Rufford Conservation Conference

11th to 13th July 2019, Kumbali Conference Centre, Malawi.

Proudly hosted by African Bat Conservation and Conservation Research Africa and supported by the University of the West of England

www.africanbatconservation.org

Report Compiled by Dr Emma Stone

University of the West of England, Conservation Research Africa.

RUFFORD CONFERENCE MALAWI 2019
CONFERENCE PROCEEDINGS

1. Conference Aim

The aims of the conference were:

1. To share experiences and knowledge in conservation programmes funded by Rufford Foundation
2. To promote and facilitate networking and collaboration across Africa.

2. Impact of Rufford Funding

A total of 19 delegates attended the conference representing the following African countries: Botswana, Uganda, Kenya, South Africa, Madagascar, Zambia, Malawi and Rwanda.

Through the conference we were able to identify the following impacts that Rufford Funding has delivered:

2.1 Supporting work on underrepresented species

The work presented by Dr Paul Webala highlighted the impact delivered through Rufford Foundation Support in gathering important research information about the distribution and echolocation calls of bats, a group of mammals that are typically underrepresented in Africa and fail to attract significant conservation funding.

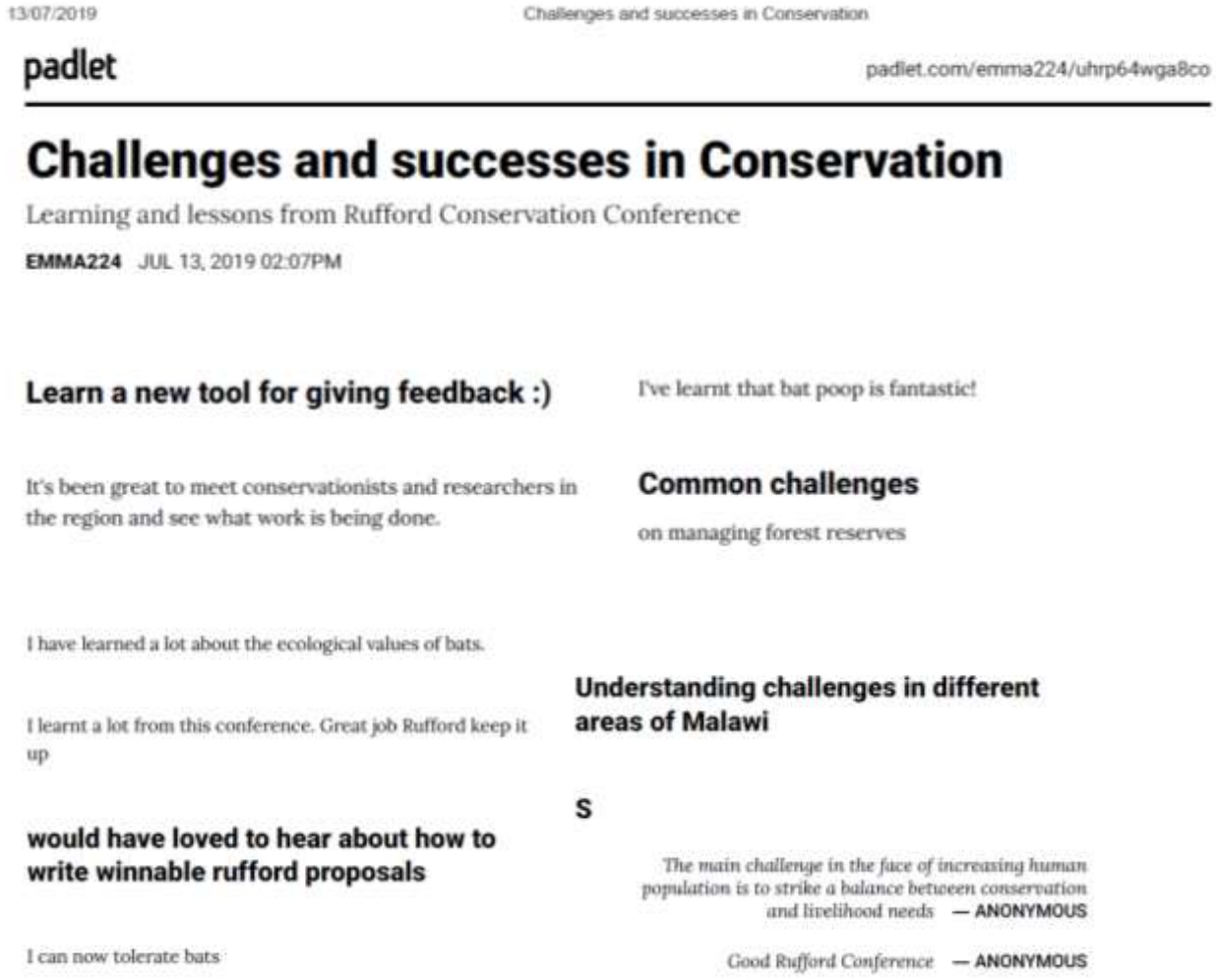
2.2 Supporting the development of new replicable models for integrated cross sectoral programmes in Africa

Nantenaina Andriamalala presented on the significant impact being achieved through Rufford support in developing a new cross sectoral approach to conservation, health, education and wellbeing. Dominique Greeff demonstrated how with support from Rufford Foundation Grants her project has been able to develop a novel and new technique which will be important in identifying

3. Recommendations and feedback

Conference Workshop

The final session of the conference involved a discussion of the lessons learned in conservation and shared experiences in Africa. Delegates were asked to put responses on Padlet to share comments which are shown below:



13/07/2019 Challenges and successes in Conservation

padlet padlet.com/emma224/uhrp64wga8co

Challenges and successes in Conservation

Learning and lessons from Rufford Conservation Conference

EMMA224 JUL 13, 2019 02:07PM

Learn a new tool for giving feedback :)

It's been great to meet conservationists and researchers in the region and see what work is being done.

I have learned a lot about the ecological values of bats.

I learnt a lot from this conference. Great job Rufford keep it up

would have loved to hear about how to write winnable rufford proposals

I can now tolerate bats

I've learnt that bat poop is fantastic!

Common challenges

on managing forest reserves

Understanding challenges in different areas of Malawi

S

The main challenge in the face of increasing human population is to strike a balance between conservation and livelihood needs — **ANONYMOUS**

Good Rufford Conference — **ANONYMOUS**

Adapatation strategies

I have learnt various conservation approaches from participants.

