DICE CONFERENCE 2022

#DICECON2022

Welcome to the DICE 2022 Twitter Conference

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

Matt Struebig, Matt Walpole, Annette Lanjou, Claire Raisin, Ruth Thompson, Courtney Morgans, Keiran Richardson and Anna Jemmett,

DICE

University of Kent

Katie Spencer

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Implications of infrastructure expansion to Borneo's mammals

Balancing economic development with biodiversity conservation is a pressing challenge for developing nations across the tropics. Southeast Asia has undergone rapid deforestation and biodiversity declines in recent years, a trend which could continue with large-scale infrastructure projects underway across the region. Indonesia has ambitious development plans to relocate its capital city to Indonesian Borneo, alongside the expansion of road networks to facilitate extraction and transportation of the island's resources such as coal, timber, and palm oil (Shira et al., 2011). The construction and growth of roads and urban centres across the world are associated with numerous direct and secondary environmental impacts (Bennett, 2017; Simkin et al., 2022). Construction and land clearance directly affect the surrounding environment, whereas uncontrolled extractive industries (i.e. agriculture, mining and logging), migration and urban sprawl also create secondary impacts that influence ecosystems much further away from infrastructural localities and can be worse than the initial development (Teo et al., 2020; Laurance et al., 2015). We explore these potential impacts to critical habitats of threatened mammals, providing recommendations to facilitate sustainable development in Borneo.

Douglas Houston

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Improving Functional Connectivity for Orangutans in an Oil Palm Dominated Landscape

Deforestation in Ketapang, West Kalimantan, Borneo has resulted in massive fragmentation of orangutan habitat, most recently from oil palm cultivation. Remnant patches of forest exist within plantations that contain orangutans at unnaturally high densities due to the influx of individuals from local deforestation. These populations are genetically isolated from the meta-population in large forests to the north and south. Researchers believe that creating ecological corridors through the plantation will connect the isolated populations to the meta-population and therefore improve functional connectivity over the landscape.

The project uses RangeShifter, an ecological simulator that models connectivity over a landscape at the individual level using land cover, population dynamics, demographics and dispersal data of the target species. A baseline model will be created of connectivity over the Ketapang area. Hypothetical interventions such as stepping stone forest patches and riparian corridors will then be modelled to assess changes in connectivity over the landscape.

Interventions that show a strong improvement in connectivity will be reviewed with a local NGO and the plantation manager. Further models will be run following feedback from both parties to determine the most-cost-effective model for potential implementation over the landscape. There are strong implications for improving the sustainability of the oil palm industry and supporting human-orangutan co-existence.

Samuel Aizlewood

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How and where should we expand UK woodlands to benefit people and biodiversity?

In the face of biodiversity loss, many governments around the globe have committed to increasing the percentage of land protected for biodiversity. The UK in particular has pledged to protect 30% of its land to support the recovery of nature and increase its woodland cover from 13% to 19%. There is therefore an opportunity for a significant shift in the way decisions about how and where to protect or implement conservation actions are made. Systematic conservation planning is a widely used decision support tool for the prioritisation of sites for conservation in a way that is transparent, defensible, flexible and minimises costs to other sectors. However, whilst in recent years increased prominence has been given to the social context within which conservation decision-making sits, there remains a need for social science methods to be better integrated into the systematic conservation planning process. This is particularly pertinent for the UK, as much of the land left available is privately owned, requiring effective engagement with landowners to determine how these biodiversity conservation targets can be met. The aim of my project is to use novel methods to quantify social factors spatially and to use these in combination with biodiversity data to prioritise sites for conservation, with a focus on woodland owners. This will enable systematic conservation planning to be more informative for on-the-ground decision-making.

Claire Stewart

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What do farmers and land-managers think about rewilding?

Over the past decade, rewilding has grown in popularity, with increasing numbers of private and charity-led rewilding projects happening across Britain. There have been calls from scientists and environmental activists to replace agricultural subsidies with incentives to rewild marginal farmland, and the charity Rewilding Britain has advocated for rewilding principles to be enshrined in the new Environmental Land Management scheme. We interviewed 95 land-managers across five regions of Britain using a structured interview to understand what they think about rewilding. We found the vast majority of land-managers were surprising open and pragmatic towards rewilding, and those with the most support spoke of being inspired by existing rewilding projects and excited about species reintroductions. However, land-managers also spoke of the concerns they have with rewilding, focusing on issues related to species reintroductions and the potential economic and food security consequences. With approximately 72% of Britain managed for agriculture, it is important to understand what land-managers think about rewilding and what activities they would support, if rewilding principles are to be incorporated in future UK agri-environment schemes.

Prof Bob Smith

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Developing a framework to improve global estimates of conservation area coverage

Gaps in existing global conservation area datasets hamper efforts to measure progress towards international coverage and biodiversity representation targets. Here we present a framework to produce more accurate global conservation area metrics, based on selecting a representative set of nations for future collection of the best available data on protected areas (PA) and other effective area-based conservation measures (OECM). First, we identified 10 factors that are drivers of conservation area establishment and drivers of biodiversity patterns, and then produced maps sub-dividing each factor into a number of categories to produce 89 features. Second, we used a global search algorithm to select the smallest number of nations needed to contain at least 10% of each feature, identifying a total of 25 countries and finding that some countries could be swapped with others without impacting the efficiency of the results. Third, we repeated the prioritisation approach with the same targets to identify a series of 100 km2 grid squares within these countries to avoid over-representing the larger nations. Collecting and analysing data for this sample could produce quicker, more accurate estimates of conservation area coverage and representativeness, and this approach could potentially improve other global conservation metrics.

