

ORC 26

CONNECTING PEOPLE PLACES AND PLANET



15TH OPPENHEIMER
RESEARCH
CONFERENCE

RANDJESFONTEIN
CRICKET GROUND,
MIDRAND
7-9 OCTOBER 2026

An Ant-eating Chat acts as a sentinel by perching upright as it scans the Kalahari landscape at sunset.

Photo credit: Marcus Westberg

15th OPPENHEIMER RESEARCH CONFERENCE

7-9 October 2026

Randjesfontein Cricket Ground,
Midrand

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WELCOME NOTE

Since its inception in 2010 the Oppenheimer Research Conference (ORC) has grown to become an important event on the global academic calendar. Today it provides a unique showcase for research covering a wide variety of environmental and natural sciences fields.

This diversity is truly exceptional. Usually when one attends a conference it has a single focus or specialisation, such as ornithology, entomology or archaeology. However, it all happens here at this conference, facilitating interdisciplinary engagement among scientists from diverse fields.

The research presented here is innovative, fostering engagement and collaboration not only across disciplines but also across scales, from microscopic to landscape and global. In doing so, we are bringing African voices to global conversations on environment, conservation and sustainability.

It's not only about scientists talking to other scientists, either. We aim to create a sustainable, long-lasting movement for nature because we need to move beyond pure discussion into translating our findings to address global challenges and together providing the answers.

This year's theme, Connecting People, Places and Planet, recognises that people and nature cannot be considered in isolation. Progress depends on connecting scientific knowledge with lived experience and acknowledging the relationships between people, the places they inhabit and the natural systems that sustain them.

The 15th Oppenheimer Research Conference brings attention to research that strengthens our understanding of these connections and points towards practical responses in conservation, climate resilience and ecological restoration. Together, we will explore how science can inform better decisions for people and the planet, both now and for generations to come.

We are confident you will be inspired over the next three days by the various crosscutting presentations and posters, on topics such as tackling biodiversity loss, land management, human-wildlife interactions, climate change adaptation and wildlife economies, as we work together to catalyse groundbreaking research to help solve some of the most pressing challenges facing our planet today.

Thank you for joining us.

Nicky and Jonathan Oppenheimer

INTRODUCTION

The Oppenheimer Research Conference (ORC) brings together select individuals and organisations operating and interested in the fields of natural and environmental science. It offers a uniquely diverse and multi-disciplinary programme that takes the form of plenaries, presentations, posters and panel discussions.

The conference, hosted by Oppenheimer Generations Research and Conservation (OGRC), aims to contribute to the conservation of ecosystems, biodiversity and heritage by creating an inclusive and encouraging platform for quality presentations, discussions, networking and collaboration.

Since its inception in 2010, the conference has grown into an event which we can proudly say is a highlight on the science calendar. This showcase of excellence offers delegates opportunities to learn and build networks and to encourage action based on solid research, which can provide solutions to mitigate environmental and conservation tipping points, focused on the following five areas:

Biodiversity loss – How can we mitigate biodiversity loss in Africa?

Landscape ecology – How do we prioritise ecosystem interventions in Africa? What gets used, protected and rehabilitated?

Climate change – How will climate change affect Africa, on land and along its coastline? What should be done to mitigate or adapt to the massive upheavals already well underway?

Wildlife economies – How do we grow inclusive economies that enable both the use and preservation of ecosystems for future generations?

Heritage – How can we take what we have learnt from the past to inform the future?

The ORC provides a platform to showcase Africa-led research and amplifies the voices of African scientists, helping to forge sustainable solutions across these five key areas, not only for Africa but for the world.

DAY 1: WEDNESDAY, 7 OCTOBER 2026

Session 1: Chair | Duncan MacFadyen

08:00 – 09:00	Registration / Networking / Refreshments
09:00 – 09:10	Welcome and Introduction Jonathan Oppenheimer
09:10 – 09:20	Keynote Address Nobel Peace Prize Winner – Global Climate Action Professor Guy Midgley
09:20 – 09:50	Is Earth's biodiversity really in peril? Plenary Stuart Pimm

09:50 – 10:20 **Morning tea**

Session 2: Chair | Rendani Nenguda

10:20 – 10:35	From cave to landscape: New insights into the depositional context, palaeoenvironment and behavioural significance of <i>Homo naledi</i> Results Presentation Tebogo Makhubela
10:35 – 11:05	An energy flow view of African terrestrial ecosystems Full Presentation Yadvinder Malhi
11:05 – 11:20	MUFASA: Mapping Unseen Fungi Across South Africa Results Presentation Cobus Visagie
11:20 – 11:35	An energetics-based decision-support tool for prey impact assessment for cheetah management Results Presentation Elizabeth Kennedy Overton
11:35 – 12:05	Medicinal plants of South Africa: Past, present and future perspectives Full Presentation Nox Makunga
12:05 – 12:20	Seasonal variation in activity budgets and ranging behaviour of <i>Indri indri</i> , in Mahatsara, Ihofa and Mantadia in the eastern part of Madagascar Results Presentation Rio Heriniaina
12:20 – 12:50	JWO Research Grant Recipient Award Presentation Jonathan Oppenheimer
12:50 – 13:00	Conference photo
13:00 – 14:00	Lunch

Session 3: Chair | Pumla Dlamini

- 14:00 – 14:30 Biodiversity Capacity as a scientifically robust metric for predicting and scaling biodiversity
Full Presentation **Andrew Davies**
- 14:30 – 14:45 Implications of ecological drivers on roan antelope populations in Mokala National Park, South Africa
Results Presentation **Nkabeng Mzileni**
- 14:45 – 15:00 Impact of invasive Rosaceae shrubs on bird and rodent diversity in montane grasslands
Results Presentation **Karabo Moloi**
- 15:00 – 15:15 More than a nest: Engineering communities in the Kalahari
Results Presentation **Robert Thomson**
- 15:15 – 15:30 Managing shared risks in South Africa's game meat sector: A One Health perspective from experts and value chain actors
Results Presentation **Lydia Bhebhe**

15:30 – 16:00 **Afternoon tea**

Session 4: Chair | Hayley Clements

- 16:00 – 17:00 Panel discussion – Unlocking investment and institutions for inclusive African wildlife economies

Facilitator:

Panel members:



Hayley Clements



Letlhogonolo Kamuti



Susan de Witt



Nabott Mbeeli



Khorommibi Matibe

17:00 – 18:00 **Break | A Taste of Africa – Cheers to Conservation!**

18:00 – 18:05 Film Introduction | **Kimberleigh Tommy**

18:05 – 19:05 **Special screening – *Pride of Samburu***

19:05 – 19:35 Questions and Discussion | **In Conversation with Shivani Bhalla and Peter Ndung'u**

20:00 Venue close

DAY 2: THURSDAY, 8 OCTOBER 2026

Session 1: Chair | Peter Makumbe

08:00 – 08:30	Registration / Networking / Refreshments
08:30 – 09:00	Transforming science into conservation action in the Congo Basin Plenary Lee White
09:00 – 09:40	Speed presentation session
09:00 – 09:05	Juvenile and mature species composition: Monitoring demographic bottlenecks in the Lowveld savanna Speed Presentation Belinda Mtetwa
09:05 – 09:10	Mapping baobab trees with machine learning and satellite imagery in the semi-arid savannas of Southern Africa Speed Presentation Chafika Phiri
09:10 – 09:15	Where, how and why: Unravelling black-backed jackal space use through movement and behaviour on Tswalu Kalahari Reserve Speed Presentation Geke Woudstra
09:15 – 09:20	Human-related land use shapes microplastic and phthalate accumulation in an African subterranean mammal Speed Presentation Erin Brooke
09:20 – 09:25	Evaluating the influence of <i>Seriphium plumosum</i> and grazing lawns on termite diversity and foraging Speed Presentation Khensani Masingi
09:25 – 09:30	The Wildlife Economy Investment Index: Turning conservation performance into financial power in Africa Speed Presentation Christian Adebambo
09:30 – 09:35	The potential of using road culverts for safe wildlife crossings along a provincial road in South Africa Speed Presentation Christoffel de Lange
09:35 – 09:40	Group Q&A Session

Poster session

09:40 – 11:00 **Morning tea and POSTER SESSION** on main auditorium deck

Session 2: Chair | Bailey Corder

- 11:00 – 11:15 Measuring rangeland performance relative to potential: Separating climate and management signals from space
Results Presentation **Andy Cunliffe**
- 11:15 – 11:45 Can elevated CO₂ help savanna trees escape the fire trap? Linking carbon gain to post-fire regrowth
Full Presentation **Edith Singini**
- 11:45 – 12:00 Uncharted waters: First insights into bottlenose wedgefish (*Rhynchobatus australiae*) movement ecology at a critical aggregation site in southern Mozambique
Results Presentation **Stephanie Venables**
- 12:00 – 12:30 Evidence-based conservation for functional outcomes
Full Presentation **Johan du Toit**
- 12:30 – 12:45 Managing rangelands for ecological functionality: How cattle grazing strategies shape plant and soil stoichiometric heterogeneity
Results Presentation **Zibanani Seletlo**
- 12:45 – 13:00 Fast fashion, global rivers and environmental recovery: Following a t-Shirt from Indonesia to Africa
Results Presentation **Lee Baumgartner**

13:00 – 14:00 **Lunch**

Session 3: Chair | Wendy Panaino

- 14:00 – 14:15 Over a decade of observation: Building long-term ecological baselines in the Greater Dyer Island marine ecosystem
Results Presentation **Loraine Shuttleworth**
- 14:15 – 14:30 Harmony with wildlife – encouraging wildlife within rural African communities
Results Presentation **Janiel Padayachy**
- 14:30 – 15:00 Silent passengers: Exploring the hidden infections in Afrotropical birds
Full Presentation **Mduduzi Ndlovu**

15:00 – 15:15	Progress in mapping and monitoring South African wetland biodiversity using earth observation Results Presentation Laven Naidoo
15:15 – 15:30	Sticking your neck out for giraffe – an emerging conservation success story across the continent Results Presentation Julian Fennessy

15:30 – 16:00 **Afternoon tea**

Session 4: Chair | Kimberleigh Tommy

16:00 – 17:00	Panel discussion – Beyond the lens: Reclaiming Africa’s conservation narrative
Facilitator:	Panel members:



Kimberleigh
Tommy



Nancy Iraba



Noel Kok



Manu Akatsa



Nyancho NwaNri

17:20 – 18:00 **CELEBRATING THE LEGACY | JWO RESEARCH GRANT**
Hayley Clements, Bernard Coetzee and 2026 Recipient

18:00 **Cocktail function**

DAY 3: FRIDAY, 9 OCTOBER 2026

Session 1: Chair | André Tranquillini

- 08:00 – 08:30 Registration / Networking / Refreshments
- 08:30 – 09:00 Socio-ecology of African woodlands: Pathways to sustainable management
Plenary **Natasha Ribeiro**
- 09:00 – 09:15 Seasonal long-distance movement of male African elephants within the protected environments of Northwest Zimbabwe
Results Presentation **Peter Makumbe**
- 09:15 – 09:45 Why grassland restoration practices should include forbs
Full Presentation **Frances Siebert**
- 09:45 – 10:00 Patterns of biotic diversity in Madagascar and the continued wonders of species discovery
Results Presentation **Steve Goodman**
- 10:00 – 10:15 Representing African landscapes in land surface models: Leveraging pan-African networks of data
Results Presentation **Enimhien Akhabue**
- 10:15 – 10:30 Fish for the future – development of a strategy to mitigate the impacts of climate change on fish populations
Results Presentation **Warren Potts**

10:30 – 10:40 JWO Research Grant 2025 Snapshot

The AQUA-STR project: Investigating trophic tipping points in African freshwater ecosystems under climate and invasion stress
2025 JWO Research Grant Recipient **Nompumelelo Baso**

10:40 – 11:10 Morning tea

Session 2: Chair | Max Makuvise

- 11:10 – 11:25 From illicit to investable: Trade intelligence and the future of wildlife economies in Africa
Results Presentation **David Newton**

11:25 – 11:40	A decade-long analysis of waterbird diversity and population dynamics at Biri Dam, Zimbabwe (2014-2023) Results Presentation Tawanda Tarakini
11:40 – 11:55	Maloti-Drakensberg mountain range temporary ponds: A source of incredible aquatic biodiversity Results Presentation Samuel Motitsoe
11:55 – 12:25	Protected areas and wildlife conservation in West and Central Africa: Lessons learned, emerging challenges and leadership Full Presentation Etotépé Sogbohossou
12:25 – 12:40	Translational conservation genetics research in South Africa Results Presentation Paulette Bloomer
12:40 – 12:55	Safeguarding Southern Africa's east-flowing rivers – a global freshwater biodiversity hotspot Results Presentation Gordon O'Brien
12:55 – 13:25	Protecting South African ecosystems through the biological control of invasive pines and wattles Full Presentation Grant Martin and Kim Canavan
13:25 – 13:40	The Natal Parks Board – A conservation adventure Results Presentation George Hughes
13:40 – 13:50	Your turn to talk ORC feedback session
13:50 – 14:05	Conference awards and close Nicky Oppenheimer

14:05 – 15:00	Lunch
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POSTER SESSION SCHEDULE

Please see pages 55-105 for the poster abstracts

Adriaana Jacobs , Eduard Venter and Lindokuhle Masimula	High-throughput sequencing analyses of soil fungal communities in South African farming systems
Alan Nare , Guy Lomax, Andrew Cunliffe, Tapiwa Gumbo and Peter Makumbe	Attributing woody encroachment in savannas using machine learning-calibrated Earth observation and process-based models
Alexis Watson , Emily Bennitt, Julien Fattebert, Stephanie Kong and Jan Venter	Thirst reshapes vigilance in plains zebra (<i>Equus quagga</i>) near water in a semi-arid system
Angelica Kaiser-Reichel , An Vi Vu, Gordon O'Brien, Annelize Erasmus and Lee Baumgartner	Flow or fail: Why fish movement matters in the Limpopo Basin
Annelize van der Merwe , Gordon O'Brien and Lee Baumgartner	Against the current, toward African anguillid eel recovery
Aphile Shosha , Carel Oosthuizen, Andrea Webster and André Ganswindt	Genetic species identification, sex determination and DNA degradation from non-invasive sampling for serval (<i>Leptailurus serval</i>) and caracal (<i>Caracal caracal</i>)
Aphiwe Mtolo and Caswell Munyai	Honeydew-mediated multitrophic interactions in fruit agroecosystems: Ecological implications for integrated pest management
April Reed and Gordon O'Brien	Advancing biodiversity conservation in the Limpopo River Basin through regional-scale ecological risk assessment
Asher Moodley , Beulah Pretorius and Carel Oosthuizen	The uncanned truth: Species identification in pilchard brands for sustainable fishery management
Ayanda Mogalekwena , Carel Oosthuizen and Elizabeth Le Roux	The effects of different landscape management strategies on the genetic structure and reproduction strategy of <i>Cynodon dactylon</i>
Bendré Kuperus , Pieter Malan, Christiaan Harmse and Klaus Kellner	Assessing the impact of bush control methods on vegetation in <i>Rhigozum trichotomum</i> -encroached areas at Tswalu Kalahari Reserve, Northern Cape province
Bharti Arora , Els Vermeulen, Logan Pallin, Alejandro Apolo Fernández Ajó, Camila Muñoz Moreda, Marina Ponzio, Emma Carroll and André Ganswindt	From blubber to biomarkers: Standardising blubber hormone extraction for baleen whale endocrine assessment of reproductive function and physiological stress
Bhekinkosi Sibanda , Josephine Mundava and Tawanda Tarakini	Population status, ecology and conservation challenges of cattle egrets (<i>Bubulcus ibis</i>), especially in the Southern Africa subregion: A systematic review and evidence synthesis

Bradley Matainz , Sally Maxwell, Lee Baumgartner, Wynand Malherbe and Gordon O'Brien	Multiple lines of evidence using aquatic macroinvertebrates towards the sustainable management of stressors in the Limpopo River Basin, Southern Africa
Bruce Crossey , André Ganswindt and Elizabeth Pienaar	Beyond the Big Five: How species preferences, risk perceptions and tourist profiles shape the likelihood of engagement in wildlife viewing activities
Buhlebenkosi Ngwenya , Buhlebenkosi Ngwenya, Hilton Ndagurwa, Anna Mabidi, Mlungu Nsikani, Angella Chichinye, Josephine Mundava and Nomagugu Ndlovu	Ecology, host plant selection and distribution of bagworms (<i>Lepidoptera psychidae</i>) in a semi-arid region in Zimbabwe: Implications for livestock mortality
Carol Munro , Pfananani Ramulifho and Leslie Brown	Macroinvertebrates as indicators of stream health in Telperion Nature Reserve, Mpumalanga, South Africa
Charlotte Moss , Heath Beckett, Kerry-Anne Grey and Guy Midgley	The interacting effects of warming, decreased rainfall and herbivory on the emergence of <i>Vachellia erioloba</i>
Charlotte Stafford and Mark Keith	Effects of bush clearing on vegetation condition and mammal activity in the Waterberg
Choolwe Luwamya	Economic analysis of legal game meat value chain in Zambia
Christiaan Harmse , Adriaan van Niekerk and Klaus Kellner	Earth observation for grazing management in the Karoo rangelands
Christina Meiring , Anja Le Grange, Jeanne Korsman, Patricia Swart and Shane Murray	IKSA – decoding South Africa's biodiversity
Christopher Garrett , Kiara Haylock, Jason Marshal and Francesca Parrini	Machine learning for habitat selection: A simulation study
Danisile Tembe , Sanelisiwe Mazibuko, Pulane Malatji and Samson Mukaratirwa	Flea and tick infection in free-range chickens in selected rural communities of South Africa
Darragh Hare , Lydia Amanzi, Abraham Eustace, Lucas Letiro, Yolanda Mutinhima, Betty Rono, Kedi Selume, Trisha Bhujle, Daisy Johnston, Emily Madsen, Lessah Mandoloma, Victoria Mkessa, Jessica Tacey, Amy Dickman, Gasto Lyakurwa and Lovemore Sibanda	Morally contested conservation: Preparing for 2030
Denis Kalombo and Kerry Slater	Comparative study of chacma baboon competition in the bankenveld habitat and bushveld habitat
Dilys Roe and Gail Thomson	Fair shares from the wild: What constitutes a fair deal for communities in the African wildlife economy?

Dumisani Khosa , Esi Bossman, Angelica Kaiser-Reichel, Annelize Erasmus, Nikisha Singh, Mmathapelo Mthembu, Robin Petersen, Nesisa Nyathi, Vongani Ngoben, Jacques Venter, Pule Mpopetsi, Tatenda Dalu, Gordon O'Brien, Eddie Riddell and Josie South	From policy to practice – reviewing the effectiveness of a decade of environmental flow implementation in the transboundary rivers of the Kruger National Park, South Africa
Elanie Snyman , André Ganswindt, Andrea Webster and Bharti Arora	Assessment of faecal glucocorticoid and thyroid metabolite patterns as indicators of physiological well-being during rehabilitation in Temminck's pangolin (<i>Smutsia temminckii</i>)
Elena Mariotti , Susan Cunningham and Andrew McKechnie	Interacting landscapes of heat and fear: Drinking behaviour in Kalahari Desert birds
Estlien Hartman , Anna Jolles, Brianna Beechler, Lin-Mari de Klerk-Lorist, Andrea Fuller	Boma-habituated African buffalo exhibit capture-induced hypothermia
Evans Nsende and Dian Spear	Assessing the effectiveness of community-based natural resource governance and benefit-sharing mechanisms in Mulobezi Game Management Area
Francesca Parrini and Tumelo Nhlapo	Pullen Nature Reserve Field Station: Establishing a long-term biodiversity research and monitoring platform in Mpumalanga's savanna biome
Hanna Loubser , Julien Fattebert and Jan Venter	Environmental and anthropogenic drivers of second-order habitat selection in lion prides of Kruger National Park
Heather Woollon , Kerrin Allan and Michael Mole	Beyond the sighting: A centralised approach to biodiversity monitoring and habitat management across conservation landscapes
Isaac Mureithi , Andrew Cunliffe, Kimberley Hockings, Tom Powell, Philip Muruthi and Peter Tyrrell	Relative Productivity Index reveals contrasting rangeland condition trajectories across governance types in southern Kenya
Jeremy van der Riet , Hayley Clements, Brian Child, Susan de Witt and Alex Chidakel	Resilience in practice: Wildlife, livestock and mixed enterprises on Namibian freehold land – who weathers the drought?
Jessica Tacey , Darragh Hare, Morgan Hauptfleisch and Lovemore Sibanda	The acceptability of human-elephant conflict management in north-western Namibia
Jonathan Birch , Pieter Malan, Christiaan Harmse and Klaus Kellner	Assessing the impact of bush control methods on vegetation and soil in <i>Senegalia mellifera</i> -encroached areas at Tswalu Kalahari Reserve, Northern Cape
Jonathan Leeming	An identification and first response guide to scorpions of the Lowveld
Josephine Maringa , Leeroy Moyo, Benhildah Antonio, Bhekinkosi Sibanda and Fadzai Matsvimbo	Vultures of Shangani

Juanita Wessels , Ryno Kemp, Marc Freeman, Bianca Coulson, Kerri Wolter and Andrew McKechnie	Non-evaporative heat dissipation across the beak and unfeathered skin in Old World vultures
Juri Filonzi , Kimberley Madikiza and Emmanuel Do Linh San	Kalahari Airbnb: Use and selection of sociable weaver (<i>Philetairus socius</i>) nests as nocturnal resting sites by the slender mongoose (<i>Galerella sanguinea</i>)
Karabelo Moloantoa , Ademola Olaniran and Ndivhuwo Mudau	Evaluation and assessment of indigenous bacterial consortia from industrial wastewater for metal recovery and valorisation
Karin Lourens	From data to survival: Applying clinical baselines to improve the rehabilitation of Temminck's pangolins (<i>Smutsia temminckii</i>)
Karla Janse van Rensburg and Louis Du Preez	Reproductive strategies of the Kloof frog (<i>Natalobatrachus bonebergi</i>) at Crowned Eagle Estate, KwaZulu-Natal, South Africa
Kathryn Williams and Andrea Schnetler-Niddrie	Mobi-kraal: Designing an effective tool for human-predator coexistence in agricultural landscapes
Kelsey Smit , Olivia Sievert and Marna Smit	Managing predators in fragments: Adaptive metapopulation modelling reveals how conservation harvest can support cheetah persistence in fenced landscapes
Kiyana Rehnema , Andrea Fuller and Ashleigh Donaldson	Climatic drivers of lion movement and home range patterns in the Kruger National Park
Lauren Harrington , Amy Dickman and Dilys Roe	A research framework for incorporating animal welfare into conservation practice
Laurene van Dijk , Andrea Webster, Carel Oosthuizen and André Ganswindt	Non-invasive assessment of adrenocortical function and diet of black-backed jackal (<i>Lupulella mesomelas</i>) living in different predator guild settings
Lily Munzhedzi , Tshepiso Mangani, Gianni Bellocchi, Simon Taugourdeau and Leslie Brown	Modelling grassland responses to management and rainfall variability using ModVege-CoSMo in a South African savanna grassland
Lizanne Roxburgh	Beyond paper parks: Optimising protected area expansion in the age of renewable energy
Llewellyn Foxcroft and Khensani Nkuna	Invasive alien species in Kruger National Park: An assessment of 100 years of inventories, science and management
Locadia Dzingwena , Virginie Rougeron, Franck Prugnolle and Elise Huchard	Human shield or landscape of fear? Spatial gradients of vigilance and activity allocation in chacma baboon populations across anthropogenic landscapes
Lovemore Sibanda , Amy Dickman, Jessica Tacey, Lessah Mandoloma, Yolanda Mutinhima, Emily Madsen, Betty Rono, Trisha Bhujle, Salum Kulunge, David Kimaili, Gasto Lyakurwa and Darragh Hare	Acceptability of conservation law enforcement in sub-Saharan Africa depends on what rangers do, where and why

Luyanda Hlamaphi , Matthew Burnett and Caswell Munyai	Response of freshwater macroinvertebrates to anthropogenic disturbances and seasonal change in the upper catchment of the uMngeni River, South Africa
Marcel Kruger , Wynand Malherbe, Annelize Erasmus, Angelica Kaiser-Reichel, Victor Wepener and Gordon O'Brien	Patterns, pressures and prospects: Native fish conservation in the Limpopo Basin
Marvelous Ngonyama and Sivu Situngu	Thermal gradients without functional shifts: Decoupled microbial responses to fire intensity in savanna soils
Mattheus Louw , Andrea Webster and André Ganswindt	Assessing how interactions between free-roaming African elephants, plains zebra and cattle affect animal welfare
Maxine Gaines , Haemish Melville and Kerry Slater	The use of camera traps and sign surveys to investigate a predator assemblage and its response to carcasses in a grassland biome on Telperion Nature Reserve, Mpumalanga, South Africa
Megan Roberts , Haemish Melville and Kerry Slater	Aardwolf ecology in a mesic grassland ecosystem
Micaela Venter , Michael Somers, Mark Keith, Carel Oosthuizen and Jan Venter	Scats vs sightings: Contrasting methods of diet assessment of the Waterberg wild dogs
Miles Muller , Leith Meyer, Andrea Fuller, Peter Bus, Brianna Beechler, Anna Jolles and Vanessa Ezenwa	Physiological strain and muscle damage in African buffalo following capture
Minette Van Wyk and Els Vermeulen	Temporal changes in coastal distribution of southern right whales (<i>Eubalaena australis</i>) in South African calving grounds
Nasiphi Bitani , David Ehlers Smith and Colleen Downs	Microhabitat composition or structure? Bird species taxonomic and functional diversity in protected grasslands along an elevation gradient
Natasha Molefe , Bharti Arora, Valeska von Mitzlaff, Friederike Pohlin and André Ganswindt	Behind the boma: Assessing physiological stress in temporarily managed white rhinoceros
Nicholaus Huchzermeyer , Gordon O'Brien and Robyn Watts	Consequences of altered flows and sediment dynamics on geomorphic processes and physical fish habitats in the Limpopo River floodplain
Nico Avenant , Marinda Avenant and Duncan MacFadyen	Small mammals as indicators of habitat integrity, disturbance and ecological condition on Tswalu Kalahari Reserve
Nkanyezi Radebe , Zabentungwa Hlongwane, Caswell Munyai, Muthulisi Siwela and Thandeka Khoza	Traditional fermentation methods and their role in food preservation and nutritional composition changes in cereal-based food in Africa: A systematic review
Nomagugu Ndlovu , Angella Chichinye, Josephine Mundava, Hilton Ndagurwa, Anna Mabidi, Mlungele Nsikani and Buhlebenkosi Ngwenya	Local ecological knowledge as a diagnostic framework for plant and insect toxicosis as drivers of livestock mortality in semi-arid Southern African rangelands

