macharia, P.G.<sup>1</sup> and Onyango, V.O.<sup>1</sup>

<sup>1</sup>Nature Kenya-EANHS, PO Box 44486-00100, Nairobi, Kenya.

Wildlife poisoning poses a great threat to the survival of African vulture species in Kenya. A key driver of wildlife poisoning is human-wildlife conflict as a result of livestock depredation. To mitigate wildlife poisoning, we rolled out community outreach programs aimed at changing attitudes and perceptions of local communities. A low-cost approach of working with community volunteers was rolled out in 5 poisoning hotspots in the southern rangelands of Kenya. Volunteers created awareness, collected data on human wildlife conflict (HWC), and supported in response to wildlife poisoning incidents. Between August 2019 and December 2021, results indicate there was an increase of 47% in reporting HWC incidents to relevant authorities and an increase of 51% in non-poisoning or wildlife killing as HWC deterrent techniques approach applied by local communities. Our work shows that community awareness campaigns with other interventions coupled, e.g. boma reinforcement can contribute to the reduction of wildlife poisoning incidents.



**S18-05 Withdrawn****S18-06 Tackling lead toxicosis in wildlife at a national scale: a South African case study.****Lucy Kemp (email:project@ground-hornbill.org.za)**Kemp, L.V.<sup>1</sup><sup>1</sup>Mabula Ground Hornbill Project, Mabula Game Reserve, Bela-Bela 0480, South Africa.

Although the impact of lead as a poison affecting both human and wildlife health has been well-researched in many other parts of the world, in South Africa it had not gained sufficient attention to warrant coordinated national action. Small NGOs and individuals were attempting to highlight and tackle the threat independently but with little success. It took the development of a government-led National Wildlife Poisoning Prevention Working Group (catalysed by international commitments under the Convention on Migratory Species), and a Lead Task Team nested within that for real progress to be made. The Lead Task Team was carefully developed to ensure that all the relevant stakeholders, including user groups, were involved from the very beginning so that all parties understand both the evidence-base relating to risks of lead as well as practical constraints to reducing lead availability in the environment. Importantly, this prevents alienation and polarisation, and allows for the co-creation of solutions. This presentation discussed the benefits of this approach and the measurable gains the group have made in just a few years.

**S18-07 Lead poisoning may not contribute to powerline collisions amongst African White-backed (*Gyps africanus*) and Cape Vultures (*Gyps coprotheres*) in South Africa.****Caroline Grace Hannweg (email:info@vulpro.com)**Casey, J.<sup>1</sup>, Wascher, C.<sup>1</sup>, Naidoo, V.<sup>2,3</sup>, Kemp, R.<sup>2</sup>, Hannweg, C.G.<sup>2</sup>, Hirschauer, M.<sup>2</sup> and Wolter, K.<sup>2</sup><sup>1</sup>Anglia Ruskin University, East Rd, Cambridge CB1 1PT, United Kingdom. <sup>2</sup>VulPro, Plot 121 Boekenhoutkloof Road, Rietfontein 0216, South Africa. <sup>3</sup>University of Pretoria, Onderstepoort Campus, 100 Old Soutpansberg Road, Pretoria 0110, South Africa.

Anthropogenic factors affect vultures across the world. Two of the main threats to vultures in Africa are mortality from powerline collisions and lead poisoning. This study looked at the relationship between the lead poisoning and powerline incidents for African White-backed Vultures (*Gyps africanus*) and Cape Vultures (*Gyps coprotheres*) to determine whether lead exposure could be contributing to vulture powerline collisions. Blood samples, from 16 African White-backed Vultures and 50 Cape Vultures admitted to Vulpro from across South Africa for various levels of rehabilitation, were tested for lead levels. Sixteen African White-backed Vulture and 50 Cape Vulture blood samples were tested for lead levels. A GLMM was run to determine predictors that may play a role in elevated blood lead levels, including wild vs control birds and reason for admission. Blood lead levels were significantly different between wild and control vultures, but showed no difference between reason for admission groups, indicating that while wild vultures are exposed to lead poisoning, it may not be contributing to power line collision incidents.