Ardiantiono

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Identifying surrogate species for mammal biodiversity in tropical forests

Evaluating the extent to which species serve as surrogates for wider levels of biodiversity is hindered by a lack of population monitoring data and objective surrogacy criteria. This problem is exacerbated when monitoring data do not account for imperfect detection, which leads to substantial bias in biodiversity estimates. Here we provide an occupancy modelling framework to measure association in species-level occupancy with four community-level biodiversity parameters that account for imperfect detection: community occupancy, species richness, functional diversity, and phylogenetic diversity. We utilize data from a camera trap campaign in the largest rainforest landscape in Sumatra, and evaluate surrogacy potential among nine candidate taxa. The highest performing surrogates tended to be wide-ranging though highly-threatened species (Clouded leopard, Sunda pangolin, sambar deer, and dhole), while well-known flagships such as tigers and rhinoceros performed poorly. Rather than assuming renowned flagships also serve as effective surrogate taxa, we advocate the use of “surrogate fleet” which uses several species as biodiversity surrogates. Finally, we suggested scientists and conservation managers adapt and improve our framework to ensure the protection of broader biodiversity.

Sophie Jago

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Assessing the effectiveness of protected areas in reducing deforestation and alleviating poverty in Kalimantan, Indonesia

Protected areas (PAs) are a main policy tool to protect against biodiversity loss but have been criticised for having detrimental effects on local communities, especially in developing countries. It is important to understand whether or not targets to expand protection to 30% by 2030 are incompatible with socioeconomic development goals. This study is the first in Kalimantan, Indonesia to assess impacts of PAs on deforestation and multidimensional poverty. Statistical matching methods were used to compare areas within and outside PAs with similar baseline characteristics. Findings indicate that, between 2005 and 2018, Kalimantan's PAs experienced on average 2.4 times less deforestation and 3.2 times greater improvements to poverty than non-protected areas. Individual PAs varied in their outcomes from 'win-win' (44%) to 'win-lose' (50%) to 'lose-lose' (6%) suggesting that trade-offs are occurring. Additionally, splitting poverty into six dimensions (education, health, living standards, infrastructure and services, environment, and social cohesion) showed that PAs performed better than areas outside for five dimensions but worse for the environment dimension. This highlights that mechanisms through which PAs benefit some dimensions of poverty may be detrimental to others. These findings have implications for policy makers in terms of understanding trade-offs and determining how to improve PA benefits. This is particularly important with targets being set to expand PA networks.

Conservation effectiveness #ConEffect

Faye Whiley

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The Sustainability of a Eurasian Lynx Reintroduction

In recent years, an interest in reintroducing Eurasian lynx (*Lynx lynx*) into Britain has emerged. The reintroduction of any large carnivore into Britain requires careful consideration since people have lived without these species for hundreds of years. Whilst previous literature identified suitable habitat and sufficient prey densities in Scotland, there has yet to be significant consideration of factors such as social issues and associated financial costs. My PhD research takes an interdisciplinary approach and investigates the social, environmental, and economic aspects of a lynx reintroduction into Scotland. This research aims to gain an understanding of stakeholders' perspectives at a comprehensive level, builds on previous individual-based models identifying suitable reintroduction sites in Scotland, and explores the economic feasibility of potential mitigation measures and compensation schemes for livestock loss by lynx. By combining these approaches, my research will assess the potential success of the reintroduction of this species into Scotland.

Marianne Lee

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Identifying the factors that influence the success or failure of conservation programmes

As we continue to lose species to extinction and global warming, it is imperative to design conservation interventions that will deliver the results necessary to protect nature before it is too late and despite the limited resources available to conservation. However, challenges in measuring conservation success have led to the conservation sector being seen as ineffective in applying learning, innovation, and improvements to processes in conservation programmes. Less well-understood is the design and improvement of approaches taken to conservation, and how quickly this improves the impact of work and effectiveness of the efforts undertaken. Using the Conservation Excellence Model, a comparative analysis of the implementation of the core conservation processes of 25 global conservation programmes was conducted to identify which approaches to conservation and modes of implementation of these approaches influence programme success or failure. The resulting standard factors are meant to aid in increasing the likelihood of learning, improvement, success, and sustainability of outcomes of conservation programmes.

Conservation effectiveness #ConEffect

Shannon Farrington

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Determining effective island conservation using the conservation excellence model (CEM).

Global biodiversity is currently declining at an unprecedented rate, largely due to several anthropogenic factors. Habitat loss, human exploitation, and invasive species are all threatening ecosystem processes, plant and animal communities, and societies use of natural resources. These threats are disproportionately affecting islands due to their higher levels of endemism, reduced land area, low species population sizes and genetic diversity, barriers to dispersal, and lower opportunity for recolonization, making islands particularly sensitive to environmental, climactic, and anthropogenic pressures and particularly susceptible to species extinctions. Using the conservation excellence model (CEM), several case studies from islands have been evaluated across 9 criteria to try to determine the biggest shortfall in current conservation outcomes attempting to reduce or prevent biodiversity loss. By determining which of the 9 areas island conservation efforts fail to address, actions can be targeted to improve them.