Norman Owen-Smith , Jan Venter and Jeremy Anderson	How should Madikwe's elephants be managed?
Nosipho Mlotshwa and Daniel Parker	Temporal activity and overlap between sympatric jackals in a mixed-use landscape at Shangani Holistic Ranch in central Zimbabwe
Nqobile Motsomane and Anathi Magadlela	Soil beneath the grass: <i>Eragrostis curvula</i> cultivars reduce metal contamination and improve soil health
Nthabiseng Mathikge	Understanding the role of specialised mouth parts in the selective feeding of dung beetles (Coleoptera: Scarabaeinae)
Pabalelo Phori , Sarah Venter and Lourens Swanepoel	Assessing the pollination success of African baobab (<i>Adansonia digitata</i> L.) flowers by day-flying insect visitors
Paula Pebsworth , Daan Lichtenberg, Mark Keith and Lourens Swanepoel	Connecting the past and present: Fifty years of change in chacma baboon and human populations
Percy Moyo , Haemish Melville, Emmanuel Do Linh San and Courtney Marneweck	Spatio-temporal ecology of the yellow mongoose (<i>Cynictis penicillata</i>) in the Rand Highveld Grassland
Phiwase Khoza , Jason Marshal and Francesca Parrini	Niche overlap or competitive exclusion? Investigating bushbuck and nyala co-occurrence at Pullen Nature Reserve
Pippa Huchzermeyer and Lara Jordan	Why have wattled cranes left? Unravelling the drivers of wetland abandonment in the Mpumalanga highlands
Rasekuwane Mosia , Andrea Fuller and Ashleigh Donaldson	Tracking the transition: The ecology of resident and released Temminck's pangolins in the Kalahari
Rigardt Hoffman	Linking national abundance patterns, spatial ecology and genetics to guide southern giraffe conservation in South Africa
Rumbidzai Mahachi , Josephine Mundava and Peter Makumbe	Effects of bush encroachment intensity on bird species diversity and composition along a landscape gradient in Shangani Holistic
Sandile Mazibuko , Justice Muvengwi and Alfred Maroyi	Comparative study on the ethnobotanical usage of medicinal plants by traditional healers at Jozini and Nongoma local municipalities in KwaZulu-Natal
Sindiswa Zondo , Zabentungwa Hlongwane, Caswell Munyai, Muthulisi Siwela, Rob Slotow, Laurencia Govender and Thandeka Khoza	Lactic fermentation of maize and sorghum mahewu fortified with edible insects as a food safety strategy
Snothile Madikizela , Zabentungwa Hlongwane, Caswell Munyai and Muthulisi Siwela	Fortification of cereal-grain food products with edible insects: Implications for food and nutrition security – a systematic review
Su-Ane Greyling and Letitia Pillay	Synergistic soil repair: Nano-and organic-enhanced phytoremediation
Swayde Lessing , Andrea Webster, Carel Oosthuizen and André Ganswindt	Non-invasive steroid hormone analysis to assess welfare in captive serval (<i>Leptailurus serval</i>) and caracal (<i>Caracal caracal</i>)

Tania Anderson , Annemarie van Heerden and Timm Hoffman	A decade of long-term vegetation monitoring at Tswalu Kalahari Reserve
Tapiwa Gumbo , Andrew Cunliffe, Sally Archibald, Ilya Maclean, Allan Sebata and Tom Powell	Managing bush encroachment on a holistically managed rangeland in a semi-arid African savanna
Terèze Viljoen , Robert Guldemon and Bernard Coetzee	The movement ecology of elephants in the Malawi-Zambia Transfrontier Conservation Area
Thilivhali Rasimphi , Sophie Mulaudzi and David Tinarwo	Integrating renewable energy to mitigate biodiversity loss in sustainable rural landscapes
Tim Forssman and Justine van Heerden	Beyond the museum: Bringing heritage to people
Tshoanelo Miya , Keneilwe Thekiso, Khethiwe Maphosa, Nomfundo Nkabi and Kuyurie Govender	Metabarcoding-based comparison of fish diversity in the uMkomaas Estuary from 2021 to 2025 under recurrent flood disturbance
Yolanda Mutinhima and Hayley Clements	Does the wildlife economy improve tolerance to African megafauna? A systematic review
Yolandi Ernst , Danielle Potocek and Ben Poulter	Livestock and methane in Africa: Towards reducing uncertainties in emission estimates
Yonela Maziko , Piet Monegi and Julius Tjelele	Impacts of <i>Lopholaena coriifolia</i> encroachment on grassland herbaceous layer and soil properties along a topographical gradient
Zelmari Moller , Kerry-Anne Grey, Guy Midgley and Heath Beckett	A functional trait perspective to woody plant encroachment in Tswalu Kalahari Reserve

ABSTRACTS AND BIOGRAPHIES

DAY 1: WEDNESDAY, 7 OCTOBER 2026

WELCOME: JONATHAN OPPENHEIMER, EXECUTIVE CHAIRMAN, OPPENHEIMER GENERATIONS

Jonathan Oppenheimer is a South African businessman, conservation philanthropist and social impact investor. He began his career at N M Rothschild & Sons, before moving to Anglo American and subsequently De Beers, where he held several senior management roles in Southern Africa and London over two decades. He completed his education at Harrow School, London and the University of Oxford, where he studied Politics, Philosophy and Economics. As Executive Chairman of Oppenheimer Generations, Jonathan is actively involved in all aspects of the family's private, commercial and thought leadership activities, including Oppenheimer Partners, Oppenheimer Generations Asia, Tswalu Kalahari Wildlife Reserve, Shangani Holistic and Oppenheimer Generations Research and Conservation. In January 2018, Jonathan joined the Board of Trustees of the Carnegie Endowment for International Peace (CEIP). CEIP is the oldest international affairs think tank in the United States and is committed to advancing the cause of peace through its global network of policy research centres.



KEYNOTE ADDRESS: PROFESSOR GUY MIDGLEY, DIRECTOR OF THE SCHOOL FOR CLIMATE STUDIES AT STELLENBOSCH UNIVERSITY

Prof Guy Midgley is Director of the School for Climate Studies, at Stellenbosch University. He focuses on climate change risks and solutions in social-ecological systems in Southern Africa. NRF A-rated, RSSA and German Humboldt Research Awardee, world's top 200 in climate change (Thomson Reuters, 2022). Multiple IPCC and IPBES lead authorships, leadership contributions to South Africa's Global Change Science Committee and national policy on climate change adaptation.

He has contributed to multiple international policy processes under the UNFCCC and the CBD since the early 2000s. He has served as co-ordinating/lead author for the Intergovernmental Panel on Climate Change 3rd, 4th, 5th, 6th assessments (between 2000 and 2021), for the Intergovernmental Platform on Biodiversity and Ecosystem Services' Global and Land Reports, the combined IPBES/IPCC report, and he co-chaired the 2009 CBD Climate Change and Biodiversity Technical Expert Report.



He chaired South Africa's Global Change Science Committee in the 1990s and 2000s, helping to grow its annual budget from R10 million to over R100 million. In his role as Chief Director, SANBI, he initiated and finalised the registration of SANBI as a National Implementing Entity for the Climate Change Adaptation Fund of the UNFCCC with an annual budget of over R 100 million, in 2014. In 2007 he was a member of the international team who shared the Nobel Peace Prize for producing the fourth global climate change assessment for the IPCC.

He currently conducts research into climate and global change impacts on ecosystems and species, working in a wide variety of Southern African ecosystems, and leads efforts by Stellenbosch University's School for Climate Studies and Centre for Invasion Biology to build multidisciplinary approaches to teaching, researching and communicating climate change issues. He has graduated many MSc and PhD students, with several of his students now occupying senior positions in SA government and national and international academic institutions and NGOs.

PLENARY: STUART PIMM, PROFESSOR OF CONSERVATION AT DUKE UNIVERSITY

Stuart Pimm is a world leader in the study of present-day extinctions and what can be done to prevent them. His research covers the reasons why species become extinct, how fast they do so, the global patterns of habitat loss and species extinction and, importantly, the management consequences of this research. Pimm received his BSc degree from Oxford University in 1971 and his PhD from New Mexico State University in 1974. Pimm is the author of over 350 scientific papers and five books. He is one of the most highly cited environmental scientists. Pimm wrote a highly acclaimed assessment of the human impact on the planet, *The World According to Pimm: a Scientist Audits the Earth*, in 2001. His commitment to the interface between science and policy has led to his testimony to both House and Senate Committees on the re-authorisation of the Endangered Species Act. He was worked and taught in Africa for nearly 30 years on elephants, most recently lions – through National Geographic's Big Cats Initiative – but always on topics that relate to the conservation of wildlife and the ecosystems on which they depend. Other research areas include the Everglades of Florida and tropical forests in South America, especially the Atlantic Coast forest of Brazil and the northern Andes – two of the world's "hotspots" for threatened species. His international honours include the Tyler Prize for Environmental Achievement (2010), the Dr A H Heineken Prize for Environmental Sciences from the Royal Netherlands Academy of Arts and Sciences (2006), the Society for Conservation Biology's Eward T LaRoe III Memorial Award (2006) and the Marsh Award for Conservation Biology (2004), from the Marsh Christian Trust (awarded by the Zoological Society of London). Sigma Xi, The Scientific Research Society, awarded him the William Proctor Prize for Scientific Achievement (2007).. In 2019, he won the International Cosmos Prize, which recognised his founding and directing Saving Nature (www.savingnature.org) a non-profit that uses donations for carbon emissions offsets to fund local conservation groups in areas of exceptional tropical biodiversity to restore their degraded lands.



SESSION 1

Is Earth's biodiversity really in peril?

Stuart Pimm

University of Pretoria, stuartpimm@me.com

Repeated headlines exclaim the majority of Earth's species are declining and at such a dire level that conservation efforts are too late. In essence, we've broken the boundaries for saving nature. Our recent work argues that two widely used global biodiversity indicators – the Living Planet Index (LPI) and the concept of planetary boundaries for biodiversity (or “biosphere integrity”) – are misleading and poorly grounded in empirical evidence. Worse still, they are harmful to the serious conservation challenges that we face in Africa, indeed damaging to conservation efforts globally.

SESSION 2

From cave to landscape: New insights into the depositional context, palaeoenvironment and behavioural significance of *Homo naledi*

Tebogo Makhubela¹, Keneilwe Molopyane², Tariye Onyeogu¹, Jess Robbins³, Lisheng Wang⁴, Lambert van Rooyen², Rebecca MacRoberts¹, Xuefeng Wang⁴, Hannah Haemmerli⁵ and Yanhong Liu⁴

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The discovery of *Homo naledi* in the Rising Star cave system transformed understanding of hominin diversity during the Middle Pleistocene and raised fundamental questions about the processes responsible for the remarkable accumulation of more than 2 500 fossil remains. Unlike other hominin-bearing deposits in the Cradle of Humankind UNESCO-WHS, *H. naledi* occurs within multiple isolated cave spaces, preserved in semi-consolidated muddy sediments and lacking associated macrofaunal assemblages. These unusual geological and taphonomic characteristics have challenged conventional explanations for fossil accumulation. This presentation synthesises recent geological results that extend understanding of the *H. naledi* depositional context beyond the Dinaledi Chamber. New U-Th chronologies and geochemical analyses of cave speleothems and sediments, integrated with records from freshwater tufa deposits at Lefika la Noka, provide an expanded framework for reconstructing environmental conditions in the Cradle during the Middle Pleistocene. By integrating cave and landscape archives, this work offers new perspectives on climate, landscape evolution and the environmental setting of *H. naledi*.

An energy flow view of African terrestrial ecosystems

Yadvinder Malhi, Ty Loft, Nicola Stevens, Bawa Sulemana and Megha Ojha
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All life on Earth is connected by flows of energy and analysis of energy flow can be a useful way of understanding ecosystems across taxa and habitat types. Despite having a long history in ecology, in recent decades energy analysis has rarely been applied in terrestrial ecology. In this talk I illustrate how energetics analysis can provide valuable insights and open novel analyses on the relationship between ecosystem health and disturbance. I draw on examples from old growth and logged rainforests in Borneo and forests and savannas in Ghana and Kenya. I then explore how energy flow analysis can be scaled from site studies to whole regions, illustrated with estimates of energy flow across all of sub-Saharan Africa. Energy flow can provide a powerful tool to connect biodiversity data to ecosystem function at the scale of region, continent or planet and also of bringing animals alongside plants into global biosphere modelling.

MUFASA: Mapping Unseen Fungi Across South Africa

Cobus Visagie
University of Pretoria, cobus.visagie@up.ac.za

Fungi are among the most diverse and functionally important organisms on Earth, yet they remain one of the least documented components of South African biodiversity. MUFASA (Mapping Unseen Fungi Across South Africa) aims to address this gap by linking biodiversity discovery with reference collections, DNA-based identification, genomics, functional biology and public engagement. The programme asks a set of foundational questions: which fungi occur across South Africa, where do they occur, what factors shape their distributions and how can improved reference resources accelerate discovery and future applications? This then leads to further questions about the roles these fungi play and how a better understanding of them can create future opportunities in areas such as agriculture, health and the bioeconomy. A central component of MUFASA is the integration of culture-dependent and culture-independent approaches for biodiversity discovery. Using *Penicillium* as a case study, I show how a modern taxonomic framework, linked to curated DNA reference databases and genome resources, creates the foundation needed for species-level ecological analyses. I also discuss the promise and current limitations of metabarcoding for fungal biodiversity surveys, particularly with respect to marker choice, database quality and taxonomic resolution. At its heart, MUFASA is about turning hidden fungal diversity into lasting scientific capacity and future opportunity.

An energetics-based decision-support tool for prey impact assessment for cheetah management

Elizabeth Kennedy Overton¹, Jan Venter¹, Hervé Fritz^{1,2}, Virginie Rougeron^{1,2} and Franck Prugnolle²

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²Université Lyon

Predators exert top-down pressures on ecosystems, potentially destabilising herbivore populations in reserves where certain natural processes are hindered. Estimating the energetic demands of large carnivores can inform minimum prey population thresholds, supporting balanced and viable reserve management. We developed a bioenergetics model for cheetahs (*Acinonyx jubatus*) using empirical and theoretical data from the literature. The model integrates key parameters influencing energy expenditure and intake, including group demographics, energy requirements, activity budgets, hunting success, competition, carcass consumption rates, target species and age class selection. Combined with site-specific reserve data, the model produces tailored estimates of prey numbers required to sustain a given cheetah population and a breakdown of the impact they have on each species. We validated the model using cheetah dietary data and herbivore census records from Tswalu Kalahari Reserve as a case study. This tool can offer reserve managers practical guidance on assessing the ecological impact of their cheetah populations and ensuring sustainable predator-prey dynamics.

Medicinal plants of South Africa: Past, present and future perspectives

Nox Makunga

Stellenbosch University, makunga@sun.ac.za

South Africa has an incredible floral heritage that is characterised by high levels of species richness and endemism that is celebrated worldwide. The cultural use of these plants is also linked to the diverse indigenous knowledge systems that exist in the country. I review the significance of South Africa's flora to different sectors of society using an historical lens that maps ethno-cultural use of different taxa throughout time. Because medicinal plants are also intertwined with many research activities at various institutions locally, understanding the approaches that have been used to study these plants is important. Using various bibliometric tools, those taxa that have been the focal species are discussed. These data illustrate vibrant research in the areas of ethnopharmacology and ethnobotany but there are clear gaps in knowledge that still exist with specific reference to conservation of medicinal plants and the influence of a changing climate. These topics are underexplored in regard to medicinal plants that are important for both the formal and informal markets where phytomedicines are traded. There are thus unique opportunities that are presented by interfacing various biotechnologies to study medicinal plants of South Africa, particularly in the exploration of different 'omics technologies.

Seasonal variation in activity budgets and ranging behaviour of *Indri indri*, in Mahatsara, Ihofa and Mantadia in the eastern part of Madagascar

Rio Heriniaina^{1,2}, Andrisoa Rabotovao¹, Omer ndrianarimanana¹, Alfred Andriamamonjy¹ and Hantanirina Rasamimanana¹

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²Université of Antsiranana

This study investigates seasonal variation in the activity budget and daily path length of *Indri indri* in the eastern part of Madagascar including Mahatsara, Ihofa and Andasibe-Mantadia National Park. Understanding how this critically endangered lemur adjusts its behaviour across seasons is essential for both ecological knowledge and conservation planning. Behavioural data were collected using a scan sampling method at five-minute intervals, allowing the quantification of time allocated to key activities such as feeding, resting, traveling, and social interactions. Daily path length was recorded to assess spatial movement patterns. Results showed marked seasonal differences in both activity budgets and daily path. During the wet season groups exhibited longer daily path lengths. In contrast, during the dry season, groups allocated more time to resting and reduced their movement, likely as an energy-conservation strategy in response to lower food availability. Overall, the findings highlight the adaptive capacity of *Indri indri* to seasonal environmental changes while emphasising the importance of habitat quality in shaping their ecological strategies. These insights are crucial for developing effective conservation measures for this emblematic and critically endangered lemurs species.

JWO RESEARCH GRANT RECIPIENT AWARD PRESENTATION

Jonathan Oppenheimer

Founded in 2019, the Jennifer Ward Oppenheimer (JWO) Research Grant was established to support and strengthen early-career African scientists conducting impactful research that addresses some of the continent's most pressing environmental challenges.

While Africa's ecosystems play a central role in global climate regulation and biodiversity stability, researchers based on the continent continue to face structural funding constraints. The JWO Research Grant responds directly to this imbalance by investing in African scholars whose work addresses complex environmental challenges from within the region. Since its inception, the JWO Research Grant has supported projects addressing biodiversity thresholds, freshwater pollution, vector-borne disease dynamics, protected area resilience, environmental monitoring using lower plant species, and wildlife responses to climate change. The grant has contributed to strengthening institutional networks across Africa while reinforcing the visibility of African-led research within global environmental discourse.

SESSION 3

Biodiversity Capacity as a scientifically robust metric for predicting and scaling biodiversity

Andrew Davies

Harvard University, andrew_davies@g.harvard.edu

Global biodiversity loss threatens ecosystems that are essential for human well-being and economic stability. Although frameworks such as the Kunming-Montreal Global Biodiversity Framework and emerging regulations mandate corporate biodiversity disclosures, standardised metrics for the measurement and reporting of biodiversity within such frameworks are lacking. While the science of measuring biodiversity is well understood, conventional approaches present challenges for market-ready measurements because they tend to revolve around direct measurements of biodiversity components and the use of labour-intensive field surveys. These approaches are slow, static, expensive, cover small areas and require a large number of highly specialised professionals who invariably focus on a limited selection of taxonomic groups. Biodiversity Capacity integrates, standardises and scales biodiversity metrics to overcome these shortcomings by relying on long-established ecological relationships between species diversity and ecosystem structure to predict the potential of ecosystems to support biodiversity across taxonomic groups. By integrating LiDAR-derived measurements of three-dimensional vegetation structure with field-based surveys of plant and animal biodiversity across diverse African ecosystems, we demonstrate that the Biodiversity Capacity approach provides a scalable, cost-effective and scientifically robust metric for predicting biodiversity.

Implications of ecological drivers on roan antelope populations in Mokala National Park, South Africa

Nkabeng Mzileni¹, Hugo Bezuidenhout¹, Sam Ferreira¹, Abel Ramoelo², Morena Mapuru³, Lufuni Munyai¹ and Roxanne Erusan¹

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²University of Pretoria

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Climate change has massive global impacts and affects a wide range of species. Threatened species such as the roan antelope (*Hippotragus equinus*) are particularly vulnerable to these changes because of their ecological requirements. Attempts to address concerns about the roan's vulnerability have not been well documented in South African protected areas. This study identifies the landscape use and distribution of the roan as well as habitat and forage suitability changes to help inform management decisions for the conservation of roan. We used fine- and broad-scale data from Mokala National Park, South Africa, that includes roan occurrence data, vegetation condition indices, vegetation (structure and plant species composition), elevation and temperature differences and precipitation strata to construct a suitability framework using the Maximum Entropy (Maxent) and Random Forest statistical package. In Mokala National Park, roan occurred in the *Schmidtia pappophoroides*-*Vachellia erioloba* sparse woodland, *Senegalia mellifera*-*Vachellia erioloba* closed woodland, *Senegalia mellifera*-*Vachellia tortilis* open shrubland, *Vachellia erioloba*-*V. tortilis* closed woodland and *Rhigozum obovatum*-*Senegalia mellifera*

open shrubland. The veld (vegetation) condition index (VCI) improved from 2019 (VCI < 50%) to 2021 (VCI > 60%), with the proportion of palatable grass species (*Schmidtia pappophoroides* and *Eragrostis lehmanniana*) also increasing. This study identified four key climatic conditions affecting roan distribution, namely annual mean daily temperature range, temperature seasonality, minimum temperatures of the coldest month and precipitation of the wettest month. These results suggest that the conservation of roan antelope should consider these key variables that affect their survival in preferred habitats and foraging areas in anticipation of changing ecological conditions.

Impact of invasive Rosaceae shrubs on bird and rodent diversity in montane grasslands

Karabo Moloi¹, Sandy-Lynn Steenhuisen¹, Stephanie Payne¹ and Grant Martin^{1,2}

¹University of the Free State, karabomoloi0312@gmail.com

²Rhodes University

Montane grasslands are vital for biodiversity, water provision and local livelihoods but are increasingly threatened by invasive fleshy-fruited Rosaceae shrubs. This study compares bird and rodent diversity between invaded and non-invaded sites. Rodents were sampled using live PVC box traps and birds using AudioMoths during dawn and dusk. Acoustic data were analysed in Raven Pro, supported by BirdNET. Invaded sites showed higher rodent density, especially *Rhabdomys dilectus chakae*. Bird diversity was similar across sites, but community composition differed, with more frugivores in invaded sites during winter. These invaders alter habitat structure, influencing species interactions and potentially accelerating further invasion.

More than a nest: Engineering communities in the Kalahari

Robert Thomson¹, Timothy Khan Aikins², Michael Cramer¹, Olufemi Olubodun¹ and Anthony Lowney³

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²University for Development Studies

³Hartpury University

For over a decade, Sociable Weaver (*Philetairus socius*) nests at Tswalu Kalahari have provided a system for understanding how these communal structures shape ecological interactions in the Kalahari. The massive nests modify local environmental conditions and provide critical resources for a diverse assemblage of associated species. We have studied the host trees and demonstrated that Sociable Weaver colonies alter soil nutrients, tree growth and reproductive measures, highlighting ecological feedbacks between the colonies and their host trees. Furthermore, we show the ecological importance of these nests for animals, focusing on the interplay of positive and negative species interactions at the nests. Long-term demographic and behavioural monitoring of Pygmy Falcons (*Polihierax semitorquatus*), an obligate associate of colonies, reveals its life-history strategies and how these raptors influence colony dynamics through interactions. Together, our work highlights the central role of Sociable Weaver nests as biodiversity 'hubs' and as ecosystem engineering structures in the Kalahari that structure ecological communities across multiple trophic levels.

Managing shared risks in South Africa's game meat sector: A One Health perspective from experts and value chain actors

Lydia Bhebehe, Hayley Clements and Wiseman Ndlovu
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South Africa's game meat sector is receiving renewed attention for its potential contribution to food security, rural development, conservation and sustainable wildlife use. Yet its growth raises questions around game animal health, food safety, environmental sustainability, market formalisation and fragmented regulation. This study aimed to answer these questions through semi-structured interviews with experts and value-chain actors across the sector. Interviews explored game animal health and disease risks, food safety practices and regulatory instruments and environmental sustainability within production. Emerging findings show that experts and value-chain actors often identify similar risks from different positions in the system. Experts emphasise surveillance, inspection, regulation and institutional coordination, while value-chain actors highlight how risks are recognised and managed during ranch management, harvesting, transport, processing and market circulation. By bridging these perspectives, the study shows that a One Health approach must be grounded in both policy-level coordination and the everyday realities of actors managing risks across the value chain.

SESSION 4

UNLOCKING INVESTMENT AND INSTITUTIONS FOR INCLUSIVE AFRICAN WILDLIFE ECONOMIES

HAYLEY CLEMENTS

Dr Hayley Clements holds the Oppenheimer-Jamma Research Chair in African Wildlife Economies at Stellenbosch University, where she is a senior researcher at the Centre for Sustainability Transitions. She leads the centre's Nature-Positive Economies research theme. Hayley's transdisciplinary research explores how African biodiversity connects to human well-being and the role wildlife economies play in achieving just and sustainable development. Her research programme addresses knowledge gaps around wildlife enterprises, their social-ecological impacts, financing and governance, working with governments and the private sector to support inclusive growth in the sector. As the inaugural recipient of the Jennifer Ward Oppenheimer Research Grant she convened 200 African biodiversity experts to co-produce a landmark assessment of Africa's biodiversity intactness, published in *Nature*. The findings show that most of Africa's remaining populations of wild plants and animals persist outside protected areas, in forests and rangelands inhabited by over 500 million people. This calls for inclusive conservation approaches such as wildlife economies that can sustain both nature and its custodian.



LETLHOGONOLO KAMUTI

Letlhogonolo Kamuti is a conservation and community development practitioner from Botswana with extensive experience in community-based natural resource management (CBNRM), rural governance and wildlife conservation. He currently serves as Botswana Manager for Life Through Wildlife (LtW), where he works with local communities, governments, researchers and conservation partners to strengthen wildlife economies that deliver both conservation and livelihood benefits. His work focuses on improving community participation in natural resource governance through innovative approaches to data systems, participatory decision-making and benefit-sharing. He is leading the development of community “Ops Rooms” that integrate governance, wildlife, financial and human-wildlife conflict data to support evidence-based local decision-making. Kamuti is currently pursuing an MPhil in Sustainable Development at Stellenbosch University, where his research examines barriers and enablers to effective community participation in natural resource governance in Botswana.



SUSAN DE WITT

Susan de Witt builds financial markets for outcomes that do not yet have one – from impact investing and outcomes-based finance in South Africa to conservation and wildlife economics today. Since 2013 she has moved novel financing mechanisms from concept to mainstream adoption across public, private and philanthropic capital. She raised ±R300 million for outcomes-based contracts, launched the first Early Childhood Development Impact Bond in an emerging market, and founded the the GSG-affiliated National Task Force for Impact Investing, now comprising over 100 investment professionals. Her current focus is conservation finance, designing regulated market mechanisms for high-value wildlife products and contributing to investor-facing guidance on nature-based revenue models. Her doctoral research at Stellenbosch University’s Centre for Sustainability Transitions, affiliated with Oxford’s Interdisciplinary Centre for Conservation Science, draws on practitioner interviews across Southern and Eastern Africa to examine what makes wildlife-based land use on community and private land genuinely investable.



NABOTT MBEELI

Nabot Tukaleni Mbeeli is a young Namibian conservationist and Chief Executive Officer of the Orange River-Karoo Conservation Area (ORKCA). With over ten years of experience in conservation and community-based natural resource management, he works at the intersection of landscape restoration, biodiversity conservation and community stewardship. He leads one of Southern Africa's most ambitious rewilding initiatives, focused on restoring ecological connectivity and resilience across the Orange River-Karoo landscape while strengthening partnerships with local Nama communities. He is also leading the development of the Nama-!Garib Geopark, an aspiring UNESCO Global Geopark in southern Namibia.



KHOROMMBI MATIBE

Khorommbi Matibe serves as the Chief Director: Biodiversity Economy and Sustainable Use at the Department of Forestry, Fisheries and the Environment, starting in May 2017. He had previously served in numerous portfolios including as Head of Department at Freedom Park Heritage site, Director for Business Development and Marketing at Limpopo Tourism and Parks Agency, Manager for the Dinokeng Tourism Project at Gauteng Department of Agriculture, Environment and Land Affairs. He has also served as a Researcher on Energy and Climate Change at the Energy and Development Research Centre at the University of Cape Town. He chairs the Wildlife Forum comprising over 30 industry associations and conservation management authorities in South Africa. His career spans over 33 years. Mr Matibe holds a master's degree in Environmental Management through the University of Nottingham (United Kingdom), a post-graduate degree through the University of Johannesburg, a bachelor's degree through the University of Venda, a diploma in Business Management through MANCOSA, and several other certificates.



