# DICE 2021 CONFERENCE

#DICECON21

# Welcome to the DICE 2021 Twitter Conference

**Thank you to all the DICE members who've agreed to showcase their research & special thanks to our session chairs:**

Jacob Bentley, Jake Bicknell, Glyn Davies, Nick Deere, Hazel Jackson, Matt Linkie, Claire Raisin, and Janine Robinson

DICE

University of Kent

**Gemma Harding**

*@AmphibiGem*

# The best laid plans? - Evaluation of species action plans

Species action plans (SAPs) underpin much of conservation management. The purpose of such plans is to define the actions needed to achieve goals and crucially, to build consensus among organisations and individuals that are in a position to influence outcomes. Systematic reviews are conducted for some SAPs, particularly where large NGOs provide support, but their implementation and impact have not been compared on a broader scale. Equally, there is little consistency in the structure and content of action plans, and limited research to evaluate their effectiveness and impact. Our initial research aims to assess how SAPs are developed, valued, utilised, and evaluated. Data were collected through an online questionnaire aimed at conservation professionals, ecological consultants and policy makers. Initial analysis shows: guidelines and templates were used to form the basis of SAPs more than 60% of the time; most conservation professionals referenced SAPs extensively for their work and felt that SAPs are play an important role in species conservation; and, less than 30% of respondents had used monitoring or evaluation tools to measure the effectiveness of SAPs. These preliminary results lay the foundations for a comprehensive review of SAPs which will highlight potential gaps and understand the relationships between organisations and SAPs and help inform improvements to allow a more focussed approach for conservation organisations, policy makers, zoos and conservation professionals

**Katie Spencer**

@KatieSpencer229

# Determining drivers of defaunation in Kalimantan using existing camera-trap data

Habitat loss coupled with anthropogenic threats (i.e hunting and human disturbance) is driving defaunation across Southeast Asia, but the patterns and processes of defaunation in Indonesian Borneo are currently unknown. Using multispecies occupancy models and existing camera-trap data from 11 sites across Kalimantan, my research explores mammal responses to environmental and anthropogenic threats, at the species and community level. This research aims to understand the relative impact of different drivers of defaunation, and how this varies between species and across the landscape. The results of this research will be important for guiding conservation efforts in Kalimantan to prevent population declines seen elsewhere in Southeast Asia.

**Lucie Poole**

@lajpoole

# Behavioural responses of mated and non-mated female Pine marten (Martes martes) to novel stimuli as a measure of personality.

Once common across the UK, Pine marten populations are now confined to Scotland and Ireland. Successful translocations of wild Pine martens have taken place from Scotland to Wales and Ireland. In order to increase the number of wild Pine martens, reintroduction programs utilizing captive animals as the founder population will need to take place. Previous research has illustrated that an assessment of individual personality may be useful when selecting individuals for reintroduction programs to increase probability of success. Increased levels of boldness in reintroduced species have been shown to decrease chance of survival and as such it may be more suitable to utilize individuals with a lower boldness for reintroduction. Measuring behavioural response of Pine marten to novel stimuli on a bold/shy continuum will provide an indication of individual levels of boldness. In order to assess levels of bold/shy personality, novel objects including different sized tennis balls, Valarian essential oil and Lavender essential oil as olfactory stimuli were placed within the Pine marten enclosure for 1 hour on three consecutive days respectively. Behaviour was recorded via remote CCTV to avoid human disturbance. Behavioural response was measured using a pre-established ethogram. Data were collected via focal continuous recording for 10 minutes prior and for the hour the novel stimuli was present in the enclosure. Latency to approach novel stimuli, frequency and duration of interactions were recorded. Bold behaviours scored +1 and shy behaviours scored -1. An overall positive score indicates the individual is bolder in personality. The findings from this study will provide a method to establish personality types and aid in identifying individuals for possible future reintroduction to the wild.

**Anna Jemmett**

@annajemmett

# Common names can affect wild camel conservation

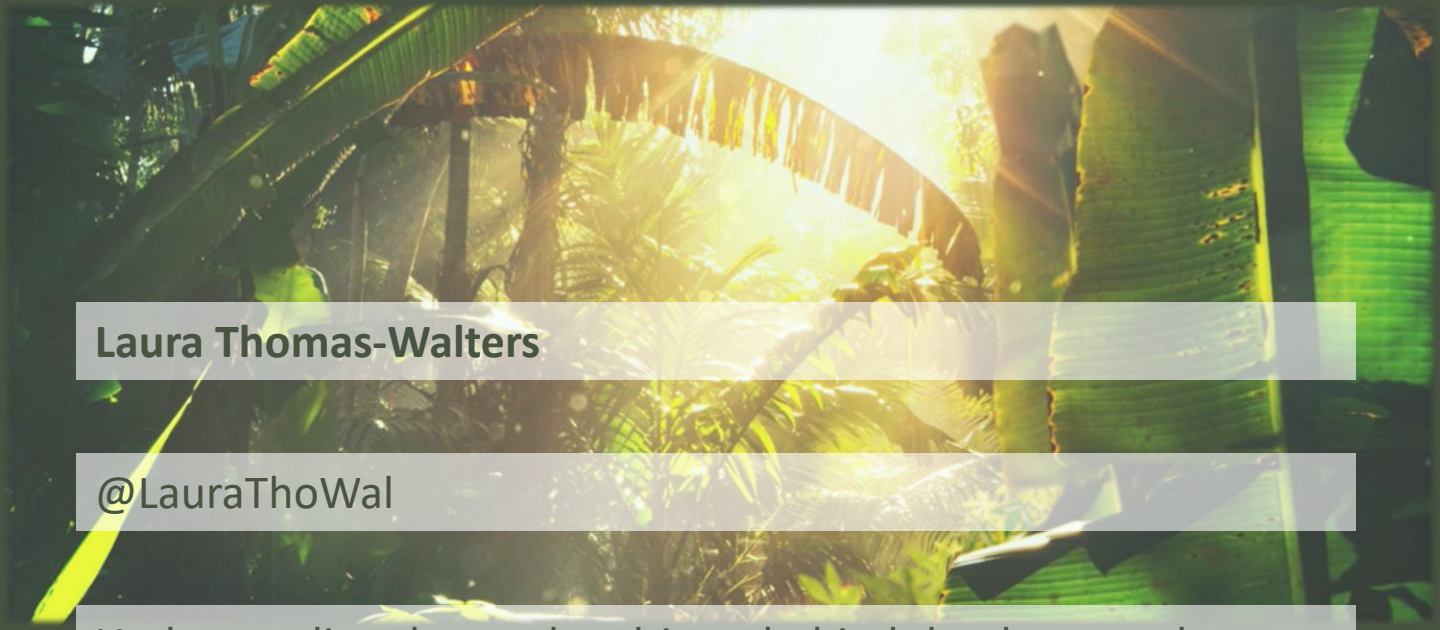
Common names are important as they are descriptors which allow species diversity to be understood and appreciated by experts and non-specialists alike. Their use has both scientific and cultural implications and a lack of clarity when using a common name can risk the perception of safety for a threatened species. This is the case for the critically endangered wild camel (Camelus ferus), which, despite extensive scientific proof of its species status, is still frequently named “wild Bactrian camel”. The wild camel is not a re-wilded version of the domestic Bactrian camel (Camelus bactrianus) but a separate species in its own right, at the very edge of extinction. Failing to clearly separate domestic Bactrian and wild camels when naming risks masking the plight of the few remaining wild camels with the global abundance of Bactrians. This has been shown by the confusion in advertising the species and red list status of domestic Bactrians by Zoological Institutions across Europe and North America. We advocate the use of a suitable English common name for C. ferus - the wild camel - which highlights both its cultural and conservation importance.

**Keith Somerville**

@KSAfricaHack

# The life, character and complex interactions of the honey badger or ratel.

The honey badger or ratel (Mellivora capensis) is one of Africa and Asia's more intriguing, if lesser known, small carnivores. It has an intriguing relationship with other carnivores, a raptor and an insectivorous bird, and a conflictual relationship with humans, notably beekeepers and honey-gatherers. Relatively little research has been done - the excellent work of Dr Colleen Begg being the exception. But in recent years, the honey badger has begun to attain minor cult status because of its courage, toughness, aggression and intelligence. An Australian rugby union forward has been nicknamed the honey badger because of his strength and on-field aggression. You tube videos show them confronting lions, chasing off leopards and hyenas, and fighting and killing a huge python while being plagued by black-backed jackals. TV documentaries, notably about a captive badger called Stoffel, have highlighted (and probably exaggerated) their ingenuity. But what is the honey badger like - are its relations with jackals, Ethiopian wolves, the pale chanting goshawk and the honeyguide what they are popularly viewed as - symbiotic relationships - or are they more complex with the honey badger being effectively parasitised?



**Laura Thomas-Walters**

@LauraThoWal

# Understanding the market drivers behind the decreased demand for ivory products in Japan

Reducing demand for wildlife products has been recognised as an important global priority, especially with fears that there are expanding markets for certain taxa. However, consumer demand is a complicated phenomenon and can involve numerous interacting biological, social, political and socio-economic factors, operating at a range of scales and time periods. Although the domestic Japanese ivory market is one of the most famous examples of demand reduction, we have limited insights into how consumer behaviour and attitudes influenced ivory sales. This is partly because post-hoc evaluations of such complex systems are difficult when relying on traditional quantitative methods. We used General Elimination Methodology and semi-structured interviews with key stakeholders to provide a richer understanding of consumer behavioural change in Japan. We identified the two biggest market drivers, the CITES international trade ban and economic recession, as well as a range of minor drivers and enabling conditions. These included respect for government authority, the passive nature of demand for ivory, and a general cultural shift away from conspicuous consumption. We also ruled out purported influences that are unlikely to have had an impact, such as pressure from eminent people.