**S18-08 Lead poisoning in South Africa's Gyps vultures: prevalence and sub-lethal impacts.****Linda van den Heever (email:linda.vdheever@birdlife.org.za)**van den Heever, L.<sup>1</sup>, Naidoo, V.<sup>2</sup>, Smit-Robinson, H.A.<sup>1</sup>, Eyssen, L.<sup>3</sup>, Coetzer, T.<sup>3</sup> and McKechnie, A.E.<sup>4</sup><sup>1</sup>BirdLife South Africa, Private Bag X16, Pinegowrie, 2123, South Africa. <sup>2</sup>Department of Paraclinical Sciences, Faculty of Veterinary Science, University of Pretoria, Onderstepoort, 0110, South Africa.<sup>3</sup>Biochemistry, School of Life Sciences, University of KwaZulu-Natal, Pietermaritzburg 3209, South Africa. <sup>4</sup>DSI-NRF Centre of Excellence at the FitzPatrick Institute, Department of Zoology and Entomology, University of Pretoria, Hatfield 0110, South Africa.

A nationwide assessment of the levels of lead toxicosis in South Africa's birds indicated that a significant proportion of Cape (*Gyps coprotheres*) and White-backed (*G. africanus*) vultures are displaying elevated lead levels. Of particular concern are the high lead levels found amongst unfledged Cape and White-backed Vulture chicks. The study suggests that these chicks are not merely ingesting lead from environmental sources such as soil, but are also receiving metallic lead particles (such as fragments of ammunition) from carrion fed to them by their parents. The chicks' haematological parameters are characterised by low packed cell volume (indicative of anaemia), with a significant negative correlation between blood lead level and delta-aminolevulinic acid dehydratase activity. Our research suggests that elevated lead levels in *Gyps* vulture chicks may be compounding their vulnerability during this critical time, when they already contend with a wide range of other anthropogenic threats.

**S18-09 Electrocutation and poisoning likely to be major threats to Egyptian Vultures in Ethiopia.****Samson Zelleke Belachew (email:zesamson@gmail.com)**Belachew S.Z.<sup>1</sup>, Bakari,S.<sup>2</sup>, Ruffo, A.D.<sup>3</sup>, Mengistu,S.<sup>1</sup>, Nikolov,S.<sup>4</sup>, Arkumarev, V.<sup>4</sup> and Oppel, S.<sup>5</sup><sup>1</sup>Ethiopian Wildlife and Natural History Society, Addis Ababa, PO Box – 32530, Ethiopia. <sup>2</sup>BirdLife Africa, Nairobi, PO Box 3502, 00100 GPO, Kenya. <sup>3</sup>Addis Ababa University, Addis Ababa, PO Box – 1176, Ethiopia. <sup>4</sup>Bulgarian Society for the Protection of Birds, Sofia, PO Box 50, Bulgaria. <sup>5</sup>BirdLife International, Cambridge CB2 3QZ, UK.

Egyptian Vultures are the only long-distance migrants among European vultures, the declining population exposed to some unclear threats along their entire flyway, and on the wintering grounds. Researchers set out field studies to count wintering Egyptian Vultures and assess the most important threats to the vultures in two important wintering grounds in Ethiopia - Afar and Oromia regions. They conducted surveys for dead birds along power lines, counted vultures in congregation points and used questionnaires for farmers and livestock holders to assess the magnitude of direct poisoning. They counted over 1,600 Egyptian Vultures in Ethiopia, underlining its importance as a wintering ground for the species. Electrocutation on small and poorly designed electricity pylons near places with high food abundance appears to be the primary threat. They found some evidence of direct poisoning targeted at Spotted Hyena *Crocuta crocuta*. Saving Egyptian Vultures will require addressing all threats with specific conservation actions tailored for each region.

**Appendix 4: Innovation in vulture conservation** (6 presentations)**S22-01 Innovation in vulture conservation: a socio-environmental perspective.****William Bowerman (email:wbowerma@umd.edu)**

Bowerman, W.W.<sup>1</sup>, Botha, A.<sup>2</sup>, Smit-Robinson, H.A.<sup>3,4,5</sup>, Anderson, M.<sup>3</sup>, Coverdale, B.<sup>6</sup>, Funda, N.<sup>7</sup>, Gore, M.L.<sup>8</sup>, Harrell, R.M.<sup>1</sup>, Krüeger, S.<sup>6</sup>, Mafumo, H.<sup>9</sup>, Mullinax, J.M.M.<sup>1</sup>, Ottinger, M.A.<sup>10</sup>, Reson, E.<sup>11,13</sup>, Shaffer, L.J.<sup>12</sup>, Thompson, L.J.<sup>2,13</sup> and van den Heever, L.<sup>3,14</sup>

<sup>1</sup>Department of Environmental Science and Technology, University of Maryland, College Park, Maryland 20742-5825, USA. <sup>2</sup>Endangered Wildlife Trust, Private Bag X11, Modderfontein, 1685, South Africa.