Unlocking investment and institutions for inclusive African wildlife economies

Susan de Witt, Letlhogonolo Kamuti, Nabott Mbeeli and Khorommbi Matibe

While biodiversity loss continues across Africa and beyond, several countries in Southern Africa buck the trend. Countering the dominant protectionist model to conservation, over the past 50 years these countries have given wildlife use rights to local people – private landholders and, in some cases, communities. The response has been a tenfold increase in wildlife numbers across the region's working lands, which have transitioned from conventional farming to wildlife-based economies. This is a compelling conservation success story, but the business models that made this work on private land have not translated onto community and state lands, where wildlife enterprises dramatically underperform. This gap reflects

institutional and economic constraints, not ecological ones. Across the continent's vast working lands, the opportunity cost of this underperformance is immense for both local people and nature.

This panel will examine what it takes to close the gap and unlock inclusive wildlife economies that sustain people and nature across Africa. Bringing together researchers, practitioners and government, the discussion will focus on overcoming the barriers that prevent capital from flowing equitably into wildlife enterprises on community land – barriers such as weak property rights, governance failures, poor intermediation, lack of embedded, consistent management and the funding needed to institutionalise good practice over time. Practical pathways will be explored that can build genuinely inclusive wildlife economies at scale.

DAY 2: THURSDAY, 8 OCTOBER 2026

PLENARY: LEE WHITE, SPECIAL ENVOY TO THE SCIENCE PANEL FOR THE CONGO BASIN

Lee White CBE is a scientist, conservationist and politician with over 40 years' experience in natural resource conservation and management in Equatorial Africa. He was Director of the WCS Gabon programme (1992-2008) and head of Gabon's National Parks Agency (2009-2019) and served as Gabon's Water, Forests, Sea and Environment Minister (2019-2023). He helped create over 50 protected areas, including Gabon's network of 13 national parks. As head of national parks in Gabon, he led the fight against ivory poaching, protecting the biggest population of forest elephants in Africa and dismantled an illegal forestry network stealing \$400 million per year from the Gabonese economy. He raised over US\$500 million of donor funding, registered 187 million tons of REDD+ results with the UNFCCC, put in place a Blue Bond for \$500 million and spoke on behalf of Africa at UNFCCC COP26 in Glasgow. He founded Pangea Nature Partners in 2024 to design and implement a new financial mechanism to make forests more valuable alive than dead. He also acts as the Special Envoy of the Science Panel for the Congo Basin and is an honorary Professor in the University of Stirling's School of Natural Sciences.



SESSION 1

Transforming science into conservation action in the Congo Basin

Lee White

Science Panel for the Congo Basin, lee@profleewhite.com

As scientists, we are uniquely positioned to understand the causes, implications and consequences of biodiversity loss and ecosystem degradation. In an era of rapid global environmental change, this knowledge carries with it a responsibility to communicate scientific evidence effectively, engage with decision-makers and contribute to the processes that shape environmental governance. This talk explores the opportunities and challenges of moving across the science-policy interface and consider how researchers can help translate knowledge into meaningful action for biodiversity conservation and sustainable development. In this presentation I reflect on my journey from scientist to conservation practitioner and ultimately to policy maker and climate-biodiversity negotiator, drawing on experiences from Gabon and the wider Congo Basin. Through this transition, I have come to appreciate the critical role that scientists play not only in generating knowledge, but also in ensuring that evidence informs conservation practice and policy decisions.

Juvenile and mature species composition: Monitoring demographic bottlenecks in the Lowveld savanna

Belinda Mtetwa¹, Anthony Swemmer², Sally Archibald¹ and Justice Muvengwi¹

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²SAEON Ndlovu Node

Long-term ecological monitoring is increasingly being recognised for its role in strengthening evidence of changes in ecosystems and observing responses to and impacts of environmental change. It particularly strengthens decision-making for landscape management as it quantifies the effectiveness of interventions. Plant ecology studies often focus on the overstorey leading to a limited understanding of how plant communities establish and survive demographic bottlenecks. In contrast, including juvenile stages (seedlings and individuals less than 30 cm tall) in monitoring studies informs whether species are represented throughout the life stages and which species experience intense bottlenecks. In the lowveld savanna of South Africa, juveniles in systems with varying disturbances such as fire, harvesting and elephant presence have been sampled over 14 years (2012-2026). Tree seedlings and individuals of height less than 30 cm were identified and counted annually across six sites in circular plots with a 5 m radius. Mature adults and recruits (individuals taller than 30 cm) were tagged and tracked from 2021 to represent the adult species composition. Across sites, 91 species were represented in the juvenile stages, with community composition comparisons for juvenile and mature individuals across species showing juvenile stages to have the highest species richness, while Shannon's diversity was highest for adult stages. Generalised linear mixed models showed that geology and rainfall were found to have an effect on the number of seedlings; however, juvenile numbers generally varied due to the sporadic nature of germination events in savanna ecosystems. The effect of herbaceous biomass varied due to varied densities across the sites.

Mapping baobab trees with machine learning and satellite imagery in the semi-arid savannas of Southern Africa

Chafika Phiri¹, Andrew Cunliffe¹, Hugh Graham², Sarah Venter³, Dave Hodgson¹ and Dawn Cory-Toussaint⁴

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Baobab trees provide critical ecosystem services to people and wildlife across Africa's semi-arid savannas, yet populations are increasingly threatened by land-use change, climate change and overutilisation. Reliable information on baobab distribution is therefore urgently needed for monitoring and managing this resource sustainably, but landscape-scale data is scarce. We evaluated whether machine learning and fine-resolution satellite imagery can accurately map baobab populations across heterogeneous savanna landscapes. Using WorldView-3 data, we trained a U-Net deep learning model and tested performance across two contrasting South African sites: Kremetart Game Farm in the Soutpansberg and Mapungubwe National Park in Limpopo. We found that large baobabs were detected reliably across multiple resolutions, but detection of smaller crowns degraded as imagery was coarsened. While freely available coarse imagery might be sufficient for mapping mature baobabs at landscape scales,

monitoring younger or smaller individuals requires finer resolution images. Our findings lay a foundation for scalable tools to support sustainable utilisation of baobabs to support livelihoods in Africa.

Where, how and why: Unravelling black-backed jackal space use through movement and behaviour on Tswalu Kalahari Reserve

Geke Woudstra, Haremishh Melville, Kerry Slater and Tracey Kreplin
University of South Africa, geke-woudstra@hotmail.com

Carnivores move through landscapes in complex ways, balancing the need to find food, avoid risk and exploit familiar areas. Yet, understanding how these processes shape space use is a challenge, particularly when relying on static descriptions of where animals occur. In this study, I explore how jackals use space by combining patterns of occurrence, movement behaviour and habitat selection. Using GPS collar data of 10 jackals, varying in sex and age, I first characterise the spatial extent of jackal home ranges and how these vary depending on the methods used. I then move beyond these static representations by reconstructing movement paths and habitat choices. This allows identification of areas where animals concentrate their activity and repeatedly return, revealing core areas within the landscape. By integrating where animals are found, how they move and why they use certain areas, this study provides a more complete, process-based understanding of jackal spatial ecology. This approach highlights how behaviour shapes the use of their environment and offers a framework for moving beyond static descriptions toward a more dynamic understanding of carnivore ecology.

Human-related land use shapes microplastic and phthalate accumulation in an African subterranean mammal

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Anthropogenic activities have increased the presence of persistent pollutants such as plastics and phthalates in terrestrial ecosystems. This study investigated macro- and microplastic exposure and quantified phthalate exposure in highveld mole-rats (*Cryptomys hottentotus pretoriae*) across an anthropogenic disturbance gradient in and around the Rietvlei Nature Reserve, South Africa. Soil and biological samples (blood, liver, faeces and hair) were collected from sites of varying anthropogenic impact. Plastics were detected in soils from high and medium impact sites, but only in mole-rats from the high impact site, primarily within caecal tissue, suggesting localised gastrointestinal retention. UPLC-MS analysis revealed BBP and DBP accumulation across all matrices, with highest concentrations in liver and hair, respectively. Phthalate concentrations were significantly elevated at the high impact site, linking pollutant load to land use intensity. These findings highlight an underappreciated risk for subterranean fauna whose fossorial lifestyle brings them into direct contact with contaminated soils.

Evaluating the influence of *Seriphium plumosum* and grazing lawns on termite diversity and foraging

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Grassland biomes support important biodiversity and ecological processes, such as decomposition and nutrient cycling. However, these biomes are characterised by contrasting vegetation habitats, including productive grazing lawns, natural grasslands and areas encroached by *Seriphium plumosum*. This study evaluated the influence of *S. plumosum* encroached areas and grazing lawns on termite diversity and foraging activity in the dry and wet season at Telperion Nature Reserve in Mpumalanga, South Africa. Grass and cellulose (tissue paper) bait grids were deployed in three areas per vegetation type and monitored over 12 months across the wet and dry season. Termite diversity and foraging activity was analysed using generalised mixed-effects models, while community composition was assessed using NMDS. Results showed that termite activity and foraging intensity and community composition varied among vegetation habitats and seasons. *S. plumosum* encroached areas showed reduced termite diversity and activities, while grazing lawns supported high levels of termite diversity and activities. Seasonal variations showed increased activities in the wet season. Findings showed that termite diversity and foraging are influenced by vegetation habitats which highlights the ecological impacts of woody encroachment, while emphasising the importance of maintaining the diversity of grasslands in supporting termite-mediated processes.

The Wildlife Economy Investment Index: Turning conservation performance into financial power in Africa

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The Wildlife Economy Investment Index (WEII) evaluates African countries' potential to attract investment in wildlife-based economic activities. Developed by ALU SOWC, the WEII uses 280 indicators measuring wildlife assets, wildlife management, ease of doing business, public sector capacity and investment safety. Results from the WEII v1 (2023) and v2 (2025) show that despite Africa's natural wealth, a gap persists between potential and performance. Countries with strong wildlife assets often lack governance to convert these into investment, while those with strong institutions may lack ecological depth. Current gaps include structural imbalances, lack of abundance metrics, biome bias and limited sectoral coverage beyond tourism. These are being addressed in WEII v3 to strengthen the Index and support its application in sovereign debt instruments, specifically sustainability-linked bonds that provide favorable financing tied to improved wildlife economy performance. This presentation details results, analyses trends and presents the WEII as a tool aligning conservation and development, while addressing Africa's need for innovative finance solutions.

The potential of using road culverts for safe wildlife crossings along a provincial road in South Africa

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²University of Alberta

³Ingwe Research Program

Roads pose a major threat to wildlife by creating dispersal barriers, fragmenting habitats and causing wildlife-vehicle collisions. A potential mitigation measure is to encourage wildlife to use pre-existing culverts as safe underpasses. However, wildlife culvert use remains poorly understood. The R40 provincial road, South Africa, runs through a network of protected and unprotected areas and has experienced high levels of roadkill. To address this, we assessed the potential of using culverts to facilitate safe crossings by quantifying the current wildlife use of culverts and identifying the characteristics that influence it. This was done by placing camera traps at 56 culverts along a 47 km stretch of the R40. We found that species from various taxa frequently used the culverts. However, usage varied among taxa, sites and culvert characteristics. This indicates that culverts may be crucial for safe wildlife crossings but require careful species-specific consideration. Ultimately, our study will guide future culvert design and placement and will contribute to broader efforts to maintain landscape connectivity and wildlife movement across human-modified landscapes.

SESSION 2

Measuring rangeland performance relative to potential: Separating climate and management signals from space

Andy Cunliffe¹, Guy Lomax¹, Isaac Mureithi², Tom Powell¹ and Remy Vandaele¹

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²African Wildlife Foundation

Rangelands support livelihoods, biodiversity and natural capital, yet management is often guided by ambiguous evidence of ecosystem condition. A key challenge is separating management effects from substantial background variability in climate and productivity, limiting robust evaluation of interventions. We present the Relative Productivity Index (RPI), a satellite-derived indicator of vegetation productivity relative to climate- and environment-driven potential. Using machine learning trained on climate, soils and topography, we estimate potential productivity and compare it with observed photosynthetic uptake to isolate shortfalls attributable to local drivers such as grazing or management. Recent work (Lomax et al., 2025; 2026) shows RPI outperforms residual trends approaches in distinguishing management impacts from climatic variability in East African rangelands. Case studies (Mureithi et al., In Review) evaluate persistent degradation and recovery signals linked with governance. We present our progress toward a global RPI product that enables consistent comparisons across space and time to strengthen accountability for stewardship and conservation investments in grassy ecosystems worldwide.

Can elevated CO₂ help savanna trees escape the fire trap? Linking carbon gain to post-fire regrowth

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Fire is a dominant disturbance maintaining savanna structure by limiting tree recruitment through repeated top-kill, which traps saplings in a persistent juvenile state. Rising atmospheric CO₂ has been shown to enhance photosynthetic carbon gain, yet whether this increased carbon supply translates into improved post-fire recovery is unresolved. A key but overlooked mechanism is the coordination between carbon acquisition and carbon deployment during resprouting, when plants must rapidly rebuild lost aboveground structure. Here, we investigate how fire and elevated CO₂ interact to influence both photosynthetic capacity and post-fire regrowth in savanna tree saplings (*Vachellia karroo*, *V. tortilis* and *V. robusta*). Saplings were grown under ambient (400 ppm) and elevated (700 ppm) CO₂, subjected to experimental burning and assessed using ACi curves alongside detailed measurements of post-fire architecture and aboveground allocation. Escaping the fire trap in savannas may depend not only on increased carbon gain under elevated CO₂, but on how effectively saplings convert that carbon into post-fire rebuilding. We hypothesise that fire-induced resprouting increases carbon demand, thereby amplifying the potential for elevated CO₂ to enhance photosynthetic recovery. However, we further propose that the extent to which increased carbon gain translates into effective rebuilding is species-specific, reflecting differences in how plants allocate resources to leaves, stems and new shoots after fire. By explicitly linking disturbance, carbon physiology and regrowth dynamics, this study provides a mechanistic framework for understanding how rising CO₂ may alter the effectiveness of fire in regulating tree recruitment and, ultimately, the structure of savanna ecosystems.

Uncharted waters: First insights into bottlenose wedgefish (*Rhynchobatus australiae*) movement ecology at a critical aggregation site in southern Mozambique

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Bottlenose wedgefish (*Rhynchobatus australiae*) are among the most imperilled marine fish globally yet fundamental knowledge gaps persist, particularly in the southwest Indian Ocean where fishing pressure is intense and enforcement of existing protections is minimal. Mozambique's Bazaruto Seascape hosts a remarkable population of >100 photo-identified individuals, representing a rare and urgent opportunity for research and conservation. In the first acoustic telemetry study of this species in Southern Africa, we tagged 18 female wedgefish (135-250 cm TL) in the Vilanculos Coastal Wildlife Sanctuary, monitoring movements for up to 4 years. Fifteen individuals demonstrated high residency, detected on an overall 56% of tracked days (max. 93%), with detections peaking in austral autumn/winter (May-August), suggesting seasonal aggregations of females consistent with reproductive site use. These findings inform the establishment of a dedicated shark and ray protection zone in Sanctuary waters, with *R. australiae*

serving as an umbrella species to increase protection of the diverse assemblage of threatened sharks and rays in the region, many of which remain vulnerable to fishing pressure.

Evidence-based conservation for functional outcomes

Johan du Toit

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Evidence-based conservation is gradually supplanting belief-based conservation but increased scientific rigour is required to evaluate the intended outcomes of conservation. This needs more than just working towards historically derived targets of species composition and population abundance. The dire trajectory of the biosphere requires an urgent focus on the functional properties of species and the ecological processes they participate in as we progress into the Anthropocene. Biodiversity loss is functionally degrading our life-support systems, global climate change is shifting the ranges of bioclimatic envelopes and human-forced environmental change is faster than the rate of evolutionary adaptation. A functional approach to conservation is thus required to first determine the type of ecosystem that could develop under forecast conditions and then to work proactively at assembling the functional groups of species adapted to that ecosystem. Conservation science is responding to the global environmental crisis by embracing concepts that traditionalists consider drastic. These include assisted migration and colonisation, a focus on functional types and groups, proxies for extinct species and rewilding to achieve functional compositions that deliver essential ecosystem services.

Managing rangelands for ecological functionality: How cattle grazing strategies shape plant and soil stoichiometric heterogeneity

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³Aarhus University

Cattle redistribute nutrients across savanna landscapes through grazing, dung and urine deposition, trampling and livestock handling. However, most grazing effects studies emphasise individual nutrients, while less attention has been given to how cattle management reshapes multielement soil and plant stoichiometry. We examined how short-term boma enclosures and broader grazing management regimes influence soil and herbaceous plant elemental composition, stoichiometric ratios and spatial nutrient heterogeneity in a semi-arid savanna. We tested whether boma sites differed from surrounding paddock areas and whether adaptive multi-paddock grazing (AMP) and continuous grazing (CG) produced divergent spatial patterns in soil and plant stoichiometry. Soil and herbaceous plant samples were collected from boma sites, adjacent AMP paddocks and continuously grazed communal areas. Elemental concentrations were measured using portable X-ray fluorescence spectroscopy and stoichiometric ratios were used to assess relative elemental balance. Linear mixed-effects models tested differences in individual elements and ratios, while PERMANOVA and multivariate dispersion tests evaluated compositional differences and heterogeneity. Boma soils showed clear shifts in multielement composition and ratios. Plant responses mirrored soil changes, with boma vegetation showing higher phosphorus ratios and potassium to magnesium ratio than paddock vegetation. In contrast, CG and

AMP showed weak differentiation in individual soil and plant elements and ratios, although multivariate analyses detected subtle management-related differences in plant ratios. Though AMP may not strongly alter nutrient chemistry, through discrete boma hotspots it can create a more heterogeneous patch-matrix nutrient landscape. We demonstrate that multielement stoichiometric approaches can reveal management-driven nutrient reorganisation that may be overlooked by single-element analyses.

Fast fashion, global rivers and environmental recovery: Following a t-Shirt from Indonesia to Africa

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¹Charles Sturt University

²National Research and Innovation Agency, Indonesia

What does an Indonesian river have to do with Africa? A lot more than most people realise. Global demand for fast fashion has created a supply chain that stretches from textile factories in Asia to second-hand clothing markets, landfills and waterways across Africa. While consumers enjoy increasingly affordable clothing, the environmental costs are often transferred through the supply chain, from manufacturing regions burdened by industrial pollution to communities managing growing volumes of discarded textiles. This journey starts in Indonesia's Citarum River, once regarded as one of the world's most polluted rivers. Driven by rapid industrialisation and textile production, the river became an international symbol of environmental decline. However, through strong political leadership, industry accountability and community action, the Citarum underwent one of the world's most significant river recovery efforts. The story does not end there. Increasing volumes of used and unsold clothing are now exported to Africa, where textile waste, microplastics and inadequate waste infrastructure are creating new environmental pressures on rivers, wetlands and coastal ecosystems. By examining both ends of the supply chain, this presentation explores how global consumption patterns shape river health across continents and highlights opportunities for science, policy and society to create more sustainable outcomes.

SESSION 3

Over a decade of observation: Building long-term ecological baselines in the Greater Dyer Island marine ecosystem

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²University of Cape Town

To understand and manage ecosystems requires long-term ecological data to assess trends, detect change and inform conservation interventions. Such datasets are rarely available for marine systems due to the logistical and financial constraints of sustained observation at sea, particularly when observations are confined to dedicated research efforts. Over a decade of continuous data collection, conducted opportunistically through ecotourism operations, has supported the development of long-term baseline ecological information of the Greater Dyer Island ecosystem across multiple taxa. These include, among

others, Indian Ocean humpback dolphins, sunfish and multiple elasmobranch species. These datasets have provided a foundation for critical ecosystem and individual-based analyses, highlighting their role in supporting future research and informing tangible management and policy processes, particularly where such information is otherwise scarce. This data collection approach not only addresses key research challenges but also generates wider benefits by supporting the blue economy through economic growth, improvement of livelihoods, job creation and preservation of the marine ecosystem.

Harmony with Wildlife – encouraging wildlife within rural African communities

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Many rural African communities near wildlife areas face human-wildlife conflict, yet their lands are vital wildlife corridors and habitats for many animal species. The Harmony with Wildlife initiative aims to promote coexistence by rewarding communities for conserving wildlife on communal land. Using camera trap networks deployed in communities, large mammal activity is monitored and shared with community representatives for awareness and verification. Each species is assigned a monetary value per observation based on its ecological and conservational value and local rarity. Communities receive quarterly payments according to the mammal species captured on their land. Funds are allocated to tribal authorities to support community development and build resilience to wildlife conflict. We are currently implementing this model within communities in the Okavango Delta, Botswana and Northern KwaZulu-Natal, South Africa, aiming to improve local attitudes toward wildlife and strengthen conservation efforts.

Silent passengers: Exploring the hidden infections in Afrotropical birds

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Understanding how ecological and behavioural factors shape parasite infections is key to predicting disease dynamics in wildlife. Across multiple studies in and around South Africa's Kruger National Park, we investigated the prevalence, diversity and physiological impacts of avian blood parasites, including *Haemoproteus*, *Plasmodium*, *Leucocytozoon*, *Trypanosoma* and filarial nematodes. Screening more than 1 000 birds representing over 80 species revealed an overall infection prevalence of about 30% and more than 100 parasite lineages, over half of which are new to science. Parasite occurrence varied with host behaviour, foraging strata and movement patterns and peaked during the wet season. Contrary to expectation, infections had little negative effect on body condition or stress indicators, suggesting tolerance in many hosts. Comparing invasive house sparrows with native grey-headed sparrows revealed lower infection rates in the invader, supporting the enemy release hypothesis. Together, these findings highlight the extraordinary diversity of Afrotropical avian haemoparasites and show that infection risk is shaped by a complex interplay of host ecology, behaviour and environment, offering new insights into the ecology and evolution of wildlife diseases.

Progress in mapping and monitoring South African wetland biodiversity using earth observation

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²Council for Scientific and Industrial Research

³University of Pretoria

For more than thirty years, earth observation studies have invested in the mapping of wetland extent and biodiversity in South Africa. Related to Sustainable Development Goal (SDG) 6, the extent of open water or the lacustrine wetland biome has been relatively well mapped and monitored at a global scale. On the other hand, vegetated wetlands, or the palustrine wetland biome, are poorly represented, reflecting < 10% of the wetland extent mapped for South Africa. Nearly half of South Africa's wetlands are palustrine in nature and therefore not monitored at all. Therefore, reporting on the extent of different Ecosystem Functional Groups (EFGs) to the Global Biodiversity Framework (GBF) by 2030, as well as monitoring natural or artificial changes in these, is deficient. The current progress in the earth observation of these wetlands will be presented as will the opportunities for further investment in research towards operationalisation of what could be envisaged as a possible optimal monitoring system.

Sticking your neck out for giraffe – an emerging conservation success story across the continent

Julian Fennessy, Stephanie Fennessy, Courtney Marneweck, Michael Brown, Arthur Muneza and Rigardt Hoffman

Giraffe Conservation Foundation, julian@giraffeconservation.org

When visiting Africa giraffe are just everywhere, right? In reality, the tallest and one of the most loved animals in the world have been undergoing a silent extinction. Giraffe are Africa's forgotten giants, but not all is lost. Already extinct in at least seven African countries, giraffe numbers declined significantly throughout their range in the last century. They have lost almost 90% of their habitat in the last 300 years. To curb these trends, the Giraffe Conservation Foundation (GCF) and collaborative governments, NGOs, private sector and community partners over more than 17 years have been standing tall for these iconic animals and our collaborative efforts with governments, NGOs, conservationists, zoos and other stakeholders are bearing fruit and inspiring successful conservation actions throughout the African continent. Giraffe can only be saved through strong partnerships and collaborative actions. So far, GCF supports giraffe conservation efforts in over 110 million acres of giraffe habitat throughout Africa and we have supported the re-introduction of giraffe and augmented populations in over 11 million acres of quality habitat. By providing a science-based approach to our work, GCF has been integral in deciphering the current giraffe taxonomy, implementing the largest GPS satellite tracking programme throughout the continent, enhancing community conservation, environmental education and much more. With all this in mind, we will highlight the plight of giraffe, while focusing on the conservation successes of GCF, an organisation at the forefront of giraffe conservation and management in Africa. As a relatively small organisation, GCF has a big impact and our approach can be seen as a positive conservation model.

SESSION 4 – PANEL DISCUSSION

Beyond the lens: Reclaiming Africa's conservation narrative

Nancy Iraba, Noel Kok, Manu Akatsa and Nyancho NwaNri

For decades, the visual and verbal stories told about Africa's wilderness have often been filtered through a foreign lens, focusing on a "pristine" Eden devoid of its people or framed by external perspectives. Beyond the lens: Reclaiming Africa's conservation narrative is a deep dive into the power of authentic representation and the essential role of local voices in securing the continent's biodiversity.

Led by a distinguished cohort of National Geographic Explorers, this session bridges the gap between rigorous conservation science and the art of impactful storytelling. These Explorers are not just documenting the natural world; they are redefining how it is perceived, ensuring that African heritage, indigenous knowledge and local leadership are at the forefront of the global environmental agenda.

This panel explores a high-level overview of how institutional support is shifting toward grassroots empowerment, elevating local voices and embracing new age technology. Attendees can expect a provocative and inspiring dialogue on how "reclaiming the narrative" is more than a cultural movement, it is a conservation necessity. By aligning storytelling with local agency, we can foster a more inclusive, effective and sustainable future for Africa's ecosystems. Join us as we explore how moving beyond the lens can dismantle stereotypes and catalyse a new era of conservation led by those who call the continent home.

KIMBERLEIGH TOMMY

Dr Kimberleigh Tommy is the Executive Director, Africa, for the National Geographic Society. Prior to this role, she served as the CEO of the Palaeontological Scientific Trust (PAST) and as the Curator at the Maropeng and Sterkfontein Official Visitor Centres in the Cradle of Humankind UNESCO World Heritage Site. She holds a PhD in Biological Anthropology from the University of the Witwatersrand.

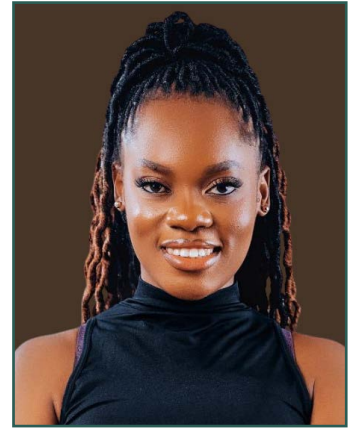
An award-winning scientist and science communicator, Kimberleigh has earned numerous prestigious accolades throughout her career. She has been recognised as a top postgraduate writer for *Science Today*, a blogger for the South African Young Academy of Science and one of the Mail and Guardian's 200 Young South Africans. Additionally, she was named one of CoCreate SA's Inspiring Fifty Women in STEM and is a recipient of the prestigious L'Oréal-UNESCO For Women in Science South African National Young Talents Programme.

Ultimately, her vision transcends her leadership roles; she is deeply committed to supporting and amplifying African voices and perspectives across science, education and storytelling.



