# The Biodiversity Conference 2025

# Abstracts Book

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# PLENARIES

## PARKS, PEOPLE AND PARTNERSHIPS

**RICKY ARCHER,** *DIRECTOR NATIONAL PARKS*

**Author Biography:**

Ricky Archer is a Djungan man from the Western Tablelands region of North Queensland and was appointed to the role of Director of National Parks in November 2023. His prior experience includes serving as the CEO of the North Australian Indigenous Land and Sea Management Alliance, including as a Ranger and an IPA Manager. Ricky holds qualifications in conservation and land management, social science, and management.

Ricky's involvement extends to collaborating with government entities, having served on several Commonwealth committees, including the Indigenous Advisory Committee, the National Landcare Advisory Committee, and contributing to the Samuel review – the independent Review of the Environment Protection and Biodiversity Conservation Act 1999. Ricky is a strong supporter and advocate of the Indigenous Ranger movement and the Indigenous Protected Areas program.

**Abstract:**

TBD

# GLOBAL BIODIVERSITY TARGETS AND IMPLICATIONS FOR CONSERVATION IN AUSTRALIA

**JAMES FITZSIMONS,** *THE NATURE CONSERVANCY, DEAKIN UNIVERSITY, UNIVERSITY OF TASMANIA*

**Author Biography:**

James Fitzsimons is Senior Advisor, Global Protection Strategies with the Global Protect Oceans, Lands and Waters division. His work includes policy and implementation of the global 30x30 protection target (including the 30x30 solutions toolkit) and other targets of the Kunming-Montreal Global Biodiversity Framework, management effectiveness and evolving policy on biodiversity credits.

He was previously director of conservation and science for the Australia Program, where he oversaw the organization's conservation planning, science and policy functions for that country. This included major conservation programs in the vast tropical savannas of northern Australia, the diverse central deserts, temperate estuaries of southern Australia, the wetlands and floodplains of the Murray-Darling Basin and urban landscapes and the development and delivery of a major protected area establishment strategy.

**Abstract:**

Global biodiversity targets, such as the Convention on Biological Diversity's Kunming-Montreal Global Biodiversity Framework (GBF), are increasingly ambitious in recognition of the significant loss, and ongoing threats to biodiversity. I explore these global targets, with a focus on GBF Target 2 (at least 30% of degraded ecosystems under effective restoration by 2030) and Target 3 (at least 30% of terrestrial and inland water areas and coastal and marine areas protected and conserved by 2030), with an emphasis on their definitions and interpretation, policy implications, and progress to date. But what do these targets mean for biodiversity in Australia and for Western Australia? I outline Australia's commitments in response and highlight the gaps that need to be filled and opportunities to be taken up if we are to achieve a Nature Positive future.

# CARBON AND NATURE REPAIR: LESSONS LEARNED FROM EXPERIENCES OF INDIGENOUS GROUPS

**CISSY GORE-BIRCH,** *CO-CHAIR INDIGENOUS CARBON INDUSTRY NETWORK*

**Author Biography:**

Cissy Gore-Birch, Co-Chair, ICIN, Owner/Director of Kimberley Cultural Connections Pty Ltd. Cissy Gore-Birch is a Jaru/Kija woman with connections to Balanggarra, Bunuba and Nyikina. Cissy has over 29 years of experience in community development, governance & decision making, leadership, negotiation and conflict resolution, native title, economic development, tourism and conservation and land management. Cissy is the inaugural Director and Co-Chair of ICIN Ltd, Previous Chair of Balanggarra Aboriginal Corporation for nearly 10 years, on the Advisory Committee of the International Savanna Fire Management Initiative (ISFMI) and the inaugural Co-Chair of the Wildfire-Resilient Landscapes Network. Cissy was awarded the Order of Australia medal in 2024 in honour of three-decades of work in WA's Indigenous communities.

**Abstract:**

The Indigenous Carbon Industry Network emerged in 2018, as 23 Indigenous land and sea organisations that own carbon projects created a coordinating body to voice their collective policy positions in relation to the carbon market, and to ensure Indigenous groups right across Australia are well-positioned to understand and maximise the benefits from carbon projects for their country and community.

Through its work creating and publishing guidance on seeking Free, Prior and Informed consent from Indigenous communities for carbon projects; advocacy on recognition of Indigenous rights and interests; as well as providing information to Indigenous groups about what a carbon project involves; ICIN has gained insights into some of the enabling factors and barriers to participation of Indigenous groups brought by the carbon market. Many of these lessons learned are relevant to the emerging Nature Repair market.

## NATURE POSITIVE IN CORAL REEF ECOSYSTEMS

**TARYN FOSTER,** *FOUNDER OF CORAL MAKER*

**Author Biography:**

Taryn is the founder of Coral Maker, a reef restoration company focussed on using technology for scaled coral deployment.

Taryn is trained as a coral biologist specialising in climate change impacts on coral reefs. She has 10+ years of research experience in coral growth, reproduction, monitoring reef health, and bleaching events. She worked as a post-doctoral researcher at the Australian Institute of Marine Science, before being awarded a Fulbright Fellowship with the California Academy of Sciences to research some of the concepts behind Coral Maker.

Since founding Coral Maker, she has built corporate partnerships with global companies, including US-based technology company Autodesk, and EU-based robotics hardware company, Universal Robots. These collaborations with robotics, AI, and design engineers have resulted in world-first innovations, including using computer vision and AI to robotically pick and place corals and mass-producing stone bases for coral deployment.

Coral Maker was recently granted a 10-hectare site at the Abrolhos Islands in Western Australia, for a large ocean-based coral nursery, with deployment beginning in 2025.

**Abstract:**

Coral reefs are one of the most biodiverse ecosystems on the planet, yet we are projected to lose 70-90% of reef building corals by 2050, and the IUCN has now listed 40% of hard corals as at risk of extinction.

In this talk we will cover what Nature Positive could look like for coral reef ecosystems, the major challenges we are facing, and some of the innovative conservation interventions that are currently being developed.

## BIODIVERSITY ON FARM - THE WHOLE SHEBANG

**DI HAGGERTY,** *2025 WA AUSTRALIAN OF THE YEAR*

**Author Biography:**

Ian and Dianne Haggerty are the grateful stewards of over 27,000 hectares of farmland in Western Australia. Their passion for farming dates back to their childhood, growing up on family farms.

In 2001, Ian and Di embarked on their journey to develop Natural Intelligence Farming, alongside the invaluable Jane Slattery (Co-Founder). Over the next 16 years, Ian and Di farmed multiple properties spanning over 200 kilometers, experimenting with their methodology across different soil types, rainfall patterns, and climates. To their surprise and delight, they consistently achieved outstanding results, proving that location didn't matter. The foundation of the Haggerty's Natural Intelligence Farming methods lies in their deep commitment to regenerating the fertility of the marginal soils in their area. They achieve this through the use of biological fertilisers, zero tillage, and cultivating healthy cereal plants that yield high tonnages of premium grain per hectare. The healthy ground cover of their crops and pastures plays a vital role in maintaining soil moisture and controlling weeds.

The Haggerty's story is a testament to their unwavering passion for farming and their dedication to sustainable and regenerative practices. They have overcome obstacles and embraced new knowledge to create a successful farming operation that not only produces high-quality crops but also nurtures the land for future generations.

**Abstract:**

This presentation explores a journey of biodiversity restoration across the scales of life ` from the microsopic organisms that enliven soils, our water and atmosphere to the macroscopic networks that sustain landscapes. Set in the heart of the Western Australian wheatbelt, it examines how Natural Intelligence Farming practices can rebuild ecological function whilst producing nutrient dense food, fibre and beverage. Through active support of biodiversity it can be demonstrated that farming systems can simultaneously nourish human, landscape and planetary health. Agriculture and biodiversity conservation are not mutually exclusive, but deeply interdependent.

## BIOCULTURAL DIVERSITY AND BIODIVERSITY

**JOE MORRISON,** *CEO, INDIGENOUS LAND AND SEA CORPORATION (ILSC) GROUP*

**Author Biography:**

Joe Morrison is Dagoman and Mualgal and has over 30 years' experience working with Indigenous people in northern Australia, nationally and more recently globally. He has extensive experience in public policy, governance, research, Indigenous development, native title, land rights. land and sea management and economic development. He is currently the Group CEO of the Indigenous Land and Sea Corporation, and prior to this, the CEO of the Northern Land Council and the founding CEO of the North Australian Indigenous Land and Sea Management Alliance (NAILSMA).

**Abstract:**

Australia's Indigenous people have been entwined with nature through complex relationships involving their language, laws and customs for over 65,000 years. Contemporary Australia benefits from the legacy of this practice and we must change the way we view nature and the relationship we need to have with it, for it to be enjoyed by all future generations.

# STATE AND TRANSITION MODELS CAN PROVIDE INSIGHT TO CHANGES IN ECOSYSTEM CONDITION FOR BIODIVERSITY

**ANNA RICHARDS**, *CSIRO ENVIRONMENT, DARWIN*

**Co-authors:**

Prober SP, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Murphy H, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Good M, *Good Ecology Pty Ltd*

O'Donnell A, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Albornoz Ramirez F, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Brooks S, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Butler D, *Australian National University*

England J, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Fraser J, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Giljohann KM, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Gunawardana D, *Department of Climate Change, the Environment, Energy and Water*

Luxton S, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Morris B, *Terrestrial Ecosystem Research Network*

Munroe S, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Piper M, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Rochelmeyer E, *Terrestrial Ecosystem Research Network*

Roxburgh S, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Saunders M, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Tetreault-Campbell S, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

Warren I, *Department of Climate Change, the Environment, Energy and Water*

Williams KJ, *CSIRO Environment, Darwin, Townsville, Black Mountain, Clayton, Hobart, Brisbane*

**Author Biography:**

Dr Anna Richards is a plant and soil ecologist with a broad interest in ecosystem management; particularly, how the science of vegetation and soil dynamics, along with land management practices, can be used to better monitor, evaluate and manage ecosystem condition. She is a senior research scientist in the Ecosystem Dynamics team at the CSIRO Tropical Ecosystems Research Centre in Darwin, Northern Territory.

Anna develops frameworks for monitoring and evaluating natural resource management activities based on an understanding of dynamic ecosystem condition and set within a state and transition modelling context. As part of this work she has co-led a collaborative project (The Australian Ecosystem Models Framework) with the Department of Agriculture, Water and the Environment to develop dynamic ecosystem models for Australia's ecosystems that incorporate both reference (endogenous) and recent (exogenous) disturbance regimes. The framework aims to improve decision making in natural resource management, and provide a conceptual underpinning to the development of SEEA-compliant (System of Environmental Economic Accounting) ecosystem accounts.

**Abstract:**

The collapse of natural ecosystems is accelerating across the globe, leading to loss of biodiversity and ecosystem services, and presenting significant risks to livelihoods and the economy. Halting and reversing this trend will require commitment to, and substantial investment in, nature positive initiatives by industry, government and communities. Consistent methodologies for characterising and predicting the effectiveness of interventions to restore and protect nature are needed to support this change. State-and-transition models (STMs) are a simple, scalable and established tool for characterising and communicating knowledge about ecosystem dynamics, that are increasingly applied in such contexts. While the models themselves describe observed change, they can be aligned with different values, including the assignment of ecosystem condition scores relating to the persistence of biodiversity in different ecosystem states. However, models have typically been developed for localised or ecosystem-specific purposes, resulting in a plethora of incompatible models at different scales and resolutions. Here we present a set of national scale frameworks and templates that can be used to collate and synthesise regional-scale expert-elicited information on restoration actions and their effectiveness for reversing or preventing loss of ecosystem condition. We describe their application to the development of 17 regional scale STMs delivered through the Ecological Knowledge System to support Australia's new Nature Repair Market. We also describe a set of guidelines for those interested in developing their own STMs and how information can be accessed through a new National Ecosystem Assessment System for Australia (NEASA) funded by TERN. While STMs usually describe site-scale characteristics, we also propose further work to identify landscape condition metrics that reflect the ratios and configurations of states and their successional pathways in a landscape.

# CULTURALLY SIGNIFICANT ENTITIES ARE CENTRAL TO COUNTRY

**TEAGAN SHIELDS,** *RESEARCH FELLOW CURTIN UNIVERSITY*

**Author Biography:**

Dr Teagan Shields is a proud Arabana woman. She grew up in Newcastle (Awabakal Country) and has worked in strategic policy reform, community engagement and biodiversity conservation across NSW, ACT and WA for the past 15 years. Teagan holds a Bachelor of Applied Science, Bachelor of Education, a Master of Marine Science and Management, and a PhD doctorate.

Teagan believes the answer to the conservation issues facing Australia lies in the Indigenous-led use of Traditional Knowledge. In 2024, she completed a PhD with the University of Melbourne, investigating systemic changes to empower Aboriginal and Torres Strait Islander land and sea managers in biodiversity conservation.

Currently serving as Deputy Chair of the federal Minister for the Environment's Indigenous Advisory Committee, Teagan also serves on several committees and boards, including the Biodiversity Council, the North Australian Indigenous Land and Sea Management Alliance and the Wentworth Group of Concerned Scientists.

**Abstract:**

The recognition of species and ecological communities of cultural significance to Indigenous Australians (culturally significant entities; CSE) presents a key opportunity to value Indigenous Knowledge. I will explore how CSE can be used as a tangible hook for policymakers and conservation practitioners to integrate Indigenous Knowledge into biodiversity strategies and planning mechanisms. Using Structured Decision-Making, we provide a pathway for Indigenous leadership to make decisions for the designation and collaborative management of CSE. While the way forward for the recognition and true collaborative management of CSE is achievable, the real challenge for governments will be supporting and empowering Indigenous Australians and their governance structures under an entrenched patriarchal western paradigm, to implement enduring change.

# THE MULTISENSORY BASIS OF NOCTURNAL LONG-DISTANCE NAVIGATION IN THE AUSTRALIAN BOGONG MOTH

**ERIC WARRANT**, *LUND VISION GROUP, DEPARTMENT OF BIOLOGY, UNIVERSITY OF LUND, SWEDEN*

**Author Biography:**

Born and raised in Australia, I studied the odd but highly rewarding combination of physics and entomology at the University of New South Wales in Sydney, receiving a first class honours degree in physics in 1985. In 1990 I completed my PhD on the optics of arthropod superposition compound eyes at the Australian National University in Canberra, under the supervision of the late George Adrian Horridge and Peter McIntyre, using introduced South African dung beetles as model organisms. During my PhD I developed a keen interest in how the optics of eyes are optimised for life at different light levels, an interest that flowed naturally from the genus of dung beetles I was studying (Onitis), whose members are nocturnal, crepuscular or diurnal.

In recent years, I turned my attention to the remarkable long-distance migration of the nocturnal Australian Bogong moth *Agrotis infusa*, a project I first dreamed up as a PhD student long ago in Canberra. Travelling over 1000 km to a specific destination it has never previously visited (high alpine caves in the Australian Alps), we discovered that this moth uses the Earth's magnetic field and the stars as compasses to find its way. We are now trying to understand how the brain processes these cues, and how the specific journey each moth has to make is programmed into its genetic code. Fortunately, I have a house and a lab in the Australian Alps which we use for this work, which happily allows me to return to Australia regularly!

**Abstract:**

Each spring, billions of Bogong moths escape hot conditions in different regions of southeast Australia by migrating over 1000 km to a limited number of cool caves in the Australian Alps, historically used for aestivating over the summer – a place they have never previously been. At the beginning of autumn the same individuals make a return migration to their breeding grounds to reproduce and die. To make these incredible journeys, we have discovered that Bogong moths rely on the stars and the Earth's magnetic field as compasses to fly in their inherited migratory direction, and a unique odour wafting from the cave that identifies the destination and provides a navigational beacon at the very end of their long journey. In my talk I will describe the experiments that led to these findings, and highlight the importance of the Bogong moth migration for the health of the Australian alpine ecosystem.

# PANELS

# MORE THAN JUST SURVEYS – IMPROVING FLORA AND FAUNA DATA FOR STRONGER EIAS

MODERATOR: NATALIA HUANG, *PRINCIPAL WILDLIFE ECOLOGIST, ECOLOGY MATTERS AUSTRALIA*

**Panellists:**

Lee McIntosh, *Deputy Chair, Environmental Protection Authority*

Lisa Adams, *Independent Environmental Approvals Advisor and President of the Environmental Consultants Association of WA*

Dr Mike Bamford, *Supervising Scientist, Bamford Consulting Ecologists*

Kellie Bauer-Simpson, *Principal Ecologist/Botanist, FVC*

Professor Stephen van Leeuwen, *BHP/Curtin Indigenous Professor in Biodiversity and Environmental Science, Curtin University*

**Abstract:**

We collect an enormous amount of flora and fauna data for EIAs, but does it support strong, nature-positive outcomes?

This panel brings together five experts working across the biodiversity assessment system:

- A fauna consultant with over 40 years' experience designing, conducting and interpreting fauna surveys.
- A flora consultant who designs, conducts and interprets flora surveys.
- An EIA consultant who evaluates data to assess impacts and develop the EIA.
- The Deputy Chair of the EPA, who reviews the EIA and recommends whether a project should proceed and under what conditions.
- A leading academic, who brings an Indigenous perspective and deep experience in biodiversity science.

Together, they'll explore how flora and fauna data could be better collected, interpreted and used, from survey design to how results are communicated, and what is really needed for good outcomes-focused decision-making in development projects.

Expect a fast-paced conversation with diverse and grounded insights. Questions on the table include:

- What are the biggest flaws – and wasted efforts - in how flora and fauna data are collected for EIA?
- What knowledge is missing, including Indigenous natural heritage, and how can it be integrated genuinely into assessments?

- How can guidance set a reliable baseline while still demanding professional scientific judgment for each project?

If you work in or around EIAs, or are interested in fauna and flora surveys, this panel is for you. You'll hear directly from the people who do the work, use the outputs, and want to see the system improve, for the sake of clarity, quality, and better outcomes for nature.

## INDIGENOUS PANEL – THE GOOD AND THE BAD IN INDIGENOUS STEWARDSHIP

MODERATOR: PROFESSOR STEPHEN VAN LEEUWEN, *BHP/CURTIN INDIGENOUS PROFESSOR IN BIODIVERSITY AND ENVIRONMENTAL SCIENCE, CURTIN UNIVERSITY*

**Panellists:**

Cissy Gore-Birch, Co-Chair, *Indigenous Carbon Industry Network*

Joe Morrison, Group Chief Executive Officer, *Indigenous Land and Sea Corporation*

Teagan Shields, Research Fellow, *Curtin University*

**Abstract:**

Indigenous stewardship has always been central to caring for Country, but how it is recognised and supported in today's biodiversity management is complex and often contested. This panel brings together three leading Indigenous voices from across Australia to explore both the opportunities and the challenges in embedding Indigenous knowledge and authority in conservation and land management.

Together, they will reflect on:

- What's working well in partnerships that support Indigenous-led stewardship.
- Where tensions and barriers remain in resourcing, governance and recognition.
- How Indigenous knowledge systems and science can be brought together in respectful and equitable ways.
- What's needed to ensure stewardship delivers lasting benefits for both Country and communities.

Expect a frank and grounded conversation on what genuine Indigenous stewardship looks like in practice — the good, the bad, and the lessons for the future of biodiversity management in Australia.

## PATHWAYS TO NATURE POSITIVE REPORTING – PwC

MODERATOR: KATELYN BONATO, *PARTNER, PwC AUSTRALIA*

**Panellists:**

Luke Twomey*, CEO, WAMSI*

Lucas Carmody, *Global Nature Lead, PwC Australia*

James Fitzsimons, *Director of Conservation and Science – The Nature Conservancy; Member, NRM Committee (DCCEEW)*

**Abstract:**

With nature loss accelerating, investors, regulators, and communities seek greater transparency on organisations' impacts and efforts to restore nature. This session unites leaders from finance, industry, science, and advisory to explore how nature-positive is defined and applied in practice.

# ABSTRACTS

## FULL PRESENTATIONS

# STRATEGIC OPPORTUNITIES FOR ENVIRONMENTAL OFFSETS WITHIN THE NORTHERN JARRAH FOREST

**DR LINDA ABDO,** *N/A*

**Co-authors:**

Dr Renee Young, *WABSI*

**Lead Author Biography:**

Linda is an Environmental Management professional with more than 18 years experience working in various sectors across natural resource management and stakeholder engagement roles. She holds a BSc (MarSc)Hons, Dip Management and PhD on the contribution of biodiversity offsets to sustainable development. She is currently a Board member of Positive Change for Marine Life, a member of Parks Australia's South-west Marine Park Advisory Committee and the Plan Vivo Nature Technical Review Panel.

**Abstract:**

The Northern Jarrah Forest is of environmental, cultural, social and economic significance. With competing existing uses of the region, and plans for the expansion of development areas, strategic solutions are required to provide adequate compensation for the impacts of development and ensure a meaningful contribution to sustainable development.

To identify opportunities at a regional scale for environmental offsets in the Northern Jarrah Forest, a literature review, stakeholder engagement, and spatial data and risk analyses were undertaken.

Climate change, vegetation clearing, altered fire regimes, disease and invasive species, and knowledge gaps were identified by both the literature review and stakeholder engagement as key priorities across the region. Associated with these, were four key offset opportunities: protection, restoration, invasive species and disease management and, management for improved water balances (ecological thinning).

Analysis of spatial data related to these priorities was then used to identify priority locations for activities to address these pressures, with restoration presenting the preferred option and lowest risk. It was recognised that the risk of other offsetting options, however, could be mitigated through the use of strategic collaborative and/or coordinated approaches.

The strategic use of offsets, particularly within a Maximum Sustainable Development approach, can reduce risk and optimise benefits to environmental, cultural, social and economic priorities. This is of particular importance in areas of high significance with competing priorities.

# A MODERN STOCKTAKE OF A NOT-SO-COMMON POSSUM: RECENT AND UNPUBLISHED RECORDS OF THE COMMON BRUSHTAIL POSSUM (TRICHOSURUS VULPECULA) IN ARID NORTH-WEST WESTERN AUSTRALIA

**MISS HANNAH ANDERSON**, *BIOLOGIC ENVIRONMENTAL SURVEY*

**Co-authors:**

Dr Judy Dunlop, Curtin University

Mr Jeff Turpin, University of New England

Dr Mike Bamford, University of Western Australia

Mr Christopher Knuckey, Biologic Environmental Survey

Mr Morgan O'Connell, Biologic Environmental Survey

Mr Glen Gaikhorst, GHD

Dr Melissa Jensen, Stantec Australia

Miss Alicia Whittington, Department of Biodiversity, Conservation and Attractions

Mr Russell Palmer, Department of Biodiversity, Conservation and Attractions

**Lead Author Biography:**

Hannah is a highly skilled senior zoologist with over 11 years experience in the implementation of various fauna projects throughout different regions in Western Australia. Hannah currently works as a senior zoologist for Biologic Environmental Survey, where she is involved in a range of projects, from basic, targeted and detailed surveys. Prior to Biologic, she worked as a Senior Technical Officer in the Animal Science Division with the Department of Biodiversity, Conservation and Attractions.