I think the approach PHE approach used in Madagascar is great

Succ

Deforestation and forest reserves

It is really had to find a good balance between community needs and conservation

A

Sending grant money via institutions is a great challenge because of bureucracy and red tape. Delayed projects or not at all

AGENDA

Time	Thursday 11th July Overview (Arrival)	Location
13:00 -14:30	Registration opens	Conference Reception Room Kumbali
14:30 -18:00	Registration Opens (delegates) (Day 1 Presenters download presentations for Day 1)	
18:30- late	Welcome Dinner – Mongolian BBQ	Boma Braai Area
Time	**Friday 12th July (Day 1)**	**Location**
08:00-09:00	Breakfast	Dining Room Kumbali
09:00-09:15	Opening and introductions	Main Conference Room – **Theme: Applied Research**
09:15-10:00	**Plenary Talk**: Invited Speaker – **William Mgoola** Director of Research, Department of National Parks and Wildlife Malawi	
10:00-10:30	**Christine Coppinger**: Informing sustainable forest product utilisation to incentivise forest protection in North Western Province, Zambia	
10:30-11:00	**Tshepo Moatswi**: Seasonal changes in springbok (*Antidorcas marsupialis*) herd composition and age structure in the Southern Kalahari, Botswana	
11:00-11:30	COFFEE BREAK	Conference Reception Room Kumbali
11:30-12:00	**Dominique Greeff**: Validating the use of dermal secretion as a matrix for monitoring glucocorticoid concentrations in African amphibian species	

12:00 - 12:30	**Daud Jones Kachamba**: Growth Performance of *Uapaca kirkiana* Müell Arg Provenances in a Breeding Seedling Orchard in Malawi	Main Conference Room – **Theme: Applied Research**
13:00 - 14:30	LUNCH	Dining Room Kumbali
14:30 -15:00	**Joyce Lepetu**: Role of Forest Resources to Local Livelihoods: Implications for conservation of Chobe Forest Reserve, Botswana	Main Conference Room – **Theme: Conservation Management**
15:00 - 15:30	**Madalitso Mwaungulu**: Mitigating Human bat conflict in urban areas of Malawi	
15:30-16:00	COFFEE BREAK	Conference Reception Room Kumbali
16:00-18:00	EXCURSION: Tour of CRA centre including, Hipposideros bat roost visit, box scheme	CRA Conservation Research and Sustainability Centre
18:30 - late	DINNER – LODGE	Kumbali Lodge

Time	Saturday 13th July (Day 2)	Location
07:00-8:30	BREAKFAST	Dining Room Kumbali
08:30-09:00	**Paul Webala**: Echolocation calls of high duty-cycle bats (*Hipposideridae* and *Rhinonycteridae*) from Kenya	Main Conference Room – **Theme: Applied Research**
09:30 - 10:00	**Emma Stone**: Roosting ecology of Mauritian Tomb bats (*Taphozous mauritianus*) in Lilongwe city Malawi – implications for sustainable urban planning.	
10:00 –10:30	**Karen Dylan Shevlin**: Bats in the back yard – importance of urban gardens for bat diversity and abundance in Malawi.	
10:30 - 11:00	**Chilungamo Phiri**: Conservation of Mchinji Forest Through Community Development	
11:00 –11:30	COFFEE BREAK	Conference Reception Room Kumbali
11:30 –12:00	**Nantenaina Tahiry Andriamalala**: Supporting uptake of cross-sector health-environment partnerships through a national learning network: experiences from Madagascar	Main Conference Room – **Theme: Community Education**
12:00 –12:30	**Felemont Kayulayula Banda**: Effects Of Community Livelihood Adaptation Strategies on Wetland Habitat Conservation and Future Community Resilience	
12:30-13:00	**Amos Ronald Kalukusu**: Potential Behavioural and Societal Responses to Human Health Risks Resulting from Climate Change in Kawaala, Kampala Suburb of Uganda	
13:00 - 14:00	LUNCH	Dining Room Kumbali

14:00 –14:30	**Jester Kaunga-Nyirenda**: Community Outreach, Education and Awareness in Wildlife Conservation in Malawi	Main Conference Room – **Theme: Community Education**
14:30 –15:00	**William Mgoola:** An assessment of the biological impact of traditional bird hunting: The case of Lake Chilwa Wetland	
15:00 –15:30	**Wilson Damien Asibu**:	
15:30 – 16:00	COFFEE BREAK	Conference Reception Room Kumbali
16:00 – 16:30	**Dr Damon Lesmeister:** Vegetation and Wildlife Monitoring of Nkhotakota Wildlife Reserve, Malawi	
16:00 – 17:30	**WORKSHOP ALL PARTICIPANTS** Sharing successes and challenges of Rufford Projects – what are the commonalities for achieving conservation impact?	Main Conference Room
17:30-17:45	Wrap up, close	
19:00 –late	Conference Dinner – Malawian cultural boma braai and traditional dancing	Boma Braai Area Kumbali

Programme Abstracts and Speaker Biographies

Name: **Christine Coppinger**
Organisation: University College Dublin
Contact Email: as_christine@remoteafrica.com
Biography: Christine Coppinger is currently working towards a PhD on pollinators and forest utilisation in the North Western Province of Zambia through University College Dublin (supported by the Irish Research Council and the Trident Foundation), after conducting preliminary research in this field between 2018 and 2019, funded by the Rufford Foundation. Her goal is to inform sustainable forest utilisation, helping to secure long term benefits for rural communities while also conserving forests.

Christine completed her BSc and an MSc in Ichthyology and Fisheries Science at Rhodes University and the South African Institute for Aquatic Biodiversity after which she worked as a Field Officer for The Endangered Wildlife Trust for over two years, initiating and managing a conservation project in the Amathole Mountains in the Eastern Cape, South Africa. She has subsequently been involved in a number of consultations in Zambia, conducting biological and sociological research on important fisheries in the country and now has over seven years of experience working in the fields of science and conservation, equipping her for her desired career in applied conservation science.

Christine enjoys keeping active outdoors, beekeeping and is inspired by the green living movement and always strives to be environmentally conscious in all aspects of her life. She is also interested in forest restoration and enjoys growing and planting indigenous trees.