<sup>3</sup>BirdLife South Africa, Private Bag X16, Pinegowrie 2123, South Africa. <sup>4</sup>School of Animal, Plant and Environmental Sciences, University of the Witwatersrand, Private Bag 3, Johannesburg, 2050, South Africa. <sup>5</sup>Applied Behavioural Ecological & Ecosystem Research Unit (ABEERU), UNISA, Florida, South Africa. <sup>6</sup>Ezemvelo KZN Wildlife, Conservation Services Division, PO Box 13053, Cascades, 2020, South Africa. <sup>7</sup>SANParks, Pretoria, South Africa.

<sup>8</sup>Department of Geographical Sciences, University of Maryland, College Park, MD 20742, USA. <sup>9</sup>Department of Forestry, Fisheries and the Environment, Pretoria, South Africa. <sup>10</sup>Department of Biology and Biochemistry, University of Houston, Houston TX 20742, USA. <sup>11</sup>Maasai Mara Wildlife Conservancies, Narok, Kenya. <sup>12</sup>Department of Anthropology, University of Maryland, College Park, Maryland 20742, USA. <sup>13</sup>Centre for Functional Biodiversity, School of Life Sciences, University of KwaZulu-Natal, Private Bag X01, Scottsville 3201, South Africa.

<sup>14</sup>Department of Zoology and Entomology, University of Pretoria, Private Bag X20, Hatfield, Pretoria 0028, South Africa.

The "African Vulture Crisis" describes the long decline in populations of most Old World vulture species in Africa that have recently been reclassified as Critically Endangered or Endangered using IUCN criteria. Multiple human-caused stressors have been linked to vulture mortality including: poisoning, directly and in association with elephant poaching; indirectly and in association with secondary impacts from poisons used for human-wildlife conflict; harvesting for trade in vulture parts for traditional medicine and beliefs; alteration of habitat through changes in land use; lead poisoning from big game hunting; drowning in farm dams; and, collisions with electrical power infrastructure, amongst other threats. The U.S. National Science Foundation funded National Socio-Environmental Synthesis Center (SESYNC) was developed to produce actionable conservation outcomes working through teams of social and environmental scientists tackling real world problems. For five years, over 20 scientists and policy makers have been working together on this problem. The study reported novel approaches including the use of the One Health framework; conservation ethics; conservation criminology; human-vulture relationships; the role of vultures in disease; and community conservation.

**S22-02 Reciprocity in human-vulture relationships: ecosystem services, environmental health, and species protection.****L. Jen Shaffer (email:lshaffe1@umd.edu)**

Shaffer, L.J.<sup>1</sup>, Botha, A.<sup>2</sup>, Coverdale, B.M.<sup>3</sup>, Garbett, R.<sup>4</sup>, Gore, M.L.<sup>1</sup>, Harrell, R.M.<sup>1</sup>, Krüger, S.<sup>3</sup>, Mullinax, J.M.<sup>1</sup>, Ottinger, M.A.<sup>5</sup>, Reson, E.O.<sup>6</sup>, Smit Robinson, H.A.<sup>7</sup>, Thompson, L.J.<sup>2</sup>, van den Heever, L.<sup>7</sup>, Bowerman, W.W.<sup>1</sup>

<sup>1</sup>University of Maryland, College Park, Maryland, 20742, USA. <sup>2</sup>Endangered Wildlife Trust, Private Bag X11,

Modderfontein, 1685, South Africa. <sup>3</sup>Ezemvelo KZN Wildlife, PO Box 13053, Cascades, 3202, South Africa. <sup>4</sup>Raptors Botswana, Maun, Botswana; <sup>5</sup>University of Houston, Houston, Texas 77004. <sup>6</sup>Maasai Mara Wildlife Conservancies Association, P. O. Box 984, Narok 20500, Kenya. <sup>7</sup>BirdLife South Africa, Private Bag X16, Pinegowrie, 2123, South Africa.

Vultures provide unparalleled ecosystem services across sub-Saharan Africa by removing dead animals and waste to recycle nutrients, regulating disease transmission, and keeping water clean. These raptors also contribute to food security and support diverse cultural practices and beliefs. Precipitous vulture population declines across the continent have triggered policy and programmatic conservation work at international NGOs and national government agencies. However, sustainable success will require grassroots initiatives that build on existing local knowledge and values. Recent research on ecosystem services as they connect to livelihoods and cultures, as well as study of One Health frameworks, offers opportunities to support and reinforce grassroots sustainability of African vulture conservation. However, explicit interdisciplinary connections need to be made to develop and implement appropriate conservation initiatives. This presentation explored the range of services provided to African vultures by human communities to identify shared interests that offer starting points to improve conservation success.