**Abstract:**

The common brushtail possum (*Trichosurus vulpecula*) is a medium-sized marsupial that was formerly widespread across Australia but has suffered extensive declines in its range and population size, with significant loss in semi-arid/arid areas. In the northern semi-arid/arid areas in Western Australia (WA), little is known about the density and distribution of brushtail possum populations. Here, we report on modern and unpublished records of brushtail possums in north-west WA, focusing on the Pilbara region. Records were sourced from various agencies and online sources. Prior to this study, only 13 records from the mainland Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion were publicly available. We uncovered 47 additional independent records, with 35 records since 2000, indicating that brushtail possums are persisting in low densities in the Pilbara bioregion. Most Pilbara possum records we found were located in riverine and rocky environments, correlating to environments that include caves and large Eucalyptus sp. The capture of these data fills an important information gap that will now be available in public data repositories. We recommend that targeted surveys and follow-up monitoring be conducted in northern WA to determine if brushtail possums are declining in this region as has been found elsewhere in northern and central Australia.

## REMOTE SENSING OF BIODIVERSITY IN MINE REHABILITATION

**MR ROBERT ARCHIBALD,** *ECOCENE* AND **MR BEN FOSBERY**, *ROY HILL*

**Co-authors:**

Ms Venecia de San Miguel, *Roy Hill*

Mr Julian Kruger, *Ecocene*

Mr Jeff Williams, *Ecocene*

Dr Jian Chai, *MultiScan*

Mr Aditya Sharma, *Ecocene*

Ms Hannah Koh, *Ecocene*

Mr Dirk Butter, *Ecocene*

**Lead Author Biography:**

Robert is Technical Lead - Biodiversity and Natural Capital, in the team at Ecocene that manage the Ecoda web-based mapping and data analytics platform. He has been at Ecocene for 15 years working across a variety of ecological survey, monitoring and research and development projects. Prior to joining Ecocene he worked in forestry and land management in operational and research related roles. One of his key interests is the application of technology to ecological monitoring and management.

Ben Fosbery is a rehabilitation and closure practitioner based in Perth, Western Australia, with experience in iron ore mine sites in the Pilbara. He holds qualifications in urban and regional planning and environmental science. Ben specialises in developing and implementing mine rehabilitation strategies, with a focus on regulatory compliance and practical outcomes. He is passionate about continuous improvement in mine closure practices and engaging with local communities.

**Abstract:**

Mining companies collect data on biodiversity in order to manage the environment responsibly and report performance against compliance criteria. Increasingly, companies are using above-earth remote sensing as a standard tool in environmental survey and monitoring. But what about biodiversity? Which components of biodiversity can we practically measure in 2025 with remote sensing?

This question is addressed using rehabilitation at the Roy Hill Mine in the Pilbara region as a case study. Remote sensing data are collected across the mine using a range of platforms and sensors. These data have been used to monitor geometry, stability and basic vegetation attributes (cover and height) within rehabilitation. Recently, Ecocene and Roy Hill have been collaborating to widen the scope of monitoring to include indicators of biodiversity. Research and development are focused on mapping plant species and vegetation classes in imagery with Deep Learning models. In 2024, pilot trials using drone imagery demonstrated promising results (> 85% accuracy) for a selection of species within rehabilitation. In 2025, further work is being undertaken to expand the number of species and the scale across which composition in rehabilitation and analogue areas is assessed.

Additionally in 2025, various structural (indirect) indicators of biodiversity are being developed to track rehabilitation progress. These include a variety of patch and 3-D structural metrics. Comparison of these metrics between rehabilitation and analogue areas can reveal how rehabilitation is developing as potential habitat. Some initial work to validate these inferences is presented.

The presentation concludes with an assessment of the expected advances in remote sensing which will further extend the capabilities of remote sensing as a biodiversity monitoring tool in mine rehabilitation monitoring.

# ENHANCING BIODIVERSITY IN THE SWAN CANNING ESTUARY: NATURE-POSITIVE SOLUTIONS USING LIVING SEAWALLS

**DR LUCY ARROWSMITH,** *RIVERS AND ESTUARIES SCIENCE, DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Dr Lucy Arrowsmith, *Rivers and Estuaries Science*

Dr Kerry Trayler, *Rivers and Estuaries Science*

Mr Josh Baker, *DNV*

**Lead Author Biography:**

Senior Environmental Officer working within the Rivers and Estuaries Science department at DBCA.

**Abstract:**

The Swan-Canning Estuary (SCE) in Western Australia has experienced significant shoreline modifications. To combat ongoing erosion risks, single-purpose coastal infrastructures like seawalls, have been used to protect the shorelines, often at the expense of complex intertidal systems. As these existing modifications near the end of their intended lifespan and new structures are constructed, integrating eco-engineered technologies presents a promising alternative to reduce erosion while enhancing biodiversity. Using ego-engineered structures from Living Seawalls, we aimed to evaluate the effectiveness of five different habitat panel styles in enhancing biodiversity and increasing habitat coverage in the SCE compared to traditional seawall infrastructures. We found the habitat panels significantly increased species richness and abundance at two of the three sites in East Fremantle when compared to the plain seawalls. Notably, the rockpool habitat panels exhibited the highest level of species richness, abundance, and diversity among the five panel types. This installation marks the first of its kind in Western Australia, and our results indicate that eco-engineered structures can be used to promote biodiversity more effectively than plain seawalls. Location, panel type and proximity to tidal range will be important considerations in their application to any new hard-engineered structures.

# INVESTIGATING MYRTLE RUST AND OTHER FUNGAL DISEASES ON AGONIS FLEXUOSA

**MR ERIC ASARE,** *EDITH COWAN UNIVERSITY*

**Co-authors:**

Dr Geoff Pegg, *The Queensland Government, Department of Primary Industries*

Dr Kylie Ireland, Biodiversity, *Conservation and Attractions*

Dr Mary Hanson, *Edith Cowan University*

Dr Kristina Lemson, *Edith Cowan University*

Dr Anna Hopkins, *Edith Cowan University*

**Lead Author Biography:**

Eric Kumi Asare has gained experience during his research career in plant pathology as a mycologist. He has special interest in understanding how fungal pathogens spread and develop into epidemics. Currently, Eric is a PhD candidate at the Edith Cowan University (ECU) in Western Australia (WA) and his research focuses on understanding the potential impact of myrtle rust on WAs native flora following detection of the pathogen in the Eastern Kimberley region in June 2022.

**Abstract:**

Endemic to south-west of Western Australia (WA), *Agonis flexuosa* (commonly called peppermint) is a keystone tree species that provides habitat, food, and protection for fauna, particularly the vulnerable Western Ringtail Possum (*Pseudocheirus occidentalis*). However, this tree species is threatened by diseases caused by pathogens including *Phytophthora cinnamomi* and *Neofusicoccum australe*. Commonly, these pathogens cause dieback resulting in tree death. The recent detection of *Austropuccinia psidii* (myrtle rust) in the Eastern Kimberley adds to the fungal pathogens potentially threatening *A. flexuosa* in WA. It is uncertain how *A. flexuosa* will respond to a myrtle rust incursion, given that *A. flexuosa* has high rust susceptibility but is genetically diverse across its native range. This study aimed to screen *A. flexuosa* seedlots from different provenances across its native range for resistance to myrtle rust to provide a basis for resistance breeding and species conservation. Phenology studies were undertaken to identify species vulnerability periods for myrtle rust. Further, other fungal pathogens causing diseases on *A. flexuosa* were investigated with the aim of building a reference library of disease symptoms and existing pathogenic fungi. This study has increased our knowledge of fungal pathogens on *A. flexuosa* and the information is useful in facilitating disease differentiation from myrtle rust. Importantly, it has also provided new insights into the potential impact should myrtle rust arrive in southwest WA.

Keywords: Myrtaceae, plant diseases, etiology, pathogenicity, disease management.

# ADVANCING ACOUSTIC DETECTION OF THE WESTERN GROUND PARROT: FROM CLUSTER ANALYSIS TO DEEP LEARNING

**MR BENJAMIN BARRETT**, *BIRDLIFE AUSTRALIA*

**Co-authors:**

Dr Allan Burbidge, *Department of Biodiversity, Conservation and Attractions*

Dr Sarah Comer, *Department of Biodiversity, Conservation and Attractions*

Dr Michael Craig, *Edith Cowan University*

Dr Pieter Poot, *University of Western Australia*

Dr Jan Hemmi, *University of Western Australia*

**Lead Author Biography:**

Benjamin Barrett is an ornithologist and the Southwest Black-Cockatoo Recovery Coordinator at BirdLife Australia. He supports recovery efforts for three threatened species, working with government, researchers, and communities. Benjamin specialises in ecoacoustics, using autonomous recorders and machine learning to monitor elusive birds like the Western Ground Parrot. His background spans NGOs, consulting, and research in threatened species conservation across Australia and internationally.

**Abstract:**

The Western Ground Parrot (*Pezoporus flaviventris*) is one of Australia's most cryptic and endangered bird species, requiring accurate and scalable detection methods for effective monitoring. This thesis evaluates two complementary approaches to automate the detection of WGP calls from field recordings, collected via an array of Autonomous Recording Units (ARUs). First, unsupervised cluster analysis was applied to identify acoustically similar events, with results manually vetted to assess detection precision and characterise false positives. While effective for exploratory analysis, cluster-based methods showed limitations in discriminating WGP calls from acoustically similar species. To address this, a supervised Convolutional Neural Network (CNN) was trained on a curated dataset of spectrograms. The CNN demonstrated improved classification accuracy, with significantly reduced false positives and greater robustness to environmental noise. By comparing the strengths and weaknesses of both methods, this study proposes a hybrid workflow combining cluster analysis for data triage and CNNs for high-precision detection. The findings contribute to improved acoustic monitoring of cryptic species and offer a scalable template for threatened species surveillance across complex soundscapes.

# HIGH-INTEGRITY NATURE CREDIT MARKETS DELIVERING MEASURABLE ENVIRONMENTAL OUTCOMES

**MRS AMY BASNETT,** *ECO-MARKETS AUSTRALIA*

**Lead Author Biography:**

Amy Basnett is the Head of Programs Environmental Markets and Standards at Eco-Markets Australia, leading the Secretariat in working to facilitate investment in nature restoration and preservation through the establishment and administration of environmental markets. Amys background is in leading initiatives across environmental management and sustainable agriculture, including water quality improvement programs across local, catchment, and regional scales in Queensland and Western Australia.

**Abstract:**

The urgency to protect and restore nature has never been more pressing, yet an estimated $700 billion annual funding gap threatens our ability to meet global biodiversity and climate targets. While government investment remains vital, scaling up private sector capital is crucial to integrating nature into mainstream financial decision-making. Nature credit markets are emerging as a key solution, offering transparent, outcomes-based mechanisms that incentivise landholders for actions that improve biodiversity, water quality, and ecosystem health. Success in these markets depends on integrity, trust, and independent oversight.

This session will explore the fundamentals of a high-integrity nature credit market, drawing on Eco-Markets Australia's (EMA) five years of experience administering the Reef Credits Program. We will showcase how market-driven approaches can deliver measurable environmental outcomes. We will also highlight the need to expand nature credit markets, including EMAs development of a national catchment water improvement credit market aimed at restoring and protecting Australia's freshwater and marine ecosystems, and Cassowary Credits Biodiversity Market, which supports rainforest restoration in the Wet Tropics.

Additionally, we will examine the potential of stacking Reef and Cassowary Credits alongside Australian Carbon Credit Unit (ACCU) projects, in collaboration with the Clean Energy Regulator, to provide landholders with diversified revenue streams while ensuring additionality and enhanced environmental outcomes. A critical focus will be enhancing Indigenous participation in nature markets, integrating traditional ecological knowledge to strengthen both environmental and cultural outcomes.

This session will demonstrate how nature credit markets are a powerful tool in advancing a nature-positive future, offering scalable solutions that drive environmental restoration, support biodiversity, and empower communities.

# RESTORATION STANDARD FOR THE WESTERN AUSTRALIAN WHEATBELT. A PRACTICAL GUIDE FOR RESTORATION MANAGERS.

**DR RENEE YOUNG,** *WESTERN AUSTRALIAN BIODIVERSITY SCIENCE INSTITUTE*

**Co-authors:**

Mrs Hanouska Bishop, *The Western Australian Biodiversity Science Institute*

**Lead Author Biography:**

Hanouska is a multi-disciplinary manager experienced in leading strategic, complex biodiversity assessments and related research, with specialist knowledge in Pilbara biodiversity values and threats. She has considerable experience in environmental approvals and regulation, program direction, innovation in environmental strategy, partnerships and governance frameworks.

**Abstract:**

The Wheatbelt region of southwestern Australia has experienced extensive habitat loss and fragmentation due to land clearing, threatening the persistence of endemic biodiversity and the ecological integrity of its unique Eucalypt woodland ecosystems. The scale of ecological degradation in the Wheatbelt exceeds the capacity of current restoration efforts, highlighting the need for coordinated approaches to achieve restoration at scale. Further, warming and drying climate scenarios pose significant uncertainty in the resilience of endemic ecosystems, requiring restoration planning to account for shifting ecological processes.

In response, the Wheatbelt Restoration Standard (WRS) has been developed to provide a structured, region-specific framework for ecological restoration. Informed by literature synthesis and interviews with Noongar kaartdijin (knowledge) holders, technical experts in ecology, land management, policy, and climate science, the WRS comprises a five-stage framework, principles and tools. It's designed to guide projects across a spectrum of base states and restoration targets, including both endemic and novel ecosystems, and may be led by values, access to markets or regulatory compliance.

Emphasising alignment with the Society for Ecological Restoration (SER) International Standards, the WRS incorporates regionally adapted approaches using the SER Ecological Recovery and Social Benefits Wheels. It supports application of the mitigation hierarchy used in environmental impact assessment and approvals processes, particularly with defining measurable completion criteria for restoration of the Eucalypt Woodlands of the Western Australian Wheatbelt Threatened Ecological Community and associated environmental values.

The WRS enables repeatable, scalable, and outcome-focused ecological restoration. It supports evidence-based monitoring and adaptive management, contributing to improved restoration governance and long-term resilience of socio-ecological systems.

# GLOBAL FORCES DRIVING THE FUTURE OF NATURE FINANCE AND OPPORTUNITIES FOR AUSTRALIA AND WESTERN AUSTRALIA

**JONATHAN BLOCH,** EXECUTIVE DIRECTOR, ANZ INSTITUTIONAL ENVIRONMENTAL MARKETS

**Lead Author Biography:**

Jonathan is a senior banker bringing over 20 years of global experience working across the resources energy and infrastructure sectors, focused on origination, structured finance, and project advisory. His current role within the ANZ Environmental Markets business is centred on driving the origination, design, incubation and development of nature-positive and carbon transition project solutions, including high-integrity native reforestation, marine restoration, and next-generation renewable biofuels. Jonathan leverages his expertise and networks in earth sciences, engineering and finance, to support development of projects which can help clients deliver scalable high impact projects across climate, nature and community.

**Abstract:**

The convergence of global emissions and nature repair policies and mandatory reporting, combined with sector-specific clean fuels mandate obligations, are driving the development of new age sustainable fuels technology, and nature based solutions. Together they can support accelerating the supply of verified high impact emissions and nature-positive outcomes. Innovations in bio-waste treatment, renewable energy production, and water management have the ability to enable investment in ecosystem restoration and provide new pathways for scalable nature-positive finance, with implications for projects in Western Australia.

# 10 SPECIES IN 10 YEARS: A REVIEW OF THE MT GIBSON MAMMAL RESTORATION PROJECT

**DR AMANDA BOURNE**, *AUSTRALIAN WILDLIFE CONSERVANCY*

**Co-authors:**

Dr Louis O'Neill, *Australian Wildlife Conservancy*

Mr Robin Sinclair, *Australian Wildlife Conservancy*

Dr Bryony Palmer, *Australian Wildlife Conservancy*

Dr Sophia Callander, *Australian Wildlife Conservancy*

Ms Aliesha Dodson, *Australian Wildlife Conservancy*

Dr John Kanowski, *Australian Wildlife Conservancy*

**Lead Author Biography:**

Amanda works at Australian Wildlife Conservancy as the regional ecologist for the southwest region. She has 15 years of international experience and an particular interest in the impacts of climate change on biodiversity. Amanda leads a team of field ecologists implementing ecological monitoring, animal translocations and research on four conservation properties.

**Abstract:**

The Australian Wildlife Conservancy's Mt Gibson Mammal Restoration Project, on Badimia Country in Western Australia, recently celebrated a significant conservation milestone. The project aimed to establish viable, self-sustaining populations of ten locally-extinct mammal species. The last planned release of the last planned species (12 Western Quolls, or Chuditch *Dasyurus geoffroii*, from the captive breeding program at Taronga Zoo) was completed in November 2024. Translocations have been conducted over the past ten years, both inside and outside a 7,828 ha feral predator-proof fenced area. Brushtail Possums *Trichosurus vulpecula* and Chuditch are in the early stages of establishing a population at Mt Gibson and, while progressing well, it is too early to confirm the outcome. Most of the other translocated species have now met medium- or long-term success criteria and shown signs of long-term viability, including good genetic diversity and recovery from the impacts of a recent severe drought. Rodents were more difficult than marsupials, with Shark Bay Mice *Pseudomys gouldii* failing to establish post-release and Greater Stick-nest Rats *Leporillus conditor* persisting in low numbers for many years before declining to barely detectible levels following drought. Feral predator control, via eradication from the fenced area and ongoing suppression across the rest of the property, has been an important part of the project. Intentional releases of species beyond the fence are enabling us to explore what conservation actions are possible in the presence of feral predators. Lessons learned from Mt Gibson will inform future translocations at this and other sites, and provide insights into the opportunities and challenges associated with large, complex, landscape-scale conservation and restoration programs.

# CAN EMERGING HYPERSPECTRAL EARTH OBSERVATION TECHNOLOGY BE USED FOR ECOSYSTEM MONITORING AND BIODIVERSITY ASSESSMENT?

**DR MARK BROOMHALL,** *ECOCENE*

**Co-authors:**

Dr Saman Akbar Zadeh, *Ecocene*

Ms Timea Kovacs-Ledo, *Ecocene*

**Lead Author Biography:**

Mark is a principal remote sensing analyst within the Ecocene Earth Observation team. Mark has expertise in many facets of EO with extensive experience gained from working at Curtin University, the Bureau of Meteorology, Geoscience Australia and most recently Ecocene. Mark is involved in R&D at Ecocene, to help build the breadth of data and intelligence that can be offered from new imagery and technology be it satellites, aerial or UAV platforms.

**Abstract:**

Remote sensing from space has been used for over 50 years to monitor the environment and to provide insights on vegetation and land cover change. Earth Observation (EO) satellites can now offer high temporal, spatial and spectral resolution imagery and meet many of the needs of environmental monitoring.

Unlike multispectral systems, hyperspectral sensors (HS) capture continuous, narrow spectral bands across a wide range of wavelengths, enabling the detection of subtle differences in spectral signatures that are often characteristic of specific plant species. Advances in sensor design, novel technology like GPS-enabled drones and commercial access to space, means that there are numerous ways to capture HS data that exploit these technologies.

Coupling these data with state-of-the-art algorithms and machine learning has significantly improved the ability to discriminate among species with similar morphological traits but distinct biochemical or structural properties.

Employing field-based surveys utilising ecologists, high resolution drone HS imagery and surface-based spectroscopy measurements allows the creation of robust spectral libraries that can be used to classify the coarser spatial resolution but higher spatial coverage HS satellite data into meaningful categories.

Recent developments in small satellite technology and commercial launch capability sees new 5 m spatial resolution HS data available for the first time, a 6-fold increase in resolution from what was previously available. As studies have shown that the accuracy of species discrimination increases dramatically with increased spatial resolution, these higher resolution HS satellites hold promise for advancing species-level mapping, ecosystem monitoring and biodiversity assessment, while reducing the need for field deployments.

This presentation will discuss recent work to move beyond just monitoring vegetation health and cover from EO to include species composition and biodiversity indicators.

# URBAN REFUGES FOR WILDLIFE: LONG-TERM GENETIC STABILITY IN A TRANSLOCATED POPULATION OF QUENDA (ISOODON FUSCIVENTER)

**DR SEAN BUCKLEY,** *MOLECULAR ECOLOGY AND EVOLUTION GROUP, EDITH COWAN UNIVERSITY*

**Co-authors:**

Dr Anna Hopkins, *Molecular Ecology and Evolution Group, Edith Cowan University*

Ms Rebecca Quah, *Molecular Ecology and Evolution Group, Edith Cowan University*

Mrs Rachyl Stover, *Molecular Ecology and Evolution Group, Edith Cowan University*

Dr Leonie Valentine, *World Wildlife Fund Australia*

Dr Harriet Mills, *Perth Zoo*

Mrs Nicole Adams, *City of Joondalup*

Ms Danielle Bowler, *City of Joondalup*

**Lead Author Biography:**

Conservation geneticist interested in application of genomic approaches to practical conservation management, with a focus on translocations, reintroductions and genetic mixing. Working across a range of taxa including freshwater fishes, marsupials, birds and reptiles. Active science communicator and blogger at The G-CAT (www.theg-cat.com).

**Abstract:**

Translocations into urban environments may be vital for protecting wildlife populations but face significant challenges due to habitat fragmentation, human disturbance, and demographic stochasticity. These often small and isolated populations are also at-risk of genetic erosion, threatening their long-term viability. To ensure the long-term success of such translocations, it is critical yet difficult to implement sustained genetic and demographic monitoring, which can provide insights into population health, resilience, and the effectiveness of urban conservation strategies over time. We assess the genetic, health, and demographic dynamics of an urban translocation of quenda (*Isoodon fusciventer*) using data collected across 89 trapping nights conducted over 29 monitoring surveys and spanning a decade in Craigie Open Space, Perth. We used genomic (DArT-seq) approaches to generate 11,516 SNPs from 167 quenda to assess genetic diversity, inbreeding, genetic drift and relatedness within the translocated population since its founding in late 2013. Despite its relative isolation, our results indicated that the Craigie population has maintained genetic diversity in line with the founding population, with little evidence of inbreeding or strong genetic drift over time. Using a relatedness network, we did not find evidence for reproductive bias amongst the founding individuals, which may have helped to maintain genetic diversity in subsequent generations. Our findings demonstrate the potential for targeted translocations within protected urban environments to preserve insurance populations of threatened species.

# ALAS DATA QUALITY MEASURES IN A BIG DATA WORLD

**DR AMANDA BUYAN,** *CSIRO*

**Lead Author Biography:**

Amanda is a Data Engineer with the Atlas of Living Australia, though was a computational biochemist in a previous life. She is now focussed on streamlining data acquisition into the ALA, as well as devising creative ways to get ALA data and use it for informed decision making.

**Abstract:**

As the world and technology is moving towards big data, the biggest question is how to separate the signal from noise. As the ALAs data is already rich, and will continue to diversify and expand, a way to measure data quality and filter out the noise becomes more pertinent. So, two questions remain: i) how does the ALA ingest data, including accounting for data quality, and ii) how do you determine what data in the ALA is useful for your use case?

In this talk, we will provide a brief overview of the ALAs data quality procedures, including how the ALA standardises all data coming in. We will also talk about what is in the future for the ALAs data, as well as how the ALAs data is and can be used for nature positive and informed decision making.