**Sicily Fiennes**

@sicilyfiennes

# Building baselines: variations in human and computer performance in identifying birds in the wildlife trade

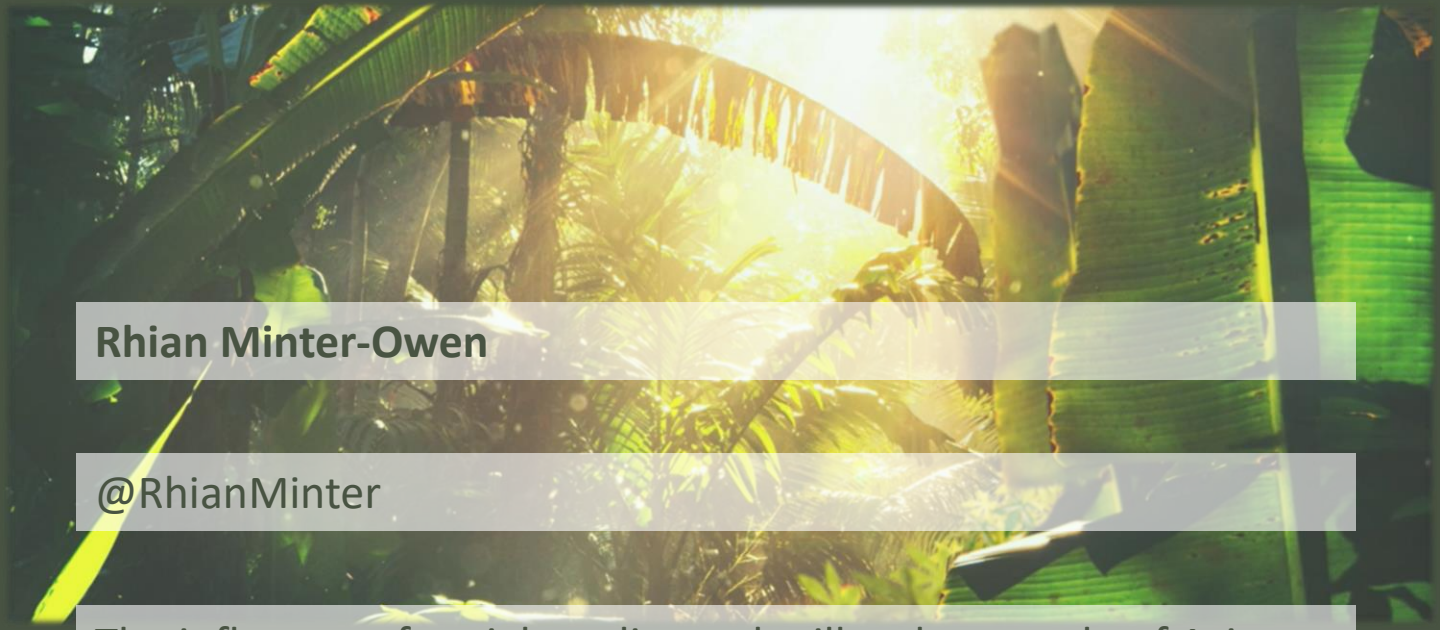
Birds are one of the most diverse and traded groups in the wildlife trade. This diversity poses vast challenges in maintaining real-time inventories across wildlife markets, as well as properly training individuals in species identification. Comparisons of human and computer performance on wildlife trade-related image classification problems are relatively scarce. In this piece of work, the accuracy of humans and computers will be compared in identification tasks for nineteen species of bird which are common in the wildlife trade in Southeast Asia. For human observers, identification accuracy was assessed with a matching task that required same/different decisions for side-by-side pairings of species of birds. To represent computers, we employed transfer learning by re-training an existing convolutional neural network on new, unique classes of bird species. Overall, the computer model performed better than the average accuracy (% of correct answers) of humans but worse than the best human score. The highest accuracy was achieved by one human participant, who likely fits the rare role of a 'super recogniser' for bird species. These results provide a valuable baseline for error rates in both manual and automatic techniques for avian species identification in wildlife markets. Image-based approaches for classification hold great promise for improving the accuracy of species identification, not only for birds, but also for many other taxa which appear in the wildlife trade.

**Helen Pheasey**

@HelenPheasey

# Quantifying illegal extraction of sea turtles in Costa Rica

Estimates of illegal wildlife trade vary significantly and are often based on incomplete data, inferences from CITES permits or customs seizures. As a result, annual global estimates of illegal wildlife trade can vary by billions of dollars. Translating these figures into species extraction rates is equally challenging, and estimating illegal take accurately is unachievable for many species. Due to their nesting strategies allowing for census data collection, sea turtles offer an exception. Despite being illegal, poaching of turtle eggs and meat continues in Costa Rica. Conservation programmes monitor nesting beaches and record poaching events. Despite the availability of robust long-term datasets, quantifying the rate of poaching has yet to be undertaken. Using data from 3 nesting beaches on the Caribbean coast, we modelled the spatial and temporal distribution of poaching of sea turtle species. We identified poaching hotspots that correlated with populated areas. While the poaching hotspots persisted over time, we found poaching is declining at each of our sites. However, we urge caution when interpreting this result as the impact of poaching varies between species. Given their low abundance on these beaches, the poaching pressure on leatherback and hawksbill turtles is far greater than the impact on the abundant green turtle. We suggest supply-side conservation interventions are reducing poaching and highlight the value of data sharing between NGOs.



**Rhian Minter-Owen**

@RhianMinter

# The influence of social media on the illegal pet trade of Asian small-clawed otters

Social media has increased rapidly in the last 20 years; its ability to portray species to a broad and international audience has brought new challenges for wildlife conservation as more species become increasingly popular in the illegal pet trade. Despite being classed as Vulnerable on the IUCN Redlist, Asian Small-clawed otters (Aonyx cinereus) are being increasingly traded as exotic pets, both through legal and illegal means. The project aims to understand the link between social media's influence on the illegal pet trade of Asian Small-clawed Otters. By utilising sentiment analysis to understand how viewers perceive viral videos of otters on the social media platform, Youtube, and how this may influence them with regard to keeping otters as pets, as well as investigating this change in perception over time. Recently, there have been many questions surrounding social media and its ability to protect vulnerable species; and whether enough is being done on social media to prevent such trading from happening in the future.

**Ruth Thompson**

@RuthM_Thompson

# How to conduct online conservation research ethically: an illegal wildlife trade case study

Abstract originally from Thompson et al., 'Ethics and governance for internet-based conservation science research', Conservation Biology https://doi.org/10.1111/cobi.13778 (open access CC-BY):

Internet-based research is increasingly important for conservation science and has wide-ranging applications and contexts, including culturomics, illegal wildlife trade, and citizen science. However, online research methods pose a range of ethical and legal challenges. Online data may be protected by copyright, database rights, or contract law. Privacy rights may also restrict the use and access of data, as well as ethical requirements from institutions. Online data has real-world meaning, and the ethical treatment of individuals and communities must not be marginalized when conducting internet-based research. As ethics frameworks originally developed for biomedical applications are inadequate for these methods, we propose that research activities involving the analysis of preexisting online data be treated analogous to offline social science methods, in particular, nondeceptive covert observation. By treating internet users and their data with respect and due consideration, conservationists can uphold the public trust needed to effectively address real-world issues.

**Katy Kennedy**

@ktken281

# Moving towards a certified trade in reptiles and amphibians

TBC

**Claire Stewart**

@clairecology

# Protecting biodiversity outside protected areas: what influences landowner participation in private land conservation?

Private land is emerging as a global conservation strategy for its potential to complement the existing protected area network. Protected areas are proving insufficient to stem global biodiversity losses as they are limited by their isolated and restricted geographical coverage, lack of connectivity, possible downgrading, downsizing and degradation, and poor representation of global biodiversity. With much biodiversity found on private land, landowner participation in conservation is crucial for safeguarding biodiversity outside protected areas to ensure larger and contiguous landscape protection, better connectivity and higher coverage of global biodiversity. A clear understanding of the factors that influence landowner participation is required for the design of successful private land conservation programmes. We carried out a global review of the factors that influence a landowner's decision to participate in private land conservation programmes. We summarise socio-demographic factors as well as the motivations and the barriers which influence landowner participation. We identified a diverse range of motivations from social recognition to improving productivity, with nature conservation and financial incentives emerging as the most frequently cited motivations. We also found economic barriers are the most frequently cited reason for non-participation. These findings can help improve the design of private land conservation programmes and increase landowner participation.

**Eleanor Stewart**

@Ele_Stewart

# Modelling the influence of land-use on ocean water quality in Wallacea, Indonesia

Land-use change through agriculture, deforestation, and urban development leaches nutrients and sediment into coastal waters. This decreases water quality and smothers habitats, reducing diversity of marine ecosystems. Regions that are suffering from degradation of fish habitat and low water quality are often areas where local communities are relying on fisheries and tourism as major sources of livelihoods. A better understanding of the relationship between land-use and water quality is needed. Until recently, these cross-realm threats have not been reflected in conservation planning and management. Ignoring this land-sea connection undermines the effectiveness of current conservation initiatives and negatively impacts coastal fishing villages. Here, we use a Bayesian hierarchical model to determine the influence that land-use in terrestrial catchments has on coastal ocean water quality in the Wallacea region of Indonesia. We use freely available satellite data to model the direct link between specific catchments and all surrounding coastal ocean pixels. Results from this model will contribute to understanding the land sea linkage to better inform development and conservation plans. The results can be paired with deforestation predictions and incorporated into a spatial prioritisation of the Wallacea region.

**Dave Seaman**

@DaveSeaman86

# Assessing orangutan population viability and connectivity, using an individual based model

It is now widely recognised that orangutans can persist in human-modified landscapes and there is increasing focus on conserving the species in these areas. Using a customised individual based model (RangeShifter) and our current understanding of orangutan ecology, we demonstrate that sustainability certification standards have the potential to create landscapes which can support stable orangutan populations and provide connectivity over a relatively small area. We now aim to apply this model over the species range and investigate how levels of forest fragmentation and hunting may affect orangutan population viability and connectivity in the future.