**S22-03 *The role of vultures within the One Health conceptual framework.***

**Linda van den Heever & Hanneline Smit-Robinson**

([email:linda.vdheever@birdlife.org.za](mailto:linda.vdheever@birdlife.org.za) / [hanneline.smit-robinson@birdlife.org.za](mailto:hanneline.smit-robinson@birdlife.org.za))

van den Heever, L.<sup>1</sup>, Thompson, L.J.<sup>2</sup>, Bowerman, W.W.<sup>3</sup>, Smit-Robinson, H.A.<sup>1</sup>, Shaffer, L.J.<sup>3</sup>, Harrell, R.M.<sup>1</sup>, Ottinger, M.A.<sup>4</sup>, Botha, A.<sup>2</sup>, Coverdale, B.<sup>5</sup>, Gore, M.<sup>3</sup>, Hassell, J.<sup>6</sup>, Krüger, S.<sup>5</sup>, McClure, C.J.<sup>7</sup> and Mullinax, J.M.<sup>3</sup>

<sup>1</sup>BirdLife South Africa, Private Bag X16, Pinegowrie, 2123, South Africa. <sup>2</sup>Endangered Wildlife Trust, Private Bag X11, Modderfontein, 1685, South Africa. <sup>3</sup>University of Maryland, College Park, Maryland, 20742, USA. <sup>4</sup>University of Houston, Houston, Texas 77004. <sup>5</sup>Ezemvelo KZN Wildlife, Conservation Services Division, PO Box 13053, Cascades, 2020, South Africa. <sup>6</sup>Global Health Program, Smithsonian Conservation Biology Institute, 3001 Connecticut Ave, Washington DC 20008, USA. <sup>7</sup>The Peregrine Fund, 5668 West Flying Hawk Lane, Boise ID 83709, USA.

The ‘One Health’ concept is cognisant of the seamless interaction between veterinary and human medicine, and how this may benefit human health, animal health and the natural environment. Through competitive regulation, vultures can control the composition of and interactions within scavenger communities, which may ultimately impact the spread of viral and bacterial diseases. Vultures are subjected to stressors that arise from a variety of anthropogenic sources. This presentation included the process for developing and implementing a One Health framework, with a focus on the challenges and complexities of Old-World vulture conservation. Integrating societal needs with management, aimed at maintaining healthy vulture populations, is key for successfully using a One Health framework to optimise the health of human and wildlife populations and ensure ecosystem health.

**S22-04 *Engaging communities to save vultures. Salisha*****Chandra (email:salisha.chandra@birdlife.org)**Chandra, S.<sup>1</sup>, Ole Reson, E.<sup>2,3</sup>, Par, L.<sup>3,4</sup>, Gacheru, P.<sup>5</sup>, Matsvimbo, F.<sup>6</sup> and Onoja, J.<sup>7</sup><sup>1</sup>BirdLife International, Mahiga Mairu Avenue, Nairobi, Kenya. <sup>2</sup>Maasai Mara Wildlife Conservancies Association, P. O. Box 984, Narok 20500, Kenya. <sup>3</sup>The Peregrine Fund, Boise, Idaho. <sup>4</sup>The Kenya Birds of Prey Trust, PO Box 883 Naivasha, Kenya 20117. <sup>5</sup>BirdLife Zimbabwe, 35 Clyde Rd, Harare, Zimbabwe. <sup>6</sup>Nature Kenya, PO Box 44486-00100, Nairobi, Kenya. <sup>7</sup>Nigeria Conservation Foundation, Km 19, Lekki-Epe Expressway, Lekki. Lagos. Nigeria.

At the heart of the African Vulture Crisis lies the interface between humans and wildlife – whether unintentional or intentional, the dramatic decline of this group of birds is being caused by human actions. Addressing these myriad and cross-cutting threats (from poisoning to belief-based use) requires engaging and supporting indigenous and local peoples in their conservation. From the plains of the Maasai Mara, Kenya to the woodlands of Zimbabwe and the wildlife markets in West Africa, communities are transforming into vulture saviours. This talk provided an overview of the novel approaches being used by communities to save vultures and traverse the difficult journey from conflict to coexistence.