Abstract: *Informing sustainable forest product utilisation to incentivise forest protection in North Western Province, Zambia.*
Zambia's primary land cover consists of woodlands which support the vast majority of rural livelihoods. Forest utilisation is however, considered to be unsustainable resulting in alarming deforestation in the past decade as the population increases. For example, the growing Zambian honey industry, servicing an insatiable global demand, sources honey largely from rural beekeepers using traditional bark hives constructed by ring-barking indigenous trees, which are often the same species considered important "honey trees". A 1992 report estimated that ~273,000 trees were destroyed annually in Zambia's North-Western Province to produce bark hives. To evaluate the importance of forests for livelihoods and the long-term sustainability of forest utilisation, structured household interviews were conducted in Zambia's North-Western Province: 30% of those surveyed were traditional beekeepers, each owning 24 hives on average, with three hives reportedly constructed per tree, each with an average lifespan of five years. Each beekeeper is calculated to fell two trees annually to make bark hives.
To responsibly promote commercial beekeeping, alternative hive technology and best practices for beekeepers are recommended to improve the sustainability of the industry. While honey is an important commercial product (the second most important income generator in the surveyed households), a number of other forest products support livelihoods in a variety of ways. Sustainable beekeeping could protect forests that support the production of a diverse array of these products which were important in over 66% of households including mushrooms, edible caterpillars and fruit. Alternatively, charcoal and timber production (important in only 4% and 1.3% of households respectively) would eventually destroy the entire natural resource base centred on indigenous forests. Informing sustainable forest utilisation and revealing the value of indigenous forests to rural communities, is hoped to instil value for forests, incentivising their protection.

Name: Tshepo Moatswi
Organisation: Okavango Research Institute, University of Botswana, Maun, Botswana
Email: tshepomoatswi2@gmail.com
Biography: My name is Tshepo Moatswi, gentleman aged 27 years old from Botswana. Raised by a single mother who is not working currently. I hold a Bachelor of Arts- Environmental science degree from the University of Botswana (2011-2015). Currently a Master of Philosophy (Natural resources management) student in Okavango Research Institute-University of Botswana. I submitted my thesis for examination in June 2019. In 2016 after I completed my undergraduate degree, I got a precious opportunity to join a non-Governmental organization (NGO) known as Kalahari Research and Conservation as a research assistant and that is when I got field experience. My undergraduate education and the experience from the conservation club prepared me well for my chosen career. Among other things that I did as a research assistant which motivate me to apply for this course are wild dog tracking using wildlife tracking devices, collaring of wild dogs with veterinarians and learning field research methods. This helped me to acquire the necessary skills and I enrolled for Master of Philosophy in natural resources management with the University of Botswana.

Abstract: *Seasonal changes in springbok (Antidorcas marsupialis) herd composition and age structure in the Southern Kalahari, Botswana.*
Nationwide aerial censuses of Botswana conducted by the Department of Wildlife and National Parks highlighted a 71% decline in the springbok (Antidorcas marsupialis) population and a contraction of their range between 1992 and 2012, but the primary causes of this decline remain unknown. The majority of the springbok population inhabits the Schwelle area of the Kgalagadi with a small proportion of that population in Mabuasehube. We conducted a study of springbok in both areas. We recorded the location of each herd as being in Mabuasehube or Schwelle and the pan name for each sighted herd. We analysed herd composition using compositional data analysis and calculated the

ratios of each demographic category to adult females. We used generalised linear mixed models in R to assess the effects of season and location on herd sizes, herd composition, and demographic ratios. The results show a high ratio of juvenile: adult females in the wet season months and a decline in the subsequent cold dry season, indicating a low recruitment rate that could be contributing to the springbok population decline. The results highlight the importance of protecting the Schwelle as a wet season range because more calves were born in the Schwelle. Declining springbok populations could cause a trophic cascade, leading to decreases in populations of their predators, such as lion (*Panthera leo*), leopard (*P. pardus*), and cheetah (*Acinonyx jubatus*), with implications for ecosystem health and functioning.

Name: Dominique Greeff
Organisation: Research & Scientific Services Department, National Zoological Garden, South African National Biodiversity Institute.
Email: avalon92dg@gmail.com
Biography:
Abstract: *Validating the use of dermal secretion as a matrix for monitoring glucocorticoid concentrations in African amphibian species.*
The complex interaction between factors leading to amphibian declines is responsible for the inability to develop robust, standardised conservation action plans. Monitoring physiological stress responses in amphibians may provide an ideal tool to assist conservationists in this regard. This study aimed to validate dermal secretions as a robust matrix for monitoring glucocorticoid alterations in an African amphibian, the edible bullfrog (*Pyxicephalus edulis*). Both a biological (handling) and physiological (ACTH challenge) validation were conducted to determine which of five available enzyme immunoassays (EIAs) tested is most suited for monitoring alterations in dermal glucocorticoid (dGC) concentrations. Additionally, the most optimal body region for monitoring dGC concentrations in *P. edulis* was identified. To confirm the activation of the hypothalamic-pituitary-interrenal (HPI) axis following ACTH administration, urinary glucocorticoid metabolites (uGCM) were also quantified. The tested corticosterone EIA was the only assay able to monitor alterations in dGC concentrations following the handling event in *P. edulis*. Further validation during the ACTH challenge supported the corticosterone EIA in this regard. Dermal secretions collected from both the ventral and dorsal regions were suitable for monitoring dGC concentrations in both sexes. A considerable increase in uGCM concentrations following ACTH administration was found, suggesting that the dGC concentrations observed were derived from the HPI axis. This study offers further support for the use of dermal secretions as an important matrix for monitoring physiological stress, and thus general health, in amphibian species.

Name: **Dr Daud Jones Kachamba**
Organisation: Department of Forestry, Lilongwe University of Agriculture and Natural Resources, Malawi
Contact Email: dkachamba@luanar.ac.mw
Biography: Daud is a Senior Lecturer in Forest Sciences, Department of Forestry, Lilongwe University of Agriculture and Natural Resources. He has a PhD in Forest Management (2016): Norwegian University of Life Sciences (NMBU), Norway, and an MSc in Forest Sciences (2007): Stellenbosch University, South Africa and a BSc in Agriculture (2003): University of Malawi. Thanks to his passion in contributing towards the development of tools and methods for forest conservation and management, Daud developed the first forest biomass models for miombo woodlands of Malawi. He also introduced the application of unmanned aerial vehicles aka drones in forest inventory in miombo woodlands. Daud is a Grantee of the World Wide Fund for Nature's RUSSEL E. TRAIN EDUCATION FOR NATURE (EFN) FELLOWSHIP, a Certified Member of the African Forest Forum (AFF), and Fellow under the FK Norway South – South Exchange Programme in Africa and a Certified Member and Beneficiary: Earthwatch Institute.