**Bob Smith**

@AnotherBobSmith

# Developing a Nature Recovery Network using systematic conservation planning

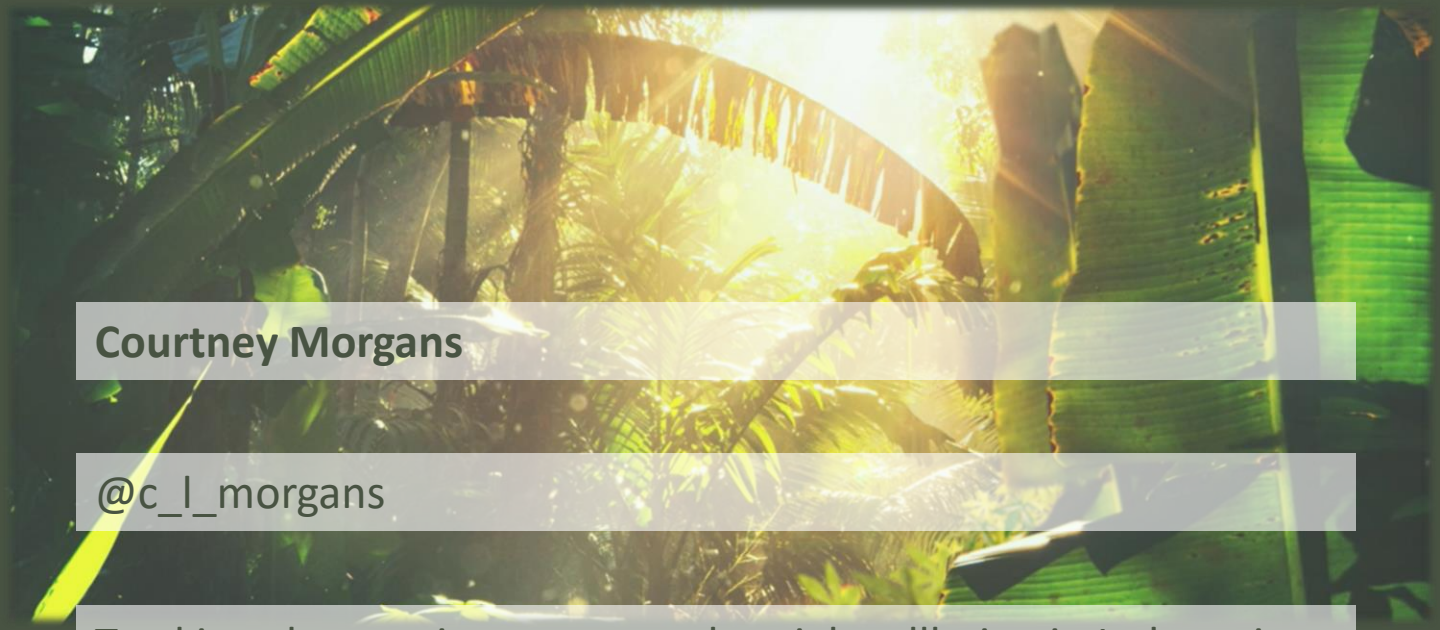
Conservation area networks in most countries are fragmented and inadequate. To tackle this in England, government policies are encouraging stakeholders to create local-level Nature Recovery Networks. Here we describe work led by a wildlife organisation that used the systematic conservation planning approach to identify a Nature Recovery Network for three English counties and select focal areas within it where they will focus their work. The network was based on identifying core zones to maintain current biodiversity and recovery zones for habitat restoration, meeting area-based targets for 50 priority habitat, landscape, landcover and ecosystem service types. It included the existing designated sites for conservation, which cover 6.05% of the study site, and identified an additional 11.6% of land as core zones and 18% as recovery zones, reflecting the organisation's broad objective of conserving and connecting 30% of England by 2030. We found that systematic conservation planning worked well in this context, identifying a connected, adequate, representative and efficient network and producing transparent and repeatable results. The analysis also highlighted the pressing need for government agencies to provide national-level guidance and datasets for setting targets and including species data in spatial planning, creating a national framework to inform local action.

**Jess Fisher**

@jessjessfisher

# Can biodiverse streetscapes mitigate the effects of noise and air pollution on human wellbeing?

By 2050, nearly 70% of the global population will be living in cities. Urban dwellers live with higher levels of noise and air pollution, which can be detrimental to human health and wellbeing. By contrast, biodiversity can positively impact human being, providing somewhere restorative to reduce stress and attentional fatigue. It remains unknown, however, whether the negative impacts of pollution on human wellbeing could be alleviated by biodiversity. Here, we use structural equation modelling to examine the complex interlinkage between biodiversity (actual and perceived), pollution (noise and air), and wellbeing (mental wellbeing and happiness) across the streetscapes of Leeds, UK. We found that the negative impacts of noise on mental wellbeing were lessened by a greater richness of flowering plants. Noise had direct negative impacts on pollinator and flowering plant richness, likely as residents did less garden maintenance on noisy streets. Air pollution had no effect in the models. These findings begin to unpick the mechanisms through which biodiversity could contribute to human wellbeing in urban residential streetscapes. Encouraging residents, councils, and other stakeholders to use diverse planting regimes could have positive impacts on human wellbeing in polluted cities.



**Courtney Morgans**

@c_l_morgans

# Tracking changes in poverty and social wellbeing in Indonesia

Defaunation is the decline of animal populations and the extinction of species due to human activities. Previous defaunation studies have relied on simplistic proxies such as accessibility and population density to measure the impact of humans on species and landscapes. These simple metrics risk overlooking a range of important socioeconomic variables that influence how individuals and communities use and interact with nature. A primary aim of the DICE Defaunation hub is to extend beyond these proxies by examining how variations in socioeconomic characteristics drive patterns of defaunation in Indonesia. This enhanced understanding will then allow us to predict and prevent further biodiversity loss. In this presentation, I will describe how we are tracking changes in poverty and wellbeing across >50,000 Indonesian villages using PODES (village census data) and demonstrate how socioeconomic characteristics have changed across the archipelago over the past 20 years.

**Gail Austen**

@lililutra

# Are people's preferences for biodiversity attributes influenced by seasonality?

2021 is the start of the UN Decade for Ecosystem Restoration. The desire to increase tree cover to mitigate climate change and deliver on net zero commitments has led to a policy focus on woodland creation and restoration. While native woodland provides one of the best ways to simultaneously tackle both the climate and biodiversity crises, only 7% of Britain's native woodland is in good ecological condition. The effective creation and restoration of woodland is reliant on a number of factors, including public support, so the preferences and views of the public must be considered in any conservation strategy. Using images characterising species found in British woodlands, we applied Q methodology to assess how people view and relate to different aspects of biodiversity. Moreover, we explore whether the seasonality associated with British woodlands impacts upon the perspectives of the public. Our findings have implications for researchers in regard to the influence seasonality may, or may not, have on their work, as well as for practitioners communicating biodiversity messages to the public. Tweets will be accompanied by images drawn by the resident artist during research data collection.

**Lindsey West**

@Lindsey1west

# Using a Relational Values Lens to Explore Community Participation in Sea Turtle Conservation

Tackling biodiversity loss requires an understanding of the multi-dimensional ways in which people value nature and the types of nature connections that can catalyze action. Recent attention to relational values has helped address the narrow conceptualization of values as either intrinsic or instrumental, and challenged the notion of a 'rational actor' making choices based solely on the utility of nature. Sea turtle conservation in Tanzania generates limited economic benefits for local communities yet they have led conservation efforts for the past 20 years, suggesting that non-utilitarian values influence participation. The study uses relational values as a lens to explore motivations and experiences of community members engaged in sea turtle conservation, and the associated impact on conservation goals. In-depth interviews were conducted with 22 community turtle monitors. Findings indicate that relational values play a role in developing a stewardship ethic, based on principles of social cohesion, caring for nature, and moral responsibility to future generations. Local stewardship driven by relational values has achieved conservation goals. Over the past 20 years, nest numbers at the largest green turtle rookery in Tanzania have increased by 40% and hatchling production has increased by 60%. Incorporating relational values into the design of biodiversity conservation programmes can avoid over reliance on incentive-based approaches and increase long term sustainability.

**Astrid Boulay-Nedergaard**

@ManonAstrid

# Urban churchyards: timeless green lungs and oasis for wildlife and people

Urban churchyards are at the crossroads of various disciplines, interlinked and inevitably dependent. While previous research has been mainly focused on the architecture and history of churchyards, a growing number of scientists are now approaching these sites from a natural angle, concentrating mainly on their biodiversity value in a world where urban areas are constantly and significantly expanding. Based on St Stephen's Churchyard in Canterbury (United Kingdom), the research explores these timeless cultural and natural landscapes to understand their role as community green spaces for local communities and biodiversity. Thanks to a qualitative-based approach, the research problem was discussed through interviews with conservationists, heritage experts, churchyard volunteers, parochial church council committee members, and a workshop with St Stephen's neighbourhood residents. The findings gravitate around three interlinked main challenges: the balance between heritage and biodiversity conservation, the sustainability of those historical places in terms of management, and the local communities' perceptions and expectations regarding their local churchyards' nature. Thanks to the findings, the research draws conclusions on how to 'appropriately' manage urban churchyards for people and nature.