NANCY IRABA

Nancy Iraba is an award-winning Tanzanian marine scientist, coral reef restoration expert, National Geographic Explorer and blue economy entrepreneur. As Co-Founder and Technical Advisor of Action for Ocean, she leads underwater programmes that equip young people and coastal communities with the skills to actively restore and protect marine ecosystems. Her work goes beyond conservation, it is about shifting power. Nancy operates at the intersection of science and storytelling, challenging who gets to speak for Africa's oceans and ensuring that the people closest to these ecosystems are the ones shaping their future. Through training, mentorship and hands-on restoration, she is opening up access to ocean careers while redefining what African-led conservation looks like. Nancy's impact has been recognised globally. She is a recipient of the 2024 Wayfinder Award by the National Geographic Society and her work has been featured in Forbes and BBC Africa. She has also received the Hidden Eco-Heroine Award (Republic of Korea, 2017), was recognised by the Next Einstein Forum (2019) for upcoming marine scientist in Tanzania and named among the 100 Tanzanian Sheroges (2020). She is a Mandela Washington Fellowship alumna (2021). Beyond the water, she contributes to shaping the future of marine science and leadership through advisory roles, including supporting curriculum reform with the University of Dar es Salaam to better align education with real-world opportunities. Nancy believes that reclaiming Africa's conservation narrative is not just about telling better stories but about shifting ownership of those stories. For her, the future of conservation lies in equipping communities to lead, innovate and be seen.



NOEL KOK

Noel Kok is an independent filmmaker and National Geographic Explorer. Passionate about refocusing the narrative of Africa, creating opportunities and unlocking barriers to entry for African storytellers, Noel is a co-founder and Executive Director of Nature, Environment & Wildlife Filmmakers (NEWF) and co-leads Africa Refocused, a collaboration between NEWF and National Geographic Society. NEWF is a community-centric organisation encouraging stories told by a connected pan-African network of natural world visual storytellers, conservationists and scientists and is dedicated to building capacity in order to enable access, support inclusion, expand local audiences and foster a culture of equity for African nature, environment and wildlife visual storytellers.



MANU AKATSA

Manu Akatsa is a documentary filmmaker, cinematographer and animator with a passion for natural history and cultural preservation. Akatsa's work captures the beauty and complexity of the world around us, while also highlighting the importance of preserving our planet's rich natural and cultural heritage. Born and raised in Nairobi, Kenya, he was exposed to the biodiversity and cultural diversity of his homeland from a young age and developed a keen eye for detail and a deep appreciation for the power of visual storytelling. He believes that, through his films, he can inspire people to reconnect with nature, protect it and appreciate the deep cultural heritage that has evolved alongside it. Akatsa recently collaborated with Freehand Studios to co-create Uli & Tata's African Nursery Rhymes, a 2D-animated children's series that follows Uli and her brother Tata on their adventures in search of Africa's disappearing nursery rhymes. Akatsa believes film projects like this can play an important role in fostering a sense of connection to the natural world, a positive self-identity and encourage conservation among children. He pushes the boundaries of storytelling by collaborating with Indigenous communities and using modern, innovative technologies to create immersive and interactive experiences for his viewers.



NYANCHO NWANRI

Nyancho NwaNri is a Gambian-Nigerian visual artist, documentarian and cultural researcher whose practice engages deeply with cultural, environmental and social questions. Working primarily through long term research-driven projects that foreground community-centred knowledge, she explores the intersections of Indigenous African spiritual traditions, culture and history with memory, the self, the natural environment and lived human experience. Her work is grounded in sustained collaboration and connection, often unfolding over extended periods of immersion and relationship-building. Alongside her artistic practice and documentary work, Nyancho NwaNri is deeply committed to education and mentorship. She regularly facilitates workshops, trainings and mentorship programmes in film and photography, supporting emerging visual artists and storytellers across the African continent and internationally. Her documentary work has been published by various international outlets such as *The New York Times*, *Reuters*, *The Guardian*, *Al Jazeera*, *The Irish Times*, *Quartz* and *Geographical Magazine*. For her documentary work, she was awarded the Reuters Yannis Behrakis Photojournalism Grant in 2021 and was subsequently nominated for the Reuters Journalist of the Year Award in 2022. She was a finalist for the 2021 Art X Prize and the Welcome Photography Prize in 2020 and was also shortlisted for Forecast Platform in 2022. She has also been a recipient of the Cite Des Arts Residency in Paris, France and the Goethe Institute Vila Sul Residency in Salvador, Brazil. Her art has been exhibited widely at museums, festivals and biennials, including the Zeitz Museum of Contemporary African Art (South Africa), Hong-gah Museum (Taiwan), Art X Lagos (Nigeria), Bamako Biennale (Mali), VideoEX Festival (Switzerland) and Ndiva Women's Film Festival (Ghana).



DAY 3: FRIDAY, 9 OCTOBER 2026

PLENARY: NATASHA RIBEIRO, PROFESSOR OF RESTORATION ECOLOGY AT EDUARDO MONDLANE UNIVERSITY

Natasha S Ribeiro is a Full Professor of Restoration Ecology at Eduardo Mondlane University (Mozambique), a Visiting Faculty Scholar at the University of Virginia (USA) and an Academic Fellow at the Centro de Estudos Florestais, University of Lisbon (Portugal). She holds a PhD in Environmental Sciences from the University of Virginia, an MSc in Forest and Biodiversity Conservation from CATIE, Costa Rica and a BSc in Forest Engineering from Eduardo Mondlane University.



Prof. Ribeiro is an internationally recognised expert in restoration ecology, forest ecology, fire ecology and sustainable forest management, with particular expertise in the ecology, restoration and conservation of Miombo woodlands in Southern Africa. Her research integrates biodiversity conservation, ecosystem resilience, climate change adaptation and carbon dynamics to support sustainable landscape management and restoration initiatives. She has led and contributed to numerous international research, conservation and capacity-building initiatives funded by organisations such as the European Union, Sida, the Darwin Initiative, the European Space Agency and the Finnish National Agency for Education. Her work has been instrumental in strengthening forest science education, advancing restoration research and informing conservation policies across Africa.

Beyond her research, Prof. Ribeiro has held several senior academic leadership positions, including Scientific Director of UEM, Advisor for Research to the Vice-Chancellor of Eduardo Mondlane University, Head of the Centre for Agricultural and Natural Resources Management (CEAGRE), Regional Coordinator of the Southern Africa Miombo Network (2011-2021) and Head of Graduate Studies at UEM.

With an h-index of 23 and an extensive publication record, she continues to contribute to scientific knowledge and policy development through collaborations with universities, government agencies, protected area authorities and international conservation organisations working to address biodiversity loss, climate change and ecosystem degradation in Africa.

SESSION 1

Socio-ecology of African woodlands: Pathways to sustainable management

Natasha Ribeiro

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Woodlands and savannas across sub-Saharan Africa are dynamic socio-ecological systems that sustain biodiversity, livelihoods and cultural identities. However, they face mounting pressures from agricultural expansion, fire regimes and climate variability, among others. This talk explores how integrating ecological processes with social dimensions can illuminate pathways toward sustainable management.

Drawing on case studies from miombo woodlands and savanna mosaics, I highlight the interplay between ecological resilience, traditional knowledge and contemporary policy frameworks. Fire management and community-based stewardship emerge as critical levers shaping ecosystem trajectories. At the same time, socio-economic drivers – such as land tenure, market incentives and demographic change – determine the feasibility and equity of management interventions. The framework presented emphasises three pillars: (1) ecological understanding of disturbance and regeneration cycles; (2) recognition of local institutions and traditional practices; and (3) adaptive governance that bridges science, policy and community priorities. By situating management strategies within this socio-ecological lens, we can move beyond sectoral approaches and foster integrated solutions that balance conservation with human well-being.

Seasonal long-distance movement of male African elephants within the protected environments of Northwest Zimbabwe

Peter Makumbe^{1,2}, Jan Venter² and Herve Fritz²

¹Research and Conservation – Oppenheimer Generations, peter.makumbe@opp-gen.com

²Nelson Mandela University

Understanding elephant navigation in human-fragmented landscapes is vital for conservation. This study tracked eight adult bull elephants via satellite GPS (2015-2024) in Zimbabwe's Hwange-Shangani landscape. Results reveal a unique male-only migration of 250-300 bulls. These elephants inhabit Hwange National Park during the wet season and move to Shangani Holistic Ranch for the dry season, arriving in April and departing in November. Movement is primarily driven by water availability, high-NDVI vegetation and topography. Average home ranges (95% KDE) were 4 815 km², with wet season ranges being significantly larger than dry season ranges. Two critical transit corridors were identified: Gwampa (42 km) and Lake Alice (60 km). Movement speed was significantly higher within corridors (0.66 km/h) compared to protected areas (0.31-0.50 km/h). Elephants exhibited a "landscape of fear" response, avoiding settlements during the day and shifting activity to the night to minimise human conflict. These findings highlight the urgent need to protect migratory routes outside formal parks through holistic land-use planning to ensure population connectivity and viability.

Why grassland restoration practices should include forbs

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³Swedish University of Agricultural Sciences

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Grassy biomes in Africa are undervalued and rapidly declining due to agriculture, mining, woody encroachment and overgrazing. Increasingly, tree planting initiatives framed as nature-based solutions threaten naturally treeless grasslands and the livelihoods they support. A key gap in restoration is the limited recognition of belowground ecosystem processes. In South African grasslands, belowground biomass can exceed aboveground biomass by up to fifteen times, yet these carbon stocks remain overlooked in offset frameworks. Indigenous perennial forbs are central to this system, storing carbon and water in underground organs that enable persistence under fire and herbivory. Our field data show that

over 60% of carbon-important forb species are lost following land-use change, although many retain viable seed banks for restoration. Carbon analyses further identify key forb groups to prioritise in restoration plans. We argue that effective grassland restoration must include indigenous forbs to sustain biodiversity, livelihoods and belowground carbon.

Patterns of biotic diversity in Madagascar and the continued wonders of species discovery

Steve Goodman^{1,2}

¹Field Museum of Natural History

²Association Vahatra

Madagascar, with a land area of about 550 000 km², is well-known for its remarkable biodiversity, high levels of endemism at different taxonomic levels. Biological inventories over the past four decades, including the collection of reference specimens, has led to a remarkable number of new descriptions, ranging from the level of family, genus, and species. In recent years, no area of Earth of comparable size has produced more new taxa to science than Madagascar. This is related to its physical detachment from any other area of land in deep geological time and for non-flying or wind-dispersed organisms the rarity of colonization, which when successful often lead to rather speciose adaptive radiations. Further, the complex geology and hydrological systems of the island, superimposed on east-west meteorological clines and different climatic oscillations in more recent geological time has led to a biologically heterogeneous landscape. These aspects will be presented and the importance of continued biological exploration of the island, using gathered data to address different questions in evolutionary biology and use the data to advance conservation actions.

Representing African landscapes in land surface models: Leveraging pan-African networks of data

Enimhien Akhabue¹, Andy Cunliffe¹, Karina Williams², Anna Harper³, Petra Holden⁴ and Tom Powell¹

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²UK Met Office

³University of Georgia

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African landscapes are under pressure, yet they remain underrepresented in the tools that inform environmental decision-making. Understanding ecosystem processes and supporting sustainable land management requires tools such as land surface models (LSMs), but their value depends on their skill in representing the landscapes they simulate, which requires translation of African ecosystem evidence into model-ready information.

We address this by linking African ecosystem observations and model evaluation. First, we evaluated simulations of water, carbon and energy exchanges across a new Pan-African scientific network to identify model performance across environmental gradients. Second, we developed a measurements-to-models workflow translating African plant trait data to useable form. Third, we used African data to improve parameters and ecosystem simulation.

This work highlights how open and collaborative research can help to progress African data along a research value chain from scattered observations to usable datasets, model improvement and decision-relevant insight.

Fish for the future – development of a strategy to mitigate the impacts of climate change on fish populations

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With climate change rapidly influencing our fish in several ways, it is essential for us to find ways to mitigate their likely responses and maintain resilient fisheries. Over the last ten years, our research group has been trying to understand how exploitation selectively removes certain physiological phenotypes from fish populations. We were only able to do this research because of our large, old sanctuary Marine Protected Areas (MPAs). Our findings have not only demonstrated how hook and line fishing reduced the potential of fish populations for physiological adaptation to the impacts of climate change, but also that sanctuary MPAs have the potential to retain and export “fish of the future” (FOF) that will promote climate resilience and adaptation. Using red roman, *Chrysoblephus laticeps*, as a model species, this presentation aims to explain the mechanism driving selection by hook and line and its impact on the evolution of fishes. We then look closely at how a well-designed network of sanctuary MPAs, or even “catch and release zones” can reduce these impacts by retaining and exporting FOF and facilitating the physiological adaptation of fish populations to a changing climate.

The AQUA-STR project: Investigating trophic tipping points in African freshwater ecosystems under climate and invasion stress

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Freshwater ecosystems across Africa face increasing threats from the impacts of climate change and invasive species. This has far-reaching consequences due to the concept of trophic cascades. The AQUA-STR project is therefore developing a continentally relevant forecasting model to identify vulnerable food web structures for prioritisation and evaluate the potential of nature-based solutions to restore stability. We integrate real-world ecological data, including $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ stable isotope signatures, into a hybrid modelling platform. This approach simulates climate-invasion-biocontrol scenarios across diverse environmental gradients, before and after biological control interventions. Our objective is to detect critical tipping points in trophic linkages and determine whether biological control can rebuild trophic complexity and resilience. To transcend the research-management divide, the model outputs will be translated into interactive, open-access online dashboards tailored to regional managers and policymakers. These tools will provide scenario-based visualisations of invasion cover, trophic risk thresholds and projected biotic responses under future climate trajectories.

SESSION 2

From illicit to investable: Trade intelligence and the future of wildlife economies in Africa

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Wildlife economies are increasingly promoted as part of Africa's conservation future, yet they are vulnerable where illegal and unsustainable trade can outcompete lawful, traceable and community-benefiting value chains. This presentation examines what it would take to make wildlife trade-based economies genuinely investable, resilient and conservation-positive. Drawing on TRAFFIC's work across Africa, it shows how trade intelligence and trade data – including seizure records, permits, online market monitoring, trade route analysis and trade discrepancies – can reveal hidden pressure points, governance weaknesses and practical intervention opportunities that conventional biodiversity monitoring often misses. Using examples from timber, ornamental plants, marine and other wildlife products, it explores how legal and illicit markets interact and argues that enforcement alone is insufficient. Behaviour change work, corruption research and prisoner interviews further highlight the need to understand incentives, social norms and decision-making across the trade chain. The presentation concludes by outlining a collaboration pathway linking trade intelligence, behavioural insight and practical implementation to support legal, sustainable wildlife economies that benefit both people and biodiversity.

A 12-year analysis of waterbird diversity, population trends, and disturbance at Biri Dam, Zimbabwe (2014–2026)

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This study monitored waterbird populations at Biri Dam, Zimbabwe over a decade (2014–2023), using bi-annual surveys along two 900 m transects near the dam wall and a fishing camp. Egrets, storks and ibises dominated, with 70% of species being residents, while Afrotropical and Palearctic migrants comprised 18% and 12% respectively. Bird numbers were higher in the wet season than the dry season. An autoregressive model predicted relative population stability with minor fluctuations in coming years. Species richness and diversity differed significantly between the two survey sites and spatial analysis revealed distinct distribution patterns influenced by season, weather and disturbance. The study underscores the need to keep anthropogenic pressure low, as upstream dams already face high disturbance levels.

Maloti-Drakensberg mountain range temporary ponds: A source of incredible aquatic biodiversity

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The Maloti-Drakensberg mountain range is a critical water catchment for South Africa and Lesotho and supports high biodiversity, including numerous temporary wetlands such as Afromontane tarns and rock pools. Despite their ecological importance and high levels of endemism, information on macroinvertebrate distribution and the environmental drivers shaping these systems remains limited. This study investigated macroinvertebrate diversity, including the molecular diversity of selected taxa and their distribution across more than 100 temporary wetlands surveyed during the summers of 2022 and 2025 in the Eastern Cape, Free State, KwaZulu-Natal and Lesotho. Over 16 000 macroinvertebrates representing 13 orders, 35 families and 46 genera were recorded, with distinct community assemblages observed between wetland types and across locations. Genetic and morphological analyses of the branchiopod genus *Branchipodopsis* revealed substantially greater species diversity than currently recognised, highlighting unresolved taxonomic complexity. Collectively, these findings provide the first comprehensive baseline for macroinvertebrates in Maloti-Drakensberg temporary wetlands and underscore their value as climate-change sentinel systems.

Protected areas and wildlife conservation in West and Central Africa: Lessons learned, emerging challenges and leadership

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Despite a significant part of sub-Saharan Africa's biodiversity occurring outside protected areas, they are a cornerstone of biodiversity conservation, yet face increasing pressures. This is particularly challenging in West and Central Africa, where conservation has historically received less attention than in other regions. Through a literature review, with a focus on lion conservation, this presentation synthesizes lessons learned, examines emerging challenges, and identifies gaps and priorities for future conservation and leadership in the region. Following the 2005 regional lion conservation strategy workshop, research and funding for lion conservation increased, generating important knowledge and conservation actions. However, habitat degradation and fragmentation, poaching and illegal trade, human-wildlife conflicts, limited governance practices and financing are still major challenges. Collaborative management partnerships and the resilience of lion populations have supported progress, but climate change and growing insecurity increasingly threaten these efforts. Funding is unequal and insufficient. Future priorities include strengthening transboundary connectivity and security, putting communities and livelihoods at the heart of conservation, investing in a new generation of African conservation scientists, and securing sustainable funding to preserve biodiversity and genetic diversity.

Translational conservation genetics research in South Africa

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Genetic diversity is one of three fundamental levels of biodiversity. Its importance in species' adaptability and resilience is formally acknowledged through the incorporation of genetic diversity indicators in the Kunming-Montreal Global Biodiversity Framework. Despite South Africa's rich history of conservation genetics research since the 1980s, large gaps persist in translating findings into practically implementable management actions. The African Chapter of the IUCN Conservation Genetics Specialist Group, in partnership with local authorities and stakeholders, is contributing to addressing this challenge. Examples of research on large mammals that are often translocated (e.g. common eland and sable antelope) illustrate the importance of sampling scale and the need for data integration from multiple genetic markers and ecology, in identifying key processes shaping diversity and underlying persistence. Species with fragmented ranges (e.g. black rhino and Cape mountain zebra) require coordinated management, countering the loss of diversity. A coordinated effort is needed to address data gaps across a broad taxonomic scope. Baselines can guide future actions and enable monitoring impacts of ongoing global change.

Safeguarding Southern Africa's east-flowing rivers – a global freshwater biodiversity hotspot

Gordon O'Brien and Lee Baumgartner

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The east-flowing rivers of Southern Africa are exceptionally diverse and collectively support the majority of the region's freshwater biodiversity, making them a globally significant biodiversity hotspot. The tropical east-flowing river systems between the Zambezi and the Phongolo Rivers are the most biodiverse freshwater ecosystems in the region and comparable to tropical systems in South America, the Congo Basin and Asia. This diversity is due to historical connections with the Congo River basin. Despite their importance, water resources in these basins are increasingly being unsustainably developed. Multiple stressors from water abstraction, infrastructure development, land-use change and alien species threaten biodiversity, ecosystem processes and the livelihoods of people who depend on them. These rivers underpin food security, water security and socio-economic wellbeing across the region. The Limpopo and Incomati River basins alone support more than 20 million largely vulnerable people in the region. Sustainable management of these transboundary systems is therefore not only an environmental imperative, but also a social and economic necessity. Improving our understanding of freshwater biodiversity and key ecosystem processes is enabling stakeholders, for the first time, to consider river management at ecologically meaningful, cross-border scales.

Protecting South African ecosystems through the biological control of invasive pines and wattles

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South Africa's biomes, including the Grasslands and Cape Floristic Region, are being degraded by highly destructive invasive Australian acacias and wilding pines. Biological control offers the only viable strategy for their long-term management. Historically, South Africa has achieved celebrated victories in tree biological control, such as suppressing Port Jackson willow using the rust fungus *Uromycladium acaciae* and the seed-feeding weevil *Melanterius compactus*. However, despite these proven successes, new tree biocontrol initiatives have slowed dramatically, facing a 70% reduction in agent approvals over the last decade due to tightening funding and regulations and unresolved conflicts of interest with the commercial forestry sector. This socio-economic complexity is evident in wilding pine management. To protect commercial timber, research has been restricted to cone-feeding agents targeting Mediterranean pines. A promising agent, the cone-feeding weevil *Pissodes validirostris*, was shelved in 2009 due to pathogen transmission concerns but was recently reinitiated to finalise host-specificity testing and petition for release. By reviewing the histories, regulatory hurdles and recent developments in wattle and pine interventions, we highlight the frameworks needed to secure the ecological integrity of South Africa's threatened ecosystems.

DR GEORGE HUGHES

Dr George Hughes is a distinguished conservationist, author, and speaker with more than four decades of experience in biodiversity conservation, sustainable tourism, and natural resource management. His work has taken him across Africa, Europe, the United States, the Middle East, and the Indian Ocean region, with a particular focus on sea turtle research and conservation. Over the course of his career, he has authored more than 300 articles, papers, and reviews on subjects ranging from marine conservation to wildlife economics and nature-based tourism.

A founding member of the IUCN Marine Turtle Specialist Group, Dr Hughes received the International Sea Turtle Society's Lifetime Achievement Award in 2009 in recognition of his contributions to global sea turtle conservation. He has represented South Africa at several international conservation conventions, including CITES, and has played a leading role in advancing sustainable use as a conservation approach.

Dr Hughes has been instrumental in numerous conservation and tourism initiatives, including the establishment of the Natal Parks Board Conservation Trust, and has received multiple honours for his contributions to conservation, tourism, and public service. He is the author of *Between the Tides: In*



Search of Sea Turtles and *Drakensberg Ranger*, and remains a sought-after lecturer and commentator on conservation and environmental issues.

The Natal Parks Board – a conservation adventure

George Hughes

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South Africa's wildlife story is one of both devastation and recovery. By the late 1800s, centuries of exploration, settlement, hunting and development had driven many species to the brink, leaving the country's once spectacular wildlife heritage on the verge of collapse. Against this backdrop emerged an extraordinary conservation experiment. Refusing to relinquish control of its protected areas, Natal established the Natal Parks Board in 1947 as an independent conservation authority dedicated to a single purpose: protecting and restoring nature. Over the following decades, it became a global leader in wildlife conservation, pioneering innovations that helped rescue endangered species, rebuild large mammal populations, and lay the foundations for one of the world's most successful wildlife economies. This presentation highlights this remarkable institution's journey, the visionaries who shaped it, and the conservation adventure that transformed South Africa's natural heritage. Importantly, it highlights how transformative conservation achievements are rarely the product of institutions alone. They emerge from the exchange of ideas, the challenging of assumptions, and collaboration between scientists, practitioners, policymakers and communities. Conferences such as the Oppenheimer Research Conference provide exactly this catalyst, creating the space where new thinking, evidence and partnerships can shape the future of conservation.

Closing

NICKY OPPENHEIMER, SENIOR PRINCIPAL, OPPENHEIMER GENERATIONS

Nicky Oppenheimer, a South African businessman and conservationist, was educated at Harrow School, London and the University of Oxford, where he studied Politics, Philosophy and Economics. He continues his long and respected legacy of environmental and conservation leadership by serving on the board of Tswalu Kalahari Game Reserve. Nicky is also a keen supporter and sponsor of the Oppenheimer Research Conference, which brings together pre-eminent individuals and organisations from the natural and environmental science industries across the world. In 2005 Nicky and Jonathan established the Brenthurst Foundation to reflect the family's contribution to the debate around strategies and policies for strengthening Africa's economic performance. As a trustee of the Oppenheimer Memorial Trust, Nicky strongly believes in investing in education and advocates that every South African has the right to a high standard of education at all levels. He holds an honorary Doctorate in Technology from Technikon



Witwatersrand in South Africa, making him the first recipient from both the public and private sectors and also holds an Honorary Fellowship from the London Business School. Additionally, Nicky is a recipient of the Presidential Order of Honour from His Excellency Mr Festus Gontebanye Mogae, the president of the Republic of Botswana.

POSTER SESSION ABSTRACTS

Please note that poster abstracts have been numbered according to layout at the conference venue

1 High-throughput sequencing analyses of soil fungal communities in South African farming systems

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High-throughput sequencing (HTS) has revolutionised the analysis of soil fungal community assessment by enabling the rapid examination of large volumes of genetic material. Rather than being constrained by limited morphological based techniques to identify fungal species, researchers can now generate comprehensive profiles of soil fungal biodiversity including those fungi that cannot be cultured on artificial media. These advanced bioinformatics tools enable the translation of complex sequencing data into practical agricultural insights on fungal diversity and the impact of anthropogenic activities. The study aims to explore how portable and scalable sequencing technologies can help narrow the technological divide between subsistence and commercial farming systems in South Africa. Two DNA sequencing platforms were evaluated using diverse soil samples to determine their reliability and applicability under real-world conditions. A total of 288 soil samples were obtained from smallholder farms across three districts in Limpopo Province, South Africa. Findings highlight the potential of portable HTS technologies to provide early disease detection and soil health diagnostics, empowering subsistence farmers with data-driven strategies to minimise crop losses, strengthen productivity and promote sustainable land management practices.

54 Attributing woody encroachment in savannas using machine learning-calibrated Earth observation and process-based models

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²Research and Conservation – Oppenheimer Generations

Bush encroachment threatens rangeland productivity and ecosystem functioning across semi-arid savannas, but identifying its causes is challenging because fire, herbivory and climate interact in complex, nonlinear ways. Here, we present a generalisable machine learning-enabled Earth Observation (EO) framework to quantify long-term woody vegetation dynamics. Multi-decadal satellite time series from 1989 to 2024 are combined with field observations, including fixed-point photography and vegetation surveys, to generate spatial estimates of woody cover dynamics. To disentangle drivers, EO-derived fire histories are integrated with spatial data on livestock and wildlife distributions. These data are used to calibrate a process-based vegetation model via a data-driven optimisation approach, enabling grazing and browsing impacts to be inferred from observations. Applied at Shangani Holistic Ranch in Zimbabwe, the framework links EO-derived indicators with field measurements to attribute vegetation change to

interacting disturbance regimes. Crucially, the approach is designed to leverage open, transferable model structures to enable redeployment and scaling across other sites.

2 Thirst reshapes vigilance in plains zebra (*Equus quagga*) near water in a semi-arid system

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Free-ranging ungulates in the semi-arid Makgadikgadi Pans National Park, Botswana, must trade off access to water against predation risk. We tested whether plains zebra (*Equus quagga*) vigilance varied with local vegetation cover, distance to water and movement direction (towards vs away from water). We analysed 21 926 individual observations from camera traps deployed between 2014 and 2016 using binomial mixed models. Vigilance increased with vegetation cover and was higher during movements away from the river, but decreased with increasing distance from the river. At the site-day scale, average vigilance declined as the number of individuals recorded per day increased, consistent with risk dilution. Overall, zebra vigilance near water was shaped primarily by vegetation structure and movement direction, with distance to water playing a minor role. Inbound movements toward water were associated with reduced vigilance, whereas vigilance increased in denser woody cover, consistent with elevated perceived ambush risk. As droughts intensify and artificial water points proliferate, vegetation structure along approach and exit routes will shape predator-prey encounters, indicating unintended risk hotspots in semi-arid systems.