Abstract: *Growth Performance of Uapaca kirkiana Müell. Arg Provenances in a Breeding Seedling Orchard in Malawi*

The population of *Uapaca kirkiana*, an indigenous fruit tree in southern and eastern Africa, continues to decline due to deforestation, forest fragmentation and wildfires. Domestication of the fruit tree has been a priority to increase its genetic diversity and improve livelihoods of small-scale farmers. The process of domestication of trees requires knowledge of ecological adaptive traits and intra-specific variation. A breeding seedling orchard comprising seven provenances was established at Bunda in Lilongwe the capital of Malawi in 2006. Growth performance was assessed through measurements in tree height, diameter at breast height (dbh), root collar diameter, number of branches and number of flowers for eight years. Results show that there are statistical significant differences ($P \leq 0.05$) in height, diameter at breast height, root collar diameter among the seven provenances. Dzalanyama had the highest mean value for height and diameter at breast height ranging from 1.8 to 3.9 metres and 3.0 to 8.9 centimetres respectively, however a local provenance collected from within 5-kilometre radius of the test site showed the least growth performance suggesting that use of a local provenance does not always guarantee the best performance. Height was found to have high heritability values ranging from 0.31 to 0.43 while number of branches and number of flowers did not appear to be under strong genetic control with heritability values of 0.12 and 0.08 respectively. The values for growth and genetic traits are from one site that could overestimate heritability values. Selection of provenances for tree improvement should be based on a combination of factors including seed quality and performance of provenances in multi-location trials.

Name: **Alphonse Karenz**
Organisation: Sustaining Africa Youth Organization, Wakiso, Kampala, Uganda
Contact Email: karenzilife@gmail.com
Biography:

Abstract: *What makes a RSG project proposal successful? The five RSGs winner's success story.*

This work exploits the Presenter's previous experience, of winning and successfully implementing all the five Rufford Small Grants and organizing the five previous RSG conferences, to discuss and provide the Malawi Conference Participants with tips on the five main factors that can make a project proposal to succeed in 1) winning a RSG grant, 2) smooth implementation, 3) M&E and Reporting, and 4) winning more grants.

The five main project factors to be discussed are as following: 1) the conservation focus (species Vs habitants), 2) the long-lasting and pragmatic outcomes, 3) the project leader (career, references and devotion), 4) the local community involvement and empowerment, and 5) the project size and future perception.

According to the Presenter and other twenty Senior RSG Recipients' statements, the above five factors are the key to the success of any RSG project. So understanding and considering these five factors will grant a better success to the Malawi Conference Participants' current RSG project implementation and future applications. The opposite is also true, misunderstanding or underestimating the above five factors have failed many RSG applications, implementation and M&E and Reporting.

Name: **Joyce Lepetu**
Organisation: Botswana University of Agriculture & Natural Resources (BUAN)
Contact Email: jlepetu@yahoo.com
Biography:

Abstract: *Role of Forest Resources to Local Livelihoods: Implications for conservation of Chobe Forest Reserve, Botswana.*

Dry Forests in Botswana are threatened by unsustainable uses and conversion to alternative land uses. In spite of the consequences of forest degradation and biodiversity loss and reliance of communities on forests livelihoods, there is little empirical data on the role of forest resources in livelihoods of the local communities. Socioeconomic, demographic, and forest use data were obtained

by interviewing 183 households residing around Chobe Forest Reserve (CFR). Forest product market survey was undertaken to determine prices of various forest products for valuation of forest use. In this study, more than nine tree species were utilised in various forest products. *Cymbopogon excavates*, *Baikiaea. plurijuga, Colophospermum. Mopane, Combretum. Apiculatum, Combretum elaegnoides, Terminalia sericea, Croton gratissimus, Berchemia discolour and Adansonia digitate* were the most frequently used species for many forest products. Forest income was significant among households contributing approximately 50% of total household income however Forest income was not statistically significant (p =. 67) different across the study sites. The largest proportion of the forest income was derived from fuelwood (44%), then construction materials (29%), thatching grass (14%), and wild fruits (13%).

These results provide valuable information on the role of forest resources to livelihoods and could be applied in developing forest conservation policies for enhanced ecosystem services and livelihoods. There is also a pressing need to facilitate specific interventions that enable forest resources to play a greater role in livelihoods through improved local forest governance.

It is recommended that provision of skill development trainings and financial support for the installation of renewable and alternative energy technologies to minimize the use of forest resources. More researches on assessing role of community forestry management in biodiversity conservation should be conducted and also ex-situ conservation interventions are critical for as approaches for biodiversity conservation.

Name: Madalitso Mwaungulu
Organisation: Conservation Research Africa (CRA) / African Bat Conservation (ABC)
Email: mada@conservationresearchafrica.org

Biography: Madalitso (Mada) is a graduate from the Lilongwe University of Agriculture and Natural Resources (LUANAR-Bunda Campus) where he earned a degree in Environmental Science. For his dissertation, Mada studied bat habitat preferences, with a focus on the ecosystem services bats provide to Malawian agro-ecosystems. Prior to this Mada volunteered with ABC for a few months. Mada believes that not much attention is given to bats and the ecosystem services they provide to Malawi, hence his involvement with ABC to help bring more information to the Malawian population about bats. Mada has vast experience in community engagement through his participation in various community outreach programs, most notably through his involvement in the fight against Child, Early and Forced Marriages (CEFM) as well as Sexual and Reproductive Health and Rights (SRHR) for young people in the SADC region. Mada also holds a certificate in Civic Leadership from the University of South Africa – School of Business Leadership (UNISA SBL) in Pretoria. Mada conducts engagement and data collection around the field sites where ABC and CRA work; Vwaza, Lilongwe, Nyika, and Kasungu.

Abstract:

Name: **Dr Paul Webala**
Organisation: Maasai Mara University
Contact Email: paul.webala@gmail.com

Biography: Dr Webala has studied bat ecology and systematics for over 15 years. He received his PhD from Murdoch University (Perth, Western Australia) where he investigated effects of selectively-logged jarrah eucalypt forests on bat habitat use in SW Western Australia.