**Danielle (Dee) Rundle**

@hamsterbundle

# Could Nintendo’s Animal Crossing be a tool for conservation messaging?

In March 2020, Animal Crossing: New Horizons was released by Nintendo, selling over 26.4 million units worldwide. Unlike many popular video games, its unique premise involves players creating an island, growing vegetation, catching wildlife and donating fossils and species to a museum. The game has been praised for its positivity, escapism and measurable benefits to mental well-being. We articulate how different features of the game encourage players to exhibit pro-conservation behaviours and attitudes (e.g. recycling litter, or planting a diversity of flowers), as well as improving players’ knowledge about the diversity of relatively little known taxa (marine and freshwater fishes and invertebrates). We also highlight where pitfalls exist (e.g. encouraging the collection of threatened species). We frame these discussions in the context of Japan's cultural relationship with the natural world, including its history of insect-collecting and its management of green spaces. We conclude by outlining some recommendations about potential improvements to future releases, or for similar games, that could further promote conservation messaging.

## Bio Blitz

@blitz_bio

BioBlitz: Bringing the community together to uncover the biodiversity of the University of Kent

An increasing body of evidence suggests people are losing their connection to the natural world, negatively impacting their health and wellbeing. During lockdown, many rediscovered the incredible benefits that spending time in nature can bring. Finding ways to sustain this connection is important, both for people and wildlife, which needs our support more than ever. The School of Anthropology and Conservation's Sustainability Working Group decided to hold a BioBlitz – a 24hr survey of all the fauna and flora that could be found on the Canterbury campus. The team had two aims: 1) to engage the local community with the wildlife on their doorsteps and restore their wonder for nature; and 2) to record as many species as possible, building a greater understanding of campus biodiversity. On 29th May 2021, staff, students and community members joined the effort to record the diversity of life on campus. From small mammal surveys at dawn to midday bee transects and bat walks at dusk, the team recorded an impressive 245 different species of plant, fungi and animal that call campus home. Additionally, 6,000 people engaged with the BioBlitz across social media, and the data collected will support future research projects and the management of the University's greenspaces. After this year's successes, we are looking forward to the next BioBlitz, where we hope to beat the species total and encourage more people to get involved and enjoy the spectacular wildlife the campus has to offer

**Gwilli Gibbon**

@GwiliGibbon

# The benefits of systematic conservation planning for meeting conservation and restoration commitments

Human actions are converting habitats, driving biodiversity loss, and eroding the ecosystem functions that support human livelihoods, health, and well-being. Protected areas remain a cornerstone of conservation efforts, but conservation planning must also incorporate other effective area-based conservation measures. Given the rapid onset of anthropogenic climate change and the failure to halt environmental destruction, there is also a need to restore degraded ecosystems for their benefits to biodiversity and people. Integrating this restoration can help recover and reconnect conservation landscapes. We apply the principles of systematic conservation planning using the Republic of Kenya as a case study. We set representation targets for conservation priority species and habitats, showing where restoration is required to meet representation gaps. In this presentation, I will discuss the contribution of Kenya's different protected area types to meeting these targets, as well as their overlap with areas of importance for carbon and water. I will then discuss how we identify additional priorities for conservation and restoration. This shows the value of systematic conservation planning approaches for designing integrated conservation and restoration strategies that meet policy commitments.

**Hermenegildo Matimele**

@matimele2

# Testing the effectiveness of criteria-based approaches for identifying biodiversity and conservation priorities

Site-scale conservation initiatives are pivotal in our efforts to halt the current trend of biodiversity loss. Despite their importance, funding for new and existing conservation areas remains inadequate and can be poorly targeted. This highlights the need for effective and focussed approaches to guarantee that resources are invested efficiently. Two of the most widely used approaches are based on identifying Key Biodiversity Area (KBAs) and Important Plant Areas (IPAs). These methodologies use a set of criteria and thresholds to identify sites that are important for biodiversity. They were designed to inform the strategic expansion of the existing network of protected areas and other effective area-based conservation measures and will be an important part of the Post-2020 Global Biodiversity Framework, which is likely to include a target to increase conservation area coverage by up to 30% of the globe by 2030. However, it is largely untested as to whether the KBA and IPA approaches produce consistent and similar results and whether the sites they identify represent broader biodiversity. This study compared the KBA and IPA approaches, focusing solely on plant data using the Maputaland Centre of Endemism in southern Africa as a case study. The findings suggest that the two methodologies are aligned in that they select similar sites, but that they both tend to select sites containing the same set of species and so fail to conserve other important biological elements.

**Jack Bedford**

@JackFBedford

# Landscape restoration: Can carbon offsets unlock funding for scaling-up efforts in Europe?

Habitat loss and degradation are key drivers of global biodiversity loss, as well as contributors to climate change, the two greatest threats to the prosperity of life on Earth. Landscape restoration has been proposed as an important tool to tackle these trends, by recovering biodiversity and ecosystem services, but is constrained by a lack of funding. Voluntary carbon markets, where payments are made to projects that sequester carbon emissions, could present a funding source for landscape restoration projects. However, these schemes can involve substantial costs, with existing literature showing a mixed picture on their cost-effectiveness for restoration projects. Using data collected from projects that have already engaged with voluntary carbon schemes, a model will be developed to estimate the potential net-outcome landscape restoration projects in Europe could expect by following this process. Additionally, interviews with staff working in European landscape restoration projects will reveal their perceptions and experiences of the voluntary carbon market. Together, these data will provide greater understanding of the role voluntary carbon markets could play in scaling up restoration efforts in Europe, and how far they can support efforts towards realising international targets for recovering biodiversity and reducing carbon emissions.

**Lois Mitchell**

@LoisJMitchell

# Assessing the role of Protected Areas and OECMs in protecting priority habitats in Kent and reaching conservation targets

With the UK expected to set a target to increase conservation area coverage to 30% by 2030, along with the UK's plans of creating Local Nature Recovery Strategies and Nature Recovery Networks, it is going to be increasingly important to understand how much of each county is managed for conservation. Other Effective Area Based Conservation Measures (OECMs) could play an important role in this. OECMs are a relatively new concept that were referred to in the Convention on Biological Diversity's Aichi Target 11 in 2010 but only formally defined in 2018 by the IUCN as 'A geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio–economic, and other locally relevant values'.
My project aims to measure the extent that Kent's conservation areas help meet targets for priority habitats and species found in the county, and the respective roles played by Protected Areas (PAs) and potential OECMs.

I will use the publicly available datasets on PAs and priority habitats, as well as any other available species distribution datasets, to measure how much of each habitat and species range occurs in Kent and how much falls within the PA network. I will also use the biodiversity and conservation area data to identify priority areas for meeting representation targets in Kent. For natural habitats outside the PA network, I will seek to identify whether different land parcels could be potential OECMs. This will involve speaking to local experts to collect the available data and assess whether different types of land ownership and management are likely to mean a site would qualify as an OECM.

The project should result in a better understanding of the effectiveness of Kent's PA system for meeting biodiversity representation targets and a starting point for future expansion of the conservation area network.

**Maria Voigt**

@m_ddlvoigt

# Projecting threats from deforestation in Indonesia

Indonesia, as one of the world's most diverse archipelagos, has experienced some of the highest deforestation rates in the world. In our project, we are assessing patterns and drivers of regional forest loss and fragmentation across Indonesia. On Borneo forests decreased by 59,949 km2 between 2000 and 2017, at an annual rate of 0.76%. In Wallacea annual primary forest loss was lower (0.39%), with up to 10,231 km2 of loss between 2000 and 2018. Using a spatio-temporally explicit deforestation modelling approach we projected sub-regional forest loss for Borno and the Wallacean archipelago and will continue to develop models for the remaining regions of Indonesia (Sumatra, Java, and Papua). These projections can be used to assess where wildlife populations, such as the critically endangered Bornean orangutan, or priority sites for species, such as the Key Biodiversity Area network, are at risk from future habitat loss. The forest loss projections also provide a valuable baseline from which to monitor forest development, as Indonesia undergoes profound policy changes that will provide both challenges and opportunities for environmental governance and conservation.

**Nick Deere**

@NicolasJDeere

# Characterising the socio-ecological conditions driving defaunation in a global biodiversity hotspot

Defaunation describes the process of local extinction of species and reduction in animal populations as a consequence of human activity, such as land-cover change, disturbance and hunting. Globally, defaunation is pervasive, with at least 477 vertebrate species having gone extinct in the last century. Defaunation is particularly alarming in the hyperdiverse tropics, where diminishing wildlife populations compromise key ecological functions and, therefore, ecosystem stability. However, to date, our understanding of defaunation is geographically limited to temperate areas and Latin America. Yet studies point to much greater species losses in tropical Asia, a region which is largely unexplored. A genuine step change in our understanding of defaunation patterns and drivers over space and time is needed: one that carries out regional assessments based on actual on-the-ground animal population data, which can tease out relative effects of environmental versus social change on the defaunation process, and hence provide valid predictions for the future. It is crucial to extend the geographical scope to more tropical regions, not only to improve global defaunation estimates, but also to provide the evidence needed to reverse negative trends. Here, we will discuss how research conducted by the Tropical Defaunation Hub plans to address these knowledge gaps across Indonesia - a tropical region central to global conservation that is experiencing a biodiversity crisis driven by rampant deforestation and substantial economic growth. We demonstrate how sophisticated modelling techniques will be applied to primary biodiversity data across multiple time points to characterise the socio-ecological conditions driving defaunation and identify developmental and environmental tipping points of biodiversity loss.