Conservation effectiveness #ConEffect

Dr Helen Pheasey

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The legal and illegal supply chains of sea turtle eggs in Costa Rica

Many poor rural communities rely on biodiversity to fulfil basic livelihood requirements. Trade bans of natural resources often conflict with poverty alleviation and can stimulate illegal trade. Understanding markets, prices and profitability along both legal and illegal trade chains is crucial if appropriate regulatory mechanisms are to be implemented. Using the legal extraction of sea turtle eggs from Ostional, we used a mixed-methods approach to analyse the legal domestic supply chain. We used semi-structured interviews, questionnaires and data on the volume and destinations of eggs sales to conduct a value chain analysis. We found an inequitable distribution of revenue along the legal supply chain, with middlemen profiting the most. Geographical barriers to trade flows and competition with illegal trade meant higher profits were achieved by sending the largest volume of eggs furthest distance. However, this increased the vulnerability of local traders to fluctuations in supply. Comparing legal and illegal trade routes, we identified potential laundering hotspots on the Caribbean coast of Costa Rica. Illegal eggs were cheaper than legal eggs available from Ostional. However, given the volume of Ostional eggs supplying the Caribbean and the fragility of local trader livelihoods, we advise caution in altering any management plan that could impact supply to this region, fearing a dwindling supply of legal eggs may stimulate illegal extraction in the Caribbean.

Orion Goodman

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Species-Granularity in Wildlife Trade Monitoring

The international wildlife trade is valued between a few billion to a trillion dollars annually (depending on whether estimates include fisheries and timber industries). The impact of the legal wildlife trade on wild population and ecosystem health is difficult to assess as few systems capture data sufficient for such assessment. The majority of species in the legal wildlife trade are not listed on the Convention on the CITES Appendices, so other databases must be used to estimate trade impact. The United States Fish and Wildlife Service's LEMIS database is often used to generate such estimates, but index limitations challenge the applicability of its data. Trade records for species are categorized by assigned four-letter codes, which are generally species-specific. For some taxa, multiple species records are captured under singular "umbrella" codes. One such code, MATF, is often used to describe over 2,300 species of marine ornamental fish that are actively represented in the legal wildlife trade. This species-level data loss prevents feedback to wild population sites and thus opportunities are lost to inform improved population and ecosystem management practices. Analysis of the obfuscating effect this umbrella code has on the applicability of wildlife trade data can inform improvements to LEMIS and other wildlife trade databases and potentially limit the need to expand protected species lists and the CITES appendices by preventing overexploitation before it happens.

Wildlife trade and sustainable use #WlifeTrade

Bristol Rigby

@BristolRigby

Mapping Market Trends: Wildlife Trade in Laos PDR

In collaboration with World Wildlife Fund for Nature, examining wildlife market survey observations collected between 2016 and 2021 will pick up where prior published research left off; creating a more current comprehensive assessment of wildlife trade in the region. Using survey records of wildlife market species observations, law enforcement seizure records, and captive breeding facility surveys from northern Lao, data will be analyzed for key facets including availability and species status. Additionally, comparing data trends prior to the Covid-19 pandemic with the 2020 season when Covid-19 restrictions were more rigid, as well as to the 2021 season when restrictions were more relaxed will be of specific interest. Questions to address will be locational frequency of species and possible correlation between species in Lao markets, captive breeding facilities, and seizure records. Data has been previously gathered through surveys conducted by WWF consultants, and will be analyzed using Excel and R Studio. Statistical analysis will be conducted comparing locations, frequency over years surveyed, and species availability. Research outcomes will seek to answer if species are more available in certain markets, the links between wildlife seized by law enforcement, and those species being held in captive breeding facilities, as well has trends in wildlife trade during the Covid-19 pandemic.

Wildlife trade and sustainable use #WlifeTrade

Gail Austen

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Sound, biodiversity and human wellbeing

Human interaction with nature is multisensory and subjective. Part of the human-nature experience is sound, which can provide situational awareness, context and meaning to the listener. In addition to the cognition of acoustic properties, human auditory processing can differentiate between the type of information being conveyed in a sound. As highlighted in Rachel Carson's seminal work, Silent Spring, loss of habitats and biodiversity leads to a loss of associated natural sounds. However, modern technology means that not only can 'natural' sounds be recreated and accessed remotely and instantly, but also that anthropogenic sound is more prevalent and widespread. Landscapes are shaped by, and subject to, human agency, but if the hills are alive with the sound of music, what does this mean for subjective human wellbeing

Hana Fairuzamira

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Hutan Desa Merabu: A case study of how social forestry empower the forest-dependent communities

Hutan Desa (Village Forest) is one of the Social Forestry scheme in Indonesia that is seen as a breakthrough in Indonesia's forest management, as it involves the local community to manage their own designated forest land area. As one of the first Hutan Desa village, Merabu in 2022 is considered as 'advanced' by the Developing Village Index. The village also gained more recognition, including award from Indonesia's Minister of Environment and Forestry. But after more than a decade, what is the present welfare situation in the eyes of the villagers? This research will analyse to what extent local organisation (LPHD) is capable of managing the forest village and its impacts on local community's well-being. This research combines Chi-squared test from questionnaires with interviews and focus group discussions. 56 out of 70 households participated on the survey during 4 weeks of data collection in April-May 2022. Preliminary result of the research shows that the majority of Merabu people are familiar with Hutan Desa (37.5%). Only one Hutan Desa management perspective out of three has a significant association with whether communities are a part of LPHD or not. The general perspective of Merabu villagers today is that they feel they need to have a more stable income, hence why there is a trend to open an individual palm oil plantation in the village. We hope the research findings help improve the policy of Hutan Desa management for the betterment of local communities' well-being.