55 Flow or fail: Why fish movement matters in the Limpopo Basin

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Fish movement underpins the health and resilience of freshwater ecosystems, enabling nutrient transport, maintaining genetic diversity and sustaining biodiversity. In river systems, connectivity is essential for these processes, yet many basins are increasingly fragmented. The Limpopo River Basin supports over 77 freshwater fish species, of which 49 depend on movement to sustain healthy populations. But 81% of the basin is already fragmented and no longer free-flowing. Despite this, the movement patterns of key species are poorly understood. Using otolith microchemistry (⁸⁶Sr/⁸⁷Sr), we reconstructed lifetime movement patterns of three freshwater migratory fish species (*Labeobarbus marequensis*, *Labeo molybdinus* and *Labeo cylindricus*), representing the first application of this approach at a basin scale in Africa. Distinct chemical signatures reveal clear evidence of movement across the system, highlighting the critical role of connectivity in supporting these species. Our findings highlight that maintaining or restoring free-flowing rivers is critical not only for the persistence of fish and biodiversity, but also for the ecosystem services and human communities they support.

3 Against the current, toward African anguillid eel recovery

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Anguillid eels undertake long-distance migration between inland rivers and the ocean, supporting fisheries, livelihoods and ecosystem functioning across African rivers. Their survival is challenged as they face multiple stressors, including habitat fragmentation, declining river connectivity, pollution, altered flow regimes, climate change, overfishing and the degradation of habitats. Regional life-history risk analyses revealed that many eel populations are exposed to cumulative and interacting pressures in all life stages. These stressors reduce recruitment, restrict migration and compromise population resilience, increasing the risk of long-term decline and localised extinction. Significant opportunities exist to reverse these trends. Restoring river connectivity, improving environmental flow management, strengthening sustainable fisheries governance, rehabilitating freshwater habitats and expanding the use of environmental DNA (eDNA) monitoring can provide cost-effective tools for detecting eel presence and tracking recovery. As indicators of connected and functioning aquatic ecosystems, Anguillid eels can guide conservation action across catchments, countries and oceans. Protecting African eels will help sustain fisheries, biodiversity and the ecological integrity of rivers from source to sea.

41 Genetic species identification, sex determination and DNA degradation from non-invasive sampling for serval (*Leptailurus serval*) and caracal (*Caracal caracal*)

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This study evaluates the effectiveness of faecal non-invasive genetic techniques for species identification, sex determination and DNA analysis on two African mesocarnivores, the Serval and Caracal. Faecal samples will be collected from known individuals and used as a DNA source to test molecular approaches under controlled conditions. Species identification will be conducted using mitochondrial cytochrome c oxidase I (COI) gene amplification and Sanger sequencing, with sequences matched against reference databases to confirm identity. Sex determination will be assessed using two molecular markers, the zinc finger (ZFX/ZFY) locus and the amelogenin (AMEL) gene, to evaluate their reliability in degraded samples. To investigate environmental effects on DNA integrity, faecal samples will be exposed to contrasting conditions (cold/dry vs. hot/wet) over 21 days. DNA degradation will be monitored through PCR success and agarose gel electrophoresis, with fragmentation patterns used as indicators of DNA quality. It is predicted that species identification will be accurate using mtDNA markers, while amelogenin will outperform ZFX/ZFY in degraded samples. Additionally, warmer and wetter conditions are expected to accelerate DNA degradation. Overall, this study aims to validate cost-effective, non-invasive genetic tools and improve methodological reliability for monitoring elusive carnivores, contributing to more robust conservation and management strategies in changing environments.

4 Honeydew-mediated multitrophic interactions in fruit agroecosystems: Ecological implications for integrated pest management

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Honeydew, a ubiquitous sugar-rich excretion of phloem-feeding hemipterans, plays a central role in structuring multitrophic interactions in fruit crop agroecosystems. Despite honeydew's ecological importance, its influence on pest-natural enemy dynamics and pest management outcomes is insufficiently understood, particularly in African systems. This review synthesises global evidence on honeydew-mediated interactions among hemipteran pests, Hymenoptera (parasitoid wasps, ants and bees) and other beneficial insects, with direct implication for integrated pest management (IPM). Studies demonstrate that honeydew enhances parasitoid longevity, fecundity and foraging efficiency, thereby strengthening biological control. However, research also shows that it promotes ant attendance, which protects pests and disrupts natural enemy activity. Furthermore, studies highlight that honeydew can impair plant health by facilitating sooty mould growth and, in some systems, interfering with pollination. Evidence also indicates that contamination of honeydew by systemic insecticides poses risks to non-target beneficial insects. This review addresses these gaps and advances a framework for integrating honeydew dynamics into ecologically informed IPM strategies.

5 Advancing biodiversity conservation in the Limpopo River Basin through regional-scale ecological risk assessment

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The Limpopo River Basin (LRB) sustains rich biodiversity and supports more than 18 million people, yet increasing pressure from altered flow regimes, declining water quality, habitat loss, invasive species and land-use change threatens ecosystem integrity. Understanding how these interacting stressors influence biodiversity is critical for sustainable basin management. This research applies a basin-scale ecological risk assessment to examine drivers and spatial patterns of biodiversity change across the LRB. A Bayesian Network-Relative Risk Method framework, PROBFLO, has been tailored for 41 sites spanning river channels, floodplain wetlands and the Limpopo estuary, creating the first basin-scale probabilistic modelling network evaluating biodiversity risk across the entire basin. Models integrate biodiversity indicator species, ecosystem service endpoints, spatial analyses of species distributions and habitat connectivity to capture basin-wide ecological dynamics. Scenario analyses evaluate how alternative environmental conditions and management actions influence biodiversity risk. The resulting models and spatial risk maps provide decision-support tools for collaborative, transboundary water resource management and biodiversity conservation planning across the LRB.

42 The uncanned truth: Species identification in pilchard brands for sustainable fishery management

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Pilchards are commercially and ecologically important pelagic fish. South Africa primarily harvests *Sardinops sagax*, a species that has experienced declines in its stock since 1987. During canning, key morphological features used for species identification are destroyed, creating opportunities for species substitution and food fraud. Traditional DNA barcoding often fails due to processing-induced DNA fragmentation, while additives such as tomato sauce may interfere with genetic analysis. This study investigated whether DNA could be extracted to verify species identity and compliance with labelling. Despite the degrading effects of processing, DNA was successfully extracted, amplified by PCR, and sequenced, enabling accurate species identification. Accurate identification supports fisheries management, conservation, and the prevention of illegal fishing. As a vital forage fish, pilchards support marine food webs and correct identification contributes to consumer protection and sustainable fishery management.

56 The effects of different landscape management strategies on the genetic structure and reproduction strategy of *Cynodon dactylon*

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As conservation efforts increasingly focus on protected areas to safeguard biodiversity, the surrounding areas, including rangelands, have often been overlooked for their potential to enhance ecological connectivity. These rangelands, traditionally used for livestock grazing, are fundamental to the landscape that connects protected areas. However, their role in maintaining ecological processes, especially species movement and gene flow, is inadequately studied. *Cynodon dactylon* (Bermuda grass) is a key species in these rangelands, providing nutritious food for herbivores. Genetic diversity can be analysed using microsatellite markers, which are highly polymorphic short tandem repeats of DNA sequences. These markers have been developed for turf-type Bermuda grasses, including *Cynodon transvaalensis* and *C. dactylon* (L.). This study tested 33+ microsatellite primers, developed in previous studies. Preliminary results for this study show that only 13 were present in the genome and successfully amplified *C. dactylon* from KwaZulu-Natal and Limpopo. Results also showed that *C. dactylon* is highly polymorphic. Analysing the allele frequency distribution from this study will help understand how rangeland management can support biodiversity conservation and landscape connectivity beyond protected area boundaries. Because *C. dactylon* reproduces both vegetatively and sexually, grazing management may influence landscape-scale genetic connectivity by affecting opportunities for flowering, seed production and gene flow among populations.

57 Assessing the impact of bush control methods on vegetation in *Rhigozum trichotomum*-encroached areas at Tswalu Kalahari Reserve, Northern Cape province

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Historic inappropriate rangeland management has resulted in the encroachment of *Rhigozum trichotomum* (three-thorn), resulting in the degradation of the rangeland and changes of the herbaceous layer in terms of species composition, grazing capacity and overall ecosystem resilience. This three-year study, conducted in the semi-arid Southern African savanna at Tswalu Kalahari Reserve, aimed to facilitate ecological restoration by monitoring woody responses alongside herbaceous biomass, species composition, diversity and density changes. The control treatments include manual felling, felling with stump-applied arboricide and soil-applied arboricide (each at 50% and 100% intensities) and an untreated control. Although the study concludes in October 2026, preliminary biannual monitoring demonstrated a reduction in woody encroachment in the 100% soil-applied arboricide treatment. Conversely, woody encroachment rapidly increased due to vigorous regrowth (coppicing) in the other treatments. Despite an initial disturbance caused by plot construction, all methods ultimately increased the grazing capacity, herbaceous composition and density, mainly due to increased rainfall over the study period. These short-term benefits may be temporary unless ongoing management is implemented to prevent re-encroachment and ensure sustainable rangeland restoration over the long term.

6 From blubber to biomarkers: Standardising blubber hormone extraction for baleen whale endocrine assessment of reproductive function and physiological stress

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Baleen whales are the ocean's ecosystem engineers and are threatened by anthropogenic pressures. These pressures result in physiological impairments that are often overlooked in traditional ecological surveys. Blubber steroids provide invaluable insights into reproductive and stress physiology. However, the existing blubber steroid extraction protocols developed by Kellar et al. (2006), Atkinson et al. (2021) and Graham et al. (2022) exhibit methodological inconsistencies. The present study aimed to develop and standardise a protocol for extracting blubber steroid hormones by a step-by-step evaluation of these parameters against previously established methods. Blubber extractions were conducted from the carcasses of three southern right whales (2M, 1F; calves) and two humpback whales (1F, Juvenile; 1M, Adult) collected from different locations in the Western Cape, South Africa. The collected samples were extracted and assessed for progestogen and glucocorticoid metabolite levels. The optimised protocol outperformed previously published methods, with higher extraction efficiency (Progesterone:138.8%;

Cortisol:111.9%), greater lipid mass (31.47%) and higher hormone concentrations (Progesterone:234.18 ng/g; Cortisol:352.06 ng/g). By reducing hazardous solvents and logistical constraints while maintaining efficient steroid recovery, the new protocol not only offers a robust framework for endocrine assessments but also provides opportunities for global collaborations.

7 Population status, ecology and conservation challenges of cattle egrets (*Bubulcus ibis*), especially in the Southern Africa subregion: A systematic review and evidence synthesis

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The Cattle Egret (*Bubulcus ibis*) is one of Africa's most adaptable yet environmentally sensitive water-birds, occupying natural wetlands, grazing systems, irrigated agro-mosaics and urban green spaces. We conducted a systematic review of 173 studies published between the 1940s and 2025, incorporating global research where it provided insights relevant to Southern African populations. Using narrative synthesis and quantitative summaries, we evaluated population trends, habitat use, breeding ecology, threats and ecosystem services. Across all studies, habitat and foraging ecology dominated the literature (46.2%), followed by population status and distribution (21.4%), breeding ecology and behaviour (16.8%) and threats and contaminants (15.6%). In Southern Africa, atlas interpretations and site-based surveys from South Africa, Zimbabwe, Botswana, Namibia and Lesotho indicate generally stable or increasing populations over the past three decades, with SABAP-derived occupancy rising from 0.38 (1987-1991) to 0.60 (2007-present). Densities peak in irrigated pastures and peri-urban green spaces of eastern South Africa but remain low in arid Namibia, high-altitude Lesotho and Zambia's under-sampled floodplains. Foraging studies show diets dominated by Orthoptera, enhanced success near livestock and machinery and seasonal shifts in both diet and foraging locations that reflect hydrology-driven changes in prey availability and habitat accessibility. Breeding studies report opportunistic, rainfall-synchronised nesting, mean colony sizes of ~65 nests, clutch sizes of 2.9 eggs and fledging success of ~62%. Key threats include loss of nesting habitat, extreme-weather colony failures, organochlorine contamination and pathogen spillover at poultry interfaces, while ecosystem-service benefits include pest suppression and nutrient redistribution. We recommend three priorities for future research: (1) advanced telemetry and stable-isotope analyses to map movements; (2) routine contaminant and pathogen screening within One Health frameworks; and (3) expanded atlas-based and citizen-science monitoring to address geographic bias. These steps will clarify the species' dual role as a service provider and early-warning indicator of environmental change across Southern Africa.

8 Multiple lines of evidence using aquatic macroinvertebrates towards the sustainable management of stressors in the Limpopo River Basin, Southern Africa

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Rivers sustain high biodiversity yet are among the most threatened ecosystems globally. In the trans-boundary Limpopo River Basin, rivers are increasingly impacted by flow alteration, declining water quality, habitat degradation, barriers and invasive species. Achieving sustainable water resource use requires a clear understanding of ecosystem requirements. However, knowledge of macroinvertebrate biodiversity and responses to interacting stressors remains limited. As sensitive ecological indicators, macroinvertebrates integrate the effects of multiple stressors across space and time. This study investigates patterns in macroinvertebrate community structure to identify key environmental drivers of ecosystem condition. Complementary biomonitoring and eDNA metabarcoding approaches were applied to improve detection of rare and cryptic taxa and to better define their ecological requirements. These data were incorporated into a probabilistic Relative Risk Assessment-Bayesian Network framework to quantify cumulative impacts, identify dominant stressors and predict ecological responses under different scenarios. Although the Limpopo Basin is significantly altered, sustainable management remains achievable. This research supports evidence-based, transboundary water resource management.

43 Beyond the Big Five: How species preferences, risk perceptions and tourist profiles shape the likelihood of engagement in wildlife viewing activities

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Wildlife tourism has been increasingly recognised as a vital contributor to conservation financing in Southern Africa, yet concerns remain regarding how visitor behaviour aligns with potential negative impacts on wildlife. Our study examined how tourist motivations affect the likelihood of engagement in six wildlife viewing activities (guided on- and off-road game drives, tracking wildlife on foot, hide-based wildlife viewing, self-drive game drives and night drives) across study sites in South Africa, Botswana and Namibia. Surveys were administered to 132 adult tourists between August 2023 and April 2024, capturing information on species viewing priorities, perceived risks of potential negative impacts on wildlife, photographic aims, previous wildlife viewing experience and demographic profiles. We identified latent preference structures through exploratory factor analysis and used ordinal logistic regression models to estimate participation likelihood across activity types. Our results show that preferences for viewing non-charismatic species, such as reptiles, were associated with greater participation in low-impact activities like hide-based wildlife viewing, whereas interest in charismatic species, including carnivores and giraffe (*Giraffa camelopardalis*), was linked to increased reliance on guided experiences. Higher risk-sensitivity reduced participation likelihood in off-road game drives, guided tracking of animals and night drives with a guide, while motivations centred on photography and close-range wildlife viewing increased the likelihood of participation for activities involving a guide, even when potential disturbance to wildlife was acknowledged. The findings of our study demonstrate opportunities to diversify tourism

products, strengthen wildlife-first viewing practices and better align visitor expectations with ecological principles through enhanced guide training, targeted visitor education and thoughtful wildlife viewing activity design.

58 Ecology, host plant selection and distribution of bagworms (*Lepidoptera psychidae*) in a semi-arid region in Zimbabwe: Implications for livestock mortality

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Livestock mortality in African rangelands has been attributed to various causes, yet bagworms (Lepidoptera: Psychidae) have only recently been flagged as a potential threat following ethno-veterinary reports. Apart from their defoliating role in the veld, little is known about bagworm ecology in savanna systems. This study examined bagworm occurrence, host plant selection, microhabitat use and distribution across ten paddocks to establish ecological conditions favouring infestation. Ground cover was the strongest predictor of bagworm presence (Spearman $r_s = 0.785$), with plots exceeding 40% cover carrying greater than 95% probability of harbouring bagworms. A logistic regression model achieved 98.7% classification accuracy. Sixteen host plant species were recorded, with active preference confirmed for *Gardenia spathulifolia* and *Cymbopogon excavatus*. Bagworms showed consistent microhabitat fidelity, favouring grass tufts and constructing cases almost exclusively from grass material (97.9%). Spatial analysis confirmed significant clustering within all paddocks, suggesting infestations aggregate around discrete favourable patches. These findings provide the ecological grounding necessary to link bagworm proliferation with livestock exposure, with identification of the toxic component within bagworms as the logical next step.

59 Macroinvertebrates as indicators of stream health in Telperion Nature Reserve, Mpumalanga, South Africa

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Maintaining river and stream health, despite growing anthropogenic pressures, is crucial for sustaining ecosystems and human societies. Freshwater macroinvertebrates are commonly used as bioindicators to assess the health and ecological integrity of lotic systems. The Upper Wilge River catchment is under pressure from anthropogenic stressors, such as mining, agriculture, industrial activities, wastewater discharge and power generation. This study assessed the macroinvertebrate assemblages and physico-chemical conditions of the Laurelin Spruit, which flows through Telperion Nature Reserve and compared these to the confluent Wilge River. Macroinvertebrates were assessed using the South African Scoring System version 5 (SASS5) methodology. Physico-chemical conditions showed little variation along the longitudinal profile of the Laurelin Spruit. Significant differences between the two watercourses indicate that the Laurelin Spruit had better water quality, however this was not supported by SASS5

metrics. 43 macroinvertebrate taxa were recorded in the Laurelin Spruit and a suite of key bioindicator taxa were identified that will inform future biomonitoring on Telperion Nature Reserve.

92 The interacting effects of warming, decreased rainfall and herbivory on the emergence of *Vachellia erioloba*

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Southern Africa's semi-arid savannas are predicted climate change hotspots, yet the effects of climate change on the recruitment of arid-adapted trees is unknown. The early developmental phases of these woody species are strongly controlled by climatic factors (temperature and rainfall), and biotic drivers such as megaherbivores through either herbivory, or endozoochory. Here we examined the interacting effects of rhino endozoochory and climate change on the establishment (germination and radicle extension) of *Vachellia erioloba* in Tswalu Kalahari Reserve through a fully factorial lab experiment, manipulating temperature and rainfall. Germination significantly increased under the highest temperature scenario, but only when coupled with increased water availability to offset evaporation. Radicle growth rate was faster at higher temperatures, although the length decreased with increasing temperature. The radicles from gut passage seeds grew shorter and slower than chemically treated seeds. These results suggest that climate change will not act in isolation on tree recruitment but will likely interact with megaherbivores to constrain establishment success in a warmer, drier future.

60 Effects of bush clearing on vegetation condition and mammal activity in the Waterberg

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Bush encroachment, a legacy of past land-use and management, is a major driver of change in Southern African savannas requiring active management intervention. Understanding how bush clearing impacts the vegetation and mammal community is crucial for evidence-based management. This study investigates the impacts of a sequential clearing treatment (manual hacking, herbicide and burning) on vegetation structure and mammal communities in the northern Waterberg. The objectives are to assess overall efficacy of treatment, evaluate changes across treatment stages and examine vegetation-mammal relationships. Using mammal relative abundance indices from camera traps and multiple vegetation metrics, comparative analyses tested for differences between stages and mammal-vegetation relationships. Distinct changes in herbaceous vegetation and mammal presence were observed that did not align with the intended impact of clearing. Our results show that success of the treatment cannot be simply measured by reduction in woody plants. This suggests clearing outcomes are driven by fine-scale vegetation changes and broader system responses, so should be assessed beyond woody plant reduction alone.

44 Economic analysis of legal game meat value chain in Zambia

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The study examines the economic viability of Zambia's legal game meat value chain, focusing on profitability, production dynamics and key constraints. Using mixed methods, it compares opportunistic sellers and established producers, applying regression and cost-benefit analyses. Findings show that game ranchers face high production costs (averaging ZMW 760/kg), resulting in significant financial losses, while retailers and transporters achieve substantial profits due to lower costs and high markups. Key challenges include complex licensing systems, high entry barriers, limited market access, weak traceability and perceptions of elite dominance. The sector's sustainability often depends on diversified income streams such as tourism and hunting. The study recommends regulating retail prices, expanding game meat production in GMAs, strengthening traceability systems, streamlining licensing processes and promoting diversification to enhance economic viability and inclusivity.

61 Earth observation for grazing management in the Karoo rangelands

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Rangelands, covering 25% of Earth's land surface, face escalating degradation pressures. Traditional in situ assessments are accurate but costly and impractical for large-scale monitoring. This research focused on the Nama-Karoo biome in Southern Africa – primarily used for sheep and goat farming and at risk of overgrazing – by integrating Earth observation technologies to enhance rangeland monitoring and sustainable management. Three experiments were conducted: (1) Livestock tracking, in situ observations, and Sentinel-2 imagery revealed that sheep congregate along drainage lines with deeper soils, with grazing patterns varying by stocking density; high-resolution NDVI data effectively identified productive and preferred grazing areas. (2) Remotely sensed vegetation indices, combined with GPS-collar movement data, demonstrated that NDVI can predict changes in sheep weight gain across seasons. (3) Multispectral imagery was unsuitable for plant species discrimination (37.5% accuracy), but hyperspectral UAV-based imaging and machine learning achieved >70% accuracy; feature selection of 12 key wavelengths improved classification to >90%. These techniques enable efficient satellite- and UAV-based ecological assessments over vast, inaccessible rangelands, supporting more sustainable management of the Karoo.

9 1KSA – decoding South Africa's biodiversity

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South Africa is one of the most biodiverse countries globally, yet biodiversity genomics research has historically relied on sequencing and analysis conducted outside the country. This has contributed to the

loss of local capacity, expertise and long-term access to biodiversity data, limiting the ability of scientists, conservation practitioners and policymakers to use genomic information effectively for conservation decision-making. To address this challenge, the South African Biodiversity Genomics Programme, 1KSA, was launched in 2023 by DIPLOMICS, a national research infrastructure supported through the South African Research Infrastructure Roadmap (SARIR). The programme aims to build sustainable, in-country capacity for biodiversity genomics while promoting equitable data governance, collaboration and open science to support applied conservation outcomes. Through a community-driven species nomination process, South African researchers contribute samples that are sequenced locally using long-read whole-genome technologies. Draft genome assemblies are generated using a standardised, open-source pipeline on national high-performance computing infrastructure. Laboratory protocols, bioinformatics workflows and assembly quality metrics are transparently documented, while data access is governed through a formal framework to enable responsible reuse by the conservation community. 1KSA provides hands-on training and skills development in laboratory protocols (library prep and sequencing), data quality control and genome assembly, enabling researchers to generate, interpret and apply genomic data locally. The resulting reference genomes provide foundational resources for population genomics, species management, climate-change impact assessments and conservation planning, as well as for identifying biodiversity-derived opportunities linked to the bioeconomy. Importantly, 1KSA strengthens collaboration between research institutions, infrastructure providers and conservation stakeholders, ensuring that genomic resources are locally owned, discoverable and usable. This poster presents 1KSA as a capacity-building conservation genomics model, demonstrating how transparent infrastructure, responsible data governance and cross-sector collaboration can translate biodiversity genomics into effective, long-term conservation outcomes in the Global South.

10 Machine learning for habitat selection: A simulation study

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Regression models have dominated habitat selection studies; however, they have limitations in their predictive capabilities. These limitations include the inability to handle non-linear data and complex variable interactions, common features of ecological data. Machine learning methods may therefore provide a powerful alternative for habitat selection due to their ability to handle non-linear relationships and complex variable interactions without parametric assumptions. Using simulated data to systematically vary non-linearity and interaction strength, we compared the performance of logistic regression and random forest models for habitat selection under varying levels of non-linearity and variable interactions. In highly non-linear scenarios, the random forest model outperformed logistic regression for multiple performance metrics. The results from this study show that random forest models can more accurately predict habitat selection than logistic regressions when data have high degrees of non-linearity. Habitat selection studies with complex ecological data should therefore consider random forest models to improve predictive accuracy and support more robust conservation planning.

77 Flea and tick infection in free-range chickens in selected rural communities of South Africa

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Fleas and ticks are blood-sucking ectoparasites that feed on animals, including chickens, causing anaemia, skin dermatitis and introduction of secondary infections, resulting in compromised animal health and productivity. Despite the negative impact, there is a scarcity of information on their burden in free-ranging chickens in South Africa. This study aimed to determine the identity and prevalence of flea and tick species infecting free-ranging chickens in the KwaZulu-Natal (KZN) and Eastern Cape (EC) provinces of South Africa. Chickens were collected from rural villages in KZN and EC provinces and screened for fleas and ticks. A combination of both morphological identification and 16S/ITS markers were used to identify the recovered ticks and fleas respectively. Twenty-four out of 79 chickens (30.4%) were infested with fleas (27.9%) and ticks (3.8%). Notably, *Echidnophaga gallinacea* was the only flea species identified infesting chickens in both provinces and *Amblyomma hebraeum* and *Haemaphysalis sp.*, were the only two tick species identified in these provinces. In KZN, Shongweni had the highest prevalence of *E. gallinacea* infections (90%), followed by Maphumulo (50%) and Umzinto (10%). However, no infestation was recorded in Mtunzini. In EC, Tsolo showed the highest *E. gallinacea* infection rate of 40% and Gcuwa recorded the lowest (10%). The KZN recorded the highest *E. gallinacea* infection rate (38.5%) than EC (17.5%). Very few chickens were infested with ticks in KZN and none in the EC. This low infestation might be due to the fact that chickens are often secondary or accidental hosts for a wide range of tick species. Overall, the highest prevalence (43.6%) of fleas and ticks was observed in KZN, compared to the EC (17.5%), however, there was no significant difference ($p = 2.730$). The inland region showed a higher infection rate (45%) compared to the coastal region (15.4%) ($p = 0.0230$) while the North Coast (33.3%) recorded higher infections than the South Coast (27.5%) ($p = 0.0230$). This high prevalence was associated with warmer and humid temperatures (climate conditions) in these localities, which were favourable for their increased distribution, infestation and development. This study provided insight on ectoparasite burden in free-range chickens, which contributes additional knowledge on the geographical distribution of these ectoparasites species in South Africa. Therefore, this baseline data can be used to develop effective and specific control strategies of ectoparasites infesting backyard chickens in South Africa. Additionally, this data provides information about ecto-parasite transmission dynamics between humans, livestock and wildlife in rural communities, where infested free-range chickens/birds roam freely and interact with livestock, wild birds and other wildlife animals that may carry parasites like ticks and fleas.

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The Global Biodiversity Framework's 2030 targets represent a bold ambition to reduce negative environmental impacts worldwide, with benefits for people and nature. Policies and programmes designed to meet the 2030 targets will be more equitable and more sustainable if they balance the perspectives of the people most affected with international pressures. However, key unanswered questions remain about the extent to which the 2030 targets reflect and are informed by the needs, interests, concerns, and practices of communities who live in biodiversity-rich areas in Eastern and Southern Africa. The Morally Contested Conservation (MCC) research project produces evidence to help inform contentious decisions about biodiversity conservation. Here we describe how the international, interdisciplinary MCC team collaboratively identified potentially contentious topics related to the 2030 targets, and how we will measure perspectives on those topics from multiple groups internationally. The community-centred component of our research aims to infuse academic and policy discourses with perspectives from rural African communities as the international conservation community moves towards 2030.