**Emily Rampling**

@erampling94

# Reliance vs resilience: adapting the conservation sector for a world with reduced aviation access

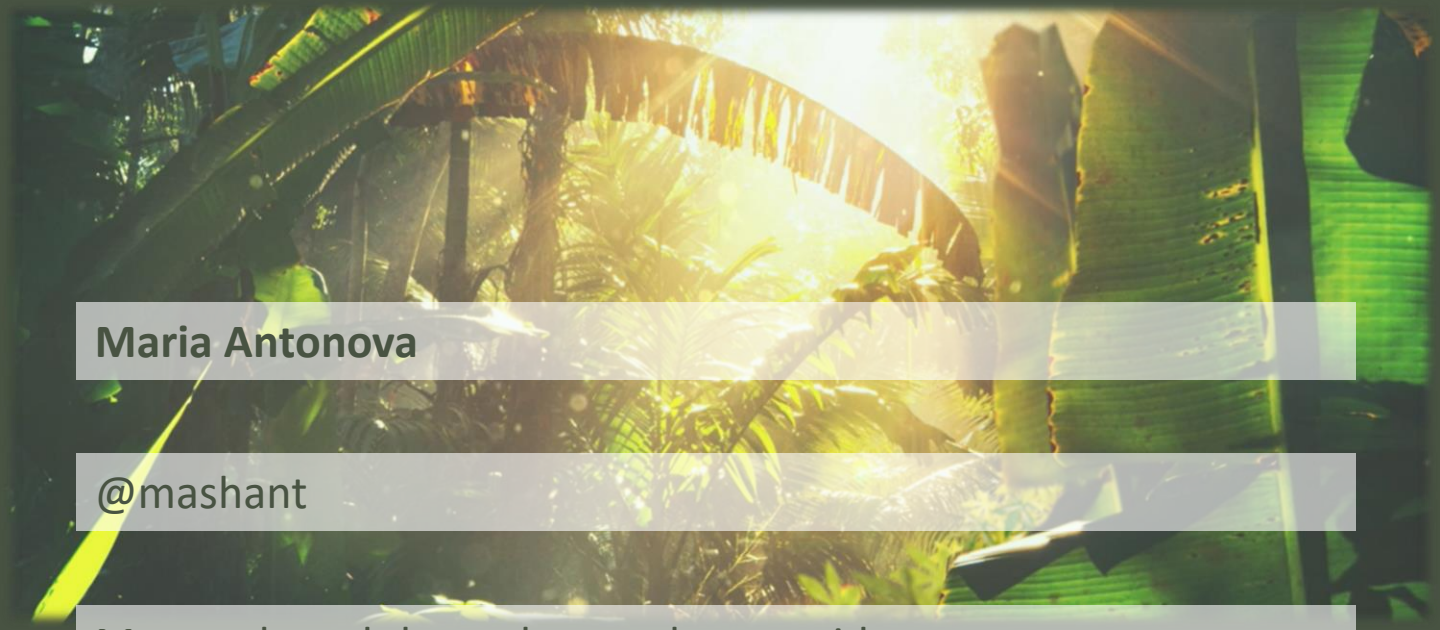
Flying can have both positive and negative impacts for conservation whilst the COVID-19 pandemic caused a huge systemic shock and significantly reduced air travel access altogether. As the climate crisis is expected to increase the occurrence of disease outbreaks and natural disasters, this research aims to find solutions which will better prepare conservation projects and managers for a future world where air travel access is not always guaranteed. Semi-structured interviews were conducted with 19 conservation researchers, practitioners and environmental business operators specifically involved in Kenyan, Madagascan or Liberian conservation plus 4 global conservation thinkers. Questions were structured to understand the influence of aviation pre/post COVID and what adaptations were made to overcome this reduction. Interviewees provided applicable solutions for reducing the reliance of conservation on the aviation industry. Pre-COVID, aviation was important for early conservation career development, enabled in-person workshops and stakeholder meetings, created tourism revenue benefits and enabled the utilisation of expatriate expertise. Pre-COVID, the importance of aviation access to interviewees was lowest for Liberia and highest for Madagascar. Locally run organisations which had diverse funding streams and were not overly-reliant on international tourism were more likely to continue high levels of conservation work throughout the pandemic and experienced fewer setbacks. Reassessing the necessity of air travel trips, greater work delegation to people in country plus greater investment in local tourism and capacity building were adaptations made by many organisations to overcome the reduction in air travel. Notable applicable solutions for reducing the conservation sector's reliance on aviation included an increase in local capacity building, greater in-country technological advancements and electricity accessibility, plus a fundamental change in the funding process within conservation. Overall, these findings are important for increasing conservation resilience for short-term shocks, such as the recent pandemic, and long-term trends, such as the climate emergency.

**Sophus Zu Ermgassen**

@sophusticated

# Biodiversity Net Gain: addressing the 5 key risks to ensure BNG actually improves England's nature

The Environment Bill will mandate that all new infrastructure developments leave biodiversity in a better state than before they were constructed. However, 'net outcome' biodiversity policies which tie conservation to biodiversity losses are very susceptible to perverse outcomes. Drawing on experience from offset systems around the world & from our Net Gain project database built and maintained at DICE, we outline how to address the 5 key risks of Net Gain to ensure it actually improves England's nature, rather than undermining it.



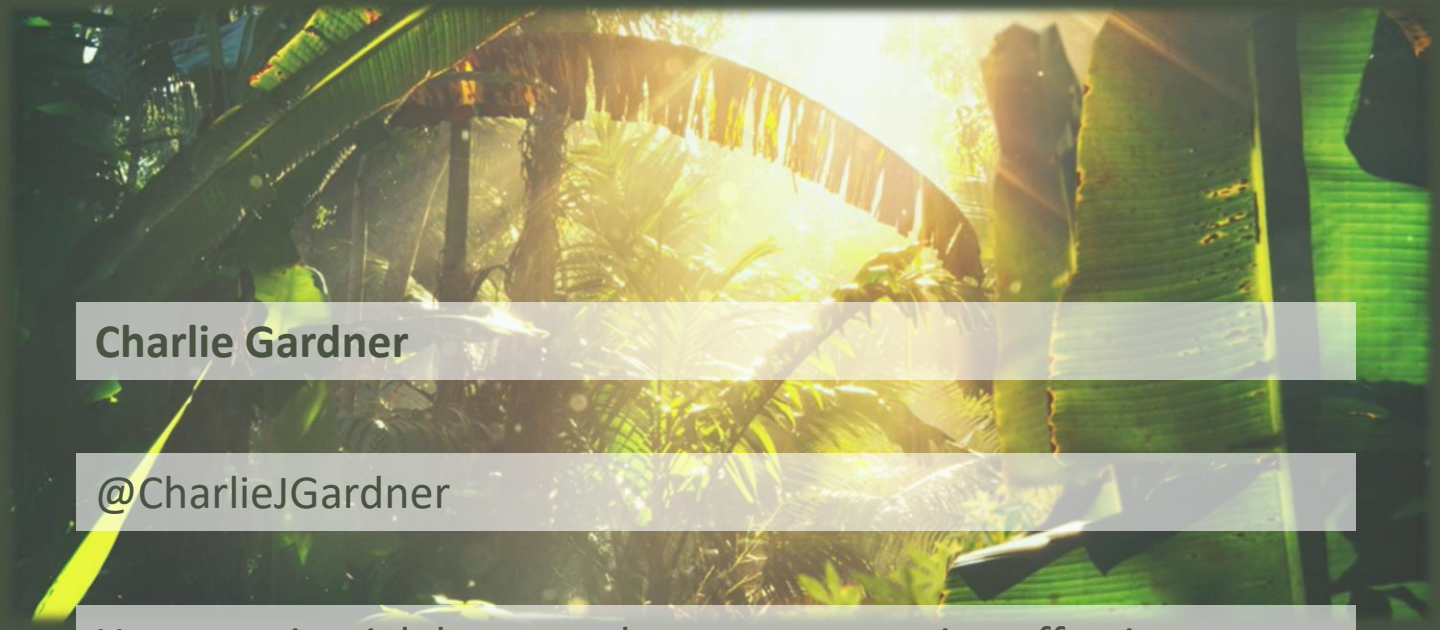
**Maria Antonova**

@mashant

# Mammals and the carbon cycle: an evidence map

Mammals drive ecosystem interactions that influence the processes of carbon sequestration and emission as well as natural carbon sink capacities on Earth. Natural carbon sinks are important in mitigating climate change. Forest and grassland ecosystems are recognized as crucial terrestrial carbon sinks, however the effects of mammal interactions on carbon uptake in soil and vegetation are highly variable and not reflected in carbon budgets.

**Conservation Effectiveness** *#ConEffect*



**Charlie Gardner**

@CharlieJGardner

# Use experiential data to enhance conservation effectiveness

Effective conservation requires an evidence base, but this is largely limited to empirical studies carried out by conservation scientists. This is problematic because research is expensive, time-consuming, and rarely specific to the on-the-ground contexts in which conservation occurs. It also ignores a valuable and irreplaceable form of evidence – the experience and insights of conservation practitioners themselves. Although anecdotal and potentially subject to cognitive biases, such 'experiential data' provide information on what works, and in what contexts, that cannot be generated through empirical studies. I illustrate the value of such data with reference to two papers on the expansion of Madagascar's protected area system and the management of its first locally-managed marine area

**Laura Nery Silva**

@laura_nerys

# Understanding the links between leadership, conservation organizations' outcomes, and gender

Effective leadership has been considered an important skill for in shifting towards more successful organisational and biodiversity results. As organisations are becoming increasingly international and multicultural, leaders must be aware of the challenges posed by the field of conservation, culture and gender to increase conservation outcomes and organisational effectiveness. The Conservation Excellence Model (CEM) allows us to assess the effectiveness of a conservation project using an integrative approach that ranges across leadership, management aspects, biodiversity outcomes, and local community outcomes. It will be possible to assess leadership by identifying how gender can influence leadership traits and effectiveness. Therefore, the aim of this study is to 1) evaluate a programme in Brazil focused on Jaguar conservation, identify major gaps and best practices and propose measures to improve it; 2) compare the programmes with others in different contexts to assess their effectiveness and identify common and successful practices and 3) analyse the differences between women's and men's leadership, identifying how they can influence project outcomes and the main challenges faced by women in conservation. This will be a pioneering CEM study of terrestrial mammal species in Latin America, which will contribute to improving conservation outcomes and generating information in a highly biodiverse country.