# SPOT THE DIFFERENCE: TRANSLOCATED CHUDITCH RESTORED TO THE WA WHEATBELT

**DR SOPHIA CALLANDER,** *AUSTRALIAN WILDLIFE CONSERVANCY*

**Co-authors:**

Mr Robin Sinclair, *Australian Wildlife Conservancy*

Mr Aaron Jacks, *Australian Wildlife Conservancy*

Ms Georgina Anderson, *University of Tasmania*

Mr Louis O'Neill, *Australian Wildlife Conservancy*

Miss Aliesha Dodson, *Australian Wildlife Conservancy*

Dr Amanda Bourne, *Australian Wildlife Conservancy*

**Lead Author Biography:**

Dr Sophia Callander joined the Australian Wildlife Conservancy (AWC) in 2022 as a Senior Wildlife Ecologist in the South West. Sophia is involved in the ecological research, monitoring and management of four AWC properties, namely Karakamia, Paruna, Mt Gibson and Faure Island Wildlife Sanctuaries. She has previously worked as a Wildlife Biologist in the UNESCO Wilderness World Heritage Area in Tasmania and as a Research Ecologist in the Australian Capital Territory.

**Abstract:**

Over the past two years, 83 Chuditch (or Western Quoll, *Dasyurus geoffroii*) have been translocated to Mt Gibson Wildlife Sanctuary, on Badimia Country on the eastern edge of the WA wheatbelt. Forty-three of the translocated individuals were fitted with VHF collars and radio-tracked after release. While some individuals dispersed across the wider property and onto neighbouring lands (all managed for conservation), a high portion of the radio-tracked Chuditch have established within or near the release area on sanctuary. All Chuditch were released outside the fenced safe-haven area into an environment where cats and foxes are managed, but present. Extensive camera arrays are used to monitor Chuditch post-release and feral predator activity in response to feral animal control, including Eradicat baiting and cat trapping. In addition, we are trialling the individual identification of Chuditch and cats, based on spot patterns and pelage characteristics recorded on remote cameras to estimate population densities. Together with trapping new, Mt Gibson born Chuditch, individual identification of new individuals from camera images has provided evidence of successful recruitment of Chuditch following translocation with at least 13 Chuditch born on site. To date, the translocation has met short-term success criteria and is on track to meet medium-term success criteria, contributing to positive management outcomes for a vulnerable species in Australia.?

# IMPROVING URBAN CONNECTIVITY FOR WILDLIFE BY USING GIS MODELLING TO INFORM COLLABORATIVE PROJECTS WITH GOVERNMENT AND COMMUNITY

**DR JANE CHAMBERS,** *NATURELINK PERTH, MURDOCH UNIVERSITY*

**Co-authors:**

Dr Margaret Andrew, *ECS Murdoch University*

Ms Ashleigh Griffiths, *Murdoch University*

Ms Christina O'Donnell, *Murdoch University*

Mr Cameron Haddleton, *Murdoch University*

Ms Kieren Scott, *Murdoch University*

**Lead Author Biography:**

Dr Jane Chambers is a wetland ecologist at Murdoch University with over 40 years experience in research and management of wetlands, rivers and estuaries in southwestern Australia. She co-created the Saving our Snake-Necked Turtle citizen science and conservation program and is Director of NatureLink Perth, a community of practice seeking to integrate nature into our city to sustain our biodiversity into the future.

**Abstract:**

Rapid urbanisation in the Perth and Peel region of Western Australia is fragmenting the landscape and reducing the size of native remnants, such that now conservation reserves are insufficient to sustain our biodiversity. However urban design can support biodiversity through urban greening, creating ecological linkages between habitats: naturelinks. This talk outlines how least cost path and circuitscape modelling in a geographic information system (GIS) have been used to identify linear and diffuse wildlife movement pathways through the urban area, to inform and test the most effective location and type of greening intervention. After modelling, treatment options are considered and vetted through community workshops to ensure local acceptance and ownership of the naturelink. Examples of this approach are described for local government areas with differing socioeconomic status and tree canopy cover.

# OVERCOMING BARRIERS TO SEAGRASS RESTORATION

**MR RAPHAEL CLEMENT,** *EDITH COWAN UNIVERSITY*

**Co-authors:**

Prof Kathryn McMahon, *Edith Cowan University*

Mr Sam Gaylard, *EPA SA*

Dr Milena Fernandes, *SA Water*

**Lead Author Biography:**

Raphael Clement holds a BSc in Biology and a Masters in Marine Sciences in France, where he specialised in genomics and bio-physical modelling. Passionate about marine ecology and diving, he is particularly interested in coastal habitat restoration and biodiversity conservation. His work focuses on integrating genetic and modelling tools to better understand ecological processes and support the health of coastal ecosystems.

**Abstract:**

Seagrass meadows provide vital ecosystem services and functions, have suffered widespread declines and require active restoration. Ecological restoration practices are rapidly evolving but successful stories at relevant scales are relatively rare. In South Australia, a remarkable natural recovery was recently identified, with the potential to provide valuable insights to improve large-scale restoration success. Over the past two decades, more than 11,000ha of Posidonia meadows naturally recolonised a unique scale never witnessed before. This study combines genomic tools and numerical simulations to investigate the roles of clonal and vegetative reproduction in this recovery process. Initial field surveys identified *Posidonia sinuosa* and Posidonia angustifolia as the main leaders of the recovery, despite their very slow growing capacities. Preliminary genetic and modelling results suggest that the recovery process varied by species with *P. sinuosa*, which prefers calmer waters, dominating the sheltered northern region, and the more wave-resistant P. angustifolia thriving in more exposed southern areas. These findings indicate that hydrodynamic characteristics were important for recovery success. Ongoing genetic analyses aim to clarify the mechanisms underpinning recovery specifically, the relative contributions of clonal spread versus recruitment from distant sources. This work will also help identify potential source populations and provide critical insights into the conditions that enable large-scale natural recovery. Ultimately, these findings will support the development of more effective, scalable, and nature-based seagrass restoration practices across Australia and beyond.

# SURPRISES IN XANTHORRHOEA

**MR GEOFFREY COCKERTON,** *WESTERN BOTANICAL*

**Co-authors:**

Ms Linda Dalgliesh, *Western Botanical*

**Lead Author Biography:**

Geoff has been working with Western Australian native flora since 1979. Through many years of Environmental Impact Assessment, he has gained a broad experience in the flora and vegetation of the state. Application of this experience leads to recognition of unusual flora on a regular basis. His latest foray into Grasstrees is immensely as rewarding in observing new species.

**Abstract:**

Grass Trees, Xanthorrhoea species, are iconic in our flora and were last taxonomically assessed in 1986. Xanthorrhoea is a pan-continental genus with 11 recognised taxa (including two subspecies of one species) in WA.

Physical characters available to identify species of Xanthorrhoea are cryptic and flowering and fruiting is irregular. Recent investigations by the authors, building on DNA analyses by McLay (2016) has found that many currently accepted species in WA are complexes of two or more species. It is also common to find two or more species of Xanthorrhoea growing together within suitable habitats and that differentiating those with similar growth habit is difficult.

We have embarked on a state-wide review of Xanthorrhoea with a view to clarifying the taxonomy of this fascinating but frustrating group.

There may be implications for development and Conservation listing may be required for some species.

# BRINGING THE BLIND CAVE EEL TO LIGHT: EDNA TRANSFORMS DETECTION IN SUBTERRANEAN ECOSYSTEMS

**MR MICHAEL CURRAN,** *RIO TINTO*

**Co-authors:**

Mr Dean Main, *Rio Tinto*

Dr Joel Huey, *Biologic*

Dr Kathryn Dawkins, *eDNA Frontiers/School of Molecular and Life Sciences, Curtin University*

Mr Syngeon Rodman, *Biologic*

**Lead Author Biography:**

Passionate about invertebrates above and below ground

**Abstract:**

The blind cave eel (*Ophisternon candidum*) is a cryptic, subterranean species endemic to the groundwater systems of northwestern Australia. It is one of Australia's three obligate cave fish and very little is known about its reproductive biology and ecology. Although it is considered rare, this perception may stem more from the species inaccessible habitat and the limitations of traditional survey techniques than from actual population scarcity. This study evaluates the application of environmental DNA (eDNA) as a non-invasive, highly sensitive method for detecting *O. candidum*. A species-specific eDNA assay was developed and validated in collaboration with eDNA Frontiers, and this assay has since been used to field-test sites across known and potential habitats. The findings demonstrate that eDNA detection rates significantly outperformed traditional survey methods, positioning eDNA as the leading and often the only reliable approach for monitoring this elusive species. The enhanced sensitivity of eDNA detection enables the investigation of previously unresolvable ecological questions, particularly those relating to the temporal dynamics of eDNA signals. To investigate this, a controlled time-trial experiment was undertaken to evaluate the persistence of DNA in groundwater environments. The results reinforce the reliability of eDNA detections as indicators of species presence and offer a foundation for advancing the understanding and management of groundwater ecosystems.

# EXPLORING DIVERSITY IN THE MARSUPIAL SUBFAMILY SMINTHOPSINAE USING GENETIC AND MORPHOLOGICAL DATA

**MR CAMERON DODD,** *THE UNIVERSITY OF WESTERN AUSTRALIA*

**Co-authors:**

Dr Renee Catullo, *University of Western Australia*

Dr Linette Umbrello, *Western Australian Museum*

Dr Kenny Travouillon, *Western Australian Museum*

Dr Andrew Baker, *Queensland University of Technology*

Dr Mike Westerman, *La Trobe University*

Dr Vera Weisbecker, *Flinders University*

Dr Meg Martin, *Flinders University*

**Lead Author Biography:**

Cameron Dodd is a PhD student at the University of Western Australia researching the taxonomy and evolution of the *Sminthopsini* a group of small marsupials including kultarrs, dunnarts and ningauis. I use a combination of modern genetic methods, 3D skull morphology and traditional linear morphology to identify and describe cryptic species of *sminthopsin* while also investigating how the group has diversified throughout Australia across space and time.

**Abstract:**

Australia has the highest mammal extinction rate on the planet. Despite this, many small mammal species remain understudied, and in some cases are yet to even be discovered. This acts as a major barrier to conservation planning as we cannot protect species that we do not understand or formally recognise as distinct taxa. This also means that there are many unique biological structures and evolutionary processes which are yet to be investigated by science. One group where this issue is particularly pronounced is the marsupial family Dasyuridae, which has had 18 new species described since 2000. This study used a genome-wide exon-capture dataset as well as 3D skull morphometric data to explore both species-level and functional diversity in the *dasyurid* subfamily *Sminthopsinae*. We focussed on identifying potential new species as well as investigating the evolution of inner ear structures in response to increasing aridity across Australia over the past 15 million years. We show the incredible functional diversity present within the *Sminthopsins* and provide the first investigation into inner ear specialisation in this group.

# DROUGHT: LOSS AND RECOVERY AT MT GIBSON WILDLIFE SANCTUARY

**MS ALIESHA DODSON,** *AUSTRALIAN WILDLIFE CONSERVANCY*

**Co-authors:**

Mr Louis O'Neill, *Australian Wildlife Conservancy*

Ms Amanda Bourne, *Australian Wildlife Conservancy*

Mr Robin Sinclair, *Australian Wildlife Conservancy*

**Lead Author Biography:**

Aliesha Dodson is a Field Ecologist with 7 years experience working for Australian Wildlife Conservancy in the Northern Territory and Western Australia. Currently based out at Mt Gibson Wildlife Sanctuary in Western Australia on Badimia Country.

**Abstract:**

Drought is a regular part of Australia's climate however climate change is having a major impact on the severity of drought conditions especially in southwest. Mt Gibson Wildlife Sanctuary, the site of a multi-species mammal reintroduction program on Badimia Country, experienced an historic drought between 2022 and 2024, which came to an end in June 2024. Rainfall in 2023 was the lowest on record and the 2023-24 summer was exceptionally hot. Nine species have been reintroduced into Mt Gibsons 7,838ha feral predator-free enclosure, and are monitored via a combination of a standardised, non-targeted remote camera survey and species-specific live-trapping, spotting or scat surveys. During the drought, we recorded large reductions in camera occupancy in Bilbies, Numbats and, particularly, Shark Bay Bandicoots, also reflected in population indices estimated from other surveys. While Red-tailed Phascogale and Woylie camera occupancy remained stable during the drought, live-trapping showed that Woylies had declined in population abundance by ~75%. The Greater Stick-nest Rat population also suffered a crash which was detected during the annual trapping survey in January 2024, where only three individuals were captured. Following the end of the drought in mid-2024, we recorded an increase in site occupancy and/ or population abundance in all reintroduced species except Greater Stick-nest Rat. Most of the reintroduced populations at Mt Gibson are recovering after the 2023/24 drought, but the functional loss of Greater Stick-nest Rats after 15 years indicates that increasingly frequent and severe droughts are likely to present a significant threat to reintroduced populations of native mammals in arid and semi-arid areas.

# STEMMING THE TOAD: CONTAINING CANE TOADS WITH ECOSYSTEM MANAGEMENT

**DR JUDY DUNLOP,** *CURTIN UNIVERSITY*

**Co-authors:**

Prof Ben Phillips, *Curtin University*

Prof Tim Dempster, *Deakin University*

Mx Karajarri Rangers, *Karajarri Traditional Lands Association*

Mx Nyangumarta Rangers, *Nyangumarta Warrarn Aboriginal Corporation*

**Lead Author Biography:**

I am a passionate wildlife ecologist specialising in the management and restoration of Australia's threatened species. I have particular interest in arid zone work, especially collaborative work with industry, government, universities and Traditional Owners on Country.

**Abstract:**

Cane toads (*Rhinella marina*) are toxic invaders that pose a population risk to many native predator fauna. Toads were introduced in 1935 to Qld and have moved westward across Australia at approximately 40km/ year, taking advantage of the abundant water across Australia's north. They are now west of Derby and will likely colonise Broome in the next 2 years. Implementation of the Toad Containment Zone (TCZ; https://toadfree.zone/ ) will prevent the colonisation of toads to approximately 27 million ha of WA, including the Pilbara and Carnarvon bioregions. This action will prevent further declines in Varanids, elapid snakes, large skinks, bats and Dasyurid species. The TCZ involves upgrading cattle dams to tanks and troughs that are inaccessible to toads, across a 150km toad firebreak. We are working with Country rather than against it; taking advantage of a naturally dry bottleneck on Karajarri and Nyangumarta Country between Broome and Port Hedland where there is almost no natural water available to toads in the dry season. We have established the specifications of toad proofing agricultural watering points, a technique which can be used across the north of Australia to reduce toad impacts in the dry season. Membership of the TCZ includes major partnership and support from Karajarri and Nyangumarta Traditional Owners, Bidyadanga Community, 5 pastoral leases, Deakin University Curtin University, Rio Tinto, BHP and is coordinated by Rangelands NRM. This talk outlines the details of the concept, what we stand to lose and how it will be collaboratively implemented in the next 2 years.

# WINDFARMS AND WILDLIFE: WHICH SPECIES ARE AT RISK?

**PROF TRISH FLEMING,** *MURDOCH UNIVERSITY*

**Co-authors:**

Mr Jesse Harper, *Fortescue*

Ms Sophie Monaco, *Fortescue*

Mr Tim McCabe, *Ecologia*

Ms Claudia Elliott, *Ecologia*

Mr Shaun Grein, *Ecologia*

Ms Sam Plant, *Ecologia*

Mr Thomas Burley, *Ecologia*

Dr Simon Cherriman, *Insight Ornithology*

Ms Astrid Moxham, *Spectrum*

Ms Erica MacIntyre, *Spectrum*

Dr Fiona Scarff, *Murdoch University*

Dr Karen Riley, *Murdoch University*

Dr Natasha Tay, *Murdoch University*

Dr Lazaro Roque-Albelo, *Fortescue*

Dr Jill Shephard, *Murdoch University*

**Lead Author Biography:**

This work represents a collaboration between Fortescue, environmental consultants (Ecologia, Spectrum) and the Harry Butler Institute at Murdoch University.

**Abstract:**

Electricity production contributes 40% of worlds greenhouse gas emissions. Conversion to renewable energy production is therefore critical for mitigating climate change. Australia's commitment to meeting emission targets has seen rapid growth in the renewable energy sector. Wind energy met 13.4% of Australia's total energy demands over the last 12 months, but the rapid increase in wind energy developments will see this proportion increase. In 2023, there were 121 Australian wind farms operating or under construction, but an additional 188 have been proposed. Markedly, there is a projected 12-fold increase over current wind energy generation, with more, much larger turbines, proposed. As the number of wind energy projects increases, so has the scrutiny of their environmental impact. Wind energy, in particular, has a pronounced ecological impact on bird and bat species due to collisions with turbine blades and towers. Understanding the potential impact of the growth of wind farms on threatened wildlife species requires species-specific collision risk data. However, reported turbine strike data is lacking for most Australian species, especially scarce, threatened species, and those whose geographic range does not overlap with existing wind farms. Without actual strike data, conservation management decisions are currently being made on the basis of theoretical predictions. To fully assess and address potential environmental impacts of wind turbine developments We have reviewed the biological traits of bird and bat species, available collision mortality monitoring, and compiled direct activity observations to identify a list of Western Australian species that are potentially at risk of wind turbine collision. We have also identified knowledge gaps that require additional research. This work is building research and industry

collaboration towards managing and mitigating the balance between green energy development and the conservation challenges that it represents.

# RESTORING THE FAUNA ON WESTERN AUSTRALIA'S LARGEST ISLAND

**DR LESLEY GIBSON,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors :**

Dr Colleen Sims, *Department of Biodiversity, Conservation and Attractions*

Mr John Angus, *Department of Biodiversity, Conservation and Attractions*

Mr Sean Garretson, *Department of Biodiversity, Conservation and Attractions*

Dr Kym Ottewell, *Department of Biodiversity, Conservation and Attractions*

Ms Kelly Rayner, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Dr Lesley Gibson is a Principal Research Scientist with the Department of Biodiversity, Conservation and Attractions (DBCA) where she leads the Animal Science Program. Dr Gibson provides scientific leadership to a team that aims to better understand the factors and processes that are critical for the conservation of Western Australia's rich and unique native fauna. She also holds an Adjunct Associate Professor position at the University of Western Australia.

**Abstract:**

The Dirk Hartog Island National Park Ecological Restoration Project (Return to 1616) aims to restore the ecological condition of Western Australia's largest island to a similar condition to that experienced by Dirk Hartog when he landed on the island in 1616. Dirk Hartog Island is situated in the Shark Bay World Heritage Area and on the country of the Malgana people, to whom it is known as Wirruwana. A fauna reconstruction of 12 mammal and one bird species on Dirk Hartog Island (DHI) over a 12-year period is a major component of this project. The re-establishment of fauna on DHI will not only help to improve the conservation outlook of many of these species but also improve the health of a previously degraded ecosystem. Now that the fauna reconstruction is well past the halfway mark with nine species released on the island, we provide an overview of the progress of this ambitious project, highlighting the various advances, challenges faced and the opportunities it has provided. We will focus on how we are measuring the progress of the translocations using novel and innovative monitoring approaches and sophisticated genetic management tools.

# ARTIFICIAL LIGHT INTENSITY THRESHOLDS FOR DISPERSING SEA TURTLE HATCHLINGS

**DR DANIEL GOMEZ ISAZA,** *AUSTRALIAN INSTITUTE OF MARINE SCIENCE*

**Co-authors:**

Dr Ross Jones, *Australian Institute of Marine Science*

Dr Phillipa Wilson, *Australian Institute of Marine Science*

Dr Kellie Pendoley, *Pendoley Environmental*

Dr Michele Thums, *Australian Institute of Marine Science*

**Lead Author Biography:**

Daniel is a conservation physiologist. His research aims to understand the responses of animals to environmental threats, and how this knowledge can be used to inform conservation and management. Daniel is currently a postdoctoral scientist at AIMS, where he is investigating the impact of artificial light at night (ALAN) on the dispersal of marine turtle hatchlings.

**Abstract:**

Artificial light at night (ALAN) is a rapidly expanding pollutant in coastal habitats that can disrupt sea turtle hatchling dispersal, increasing the chance of mortality from dehydration, exhaustion, or predation. While much information exists on light wavelength, there is a paucity of data on light intensities that may limit the disruption to hatchling dispersal. However, artificial light is not homogeneous; different lighting systems, such as light emitting diodes (LED) and high pressure sodium (HPS) lamps, generate light of different spectral quality. Sea turtle nesting sites can be exposed to individual light spectra or a complex mosaic of light spectra in the nighttime environment. This research aimed to identify behavioural dose-response curves for sea turtle hatchlings exposed to individual lighting types (warm LED and cold LED), and the combined spectra of ALAN measured in a region where there are turtle rookeries. Newly hatched green turtles (Chelonia mydas) were exposed to varying light intensities in a Y-maze choice experiment to develop dose-response relationship to light treatments. Our results allow us to estimate levels of ALAN, including light spectrum and intensity, that could result in reduced impact to sea turtle hatchling dispersal. The findings of this research are important to inform risk assessments and developing guidance for industry, coastal developers, and natural resource management authorities to mitigate the threat posed by ALAN on these threatened species during their vulnerable early-life dispersal.

# BROWSE ISLAND NATURE RESERVE ECOLOGICAL RESTORATION PROJECT - RESTORING THE JEWEL IN THE CROWN

**MR BRUCE GREATWICH,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Karina Sorrell, *Monash University*

Mr Rohan Clarke, *Monash University*

Mr Donal Smith, *Monash University*

Mr Liam Rawlins, *Department of Biodiversity, Conservation and Attractions*

Mr Russell Palmer, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Presenters Karina Sorrell: PhD candidate and seabird specialist working within the Research, Ecology and Conservation Group, School of Biological Sciences Lab, Monash University. Bruce Greatwich: Conservation Coordinator for DBCA West Kimberley implementing research and management programs. Joint coordinator for the Browse Island rodent eradication project. Co-authors and key project staff. Rohan Clarke & Donal Smith: Monash University. Liam Rawlins & Russell Palmer: DBCA.

**Abstract:**

Browse Island is the states most remote Nature Reserve, located ~450 km north of Broome in the tropical Indian Ocean, accessible via a lengthy journey on a liveaboard vessel. This small island of ~17 ha was described in 1865 as having been appropriated by millions of the feathered tribe, whose eggs lie scattered thickly over every available part of the islet". However, it was devastated by the activities of guano miners in the late nineteenth century, most notably through disturbance, landscape alteration, weeds, and the introduction of the invasive rodent Asian House Mouse (Mus musculus castaneus). By the early twentieth century, seabirds were entirely absent.

Recognising the importance of Browse Island as a regional link in maintaining the entire north-west seabird population, a collaborative ecological restoration project between Monash University and the Department of Biodiversity, Conservation and Attractions has been embarked upon. Our vision is to restore Browse Island to its former glory and ecological character and also inform similar threat management projects in the region at Adele Island Nature Reserve and Ashmore Reef. Eradication of the House Mouse which poses an ongoing impediment to seabird recovery and a biosecurity risk to mainland Australia is a critical first step towards this goal.