Paul is a National Geographic Explorer, wildlife biology lecturer, published author, and regional expert on small mammals, especially bats, with extensive fieldwork experience. Using standard sampling methods (mist nets, harp traps, hand nets), molecular techniques, acoustics, and radio-telemetry, he uses bats as a focal group to understand and interrogate processes that drive rarity and abundance of mammals in natural, and human-dominated, landscapes. He is primarily a community ecologist, although his research addresses a variety of important questions for improving bat conservation in eastern Africa. His research also spans several subfields of biology, as his work examines behavioural,

ecological and systematic/taxonomic questions. He has collaborated with prominent bat biologists around the world, further emphasizing the high quality of his work and his commitment to bat research and conservation.

He has held positions at National Museums of Kenya (NMK), Kenya Wildlife Service (KWS), Karatina University (Kenya) and at Maasai Mara University (Kenya). He is a member of the Bat Specialist Group of the IUCN Species Survival Commission, and a research associate with the NMK, KWS and the Field Museum of Natural History (FMNH, Chicago, IL., USA). In addition, he is the current Chair of the nascent Bat Conservation Africa (www.batconafrica.net/), a network of African biologists, naturalists, conservationists, bat interest groups, students and other stakeholders to promote collaboration and coordination on numerous trans-boundary issues involving bats.

Abstract:

Name: Dr Emma Stone
Organisation: Conservation Research Africa, African Bat Conservation
Email: Emma4.stone@uwe.ac.uk

Biography: Emma is passionate about applied conservation science which delivers impact, both academic and societal. Her research focuses on an interdisciplinary approach combining social, geographical and ecological methods to understand and predict the dynamic interrelations between ecosystems, society and poverty as a result of Global Environmental Change. Emma is the founder/director of African Bat Conservation and the umbrella charity Conservation Research Africa (www.conservationresearchafrica.org). Emma is a Senior Lecturer in Conservation Science at the University of the West of England, UK, and Honorary Research Fellow at Cardiff University and the University Bristol UK. Emma has worked in Africa since 1998 when she conducted biodiversity research for three years in the remote Kafue National Park, Zambia, and then worked in a wildlife centre managing community education and outreach projects. Emma has been conducting bat research in Africa (particularly Zambia, Malawi and South Africa) since 1998 and conducted her PhD research in the Bat Ecology and Bioacoustics Lab at the University of Bristol, UK on the impact of development on bats with a focus on the ecological impacts of artificial lighting. Emma developed a novel field-based experimental approach which demonstrated the first evidence of negative impacts of high pressure sodium and LED street-lights on bats (Stone *et al.* 2009, Current Biology; Stone *et al.* 2012, Global Change Biology). Emma has secured over £1.6million in conservation and research grant funding since 2005 and published in high impact journals (642 citations, H-Index 10) including Current Biology (IF 8.9, Stone *et al*. 2009, 309 citations), Global Change Biology (IF 8.4, Stone *et al*. 2012, 126 citations) and Proceedings of the Royal Society B (IF 7, Stone *et al.* 2015, 48 citations).

Abstract: *Roosting ecology of Mauritian Tomb bats (Taphozous mauritianus) in Lilongwe city Malawi – implications for sustainable urban planning.*

Increasing levels of urbanisation has led to a greater use of artificial structures by bats as alternative roost sites. Despite the widespread presence of bats, roost availability may limit their distribution and abundance in urban environments. Little quantitative information exists on the drivers of roost selection and the preferred building characteristics for roosting. We explore the factors influencing roost selection in the Mauritian tomb bat (*Taphozous mauritianus*), within an urban landscape in Lilongwe city, Malawi. Eight building and five landscape features of roosts were compared with both adjacent and random control buildings throughout the city. Buildings containing roosts were situated closer to woodland (mean 709m) compared to random buildings (mean 1847m) but did not differ in any other landscape feature explored. Roosts were situated on buildings that had larger areas and taller walls, suggesting bats choose buildings containing features that have a role in predator-avoidance but which also act as dominant features for acoustic perception when leaving the roost. The importance of exposed roof beams in roost selection indicates that beams provide essential refuge

immediately after being disturbed. Whilst roosts are situated more so on brick walls, this feature was also associated with landscape features, therefore its importance in roost selection is less clear. These results are indicative that *T. mauritianus* selects roosts at both the building and landscape level. The selectivity of *T. mauritianus* in relation to its roost sites implies that preferred roosts are a limited resource, and as such, conservation actions should focus on protecting roost sites and the woodland bats rely on.

Name: Karen Shevlin
Organisation: Conservation Research Africa (CRA), African Bat Conservation (ABC)
Email: Karen@africanbatconservation.org
Biography: Karen holds a BSc (Hons) in Environmental and Ecological Sciences and an MSc with Distinction in Biodiversity and Conservation from Trinity College, Dublin. She carried out her BSc and MSc theses on insect ecology, conservation and biocontrol in Ireland. Since graduating, she has worked as a research entomologist for Maynooth University, University College Dublin, and Trinity College Dublin. She has also worked on biodiversity and conservation policy for the National Trust in Ireland, and in education and outreach for the Irish Wildlife Trust. In Africa, Karen conducted insect surveys of Lapalala and Welgevonden Game Reserves in South Africa. She then went on to work as a lecturer in entomology and surveying techniques in Balule Game Reserve in the Kruger National Park, South Africa, as well as conducting her own independent research into the diversity of insects in farmland in southern Uganda. Karen is the Projects Manager for African Bat Conservation based in Malawi, leading on all the ABC special research and outreach programmes including coordinating Operation Wallacea and Biosphere Expeditions and University Field Courses. Karen is also the ABC entomologist for the project coordnating research on the conservation and ecology of the insects of Malawi.
Abstract: *Bats in the back yard – importance of urban gardens for bat diversity and abundance in Malawi.*