Dr Jessica Fisher

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Nature, smells, and human wellbeing

The link between nature and human wellbeing is well established. However, few studies go beyond considering the visual and auditory underpinnings of this relationship, even though engaging with nature is a multisensory experience. While research linking smell to wellbeing exists, it focuses predominantly on smells as a source of nuisance/offence. Smells clearly have a prominent influence, but a significant knowledge gap remains in the nexus of nature, smell, and wellbeing. Here, we examine how smells experienced in woodlands contribute to wellbeing across four seasons. We show that smells are associated with multiple wellbeing domains, both positively and negatively. They are linked to memories, and specific ecological characteristics and processes over space/time. By making the link between the spatio-temporal variability in biodiversity and wellbeing explicit, we unearth a new line of enquiry. Overall, the multisensory experience must be considered by researchers, practitioners, policy-makers and planners looking to improve wellbeing through nature.

Lindsey West

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Using a socio-psychological approach to explore community support for sea turtle conservation in Tanzania

The success of biodiversity conservation programmes relies heavily on acceptance and support from local communities. In Tanzania, support for sea turtle conservation appears to be widespread, even though it generates minimal economic benefits for coastal communities. This study aims to understand the individual and social factors that influence local support. It goes beyond economic based factors as predictors of support, and instead explores the role of cognitions and social processes in shaping people's relationship with sea turtles and the broader marine environment. We examine the relationship between value orientations and beliefs, and the presence of supportive attitudes and norms towards community-based sea turtle conservation.

By using a socio-psychological approach we show that a relational value orientation influences local support for sea turtle conservation. Specifically, we demonstrate that social bonds and interactions between community members provide a pathway for the expression and reproduction of relational values. Therefore, the findings from this study extend our understanding of the social processes of value formation.

Michaela Lo

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Multidimensional impacts of nickel mining on village well-being in central Indonesia

Renewable energy is argued to be a necessary step in preventing the worsening effects of climate change. Critical minerals are fundamental in shifting towards renewable technologies and electrifying the transport sector. Nickel is one such contributing mineral to the low-carbon agenda, yet little research has addressed what impacts this has on local communities. Indonesia is the largest producer of nickel in the world, where active mining operations are mostly concentrated on the island of Sulawesi. Employing quasi-experimental methods, we examine the multidimensional impacts of nickel mining on local communities in Sulawesi, central Indonesia between 2011 and 2018. We assess whether poverty baseline conditions mediate the spatial distribution of well-being outcomes across villages, and how this varies by dimension. Accounting for the multidimensional impacts of mineral mining extraction in research and policy making are vital to achieve a just and sustainable future.

Katherine McKee

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Examining how different images of chimpanzees impact willingness to donate to conservation non-profit organisations

Dr Helen O'Neill

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Ethical considerations in natural history film production and the need for industry-wide best practice

Natural history documentary films can be a powerful tool for wildlife conservation, providing an accessible means to increase public knowledge of the natural world. There has been an increasing focus in documentary films on the threats to biodiversity in recent years that has positively aided conservation efforts. However, potential ethical and welfare implications of natural history film making are often overlooked. These programmes are often lauded for their cinematography, however filming techniques and practices should satisfy high ethical standards and should be evaluated to assess disturbance caused to wildlife and any associated negative impacts. This evaluation should include the direct impact of the filming, as well as considering the risk of viewers replicating human-wildlife encounters they see on film. Trends towards the use of highly dramatized storytelling, anthropomorphism and the inclusion of inaccurate information should also be addressed. Although some production companies have filming guidelines in place, this is not standard industry practice. Natural history films are an important means of educating and enthusing people about nature and its conservation; however, it is vital that films are made responsibly. To facilitate this discussion, we propose recommendations, including standardised industry-wide guidelines, codes of conduct and independent ethical reviews, for natural history film makers to mitigate and avoid negative impacts

Hermenegeldo Matimele

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Designing an ecological network for biodiversity and ecotourism in Maputaland

Expanding the global network of conservation areas will depend on creating new community managed protected areas (PAs) and Other Effective Area-Based Conservation Measures (OECMs). OECMs often have different goals and funding mechanisms. Here we show how the Systematic Conservation Planning approach can be used to design an ecological network for Maputaland, a trans-frontier conservation area in southern Africa. We used the Marxan with Zones software to identify where best to locate two types of conservation area to complement the existing PA network, based on meeting targets for 45 landcover types and 212 species. Zone 1 conservation areas are designed to protect species vulnerable to over-harvesting. The cost of including sites in this zone was based on their risk of being impacted by anthropogenic pressures, so that less vulnerable sites were preferentially selected where possible. Zone 2 conservation areas are designed to be less intensively managed and funded through community-based ecotourism, so only meet targets for the landcover types and species that are less vulnerable to over-harvesting. The cost of including sites zone 2 was based on its suitability for ecotourism, as measured using Analytical Hierarchy Process modelling. The results identified priority areas for both zones in Eswatini, Mozambique and South Africa and will be particularly important for designing trans-frontier conservation ecotourism initiatives and protecting endemic plant species

Ecological landscapes and seascapes #LandSea2

Monty Ammar

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Are shape, size, and relative proportions of open water to bare soil predictors of natural regeneration following artisanal gold mine abandonment in tropical forests?

Gold-mining is a growing driver of deforestation in Amazonia and is the principal driver in Guyana where it is an important source of income. Mining necessarily involves cutting down trees and removing topsoil to reach underlying gold deposits. This has been shown to stunt the rate of forest regeneration following abandonment. Previous work has quantified the extent of forest loss and rate of natural and assisted regeneration following mining through field sampling and remote sensing analyses (Heemskerk et al. 2001; Rahm et al. 2014; Kalamandeen et al. 2020). Among this research, topsoil removal has been identified as a predictor of stunted regeneration. We hypothesise that mining-patch shape, area and relative proportions of bare soil to water also impact the rate of regeneration. Leveraging an Artificial Intelligence approach known as semantic segmentation, we automate the collection of mining-patch spatial data from satellite images spanning 7 years. A set of Normalised Difference Vegetation Indices (NDVI) will be used to quantify the rate of regeneration at each mining-patch. With the data, we aim to carry out multiple regression to test for a relationship between mining-patch shape, area (m2) and the proportion of water to bare soil within a mining patch as predictor variables, and natural regeneration rate as a response variable. We hope that this research will inform policy around mining to minimise forest loss in light of recent REDD + investments in Guyana.