In a first for Australia, remoteness and logistical constraints can be overcome by delivering aerial rodenticide baiting via drones, scheduled for September 2025. Using this cutting-edge technology, baiting will be done with unparalleled precision and systematic coverage. Other threat management operations include weed control, recreational and Indonesian fisherman visitation management. Research projects including seabird population counts, seabird to island nutrient transfer using stable isotope analysis, Bridled

Tern satellite tracking, and deployment of decoys for breeding recolonisation are being implemented to complement our threat management operations.

# HOW EFFECTIVE ARE NOVEL TECHNOLOGIES THAT REDUCE LABOUR REQUIREMENTS FOR FERAL CAT CONTROL?

**DR MICHELLE HALL,** *BUSH HERITAGE AUSTRALIA / UWA*

**Co-authors:**

Mr Ben Parkhurst, *Bush Heritage Australia*

Ms Sarah Gilleland, *Bush Heritage Australia*

Mr Sam Fischer, *Bush Heritage Australia*

Mrs Michelle Judd, *Bush Heritage Australia*

Mr Dean Mowat, *Bush Heritage Australia*

Ms Jessica Stingemore, *Bush Heritage Australia*

Ms Jessica Bolton, *Bush Heritage Australia*

Mr Jeff Pinder, *Bush Heritage Australia*

Dr John Read, *Thylation & Ecological Horizons*

Dr Angela Recalde-Salas, *Bush Heritage Australia*

**Lead Author Biography:**

Bush Heritage's Senior Ecologist for WA and SA and an Adjunct Senior Research Fellow in the NESP Resilient Landscapes Hub in the School of Agriculture and the Environment. With an interest in monitoring to inform effective conservation of biodiversity.

**Abstract:**

Effectively conserving native fauna requires protecting and restoring native habitat and reducing threats posed by invasive species. The threat of feral cats is recognised as particularly challenging to address and is therefore a focus of research and innovation. Although integrating diverse control methods is more effective at controlling pest populations, certain methods are labour intensive, and some innovations seek to address this. Bush Heritage is investigating the effects of incorporating two labour-saving approaches, Felixer grooming traps and Celium trap alert technology, into integrated management of invasive predators on our Midwest Reserves. These reserves lie in the semi-arid zone and are embedded in connected landscapes, with management efforts impacted by low feral cat densities and re-invasion. Quantifying the results of management, beyond effort to understand effectiveness, also poses challenges, with increasing difficulty from quantifying the number of cats removed, to effects on the remaining cat population over time, and effects on populations of native species. We monitor results using remote cameras in a replicated BACI (Before-After Control-Impact) experimental design to investigate the effects of management activities at different spatial and temporal scales in managed areas relative to untreated references. Here we report early results from more than 20 deployments of grooming traps on 3 reserves over a 3-year period, as well as initial trials of the trap alert technology.

# POPULATION GENETIC DIVERSITY, STRUCTURE AND RELATEDNESS OF THE CRYPTIC PILBARA OLIVE PYTHON, LIASIS OLIVACEUS SUB SP. BARRONI IN THE PILBARA, WESTERN AUSTRALIA

**DR ZOË HAMILTON**, HELIX MOLECULAR SOLUTIONS

**Co-authors:**

Mr Joshua Keen, *Biota Environmental Sciences*

Mr Roy Teale, *Biota Environmental Sciences*

Miss Yvette Hitchen, *Helix Molecular Solutions*

Mr Nathan Beerkens, *Biota Environmental Sciences*

Miss Serina McConnell, *Helix Molecular Solutions*

**Lead Author Biography:**

Zoë (Helix) and Biota Environmental Sciences (Biota) sought to collaborate with BHP to provide robust evidence around the conservation status of the Pilbara Olive python subspecies, Liaises olivaceous sub sp. *barroni*, for the purposes of effective management. Research priorities include understanding the genetic diversity and structure of the subspecies in the Pilbara and its populations across its range, determine diet of juvenile and adults and understand the habitat requirements. We disentangle detectability from rarity with the use of VHF transmitters to allow spatial ecology to further attain information on patterns of movement and habitat utilisation. The project assesses the utility of tools such as eDNA detection and its application. The focus of this presentation is the conservation genetics of the subspecies - the assessment of genetic data and patterns of genetic diversity to determine if populations show patterns consistent with characteristics of threatened taxa. The overarching aim is to assist in the regulations for 'monitoring' to collect relevant data that will increase the understanding of the species and enable more informed decisions with regards to their conservation status.

**Abstract:**

The Pilbara Olive Python (*Liasis olivaceus barroni*, POP) is a large, threatened snake restricted to the Pilbara and northern Ashburton regions of Western Australia (Pearson et al., 2013). It is listed as "Vulnerable" at a State and Federal level. Recent genetic studies support its elevation to full species status, pending morphological review.

Due to its conservation status and specific habitat requirements, POP is frequently a focal species in environmental impact assessments (EIA) across the Pilbara and is often subject to mandated monitoring. However, it is a challenging species to effectively monitor in a statistically robust framework because of the difficulty in obtaining sufficient individuals to detect trends relative to putative impacts. Therefore, most monitoring programs have resorted to finding evidence of persistence (or occupancy) in impacted areas between annual monitoring events.

Since 2021, a collaborative project involving Helix Molecular Solutions, Biota Environmental Sciences, BHP, Murdoch University (PhD candidate Joshua Keen), and other mining partners has expanded on traditional

POP monitoring approaches. A key component assesses population genetic health via molecular diversity, structure, and relatedness across the Pilbara.

Using 30 microsatellite loci, 94 individuals were genotyped from field-collected scale clippings, carcasses, and sloughs. These data, paired with field records, reveal previously undocumented genetic diversity, gene flow, and differentiation among subpopulations. Genetic structuring supports three primary subpopulations, with evidence of dispersal between them.

Relatedness analyses have identified first- and second-order kin relationships, highlighting individuals with disproportionate genetic influence, valuable for understanding connectivity and informing conservation management.

# USING AI MODELS TO PREDICT TREE PATHOGEN IMPACTS ON URBAN FOREST DIVERSITY

**DR MARY HANSON,** *EDITH COWAN UNIVERSITY*

**Co-authors:**

Dr Anna Hopkins*, Edith Cowan University*

Dr Kristina Lemson*, Edith Cowan University*

**Lead Author Biography:**

Dr Mary Hanson is experienced in molecular plant pathology and aerobiology, particularly researching the effect of environmental factors on fungal and oomycete plant diseases and developing novel pathogen detection methods. Her latest research uses microbiome profiling and eDNA analysis to study the dynamics of pollen, microorganisms and bioaerosols in the environment.

**Abstract:**

Mapping disease networks is a useful way of predicting the impact and spread of plant pathogens. The advance of machine learning algorithms and increasing availability of ecological databases offers new possibilities for more accurate and effective networks that can predict which plants are most at risk from disease, how fast infection will spread and support decision making regarding quarantine or removal. Building on previous street tree mapping research, we explore how artificial intelligence can be used to apply network analysis, and train machine learning models on simulated data in order to predict the spread of Myrtle Rust, Polyphagous Shot Hole Borer and Xylella fastidiosa across street trees in the city of Perth, WA, therefore predicting possible scenarios in the event of an incursion. To test the adaptive nature of the models, pathogen factors such as host interactions and method of transmission were considered, along with potential dispersal distances. The findings of this research will provide insights for land managers and urban planners when considering the design of urban tree scapes therefore supporting the role of urban trees in conserving the diversity of native trees in urban settings. Future work will seek to validate the models across multiple cities and under a range of disease scenarios.

# NYAMAL RANGERS INLAND WATERS SHARED-LEARNING TRAINING & MONITORING PROGRAM

**MR ADAM HARMAN,** *LATERAL ENVIRONMENTAL*

**Co-authors:**

Mr Adrian Taylor, *Nyamal Aboriginal Corporation*

Sharon O'Connor, *Nyamal Aboriginal Corporation*

**Lead Author Biography:**

Adam is a passionate freshwater ecologist working alongside, learning from and empowering other like-minded environmental practitioners and traditional owners for improved research, monitoring and management of our Inland Waters.

**Abstract:**

The Nyamal people have a deep connection to Inland Waters covering close to 30,000 km2 of country to the south west of Port Hedland. They hold critical knowledge about the history of species and ecosystems, and can add significant value to our understanding of how they have changed over time across a variety of types of Inland Waters.

Working as one as part of a shared-learning monitoring and training program for Nyamal Rangers over the last 18 months, backed by Industry, the integration of western science and traditional ecological knowledge has built mutual respect, responsibility and connectedness whilst tackling the challenge of conservation and management of Inland Waters.

Partnering with North Regional TAFE WA, delivering a field based and tailored formal accreditation/qualification in Inland Waters sampling techniques (measuring and monitoring) has created positive outcomes for both Traditional Owners (ranger team) and the mining industry alike, including direct and representative involvement of the Nyamal people in management of Inland Waters on-country, improved understanding and consideration of cultural and spiritual values, connection with environmental values, including invasive species management.

# NORTHERN QUOLLS SHOW RESILIENCE TO MODERATE FIRE REGIME IN THE ABSENCE OF INTRODUCED PREDATORS

**DR NATASHA HARRISON,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Dr Judy Dunlop, *Curtin University*

Dr Harry Moore, *Department of Biodiversity Conservation and Attractions*

Ms Alicia Whittington, *Department of Biodiversity Conservation and Attractions*

Mr Pedro Palheiro, *Department of Biodiversity Conservation and Attractions*

Murujuga Aboriginal Corporation

Dr Lesley Gibson, *Department of Biodiversity Conservation and Attractions*

**Lead Author Biography:**

Tash is a population and behavioural ecologist working to identify the impacts of interacting threats and management interventions on fauna in Western Australia.

**Abstract:**

Fire regimes have been altered substantially in contemporary times, often having considerable negative impacts on fauna. Understanding how populations respond to fire, as well as interacting threats, is critical to developing strategic conservation management programs. The main negative impacts of fire on northern quolls (*Dasyurus hallucatus*; a Dasyurid predator) are thought to be the destruction of resources and increase in predation pressure often associated with fire. Disentangling the relative impact of fire requires investigation of these phenomenon in isolation. In this observational study, we explore eight years of northern quoll population monitoring on Dolphin Island, in north-west Western Australia, as well as that of common rock rats (*Zyzomys argurus*), a popular prey item. Dolphin Island comprises undisturbed northern quoll habitat that is free from invasive herbivores and predators. During the study, a large wildfire burnt the majority of the island, providing the unique opportunity to examine population responses to fire in the absence of other key threatening processes (such as habitat degradation and predation by invasive species). There were no differences in northern quoll body condition, sex ratios, or female survival estimates before and after the fire. Local northern quoll abundance estimates six months after the fire were almost twice as high compared to those from six months before. Rock rat capture rates declined substantially after the fire, hinting at possible increased predation by quolls. Taken together, these findings suggest that northern quolls may be resilient to fire when other threatening processes are abated. Further experimental interrogation is required to determine whether these relationships are correlative or causative, and to refine a fire regime suitable for northern quolls. We suggest that control of invasive predators and protection of critical habitat in fire-prone areas will likely promote northern quoll persistence.

## DIEBACK DETECTOR DOGS

**DR SHANIKA HARSHANI,** *DEPARTMENT OF BIODIVERSITY CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Ms Julia Rayment, *NSW National Parks and Wildlife Service*

Mr Ryan Tate, *TATE Animal Training Enterprises*

Dr Magali Wright, *Enviro-dynamics*

Prof David Guest, *The University of Sydney*

Dr Sarah Dunstan, *EcoPath Solutions Pty Ltd*

Dr Kylie Ireland, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Shanika Harshani is a Research Scientist at the Department of Biodiversity, Conservation and Attractions (DBCA), Western Australia. Her research focuses on Plant pathology, Restoration ecology, and Environmental conservation with a particular interest in mitigating the impacts of Phytophthora dieback on native ecosystems. Currently she is investigating the efficacy of Dieback Detector Dogs and their application in managing Phytophthora dieback.

**Abstract:**

Phytophthora dieback caused by the plant pathogen *Phytophthora cinnamomi* is the greatest disease threat to flora in the southwest bioregion of Western Australia (WA). More than 40% of native species in the region are likely to be susceptible to the pathogen and the impacts caused are permanent and irreversible. Once a site is infested, the pathogen persists and cannot be eradicated. Accurate and timely detection and mapping of the extent of infestations are key to planning effective disease management and stopping the spread. Current available diagnostic and mapping methods are expensive, labour-intensive and time-consuming. In 2022, a pilot study conducted by the NSW National Parks and Wildlife Service with Tate Animal Training Enterprises revealed the potential of using detector dogs as a method of detecting *P. cinnamomi*. A dieback detector dog consortium led by the WA Department of Biodiversity, Conservation and Attractions then obtained funding from a Saving Native Species grant to broaden this initiative in WA, NSW and Tasmania, with a focus on protecting threatened species. The consortium aims to assess how effective detector dogs can be in laboratory and field applications and develop a policy framework to support their commercialisation. Applications in laboratory soil sample testing, mapping disease extent, assessing threatened species translocation sites, screening nursery plants, hygiene checks during mining and forestry operations are currently being explored. To date, findings indicate that the two trained dogs, Alice and Echo, have a promising sensitivity in detecting *P. cinnamomi*. A project update and applicability of dieback detector dogs in improving dieback management in WA will be discussed.

# A NATURAL ADVANTAGE HOW BUSINESSES ARE RESHAPING TO INTEGRATE NATURE (A DELOITTE CASE STUDY)

**MS CELIA DEBENS,** *DELOITTE*, PRESENTED BY **MS TRACEY HASSELL,** *DELOITTE*

**Co-authors:**

Ms Megan Graham, *Deloitte*

**Lead Author Biography:**

Celia is an environmental practitioner by background, with experience in environmental management across Australia, South Africa and America. She is currently a Partner in Deloitte's Climate and Sustainability team where she supports clients on integrating environment into core business. Celia also has experience in biodiverse carbon and leads Deloitte's Carbon Forest program.

**Presenter Biography:**

Tracey Hassell, Director Sustainability and Climate, is a leader in delivery of sustainability and environment strategy for the Deloitte Sustainability and Climate team in Perth WA. Her expertise supports delivery of projects for government, renewable energy, waste and mining sectors including nature strategy and policy, decarbonisation strategy and circular economy strategy.

**Abstract:**

The relationship between the corporate world and the natural world is slowly being redefined. Where business used to see the front door as a boundary line for responsibility, entities around the world are now tackling, and having to report on, their relationship with nature.

With this connection made and understood at the executive and board level, many businesses are coming to the realisation that their business model either can integrate nature in its existing form or needs to shift and reshape to do so. Examples of this are appearing globally: banks are defining their own metrics on biodiversity loss and ecosystem recovery, farmers are re-wilding strategically into their crop systems and architects are designing around nature, not through or over it.

Deloitte is also evolving its relationship with the natural environment through a series of biodiverse carbon projects in New South Wales and Victoria. In 2022, we set out to see if we could both drawdown emissions and regenerate landscapes ourselves, for the primary purpose of generating high quality Australian Carbon Credit Units (ACCUs). Today we have a forest manager running our program to deliver on emissions goals, but also biodiversity co-benefits and commercial outcomes.

As a company whose value lies in people, technology and information, it has been a significant learning journey for Deloitte to incorporate both ownership of land and land regeneration activities as part of business as usual. There are lessons to share on the challenges and commercial realities which we have

experienced, but also note that the level of engagement and understanding of our natural environment, generated by even a small tweak to our business model, is a positive signal amidst both increasing biodiversity loss as well as ESG politicisation.

Integrating nature into business is not simple, but business models are beginning to change it is hoped that discussing lessons from a lived example may support others with this shift.

# SHARED ANALYTICS TO SUPPORT A NATURE POSITIVE TRANSITION IN A MULTI-STAKEHOLDER COASTAL ENVIRONMENT: PROGRESS AND CHALLENGES

**PROF MATTHEW HIPSEY,** *THE UNIVERSITY OF WESTERN AUSTRALIA*

**Co-authors:**

Brendan Busch, *The Western Australian Biodiversity Science Institute*

Luke Twomey, *The Western Australian Marine Science Institute*

Chris Gentle, *The Western Australian Biodiversity Science Institute*

**Lead Author Biography:**

Prof Matthew Hipsey is a Co-director, of the Centre for Water and Spatial Science at The University of Western Australia, and theme-leader within the WAMSI-Westport Marine Science Program focusing on Cockburn Sound. He has 25 years of experience in modelling environmental systems, with a focus on developing tools for simulating aquatic ecosystem dynamics, and using these tools to support management.

**Abstract:**

Predictive ecosystem models for guiding assessment of aquatic environments have become a cornerstone for adaptative management, however, in settings with diverse users and stressors, it nonetheless remains challenging to compute the cumulative impacts that they face, and to build a shared vision for restoration actions that can be adopted to build resilience. In this presentation, we describe our recent efforts to develop a prototype for a shared analytics “facility”, which is seeking to integrate diverse data and modelling tools associated with a complex coastal ecosystem (Cockburn Sound, Western Australia). The purpose is to support the ecosystem stewardship activities of both development proponents and environmental regulators.

The core of the platform is a 3D hydrodynamic-ecological model which is nested within regional met-ocean predictions and integrated with a suite of other environmental models. To build trust in the predictions it has been validated against a hierarchy of ecosystem metrics by utilising a 50-year compilation of curated public and private data associated with water and sediment quality, and benthic habitats.

For a common approach to be used for both impact assessment and restoration planning, the modelling and data analytics is coordinated by a novel cloud-based platform based around secure “landing zones” for private or shared analytics using the common toolset. In building the modelling tools, capability has been included to be able to accommodate the full portfolio of activities occurring within the ecosystem – both impacts (dredging, shipping, discharges, etc.) and restoration (replanting, regenerative aquaculture, etc.). These activities are included as modifiers to the ecosystem and can be "stacked" to quantify regional-scale cumulative changes. Current challenges will be discussed related to how the platform could be used to quantify the benefits of restoration proposals and guide investment.

# WIND TURBINE BIRD COLLISION RISK MODELS - WHAT'S MISSING?

**PROFESSOR GRAEME HOCKING,** *MURDOCH UNIVERSITY*

**Co-authors:**

Dr Wafaa Mansoor, *Murdoch University*

Dr Soudabeh Shemehsavar, *Murdoch University*

Prof Trish Fleming, *Murdoch University*

Prof Jill Shepherd, *Murdoch University*

**Lead Author Biography:**

Professor of Mathematics at Murdoch since 2010. Long career of modelling physical, environmental and biological processes.

**Abstract:**
In the international shift to renewable energy, a growing number of wind farms are being proposed and built both in Australia and elsewhere. A pivotal analysis in the design and building of wind farms for power generation is of the danger to bird and bat life as a result of direct collision, barotrauma or other factors such as traumatic change of habitat. Most of the collision risk models (CRM) are based on the BAND (2007) model that is very generic and runs with limited data and a large number of assumptions about bird behaviour. This is in part due to the difficulty of acquiring sufficient data to enable detailed simulation. We discuss the existing collision risk models for birds interacting with wind farms in general terms, and include a discussion of some of the important factors that are missing from the models that may have a profound impact on the outcomes in terms of impact on bird populations in the vicinity.

# EMBEDDING INDIGENOUS VALUES IN RESTORATION: LEARNINGS FROM THE CO-DESIGN OF A TWO-WAY BIOCULTURAL MODEL LED BY BARDI JAWI OORANY RANGERS

**MS VIVIEN HUNTER**, SENIOR RANGER, BARDI JAWI OORANY (WOMEN) RANGERS

**Co-authors:**

Tamara Moore, *Bardi Jawi Oorany (women) Ranger Coordinator*

Sara Cavalcanti Marques, *PhD student, Murdoch University*

**Lead Author Biography:**

Vivien Hunter, a Bardi Jawi woman from WA's Kimberley region, joined Bardi Jawi Oorany Rangers in 2021 to work on conservation within the Bardi Jawi Indigenous Protected Area. The group's focus is Monsoon Vine Thicket restoration, and Vivien, concerned with declining vegetation health on Country, developed a passion for native plant propagation, contributing vastly to the women's revegetation program. With a range of qualifications, she is now taking on more leadership across multiple projects.

**Abstract:**

While there is increasing recognition of the value of biocultural approaches to improve long-term restoration outcomes, in practice Indigenous Knowledge has seldom been considered when developing these initiatives. With existing efforts falling short of halting the rapid loss of biodiversity across Australian ecosystems, and with 70% of the continent now considered part of the Indigenous estate, there is a growing call for pathways that truly enable Indigenous stewardship of Country and allow for holistic recovery activities. As landscapes have historically been managed by Traditional Owners to promote availability of food and medicine plants, incorporating culturally significant species into planting programs is consistent with longstanding Indigenous custodianship duties. The use of native bush tucker and medicinal plants therefore offers an opportunity to deliver meaningful social, cultural and economic benefits while addressing critical environmental targets. Yet to date, there is a gap in restoration models designed to meet these aims combined.

To this end, our collaborative case study seeks to co-design a biocultural restoration plan that protects and recovers the cultural and ecological integrity of threatened Monsoon Vine Thickets in the Dampier Peninsula in Western Australia's Kimberley region. Adopting two-way and decolonized methodologies, our research integrates western science with Bardi Jawi Oorany Rangers' vast Traditional Ecological Knowledge to develop a restoration model shaped by local needs and aspirations but informed by global and national nature-positive trends. In this presentation, we will provide insight into the key steps and tools used to co-design a biocultural restoration plan and highlight learnings from our cross-cultural research experience. In doing so, we hope to shed light on how other groups can develop fit-for-purpose strategies that align with their cultural and ecological values to recover and heal Country.

# ONE WORM SPECIES PER ROCK?

**DR MD AMINUL ISLAM,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Mr Adrian Pinder, *Department of Biodiversity, Conservation and Attractions*

Dr Patrick Martin, *Royal Belgian Institute of Natural Sciences*

Dr Kristen Fernandes, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Dr Md Aminul Islam is a young researcher passionate about exploring invertebrate diversity, distribution patterns and evolutionary history using molecular data. Currently, he works as a research scientist at the Department of Biodiversity, Conservation and Attractions.

**Abstract:**

*Phreodrilid oligochaetes* mostly occur in cooler wetter parts of the southern hemisphere, with greatest diversity in Tasmania and Western Australia. In warmer climes, they are usually found in mesic habitats such as at high altitude, deep lakes, groundwater or springs. It is thus anomalous that numerous new species are being discovered on isolated granite outcrops in the semi-arid to arid inland areas of Western Australia. These outcrops have uneven surfaces forming small temporary rain-filled pools known as ngammas, often with adjacent moss and herb dominated meadows growing on shallow soil. *Phreodrilids* mostly occur in the moss beds. After rains, the pools fill and the meadows become saturated; but in the very hot summers, both habitats dry completely. Morphological studies have suggested seven distinct species from 11 outcrops sampled to date, with only a single form per rock. However, divergence in COI and 28S sequence data provides strong support for species-level diversity within these morphotypes. That *phreodrilids* are otherwise absent from these regions may reflect naturally high salinity, made more prevalent through dryland agriculture over the last 100 years, and less predictable presence of freshwater in most other wetlands. Past climatic variation, especially during the Pleistocene, would have meant salinity and drought would have been even more severe at times and may have contributed to the disappearance of *phreodrilids* from the broader landscape. Granite outcrops may therefore provide relictual habitats which require only minor rain events to saturate the moss beds and fill pools. Subsequent genetic divergence would then reflect very limited opportunity for dispersal between outcrops. There are dozens of granite outcrops that have not yet been sampled, suggesting this region could have an even higher diversity of this family than our results suggest.