**Jean Hercé**

@HerceJean

# Impact of selective logging on orchid bees in French Guyana

While tropical forests are being cleared at an alarming pace, technics to mitigate the impact of timber extraction on biodiversity have been developed and are now increasingly used worldwide. Conservation value of selectively logged forests remains unarguably higher than a cleared forest, yet, the removal of bigger trees often results in small clearings and skid trails, as well as changes in plant species composition and canopy structure. The impact of such entropic disturbance has on biodiversity and pollinators remains largely unknown. In this study, impact of selective logging on orchid bee populations has been assessed at the forestry exploitation of Montagne de Kaw, in French Guyana. In this forest, timber was harvested until 2015 at the rate of 5 cubic meters per hectare. Orchid bees populations of three forest plots selectively logged until 1995, 2005 and 2015 have been sampled to be compared with population from unexploited forest plots. So far, 2849 orchid bees from 15 species were caught at 24 sampling stations, using bottle traps baited with eucalyptol, clove oil and methyl salicylate. The result should provide new insights on how these neotropical pollinators cope with timber extraction in rain forest.

**Charlie Russell**

@CJG_Russell

# Spatio-Temporal Variations in Habitat Loss and Population Trends of Migratory Raptors

Migratory raptors are present in a dynamic inter-continental system throughout their annual cycle, exploiting seasonal variations in resource availability and reduced competition. However, they often suffer more severe declines than their sedentary counterparts due to their susceptibility to a broader range of threats spatially. Investigating populations trends and threats at both a global and regional scale throughout the full annual cycle is integral to understanding and quantifying the impacts of threats to inform effective conservation action. Existing observational data and migration counts were used to generate range maps and populations trends for three migratory raptor species from 2008-2019, using landcover data to analyse habitat change. Preliminary results show overall trends mask regional declines for some least concern species, highlighting the importance of analysing regional trends. Changing land cover in breeding areas impacts count for some species, identifying habitat loss as a key threat. The extent of this relationship varies between species and regions, and further understanding the regional variations in population trends and their relationship with habitat loss using existing data can improve our understanding of the drivers behind trends to target management plans.

**Louise Gower**

@Wildspot_Kent

# Understanding the biodiversity value of conventional and organic orchards using birds as bioindicators

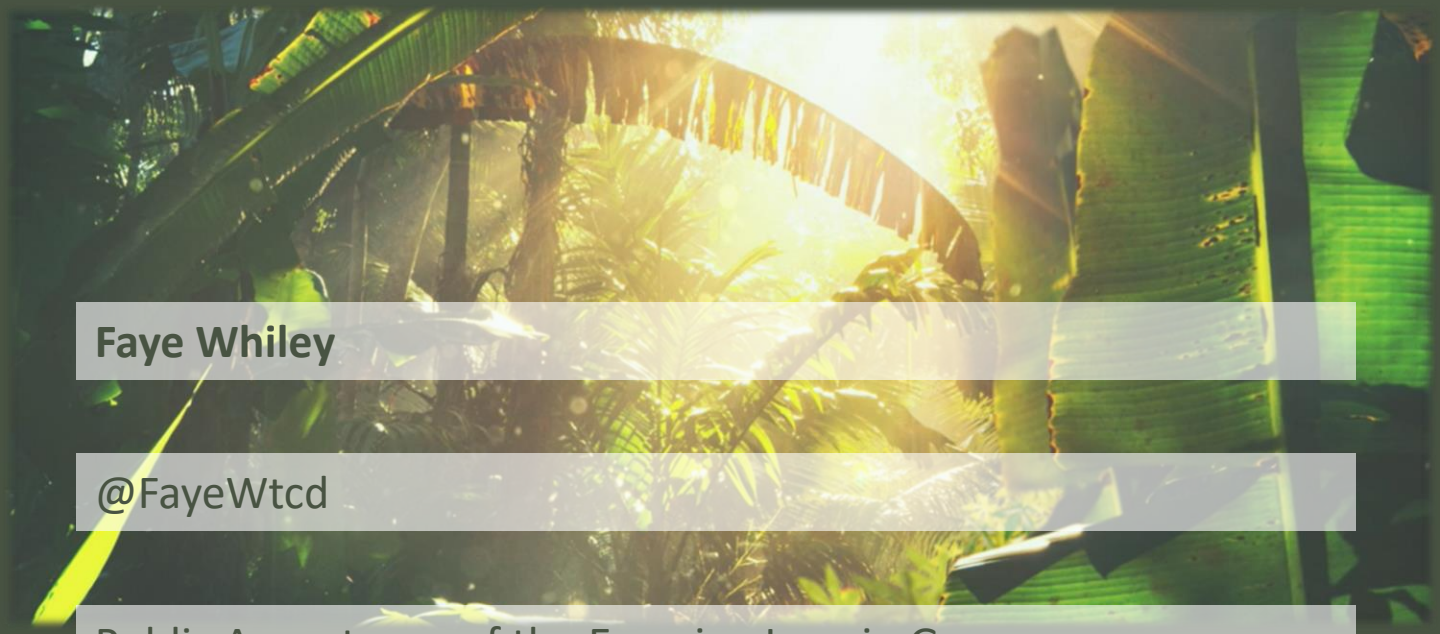
Over 70% of UK land is used for agricultural production and, despite progress in agroecological methods, changing and expanding agriculture persists in driving biodiversity loss. The former EU agricultural policy has been a major cause of farmland intensification, including habitat alteration and use of chemical inputs aimed at improving yields; these practices are widely linked to biodiversity decline. Under the new UK agricultural reform policy, are plans to encourage sustainable farming and create habitats for biodiversity recovery. To support production, all food systems rely on biodiversity and a wide range of ecosystem services such as crop pollination, seed dispersal, soil fertility and pest control. A recognised way of determining the health of ecosystem services is by using birds as bioindicators. In this study we seek to understand how agricultural management practices impact bird communities in fruit farms. Focusing on apple growing in conventional and organic orchards in Kent and East Sussex, UK, bird surveys were conducted during Spring across 8 conventional and 8 organic orchards. We also measured habitat features within and surrounding the orchards. We use ordination techniques to characterise the communities in the different orchard types (organic/conventional), and multiple regression, to explore predictors (e.g. habitat features, spraying regimes, management practices) of bird species richness and relative abundance.

**Matt Struebig**

@mattstruebig

# Riparian buffers mitigate biodiversity declines in oil palm agriculture

Riparian buffers – strips of non-cultivated land alongside waterways – are potentially important for biodiversity in the tropics, but relatively little is known of their conservation value. In an oil palm dominated landscape in Borneo, we characterised communities of 8 animal groups in riparian buffers and compared them to nearby recovering logged forest. Buffer width was the main predictor of species richness (family richness for aquatic insect larvae) and abundance, with widths of 40-100 m on each side of the river supporting similar biodiversity levels to the reference forest. However, width responses varied markedly among taxa, and buffers often lacked many forest-dependent species. Much wider buffers than are currently mandated are needed to safeguard most species, and the largest biodiversity gains are achieved by increasing relatively narrow buffers. To provide optimal conservation outcomes in tropical production landscapes, we encourage policymakers to prescribe width requirements for key taxa and different landscape contexts.