Aimee Seager

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Highlighting potential species for reclassification on the IUCN Red List

Southeast Asia contains multiple global biodiversity hotspots and megadiverse countries as a result of the high levels of endemism and rich tropical forests. However, countries within Southeast Asia, such as Indonesia, are facing concerning levels of deforestation due to the increase of logging for palm oil and timber plantations, and the ongoing development of infrastructure. The loss of forest cover causes a major reduction to suitable habitat for species reliant on these forests. This indicates the need to reassess the endemic species of Indonesia's International Union for the Conservation of Nature (IUCN) Red List status. To do this, the IUCN have produced a list of criteria in which species can be assessed with. This reassessment uses IUCN criterion A2 (to infer a decrease in population size) based on a reduction of suitable habitat (sub-section C). Initially, species endemic to Borneo were analysed to obtain a subset of data before increasing the geographic range to the Indonesian archipelago. This method uses change in forest cover data from the Joint Research Centre and species area of extent (AOO) from the IUCN. In order to do this, the change in forest cover within a species AOO is calculated from 2021 to either ten years prior, or a three generational period. This produces the change in forest cover within each species AOO and will provide an indication of whether the endemic species require reclassification on the IUCN Red List.

Jacques-Marie Chartron

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Towards a Bluer (and Brighter) Future: An Analysis of How Co-locating Aquaculture and Offshore Windfarms Could Benefit the Marine Biodiversity and Economy of the UK.

Ocean health is intrinsically linked with global ecosystems and human populations. As our understanding of how our use of marine resources is impacting on marine ecosystems grows, so too does our responsibility to maintain the health of our oceans. A driving concept behind the move towards a more sustainable use of marine resources is the idea of blue growth. This ideology highlights the need to maintain natural ocean resource health alongside growing the blue economy. One way to do this is through the development of multi-purpose platforms which, for the most part, consist of hybrid energy generation. Recently however, there has been a drive in Europe to co-locate aquaculture on offshore windfarms. Seaweed and shellfish aquaculture have a vast range of benefits from carbon sequestration and nutrient balancing to habitat and biodiversity restoration. By co-locating aquaculture to existing and new offshore windfarms it will be possible to improve global ocean health and provide a haven for marine wildlife in a way that continues to grow the marine economy. However, this idea is still very new and there are many conflicting ideas as to how it should work. This research investigates the perceptions of a number of industry experts on how co-location can work through semi-structured interviews. This will highlight where differences of understanding lie in order to show what key issues need to be addressed before co-location can effectively work.

Juliana Martins

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Red List of Ecosystems in the Brazilian Cerrado: a conservation status assessment

The Red List of Threatened Species by IUCN has long been a gold standard for endangered species identification and conservation. Since 2014, another red list has been developed aiming to assess the conservation status at a higher biological scale: the Red List of Ecosystems (RLE). This study aimed to apply the RLE methodology to evaluate the vulnerability risk of the ecosystems composing the Brazilian Cerrado. The Cerrado is the second largest biome in Latin America and holds one of the most intense agriculture and livestock farming expansion in the world. The Cerrado is divided into twenty ecoregions, each composed of four vegetation types: forest, savannah, grassland, and wetland. We used remote sensing satellite data from 1985 to 2020 to assess Criteria A, regarding vegetation loss rate, and Criteria B, which relates to restricted geographic distribution. The analyses were conducted using QGIS software. We found that Costeiro, Chapadão São Francisco, and Vão do Paranã, are the most threatened regions. The least concerned are Bananal and Parnaguá. Our results indicated Criteria B1 is key to distinguishing vulnerability risk between ecoregions, but not for discerning vegetation types within them. Therefore, we highlight the importance of assessing more than one criterion for accurate results. Our proposed categorisation aims to inform decision-makers on where to focus local conservation efforts. This is the first assessment of the Brazilian Cerrado using the RLE methodology.

Ecological landscapes and seascapes #LandSea2

Kristina Grant

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Testing Footprint Identification Technology (FIT) with the Northeast African Cheetah *(Acinonyx jubatus soemmeringii)*

My research project is testing Footprint Identification Technology (FIT) as a potential non-invasive population monitoring tool to be used in the field conservation of the Northeast African cheetah *(Acinonyx jubatus soemmeringii*). FIT is an add-in developed for JMP software by WildTrack. It is based on traditional tracking knowledge and has been successfully used to help conservation efforts for several threatened species. The software uses manually placed anatomical landmark points to statistically compare footprint metrics. I will test whether FIT can accurately identify between individual cheetahs based on photographs of their footprints. To date, FIT has been shown to accurately identify between prints from Southern cheetahs *(Acinonyx jubatus jubatus),* however, it has not been tested with *A. j. soemmeringii,* which are a genetically and physically distinct subspecies. I will also examine the potential for operator bias when placing the landmark points by testing a subset of prints with 3 different operators.

The potential use for this tool to help quantify and monitor wild populations will be evaluated and discussed within the context of the threats currently facing cheetahs in the wild. Notably, *A. j. soemmeringii* are most at risk from the illegal trade that exists in the Horn of Africa, where young cubs are trafficked to the Middle East to be sold as pets. Up to 300 cheetahs are estimated to be taken from the wild each year, however, there is very little data on wild cheetah populations in the regions from which they originate. Improved data on these fragmented populations will enable the potential for conservation strategies and legal frameworks to be established to help protect this species, and, indirectly, concurring species and environments that are also under threat.