# FIRST EVIDENCE OF THE EUROPEAN HONEYBEE (APIS MELLIFERA) AS AN EFFECTIVE POLLINATOR OF AN ENDEMIC BLOODROOT (HAEMODORUM SPICATUM)

**MS ASHLEY JENKIN,** *EDITH COWAN UNIVERSITY AND KINGS PARK SCIENCE*

**Co-authors:**

Dr Siegried Krauss, *Kings Park Science*

Dr Elizabeth Lowe, *Edith Cowan University*

A/Prof Eddie van Etten, *Edith Cowan University*

**Lead Author Biography:**

Ashley is a masters by research student with Edith Cowan University and Kings Park Science specialising in pollination ecology and terrestrial entomology. Her research focuses on the ecology of insect pollinators in ecosystems exposed to land-use change, and the impact on native flora. Ashley is an experienced science educator and published researcher involved in multi-agency threatened flora projects. She is passionate about collaborative research designed to improve conservation outcomes.

**Abstract:**

The European honeybee (*Apis mellifera*) is an introduced species in Australia that can out-compete native pollinators. Specialised traits of flowers such as unique petals and concealed reproductive structures may limit access of honeybees to nectar and pollen resources. However, honeybees have a capacity to quickly learn and/or coordinate foraging efforts to access specialised flowers for nectar and pollen, with varying levels of pollinator effectiveness. These interactions can have significant implications for the effective pollination of many native Australian plants as well as impacts on native pollinators.

In this study, our aim was to assess the ability of A. mellifera to act as an effective pollinator of a highly specialised Australian plant. We conducted a three-month study within Kings Park on the bloodroot (*Haemodorum spicatum*) during a post-fire mass-flowering event of ~500 000 plants. The dark flowers of this species remain closed, even during anthesis, which requires specialised access for effective pollination by native bee species such as *Leioproctus haemodori*. More than 125 hours of field observations and visitation assessment of 500 plants revealed that all 1357 active visits to flowers were by *A. mellifera*, with only one observation for *L. haemodori*. Visitation data and analyses of pollen loads showed that *A. mellifera* were able to learn to access *H. spicatum* flowers and effect the transfer of pollen for effective pollination. Honeybees also visited *H. spicatum* plants in a way that would promote pollination across the population instead of self-fertilisation.

This is the first evidence in Australia of *A. mellifera* learning behaviour to become an effective substitute for a native pollinator on a highly specialised pollination system. Our research is continuing to determine the impact of this atypical mass pollination event on specialised native plant-pollinator relationships and impacts on native pollinators.

# BEYOND PRODUCTION: BUILDING A CONSERVATION ESTATE ON MARGINAL FARMLAND AT BOOROKUP (BORE'RA'CUP)

**JUSTIN JONSON,** *THRESHOLD ENVIRONMENTAL PTY LTD*

**Co-authors:**

Ms Imelda Lagarde, *Visayas State University Alangalang*

**Lead Author Biography:**

Justin Jonson is the Managing Director of Threshold Environmental Pty Ltd. He is an award winning and industry leading restoration ecologist and carbon project developer with 17 years' experience designing and delivering large-scale restoration works in WA. He is a founding co-author of both the Australian and International Standards for Ecological Restoration and served on the SERA Board 10 years. Justin has successfully partnered with like-minded individuals and organisations to deliver an expansive portfolio of innovative restoration projects within production landscapes, replanting more than 10 million trees and shrubs across 121 different restoration reference system units.

**Abstract:**

The broadacre agricultural production landscapes of southwest WA produce over AUD$5B annually in the export of wheat, barley, canola and sheep. This wealth has come at a cost to the environment and native ecosystems, where more than 70% have been cleared, 10% are affected by salinity, and the remaining remnant ecosystems are fragmented and subject to ongoing degradation. In order to make some effort to offset the negative externalities of production, meaningful investment in nature positive land-use change is required.

Boorokup (Bore'ra'cup) is a 358-ha property located on the Gordon River in the Great Southern region of Western Australia. The property was purchased for the primary objective of undertaking whole-of-site ecological restoration to establish a conservation estate. The Boorokup Restoration Project demonstrates how marginal farmland can be restored to a more valuable nature-based land-use and make a net positive contribution to the environment and conservation of biodiversity.

Presented here are some of the steps taken to purchase, plan, and implement a whole-of-site ecological restoration and ERF project for conservation objectives. This will include a focus on the technical aspects of the restoration planning and delivery when operating at scale.

Every new restoration site presents its own unique character and value proposition. Here we share how Boorokup's 4.2 kilometres of Gordon River frontage, connection to an ancient drainage salt-lake system, old-growth remnant trees, dune systems, and landscape position connecting large remnant vegetation define this project as being high in conservation value and worthy of restoration.

# AUSTIN DOWNS - ONCE PART OF A HOLISTICALLY MANAGED ESTATE, THEN A HEAVILY MINED AND OVERGRAZED PASTORAL STATION - NOW A 167,000 HA RESTORATION PROJECT LOOKING TO COLLABORATE (INCLUDING WITH MINING) TO FURTHER LIFT NATURE POSITIVE OUTCOMES

**MS JO JACKSON KING,** *AUSTIN DOWNS STATION*

**Lead Author Biography:**

Could be any of us there presenting - Jo - eco-pastoralist on Austin Downs, Occupational Therapist, writes most of our documents. Martin - also eco-pastoralist, also First Nations man, best on tech. Barb - eco-pastoralist, leaseholder, Occupational Therapist, best on plants.

**Abstract:**

Austin Downs, located near Cue, WA, is a 167,000-hectare pastoral lease undergoing significant ecological regeneration. Managed by an inter-generational family business, including First Nations members, since 2001, Austin Downs has faced challenges from past mining activities, extensive tree removal, historical grazing practices, and climate change, leading to decreased productivity and increased erosion. A shift to cattle grazing with innovative methods, such as using mobile water infrastructure to control grazing pressure, have been implemented. In 2024, under the Accounting for Nature umbrella, Bush Heritage Australia carried out an audit of vegetative biodiversity to support and monitor further activities on Austin Downs.

Until 2022 biodiversity gains were only possible as leaseholders subsidised regenerative activities with off-property work. However, as carbon income is not reliable and biodiversity credit income is still distant another significant, sustainable, on-property income source is required to maximise and sustain regeneration gains on Austin Downs.

This presentation outlines the story of Austin Downs from before white settlement, the impacts of mining and grazing, ecological regeneration methods and outcomes and then outlines a proposed collaborative pilot project. This would include mining companies, traditional owners, shires, institutions and energy developers to fund activities which complement each other and lead to nature positive outcomes both on property and in the community. The presentation will also show how more flexible lease conditions would unlock nature positive outcomes on pastoral properties in Western Australia.

# RETHINKING ENVIRONMENTAL IMPACT ASSESSMENT FOR NATURE POSITIVE DEVELOPMENT

**DR HOLLY KIRK,** *CURTIN UNIVERSITY*

**Co-authors:**

Dr Dale Wright, *BirdLife Australia*

Dr Georgia Garrard, *Zoos Victoria*

Dr Casey Visintin, *RMIT University*

Prof Sarah Bekessy, *RMIT University*

Dr Matthew Selinske, *Mosaic Insights*

**Lead Author Biography:**

Dr Holly Kirk is a Senior Research Fellow at Curtin University, in the Population Biology and Genomics Group. Her research seeks to integrate ecological knowledge into urban planning and design, focussing on the creation of science-based decision support tools. An expert in urban ecology and spatial modelling, Holly uses this knowledge to plan cities that support and enhance biodiversity.

**Abstract:**

Achieving nature positive development within existing regulatory frameworks will be challenging. To halt and reverse global biodiversity loss requires restoration and enhancement of all ecosystems, including novel, human-dominated ecosystems where people can arguably have some of the greatest positive impacts biodiversity. Actions need to be supported by a fundamental shift in how we value and assess biodiversity in in these landscapes. Traditional Environmental Impact Assessments (EIAs) often fall short in this regard, focusing primarily on mitigating negative impacts rather than promoting positive outcomes a new approach is clearly needed.

We have developed an additional pathway that can be followed alongside the EIA framework, assessing the potential for biodiversity gain at development sites and reframing biodiversity as an asset to be enhanced. This approach aims to enable identification of biodiversity opportunities in planning and development, encouraging actions that support sustainable and resilient ecosystems, and providing a clearer link to the social and economic benefits that can be accumulated. We illustrate this additional nature positive pathway using two hypothetical development case studies, showing how proponents can be incentivised to implement nature positive actions. We explore how biodiversity potential might be identified at a development site and how a nature positive pathway can act as a complementary mechanism to existing regulatory processes, aligning with the global nature positive agenda.

# WORKING RIGHT WAY TO ENSURE CULTURALLY-SAFE SPACES AND OPPORTUNITIES

**A/PROF ANDREW KNIGHT,** *BIOCULTURAL FUTURES AND ARC TRAINING CENTRE FOR HEALING COUNTRY, SCHOOL OF LIFE AND MOLECULAR SCIENCE, CURTIN UNIVERSITY* AND **DR DAVIDA ASANTE-NIMAKO,** *ARC TRAINING CENTRE FOR HEALING COUNTRY, SCHOOL OF LIFE AND MOLECULAR SCIENCE* CURTIN UNIVERSITY

**Co-authors:**

Ms Sam Murray, *Indigenous Desert Alliance*

A/Prof Raquel Tardin-Coehlo, *Curtin University*

**Lead Author Biography:**

Andrew collaborates with Aboriginal Corporations, industry, universities and non-government organisations on cross-cultural ways of knowing and doing to heal Country that promote stewardship, mentoring and learn from setback, surprises and successes. Andrew is currently the Co-lead of BioCultural Futures, the Lead for Collaborative and Ethical Research with the ARC Industrial Training Centre for Healing Country at Curtin University and the Native Seed Technology and Innovation Hub.

**Abstract:**

Cross-cultural collaborative approaches to land and sea management, ecological research and the development and implementation of environmental laws and policies, are increasingly promoted as the gold star for projects and programs. Such initiatives seek to promote self-determination within Aboriginal and Torres Strait Islander Peoples Communities, On Country and through commercial activities. To be successful, this requires organisations to define, implement and evaluate standards of professional ethical practice that meet the expectations of the United Nations through the Declaration on the Rights of Indigenous Peoples, is pragmatic and that is Indigenous-lead. The concept of Cultural Safety, has established itself in several sectors as a prerequisite for professional ethical practice, notably healthcare and business (as psychological safety). The environment sector is still finding its feet as regards the thinking around, and the application of, Cultural Safety. We present an expanded, forward-looking concept of Cultural Safety that we refer to as Culturally-safe Spaces and Opportunities, a synthesis of good practices from other sectors aligned with the environment sector, and lessons we have learnt from our attempts to embed attitudes, behaviours and institutions the promote Culturally-safe Spaces and Opportunities through cross-cultural collaborative approaches with Aboriginal Corporations, Aboriginal-led businesses and Aboriginal Ranger Teams. This provides a new pragmatic way to think about Cultural Safety that promotes its uptake, tools for mainstreaming it into organisations, and methods for tracking it so as to enhance the capacity of forward-thinking organisations committed to ensuring the well-being of Aboriginal and Torres Strait Islander Peoples and allies.

# CARING FOR THE CANARY: UNDERSTANDING HAKEA VICTORIA AND OTHER OBLIGATE SEEDERS OF FITZGERALD RIVER NATIONAL PARK IN THE FACE OF INCREASING FIRE FREQUENCY

**A/PROF DYLAN KORCZYNSKYJ,** *THE UNIVERSITY OF NOTRE DAME AUSTRALIA*

**Co-authors:**

Ms Tasmin Lancaster, *University of Notre Dame Australia*

**Lead Author Biography:**

Dylan is an ecologist and respected academic leader at the University of Notre Dame Australia, with diverse research interests spanning botany to zoology, ecophysiology, fire interactions, evolution and environmental restoration. Dylan joined Notre Dame in 2003 to support the establishment of the Bachelor of Science and continues to lead the Program today.

**Abstract:**

Anecdotal evidence shows that the floristic icon of Fitzgerald River National Park, *Hakea victoria*, is declining in some areas, and too frequent fire is likely to blame and may risk a similar fate for other obligate seeders. Despite its charismatic appearance *H. victoria* is under-studied and to remedy this we joined forces with the Friends of the Fitz to take the first step to better understand the implications of increasing fire frequency associated with a drying climate. Our space-for-time approach revealed vital statistics about critical life stages of the species. This included: a juvenile period of 5-years, steadily increasing fruit production across the lifespan that can exceed a century; high viability of new seed rapidly declines with canopy storage; minor inter-fire recruitment, and population thinning with time-since-last-fire. This new information helps to identity the optimum fire-return interval for this species, but what about the other +100 obligate seeders in the Park? This as where the story continues. State NRM Community Stewardship funding of the Friends is enabling an extension of the project to a representative sample of obligate seeders, with additional value-adding plans to engage Indigenous Rangers and more students: watch this space!

# BIODIVERSITY RISK AND ACTION PLANS: A STEP-BY-STEP GUIDANCE FOR INCORPORATION INTO A GOVERNANCE FRAMEWORK

**MS GAY LANDWEHR,** *ALCOA*

**Lead Author Biography:**

Gay has accumulated 40 years of experience working in the field of ecology, mine site rehabilitation, closure planning and environmental approvals and is enjoying her latest global role in biodiversity management and governance. She is a Certified Ecological Restoration Practitioner with varied site experiences, ranging from the Goldfields of WA to Northern Australia to Brazil. Gay blends practical applicability with scientific rigour and community expectations.

**Abstract:**

To mainstream biodiversity into the corporate mindset, a governance framework provides the avenue to do so. This paper will describe the current global framework requirements for biodiversity risk assessments and action plans, and how to integrate these into business as usual. The complexity of determination of both an area of influence and ecosystem services, and the difference between impacts and dependencies of a business on biodiversity and ecosystem services, will be discussed with specific examples provided. A recently developed biodiversity governance framework will be described, with the associated challenges of the formulation and implementation of such a framework.

# GHOST BATS: USING A TRAINED AI MODEL TO DETECT CALLS IN LARGE-SCALE MONITORING DATASETS

**MR BENJAMIN LAWRENCE,** *WOOD*

**Co-authors:**

Mr Peter Glorie, *Wood*

**Lead Author Biography:**

Benjamin Lawrence is an acoustician, specialising in bioacoustics within Woods VDN team in Perth, Australia. Bens's focus is fauna monitoring and impact assessments using noiseAI and other relevant tools. He has extensive experience collaborating with ecologists on projects in marine and remote environments. He has recently authored a paper documenting construction noise effects on the little penguin (*Eudyptula minor*), published in 'The Effects of Noise on Aquatic Life' book.

**Abstract:**

The declining population of the Australian native Ghost Bat *Macroderma gigas* (*Megadermatidae*) has resulted in extensive monitoring programs, including passive acoustic monitoring. Acoustic analysis of the Ghost Bats social and echolocation calls can provide insight into the behaviour of this species, informing management and conservation.

This analysis is currently performed by a small number of experts who review audio recordings. This method is time consuming due to the Ghost Bats diverse and complex calls and the massive data sets that are gathered, limiting the number of sites that can be effectively monitored. Trained AI models can efficiently process these data sets and provide significant time and cost benefits over current analysis methods without sacrificing accuracy.

This paper presents the results from continuous recording across 10 Ghost Bat roosts in the Pilbara region of Western Australian over a period of 12 months using a trained AI model. The model detected Ghost Bat social and echolocation calls, providing an indication of presence and usage of the roosts over different seasons. The model's performance demonstrates that it can be deployed to increase the value of large-scale monitoring programs.

# ECOPHYSIOLOGICAL APPROACHES AT THE NEXUS OF CONSERVATION SCIENCE AND MANAGEMENT INITIATIVES OF THREATENED SPECIES

**DR WOLFGANG LEWANDROWSKI,** *KINGS PARK SCIENCE, DEPARTMENT OF BIODIVERSITY CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Dr Emily Tudor, *Kings Park Science*

Mr Hayden Ajduk, *Rio Tinto Iron Ore*

Mrs Julijanna Hantzis, *Rio Tinto Iron Ore*

Mrs Natalie Murdock, *Rio Tinto Iron Ore*

Dr Ashley Jenkin, *Kings Park Science*

Dr Sean Tomlinson, *Curtin University*

Dr Jason Stevens, *Kings Park Science*

**Lead Author Biography:**

I am a research scientist based at Kings Park Science in Perth Western Australia with a strong focus on seed ecology and plant ecophysiology across managed and natural ecosystems. My research develops an insight into seed and plant performance constraints in response to abiotic and biotic factors, particularly those exacerbated by climate change or anthropogenic disturbance, with the aim to inform conservation and restoration outcomes.

**Abstract:**

A mechanistic understanding of how threatened plants respond to environmental change is critical to the conservation and restoration of their habitat. Ecophysiological approaches provide fundamental insights into how plants persist in their environment and are the nexus for bridging threatened species requirements with conservation and management initiatives. Here, we present two case studies of conservation dependent narrow range endemics, *Aluta quadrata* and *Tetratheca butcheriana*, from banded ironstone formations in the Pilbara, northwest of Western Australia. Working together with industry, we aimed to generate knowledge for defining species interactions with edaphic and climatic factors shaping their distribution and persistence across the landscape. We combined high resolution species distribution models (SDM) with ecophysiological studies, and discovered patterns and drivers of variation in both plant responses and their environment. Using this knowledge, we were able to effectively describe how plant performance is distributed across the landscape, and provide a baseline for future conservation and monitoring actions, as well as to explore the mechanisms underpinning short-range endemism in this system.

# MULTI-SENSOR APPROACH FOR VEGETATION CONDITION ASSESSMENT

**DR LAVENDER LIU,** *ECOCENE*

**Co-authors:**

Ms Timea Kovacs-Ledo, *Ecocene*

Ms Elizabeth Mair, *Ecocene*

Mr Jake Manninen, *Ecocene*

Ms Kristin Wouters, *Ecocene*

**Lead Author Biography:**

Dr Lavender (Qingxiang) Liu is a Principal Remote Sensing Analyst specialising in Earth Observation and geospatial data analysis. Lavender has technically led multiple projects spanning environmental and ecological monitoring, agriculture and infrastructure applications. In recent years, Lavender has delivered training to users through both online and in-person workshops. She was awarded the 2023 winner of the WA & Oceanic Future Leader of the Year by Geospatial Council of Australia.

**Abstract:**

Assessing vegetation condition, cover, structure and distribution is crucial for understanding human impacts and guiding effective environmental management. Regular monitoring is essential to inform timely and effective management plans, enabling proactive responses to ecosystem changes.

Traditional on-ground surveys, while trusted and widely accepted, are often labour-intensive and difficult to scale for large-area or frequent vegetation monitoring. Earth Observation (EO) technologies offer a cost-effective and scalable solution, complementing field methods with broader spatial and temporal coverage. Recent advances in sensor technologies now deliver data at unprecedented spatial, spectral and temporal resolutions. When combined with advanced data analytics like Deep Learning, these capabilities enable more comprehensive and precise assessments of vegetation health, structural density, and species composition than ever before.

Combining data from multiple sensors and platforms has proven to be an effective approach for comprehensive vegetation monitoring. For example, multispectral sensors capture data across various wavelengths, allowing for health and cover evaluation, and species differentiation, while Light Detection and Ranging (LiDAR) data adds detailed three-dimensional measurements of vegetation structure such as canopy height. By integrating multispectral and LiDAR data, we can achieve a holistic understanding of vegetation dynamics, capturing changes in health, cover, composition and structure over time.

This presentation explores practical uses of multi-sensor EO data through case studies from Western Australia including the Pilbara region, demonstrating how customised combinations of satellite, aerial, and LiDAR data enhance vegetation monitoring and assessment. Key findings, challenges, and ongoing developments will be discussed, highlighting the potential of integrated EO approaches to support biodiversity conservation and environmental management.

# A LANDSCAPE SPECIFIC AND MEANINGFUL ASSESSMENT OF CAT MANAGEMENT TOOLS BY THE NYANGUMARTA RANGERS

**MR JACOB LOUGHBRIDGE,** *YAMATJI MARLPA ABORIGINAL CORPORATION*

**Co-authors:**

Miss Kailee Savoia, *Environs Kimberley*

Ms Hamsini Bijlani, *Environs Kimberley*

**Lead Author Biography:**

Since the Nyangumarta Warrarn Indigenous Protected Area was declared in 2015, the Nyangumarta Rangers have been caring for over 28,000km2 of country spanning from 80 Mile Beach to the Great Sandy Desert. Based out of Bidyadanga Community, the rangers are employed by Yamatji Marlpa Aboriginal Corporation and report back to the RNTBC of Nyangumarta Warrarn Aboriginal Corporation. Environs Kimberley is a key partner in this project and has a long-standing relationship with the Nyangumarta Rangers.

**Abstract:**

Managing feral cats is of high importance to the Nyangumarta people, of the western edge of the Great Sandy Desert. Feral cats threaten the conservation of newly rediscovered populations of Northern Quoll, Northern Brush-tail possum, Greater Bilby and Black-flanked Rock Wallaby on Nyangumarta Country. There are many examples of studies testing the effectiveness of various cat management tools. However, results are landscape specific, and few studies have been trialled near or on Nyangumarta country, and none have been tailored to the requirements and constraints of Indigenous ranger groups operating in the desert region.

We aim to apply a cost-benefit analysis on three cat management techniques (Felixers, shooting and cage trapping) as a decision-making tool to guide management of feral cats by the Nyangumarta rangers on their country.

To improve the meaningfulness of this study to Indigenous ranger groups; we have used a cost-benefit analysis with a broad definition of the word benefit. Using camera traps, we will measure the standard ecological benefits such as changes in cat activity levels. However, we will also measure the social and cultural benefits of each technique. Surveys post control operation will be used to determine a management tools ability to incorporate traditional skills and knowledge, providing Nyangumarta people a method of sharing and strengthening their connection to culture.

Land management achieves social, cultural and ecological outcomes. Tools used in land management should be assessed against these criteria to ensure they can be delivered in a sustained and engaged manner. This trial is underway with all data collected by the end of the 2025 field season (September).

# WA VEGETATION EXTENT (WAVE) PILOT PROJECT

**MS CAROLYN MARTIN,** *DEPARTMENT OF WATER AND ENVIRONMENT REGULATION*

**Co-authors:**

Ms Helena Mills, *Department of Water and Environmental Regulation*

Mr Liam Robinson, *Department of Water and Environmental Regulation*

**Lead Author Biography:**

Carolyn Martin is the Program Manager for the WAVE Pilot. She is a champion for spatial enablement and innovation in ICT with a passion for accessible technical communication. Carolyn is an MSc GIS with a 25-year career in public service spanning three states and territories starting out in GIS for mining tenure and native title to now specialising in strategic leadership for spatial and data innovation.