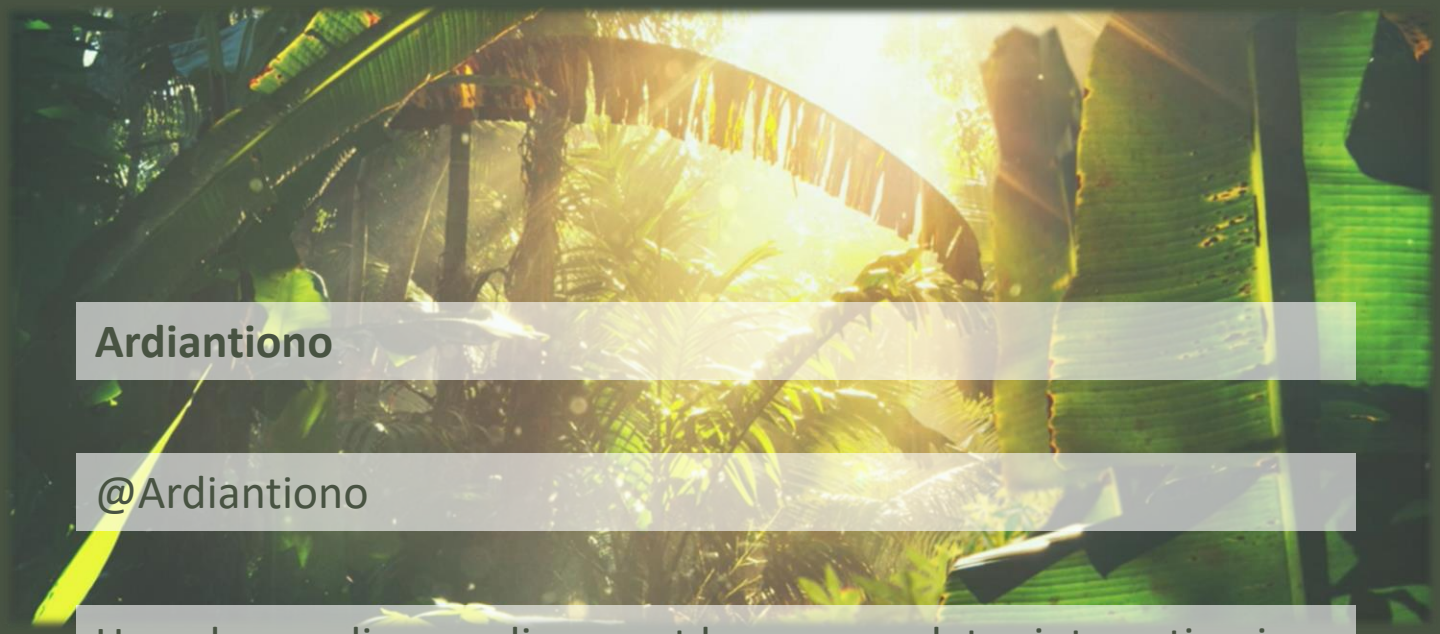
**Faye Whiley**

@FayeWtcd

# Public Acceptance of the Eurasian Lynx in Germany

The Eurasian lynx (Lynx lynx) are re-establishing their former ranges across Europe due to an increase in habitat and prey populations, and social tolerance. Despite this growth in social tolerance, there are illegal killings of lynx across Europe. Acceptance of lynx has been investigated in some European countries; however, it has not been researched in Germany where several illegal killings have been proven. These illegal killings can prohibit the three lynx populations within Germany from expanding and threaten their long-term conservation success. Self-administered questionnaires were distributed online to residents across the sixteen German states. The questionnaire collected data on demographics, knowledge on the lynx, impacts or perceived impacts caused by the lynx and lynx management. Descriptive statistics, and acceptance scores for each respondent, were calculated. A classification tree analysis revealed relationships between attributes and acceptance scores. The state of Bremen has the highest acceptance score, >76% of respondents thought lynx should be protected and 55% of hunters feel lynx impact their hunting experience. Despite an overall positive acceptance level within Germany, involving stakeholders in lynx management decision-making, and undertaking active dialogue with those who hold negative perceptions, ultimately improves human well-being,and minimizes illegal killings of lynx.

**Human – Wildlife co-existence** *#HumWild*

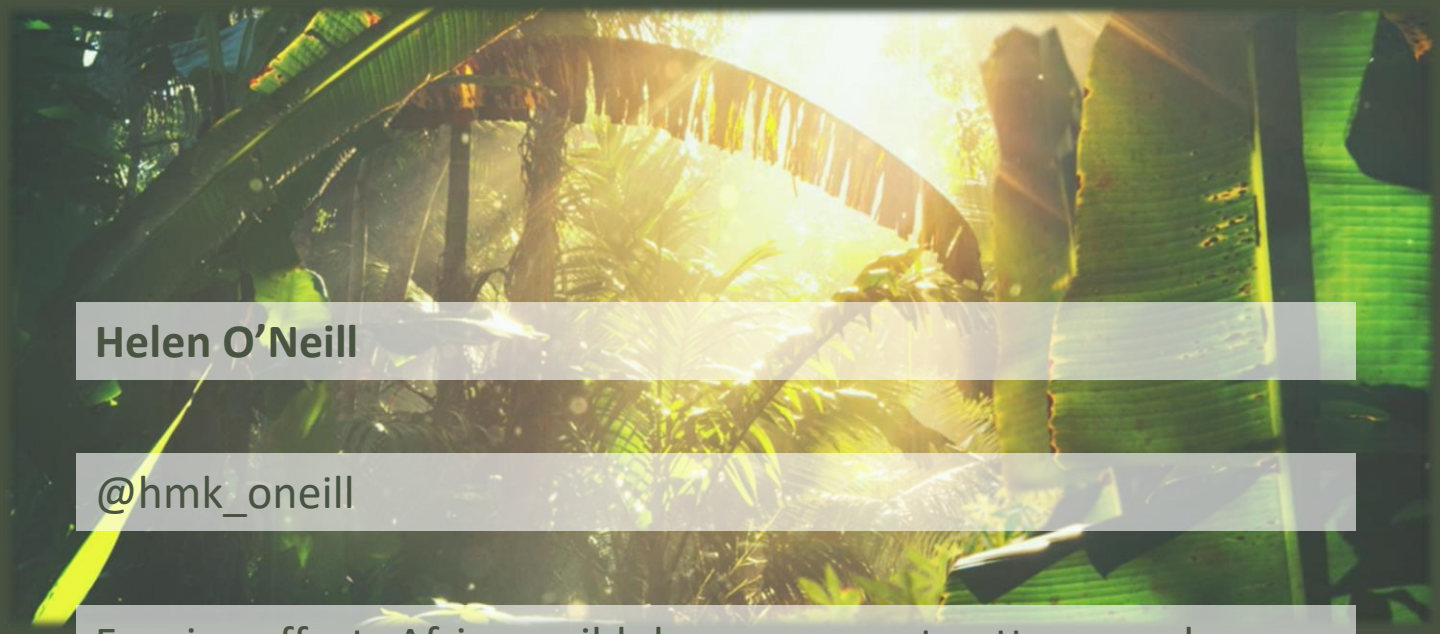


**Ardiantiono**

@Ardiantiono

# How does online media report human-predator interaction in Indonesia?

Media reports on human-predator interaction can influence public attitudes and supports toward wildlife conservation. Negative interactions between humans and wildlife in Indonesia are dominated by two predator species: Sumatran tiger (Panthera tigris sumatrae) and saltwater crocodile (Crocodylus porosus). This research aims to characterize the patterns of media reporting on human-predator interaction and compare the reporting between tiger and crocodile. Media reports published between 2017-2019 were collected from online mass media using Google News searching tool. Four parameters were used to evaluate the media content: tone, framing, illustration, and objectivity. Reports on human-tiger interaction (HTI; 356 articles) and human-crocodile interaction (HCI; 430 articles) showed similar patterns including dominant negative headline tone, neutral reporting focusing on interaction events, use of neutral-safe illustrations, and objective reporting. Media reporting on HCI differed significantly with HTI. Reporting on HTI incidents used more negative contents and illustrations; and not as comprehensive as HTI reporting. To promote balanced reporting, this research recommends collaboration between practitioners, scientists, and media to increase the media awareness on human-predator interactions and wildlife conservation; to write engaging content; and to increase the roles of practitioners and scientists as writers and sources in mass media.

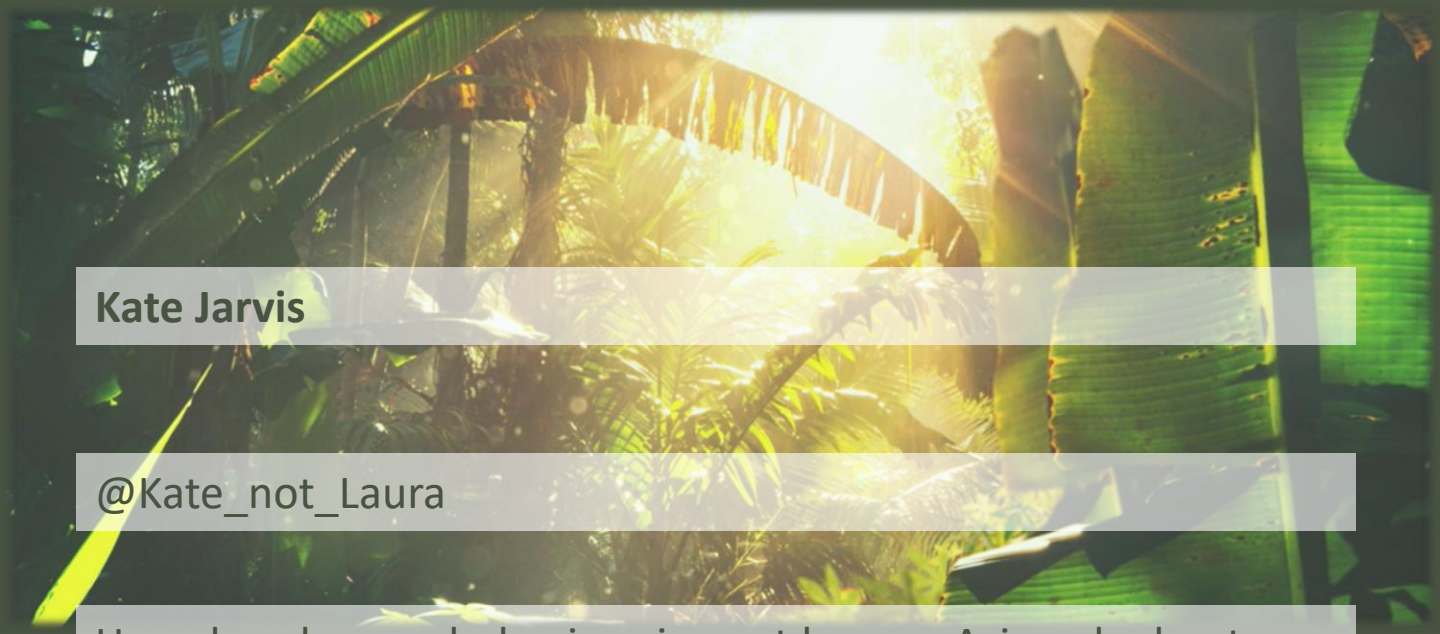


**Helen O'Neill**

@hmk_oneill

# Fencing affects African wild dog movement patterns and population dynamics

Wildlife fences are used in attempts to prevent human–wildlife conflict and reduce poaching, despite known negative impacts on landscape connectivity and animal movement patterns. Such impacts are likely to be particularly important for wide-ranging species, such as the African wild dog (Lycaon pictus), which require large areas of continuous habitat to fulfil their resource requirements. Laikipia County in northern Kenya is an important area for wild dogs but new wildlife fences are increasingly being built in this ecosystem. Using a long-term dataset from the area's free-ranging wild dog population, we evaluated the effect of wildlife fence structure on the ability of wild dogs to cross them. The extent to which fences impeded wild dog movement differed between fence designs, although individuals crossed fences of all types. Purpose-built fence gaps increased passage through relatively impermeable fences. Nevertheless, low fence permeability can lead to packs, or parts of packs, becoming trapped on the wrong side of a fence, with consequences for population dynamics. Careful evaluation should be given to the necessity of erecting fences, where fencing is unavoidable, projects should use the most permeable fencing structures possible, both in the design of the fence and including as many purpose-built gaps as possible, to minimise impacts on wide-ranging wildlife.