I am collaborating with Larissa Slaney, a PhD candidate at Heriot-Watt University, who is also examining FIT with cheetahs; she is additionally looking at subspecies classification, sex classification, and relatedness.

Lucy Raggett

@UoKBioBlitz

University of Kent BioBlitz 2022

The University of Kent's second BioBlitz was held on its Canterbury campus on 11th June 2022. This was an interactive event aimed to involve the public in identifying as many species present within the university campus in 24 hours.

To achieve this, over 15 identification survey events took place, alongside presentations and workshops, throughout the day which focused on increasing the participants' involvement in the ultimate goal of identifying as many different species as possible and increasing the public's awareness of the local wildlife. Some of the most popular surveys include the bird walks, newt surveys and bug trails. These were led by student volunteers and we were also lucky enough to have Kent Moth Group, the Wildwood Trust and Kent Wildlife Trust help us out too.

With 408 attendees, species abundance and richness were calculated from these surveys. The overall count was 290 species with the majority being found around Eliot footpath and in Parkwood. This number includes some songbirds and birds of prey, extremely rare moths and fungus species. Over 60% of the participants found the event to be extremely satisfying.

Overall, the event can be considered as a success. The attendance increased by 150 participants from last year, as well as the number of species identified increased by 45. We hope to make the BioBlitz an annual event!

Irene Pinondang

@arethareth

Monitoring mammal populations in the plantation-restoration peatland in Kampar Peninsula, Riau, Sumatra: a story from the field

Currently, I am conducting my fieldwork in plantation-restoration forests in Riau, Sumatra, to monitor mammals population. We plan to deploy camera traps in 200 grids, 2x2 km, that are divided into three block sampling areas. We've started since October last year and have one block completed, meaning we have pictures from the survey. So, for the conference, I would like to share the update on my fieldwork, including the team, challenges, animals from camera traps, and other findings.

Luke Owen

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Habitat factors affecting the spatial distribution of harvest mice (Micromys minutus) in Kent

This study will be focused on the presence of the Eurasian harvest mouse (Micromys minutus) in various locations throughout Kent. The Eurasian harvest mouse is a Biodiversity Action Plan species in England and classified on the IUCN red list of British mammals as near threatened in England, Vulnerable in Wales and Critical in Scotland. Data for this study was collected over a 5 year period from 2015-2020 by Steve Kirk and the Wildwood team.The nests of this species were used as indicators of presence and a variety of habitat factors were recorded at each successfully surveyed location. As the presence/absence of these factors was recorded in binary format, Chi square analysis was used to determine independence, with a series of bonferroni post hoc tests used to determine individual significance. By discovering which habitat factors are associated with the highest presence of harvest mice nests, it could be possible to aid in highlighting which specific habitats to protect and upkeep to stabilise the decline of the species.

Prof Keith Somerville

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The Days of the Jackal

The Eurasian golden jackal is a species whose European range y has been restricted historicall to south-eastern Europe, the Balkans, Greece and the regions bordering south-eastern Russia, the Caucasus and West Asia. There is no evidence that it ever inhabited Central, Western or Northern Europe. In the last 50 years that has begun to change, with jackals increasing in numbers and dispersing from their old European range into central, Western and Northern Europe – notably from their main historical stronghold in Bulgaria and Romania. In the last decade they have been verified as being present in the Baltic States and as far north as Finland, with sightings even in areas of Northern Norway close to the Arctic Circle. They are present across central Europe and moving from Austria, Croatia, Slovenia and Poland have established populations in Switzerland, Italy, Germany and as far west as France, Belgium and the Netherlands. Why? Has the end of the Cold War and the breaking down of Cold War military barriers helped dispersal, is the reduced presence of wolves in some areas enabling jackals to assume apex predator roles without the threat posed by the larger canids or could it be that global warming and a shallower covering of snow in winter have enabled jackals to hunt and forage more successfully in regions that were closed to them by deep snow?

Dr Charlie Gardner

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Conservation's climate blindness

Global biodiversity is threatened by a range of anthropogenic threats including climate change, which increasingly affects all species and may trigger abrupt ecological disruption in many ecosystems by mid-century. However, we suggest that mainstream conservation science is not adequately alert to the urgency of the 'climate emergency'. To ascertain the extent of conservation's climate blindness, we searched for mention of climate change in all articles published in the journals Biological Conservation, Conservation Biology and Conservation Letters in 2019 and 2020. We reviewed 1215 papers and found that only 43.8% of papers mention climate change, and only 18.6% integrate climate change into their research to any extent. Such climate blindness may contribute to inaccurate or suboptimal research findings, including through spatial misprioritisation, misleading extinction risk analysis, misleading research findings, suboptimal threat identification, suboptimal management decision-making, inappropriate snapshots and, controversially, wasted resources on doomed species or sites.

Sustainability and Climate Change #SustCCh

Sophus zu Ermgassen

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A home for all within planetary boundaries

Secure housing is core to the Sustainable Development Goals and a fundamental human right. However, potential conflicts between housing and sustainability objectives remain under-researched. We explore the impact of current English government housing policy, and alternative housing strategies, on national carbon and biodiversity goals. Using material flow and land use change/biodiversity models, we estimate from 2022-2050 under current policy housing alone would consume 104% of England's cumulative carbon budget for 2050 (2.6/2.5Gt [50% chance of <1.5°C]); 12% from the construction and operation of newbuilds and 92% from the existing stock. Housing expansion also potentially conflicts with England's biodiversity targets. However, meeting greater housing need without rapid housing expansion is theoretically possible. We review solutions including improving affordability by reducing demand for homes as financial assets, macroprudential policy, expanding social housing, and reducing underutilisation of floor-space. Transitioning to housing strategies which slow housing expansion and accelerate low-carbon retrofits would achieve lower emissions, but we show that they face an unfavourable political economy and structural economic barriers.