**Abstract:**

Western Australia is a vast area, home to a complex range of unique vegetation and varied landscapes. However, WA does not have a regularly updated, state-wide map of vegetation extent. So, the location of vegetation, and its losses and gains over time, remains unknown across the State. But this data is a crucial component of informed decision and policy making for over 27 government functions across at least eight agencies, ranging from land use planning to cumulative environmental impact monitoring to fire mitigation strategies. Vegetation Extent is a foundation dataset for measuring success towards the WA Native Vegetation Policy and national and international conservation targets.

To address this knowledge gap, the Western Australian Governments Digital Capability Fund has invested in a pioneering pilot project for a future Western Australian Vegetation Extent (WAVE) system. The 3-year WAVE Pilot is exploring advances in spatial and data science, with a focus on machine learning and artificial intelligence, to discover and propose an automated solution to this big-data problem. The initial focus is on three trial areas, the Pilbara, Swan Coastal Plain and Avon Wheatbelt IBRA regions; each having different soils, climates, vegetation and land use histories, providing fascinating challenges when it comes to vegetation feature detection and classification from satellite images.

The WAVE Pilot uses an innovation frameworks approach and is engaged with a broad range of project partners including jurisdictional counterparts, CSIRO, the WA Data Science Innovation Hub, TERN, and Industry to discover or develop solutions to this complex technology innovation challenge.

The presentation will showcase the range of exciting activities and partnerships underway and outline next steps towards a future AI-powered vegetation mapping and monitoring system for Western Australia.

# INTERGENERATIONAL KNOWLEDGE SHARING AND KINSHIP: A 50 YEAR LONGITUDINAL STUDY OF TRAPDOOR SPIDERS IN THE WESTERN AUSTRALIAN WHEATBELT

**DR LEANDA MASON,** *EDITH COWAN UNIVERSITY*

**Co-authors:**

Prof Barbara York Main

**Lead Author Biography:**

Dr Leanda Mason (they/them, Minang Nyungar) has research focuses that are broad and intersecting. These research interests include, but are not limited to: conservation ecology, tertiary education, and equity/diversity/inclusion frameworks. They have specialist skills surveying of trapdoor spiders, having conducted extensive research on their ecology and the challenges they face in urban environments due to their short-range endemic traits.

**Abstract:**

In a fragmented remnant of the Western Australian wheatbelt, a 50-year longitudinal study of *Gaius villosus* (formerly *Anidiops villosus*) trapdoor spiders continues to shed light on the tenacity of some ways of being in old, stable landscapes. Initiated in 1974 by the late Prof. Barbara York Main, this work is among the longest continuous invertebrate studies globally. It has revealed extraordinary longevity (up to 43 years), generational burrow fidelity, and reproductive patterns influenced by local climatic rhythms and cycles (Main 1978, Mason et al. 2018). Trapdoor spiders are typically classified as short-range endemics (SREs) and persist in living museums amidst extensive land clearing and agricultural intensification. Informed by Noongar relational ontologies and matriarchal philosophies of care, this longitudinal study will continue after intergenerational knowledge sharing both among spider kin and between peoples across time (Hughes-D'Aeth, 2008; Mason & Kennedy, 2020). Moving onward, the next 50 years will explore the ethical and ecological implications of kincentric conservation; honouring long-lived nonhuman Elders, including Noongar ways of knowing doing and being, and valuing practices that (continue) to resist extractive paradigms. As we mark the close of the first 50 years of study and step into the next, a provocation may be: what might biodiversity conservation look like when grounded in a deep sense of place, tenacity, reverence, and reciprocity?

# NATURE POSITIVE LARGE-SCALE SOLAR DEVELOPMENTS: REGULATING ECOVOLTAICS

**MISS NISCHALA MCDONNELL,** *MACQUARIE LAW SCHOOL, MACQUARIE UNIVERSITY*

**Lead Author Biography:**

Nischala McDonnell is investigating the barriers and opportunities to implementing ecovoltaics in regulatory frameworks within her PhD at Macquarie Law School. In 2024, Nischala completed an industry internship on nature positive requirements for Spark Renewables. Nischala is now a legal graduate at Spark Renewables, and a Research Fellow for the ARC Foundational Australian Agrivoltaics Regulation Model Project led by A/Prof Madeline Taylor in partnership with Spark Renewables and the NSW DPI.

**Abstract:**

To meet the Australian governments 2030 target of 82% renewable electricity, rapid upscaling of renewable energy infrastructure is essential. Investment and generation capacity in Australia's renewable energy sector is anticipated to increase following the enactment of the Future Made in Australia Act 2024 (Cth) and adoption of Capacity Investment Scheme targets within the Climate Change Act 2022 (Cth) in February 2025. Renewable energy developments are valued as green sources of electricity in contrast to fossil-fuel based energy systems. However, the renewable energy rollout presents a largely unaddressed green-green dilemma, whereby emissions reduction technologies may be developed to the detriment of flora and fauna biodiversity.

This paper investigates the biodiversity impacts and opportunities for ecological regeneration in the renewable energy transition, using large-scale solar projects in New South Wales as a case study. Conventional large-scale solar projects often threaten the integrity and health of ecosystems due to poor site selection and design. Proposed nature positive reforms in NSW, as well as at the federal level, promise to strengthen large-scale solar development compliance with the biodiversity mitigation hierarchy to deliver regeneration, not just offsets. The impact of NSW's 2025 nature positive reforms to incentivise and manage biodiversity restoration remains uncertain. This uncertainty is compounded by the stalled federal natural positive legislative reform.

To resolve the green-green dilemma, this paper proposes ecovoltaics as a novel sociotechnical and regulatory innovation capable of holistically integrating photovoltaic generation and ecological regeneration. Ecovoltaics is undefined, and no pilot studies exist in NSW. This paper seeks to demonstrate the correlation of ecovoltaics with nature positive reforms to ignite transformative shifts in large-scale solar developments; from conventional projects to biodiversity boosters.

# A GAMMA RAY SIGNATURE OF A DROUGHT INDUCED FOREST DIE-OFF EVENT

**DR GAVAN MCGRATH,** *DEPARTMENT OF BIODIVERSITY CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Dr Joe Fontaine, *Murdoch University*

Mr Ricky Van Dongen, *Department of Biodiversity Conservation and Attractions*

Dr Katinka Ruthrof, *Department of Biodiversity Conservation and Attractions*

**Lead Author Biography:**

Gavan is a research hydrologist working to better understand the interactions between climate, hydrology and ecosystems. His research topics include the urban heat island, water quality, eco-hydrology and sediment - vegetation feedbacks and more recently, forest drought responses.

**Abstract:**

The Jarrah Forest of south-west Australia experienced one of its driest and warmest six months between 2023-24, resulting in a widespread forest die-off event. As Jarrah have the potential to have roots more than 40 m deep, was this die-off associated with excessive competition for water by high density stands in deep rooting zones, or did it occur over shallow bedrock with limited water storage capacity? To answer these questions on-ground surveys and forest health surveys helped inform a spatio-temporal remote sensing analysis to identify impact across the entire forest. Data from airborne gamma radiometrics surveys were compared to the spatial distribution of Jarrah forest die-off. A gamma ray signature, indicative of the radio isotope decay of potassium to argon, was strongly associated with die-off, much more so than other landscape attributes like hillslope position, slope and aspect. Granite and gneiss bedrock have comparable concentrations of potassium to that estimated at die-off sites. This die-off event therefore predominantly occurred on thin soils that have more recently weathered from bedrock, whereas deeper soils have been leached of more mobile elements like potassium. On-ground geophysics surveys were conducted to quantify the changes in depths to bedrock associated with gradients in potassium concentrations, thus enabling estimation of soil thickness thresholds making the forest vulnerable to die-off under current climatic conditions. With shallow soils the predominant driver of this Jarrah die-off event, forest structure on deep soils seems to have played a secondary role. Nevertheless, significant water stress was also evident in areas of the forest with deeper soils, and it remains unknown for how long these sites will remain able to meet their current water use requirements, given projections of a future with hotter, drier and more prolonged droughts.

# A NOVEL METHOD FOR TRANSLOCATION SITE SELECTION OF URBAN ENDANGERED SHORT-RANGE ENDEMIC FLORA

**MR JARRAD MCKERCHER,** *EDITH COWAN UNIVERSITY*

**Co-authors:**

A/Prof Eddie van Etten, *Edith Cowan University*

Dr João Filipe, *Edith Cowan University*

Dr Gavan McGrath, *Department of Biodiversity, Conservation and Attractions*

Dr Nicola Delnevo, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

I am a PhD Candidate and casual Research Assistant at ECU specializing in remote sensing, spatial data analysis, and environmental modelling. With coding an GIS expertise, I have conducted advanced wildfire and soil studies, including fire severity assessment, species distribution modelling, and digital soil mapping. Previously working with the Perth Airport Rare Plant Project and the PEAT project, I conducted habitat and predictive modelling, plant propagation techniques and plant monitoring.

**Abstract:**

Western Australia's unique biodiversity is increasingly challenged by urban expansion, placing rare, range-restricted species under greater threat. *Conospermum undulatum*, an endemic species of high conservation value, exemplifies these pressures. This investigation assessed the potential of Species Distribution Modelling (SDM) and geophysics as a tool to aid conservation outcomes through assessment of potential translocation sites for rare species persistence. MaxEnt SDM incorporating a K-fold cross validation approach was developed to determine key environmental predictors associated with *C. undulatum* occurrence. From the modelling, four candidate translocation sites were selected to undergo geophysical investigation to determine fine scale habitat associations to inform translocation site selection. The SDM demonstrated exceptional predictive power (AUC = 0.99; R2 = 0.97), providing confidence in the habitat suitability assessment. Soil type, vegetation complex, elevation, and depth to groundwater were the key environmental predictor variables associated with *C. undulatum*. Geophysical surveys corroborated model findings, particularly highlighting a clear habitat association with groundwater depth and *C. undulatum* at the habitat level. Integrating SDM and geophysical methods established a flexible, multi-scale, and evidence-based workflow for rare species translocation site selection. This approach improves confidence in identifying suitable sites and offers a foundation for deeper habitat assessments, including the integration of additional soil and hydrological analyses to further evaluate habitat suitability. This study highlights the promising application of combined distribution and habitat modelling tools to preserve rare species and aid in positive biodiversity outcomes. The approach offers significant potential for broader application across similarly range-restricted flora within Western Australia and beyond.

# UNDERSTANDING THE INFLUENCE OF ACCESS ON THE SOCIAL-ECOLOGICAL CONTRIBUTIONS OF PROTECTED AREAS

**MS VALERIA MENDEZ,** *THE UNIVERSITY OF WESTERN AUSTRALIA*

**Co-authors:**

Prof Graeme Cumming, *The University of Western Australia*

Dr Matthew Navarro, *The University of Western Australia*

Prof Abbie Rogers, *The University of Western Australia*

**Lead Author Biography:**

I am a PhD student in conservation biology at the University of Western Australia and a Forrest Research Scholar. With my work I explore the relationship between area-based conservation and the well-being of human communities. My PhD project focuses on elucidating the contributions of coastal protected areas to local communities in Western Australia. The aim is to tackle the barriers people experience to benefit from conservation outcomes and address how management decisions can reduce them.

**Abstract:**

Protected areas can provide important benefits to people. However, they can also control what is made accessible and to whom, creating winners and losers in conservation-driven trade-offs. Understanding how protected area accessibility influences conservation outcomes is critical for both improving the effectiveness of conservation management and identifying solutions to any access-related problems. Despite its importance, the literature on access in conservation remains scattered, jeopardizing our capacity to conduct structured analyses. Treating access in conservation as the ability of potential beneficiaries to perceive and extract (or receive) benefits from protected areas, we reviewed social-ecological research on protected area access and integrated our findings with concepts from other disciplines (e.g., healthcare) to develop a novel and more holistic framework for understanding the role of access in different conservation contexts. We illustrate the framework using the example of accessibility of protected areas in South Africa. Our analysis of the South African context suggests that when entitlements are the sole means of access granted, conservation benefits are not effectively delivered, and wealthier stakeholders benefit the most from protected areas. If protected areas are to deliver an equitable distribution of benefits, additional means of access (e.g. improved road connectivity) are necessary to ensure that all people can benefit from their entitlements. A social-ecological approach to exploring access helps to identify the multidimensional and interacting sources of barriers to access to protected areas (e.g. entitlements, affordability, social stratification), while also recognizing how the allocation of capital by conservation managers can reinforce or dismantle these barriers.

# NAVIGATING KNOWLEDGE GAPS FOR WESTERN AUSTRALIA'S INLAND WATERS

**MS SONJA MENNEN,** *WESTERN AUSTRALIAN BIODIVERSITY SCIENCE INSTITUTE*

**Lead Author Biography:**

Sonja Mennen works as a Program Director for the Western Australian Biodiversity Science Institute. She is an environmental scientist and communicator who has worked for research organisations, private industry and public service - in Australia and overseas. Sonja recently developed WABSIs Inland waters research program. Stakeholder engagement helped develop this prioritised research program about critical end user knowledge gaps for inland waters biodiversity resilience in Western Australia.

**Abstract:**

Balancing the need to protect Western Australia's (WA) diverse inland aquatic ecosystems with economic development demands well-informed policies, effective management strategies, and practical guidance. Access to high-quality scientific data through carefully planned and prioritised research efforts is crucial for addressing biodiversity knowledge gaps.

WAs inland waters are home to numerous endemic species that are specifically adapted to survive in a climate with unpredictable rainfall and fluctuating water levels. These ecosystems face increasing threats from both natural causes and human activities, compromising their ecological health, biodiversity, and the availability of water and its quality. Given the vastness of WAs landscapes and limited research funding, a targeted and cooperative approach is essential to tackle the most urgent issues affecting inland waters.

In response, the Western Australian Biodiversity Science Institute (WABSI) launched a collaborative program to identify and address critical research needs for WA's inland waters.

By engaging stakeholders, including government agencies, industry leaders, agricultural representatives, researchers, and non-profit organisations, the program identifies key knowledge gaps centred around focus areas such as: water quality and availability, water extraction and discharge, ecosystem functioning, data collection, and principles and guidance. It takes into account existing research plus the challenges posed by climate change, historical and current land use, and other emerging threats.

The program will be implemented through coordinated research initiatives supported by a robust governance framework, ensuring efficient delivery and tangible outcomes. This collaborative approach aims to establish a strong foundation for evidence-based management and policy-making, promoting the sustainable stewardship of WA's inland waters while safeguarding biodiversity and supporting the region's economic growth.

# PROTECTING PEATLAND ECOSYSTEMS AND ADDRESSING THREATS IN SOUTHWESTERN AUSTRALIA

**PROF NICKI MITCHELL,** *THE UNIVERSITY OF WESTERN AUSTRALIA*

**Co-authors:**

Dr David Blake, *Edith Cowan University*

Ms Holly Winkle, *The University of Western Australia*

**Lead Author Biography:**

Nicki is a zoologist focused on anticipating how climate change will impact threatened species, with pre-emptive strategies to prevent extinctions - such as assisted colonisation - being a major research interest. Study species include marine and freshwater turtles, skinks, frogs and mammals, and she integrates physiological and behavioural ecology, genetics and modelling to inform species recovery. Nicki leads research on SW peatlands and has interests in policy and nature positive initiatives.

**Abstract:**

Some of the world's most unique and important peatlands are found in the high rainfall zone of southwestern Australia. This area provides ideal climatic and geo-botanical conditions where wetlands with organic-rich soils can develop, and these ecosystems support iconic threatened species such as pitcher plants and sunset frogs. To address a lack of knowledge and the synergistic threats of climate change, increasing fire frequency and invasive species, a transdisciplinary research project guided by Noongar elders is underway. The five-year project (PEAT Southwest) is advancing several goals: i) to build a collaboration between local knowledge holders and technical specialists to better manage and promote southwestern peatland ecosystems; ii) to thoroughly characterise far southwestern peatland geodiversity and biodiversity; and iii) to use this new knowledge to develop a comprehensive management strategy and implement critical actions for southwestern peatlands. This presentation will highlight research underway on the nationally threatened Empodisma peatlands situated in the Walpole Wilderness Area. We will first demonstrate a digital soil mapping (DSM) approach that incorporates machine learning and earth observation data to determine the spatial distribution of southwestern peatlands. We will also characterise the types of peats and their indicative age, carbon stocks and soil-carbon gas fluxes, and hydrology. Finally, we will describe peatland biodiversity, which we are studying at various scales and with various methods, including eDNA (soil microbiomes), rapid assessments, bioblitzes, and detailed ecological and genetic studies of species such as sunset frogs, pitcher plant flies, and red flowering gums. Collectively, we are rapidly accumulating scientific knowledge and working with the community, cultural custodians and external stakeholders to raise awareness and promote enhanced protection of our peatlands.

# DRONESCAPE: TERN'S UAV-BASED ECOSYSTEM MONITORING INFRASTRUCTURE

**DR JUAN CARLOS MONTES-HERRERA,** *UNIVERSITY OF TASMANIA*

**Co-authors:**

Prof Arko Lucieer, *University of Tasmania*

A/Prof Ben Sparrow, *TERN Ecosystem Surveillance*

**Lead Author Biography:**

Passionate marine biologist with a keen interest in leveraging technology for ecological understanding and conservation. Experience in benthic and plant community ecology, conducting interdisciplinary fieldwork, and applying advanced imaging technologies in both marine and terrestrial ecosystems. Dedicated to pushing the boundaries of scientific inquiry, fostering scientific communication, and promoting community involvement.

**Abstract:**

dronescape is a research infrastructure initiative within TERN that incorporates uncrewed aerial vehicle (UAV) remote sensing into Australia’s terrestrial ecosystem monitoring framework. The project aims to bridge spatial and temporal gaps between ground-based observations and satellite data by deploying UAVs equipped with RGB, 10-band multispectral, and LiDAR sensors across TERNs national surveillance plot network. Using standardized data collection protocols and automated processing workflows, dronescape produce analysis-ready outputs such as orthomosaics, reflectance maps, vegetation indices, and 3D point clouds. As of 2025, over 120 plots have been surveyed across multiple bioregions, with continued expansion underway. Each site covers approximately 90,000 m, contributing to a growing archive of high-resolution spatial data. This presentation will focus on the operational aspects of implementing UAV monitoring at scale, including field deployment, data standardization, and initial outputs. It will outline how these workflows support the broader goal of enhancing long-term, repeatable monitoring within Australia's terrestrial ecosystems.

# ENHANCING OUTCOMES FROM ENVIRONMENTAL MODELLING THROUGH GOVERNMENT-CURATED BIODIVERSITY DATA?

**MS TRISHA MORIARTY,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTION*

**Co-authors:**

Ms Cassia Piper, *Department of* Biodiversity, Conservation and Attraction

Mr Karl Bac, *Department of* Biodiversity, Conservation and Attraction

Ms Amanda Baker, *Department of* Biodiversity, Conservation and Attraction

**Lead Author Biography:**

Trisha Moriarty is the Manager of the WA Biodiversity Information Office, joining the Department of Biodiversity, Conservation and Attractions in 2024. With over 15 years of experience, she has led technical teams in geospatial and scientific data management. Trisha focuses on user-centric design, data standards, and quality control. She previously served as Director of Geoscience Information at the NSW Geological Survey and Assist. Director of Data Governance and Policy at Geoscience Australia

**Abstract:**

One of the primary challenges in conducting and producing meta-analyses and spatial modelling is the lack of up-to-date, publicly available biodiversity data and ability to verify the quality of the input data. Governments are helping to address this issue by providing curated data repositories, which can enhance the reliability and trustworthiness of modelling inputs and by extension improve the outcomes of environmental management policy and decisions.

The Biodiversity Information Office (BIO), established in 2021 and hosted by the Department of Biodiversity, Conservation and Attractions (DBCA), plays a crucial role in making Western Australian biodiversity data more discoverable, accessible, and usable. Through the development of the Dandjoo biodiversity data repository, BIO aggregates data from various sectors, including government, industry, and research, to provide a consolidated database and a single point of discovery. Supporting the platform is a taxonomic name register called Nomos, developed to provide up-to-date taxonomic names from the regulatory authorities, an essential component of BIO quality assurance efforts. By mapping to data standards like Darwin Core and the Australian Biodiversity Information Standard, BIO also ensures data interoperability and consistency, elevating the quality of data provisioned through Dandjoo for use by both public and private sectors.

In this presentation, we will highlight the work of BIO and explore how the Dandjoo platform was designed and implemented to lower the barriers of data sharing and make Western Australia's biodiversity data more discoverable and accessible, contributing to the broader goals of improving environmental data management and supply in Australia.

# GREAT DESERT SKINK AT MATUWA KURRARA KURRARA NATIONAL PARK/INDIGENOUS PROTECTED AREA – FIRST RECORDS FROM INDIGENOUS RANGERS

**DORIAN MORO,** TARLKA MATUWA PIARKU ABORIGINAL CORPORATION

**WILUNA MARTU RANGERS**

**Lead Author Biography:**

Dr Dorian Moro is the Program Manager for the Wiluna Martu Rangers. With a history in wildlife conservation and management, and more recently indigenous stewardship, he has been supporting the team to establish business partnerships over the past 5 years. Wiluna Martu Rangers involve themselves in flora and fauna surveys, seed collections, cultural activities, and land management operations across their native title around Wiluna (northern Goldfields).

**Abstract:**

The Wiluna Martu remain proud for their younger generations when rare species are found to persist on the land that supports them, empowering them to know that their Country remains healthy. In the Wiluna area of the northern Goldfields, the Martu Traditional Owners retain knowledge of great desert skink (referred to as Tjakurra) even though many younger people have not seen a living animal. The great desert skink is listed nationally as Vulnerable. It lives in a family burrow system in the western deserts of Australia, in mature spinifex habitats, and have communal latrines with large scats and burrows. In 2023, Wiluna Martu Rangers conducted a targeted survey for this species in Matuwa at locations close to where circumstantial records were observed a few years earlier during opportunistic track surveys. Rangers clearly articulated they looked for areas of the landscape that were clearly demarcated by healthier spinifex often seen with tall seed heads.

Searches across potential sites in Matuwa revealed no evidence of tjakurra tracks or latrines. However, a fourth site was identified only coincidentally while driving because rangers thought the spinifex looked larger and healthier ‘over there’. Ground searches here confirmed initial evidence of tjakurra: large scats at several communal latrine sites (especially near the larger healthier spinifex), with large active burrows and clear tracks in the sand. A wider search of this site identified an additional 5 active burrow groups. Remote cameras installed at this site confirmed tjakurra, the first evidence and record of this threatened species for Matuwa. Images across the year confirmed more skink activity at all active burrows at this site. Subsequent surveys in 2024 and 2025 have now expanded the number of known tjakurra sites (totalling 116 active burrows) at Matuwa to five.

This outcome could not have been possible without the experienced tracking and observation skills of the Wiluna Martu, and their inherent knowledge of Country shared within the wider indigenous community. These records extend the distribution of the species to the south-west of its known range in Australia. Knowledge of the presence of this threatened species is invaluable for assisting plans for fire management, and to support the push-back to mining exploration in the wider area. This Ranger-led survey is now part of a national survey called ‘Mulyamiji Month’ that involves desert rangers across Australia to survey - and look

for trends in - great desert skink nationally. In 2025 this initiative involved 172 rangers from 16 ranger teams.