We compared bat species diversity and abundance in two urban habitats in Lilongwe city, Malawi. We predicted that riverine habitats would contain higher bat diversity and richness than gardens. Standardised bat trapping surveys were conducted using mist nets and harp traps over two seasons (hot dry and wet). Vegetation surveys were conducted in 10x50m plots at each survey site to assess vegetation structural characteristics (including foliage height diversity and species diversity). Riverine ecosystem quality and macroinvertebrate diversity was assessed at ten sites according to Raven *et al*. 1998 and Lowe *et al*. 2013. Repeated Measures Generalised Mixed Models with site as a random effect were used to investigate the relationship between habitat and environmental variables and bat species richness and relative abundance ages in R version 3.3.1. A mean of 2.6 species (SD = 1.5, n = 48 surveys) captured per survey, in 13 species with a total of 426 bats captured (mean = 8 bats/survey, SD = 7.1, n = 48 surveys) across habitats and seasons. There was no significant difference in the numbers of bats caught between habitats (SE = 1.9, P = 0.704). Significantly more bats were trapped during the wet season than the dry season (Est. = 0.52, SE = 0.34, n = 48, P = 0.02). There was no significant difference in the bat species diversity between habitats and seasons. Garden habitats are not significantly different from riverine habitat in terms of both bat diversity and abundance. This highlights the importance of wooded garden habitats in Lilongwe in supporting urban bat biodiversity.

Name: **William O Mgoola**
Organisation: Assistant Director (Research and Development)
Department of National Parks and Wildlife
Contact Email: wmgoola@yahoo.co.uk
Biography: William Mgoola is the Head of Research in the Department of National Parks and Wildlife with more than 20 years of experience in wildlife conservation and management. He provides oversight,

facilitates coordination and implementation of biodiversity conservation and research projects in protected areas including promoting collaboration with internal and external researchers, research institutions and universities in biodiversity research projects. He was also once a Winner of a Rufford small grant under the Whitley Award Scheme for International Nature Conservation administered by the Royal Geographical Society for Clawless Otter (*Aonxy capensis*) conservation study in Nyika National Park and Vwaza Marsh Wildlife Reserve, Northern Malawi.

He is the Scientific Focal Point for the Convention in International Trade of Endangered Species of Wild Fauna and Flora (CITES), and National Focal Point for the Ramsar Convention on Wetlands to which Malawi is a Party. For the past five years, William has been involved in Shire River Basin Management Program (SRBMP) that has just been concluded which focused on strengthening the management of the remaining natural habitat blocks in the Shire Basin and protected areas that included Liwonde National Park, Lengwe National Park, and Elephant Marsh to protect and enhance the delivery of environmental services such as catchment protection, flood attenuation, and biodiversity conservation. The Elephant Marsh wetland was designated as a Wetland of International Importance (Ramsar Site) in 2017, as Malawi's second Ramsar Site. He is also currently coordinating the natural resources management component of the Global Environmental Facility (GEF) funded program under the Shire Valley Transformation Program (SVTP 2018-2023) to strengthen the management of protected areas in the Lower Shire Valley. William holds a Master of Science in Environmental Science from the University of Malawi.

Abstract: *An assessment of the biological impact of traditional bird hunting: The case of Lake Chilwa Wetland.*

A bird hunting study was carried out between October 2005 and July 2006 in Lake Chilwa wetland, Southern Malawi, to gain better knowledge and understanding of bird hunting, and assess the biological impact of bird hunting on bird population. A combination of four data collection techniques was used; semi-structured questionnaire interviews, focus group discussions, key informant interviews, bird counts and personal observations in three study sites. Data from semi-structured questionnaire was analyzed using Statistical Package for Social Science (SPSS) software. Pearson's Chi-Square analysis was used to test for statistical significance between and among variables. Analysis of Variance (ANOVA) was applied to test the difference in bird catches between the different hunting methods. Z test was used to test for statistical differences in catch per unit efforts, number of traps and hunting time at present and the past ten years. T test was used to compare relative abundances of birds.

The assessment of the biological impact of the different hunting methods on bird population revealed a decline in bird catches in terms of catch per unit efforts between the present time and the past ten years. Bird catches and species composition varied according to hunting method. There was a significant difference in bird catches between the different hunting methods (ANOVA: df = 141; F = 13.892; $p < 0.001$). An estimated 1 335 367 birds were harvested per year for livelihood through various hunting methods of which 1 106 566 comprised mostly of Queleas (*Quelea spp*), Bishops (*Euplectes spp*) and Weavers (*Ploceus spp*). A total of 228 801 waterbirds hunted composed mainly of Common Moorhen (*Gallinula chloropus*), Purple Gallinule (*Porphyrio madagascariensis*), Lesser Gallinule (*Porphyrio alleni*) and Black Crake (*Amaurornis flavirostris*).

The abundance of birds was high in areas not easily accessible for bird hunting compared to areas where hunting was regular and easily accessible. Pearson Chi-square analysis showed a strong association between areas not easily accessible and abundance of birds (($\chi^2 = 65.00$; df = 3; $p < 0.001$). There was a significant difference in the amount of time hunters invested in bird hunting at present and the past 10 years (Z test: $z = 3.108$; $p < 0.001$). The increase in the number of traps a hunter sets per day at present compared to the past 10 years was significant (Z test: $z = 2.061$; $p = 0.04$). The use of indiscriminate hunting methods places enormous pressure on bird species.

The study recommends the strengthening of local institutional capacity for the conservation and protection of birds, development of bird management plan for the wetland, and sensitization and awareness campaigns to ensure sustainable bird hunting. Further research on the ecology, breeding and population dynamics of the target waterbirds is required in order to formulate appropriate utilization and conservation measures.