Sustainability and Climate Change #SustCCh

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Analysing the distributions in native and non-native Maltese snake species.

Many reptile species are at risk of extirpation due to human influence on natural landscapes. Malta has two native and two naturalised snake species and using a complementary methodology of citizen science and fieldwork, locality records were collated for the species across the three main islands of the Maltese archipelago. *Hierophis viridiflavus* is the most common and the only species found on all three islands. *Telescopus fallax* and *Zamenis situla* are isolated to the island of Malta with occasional individuals found on Gozo, likely due to accidental relocation. *Hierophis algirus*, the rarest of the four species, remains largely confined to the localities surrounding Floriana with individuals found as far as Luqa. *Z.situla*, is believed to be declining and results demonstrate a shift from natural to anthropogenic landscapes. Juveniles and adult *T.fallax* show tendencies to shelter in traditional Maltese rubble walls. Furthermore, despite persisting in urban environments, all species were victims of cat predation, roadkill, and suspected direct persecution. The species are also at risk of further declines due to global warming and reduced precipitation. To combat these combined threats, urgent intervention is required to mitigate further habitat loss and fragmentation, improve public knowledge to reduce direct persecution, control feral cat populations, and manage road networks to accommodate movements of terrestrial species to reduce roadkill.

Olga Tolstaia

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Action plan for successful reintroduction of the Amur leopard (Panthera pardus orientalis)

Amur or Far Eastern leopard *(Panthera pardus orientalis)* is critically endangered species living in the Far East of the Russian Federation. According to available investigations there are not more than 50 animals left in the wild. Reintroduction of the Amur leopard may play significant role in saving these critically endangered species from extinction. Current project is aimed to propose recommendations on modification of the existing program for reintroduction of the Amur leopard and to enhance it into action plan that would mirror IUCN reintroduction guidelines and open standards for the practice of conservation. The project also reflects the following research questions: whether there were any changes in Amur leopard threats during past few years that may influence the program and whether it is appropriate to apply experience from conservation and translocation programs of other big cats in the program for reintroduction of the Amur leopard. The project is based only on qualitative methods connected with analysis and interpretation of the existing literature and results of interviews with relevant conservation specialists. The results of the project may be used by conservation organizations and other stakeholders for making decisions on further steps in the implementation of the Amur leopard reintroduction program.

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Effects of Rearing History on Captive Adult Female Social Competency Behavior in the Critically Endangered Western Lowland Gorilla (Gorilla gorilla gorilla)

The critically endangered Western Lowland Gorilla presents a unique social structure including a dynamic female dominance hierarchy and a silverback male who enforces group cohesion. Females alloparent the groups' offspring and may form coalitions in the face of threat from strangers or other groupmates. Social cohesion is essential to group function in captivity and survival in the wild. Sixteen zoo-housed adult female western lowland gorillas, three hand-reared and thirteen parent-reared, were observed to assess their social competency behaviour. Hand-reared females initiated a smaller proportion of affiliative interactions and a larger proportion of agonistic interactions compared to parent-reared subjects – although hand-reared subjects did not represent the highest or lowest sociality score. Additionally, one subject raised by a hand-reared female had the highest sociality score and both received and initiated a high proportion of affiliative interactions in her group. This highlights a notion that hand-reared individuals may still rear socially competent offspring even if their own sociality is lower in comparison. Group effects including social avoidance by groupmates or the silverback's involvement in enforcing group cohesion may have affected the sociality scores of these females. The silverback's rearing history and social competency should be further investigated in this context to understand female social dynamics and mechanisms for social cohesion.

Tom Fry

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Long term population analysis of great crested newts on the University of Kent campus

The great crested newt, Triturus cristatus, is a threatened species found widespread across Europe, currently at threat from anthropogenetic forces resulting in mass fragmentation of populations. One known population is found at the University of Kent and has been under surveillance since 1998 and is still until research today; my project is one of these studies. This project aims to analyse the trends in population, survival and detectability using data collected from 2000 to 2021 via the capture-mark-release software MARK. Using the image analysis software Wild-ID individual specimens are identified and logged. This builds an encounter history which can then be developed, compiled, and analysed using the Cormack Jolly Seber model to produce estimated numbers of annual survival and detectability. Using this, annual population estimates will be collected and compared to earlier years data (<2015).
Currently this research is still to be completed, however once complete, it will ensure that this 21-year-old study is up to date for future analysis. The results can then be used to provide more research into the species and how better we can contribute to its conservation.