52 Comparative study of chacma baboon competition in the bankenveld habitat and bushveld habitat

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Competition plays an important role in understanding the social organisation, behaviour, survival and reproductive success of primates. In chacma baboons (*Papio ursinus*), both intragroup and intergroup competition are influenced by habitat structure, resource distribution and social hierarchy. While several studies have focused on feeding behaviour, dominance and mating strategies in relation to baboon competition, fewer have examined how different habitat structures influence competitive behaviour. This study aims to investigate the influence of habitat structure on intra- and intergroup competition in two chacma baboon troops inhabiting contrasting environments: the open Bankenveld grassland habitat of Telperion Nature Reserve and the denser bushveld habitat of Swebeswebe Nature Reserve. Behavioural data collection began in August 2025 and will continue until August 2026. Data are being collected using scan sampling at 15-minute intervals and ad libitum observations during competitive interactions. GPS coordinates are also being recorded to analyse movement patterns and spatial behaviour using GIS

software. To account for repeated observations, Generalised Estimating Equations (GEE) will be used to model the outcomes of intra- and intergroup conflicts, including win-loss interactions. The Wilcoxon signed-rank test will be used to evaluate behavioural changes following competitive interactions and determine whether troops alter their movement patterns and space use after these events. It is expected that habitat structure will influence competitive behaviour. The open habitat may be associated with lower levels of competition due to greater visibility and more dispersed food resources, whereas the denser bushveld habitat may exhibit higher levels of competition because of concentrated resources and reduced visibility. The findings will provide insights into how habitat structure influences the social dynamics and competitive interactions of chacma baboons across different environments.

79 Fair shares from the wild: What constitutes a fair deal for communities in the African wildlife economy?

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Much has been made of the potential for the wildlife economy in Africa to be a source of green, inclusive, economic development. At the same time, criticism has been levelled at some key sectors and/or individual enterprises within the wildlife economy for the low levels of benefits captured by local communities. For example, in Uganda's gorilla tourism industry, local communities living adjacent to Bwindi Impenetrable Forest receive a tiny percentage of the permit fees that tourists pay to track gorillas. Within the trophy hunting sector, a frequently cited criticism is that communities receive less than 3% of the income generated. Drawing on a literature review and a survey conducted through the IUCN Sustainable Use and Livelihoods Specialist Group, this study explores the available information on what benefits communities do actually receive and the nature of the deals they are able to strike with the private sector in various wildlife economy activities including tourism, hunting, biocredits and forest products and compares this with what is currently considered good practice in other sectors outside the wildlife economy including products labelled as being fairly traded.

62 From policy to practice – reviewing the effectiveness of a decade of environmental flow implementation in the transboundary rivers of the Kruger National Park, South Africa

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It is now apparent that freshwater resources and the ecosystems they maintain are under increasing pressures, impacting water security and the delivery of ecosystem services dis-benefiting both society and biodiversity. Predictable and consistent hydrological patterns are critical to maintain ecological functions and ecosystem services in freshwater systems. Environmental Water Requirements (EWR) or environmental flows have been implemented globally to mitigate the negative impacts of hydrological alteration caused by dam construction and water abstraction. In this study, we used long-term fish bio-monitoring data from Kruger National Park to evaluate fish community responses pre- (2000-2012) and post- (2013-2023) EWR implementation in the Crocodile and Sabie rivers. Biodiversity indices showed no statistically significant differences following EWR implementation (all $p > 0.05$); however, all indices exhibited moderate to very large effect sizes (Crocodile: Cohen's $d = 0.41$ - 0.68 ; Sabie: Cohen's $d = 0.77$ - 1.65). PERMANOVA revealed a significant shift in community composition in the Sabie River (Pseudo- $F = 4.91$; $p = 0.003$; PERMDISP: $p = 0.61$) but not in the Crocodile River (Pseudo- $F = 1.05$; $p = 0.44$). Beta diversity partitioning indicated greater compositional change in the Crocodile River, with Sørensen's dissimilarity decreasing from 0.514 to 0.353 post-EWR, driven by increased species turnover (0.083 to 0.158) and reduced nestedness (0.431 to 0.195). The Sabie River remained comparatively stable (pre: 0.246; post: 0.251). Overall, EWR implementation was associated with ecologically meaningful shifts in fish community structure in both rivers; as such, continued monitoring is necessary to identify the fish responses from ecological and management drivers.

11 Assessment of faecal glucocorticoid and thyroid metabolite patterns as indicators of physiological well-being during rehabilitation in Temminck's pangolin (*Smutsia temminckii*)

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Pangolins are the most trafficked mammal globally, resulting in severe population declines across all eight species. Rehabilitation of confiscated individuals from the illegal wildlife trade for reintroduction to the wild, is an essential component of their conservation strategy. Rescued pangolins are often admitted in poor physiological condition, however assessing physiological recovery during rehabilitation is difficult

due to the reliance on behavioural and clinical indicators. Using longitudinally collected faecal datasets from individuals under human care, glucocorticoid (fGCM) and triiodothyronine (fT3) metabolite quantification allows the assessment of physiological stress and metabolic condition in pangolins undergoing rehabilitation. We predict that stress biomarkers (fGCM) will decrease as body condition parameters (fT3) increase over the course of rehabilitation, reflecting recovery. This integrative approach provides a valuable tool to assess physiological well-being, inform rehabilitation practices and subsequently improve post-release outcomes in this cryptic but vulnerable species.

93 Interacting landscapes of heat and fear: Drinking behaviour in Kalahari Desert birds

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Many desert birds depend on surface water to survive in habitats characterised by extreme heat and scarce resources. During heat waves, birds must dissipate heat through evaporative cooling while avoiding dehydration. As climate change intensifies heat waves, arid-zone birds are expected to become increasingly water-dependent. However, waterholes can carry high predation risk, creating trade-offs between dehydration avoidance and predation risk. This study uses camera-traps, temperature loggers and focal observations to evaluate these trade-offs at waterholes in high- and low-predation areas in the Kalahari Desert. Preliminary results show that vigilance and drinking time are affected by both air temperature and predation risk, with birds drinking less and being more vigilant when temperature and predation risk are simultaneously high. Raptors visit troughs in the high-predation area at high rates, peaking at midday and afternoon, while non-raptors avoid these times in the high-predation area but visit troughs continuously in the low-predation area. These findings suggest Kalahari birds modify their behaviour to balance thermoregulatory needs against predation risk.

80 Boma-habituated African buffalo exhibit capture-induced hypothermia

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Daily rhythms of body temperature are tightly regulated in large mammals but may be altered by stressors such as chemical immobilisation and capture. In free-ranging African ungulates, not habituated to human presence, capture-induced hyperthermia is typically observed. Whether similar patterns of hyperthermia are evident in boma-habituated African ungulates is not clear. In our study, juvenile African buffalo were implanted with temperature-sensitive data loggers that recorded core body temperature at five-minute intervals. Following habituation to boma housing and recovery from logger implantation, individuals were chemically immobilised using azaperone and etorphine every second day for two weeks and thereafter once weekly for three weeks. Body temperature data collected on immobilisation days were compared with data from the preceding day. While mean and maximum daily body temperatures remained unchanged, daily amplitude increased significantly and minimum daily temperature

decreased significantly on immobilisation days. The findings indicate that chemical immobilisation alters normal 24-hour thermoregulatory patterns in buffalo, resulting in capture-induced hypothermia. Understanding responses of ungulates to immobilisation with specific drug combinations is critical for improving animal welfare and management practices, particularly under increasing environmental variability, where climate change may intensify thermal stress. Future studies should investigate alternative immobilisation protocols and compare responses in free-ranging populations to better inform conservation and wildlife management strategies.

46 Assessing the effectiveness of community-based natural resource governance and benefit-sharing mechanisms in Mulobezi Game Management Area

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Over the past three decades, community-based natural resource governance gained prominence as a strategic approach to conservation and rural development in sub-Saharan Africa. In Zambia, game management areas (GMAs) represent critical landscapes where devolved governance frameworks aim to empower local communities and promote equitable benefit-sharing. This research examines how well community-based natural resource governance and benefit-sharing systems function in the Mulobezi GMA in Zambia, highlighting persistent issues such as elite capture, weak institutional capacity, and inequitable distribution of wildlife-related benefits. Using a mixed-method approach, the study evaluates institutional effectiveness, stakeholder participation, and community perceptions to generate practical recommendations for improving governance, equity, and accountability in Zambia's CBNRM system.

12 Pullen Nature Reserve Field Station: Establishing a long-term biodiversity research and monitoring platform in Mpumalanga's savanna biome

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University-owned field stations in biodiverse landscapes provide sustained access for teaching, postgraduate training and long-term ecological monitoring. Pullen Nature Reserve, donated to the University of the Witwatersrand in 1985 and managed by the School of Animal, Plant and Environmental Sciences, lies within Mpumalanga's Savanna Biome as part of the Mara Conservancy, about 90 km from the Kruger National Park. Following a period of limited use, a strategic 5-year development plan now positions the reserve as an active field station for research and education. Camera trap surveys are underway to establish baseline mammal occupancy data, with further biodiversity assessments planned to broaden taxonomic coverage. Active veld management is restoring ecological integrity and establishing the foundation for long-term monitoring of the effect of bush encroachment, invasive alien plants and restoration on biodiversity across the site. Pullen illustrates the potential for institutional land in ecologically significant landscapes to be developed into a dedicated long-term research and monitoring site.

13 Environmental and anthropogenic drivers of second-order habitat selection in lion prides of Kruger National Park

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Lions (*Panthera leo*), as apex predators, play a pivotal role in regulating prey populations and maintaining ecological balance within African savannas. Understanding their spatial ecology offers valuable insights for both ecological theory and applied management, including infrastructure placement and water provisioning in protected areas. Environmental heterogeneity and anthropogenic features jointly determine predator space use within these dynamic landscapes. Previous studies on lion habitat selection have focused largely on prey abundance or human disturbance, often overlooking the combined influence of environmental and anthropogenic drivers. This study quantified how terrain, Normalised Difference Vegetation Index (NDVI), water and infrastructure jointly shape habitat selection at a fine-scale, second-order Resource Selection Function (RSF) level in Kruger National Park (KNP). We monitored 36 GPS-collared adult female lions from multiple prides across southern KNP (June 2024-July 2025). RSFs were fitted using Generalised Linear Mixed-Effects Models (GLMM) to evaluate pride-level selection within available population ranges. Environmental covariates included terrain (elevation, slope, ruggedness, soil type), NDVI, water proximity and anthropogenic features (roads, fences, buildings). Roads and proximity to water were the strongest predictors of lion occurrence, with preference for areas near buildings. Lions avoided higher elevations and fenced boundaries, while rainfall was non-significant. Weak NDVI avoidance indicated preference for semi-open terrain and greater use of granite-derived substrates reflected underlying vegetation and prey patterns. Lions also favoured ridges, moderately rugged terrain and north-facing slopes while avoiding east-facing slopes. Lion space use in KNP is shaped by interactions between natural gradients and human infrastructure, reflecting fine-scale trade-offs beyond prey density alone. Recognising infrastructure as an active ecological driver is crucial for management: SANParks should integrate road density, artificial water provisioning and boundary configuration into spatial planning to balance predator ecology and prey accessibility.

14 Beyond the sighting: A centralised approach to biodiversity monitoring and habitat management across conservation landscapes

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Effective reserve management and biodiversity assessment require continuous wildlife monitoring and systematic tracking of habitat management interventions. As conservation technologies expand, there is an increasing need for standardised systems capable of generating comparable datasets across diverse landscapes. To address this challenge, the ArcGIS-based platform Beyond The Sighting (BTS) was developed to centralise wildlife observations, enabling landscape-scale assessments of species diversity and occurrence. Complementary veld management workflows and dashboards support spatial decision making and monitoring of habitat restoration activities, facilitating assessments between species responses and changes in veld condition. Launched in early 2025, BTS is employed across 13 sites

spanning 3 977.9 km² in South Africa, Botswana, Namibia, Kenya and Tanzania. To date, 23 483 sightings representing 636 species have been recorded by 244 active users. With continued expansion, centralised platforms such as BTS can provide scalable tools for biodiversity monitoring, habitat restoration tracking and evidence-based conservation management across diverse wildlife landscapes.

101 Relative Productivity Index reveals contrasting rangeland condition trajectories across governance types in southern Kenya

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Rangeland degradation threatens pastoral livelihoods across East Africa, yet evaluating rangeland condition remains difficult because vegetation productivity in drylands is strongly influenced by high interannual climatic variability. This complicates the distinction between climate-driven fluctuations and persistent ecological change. We used the Relative Productivity Index (RPI), which quantifies observed vegetation productivity relative to modelled biophysical potential, to examine spatial patterns and long-term trends in relative productivity across governance types in Kenya's Amboseli-Tsavo ecosystem from 2000-2022. Theil-Sen trend analysis was applied across six governance types spanning national parks, conservancies, and pastoral grazing lands. Governance type alone was a weak predictor of productivity outcomes. Amboseli National Park showed the strongest negative long-term trend, while adjacent Community/Group Ranches also showed substantial declines in relative productivity. In contrast, Amboseli Conservancies maintained near-stable relative productivity, while Tsavo East and West National Parks showed positive trends, and Tsavo Conservancies/Ranches remained broadly stable despite heterogeneous tenure arrangements. As an observational analysis, these findings describe associations rather than causal relationships. Overall, the results suggest that rangeland productivity trajectories are shaped by interacting ecological, hydrological, and governance-related processes, and demonstrate the value of RPI for identifying spatially heterogeneous patterns of rangeland condition across complex governance landscapes.

94 Resilience in practice: Wildlife, livestock and mixed enterprises on Namibian freehold land – who weathers the drought?

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Our research looks at the economic viability and resilience of the dominant land-use systems on Namibian freehold farms, namely, livestock and wildlife-based land use (WBLU). In the context of worsening drought conditions, land degradation and growing economic pressures, we contend that understanding how these systems perform economically is important for informing landholder decision-making and policy direction. Drawing on survey data conducted over three months in 2024, collected from landholders in central and northern Namibia, our research compares income streams, operational costs and profitability across land-use models. It builds on existing literature that suggests that wildlife enterprises

may offer greater returns on marginal land by generating income from ecotourism, hunting, game meat and live sales. Our research evaluates how each model performs not just in terms of profit, but also in its ability to withstand environmental and market shocks. Early findings suggest that WBLU may provide comparative advantages over traditional livestock operations, particularly in degraded or drought-prone areas, due to their diverse income streams and ecological alignment. By reframing land-use economics through both profitability and adaptive capacity, this research offers timely insight into how Namibian farmers are navigating change and how future land-use decisions might be more effective.

81 The acceptability of human-elephant conflict management in north-western Namibia

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Human-elephant conflict is an ongoing challenge in the north-west of Namibia, where prolonged drought and expanding human habitation exacerbate competition for limited resources between African savannah elephants (*Loxodonta africana*) and people. This study examined how different groups of people, from local communities experiencing varying levels of reported human-elephant conflict to international members of the public, would like this conflict to be managed. The study applied a mixed-methods survey and vignette experiment to investigate how the acceptability of different forms of human-elephant conflict in north-western Namibia may vary with factors such as reported or perceived conflict intensity and demographic characteristics. The study also assessed the acceptability of lethal and non-lethal elephant management strategies, including whether judgments shift based on an elephant's perceived history of conflict and the respondent's geographic location. Together, this research aims to inform the design of elephant management strategies that are both context-appropriate and publicly acceptable.

63 Assessing the impact of bush control methods on vegetation and soil in *Senegalia mellifera*-encroached areas at Tswalu Kalahari Reserve, Northern Cape

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Senegalia mellifera (Black-thorn) bush encroachment is a major driver of rangeland degradation in semi-arid savannas. It reduces herbaceous productivity, biodiversity and grazing capacity, while altering vegetation structure and ecosystem functioning. This study evaluated the effectiveness of manual, chemical and integrated bush control methods at Tswalu Kalahari Reserve (TKR), Northern Cape over a three-year period, to determine which methods most effectively promoted herbaceous recovery while limiting woody regrowth (coppicing) and improving grazing capacity. A randomised block design was used to compare seven treatments across permanent monitoring plots, with biannual assessments of herbaceous biomass, species composition, diversity, density, woody structure and soil-surface condition,

supplemented by soil and microbial analyses, before and after treatment application. The results showed that 100% manual felling, combined with a cut stump chemical treatment produced the best short-term herbaceous responses, reflecting a higher biomass production and estimated grazing capacity compared to the other treatments and the untreated control. However, these responses are interpreted as the first phase of post-treatment recovery, likely amplified by exceptionally favourable rainfall seasons following treatment implementation. At the same time, increasing trends in tree equivalents per hectare and woody species diversity indicate ongoing woody re-establishment (especially coppicing), suggesting that the observed gains in herbaceous productivity may be temporary. The findings therefore indicate that, although intensive bush control can stimulate rapid short-term recovery, long-term restoration success will depend on sustained follow-up management to prevent re-encroachment in this rainfall driven ecosystem. This study provides applied guidance for adaptive bush-control planning and sustainable rangeland restoration in semi-arid Southern African savannas.

15 An identification and first response guide to scorpions of the Lowveld

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Identifying a scorpion implicated in a sting is of vital importance for swift and effective medical treatment especially for high risk species and high risk patients. However, scorpion identification is a challenge for many people due to technical keys, variations within a species across its range and a lack of information for scorpion sting first responders and medical professionals. Regional keys solve the identification conundrum by offering not only a pictorial guide to scorpion species in a specific region, but also identification characteristics and notes on similar species and their differences. In this Identification & First Response Guide To Scorpions Of The Lowveld poster, Jonathan Leeming offers a regional guide to scorpions of the Lowveld area of Southern Africa that links to free online resources. These resources focus upon identification characteristics of each species as well as first response notes such as typical symptoms, timeframes, the dividing line between applying first aid and when professional medical attention and antivenom is required and who to contact if there is a medical emergency. When linked to the Essential Scorpion Sting First Response Framework, this poster and associated online resources offer a definitive guide for any scorpion sting in an area that experiences more than their fair share of scorpion related medical emergencies.

47 Vultures of Shangani

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Vulture species are not faring well across Southern Africa and have not been for some time. Threats range from deliberate and accidental poisoning, harvesting for traditional medicine, collision with infrastructure and electrocution, to habitat and food resource loss. These cumulative pressures have driven most of the region's species to the brink of extinction. Across a largely hostile range, a few havens exist outside

of protected areas in the form of well-managed private lands. Shangani Holistic is one such area, with a long history of protecting vultures and other bird species – from the times of roosting and breeding Cape Vultures on Wabai Hill (the northernmost known colony), to its designation as an Important Bird Area, to currently hosting a continually growing population of successfully breeding White-backed Vultures, with records showing more than 80 pairs. The success story of Shangani Holistic is a testament to what is possible for conservation when private landowners manage their land for people, planet and profit.

17 Non-evaporative heat dissipation across the beak and unfeathered skin in Old World vultures

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Non-evaporative heat loss via the beak and other unfeathered regions is an important but understudied thermoregulatory mechanism in large birds. We used infrared thermography to assess heat fluxes across the beak and unfeathered head and neck regions in Cape (*Gyps coprotheres*), Lappet-faced (*Torgos tracheliotos*) and White-backed Vultures (*Gyps africanus*). Heat loss was quantified over air temperatures (T_{air}) between 4.6–35.6°C. In all species, beak surface temperature tracked T_{air} below inflection points at $T_{air}=14$ –15°C, but increased above T_{air} at higher values, indicating regulated heat loss. Lappet-faced Vultures showed evidence of regulated heat loss via unfeathered skin, while evidence in Cape Vultures was equivocal. Maximum dry heat loss across the beak accounted for 4.7% (Cape), 5.9% (Lappet-faced) and 4.6% (White-backed) of allometrically-predicted basal metabolic rate (BMR). Our results confirm the beaks of Old World vultures serve as controllable heat radiators, as does the unfeathered skin of one study species, revealing that non-evaporative cooling plays an important thermoregulatory role in Old World vultures.

95 Kalahari Airbnb: Use and selection of sociable weaver (*Philetairus socius*) nests as nocturnal resting sites by the slender mongoose (*Galerella sanguinea*)

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The slender mongoose (*Galerella sanguinea*), a strictly diurnal small carnivore, typically uses burrows, rock crevices, and hollow trees as nocturnal resting sites. In this study we documented an under-described behavioural association with Sociable Weaver (*Philetairus socius*) nests, keystone structures that support a diverse community of commensal species in arid ecosystems. We used VHF telemetry to quantify nocturnal resting site selection in free-ranging slender mongooses at Tswalu Kalahari Reserve. To determine whether nest selection is non-random, we compared biological, architectural, environmental and spatial characteristics of used nests with those available within individual home ranges. Mongooses spent 77.47% of recorded nights in sociable weaver nests (individual range: 19.64%–92.23%, $n=475$), while only 31.96% of available nests were used. Probability of use increased from approximately 5% for small unconcealed nests, to 60% for large concealed nests, and also increased towards the interior

of estimated home ranges. However, these nest characteristics provided limited evidence for explaining reuse intensity. Our findings identify sociable weaver nests as an important resource for small carnivores, highlighting the broader importance of keystone structures in shaping mammalian behaviour and habitat use in arid environments.

18 Evaluation and assessment of indigenous bacterial consortia from industrial wastewater for metal recovery and valorisation

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Industrial wastewater pollution is a global concern due to rapid increase in the development of industries. Population growth leading to demand for goods promotes industrialisation development which further exuberates the availability of contaminants in the environment. Heavy metals contaminating water from various industrial processes are toxic at high concentrations and poses a serious threat to soil, air, water and aquatic environments. Limited research has been conducted on the use of indigenous bacteria that thrive in different harsh industrial wastewater conditions for their applications in the removal of heavy metal for their recovery and valorisation. The current study examines the use of indigenous bacteria for bioremediation and recovery of valuable heavy metal and their valorisation. Samples were collected from three industrial sites and water chemistry was analysed using ICP while a metagenomic approach was adopted to determine bacterial communities in wastewater. Bacterial cultures were enriched from the water samples using nutrient and minimal media for minimum inhibitory concentrations (MIC) and maximum tolerance concentrations (MTC) tests with three metals of interest: Zinc (Zn), Lead (Pb) and Copper (Cu) dosed in the media. Bacterial growth and metal precipitation was monitored at different maximum metal concentrations: 2500 mg/L for Zn, 500 mg/L for Pb and 200 mg/L for Cu which proved high tolerance by the enriched bacteria compared to previous reports in the literature. Effects of pH on metal precipitation was also evaluated by subjecting the consortia to three pH conditions: 3, 7 and 9. The results from SEM and TEM demonstrated that indigenous bacterial consortia use different mechanism primarily bioprecipitation for Pb, bioaccumulation for Zn and biosorption for Cu removal from their dissolved state. These results further prove the potential and effectiveness of using indigenous bacteria for removal of toxic heavy metals from water contaminated by industrial waste.

19 From data to survival: Applying clinical baselines to improve the rehabilitation of Temminck's pangolins (*Smutsia temminckii*)

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Temminck's pangolins (*Smutsia temminckii*) are frequently admitted for veterinary care and rehabilitation following confiscation from the illegal wildlife trade, often in compromised physiological states. Clinical decision-making has historically been limited by a lack of species-specific hematology and serum biochemistry reference intervals. This study established baseline hematology and serum biochemistry parameters for Temminck's pangolins and demonstrates their application in a high-volume clinical setting at the Johannesburg Wildlife Veterinary Hospital, which has treated over 200 confiscated pangolins. Case-based examples show how these data inform

fluid therapy, nutritional management and interpretation of organ function and stress. Applying species-specific baselines has improved clinical decision-making, survival and release outcomes. This work highlights the value of integrating clinical research into conservation practice to improve outcomes for trafficked wildlife.

20 Reproductive strategies of the Kloof frog (*Natalobatrachus bonebergi*) at Crowned Eagle Estate, KwaZulu-Natal, South Africa

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Amphibians comprise the most threatened vertebrate class globally, with 41% of species facing extinction. While habitat loss and climate change are primary drivers, these populations are increasingly pressured by agricultural chemical runoff, mining activities, deteriorating water quality from urban siltation and the degradation of forest understories by livestock and invasive species. Such threats are particularly serious for range-restricted habitat specialists like the Kloof Frog (*Natalobatrachus bonebergi*), a monotypic South African endemic. Despite its specialised nature, the fine-scale micro-habitat requirements and developmental biology of *N. bonebergi* are poorly understood, especially within increasingly fragmented urban forests. This study investigated a population of *N. bonebergi* at Crowned Eagle Estate (Kloof, KwaZulu-Natal, South Africa) to identify the specific drivers of occupancy, reproductive success and ontogenetic progression. Surveys of 14 breeding sites within the study area confirmed that *N. bonebergi* prefers slow-flowing stream sections with dense vegetation, utilising invasive Kahili ginger (*Hedychium gardnerianum*) as a primary oviposition substrate. Visual data suggests vertical and temporal activity is governed by a balance of environmental constraints and social interactions, with males prioritising a specific “active zone” for advertisement calls to maximise signal transmission while minimising predation risk. Breeding activity follows a clear seasonal shift; September and October data represent the start of the breeding season with inconsistent energy output, whereas April observations show robust, high-energy activity linked to peak competition. Analysis of developmental chronometry reveals a non-linear growth trajectory characterised by phase-specific velocity shifts, following a “common clock” with a pooled developmental rate of 0.1349 stages per hour. While sharing terrestrial oviposition traits with *Allobates femoralis* (brilliant-thighed poison frog), *N. bonebergi* exhibits a more compressed timeline, reaching Stage 25 in approximately 7.8 days, which is significantly faster than *A. femoralis*. A critical Stage 10 Turning Point was identified where developmental noise stabilises, marking the transition into programmed organogenesis. Furthermore, the study identified significant temporal desynchronisation within egg masses, suggesting an evolutionary “bet-hedging” strategy to mitigate risk from localised environmental stressors. Ultimately, this study demonstrates that *N. bonebergi* development is a highly conserved process with a metabolic clock precisely optimised for permanent stream habitats. These findings highlight a sophisticated life-history strategy where social-spatial partitioning and developmental asynchrony act as vital risk-mitigation tools. Importantly, this study documents the developmental biology and acoustics of this species in unprecedented detail, providing data that has been entirely absent from the literature until now.

82 Mobi-kraal: Designing an effective tool for human-predator coexistence in agricultural landscapes

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Coexistence between people and predators within agricultural landscapes is essential for the conservation of biodiversity and critical ecosystems, but requires a shift from reactive conflict management to proactive mitigation methods. Through discussions with farmers in leopard conflict areas in the Western Cape, the Cape Leopard Trust (CLT) recognised the urgent need to create a mobile, predator-proof kraal (enclosure) to better protect livestock, safeguard environmental integrity, improve food security and reduce negative farmer-predator interactions. Leveraging expertise through a national competition and conservation partner experiences, the CLT facilitated the design of a practical “Mobi-kraal” that has been tested on diverse farms across South Africa and released as an open-access blueprint, build guide, video and field-evaluation report to encourage widespread adoption and adaptation. All project resources are available for free download from mobikraal.org. We discuss the Mobi-kraal journey, from conception to field-testing insights and real-world applications of an accessible resource for livestock farmers and conservation organisations to add to their depredation mitigation toolbox.

21 Managing predators in fragments: Adaptive metapopulation modelling reveals how conservation harvest can support cheetah persistence in fenced landscapes

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Across Southern Africa, large carnivores increasingly persist in fragmented, fenced landscapes where natural dispersal is limited and long-term persistence depends on active management. South Africa’s managed cheetah metapopulation, spanning 70 reserves, represents a unique example of conservation-driven metapopulation management globally. We present the 2026 Population Viability Analysis and Annual Harvest Model developed to evaluate long-term viability and inform sustainable offtake thresholds. Using longitudinal data from 1987 cheetahs monitored between 2012 and 2025, we parameterised stochastic metapopulation models. Simulations showed positive growth, high genetic retention and saturation of available habitat, indicating that space, rather than reproduction, limits expansion. Moderate, regulated harvest from the metapopulation remained sustainable, particularly under continued reserve growth. These results demonstrate that adaptive, data-driven metapopulation management can reconcile population viability with regulated conservation offtake to support species recovery efforts, offering a scalable model for large carnivore persistence in increasingly human-modified landscapes.