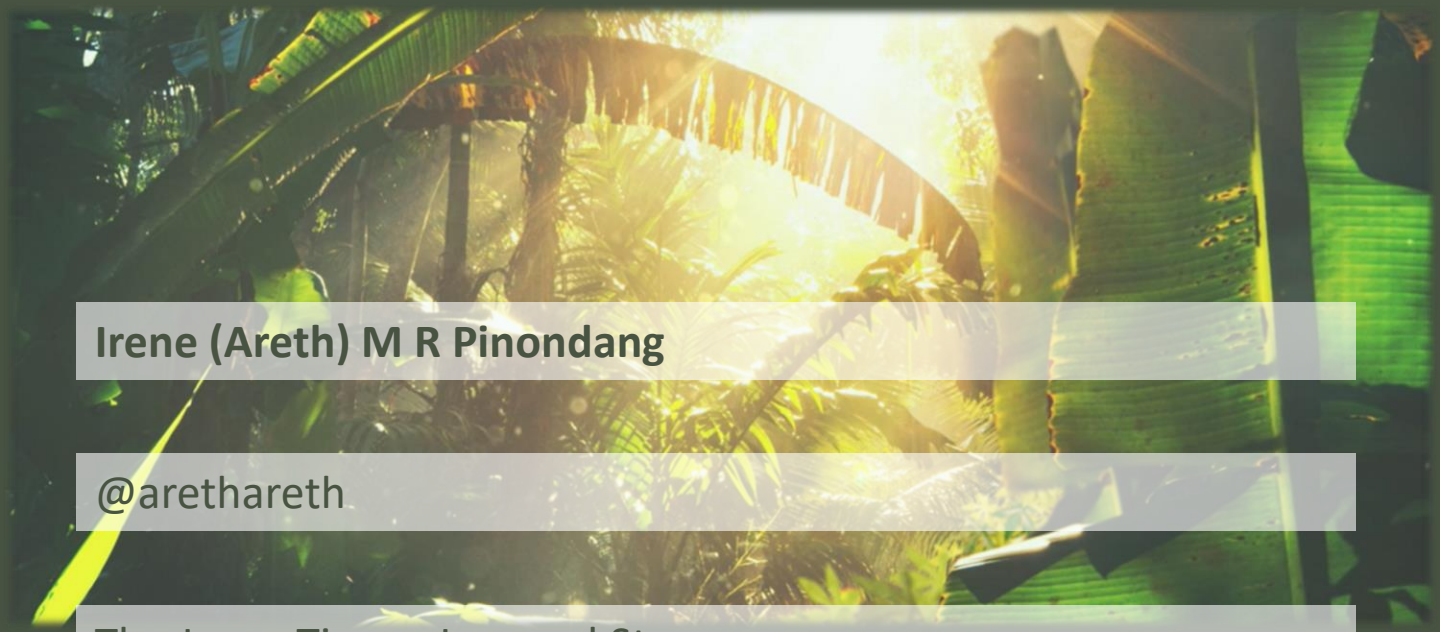
**Kate Jarvis**

@Kate_not_Laura

# How does human behaviour impact human-Asian elephant coexistence?

Negative human-Asian elephant interactions (HEI) are considered the primary threat to the endangered wild Asian elephant (Elephas maximus), whose population numbers often fall below minimum viable thresholds. Coexistence challenges between wildlife and people pose a significant threat to biodiversity, and their management is paramount for conservation. A human population increase of four billion is expected within the next 80 years, with greatest growth expected mostly in biodiversity-rich, tropical developing nations, which make up much of the Asian elephants' range, squeezing this umbrella, keystone and flagship species into ever-more fragmented spaces, resulting in a situation of increased resource competition and fatalities on both sides. Attempts to mitigate HEI span retributive killings, restricting migratory movements, barriers, alarm systems, selective crop planting, etc. However, little is known about how this sentient and cognitively complex species responds to human behaviours during direct encounters. This questionnaire-based study aims to fill this gap, also gauging if aggression in humans generates a positive feedback loop of aggression in elephants. It will explore variation in behavioural interactions across sites in range countries, examining the influence of people's tolerance, cultural beliefs and elephant habituation levels, location and frequency of encounters among other factors on the quality of behavioural interactions between people and elephants.

**Human – Wildlife co-existence** *#HumWild*



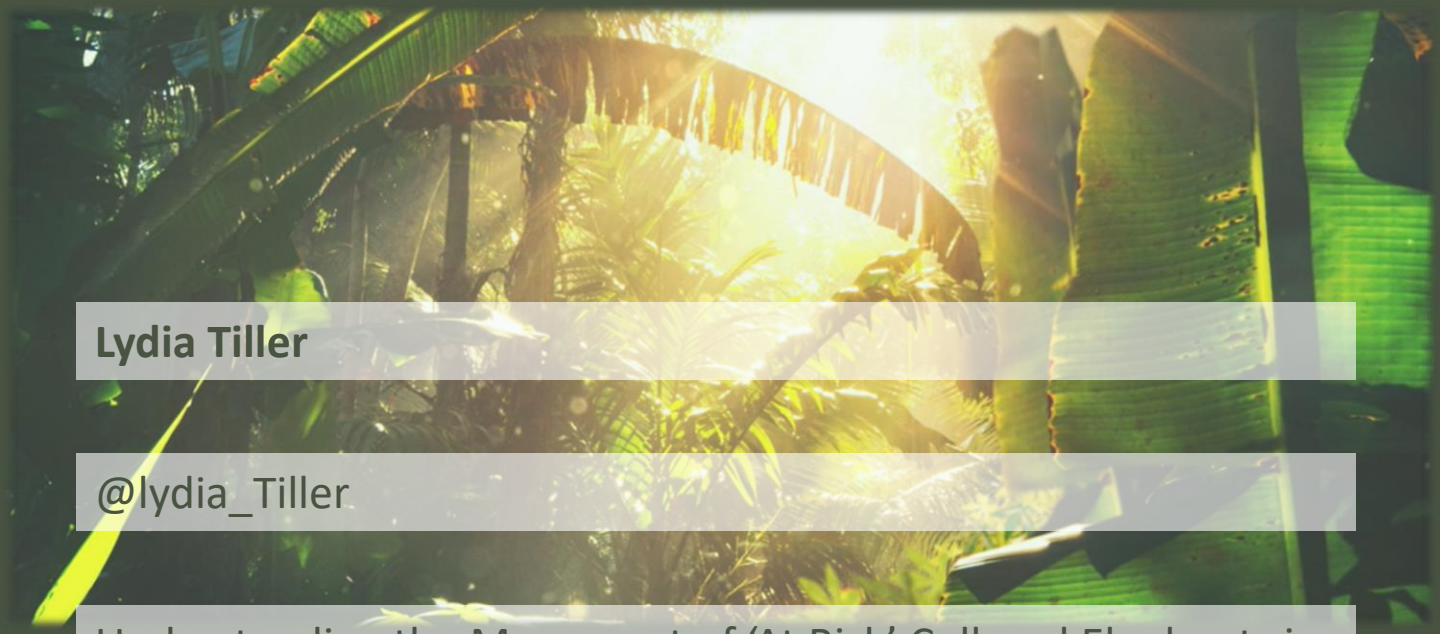
**Irene (Areth) M R Pinondang**

@arethareth

# The Javan Tiger – Leopard Story

It is said that Java was once dominated by natural forest where Javan tigers and leopards could be found. Thought different, both are considered tigers. Around the years 1600-1800's, both animal populations had dropped dramatically. Tigers and leopards were used as rituals in tiger-buffalo fighting and tiger-spearing ceremonies. According to several sources, during the period 1830-1860, an average of 1,250 tigers and leopards were killed each year because of both these ritual practices. And at the same time, natural forests were cut down for teak plantations, which took place during the 16th century pre-colonial era. Between 1785 and 1840, the clearing of primary forest occurring in the mountains had been recorded. The wood was used for fuel and land was converted to plant coffee and build settlements. The introduction of guns from Europe also contributed, making it much easier to hunt tigers and leopards. Javan tigers were declared extinct by the IUCN since the 1980s, and up until now their existence is still yet to be found. At present, the Javan leopard can still be found in fragmented forests but are listed as a critically endangered species. Javan Leopards were recorded as being targeted for hunting and trading. Also, conflicts between people and leopards occurred as habitats were found next to settlements, which reduced prey populations. In fact, tigers and leopards are key species that play a crucial role to maintain the natural balance/state of living processes in forests. Conserving leopards means conserving nature and our lives now as well as future generations.

**Human – Wildlife co-existence** *#HumWild*



**Lydia Tiller**

@lydia_Tiller

# Understanding the Movement of ‘At Risk’ Collared Elephants in the Tsavo Ecosystem

Tracking elephants using GPS collars that report via satellite have been shown to be effective in defining how elephants use ecosystems and provide data that can help understand their movements and preserve connectivity. With real-time reporting, alert algorithms and increasingly sophisticated tools to monitor movements in the field, tracking collars have also become an important tool to guide efficient deployment of security patrols

Across the Tsavo Conservation Area in Kenya, Save The Elephants have collared thirty-five elephants in areas with high levels of human-elephant conflict and risk of poaching. The main objectives of this collaring were to: (1) understand elephants’ use of underpasses and their movement in relation to the Standard Gauge Railway and highways in Tsavo ecosystem; (2) identify macro causes of human-elephant conflict; (3) improve cross border security of elephants by integrating real time elephant movement and; (4) monitor the adaption of translocation elephants into a new environment.

This invaluable movement data gives us a better understanding of the behaviour and movements of elephants in these ‘at risk’ areas, whilst investigating methods to ensure coexistence between elephants and humans. The data is also feeding into regional elephant management strategies, spatial planning and development plans across Kenya.

**Human – Wildlife co-existence** *#HumWild*