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Orchid conservation in Nepal: A need for shared understanding of illegal trade networks and domestic legislation

Nepal hosts >500 orchid species, more than 100 of which are reportedly harvested for Ayurvedic, Amchi, and Chinese medicinal trade. Wild orchid harvest and trade have been, at different times, both legal and illegal in Nepal. However, many orchid species are sensitive to over-harvest due to their biology yet are economically important to many rural communities, including to socio-economically disadvantaged Indigenous groups and women. This threatens not only orchid conservation, but also harms ecosystem services and rural livelihoods, and overlooks potential for more sustainable management. We explore the existing challenges to conserving Nepal's most traded medicinal orchids. We highlight what is known about the country's legal and illegal trade, based on analysis of seizure records, the CITES Trade Database, and adetailed analysis of national and sub-national legislation governing orchid resources. We found that, despite being legally protected, orchids are being traded illegally, mis-reported in the CITES Database and implementation of legal projections is subject to wide confusion. We highlight the need for detailed, shared understanding of both illegal trade networks and of domestic legislation–in order to tackle illegal trade, and meaningfully support more sustainable use of plant

Natalie Yoh

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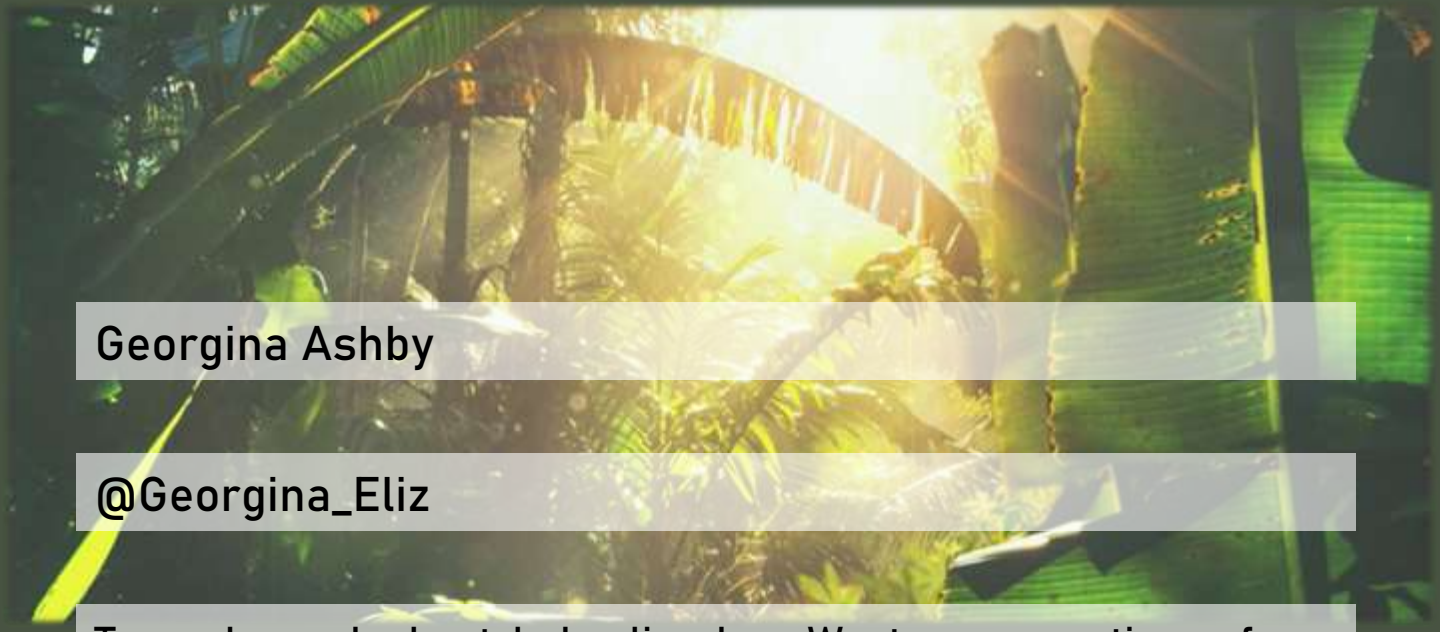
Using remote sensing to assess how bats are impacted by logging in Borneo

Logging is the most widespread disturbance in tropical forests. However, many species can persist in logged forests, particularly where disturbance levels are comparatively low. Despite a growing knowledge of logging effects on wildlife, there remains little information for bats in the Asian and African tropics – in part due to major challenges in monitoring, particularly for aerial insectivorous species. We integrated remote sensing data from passive acoustic bat detectors with LiDAR-derived measures of forest structure from a human-modified landscape in Borneo. Across a gradient of habitat disturbance comprising old-growth forest, repeatedly logged forest, and tree plantations, we recorded 105,576 bat passes from 21 taxa. Our findings demonstrate how coupling information from acoustic detectors, machine learning algorithms, and LiDAR data can be used to assess the impacts of land-use change on underrepresented taxa.



Georgina Ashby

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Towards an elephant-led policy: how Western perceptions of elephant welfare influence elephant handling practices in Thailand

Elephants are revered in Thai culture and there is a long history of taming and utilising the species, previously for warfare and logging, and now tourism. It is estimated that 78% of Thailand's elephants are in captivity, and that the majority of these are in the tourism trade. In order to tame these semi-wild, large and, in certain circumstances, dangerous animals, practices are deemed necessary in Thai culture that have become controversial in other – and particularly Western – cultures. Previous studies have claimed that consumer satisfaction and preference can be integral in influencing and solidifying change in welfare standards in elephant tourism venues (ETVs) in Thailand. To explore this, we examine eleven ETVs in four different regions in Thailand and interview mahouts (elephant handlers), ETV managers and veterinarians about elephant handling practices and welfare standards. In the ETVs under study, we find that practices perceived as cruel by Westerners – including the use of bull hooks and chains, and elephant riding – are actively used by the mahouts, but that such methods are hidden from the Western tourists towards which the ETVs are predominantly marketed. Hiding these tools when tourists are present has a direct and negative impact on mahout safety and on elephant welfare. We suggest refinements to Thai elephant tourism policy with a view to embedding elephant-led approaches and ensuring that the expertise of veterinarians and mahouts can reliably inform best practice for welfare in ETVs.