96 Climatic drivers of lion movement and home range patterns in the Kruger National Park

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Despite their ecological importance as apex predators and keystone species, African lions (*Panthera leo*) face numerous threats and the influence of climatic variability on lion movement and space use remains poorly understood. We fitted 12 free-living adult female African lions in the Kruger National Park with GPS collars to investigate the effects of climatic variables on their movement and home range size. Our preliminary findings indicate seasonal variation in lion home ranges, with home range size 57 km² larger in the dry season than in the wet season. Lions displayed predominantly nocturnal activity, with movement peaking during crepuscular and nocturnal hours and declining during midday. After accounting for time of day and season, the hourly distance travelled by lions was influenced by black globe temperature, wind speed and rainfall. The mechanisms underlying the relationships between climatic variables and lion movement as well as space use require further investigation. These findings provide an initial step towards improving our understanding of the climatic drivers of lion movement and reveal seasonal patterns of space use.

48 A research framework for incorporating animal welfare into conservation practice

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Animal welfare is of growing concern to many people and is increasingly being incorporated into conservation policies and decision-making around the world. However, despite apparent growing responsibility for conservationists to consider animal welfare, there is often hotly contested disagreement among different stakeholders and interest groups regarding if, when, and how, wild animal welfare should be tackled in real-world wildlife use and conservation. The resulting conflict – which is often based on emotion and mutual misunderstanding – is neither helpful (it hinders progress and focuses on the wrong things) nor appropriate (since it is not possible to separate the individual animals and their welfare from the species and populations that conservationists aim to sustain). We outline six key steps in a strategic research framework that we believe are necessary to support incorporation of animal welfare into conservation practice, based on scientific and empathetic principles. Ultimately, we propose a move towards ensuring Quality of Life and, where animals are killed as part of conservation/management strategies, Quality of Death for wild animals, as an integral component of a broader, holistic approach to conservation that is effective, 'fair' and safe for both people and animals.

64 Non-invasive assessment of adrenocortical function and diet of black-backed jackal (*Lupullela mesomelas*) living in different predator guild settings

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Black-backed jackal (*Lupullela mesomelas*) are ecologically important mesopredators whose dietary flexibility and physiological stress responses are poorly understood across different land use types. Depending on predator assemblage and prey availability, jackal occupy trophic positions ranging from apex predator to scavenger across a land use gradient, yet how this shapes their physiology and diet is unclear. This study uses non-invasive faecal analyses, combining steroid hormone quantification with DNA metabarcoding, to compare adrenocortical responses and sex-specific dietary composition across four predator assemblages in South African reserves. Preliminary results indicate successful validation of a species-specific enzyme immunoassay for quantifying faecal glucocorticoid metabolites and that previously collected samples are suitable for metabarcoding analysis. Initial dietary analysis across three predator assemblages revealed variation in diet diversity and composition between different predator guild settings. Findings will provide the first non-invasive framework for investigating how predator composition shapes jackal ecology across managed landscapes.

22 Modelling grassland responses to management and rainfall variability using ModVege-CoSMo in a South African savanna grassland

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Grassland ecosystems are influenced by interactions between plant diversity, environmental drivers, and management practices, making their simulation complex. This study applies the ModVege grassland growth model coupled with the Community Simulation Model (CoSMo) to a grassland system at Telperion Nature Reserve, South Africa. Plant species were grouped into functional categories based on shared ecological characteristics, including grazing response, growth form, and phenology, allowing species with similar growth patterns and seasonal behaviour to be represented together. Model parameters, originally developed for European grasslands, were adapted to reflect South African conditions, including local species composition and environmental variability. The modelling framework integrates these functional groupings with group-level processes to simulate vegetation dynamics.

83 Beyond paper parks: Optimising protected area expansion in the age of renewable energy

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Southern Africa is at a crossroads. The region harbours some of the world's most irreplaceable biodiversity while simultaneously facing urgent pressure to expand renewable energy infrastructure to address energy poverty and drive decarbonisation. These twin imperatives compete for the same

land – and without science-based planning, both risk falling short. This project presents a systematic conservation planning framework developed for South Africa that navigates this tension explicitly. Using cutting-edge spatial optimisation tools, the approach identifies where protected area expansion delivers the greatest biodiversity return and where renewable energy facilities can be sited to meet national generation targets with the least possible impact on sensitive ecosystems. The result is not a compromise between conservation and development – it is a roadmap for achieving both. Delivered through an open-access, interactive planning application, the framework places this analytical power directly in the hands of conservation agencies, energy planners and government departments – without requiring specialist technical expertise. The framework is explicitly designed for transferability. With appropriate biodiversity data and stakeholder engagement, it can be deployed across Southern Africa and beyond – offering a replicable model for nations seeking to meet their 30x30 commitments without sacrificing the energy transition their people urgently need.

65 Invasive alien species in Kruger National Park: An assessment of 100 years of inventories, science and management

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Alien and invasive species pose a growing threat to protected areas, yet long-term institutional learning around their management is often poorly documented. We synthesise over a century (1930s-2026) of research and management on alien species in Kruger National Park to assess how knowledge has evolved and shaped practice. Using 124 peer-reviewed papers, reports, management documents and historical records, we assessed work across four eras, from early species records in the 1930s to contemporary adaptive management. Evidence was classified into baseline inventories, invasion processes, impacts and management. Management and monitoring dominated the literature, reflecting the park's operational need to respond to expanding invasions. The study revealed a progression from checklists and early control efforts, through large-scale clearing and biological control, to spatial prioritisation, policy alignment and effectiveness monitoring. Our findings point to an iterative, co-evolving system in which science and management continually inform each other, offering a blueprint for strengthening invasive species governance in protected areas globally.

84 Human shield or landscape of fear? Spatial gradients of vigilance and activity allocation in chacma baboon populations across anthropogenic landscapes

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Human-dominated landscapes can simultaneously impose ecological constraints on wildlife through habitat modification and disturbance while providing refuges from natural predators. The Human Shield Hypothesis predicts that prey species preferentially use areas close to human infrastructures because large carnivores avoid these areas, whereas the Landscape of Fear framework predicts spatial variation in antipredator behaviour according to perceived predation risk. Although these hypotheses have received considerable support in ungulate systems, explicit spatial tests in non-human primates remain

scarce. We investigated how vigilance and activity allocation vary in relation to human infrastructure in a population of chacma baboon (*Papio ursinus griseipes*) inhabiting Shangani ranch, a wildlife-livestock coexistence landscape in western Zimbabwe. We predicted that, i) vigilance would increase with distance from human infrastructure, whereas ii) feeding and social activities would decline with increasing distance from human infrastructure, consistent with a human-mediated refuge effect. Behavioural scan data were collected from habituated baboon troops across areas differing in proximity to human infrastructure. Spatial patterns of vigilance, feeding, social behaviour, movement and resting were analysed to assess whether human presence generates behavioural gradients consistent with either the Human Shield Hypothesis or the Landscape of Fear framework. The study provides one of the first tests of the Human Shield Hypothesis in a wild non-human primate and provide new insights into how anthropogenic landscape shape behavioural decision making and human-wildlife coexistence.

85 Acceptability of conservation law enforcement in sub-Saharan Africa depends on what rangers do, where and why

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Effective and equitable biodiversity conservation requires that conservation law-enforcement approaches be socially acceptable to diverse publics. However, some conservation law enforcement activities in and near protected and conserved areas (PCAs) can be highly contentious, especially for activities associated with militarised conservation, such as rangers monitoring people's movements, stopping and searching people, making arrests, or carrying guns. We used a vignette experiment to quantify the acceptability of 32 hypothetical scenarios describing a variety of ranger activities inside and outside PCAs in sub-Saharan Africa. We compared responses from members of ten international publics (n = 3 687). Overall, acceptability depended on the specific activity rangers would carry out, why they would carry it out and whether it would occur inside or outside a PCA. Ranger activities were generally less acceptable to participants living closer to PCAs compared to those living farther away. Our findings could help decision-makers evaluate the implications of expanding conservation law enforcement activities in line with global commitments to increase PCAs by 2030.

23 Response of freshwater macroinvertebrates to anthropogenic disturbances and seasonal change in the upper catchment of the uMngeni River, South Africa

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Freshwater macroinvertebrate communities are recognised as vital indicators of ecological change in rivers. In this study, we assessed the responses of freshwater macroinvertebrate communities to anthropogenic disturbances and seasonal changes along the river before and after the tributary in the uMngeni River upper catchment. Following the South African Scoring System version 5 protocol, we sampled freshwater macroinvertebrates at four local-level sites during five sampling visits across all four seasons. A total of 4 235 specimens were collected. The winter season has the highest abundance across all sampling points. The main river and the tributary showed similar freshwater macroinvertebrate abundances, 1 030 and 1 079, respectively; however, a kilometre after the tributary joined the main river, the abundance decreased to 895. Approximately 5 km downstream, the abundance increased to 1 231 macroinvertebrates. The abundance of freshwater macroinvertebrates varied with season. Also, the disturbed tributary positively influenced macroinvertebrate abundance in the mainstream of the upper uMngeni River. This study showed that macroinvertebrates responded differently to seasonal changes.

24 Patterns, pressures and prospects: Native fish conservation in the Limpopo Basin

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The ecologically important Limpopo River Basin (415 000 km²) supports high freshwater biodiversity, with key refugia in northern Kruger National Park, the Mozambique floodplain and upland systems such as the Waterberg region. While these areas serve as critical reservoirs for endemic and range-restricted fish species, much of the basin has been noticeably transformed. Multiple interacting stressors, including altered flow regimes, declining water quality, habitat loss, alien species and instream barriers, degraded habitat quality, reduced connectivity and altered native fish assemblages, are driving population decline and reducing ecosystem integrity. At the same time, biodiversity patterns remain unresolved, with ongoing taxonomic revisions and evidence of cryptic diversity suggesting that true species richness is underestimated across the basin. Following the characterisation of ecological integrity status and identification of key fish refuge areas, we propose a two-pronged trans-boundary river restoration and native fish recovery programme centred on population augmentation and habitat restoration within historical ranges. This research aims to support native fish biodiversity recovery across the basin, strengthening long-term ecological resilience and sustainability of fish populations.

66 Thermal gradients without functional shifts: Decoupled microbial responses to fire intensity in savanna soils

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Fire intensity generates strong soil thermal gradients, yet microbial functional responses are poorly resolved. This study examines how variation in prescribed fire intensity influences soil temperature profiles and bacterial function in a South African savanna. Soil temperatures at 2 cm exceeded those at 5 cm during peak burn periods (ΔT up to 6°C; $p=0.0045$), confirming depth-dependent heat penetration linked to fire intensity. However, bacterial functional diversity showed limited response, with no significant effects on Shannon diversity and only a marginal depth-treatment interaction for Simpson diversity ($p=0.049$). Substrate utilisation was largely unchanged, with significant reductions observed only for polymer and carboxylic acid use at 2 cm ($p\leq 0.005$). These results indicate a decoupling between fire-driven thermal gradients and microbial functional responses, suggesting that short-term microbial resilience constrains functional shifts under variable fire intensity.

67 Assessing how interactions between free-roaming African elephants, plains zebra and cattle affect animal welfare

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Wildlife-domestic livestock interactions in mixed-use landscapes can influence animal welfare, yet these effects are poorly understood when species competing for resources are involved. This study aims to examine a stress-related physiological biomarker (faecal glucocorticoid metabolites, fGCM) in free-roaming African elephants, plains zebra and cattle, utilising the same space under a holistic management system at Shangani Ranch, Zimbabwe. Fresh faecal samples collected across wet and dry seasons (37 & 7 for elephant; 37 & 32 for zebra and 45 & 33 for cattle) that represent periods of varying resource availability, elephant densities and the intensity of management activities are used to quantify fGCMs for each of the three species. Seasonal differences in fGCM concentrations between species are expected, reflecting species-specific responses to shared landscape utilisation under varying conditions. Results from this study enable population-level pressures associated with these factors to be identified, informing animal welfare and considerations for adaptive management strategies that promote coexistence, wildlife conservation and livestock production.

25 The use of camera traps and sign surveys to investigate a predator assemblage and its response to carcasses in a grassland biome on Telperion Nature Reserve, Mpumalanga, South Africa

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The effects of carrion on animal communities and ecological processes are poorly understood. Carcasses are valuable but short-lived resources and understanding how vertebrate scavengers interact with them

and conversely, how carcass availability shapes predator communities, is essential for a deeper grasp of this ecosystem service. Such understanding is particularly important in transformed landscapes in the absence of apex predators. My study examines how decomposing adult male blue wildebeest (*Connochaetes taurinus*) carcasses affect predator and scavenger communities in the biodiverse but threatened Bankenveld grasslands of Telperion Nature Reserve, Mpumalanga, South Africa. Sign and camera trap surveys were implemented to study predator responses to 15 experimental treatments: five open carcasses, five caged carcasses and five controls. Predator species diversity was reduced at both open and caged carcasses compared to controls.

26 Aardwolf ecology in a mesic grassland ecosystem

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The aardwolf (*Proteles cristata*) represents a unique and understudied member of the family Hyaenidae. Unlike its carnivorous relatives, the aardwolf is a highly specialised insectivore that feeds almost exclusively on harvester termites. This extreme dietary specialisation makes the species an ideal model for investigating how bottom-up ecological forces, such as prey availability and habitat condition, influence the spatial ecology and behaviour of a specialist carnivore. Because the aardwolf relies heavily on a single prey group, aspects of its ecology, including home range size, habitat use and movement patterns, are closely linked to the abundance and distribution of termites. Seasonal fluctuations in termite activity may therefore have important consequences for aardwolf foraging behaviour, resource use and spatial distribution. In addition, land-use practices may directly influence aardwolf persistence and ecological dynamics.

86 Scats vs sightings: Contrasting methods of diet assessment of the Waterberg wild dogs

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The free-roaming population of African wild dogs (*Lycaon pictus*) in the Waterberg persists unmanaged in a fragmented landscape where wide-ranging habits increase exposure to anthropogenic pressures. Human-wildlife conflict in the region stems from the real and perceived stock losses of both livestock and game. This study assessed diet using complementary approaches, long-term observational records and DNA metabarcoding. The observational data provided insight into prey demographics, such as age and sex. For the DNA metabarcoding, scats were collected over one year, including a denning period during which supplemental feeding was implemented. The metabarcoding detected a broader spectrum of prey species, including those not commonly detected in observational studies. Across both methods, diet was dominated by medium-sized ungulates, with impala (*Aepyceros melampus*) as the primary prey species outside of the denning season. During the denning season, the dominant prey species shifted to common warthog (*Phacochoerus africanus*), which was the most provisioned species in the supplemental feeding. Despite this shift, there was no significant seasonal difference in prey

composition and prey use reflected relative availability, rather than specialisation in any one species. The DNA metabarcoding indicated that livestock did not form part of the Waterberg wild dog diet over the course of this study. The communication of locally derived evidence may be key in improving landowner tolerance; however, this approach may not be sustainable in all wild dog populations.

87 Physiological strain and muscle damage in African buffalo following capture

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African buffalo (*Syncerus caffer*) are frequently captured for disease surveillance and conservation management at the human-wildlife interface, yet capture may compromise welfare outcomes. We compared physiological responses of free-living buffalo immobilised by darting from a helicopter (n=131) or vehicle (n=13) in the Kruger National Park. We analysed arterial and venous blood samples to investigate changes in the animals' acid-base status, blood gases, skeletal and cardiac muscle function and stress responses. Both capture methods induced acidaemia, hyperlactataemia, hypoxaemia, hypercapnia, tachycardia and elevated cortisol and muscle enzymes. Compared to vehicle captures, helicopter captures led to greater increases in rectal temperature, lactate, catecholamine and myoglobin concentrations, indicating greater exertion and skeletal muscle damage. Cardiac troponin I was markedly elevated in both capture groups, indicating cardiac strain. These results link capture-induced physiological stress with mechanisms that underlie the morbidity that may compromise captured buffalo. Refining capture practices is essential to improve animal welfare and support biodiversity conservation.

27 Temporal changes in coastal distribution of southern right whales (*Eubalaena australis*) in South African calving grounds

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Southern right whales (*Eubalaena australis*) are capital breeders whose reproductive success is tightly linked to body condition and prey availability. Long-term monitoring of the South African population has revealed concerning declines in maternal body condition, calving rates and coastal prevalence over the past decades, likely driven by climate-induced changes in krill distribution and oceanographic shifts. Building on Elwen and Best (2004), this study extends the temporal scope to 45 years of aerial survey data (1979-2024) to investigate changes in coastal distribution patterns of cow-calf pairs along South Africa's calving grounds. Using photo-identification and spatial binning methods, we assess whether experienced cows preferentially occupy specific coastal areas, whether site fidelity influences calving success and how reproductive outcomes vary across habitats. Hypotheses are that experienced cows show stronger fidelity to favourable coastal areas and successful calving events are more frequently associated with high-density bins characterised by shallow, sheltered waters. This study will explore the importance of coastal habitat quality in shaping reproductive success and underscore the need to consider both ecological change and behavioural fidelity in conservation strategies.

28 Microhabitat composition or structure? Bird species taxonomic and functional diversity in protected grasslands along an elevation gradient

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Grasslands are among the most threatened biomes globally. Identifying the influence of local-scale variables on bird communities is important for grassland management interventions. Here, we investigated bird community composition and taxonomic and functional diversity responses to microhabitat composition and structural characteristics of grassland patches along an elevation gradient in KwaZulu-Natal, South Africa. We surveyed 11 protected grassland patches using point count surveys during the breeding season of 2021-2022. We found that bird community composition varied along the elevation gradient, with low-elevation sites characterised by a distinct bird community from mid-elevation and high-elevation sites. The primary drivers of bird taxonomic diversity were elevation, structural complexity and proportion of bracken fern (*Pteridium aquilinum*). Bird species richness significantly decreased along the elevation gradient as altitude increased. The responses of functional diversity measures to microhabitat characteristics varied. Microhabitat structure was a consistent variable influencing all functional diversity indices (richness, divergence and evenness). The results showed that functional richness and divergence increased with structural complexity, while functional evenness decreased. Functional divergence decreased with an increase in the proportions of woody vegetation. These results suggest that in grasslands, bird species communities are structured by both microhabitat composition, structural attributes and elevation. Conservation strategies should prioritise both microhabitat structure and composition characteristics to maintain bird species richness and functional diversity.

29 Behind the boma: Assessing physiological stress in temporarily managed white rhinoceros

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White rhinoceroses (*Ceratotherium simum*) are a key focus of conservation management in South Africa because of ongoing poaching pressure, raising the need for interventions such as translocations. During such translocations, animals are temporarily placed in bomas to facilitate handling and behavioural/welfare monitoring before being released back into wild. However, the effects of temporary confinement on rhino well-being have not been well examined yet. This study investigates changes in physiological stress levels of 10 sub-adult male white rhinos housed in social groups within boma facilities for 13 weeks in Kruger National Park, South Africa. 130 collected faecal samples (n=13 per focal animal) will be analysed using an enzyme immunoassay to quantify fGCM concentrations. Additionally collected behaviours, such as feeding activities, movement patterns and defecation rates, will be related to the revealed individual fGCM pattern. By combining endocrine and behavioural measures, this study aims to improve our understanding of rhino's response to temporary confinement and contribute to management practices that support animal well-being during conservation interventions.

30 Consequences of altered flows and sediment dynamics on geomorphic processes and physical fish habitats in the Limpopo River floodplain

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The Limpopo River floodplain represents a critical ecosystem where geomorphic processes, hydrology and habitat dynamics interact to sustain fish biodiversity and human livelihoods. This balance is increasingly threatened by altered water and sediment regimes due to land-use pressures and climate variability. Understanding the relationship between geomorphic processes and hydrology and their impacts on fish habitat availability is critical for assessing current conditions and projecting future trajectories. This study contributes to a larger Oppenheimer-funded project titled *Biodiversity and ecosystem conservation for sustainable water resources and human livelihoods in the Limpopo River, Southern Africa* that aims to integrate physical, chemical and biological information to undertake a holistic evaluation of multiple stressors driving the Limpopo River ecosystems and contribute to future management of water resources, environmental flows and biodiversity. This work highlights the vulnerability of the Limpopo River floodplain and the urgent need to conserve its ecological functions for both nature and people.

68 Small mammals as indicators of habitat integrity, disturbance and ecological condition on Tswalu Kalahari Reserve

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Small mammals, including mice, shrews and sengis, are widely recognised as effective bioindicators for biodiversity monitoring and environmental assessment. Their small home ranges, habitat specialisation and sensitivity to environmental change allow community composition to reflect ecological conditions and disturbance regimes. In Southern Africa, however, long-term studies assessing small mammal communities as indicators of habitat integrity are scarce, particularly in the Kalahari. This study presents six years of small mammal monitoring conducted across multiple habitat types within Tswalu Kalahari Reserve. Patterns of species richness and diversity were analysed across habitats representing different successional stages. Results reveal shifts in community composition along this gradient, with generalist species dominating early successional habitats, while specialist species become increasingly prominent in mature, structurally complex habitats. Several species consistently appear or disappear along this gradient, suggesting potential indicator value. These findings support the use of small mammal assemblages as practical indicators of habitat integrity and ecological condition in the southern Kalahari, highlighting their value for long-term ecosystem monitoring and conservation management.

98 Traditional fermentation methods and their role in food preservation and nutritional composition changes in cereal-based food in Africa: A systematic review

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Traditional fermentation of cereal-based foods is an important method for improving nutritional quality, enhancing food preservation and supporting food security in many African communities. Fermented cereal-based foods are essential to dietary cultures and food security initiatives in sub-Saharan Africa, where approximately 282 million people are undernourished and facing severe micronutrient deficiencies. African traditional fermentation methods, which mainly rely on spontaneous fermentation and backslopping, have long been used as accessible, low-cost ways to enhance the safety, nutritional value and preservation of staple grain foods. This review assessed the effect of traditional fermentation methods on the nutritional composition and preservation of cereal-based diets throughout Africa. A comprehensive literature search was conducted using scientific databases, Web of Science, PubMed, Google Scholar and ScienceDirect from the year 2000 to 2026, following PRISMA guidelines to identify peer-reviewed studies investigating traditional fermentation of cereal-based food. A systematic search yielded 330 articles, which were screened to identify 54 eligible studies included in the qualitative synthesis. Studies focusing on fermentation processes, microbial activity, preservation and changes in nutritional composition were considered for inclusion. African traditional fermentation improves the physical quality, nutritional value and storage life of cereal-based foods. These benefits depend on proper fermentation time and optimal pH conditions and can be further enhanced through fortification or biofortification. However, there are gaps in the validation of nutrient bioavailability in vivo, the standardisation of methods and the integration of traditional practices with modern food safety systems. Overall, fermentation should be encouraged as a key strategy for addressing micronutrient deficiencies and food safety challenges in Africa.

69 Local ecological knowledge as a diagnostic framework for plant and insect toxicosis as drivers of livestock mortality in semi-arid Southern African rangelands

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Livestock mortality threatens ranching productivity across semi-arid Southern African rangelands. Shangani Holistic Ranch, Zimbabwe has experienced a significant increase in cattle deaths. An ethnobotanical survey was carried out in the Ranch and surrounding communities, documenting local ecological knowledge (LEK) on livestock mortality. The findings revealed that bagworms were the primary perceived driver, followed by various poisonous plant species. Identified poisonous plant species were systematically compared against scientific literature for toxicity and most proved non-lethal under normal exposure, making bagworms a poorly understood but ecologically significant pest threat. The study further examined how vegetation diversity and structural attributes influence bagworm occurrence using microhabitat vegetation surveys. Results showed that bagworm occurrence was associated with woody canopy cover

($\chi^2 = 4.17$, $p = 0.04$), abundance ($\chi^2 = 7.63$, $p = 0.01$) and diversity ($\chi^2 = 5.14$, $p = 0.02$), indicating that dense vegetation supports bagworm proliferation. These findings reveal an overlooked link between rangeland degradation and perceived livestock losses through bagworm infestations.

88 How should Madikwe's elephants be managed?

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Madikwe Game Reserve in North-West province was established in 1993 with the mandate of generating more revenue from wildlife than yielded by cattle ranching. In order to achieve this, the 'Big Five' were introduced, including 250 elephants translocated from Zimbabwe. Its economic success has been outstanding, but now this is threatened with being derailed by the perceived overpopulation of elephants that has developed: >1 600 elephants within 750 km². The regional population density, now approaching 3 animals per km², is among the highest attained by elephants. How to intervene is proving highly contentious, especially whether lethal reduction of the population (culling) should be implemented at this stage, given the logistics of the operation needed and the anticipated negative repercussions for tourist visitation and the associated economics. We undertook a prospective appraisal of alternative scenarios founded on ecological science and experience. Alternatives to culling include immunocontraception, restricting waterhole distribution and enabling dispersal movements. All of these options alone would be fraught in some way, given the limited extent of the fenced protected area. Some combination of adaptive management involving all applicable actions is advisable, supported by monitoring of the outcomes for the vegetation cover as well as for the trend in the elephants. Fundamentally, the size of the effectively protected area needs to be enlarged through the incorporation of Other Effective Conservation Measures (OECMs) allowing resource extraction.

89 Temporal activity and overlap between sympatric jackals in a mixed-use landscape at Shangani Holistic Ranch in central Zimbabwe

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Understanding how sympatric carnivores coexist in mixed-use landscapes is important for effective wildlife management. Our study examined temporal activity patterns and overlap between black-backed jackals (*Lupulella mesomelas*) and side-striped jackals (*Lupulella adusta*) using camera trap data collected during the wet and dry seasons of 2017 and 2018 at Shangani Holistic Ranch, Zimbabwe. Both jackal species showed mainly nocturnal activity across the seasons. However, temporal overlap differed between seasons, with moderate overlap during the dry season ($\Delta = 0.59$ - 0.63) and much lower overlap in the wet season ($\Delta = 0.32$). The reduced overlap in the wet season suggests greater temporal separation, possibly linked to changes in prey availability and/or reduced competition. Our results indicate that temporal niche separation likely enables these sympatric mesopredators to coexist in a mixed-use landscape.

70 Soil beneath the grass: *Eragrostis curvula* cultivars reduce metal contamination and improve soil health

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Metal contamination from mining, heavy traffic and illegal mining pose a serious environmental threat, especially in urban and peri-urban areas where soils near roadsides and mine-adjacent zones are exposed to pollutants. Unregulated mining worsens contamination, affecting ecosystems and agricultural lands. Although grasses are often considered ineffective in multi-metal contaminated soils, *Eragrostis curvula* shows promise as a hardy native species for phytoremediation in such environments. This study examined whether the *E. curvula* cultivars, Ermelo and Agpal, showed potential to reduce metal concentrations in contaminated soils. Metal concentrations in pre-planting soils, post-harvest soils and plant tissues were determined and bioconcentration factors were calculated for samples from all soil collection sites. Pre-planting soils collected from Jameson Park, Kaydale and Rensburg had high concentrations of iron (36 000-50 000), manganese (800-900), nickel (48-75), strontium (10-20), zinc (71-79), chromium (117-224) and barium (114-117) mg/kg, with a pH of 4.6-5.0 and total cation concentration of 4.7-10.9 cmol/L. The Ermelo cultivar accumulated iron (3 289-6 149), manganese (185-522), nickel (13-26), strontium (9-10), zinc (46-64), chromium (55-85) and barium (36-71) mg/kg, while the Agpal cultivar accumulated corresponding concentrations of 3 092-5 216, 136-488, 4-32, 8-26, 48-57, 21-122 and 37-77 mg/kg. The iron (9 000-32 000), manganese (200-809), nickel (31-63), strontium (8-16), zinc (33-73), chromium (83-137) and barium (73-113) mg/kg of post-harvest soils decreased significantly, while the pH increased to 5.2-5.6 and the total cation concentration was 4.3-7.2 cmol/L. The cultivars had varied bioconcentration factors for iron (0.06-0.15), manganese (0.12-0.57), nickel (0.08-0.53), strontium (0.37-1.10), zinc (0.51-0.93), chromium (0.10-0.89) and barium (0.33-0.68) indicating more efficient accumulation of zinc and strontium, while iron and chromium were taken up to a lesser extent. The presence of *E. curvula* cultivars in the soils promoted the proliferation of plant growth-promoting bacterial genera, including *Bacillus*, *Pedobacter*, *Pseudomonas* and *Flavobacterium*, in the post-harvest soils. The activity of these bacteria and their associated soil enzymes may have contributed to the ability of *E. curvula* to maintain growth and persist under metal-contaminated conditions. These results highlight *E. curvula*'s potential as a phytoremediation agent in multi-source metal-polluted soils.