# LEVERAGING MACHINE LEARNING TO EXAMINE GROUNDWATER DEPENDENT TREES AND WATERBODIES IN THE PILBARA, WESTERN AUSTRALIA

**DR JASMINE MUIR, *FRONTIERSI***

**Co-authors:**

Dr Claire Fisk, *FrontierSI*

Tharani Gopalakrishnan, *FrontierSI*

James Leversha, *FrontierSI*

Lachlan Hurst, *FrontierSI*

Madeleine Seehaber, *FrontierSI*

Paula Fievez, *FrontierSI*

**Lead Author Biography:**

Dr Jasmine Muir is a Sector Lead at FrontierSI, leading the ENVestigator program, which unites government, research, and industry to deliver innovative environmental monitoring tools, that leverage satellite and field data. She holds a PhD in Remote Sensing of vegetation structure and condition, and has broad experience across research, government, and industry.

**Abstract:**

Mining operations must actively monitor and manage their environmental impacts, particularly the effects of mine dewatering on groundwater-dependent vegetation (GDV). Dewatering, which lowers the water table to access mineral deposits, can adversely affect native vegetation reliant on stable groundwater access. While ground-based vegetation surveys are a regulatory requirement, typically conducted every six to twelve months, they are time-consuming, costly, limited in spatial coverage, and difficult to repeat frequently. This creates a need for scalable, efficient monitoring solutions.

To address this challenge, the ENVestigator toolkit has been developed as an ESRI ArcGIS Pro plug-in, providing a suite of Earth observation (EO) based tools designed to detect and monitor GDV and associated environmental features, in the Pilbara region of Western Australia. The tools harness large archives of satellite imagery and advanced machine learning to deliver multiple lines of evidence for GDV health and distribution. Key functionalities include rapid GDV mapping, near real-time monitoring of vegetation change, and trend detection across broad spatial and temporal scales.

Recent updates introduce a ‘Waterbodies Mapping Tool’, which applies machine learning to Sentinel-2 and WorldView-3 imagery combined with terrain data to identify and track open surface water occurrence and persistence. Outputs include binary water presence maps, frequency layers, and temporal extent graphs, providing valuable insight into hydrological changes within mining landscapes. These capabilities complement vegetation monitoring, enabling early detection of environmental change, prioritisation of site visits, and support for remote decision-making.

Overall, ENVestigator enhances environmental compliance, supports the protection of sensitive ecosystems, and strengthens biodiversity outcomes across remote mining operations.

This presentation will showcase how new ENVestigator tools, including updates to the GDV monitoring tools and waterbodies mapping, are improving environmental management by enabling faster and more effective responses to mining impacts.

# TEMPORAL AND SPATIAL CHANGES IN AQUATIC FAUNA IN THE KENT STREET WEIR POOL OF THE CANNING RIVER, PERTH, WESTERN AUSTRALIA

**MR PETER NOVAK,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Miss Amie Gillies, *Department of Biodiversity, Conservation and Attractions*

Miss Michelle VanCompernolle, *Department of Biodiversity, Conservation and Attractions*

Mrs Suzanne Thompson, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Pete is an aquatic ecologist with nearly 20 years' experience working in SWWA, the Kimberley, Northern Territory and overseas in China. His research focuses primarily on informing and improving management of aquatic systems including submerged macrophyte restoration, tropical river food webs, flow/ecology relationships, and contaminants in aquatic systems. He currently works on projects investigating plastic debris in estuaries and a long-term ecological restoration project for the Canning River

**Abstract:**

In a changing climate, that is driving increasing saline intrusion into freshwater zones and reduced rainfall runoff, the management of freshwater habitats is vital for the conservation of freshwater species. The Kent Street Weir Pool (KSWP) of the Canning River extends over 7 km upstream from the Kent Street Weir and is one of the largest permanent freshwater ecosystems in Perth. The weir pool has historically suffered from low fish diversity and poor water quality and historical management action to improve water quality and biodiversity include: oxygenation; PhoslockTM additions; revegetation and nutrient management in the catchment; and the construction of a fishway to facilitate fish movement upstream, past the weir.

This study aimed to document the current biodiversity values of the KSWP by determining spatial and temporal patterns, and environmental drivers of the abundance and condition of aquatic fauna, and the utilization of the KSWP by estuarine migrants. Pressures were also documented including water quality conditions and prevalence of non-native species.

This year-long investigation found that the KSWP hosts 22 species of fish, decapods and turtles including 10 native freshwater species, four native estuarine/marine migrants and 8 non-native species. We found that the fish community differed significantly throughout the year and between sites. The downstream sites were characterized by a high abundance of native estuarine fish migrants, while sites further upstream had a higher abundance of native freshwater fish species. Native fish dominated during winter and spring, but invasive species dramatically increased in abundance during summer, coinciding with a decline in natives. The information gathered by this research will be critical in guiding a long-term restoration project to improve biodiversity values in this vital freshwater habitat.

# MICROBAT, MACROTRAVEL: TRACKING THE AMBITIOUS JOURNEYS OF THE PILBARA LEAF-NOSED BAT

**MR JAYDEN O'BRIEN,** *FORTESCUE*

**Lead Author Biography:**

Jayden is an environmental professional with more than 15 years' experience across the mining, construction, and government sectors. His career journey has taken him from consulting and site-based roles in the WA Goldfields to leading revegetation works on some of Perth's largest road infrastructure projects, including delivery of WA's first fauna bridge. Since joining Fortescue in 2019, Jayden has been responsible for securing key environmental approvals for the Iron Bridge Magnetite Project and, more recently, has embraced the role of the company's resident "batman". He is passionate about science and thrives on tackling bespoke challenges at the edge of current knowledge and practice.

**Abstract:**

Pilbara Leaf-nosed Bats (PLNB, *Rhinonicteris aurantia* Pilbara Form) are a threatened insectivorous microbat endemic to the Pilbara region of Western Australia. PLNB rely on climatically benign roosts to survive in the harsh Pilbara environment. These caves, characterised by high humidity and consistently warm temperatures, serve as permanent diurnal roosts and can also host maternity colonies during the parturition and lactation period. However, such roosts are rare and challenging to find, with currently only approximately 50 known locations within the Pilbara, many of which are associated with mineral ore bodies.

To investigate movement ecology and site fidelity of PLNB, we tagged 153 individuals with passive integrated transponders (PIT) across over two campaigns at two permanent roosts located 30 km apart in the East Chichester subregion. We monitored the tagged bats using a network of six Biomark reader systems placed at the entrances at both diurnal and transitory roosts.

Our findings revealed that 70% of tagged bats were resighted on at least one occasion within 12 months (of tagging). Interestingly, male PLNB exhibited greater site fidelity than females, despite both sexes using the roosts. Site fidelity also varied between the two caves. For individuals with a high level of site fidelity, we analysed foraging duration (time spent out of the cave each night) and observed frequent nightly returns to the roosts for some individuals.

Additionally, we recorded over 25 inter-colony movements, including a remarkable 65 km nightly journey by a female bat between two roosts the largest recorded for the species.

These findings are crucial for managing and conserving this threatened species. Understanding PLNB movement and site fidelity helps identify critical habitats and protect roosts, highlighting the need to consider their spatial needs to avoid or mitigate impacts.

# STATE AND TRANSITION MODELS TO SUPPORT MANAGEMENT IN THE MULGA RANGELANDS OF WESTERN AUSTRALIA

**DR ALISON O'DONNELL**, *CSIRO ENVIRONMENT*

**Lead Author Biography:**
Alison is an ecologist with expertise in arid and semi-arid ecosystems. Her work focuses on the impacts of land use and management, climate variability, and fire on vegetation dynamics. Her research uses remote sensing, field survey and dendrochronology techniques to understand ecosystem processes and to support evidence-based approaches to restoration and adaptive management.

**Abstract:**
State and Transition Models (STMs) provide a structured framework for understanding ecosystem dynamics, identifying degradation pathways, and informing restoration and adaptive management strategies. They are increasingly used in nature-positive programs to support the recovery and resilience of modified landscapes.

This project developed STMs for mulga woodlands and chenopod shrublands across the Gascoyne, Murchison, Pilbara, and Yalgoo regions. These vegetation communities are of high ecological and pastoral value but have been significantly altered by historical land use.

Using the AusEcoModels framework and existing archetype models, STMs were developed that integrate monitoring data with expert knowledge obtained through a multi-stakeholder elicitation process. Participants included scientists, land managers, pastoralists, Indigenous representatives, and government staff. The resulting models define key ecosystem states, transitions, and associated drivers, including grazing intensity, hydrological change, and Buffel grass invasion.

The STMs identify measurable indicators of ecosystem state and change, providing a foundation for improved monitoring, decision-making, and regulatory support. When linked with spatial and remote sensing tools, they offer a pathway toward more transparent and effective ecological restoration in arid rangelands. This work contributes to the scientific basis for nature repair initiatives and supports the development of evidence-based methods for land condition assessment and management.

# AUSTRALIAN CARBON AND NATURE MARKET TRENDS AND EMERGING OPPORTUNITIES

**DANIEL OTA,** *HEAD OF ENVIRONMENTAL MARKETS, ANZ*

**Lead Author Biography:**

Dan is a senior banking and financial markets leader with over 20 years of global experience in providing bespoke financing solutions to large institutional clients. Having previously worked in project finance and global loan product roles, he now leads ANZ's Environmental Markets team, which aims to support clients with opportunities in carbon and emerging nature markets and developing innovative banking solutions.

**Abstract:**

The Australian carbon and nature markets bring together a uniquely diverse range of market participants with different objectives and requirements. The markets are evolving with continued policy development and shifts towards more robust methods and measurable outcomes to support price discovery and increased investment flow. While changes can bring uncertainty, understanding the underlying trends and the role of market-based mechanisms to support Australia's climate and nature objectives provide the foundation for growth, innovation and new opportunities.

# UNDERSTANDING COSTS OF NATURE DECLINE, BIODIVERSITY FINANCING, AND SUSTAINABILITY REPORTING FOR BETTER BIODIVERSITY OUTCOMES

**MR RAM PANDIT,** *THE WESTERN AUSTRALIAN BIODIVERSITY SCIENCE INSTITUTE*

**Lead Author Biography:**

Ram is an environmental and resource economist with over 20 years of teaching, research and professional experiences in the field of conservation and development. Ram is a Research Director of Biodiversity Economics and Finance Program at the WABSI. He also works at the UWA and teaches courses on environmental, resource, and development economics. He is involved in IPBES works and has active research agenda in biodiversity conservation and ecosystem services fields.

**Abstract:**

Biodiversity financing has been a common topic of discussion among private and public agencies in recent time due to the growing realisation of impacts and dependencies of economic activities on nature. Estimates suggest a significant funding gap to fulfil societal aspirations/targets conserving biodiversity. Given the funding gap to fulfill these societal aspirations/targets under KMGBF or SDG by 2030, flow of substantial additional funds per year is required in conservation activities. What is the extent of costs imposed by economic activities on nature directly and indirectly across different sectors and what policy options can be used to address the funding gap? To answer these questions, this paper outlines the costs of nature decline for various sectors, and purpose ways to reduce the costs through innovative financing mechanisms. In addition, it outlines the features of evolving sustainability reporting standards, including Australian standards, which could reflect the true account of impact and dependencies of economic activities on nature. In this context, the paper will also highlight some of the WA based initiatives towards nature positive outcomes and the potential implications of global, regional, and national trends of sustainability reporting for WA.

# ECOSYSTEM SCIENCE AND TOOLS FOR ASSESSING NATURE RELATED IMPACTS, RISKS AND DEPENDENCIES

**DR TINA PARKHURST,** *THE UNIVERSITY OF MELBOURNE*

**Co-authors:**

Dr Emily Nicholson, *The University of Melbourne*

**Lead Author Biography:**

Tina Parkhurst is an ecologist and currently works as a Research Fellow at the University of Melbourne, where she is developing ecosystem approaches for nature related disclosure frameworks to quantify biodiversity impacts and linking ecological and commercial risks.

**Abstract:**

The twin crises of climate change and biodiversity loss are putting people's well-being and the economy at risk. With more than half of global economic outputs relying on nature, there is increasing demand for the private sector to understand and manage biodiversity impacts and nature-related risks and dependencies. Addressing this double materiality of both impacts and reliance on nature is crucial. Ecological risks, including risks of species extinction and ecosystem degradation and collapse, must be managed to avoid commercial risks to individual companies and the broader economy, including physical, transitional and systemic risks.

Several private sector-led frameworks assist corporations to measure and disclose their nature-related impacts, dependencies and risks. Current nature metrics are predominantly based on global species metrics or broad provision of ecosystem services. These are inadequate to understand and quantify impacts, or the link between ecological and commercial risks, because they do not account for the diversity of ecosystem types and their functions that underpin the benefits they provide.

Here we present an ecosystem-focussed approach informed by global ecosystem standards that are recommended for use in the Kunming-Montreal Global Biodiversity Framework, and in corporate nature risk and disclosure frameworks such as the Taskforce for Nature-related Financial Disclosures (TNFD). The approach can support companies to meet disclosure standards, screen impacts, assess nature risk and dependencies, and evaluate conservation actions leading to ecosystem recovery. This provides opportunities for strategic planning of nature positive business investments across sectors in line with global biodiversity goals.

# EARTH OBSERVATION DATA FOR SUPPORTING BIODIVERSITY MONITORING: A CASE STUDY IN THE GREAT WESTERN WOODLANDS.

**DR ADRIANA PARRA RUIZ,** *CSIRO*

**Co-authors:**

Dr Zheng-Shu Zhou, *CSIRO*

Dr Shaun Levick, *CSIRO*

Dr Matt Garthwaite, *CSIRO*

**Lead Author Biography:**

Adriana Parra Ruiz is a CSIRO Early Research Career (CERC) Fellow since 2024. Her research interest includes monitoring Land Cover change using remote sensing information and evaluating the derived effects of these changes on ecosystem services. Adriana obtained a Masters degree in Earth Science from EAFIT University, Colombia, in 2014 and completed a PhD in Ecology, Evolution and Conservation Biology at the University of Nevada, Reno, in 2021.

**Abstract:**

As part of a global effort to halt the rapid loss of biodiversity, the Kunming-Montreal Global Biodiversity Framework (GBF) defines an ambitious set of goals to achieve sustainable development by 2050. To track the progress of countries towards these goals, the GFB includes a monitoring framework comprising 43 headline biodiversity indicators. Many of these indicators require information on ecosystem structure, composition or functioning, some of which can be provided by satellite-based Earth observation (EO) data. Different EO sensors (e.g., optical, radar, LiDAR) can produce unique information on various ecosystem characteristics, and the large coverage and systematic periodicity of EO data facilitate tracking changes in indicators across different spatial and temporal scales.

In this study, we focus on the use of EO data for the GBF Headline Indicator A.2: extent of natural ecosystems. We use the Great Western Woodlands (GWW), located in south-western Australia, as an example of study area. This region is of significant biodiversity importance as the largest temperate woodland ecosystem in the world, and faces threats related to climate change impacts, particularly, increases in aridity conditions and in fire frequency. For these reasons, monitoring ecosystem extent in the GWW is essential for land management, and conservation efforts.

We present preliminary results on the implementation of a classification workflow for ecosystem extent mapping in the GWW by fusing satellite acquired optical and radar data. We conduct our analysis by incorporating multi-source Analysis Ready Data on a cloud computing platform. Moreover, we assess possible improvement in classification accuracy through the implementation of different machine learning approaches.

# NATURE POSITIVE IN PRACTICE: IMPLICATIONS FOR EMBEDDING AND DEMONSTRATING IMPACT OF ECOLOGICAL RESTORATION

**DR BLAIR PARSONS,** *GREENING AUSTRALIA*

**Co-authors:**

Ms Zoe Birnie, *Greening Australia*

Ms Michelle Frankel, *Greening Australia*

**Lead Author Biography:**

Blair has 25+ years experience in the environmental sector across biodiversity survey, monitoring and valuation, conservation planning, impact assessment, and ecological modelling. As Director Impact at Greening Australia, he leads impact evaluation, strategy, planning and design, and research initiatives. He has held multiple leadership roles and maintains strong cross-sector links. Blair holds a PhD in Zoology and is an Accredited Expert Accounting for Nature (Vegetation, Birds).

**Abstract:**

The concept of Nature Positive encourages organisations and markets to integrate biodiversity and ecosystem restoration into their strategies, operations, and investments, requiring clear demonstration of nature enhancement. As this approach gains momentum, environmental organisations must reshape and refocus to embed it in their work and outcomes.

Greening Australia has been progressing toward Nature Positive, applying an impact-centric lens to its operations. By embedding these principles, the organisation is reconfiguring ecological restoration approaches to align with and unlock new financial mechanisms. This evolving model supports partners and investors seeking credible pathways to contribute to biodiversity recovery, climate resilience, and land repair.

A key step has been developing and applying guidelines for objective setting, aligned with the Open Standards for the Practice of Conservation. These guidelines establish clarity on project goals, objectives, targets, and indicators. We are also building monitoring and evaluation standards to ensure consistent measurement of outcomes and performance, using accepted frameworks (e.g. Accounting for Nature) where available and developing new ones where gaps exist (e.g. community partnership and wellbeing evaluation).

To demonstrate Nature Positive outcomes, we've applied these frameworks to current projects and evaluated environmental, community, and economic impacts. For example, we've explored long-term results of revegetation projects in ACT/NSW on woodland bird communities and landholders, assessed a collaborative First Nations conservation project in Queensland, and examined nature-based solutions such as biodiverse sandalwood and fodder systems for restoring degraded agricultural land.

In this presentation, well share how the pursuit of Nature Positive is reshaping Greening Australia's restoration approach and offer insights for organisations aiming to embed these principles into their core strategy.

# STRONGER TOGETHER: INTACT SOIL TRANSLOCATION INCREASES THE RESILIENCE OF INOCULATED MICROBIAL COMMUNITIES

**MR SHAWN PEDDLE,** *FLINDERS UNIVERSITY*

**Co-authors:**

Ms Tarryn Davies, *Flinders University*

Dr Craig Liddicoat, *Flinders University*

Mr Riley Hodgson, *Flinders University*

Ms Angela Sanders, *Bush Heritage Australia*

Dr Siegfried Krauss, *Department of Biodiversity Conservation and Attractions*

A/Prof Martin Breed, *Flinders University*

**Lead Author Biography:**

Shawn has recently completed his PhD and now works as a Research Associate at Flinders University focussing broadly on improving ecosystem restoration outcomes. Shawn's research uses embedded experiments and genomic approaches to cover a variety of themes including seed sourcing strategies, soil translocations and microbial inoculations to improve restoration outcomes.

**Abstract:**

Improving ecosystem restoration outcomes is essential to address the twin global crises of biodiversity decline and climate change. Soil microbiota are fundamental ecosystem components that can drive ecosystem recovery. However, their effective integration into ecosystem restoration efforts is yet to be adequately realised. Soil translocation aims to inoculate whole microbial communities into restoration sites to effect both above- and below-ground recovery trajectories. Despite growing acknowledgements of their potential to improve restoration quality, there is limited experimental evidence on how to implement soil translocations to successfully inoculate soil microbiota in restoration contexts. By embedding a soil translocation experiment into a restoration project in southwest Western Australia a global biodiversity hotspot we show that retaining soil structural integrity through intact soil translocation is important in achieving successful establishment of microbial inoculants. By contrast, surface spreading the predominant method of soil translocation used in restoration saw microbial communities diverge away from the microbial profile of donor sites and become more like those in the recipient sites. Our findings suggest that the restoration sector should rethink its approach to achieving successful microbial inoculations and consider the benefits of retaining structural integrity in translocated soils. Upscaling of investments and innovation are required to meet the increasing demand for soil translocations capable of effectively driving ecosystem recovery.

# BUILDING DIGITAL CONFIDENCE TO ASSESS FERAL IMPACTS ON PRIORITY WATERHOLES: INSIGHTS FROM DALUK RANGERS AND RESEARCHERS WORKING IN THE WARDDEKEN INDIGENOUS PROTECTED AREA

**DR CARA PENTON,** *CHARLES DARWIN UNIVERSITY*

**Co-authors:**

Ms Suzannah Nabulwad, *Warddeken Land Management*

Ms Cathy Robinson, *CSIRO*

**Lead Author Biography:**

Cara is a hybrid Research Fellow at Charles Darwin University and Ecological Monitoring Manager at Warddeken Land Management in West Arnhem. She specialises in cross-cultural ecology and management for priority species and places. Her research focus is the digital inclusion of Indigenous rangers in ecological monitoring and research and the integration of ethical AI systems.

**Abstract:**

Waterholes are culturally and ecologically significant places for the people of West Arnhem Land. As Suzannah Nabulwad explains, Different waterholes are important for different reasons some we visit with family, some are connected to important stories, some are home to birds like emu and duck, or animals like wallaby. In response to concerns about the increasing damage from feral herbivores, researchers and the Mamadawerre community worked together to assess changes to the health of Country and define local indicators of healthy Country to guide management. At three key waterhole sites, the community trialled a range of digital tools including camera traps, acoustic recorders, drone-based mapping, and walking transects to gather ecological data while building digital confidence and capability among rangers. These methods were evaluated not only for their scientific utility but for how well they could be embedded into ongoing ranger-led practice. Through this collaborative monitoring, feral horses were identified as the most significant source of ecological degradation. Within six months, following wider consultations with Traditional Owners residing beyond the community, a major aerial cull was undertaken by the Indigenous Feral Management Team. This operation removed over 385 feral horses from the surrounding waterhole area marking the first formal feral horse management effort in this local region. Importantly, the project also created opportunities for rangers more confident with technology to teach others, fostering shared learning and reinforcing cultural connections to these places. This case study illustrates how Indigenous-led, inclusive, and adaptive environmental management can strengthen both ecological outcomes and community knowledge systems, offering a scalable model for other regions.

# BARRIERS AND OPPORTUNITIES TO INVESTMENT IN NATURAL CAPITAL PRODUCTION LANDSCAPES (NCPLS)

**MR THOMAS PICTON-WARLOW,** *SWIMMING365*

**Lead Author Biography:**
Engaged with UWA on the Natural Capital Production Landscapes project.

**Abstract:**

This paper focuses on key findings of the Natural Capital Production Landscapes (NCPLs) project—an eighteen-month initiative funded by the Future Drought Fund and supported by the South-West WA Drought Resilience Adoption and Innovation Hub. The project involved surveys, interviews, and workshops with growers and investors to explore how natural capital is perceived, understood, and integrated into agricultural and investment decision-making across Western Australia. The project specifically examined perceptions, awareness, and current practices through structured engagement with growers and investors, aiming to identify the barriers and opportunities for scaling NCPLs. The findings indicate limited understanding of natural capital among survey participants, especially its abiotic elements like water, energy, and soils. This lack of clarity increased perceptions of risk and reduced confidence in investment models. Despite this, both groups strongly supported tangible, low-risk initiatives tied to familiar assets—but were unsure how to connect these to business or financial frameworks. The findings imply the importance of targeted, systems-based education strategies that connect natural capital to familiar production assets (like soil, water, and energy) and investment structures. To integrate natural capital in current business practices, next steps could include pilot demonstrations, sector-specific extension approaches for both growers and investors, and coordinated policy alignment and support.