Name: Nantenaina Tahiry Andriamalala
Organisation: Madagascar PHE Network
Email: antenaina@phemadagascar.org
Biography: ANDRIAMALALA Nantenaina, works for the Madagascar PHE Network since 2015, and is currently taking the role of the national coordinator of the network. He is an environmentalist from the University of Antananarivo, Madagascar, and from his previous works, Nantenaina has experiences in environmental education, conservation projects, and in monitoring and evaluation of development program.
Abstract: *Supporting uptake of cross-sector health-environment partnerships through a national learning network: experiences from Madagascar.*
Isolated communities living in Madagascar's priority biodiversity conservation areas often lack access to health services - almost 1 in 5 women report unmet family planning needs. Their ability to engage in sustainable natural resource management and livelihood diversification is restricted by poor health and unmet family planning needs. Population-Health-Environment (PHE) is a tested, developed and promoted holistic approach to sustainable development: reflecting the connections between people, their health and the environment. Cross-sector partnerships between community health service providers and marine conservation organisations can leverage the community relations and operational infrastructure of environmental organisations, who tend to work in more remote locations, to extend the reach of health service providers and improve community health. The Madagascar PHE Network was established in 2014 to bring together health and environmental organisations across the country. PHE network activities, including coordination meetings, training workshops, learning exchanges and tailored mentoring, are evaluated through feedback from PHE network members and review of the uptake of PHE partnerships. Basic data are collected on all active PHE partnerships: names of villages served / engaged, total number of people in these zones, types of health services delivered and natural resource management initiatives supported, number and types of contraceptives distributed. Community testimonies and lessons learned are also shared. When the PHE network was created (2014), there were just 3 active PHE partnerships reaching around 40,000 people with improved access to health services as a result of integrated health-environment programmes or partnerships. By the end of 2018, there were 15 active PHE partnerships reaching more than 200,000 people, with a further 20 PHE partnerships in development. These partnerships can enhance community-based biodiversity conservation efforts by enabling couples to space or limit their births, diversify their livelihoods, and give women more time to engage in natural resource management.

Name: **Felemont Banda**
Organisation: University of Malawi-Polytechnic
Contact Email: fbanda@poly.ac.mw
Biography: Felemont Banda Holds an MSc in Geo-Information Science and Earth Observation, Bachelor of Science, Bachelor of Laws (LLB-Hons) and Diploma in Education. He is a lecturer in Urban Development Planning with Land Surveying and Physical Planning Dept. at the University of Malawi-Polytechnic. His area of research interest is Environmental Planning, Conservation and Climate Change Adaptation Planning. He is a 2016 recipient of Rufford Small Grant and also a recipient of 2013 World Wide Fund Education for Nature scholarship.
Abstract: *Effects Of Community Livelihood Adaptation Strategies on Wetland Habitat Conservation and Future Community Resilience.*

The purpose of the study was to understand the impact of community adaptation strategies on the conservation of Lake Chilwa wetland environment. The study was thus conceptualised in the context of communities who engage in unsustainable modes of livelihoods which not only threaten their future livelihoods but also threaten the integrity of Lake Chilwa environmental conservation. This study combined observation conducted over several years and face to face interviews with purposively selected respondents. For purposes of triangulation, this data was further supplemented with focus group interviews. Recorded data was transcribed and coded for thematic analysis. Results show that, over the decades, livelihood practices have undergone transformation to suit the changing climatic conditions in the Lake Chilwa wetland region. Majority of changes which have occurred to livelihood practices at a household level cumulatively weaken communities' future resilience, increase their vulnerability and compromises their adaptive capacity because they are maladaptive in nature. Much as the livelihood adaptation strategies have improved some individual household's short term economic position, the cumulative effects of such adjustments or introduction of new livelihoods on the community as a whole is not beneficial judging by the potential negative effects which such adaptation measures pose to the wetland habitat conservation and future community resilience. The relevance of this study to conservation is that findings have revealed that there is need for policy makers to put in place a livelihood practices monitoring mechanism for communities in biodiversity rich sensitive environments. This approach coupled with community conservation education would ensure that communities do not adopt maladaptive strategies which are detrimental to the biodiversity of the area.

Name: Amos Ronald Kasukulu

Organisation: School of Sciences, Nkumba University, Uganda

Email: kalronie@yahoo.co.uk

Biography:

Abstract: *Potential Behavioral and Societal Responses to Human Health Risks Resulting from Climate Change in Kawaala, Kampala Suburb of Uganda.*

Climate change poses greater human health risks associated with its impacts, bringing urban and peri-urban populations in great disarray. The study investigated (a) the relationship between climate change impacts and the human health risks, (b) gender aspects associated with human health risks, (c) the survival tactics and response mechanisms to human health risks resulting from climate change impacts. It targeted a population of 1500 residents of Kawaala and randomly selected 234 respondents. The findings show that there is a significant relationship between climate change impacts, and human health risks, with P = 0.023, which is [P< 0.05)]. Erratic heavy rains posed more human health risks [Mean = 1.500, SD .50107] accompanied by prolonged dry spells [Mean = 1.4316, SD = .49636] followed by floods [Mean = 1.1368, SD = .34432] which had serious effects on children, women and the elderly. These result into building wooden bridges and using flying toilets while respondents preferred to stay indoors during flooding as opposed to moving to higher grounds immediately. Significant variations existed between residents who preferred staying out of flood waters, avoiding driving through flooded areas, staying away from power lines and electrical wires and turning off electricity and gas during flooding. Climate change impacts were viewed as significant predictors for reduced availability of water for drinking, cooking and hygiene evidenced by the (R square = .618, adjusted R, = .792, F= 62.386) while rising temperatures increased the spread of malaria in some locations. A high regression value of 33.217 compared to the residual 19.700 was obtained meaning that climate change impacts explain at least 79% of the variation of the risk of water stress in the area.

Name: **Jester Kaunga-Nyirenda**

Organisation: Assistant Director (Extension & Environmental Education), Department of National Parks and Wildlife
Contact Email: jkaunganyirenda@gmail.com
Biography: Mr. Kaunga-Nyirenda is a natural resource management professional working with the DNPW since 1996. Holding many roles within the Department, he has managed multiple protected areas assuming various portfolios as Park manager and as Divisional Manager for several protected areas responsible for all research, law enforcement, environmental education, community based natural resources management and ecotourism management before assuming the post of Assistant Director earlier responsible for Research and Development and later for Education, Extension and Community Development. Mr. Kaunga-Nyirenda has also been instrumental in developing a number of project proposals for donor funding for DNPW and has managed a number of donor funded projects including the most recent World Bank/Global Environmental Facility (WB/GEF) funded Shire River Basin Management Project as Subcomponent Leader for Ecological Management Subcomponent. In this project, he assumed overall responsibility for the supervision of the Shire River basin-wide biodiversity surveys, the Elephant Marshes Wetlands' biodiversity, climate resilience and livelihoods studies and Nature-Based Tourism Studies for the Shire River Basin. In his current role, he is the Head and responsible for Wildlife Conservation Education, Extension and Community based natural resources management assuming overall responsibility for the management of the extension, environmental education and community development functions within the DNPW.
Abstract: *Community Outreach, Education and Awareness in Wildlife Conservation in Malawi.*

Name: **Chilungamo Phiri**
Organisation: Wala Foundation, Malawi
Contact Email: chilungamo2@gmail.com
Biography: Chilungamo Phiri works for the Wala Foundation, a local Malawian organization that deals with community engagement projects. Chilungamo is a business management graduate in 2013 and leads some Wala Foundation projects in communities as a grassroots NGO.
Abstract: *Conservation of Mchinji Forest Through Community Development.*
Wala Foundation are conserving 10 Hectares of forestry in Mchinji Malawi, by empowering the community to take care of the forest through honey farming. Fifty bee hives were given to the community, and members trained in how to take care of the trees. Marketing support was also given. As a result the forest is protected, and trees are not being cut down. The community are able to have addition source of income through bee keeping in the forest. The project has protected trees and wild animals.