71 Understanding the role of specialised mouth parts in the selective feeding of dung beetles (Coleoptera: Scarabaeinae)

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The use of a complex food substance such as herbivore dung by dung beetles has promoted the evolution of an adaptive feeding strategy known as particle feeding. The selection of fine particulate matter elevates the food nutrient quality up to fivefold. However, it is not known how dung beetles achieve this. Dung beetles possess highly specialised mouthparts, but how these operate is still not fully understood. The downside to exploiting an ephemeral food source such as dung is that it is not always available, thus several dung beetle genera have resorted to exploring alternative diets such as dry food (dead plant material, dry dung pellets) and carrion. Several hypotheses attempting to elucidate the mode of action

of these mouthparts have been put forward, but only one has been consistent with several experimental findings. This hypothesis suggests that dung beetles increase the nutrient quality of dung using their mouthparts as a filtering apparatus that concentrates minute and nutritious dung particles and eliminates excess water and intractable plant fragments with no nutritional value. Therefore, this study investigated the morphology of various internal components of dung beetle mouthparts to understand their respective roles in particle feeding. Microscopy and geometric morphometrics analysis (GMA) were used to compare the mouthparts of nine dung beetle species from four feeding groups (generalists, wet, dry and carrion feeders). The qualitative microscopy analysis revealed that dry dung feeders possessed grinding and cutting structures, which are reduced or absent in generalists, wet dung and carrion feeders. Carrion feeders have similar structural features as generalists and wet feeders, presumably because of a pre-adaptation to liquid-based food. GMA results indicate that these distinct structural features of the mouthparts across feeding groups are determined by phylogeny rather than selective pressures for a food type. The quantitative microscopy results indicate that the filtering apparatus is not designed to effectively expel excess water, the hypothesis is not entirely valid and needs to be revised.

32 Assessing the pollination success of African baobab (*Adansonia digitata* L.) flowers by day-flying insect visitors

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The African baobab (*Adansonia digitata*) tree is an iconic species native to African countries that rely on animals for pollination. *A. digitata* flowers display nocturnal blooming, making them well-suited for nocturnal visitors such as bats and hawkmoths. Despite the floral traits of baobab conforming to the bat-pollination syndrome, baobab flowers have been observed to attract visitors other than bats in the morning, such as bees and beetles. However, a knowledge gap exists regarding the significance of day-flying insects in pollinating baobab flowers. This study assessed whether diurnal insects could pollinate flowers in the morning before they lose receptivity. This was done using hand- and open-pollination treatments to assess the effect of daytime visitors on fruit set. Our results showed a very low reliance of baobab trees on day-flying insect pollinators, as evidenced by significantly lower fruit set in open-pollinated flowers. The 95% confidence interval (CI) for the success rate of open-pollinated trees varied from 0.025 to 0.22, indicating that the success rate was likely between 2.59% and 22.1%. In comparison, the 95% CI for the success rate of hand-pollinated trees ranged from 0.15 to 0.34, suggesting a likely range of 15.8% to 34.3%. The hand-pollination treatment showed that the stigma remained receptive. At the same time, bees and beetles visited the flowers in the morning, yet flowers visited by insects (open-pollinated) during this period did not set fruit. Thus, we concluded that diurnal insects do not contribute to baobab fruit production.

90 Connecting the past and present: Fifty years of change in chacma baboon and human populations

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Human-wildlife interactions are increasingly shaped by rapid environmental change and human population growth, yet long-term perspectives remain scarce. This study examines changes in chacma baboon and human populations over the past 50 years in Limpopo Province, South Africa, and explores how these shifts influence human-baboon interactions and coexistence. We compare historical records, published accounts and earlier surveys with contemporary field data and demographic information to assess changes in baboon distribution and abundance. These patterns are evaluated alongside human population growth and land-use change to determine how landscape transformation alters opportunities for interaction. Preliminary observations suggest that human expansion and land-use change are reshaping spatial overlap between baboons and people. In some areas, this may correspond with increased crop foraging and contact, while in others it may constrain movement or reduce habitat availability. By linking past and present data, this study contributes a long-term perspective on human-primate coexistence and highlights implications for biodiversity conservation, wildlife management and locally relevant conflict mitigation strategies.

33 Spatio-temporal ecology of the yellow mongoose (*Cynictis penicillata*) in the Rand Highveld Grassland

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The yellow mongoose is a diurnal mesopredator endemic to Southern Africa, yet its ecology in the threatened Rand Highveld Grassland is largely unstudied. This study will investigate the space use, activity patterns, burrow dynamics and diet of yellow mongooses at Telperion Nature Reserve, Mpumalanga. Over 12 months, 16 individuals will be fitted with motion-sensing VHF radio-collars and tracked. We will estimate home range and core area sizes using autocorrelated kernel density estimation (AKDE) and quantify circadian and seasonal activity patterns using continuous focal monitoring supported by collar pulse rates. We will analyse seasonal burrow switching dynamics and assess diet composition from undigested remains in scats. We anticipate males will occupy larger home ranges than females and that activity will follow a bimodal pattern.

72 Niche overlap or competitive exclusion? Investigating bushbuck and nyala co-occurrence at Pullen Nature Reserve

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Mechanisms enabling coexistence between nyala (*Tragelaphus angasii*) and bushbuck (*Tragelaphus scriptus*), two closely related species that broadly overlap in habitat use, remain poorly understood. We tested whether these species partition their ecological niche temporally or spatially and whether they display evidence of competitive displacement over time. Camera trap data collected across multiple years at Pullen Nature Reserve, combined with vegetation surveys, were analysed using occupancy models incorporating environmental variables (e.g. slope, elevation, NDVI). Camera trap timestamps were used to characterise the timing of occurrence by each species. Preliminary results indicate substantial habitat overlap but partial temporal segregation, with bushbuck displaying mainly crepuscular activity and nyala being primarily active during the day. These findings highlight the role of temporal partitioning in facilitating coexistence and the importance of long-term monitoring for understanding competitive dynamics between sympatric species in small reserves.

34 Why have wattled cranes left? Unravelling the drivers of wetland abandonment in the Mpumalanga Highlands

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High-altitude wetlands in the Mpumalanga highlands were once nesting strongholds for the threatened Wattled Crane, yet some now stand abandoned. What changed? This study investigates the hidden drivers of wetland abandonment by linking catchment transformation, hydrogeomorphic change, ecological condition and management practices across scales. Using a multi-scale approach, we combine historical landscape analysis, field-based wetland assessments and high-resolution crane tracking data to connect landscape processes with fine-scale habitat use. We assess how land-use changes, drainage and geomorphic instability which alter wetland structure, hydroperiod and vegetation, all of which are key components of crane nesting habitat. By identifying the environmental conditions associated with both abandoned and actively used wetlands, this research aims to uncover why cranes leave and what keeps them. The findings will provide actionable insights for wetland restoration and conservation strategies to secure the future of crane populations in South Africa's highland ecosystems.

97 Tracking the transition: The ecology of resident and released Temminck's pangolins in the Kalahari

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Ground pangolins (*Smutsia temminckii*) are one of the most poached and trafficked mammals globally and their natural populations have drastically declined over the years. These pangolins are often

confiscated from poachers, rehabilitated and released back into the wild-through post-release programmes. The post-release monitoring research that is conducted on released pangolins typically focuses only on those individuals, without comparison to resident pangolins in the same area. As a result, it is difficult to make inferences on the normal behaviour of the released pangolins and their adaptation to their new environments. I therefore aim to study the ecology of released pangolins alongside resident pangolins in the Kalahari, to determine if the released pangolins successfully adapt to their environments. I will attach custom-built tags that will consist of a very high frequency (VHF) component and tri-axial accelerometer with global positioning system (GPS) unit. The data from these tags will be used to determine home range, habitat selection and energy expenditure of both released pangolins and resident pangolins. The information from this study will be used to inform conservation management of pangolins through the post-release monitoring programmes being conducted for these animals.

35 Linking national abundance patterns, spatial ecology and genetics to guide southern giraffe conservation in South Africa

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Southern giraffe (*Giraffa giraffa*) populations in South Africa represent a conservation success. At 40% of the total wild population, their increasing numbers and expanding range across public and private lands in the country is positive. However, the country's wildlife is highly fragmented, requiring a shift from simple population monitoring to management approaches that incorporate spatial ecology and genetic integrity. This study links national abundance patterns, movement ecology and genomic data to provide a framework for their long-term conservation. Our findings highlight the central role of private land stewardship alongside public land management, highlighting that small, fenced reserves can alter natural spatial ecology by compressing home ranges and intensifying habitat selectivity. Genomic analyses further reveal that decades of translocations have resulted in subspecies hybridisation, with some more 'pure' provinces observed. Together, these results emphasise the need to maintain genomic distinctness while promoting landscape connectivity to ensure southern giraffe populations remain ecologically functional and genetically resilient.

73 Effects of bush encroachment intensity on bird species diversity and composition along a landscape gradient in Shangani Holistic

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²Oppenheimer Generations – Shangani Holistic Ranch

Bush encroachment is transforming open grasslands in Shangani Holistic rangelands into woody thickets, with potential consequences for biodiversity and ecosystem functioning. This study investigated the effects of bush encroachment on bird species richness, diversity, composition and feeding guild structure. Nine sampling sites representing three encroachment levels (low: 0-10%, moderate: 10-20% and high: 30-50% tree cover) were surveyed using the point count method. A total of 77 bird species were recorded, with the highest richness observed in highly encroached sites (46 species). Non-Metric

Multidimensional Scaling revealed shifts in species composition along the encroachment gradient, characterised by the replacement of habitat specialists with generalist species, while moderately encroached sites supported transitional assemblages. Quasi-Poisson modelling indicated a decline of carnivorous species in highly encroached areas, whereas scavengers were most abundant at moderate levels of encroachment. Generalised linear models and post-hoc pairwise comparisons showed no significant differences in overall bird richness among encroachment levels or vegetation types ($p > 0.05$). The findings suggest that bush encroachment primarily influences avian community composition and trophic structure rather than species richness. Management interventions should therefore prioritise maintaining habitat heterogeneity to accommodate shifts in avian community composition associated with increasing bush encroachment.

49 Comparative study on the ethnobotanical usage of medicinal plants by traditional healers at Jozini and Nongoma local municipalities in KwaZulu-Natal

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The study aims to compare the ethnobotanical knowledge and utilisation patterns of medicinal plants for treating sexually transmitted infections between traditional healers in Jozini and Nongoma municipalities, as shaped by protected area proximity. The study was conducted in Jozini which is adjacent to protected areas and Nongoma which is further from protected areas. The participants were obtained through snowball sampling. It was determined that Jozini had a greater species richness than Nongoma. The regression analysis revealed that distance from protected areas did not have a significant influence on number of species mentioned by traditional healers. Gonorrhoea and genital warts are the most prevalent STIs across both Jozini and Nongoma. In Jozini, traditional healers predominantly use roots and whole plant to treat STIs, while in Nongoma they also incorporate tubers, bulbs along with roots and whole plants.

50 Lactic fermentation of maize and sorghum mahewu fortified with edible insects as a food safety strategy

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The Food and Agriculture Organisation has recognised edible insects as being rich in nutrients and as having significant potential as an alternative source of animal protein. However, edible insects have been reported to contain toxins (heavy metals) and allergens (Tropomyosin and Arginine kinase). Fermentation has been reported as an effective method to break down these toxins and allergens. The proposed study aims to assess the effect of lactic fermentation on the allergen properties and microbiological safety of maize and sorghum mahewu fortified with edible insects. Maize and sorghum mahewu will be prepared using the standard method, with maize and sorghum meal partially substituted by 5% and 10% (w/w) mopane worm, termites and Gynanisa caterpillar meals. Microbial safety will be tested using Coliform

count and characterisation. To detect allergenic proteins, mass spectrometry (MS) will be used, followed by separation of the allergens using liquid chromatography. Data will be analysed using a three-way ANOVA. It is expected that fermentation will increase microbial safety and digestibility while reducing protein allergens. The results of this study will be crucial in ensuring the food safety of maize and sorghum mahewu supplemented with edible insects.

99 Fortification of cereal-grain food products with edible insects: Implications for food and nutrition security – a systematic review

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Malnutrition and food insecurity are major global public health challenges, particularly in low- and middle-income countries. Rapid population growth, climate-related pressures on food systems and increasing demand for sustainable nutrient-dense foods have intensified the search for alternative protein sources. Cereal-grain food products are widely consumed staple foods in many developing countries; however, they are generally rich in carbohydrates and limited in protein and essential micronutrients. In recent years, edible insects have emerged as a promising sustainable food ingredient due to their high nutritional value, environmental sustainability and potential to improve dietary quality. Therefore, this systematic review evaluated the effects of edible insect fortification on cereal-grain food products, with emphasis on physical quality characteristics, nutritional composition and implications for food and nutrition security through consumer acceptance. A comprehensive literature search was conducted across six electronic databases, namely Web of Science, Scopus, PubMed, ScienceDirect, African Journals Online and Google Scholar, for studies published between 2009 and 2025, following the PRISMA guidelines. A total of 970 articles were identified. After screening and eligibility assessment, 45 studies met the inclusion criteria. An additional ten studies were identified through reference list screening, resulting in 55 studies included in the final review. The findings showed that edible insect fortification significantly improved the nutritional quality of cereal-grain food products by increasing protein, fat and mineral contents, particularly iron and zinc. Insect incorporation also influenced key physical quality characteristics, including colour and texture, with the magnitude of these changes depending on insect species and substitution level. Consumer acceptance was influenced by insect type, inclusion level, product type and familiarity with entomophagy, with lower fortification levels generally receiving higher acceptability. Overall, the results indicate that edible insect powders can serve as a viable and sustainable ingredient for enhancing both the nutritional and functional properties of cereal-based foods, thereby contributing to the reduction of protein-energy malnutrition and micronutrient deficiencies, particularly among vulnerable populations in developing countries.

74 Synergistic soil repair: Nano-and organic-enhanced phytoremediation

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Hyperaccumulation mechanisms in plants provide the foundation for rehabilitation strategies to transform contaminated landscapes into functioning ecosystems. Chemical characterisation on the South African plant Ni-hyperaccumulator, *Berkheya zeyheri*, identified organic acids as crucial chelators of Ni.

These acids were translated into soil amendments (citric acid, malic acid, citric-malic mixture, TiO₂ and organic acid functionalised TiO₂ nanoparticles) and applied to Chamomile (*Matricaria Chamomilla* L), Lavender (*Lavandula angustifolia*) and Geraniums (*Pelargonium graveolens*) grown on mine tailings. Chamomile offered meaningful remediation of multi-contaminated soil (Ni, Zn, Cu) with the potential of economic benefit through zinc recovery when organic acid functionalised TiO₂ nanomaterials were used. Lavender and Geraniums, valuable for their essential oils and landscape diversity, showed improved growth and metal uptake under TiO₂ nanomaterial treatments, supporting phytostabilisation and sustainable livelihood opportunities through essential oil extraction, aligning with ecological restoration and community-based economic development. Together, these findings demonstrate how synergistic remediation strategies can be used to restore contaminated sites, support biodiversity and create pathways for sustainable economic use of rehabilitated landscapes.

91 Non-invasive steroid hormone analysis to assess welfare in captive serval (*Leptailurus serval*) and caracal (*Caracal caracal*)

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Anthropogenic environmental change and captivity increasingly threaten global biodiversity, yet despite their vital ecological role in regulating small-mammal populations, mesocarnivores remain significantly understudied. Additionally, assessing the welfare of these species is often hindered by their elusive and nocturnal nature. This study aims to validate a non-invasive method for monitoring stress and welfare in serval (*Leptailurus serval*) and caracal (*Caracal caracal*) by measuring faecal glucocorticoid metabolites (fGCMs). To ensure biological relevance and account for species- and sex-specific variations in hormone metabolism, an ACTH challenge will be conducted to validate a species- and sex-specific Enzyme immune assay (EIA). Furthermore, I will assess the post-defaecation stability of fGCMs to determine the window of reliability for samples exposed to environmental elements and bacterial degradation. Following validation, this methodology will be applied to individuals housed at the Cheetah Experience to evaluate how welfare fluctuates in response to varying environmental disturbances within and between individuals. This research provides a critical toolset for the non-invasive monitoring of serval and caracal welfare, facilitating improved management strategies in both captive and wild contexts.

36 A decade of long-term vegetation monitoring at Tswalu Kalahari Reserve

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Vegetation monitoring documents the nature, extent and rate of vegetation change in response to key climate drivers (e.g. rainfall) as well as land use drivers, especially herbivory. Longer term monitoring in arid systems is important due to the high spatio-temporal variation in rainfall and ecosystem complexity. This study also aims to evaluate the use of fixed-point repeat photography as a monitoring tool for studying change in the vegetation composition, cover and structure at Tswalu Kalahari Reserve. Our results suggest that an erratic rainfall pattern strongly regulates plant productivity in Tswalu. Furthermore, there is extreme temporal and spatial heterogeneity across Tswalu (spatial asynchrony), with patch dynamics

and constantly changing ecological states. Spatial asynchrony is key to a resilient landscape. Maintaining a maximum species diversity is critical for ecosystem resilience. During the 10 year period rainfall variation was extreme and there was no directional trend. Research needs to continue for as long as possible to determine any net change over time and the influence of land use drivers.

102 Managing bush encroachment on a holistically managed rangeland in a semi-arid African savanna

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Bush encroachment poses a significant challenge for landowners across savanna ecosystems. Our aim is to develop an evidence-base to support practical solutions for managing bush encroachment in a semi-arid African savanna. We evaluate the efficacy of targeted bush-encroachment management strategies in reducing woody plant density and resprouts from cut stumps, and their impacts on grasses at Shangani Holistic in Zimbabwe. We report data collected 18 months post-treatment, using statistical model-based inference to account for climatic variability. Our preliminary results indicate that thinning and fire (TF) yield the greatest benefits in reducing seedling, sapling, and tree densities, while also increasing above-ground grass biomass and diversity. Other, more intensive treatments, including thinning, fire, and browsers (TFB), and thinning, targeted herbicide application, and fire (THF), had a greater suppressive effect on resprouting, but the longer-term implications of this are not yet clear from the available data. The findings inform sustainable management of bush encroachment in semi-arid African savanna rangelands.

75 The movement ecology of elephants in the Malawi-Zambia Transfrontier Conservation Area

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Translocations are often used as a management tool to control population densities and population growth. However, the success of translocations is seldom assessed, especially for long-lived species such as African savanna elephants (*Loxodonta africana*), for which survival and reproduction are not yet available to measure success. The movement ecology of African elephants is an effective method for measuring both the effect and the success of translocation on a population of elephants. In 2022, a total of 263 elephants were translocated to Kasungu National Park and 30 elephants were collared with GPS collars. This three-fold increase in elephant density allows us to evaluate how resident elephants respond to such a large increase in density, while also examining how the introduced elephants responded to a novel environment. Elephants are cathemeral animals and thus move throughout their environment both during the day and night. This study, therefore, also looks at the movement of these elephants under different nocturnal environmental conditions, including different moon phases. The outcomes of this study will serve as a post-translocation evaluation and aid in the development of a conservation management strategy for the endangered African savanna elephant in this landscape.

37 Integrating renewable energy to mitigate biodiversity loss in sustainable rural landscapes

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Biodiversity decline poses significant threats to ecosystem stability and rural livelihoods. While renewable energy is widely promoted for climate change mitigation and sustainable development, its implementation can also influence biodiversity outcomes. This study investigated how decentralised renewable energy technologies can support biodiversity conservation while improving energy access in rural communities. Using a mixed-methods approach including household surveys, stakeholder interviews and participatory observation the research examined the socio-economic and ecological impacts of renewable energy adoption. Findings show that these systems reduce reliance on traditional biomass fuels such as firewood, easing pressure on local vegetation and fragile ecosystems. Renewable energy adoption also enhances waste management, lowers greenhouse gas emissions and integrates with agricultural activities, promoting more sustainable land use. By strengthening the resilience of rural socio-ecological systems, these approaches contribute to ecosystem recovery and long-term biodiversity protection. The study underscores the importance of supportive policies, community engagement and innovative financing in ensuring that renewable energy initiatives safeguard biodiversity while enhancing rural livelihoods.

53 Beyond the museum: Bringing heritage to people

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Traditional museums face numerous challenges in Africa, one of the most significant being public access to museum collections and heritage sites. This issue is exacerbated by physical barriers, such as distance, as well as financial constraints, which limit people's ability to view, visit and engage with heritage. The result is a growing divide between researchers and the public. To address this, we developed an interactive travelling museum that presents Southern Africa's archaeology directly to communities. Visitor interviews demonstrate that the museum not only supports learning about archaeology but also fosters a deeper appreciation of the past. The opportunity to touch and handle artefacts while discovering their histories had a particularly profound impact. Here, we summarise these findings and introduce the next phase of the project: a mobile display designed to travel throughout Kruger National Park and into neighbouring communities. As a highly visible, mobile heritage platform, the museum aims to extend its reach, enhance public understanding of the region's past and promote ongoing archaeological research into the kingdom of Thulamela.

38 Metabarcoding-based comparison of fish diversity in the uMkomaas Estuary from 2021 to 2025 under recurrent flood disturbance

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Estuaries are dynamic ecosystems whose fish assemblages may be reshaped by extreme hydrological disturbance. Following the catastrophic 2022 KwaZulu-Natal floods and subsequent severe storm events in the greater eThekweni region, this study investigates whether periodic flooding has influenced fish diversity in the uMkomaas Estuary. Fish metabarcoding datasets from 2021, 2023, 2024 and 2025 are used to compare diversity before and after the onset of recurrent flood disturbance. Using 2021 as a pre-flood baseline, the study aims to assess interannual variation in species richness, community composition and species turnover. Sequence data will be processed using a standardised bioinformatic workflow to generate taxonomic assignments, after which diversity metrics and multiyear community comparisons will be used to evaluate temporal shifts in assemblage structure. This work will provide insight into the sensitivity and resilience of estuarine fish communities to repeated flood events and highlight the value of metabarcoding for biodiversity monitoring in South African estuaries.

51 Does the wildlife economy improve tolerance to African megafauna? A systematic review

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The presence of tangible benefits from wildlife is considered a key driver of wildlife tolerance in social-ecological systems where human-wildlife conflict is prevalent, stemming from philanthropic support and wildlife-based economies. However, global contentions surrounding wildlife economy activities may threaten these economies and, in turn, wildlife tolerance. Whether this would be the case remains uncertain, as the relationship between wildlife economies and tolerance has not been systematically evaluated. To address this gap, we conducted a systematic literature review evaluating evidence on whether the wildlife economy influences tolerance of African megafauna and the determinants of this influence. Evidence from 48 systems with wildlife economy initiatives was identified. Most systems were characterised by moderate tolerance levels (45%), while high and low tolerance were also relatively common (29% and 26%, respectively). Wildlife-related employment was most frequently reported to improve tolerance, followed by wild meat dividends and community development. Benefit types associated with high tolerance differed geographically and depended on whether benefits were received at individual, household, or community level. Our findings emphasise the need for contextual investment in wildlife economies and institutions shown to promote tolerance. As human-wildlife conflict continues to threaten biodiversity and human wellbeing, understanding how wildlife economies drive tolerance is essential for effective coexistence strategies.

100 Livestock and methane in Africa: Towards reducing uncertainties in emission estimates

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Africa holds approximately a third of the global livestock population, with enteric fermentation comprising over 70% of the agricultural greenhouse gas emissions, yet the continent remains underrepresented in methane monitoring and research. We synthesised livestock methane emission data across Africa to identify observational gaps and recommend improvement pathways. Most countries rely on IPCC Tier 1 default emission factors, which empirical studies show systematically overestimate enteric methane for cattle and underestimate for small ruminants. Inventory database comparisons show strong correlations but significant country-level divergences, with national reports exceeding the mean by > 40% in several countries, including Gabon, South Africa and Botswana. Ethiopia has the highest mean enteric fermentation estimate, followed by Chad and Sudan. Three critical gaps include incomplete activity data, heavy Tier 1 reliance with unreported uncertainties and transparency deficits in national reporting. Satellite-based inversions further indicate that African national inventories systematically underestimate sectoral emissions. The study recommends coordinated prioritisation of Tier 2 transitions in high-emission countries, expanding measurement infrastructure, integrating UAV-based livestock enumeration and strengthening governance frameworks.

39 Impacts of *Lopholaena koriifolia* encroachment on grassland herbaceous layer and soil properties along a topographical gradient

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South African grasslands occupy approximately one-third of the land surface, supporting both commercial and communal livestock production systems. However, these systems are increasingly affected by woody and shrub encroachment, which often alters grassland structure, reduces grass productivity, changes species composition and affects soil processes such as nutrient cycling and water infiltration. One such species, *Lopholaena koriifolia*, a perennial woody shrub commonly found in disturbed or underutilised grasslands of South Africa, may have an impact on grassland dynamics through root competition, competitive shade and possible allelopathic effects. To assess the effects of *Lopholaena koriifolia* on grassland vegetation structure, composition and productivity across different slope positions, a study was conducted at Telperion Nature Reserve, South Africa, located between 25° 38' and 25° 45' South and 28° 55' and 29° 03' East.

40 A functional trait perspective to woody plant encroachment in Tswalu Kalahari Reserve

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Savannas are globally significant ecosystems that support many livelihoods through wildlife tourism and livestock farming. However, these ecosystem services are under threat due to woody plant encroachment (WPE). Predicting WPE trends is complicated by the interacting effects of global and local drivers – the relative importance of which varies regionally. In semi-arid savannas climate, soil properties and herbivory appear to be important drivers. This study used a trait-based approach to determine whether successful encroachers in Tswalu Kalahari Reserve (TKR) possess a distinct trait syndrome that facilitates encroachment, while simultaneously identifying the role of these drivers in woody community organisation. No significant environmental-trait relationships were identified. Interestingly, the WPE signature was found to differ: some plots showed woody thickening, while others experienced turnover in vegetation composition, and some showed signals of both. TKR's environmental gradients may be too small to detect environment-trait relationship, and performing this study over a larger gradient could be more insightful. Additionally, this is a relatively young reserve, with sections being acquired at different times. The woody community might be recovering from past land use as livestock farms which could be confounding signals of WPE. This highlights the need for a more nuanced approach to understanding woody plant dynamics that includes legacy effects of past land use.



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