**S22-05 *A conservation criminology-based desk assessment of vulture poisoning in the Great Limpopo Transfrontier Conservation Area.*****André Botha (email:andreb@ewt.org.za)**Gore, M.L.<sup>1</sup>, Hübshle, A.<sup>2</sup>, Botha, A.J.<sup>3</sup>, Coverdale, B.<sup>4</sup>, Garbett, R.<sup>5</sup>, Harrell, R.<sup>1</sup>, Krueger, S.<sup>4</sup>, Mullinax, J.M.<sup>1</sup>, Olson, L.<sup>1</sup>, Ottinger, M.A.<sup>6</sup>, Smit-Robinson, H.A.<sup>7</sup>, Shaffer, L.J.<sup>1</sup> and Thompson, L.J.<sup>3</sup><sup>1</sup>University of Maryland, College Park, Maryland, USA. <sup>2</sup>University of Cape Town, Cape Town, South Africa. <sup>3</sup>Endangered Wildlife Trust, Midrand, South Africa. <sup>4</sup>Ezemvelo KZN Wildlife, Cascades, KZN, South Africa. <sup>5</sup>BirdLife International, Nairobi, Kenya. <sup>6</sup>University of Houston, Texas, USA. <sup>7</sup>BirdLife South Africa, Johannesburg, South Africa.

Conservation stakeholders have identified evidence that a number of vulture species in particular ecosystems are being systematically targeted by poisoning with potentially significant effects on human, wildlife, and ecosystem health. This study explored the extent to which an interdisciplinary, expert team-based approach linking conservation and criminology could help inform efforts to prevent poisoning of Africa's vultures. The study used the case of illegal vulture poisoning and conservation in the Great Limpopo Transfrontier Conservation Area (GLTFCA), a known poisoning site, as an example. They used an interdisciplinary framework, conservation criminology, to guide a desk assessment of how the local environment may create opportunities for illegal poisoning. Their assessment was conducted as a science team and included multiple iterations and structured discourse. The assessment identified different elements of vulture poisoning and the opportunity factors that can both underlie the problem and inform prevention strategies and tactics.

**S22-06 Conservation considerations of threatened vultures in Africa using the open standards model.****Reginal M Harrell (email:rharrell@umd.edu)**

Harrell, R.M.<sup>1</sup>, Mullinax, J.M.<sup>1</sup>, Botha, A.J.<sup>2</sup>, Bowerman, W.A.<sup>1</sup>, Anderson, M.<sup>3</sup>, Anderson, T.<sup>3</sup>, Coverdale, B.M.<sup>4</sup>, Funda, X.N.<sup>5</sup>, Garbett, R.A.<sup>6</sup>, Gore, M.L.<sup>1</sup>, Krueger, S.C.<sup>4</sup>, Mafumo, H.<sup>7</sup>, Olsen, L.J.<sup>1</sup>, Ottigner, M.A.<sup>8</sup>, Reson, E.O.<sup>9</sup>, Shaffer, L.J.<sup>1</sup>, Smit-Robinson, H.A.<sup>3</sup>, Thompson, L.J.<sup>2</sup>, van den Heever, L.<sup>3</sup> and Virani, M.<sup>10</sup>

<sup>1</sup>Department of Environmental Science and Technology, University of Maryland, College Park, Maryland 20742, USA.

<sup>2</sup>Endangered Wildlife Trust, Modderfontein, 1685, South Africa. <sup>3</sup>Birdlife South Africa, Pinetown 2123, South Africa.

<sup>4</sup>Ezemvelo KwaZulu-Natal Wildlife, Cascades 3202, South Africa.

<sup>5</sup>Kruger National Park, SANParks, Skukuza, South Africa. <sup>6</sup>Raptors Botswana, Maun, Botswana. <sup>7</sup>Department of Environmental Affairs, Pretoria, South Africa <sup>8</sup>University of Houston, Houston, Texas, USA. <sup>9</sup>Maasi Mara Wildlife Conservancies Association, Maasi Mara, Kenya. <sup>10</sup>Mohamed Bin Zayed Raptor Conservation Fund, Boise, Idaho, USA.

The Conservation Measures Partnership's Open Standards (OS) for the Practice of Conservation was used to rank concerns and evaluate options for the protection, conservation, and restoration of endangered vulture species existing south of the Sahara Desert. A team of African and US scientists went through several iterations of the OS methodology to establish and recommend an approach to mitigate vulture losses from the various externalities that impact survival and maintain healthy populations. These findings were presented and compared with a simple Logic Model that focuses on outcomes that can be qualified and quantified as evaluative tools to determine the success of recommendation implementation.

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