Name: Wilson Damien Asibu
Organisation: Country Minders for Peoples Development, Malawi
Email: wilasibu@gmail.com
Biography: *Eye on Nature and The Environment: The Case of Phirilongwe Forest Reserve and Kabudila River*
Abstract: We've all heard the cliché, "a picture tells a thousand words", but there is real value in using images to influence positive action through advocacy and education more especially in nature conservation. Images help us learn, images grab attention, images explain tough concepts, and inspire. This is what are doing through Eye on Nature and The Environment in Malawi through The Natural Assets Protection Program so as to influence positive policy and practice in nature conservation in Malawi. We do evidence based advocacy through both still and motion pictures and stories from communities on endangered natural assets as well as best practices elsewhere on the same just as with the case of Phirilongwe Forest Reserve. Phirilongwe Forest Reserve is next to Phirilongwe and is located in Mangochi District, Southern Region, Malawi. Phirilongwe Forest Reserve has a length of 51.22 kilometres. There is colossal deforestation in this forest reserve for timber and charcoal. The authorities

said they didn't know about this because the encroachers were doing it at the middle of the reserve. Truckloads and truckloads of charcoal were being seen daily taken to major towns and cities. As a result other occupants of the forest of the animal and insect kingdom have likewise suffered. Beekeeping has gone down as well as a result.

But through our advocacy patrols in the reserve which stopped have resumed and laws are being enforced now to protect the reserve. We took also initiative to reverse the destructive course of nearby Kabudila River. Locals began farming right in the river and oftentimes diverted the river which subsequently led to water destroying crops. We conducted community education and awareness meetings on the dangers of farming in the river as well as diverting it. As I speak community by-laws have been developed and being enforced stopping people from farming in the river and diverting it.

In conclusion, as nature conservationists, let us use evidenced-based advocacy and education and much images in our work as much as possible. Images have potent power to communicate than words.

Name: Raymond Davis, and Dr Damon B. Lesmeister

O**rganisation:** US Forest Service, Pacific Northwest Research Station, Corvallis, OR, USA.

Email: damon.lesmeister@usda.gov

Biography: Dr. Damon Lesmeister is a research wildlife biologist with the Pacific Northwest Research Station, US Department of Agriculture Forest Service. He is stationed at the Forestry Science Laboratory in Corvallis, OR. Much of his current research focuses on conservation and management problems in the biology and ecology of threatened and endangered wildlife species associated with late-successional forests in the Pacific Northwest. His research directly or indirectly addresses questions related to interactions between avian and mammalian predators and their prey. He is particularly interested in long-term studies of demography, effects of disturbance, spatial ecology, resource selection, and linkages between predator and prey populations. For data collection on many of his projects, he uses non-invasive methods such as camera trapping, passive bioacoustics, scat collection, and sign surveys. Dr. Lesmeister is actively developing methods to rapidly and efficiently extract relevant ecological information from massive data collected using non-invasive methods. Current projects in the US include long-term demography of northern spotted owls; long-term abundance and survival of small mammals in an old-growth forest; food web dynamics in an old-growth forest; experimentally testing hypotheses of factors that limit red tree vole occupancy of young forest; ecology of small carnivores in an old-growth forest; testing autonomous recording units to detect rare forest owls; and mixed-severity wildfire effects on avian community dynamics, habitat, and prey.

Abstract: *Vegetation and Wildlife Monitoring of Nkhotakota Wildlife Reserve, Malawi*

African Parks (AP) assumed management of Nkhotakota Wildlife Reserve (NWR) in 2015 and have undertaken efforts to realize the ecological and economic promise of the reserve, including translocating extirpated species and installation of new infrastructure. With support from the US Agency for International Development in Malawi, the US Forest Service (USFS) and AP have partnered in technical cooperation since 2017. Long-term monitoring of wildlife and habitat is a central component of this partnership. Effective wildlife conservation and land management require an understanding of population trends for multiple co-occurring wildlife species as well as dynamics of land cover. As such, this partnership has focused on establishing programs for long-term monitoring remotely-sensed land

cover, ground-based vegetation, and wildlife populations. Considering NWR objectives and logistical constraints, USFS and AP designed a reserve-wide monitoring network comprised of 70 non-adjacent 5 km^2 hexagons, each includes three monitoring plots separated by 1.4 km (total of 210 plots). Habitat monitoring focuses on important predictors of wildlife use, including density, species, and size of trees. Wildlife monitoring relies on a network of camera traps (one at each plot) that provide an effective means of monitoring a wide range of medium- and large-bodied mammals. USFS and AP developed a land cover map using machine learning methods with classes for Afromontane forest, Miombo woodland (three density classes), agriculture and forest clearing, dambos, and exposed rocky features. USFS and AP have established 78 vegetation/camera trap plots in 26 hexagons since November 2018. Camera traps have effectively detected each of the species translocated by AP since 2015, as well as roan antelope (thought extirpated), African civet, bush baby, aardvark, honey badger, and blue monkey. Future plans include the completion of plot establishment by November 2019, as well as occupancy analyses to better understand wildlife distribution and use within NWR.

Conference Photographs

William Mgoola, Assistant Director of the Department of National Parks and Wildlife Malawi, giving the plenary talk.

Christine Coppinger

Joyce Lepetu giving her talk.

Delegates visited the Conservation Research Africa Research Centre.

Dr Stone giving delegates a tour of the CRA Research centre to explain the bat and biodiversity research programmes happening around the urban areas of Lilongwe.

Dr Webala, enjoying sharing bat knowledge and experiences of bat boxes.

Delegates enjoy a cultural evening with traditional Malawian dancers for the end of conference dinner.