# THE POLLINATION CRISIS DOWN-UNDER

**DR KIT PRENDERGAST,** *CURTIN UNIVERSITY / UNIVERSITY OF SOUTHERN QUEENSLAND*

**Co-authors:**

Prof Graham Pyke, *Macquarie University*

Prof Zong-Xin Ren, *Chinese Academy of Sciences*

**Lead Author Biography:**

Dr Kit Prendergast is a leading expert in biodiversity of native pollinators. Her PhD revealed the remarkable biodiversity of native bees on the Swan Coastal Plain. Her research since has covered diverse aspects relating to taxonomy, conservation, restoration, impact assessments and pollination, and she has published over 60 articles. Kit is also a renowned science communicator, and has numerous awards for her research and outreach, including Curtin Young Achiever Award.

**Abstract:**

Southwest Western Australia is a biodiversity hotspot, yet the native pollinators - so crucial to sustaining the natural ecosystems - have received little attention prior to the mid-2000s. Against this, since the 90s, there has been a growing realisation internationally among both scientists and the public that pollinators and pollination are under threat, with headlines of 'bee apocalypses'. Surprisingly though, we have not heard this much in Australia, save for attention about honey bee declines, even though contrary to public opinion, honey bees are not under threat. We explore whether Australia really is facing a pollination crisis by investigating the literature, through core themes relating to the pollination crisis and component crises. We reveal that there has been an increase in research publications relating to a pollination crisis, but this has centred around Europe and the USA. In Australia, despite no species being listed on the IUCN Red List, and a lack of coverage, we found that the factors known to drive the pollination crisis are very much at large, and Australia has not 'dodged the bullet'; immediate action to address and mitigate its own pollination crisis. We identify a number of steps that are known to aid in addressing the pollination crises, including increased taxonomic work on suspected plant pollinators, establishing long-term monitoring of plant pollinator relationships, incorporating pollinator conservation into agriculture including restricting use of various pesticides and adopting an Integrated Pest and Pollinator Management approach, conservation and management of plants and their pollinators, and legislation and protection for pollinator populations threatened with extinction. Pollinator conservation is not a priority even in the SWWA, and appropriate Government policy, funding and regulation is needed to protect our indigenous pollinators and their pollination services.

# IS THERE MUSH-ROOM FOR BETTONGS ON DIRK HARTOG ISLAND?

**MS REBECCA QUAH,** *EDITH COWAN UNIVERSITY*

**Co-authors:**

Dr Saul Cowen, *Department of Biodiversity, Conservation and Attractions*

Ms Kelly Rayner, *Department of Biodiversity, Conservation and Attractions*

Dr Robert Davis, *Edith Cowan University*

Dr Anna Hopkins, *Edith Cowan University*

Dr Harriet Mills, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Rebecca is a wildlife ecologist working in research and consulting. She specializes in vertebrate fauna, conservation translocations, and molecular biology. She is currently undertaking a PhD using molecular techniques to guide the translocations of *mycophagous* mammals and previously attained a Masters studying the genetics and population viability of reintroduced Shark Bay mice.

**Abstract:**

Boodies (*Bettongia lesueur*) and woylies (*Bettongia penicillata*) are *mycophagous* marsupials known for their crucial role in ecosystem health through fungal spore dispersal and bioturbation. As part of ongoing restoration efforts, these bettong species are being reintroduced to Dirk Hartog Island, where understanding their dietary requirements is essential for successful establishment. This study investigated the *mycophagous* habits of these species in arid and semi-arid regions to assess fungal consumption patterns. Through dietary analysis of scat samples collected from existing populations, we identified key fungal taxa consumed by these species. Complementing this dietary research, we conducted an environmental DNA (eDNA) survey of soil samples across three dominant habitat types on Dirk Hartog Island to characterise the available fungal resources. This research aims to establish baseline data on fungal diversity and distribution across the island prior to species reintroduction. By comparing the fungal communities present on Dirk Hartog Island with known dietary preferences of boodies and woylies from mainland populations, we seek to assess the suitability of available fungal resources for supporting reintroduced populations. This study represents a novel approach to pre-reintroduction habitat assessment, with implications for reintroduction planning, predicting reintroduction success and informing adaptive management strategies for these ecologically significant species.

# USING BIOSECURITY SMARTS ON BARROW ISLAND

**MISS CAITLIN RAE,** *CHEVRON AUSTRALIA*

**Co-authors:**

Mrs Shannon Lange, *Chevron Australia*
Miss Emma Johnston, *Chevron Australia*

**Lead Author Biography:**

Caitlin, Shannon, and Emma currently work within the Chevron Australia Environment & Quarantine team. The team consists of experienced environmental and quarantine specialists who work to implement environmental monitoring and quarantine safeguard requirements for Australian oil and gas operations. Between the three of them, they have previously worked in government and the scientific and technical services industry. Their diverse backgrounds contribute to a robust and dynamic team.

**Abstract:**

Barrow Island, situated off Australia's north-western coast, is a Class A Nature Reserve renowned for its unique environment and diverse ecosystems, including grasslands, limestone uplands, beaches, reefs, and more. Several factors contribute to its rich biodiversity, which includes over 2,800 species of plants, mammals, birds, reptiles, amphibians, and invertebrates.

An essential aspect of preserving Barrow Island's conservation values is preventing the introduction and proliferation of non-indigenous species (NIS). Advanced monitoring tools and training programs have been implemented to detect and prevent the proliferation of NIS. Key tools include:

1. Environmental Acoustic Recognition Sensor (EARS): Developed with Edith Cowan University, EARS detects the Asian house gecko (AHG) using microphones and software to identify specific acoustic patterns. It transmits sound files and metadata in real-time for analysis, aiding in fast detection and response.

2. Print Acquisition Wildlife Sensors (PAWS): PAWS records and transmits real-time data on species identification using capacitance sensors, load cells, and cameras. It sends data to an online portal for daily assessment, enabling early response to NIS detections.

3. CritterPic: This device captures high-quality images of small to medium-sized animals, with reduced false triggers and real-time data upload. It includes AI capabilities and can be fitted with a lure dispenser. CritterPic enhances detection and surveillance of non-indigenous species and collects data on other species of interest.

This presentation will showcase biosecurity technologies that represent a new generation of tools. These innovations are pivotal in advancing biosecurity science and safeguarding unique ecological communities such as those on Barrow Island.

Acknowledgments: Biosecurity Science Business Partners – Murdoch University, Critter Solutions, Edith Cowan University, SRA Information Technology, Stantec.

# SHIFTING OUR EIA AND APPROVALS MINDSET

**MR MITT RAMGOBIN,** *UMWELT ENVIRONMENT AND SOCIAL CONSULTANTS*

**Lead Author Biography:**

Mitt Ramgobin is an environmental practitioner with over 15 years of experience in approvals and heritage management. He has led environmental initiatives, ensuring sustainable development while safeguarding ecosystems. As an EIA specialist, Mitt has conducted assessments for diverse projects, balancing ecological preservation with economic progress. He excels in identifying and mitigating environmental risks combining scientific rigour with practical solutions.

**Abstract:**

Environmental Impact Assessments (EIA) have traditionally focused on species and communities, often neglecting the broader landscape and systemic interactions crucial for biodiversity conservation. This abstract explores the potential benefits of shifting from a species/communities-based EIA to a landscape/systems-based EIA, drawing on publicly available project analyses. The analysis of publicly available projects reveals that traditional EIAs often fail to capture the cumulative and interconnected impacts of development on ecosystems. By focusing narrowly on individual species or communities, these assessments can overlook critical ecological processes and landscape-level interactions that sustain biodiversity. This limitation can lead to suboptimal mitigation measures and missed opportunities for achieving nature-positive outcomes. A landscape/systems-based EIA approach addresses these shortcomings by considering the broader ecological context. This method integrates landscape ecology principles, assessing how land use changes affect habitat connectivity, ecosystem services, and overall ecological integrity. Such an approach not only provides a more comprehensive understanding of environmental impacts but also facilitates the identification of more effective mitigation and offset strategies. Implementing landscape/systems-based EIAs can lead to better nature-positive outcomes by ensuring that development projects contribute to the restoration and enhancement of ecosystems rather than merely compensating for losses. This shift aligns with the growing emphasis on achieving net biodiversity gains and supports the goals of recent environmental policies aimed at reversing biodiversity decline. Moreover, landscape/systems-based EIAs can streamline the approvals process by providing clearer, more robust evidence of environmental impacts and mitigation measures. This can enhance regulatory confidence and reduce delays associated with inadequate or contested assessments.

# DIEBACK-FREE GRAVEL - INNOVATIONS TO ADDRESS AN ONGOING CHALLENGE

**MR BRUNO RIKLI,** *DIEBACK WORKING GROUP*

**Co-authors:**

Miss Pip Soulsby, *Dieback Working Group*

Mr Garnet Gregory, *Dieback Working Group*

**Lead Author Biography:**

Bruno is a DWG Project Manager and scientist, Director of BARK Environmental Consulting and environmental biosecurity specialist. He has over 30 years of experience managing projects in conservation reserves, forestry and regulatory roles in government. He is one of a few long-serving qualified Dieback Interpreters in Australia and enjoys listening to First Nations people and communicating knowledge, science and policy into practical land management initiatives to Care for Country the Right Way

**Abstract:**

The construction and maintenance of Australia's road network relies on importing basic raw materials (BRM) such as gravel and sand for essential access. In WA alone, more than 8 million cubic meters of laterite gravel is required every year for civil works. If BRM used for construction contains *Phytophthora cinnamomi* (a soilborne water mould that destroys the roots of susceptible plants) spores, they can spread and ultimately impact threatened species and ecological communities.

The current process for obtaining Phytophthora Dieback-free BRM is unsustainable as it relies on clearing intact native vegetation to access the soils beneath it. Novel approaches to accessing dieback-free BRM have seen significant breakthroughs in recent years, through collaborative research projects with Curtin University and WA State Government. Work published by Dr Elaine Davison on sterilisation of gravel presents a novel and promising solution to this challenge, demonstrating that Phytophthora can be eliminated from over 94% of samples.

The Dieback Working Groups (DWG) BRM sub-committee has released the 2021 Best Practice Guidelines for Management of Phytophthora Dieback in the Basic Raw Materials Industries, which outlines how to minimise the risk of infestation at all stages of the exploitation of this important resource.

DWG secured a $2.4 million Saving Native Species Threat Innovation Federal Government grant in which the funding will be used to research, trial and promote the application of an innovative soil-fumigation methodology to mitigate the spread of *Phytophthora cinnamomi*.

This project is funded by the Australian Government Saving Native Species Program, for innovative projects, including new technologies, methods and tools, to reduce threats to threatened species and ecological communities.

# SALT SHOCK: REVIEWING THE SUBLETHAL IMPACTS OF HYPERSALINITY ON ESTUARINE BIOTA

**MR BEN ROOTS,** *MURDOCH UNIVERSITY*

**Co-authors:**

Mr Josh Nitschke, *Flinders University*

Dr James Tweedley, *Murdoch University*

Dr Essie Rodgers, *Murdoch University*

**Lead Author Biography:**

I am a marine biology PhD candidate, specialising in ecophysiology and benthic ecology. I have a background in marine invertebrate community ecology, and experienced in fish community ecology, and am passionate about all things invertebrates.

**Abstract:**

Climate change and anthropogenic modifications to freshwater flow are increasing the magnitude and duration of the hypersaline (>40 ppt) conditions in estuaries. While the lethal effects of hypersalinity, such as fish kills, are well-documented, the sub-lethal impacts are less studied. We undertook a global review aimed to, for the first time, chronicle these sub-lethal impacts and generalise them across the multiple levels of organisms, encapsulating estuarine flora (phytoplankton, seagrasses, mangroves, and salt marshes), fauna (invertebrates, fish, mammals, reptiles, and birds), and identify discrete salinity thresholds that cause major shifts in their biology. Hypersalinity was found to be a major stressor acting on organisms, increasing energetic demands through the need to osmoregulate/reduce permeability and maintain essential functions. This can often come at the cost of growth, leading to reduced body/leaf size and changes in energy allocations towards managing oxidative stress, while also decreasing habitat size in plants. Increasing salinity reduces the taxonomic and functional diversity of faunal assemblages, decreasing resilience and the provision of ecosystem services (e.g. nutrient cycling). Moreover, trophic pathways are simplified, reducing dietary breadth and the amount of energy consumed by higher-order consumers, including fish, mammals and migratory birds. This can result in emaciation, lower resistance to disease, changes in distribution and reduced breeding success. As estuaries and their faunas provide extensive societal benefits, hypersalinity can deleteriously impact cultural values, recreational amenity and economic yields from tourism and/or fisheries. The impacts of sub-lethal hypersalinity are still relatively understudied, and with hypersalinity predicted to increase in the future, greater focus should be placed on pinpointing sublethal thresholds and further understanding the impacts of hypersalinity on ecosystem function.

# BEYOND SPECTRAL VARIATION: CHARACTERIZING ECOLOGICAL NICHES THROUGH SPECTRAL-STRUCTURAL DATA FUSION FOR CONSERVATION

**A/PROF PETER SCARTH,** *OZIUS PTY LTD*

**Co-authors:**

Mr Tim Hackwood, *Ozius Pty Ltd*

Mr Sam Gillingham, *Ozius Pty Ltd*

Ms Alisa Starkey, *Ozius Pty Ltd*

Mr Ben Starkey, *Ozius Pty Ltd*

**Lead Author Biography:**

Dr. Peter Scarth, Ozius Director & CTO and UQ Adjunct Assoc Prof (PhD UQ). Expert in remote sensing across terrestrial/aquatic systems (LiDAR, SAR, optical) & AI/big data for landscape ecology. Nearly 30 years of experience developing validated mathematical models & operational systems for large-scale vegetation monitoring (cover, structure, change). Works to democratise spatial data access, translating complex environmental data into actionable insights for science, policy & land management.

**Abstract:**

Rapid global change demands innovative methods for monitoring landscape-scale biodiversity features crucial for conserving Earth's natural habitats. We present a novel approach integrating Sentinel-1 radar, Sentinel-2 optical, GEDI LiDAR, and climate datasets to map fine-scale ecological niches and inform biodiversity conservation actions. This data fusion generates detailed spatial models characterising horizontal cover dynamics and vertical structure across diverse ecosystems.

Our methodology combines spectral variation with structural endmember analysis, synthesising multidimensional 'ecological facets ‘discrete combinations of vegetation structure, spectral reflectance, climatic regimes, and dynamic cover conditions. These ecological facets represent unique environmental niches conceptualised by Hutchinson (1957), capturing both realised and fundamental niches within spatially explicit frameworks. By representing niche space as multidimensional convex hulls in ecological data space, our approach identifies the purest examples ecological endmembersacross extensive landscapes.

Applied to New Zealand and Australia, our maps demonstrate that spectral and structural variability from advanced satellite data effectively captures niche diversity. This approach expands on the Spectral Variation Hypothesis by incorporating structural complexities that traditional spectral methods often overlook. Furthermore, our method captures environmental trajectories over time, tracking shifts in ecological conditions amid climate variability and human disturbances.

Our results showcase innovative tools for mapping and monitoring ecological niches with unprecedented spatial and temporal detail. They provide essential guidance for targeted conservation and restoration, improving our ability to respond to biodiversity loss. This supports informed decision-making and meaningful progress toward a Nature-Positive future.

# EMPOWERING DECISION-MAKERS WITH ACCESSIBLE BIODIVERSITY DATA

**MS JULIET SEERS,** *CSIRO/ATLAS OF LIVING AUSTRALIA*

**Lead Author Biography:**

Juliet Seers is passionate about making biodiversity data accessible and useful. As the Training and Outreach Coordinator at the Atlas of Living Australia, she works with environmental consultants, ranger groups, and government stakeholders to help them leverage ALA data for better decision-making. With a background in environmental communication and training, Juliet helps diverse groups use the platform more effectively to support their workflows and meet their unique needs.

**Abstract:**

A nature positive future will require biodiversity data that is accessible and consistently organised, so it can be easily understood, shared, and prepared for real-world use. The Atlas of Living Australia (ALA) is a national data platform that brings point-based biodiversity occurrence data together in a central location, already making over 140 million records accessible. Despite this, the ALA currently underrepresents data from high quality, structured biodiversity surveys from the private sector.

In Western Australia (WA), the Index of Biodiversity Surveys for Assessments (IBSA) captures much of this valuable information. However, due to inconsistent formatting, this data remains disconnected from the ALAs main infrastructure.

This is more than just a technical gap it's a missed opportunity. The private sector, particularly in resource-rich regions, holds large volumes of high-quality data that could fill critical knowledge gaps, especially in under-surveyed areas. Without standardised formats and shared protocols, much of this data remains siloed and underutilised.

This talk highlights the real opportunity to foster better collaboration across government, industry, and science to support decision-making and accountability in a nature positive future.

# NATIVE BEE SURVEYS AT WALYARTA CONSERVATION PARK. INCORPORATING CULTURAL KNOWLEDGE AND WESTERN SCIENCE TO REVEAL HIGH NATIVE BEE VALUES

**MR BOB SMITH,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Bruce Greatwich*, Department of Biodiversity, Conservation and Attractions*

Kit Prendergast, *Curtin University / University of Southern Queensland*

Nyangumarta Rangers

Mr Jacob Loughridge, *Yamatji Marlpa Aboriginal Corporation*

Mr Danny Barrow, *Department of Biodiversity, Conservation and Attractions*

Ms Nicole Godfrey, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Nyangumarta Rangers. Nyangumarta Warrarn Aboriginal Corporation. Bruce Greatwich: Conservation Coordinator for DBCA West Kimberley. Bob Smith: Eighty Mile Beach Operations Officer for DBCA West Kimberley. Dr Kit Prendergast: Curtin University researcher and independent native bee expert.

**Abstract:**

Native bees play a critical role in maintaining ecosystem health and the honey they produce remains an important resource for Traditional Owners. Despite their deep cultural significance, in many areas little is known of their ecology from a western science perspective. Through a collaborative partnership between Nyangumarta Warrarn Aboriginal Corporation, the Department of Biodiversity, Conservation and Attractions and native bee scientist Dr Kit Prendergast, a two-way science project was established to uncover the diversity of native bees and plant species associations, in Walyarta Conservation Park on Nyangumarta Warrarn.

Walyarta Conservation Park is situated 200 km south of Broome and is in a formal joint management partnership between Nyangumarta Warrarn Aboriginal Corporation, Karajarri Traditional Lands Association and DBCA. It is an area of significant cultural and environmental values. The joint management arrangement creates a path for relationship and capacity building, consultation and learning between partners. Through this pathway, sugarbag bee (*Austroplebeia essingtoni*) was identified as a species of high value to Nyangumarta people due to its sought after honey food resource.

We undertook surveys for sugarbag bee as well as other native bee species and over three years have revealed a high species richness, evident by 36 taxa recorded thus far. Six of these may be undescribed species and a further 3 taxa appear to be previously never recorded and new to science. Melaleuca spp. have been identified as critical host species. This project has allowed working together as one incorporating cultural, ecological and latest scientific knowledge. Results further highlight the biodiversity values of Walyarta and reinforces importance of threat management programs. Future work includes working with

Bidyandanga school, additional surveys during peak flowering periods and formal description of undescribed species.

# SOCIO-ECONOMIC OUTCOMES AND RISKS IN ECOSYSTEM RESTORATION

**DR ALAYA SPENCER-COTTON,** THE UNIVERSITY OF WESTERN AUSTRALIA

**Co-authors:**
Dr Abbie Rogers, *The University of Western Australian*

**Lead Author Biography:**
Alaya Spencer-Cotton is an environmental economist and Research Fellow at the UWA Centre for Environmental Economics and Policy. With a background in marine and environmental science, her research explores how people value nature, using survey and behavioural for better decision-making about managing natural resources. Her current work focuses on coastal and marine values, nature repair, and public preferences and social licence for offshore wind energy in Australia.

**Abstract:**
Achieving nature-positive outcomes through marine and coastal restoration requires a clear understanding of the social and economic dimensions of success, as well as the risks these dimensions may pose to overall project success. This work explores existing knowledge on the socio-economic outcomes and associated risks of restoration and nature-based solutions in Australia. Drawing on a network of experts and a desktop review of published studies, project databases, and existing frameworks, we are developing a framework for identifying and evaluating key outcomes such as community engagement, economic opportunity, and social equity. The work also highlights common barriers and sources of uncertainty that can affect project success. These insights are intended to support more informed planning, investment decisions, and transparent evaluation of restoration success ultimately helping to de-risk nature repair activities and guide implementation aligned with national biodiversity and climate targets.

# BIODIVERSITY MATTERS FOR ECOLOGICAL RESILIENCE OF NATURE-BASED SOLUTIONS

**PROF RACHEL STANDISH,** *MURDOCH UNIVERSITY*

**Co-authors:**

Dr Tina Parkhurst, *University of Melbourne*

**Lead Author Biography:**

Professor Rachel Standish is a plant ecologist with over 25 years of experience in the application of ecological theory towards nature repair. She leads a research team focused on healing country in mining, agricultural and urban landscapes for nature-people benefits. Dr Tina Parkhurst is an ecologist motivated to reverse the tide of ecosystem degradation in Australia and across the globe. She is developing tools to embed ecosystem assessments into corporate nature-related disclosures.

**Abstract:**

The concept of ecological resilience, that is the ecosystems capacity to persist after disturbance, is one of the most perplexing in restoration ecology science and practice. At best, it can inform restoration interventions and offer certainty to proponents by deliberately managing for persistence after disturbance. At worst, it can be used as a hook to attract attention without proper consideration of attributes that support ecological resilience. Here, we review how ecological resilience has been conceptualised in the context of Nature-based Solutions (NbS). These are actions that address societal challenges such as climate change, biodiversity loss and sustainable development, to benefit people and nature. We offer an ecological perspective of the developing practice, suggest interventions to target resilience mechanisms, and identify knowledge gaps. We will show for example, that ecological resistance is overlooked in NbS despite its importance as an ecosystem response to climate change. Additionally, while there is increasing recognition of the role of biodiversity in contributing to ecological resilience, it is underreported in NbS project assessments at some levels of biological organisation. While confusion about the concept of ecological resilience lingers, we argue that where it is applied with intent, it can help guide interventions towards a nature positive future. We will showcase effective NbS that incorporate diversity across all levels of biological organisation and discuss others that require more research to understand their contribution to nature positive outcomes. We conclude with a suggested way forward for creating resilient NbS in the context of Australia's nature repair market.

# IMPLEMENTING THE RABBIT BIOCONTROL PIPELINE STRATEGY FOR SUSTAINABLE SUPPRESSION OF RABBIT IMPACTS

**DR TANJA STRIVE,** *CSIRO*

**Co-authors:**

Dr Elena Smertina, *CSIRO*

Dr Masood Azeem, *CSIRO*

Ms Mega Pavy, *CSIRO*

Dr Nias Peng, *CSIRO*

Dr Omid Fahri, *CSIRO*

Dr Maria Jenckel, *CSIRO*

A/Prof Michael Frese, *University of Canberra*

Dr Ina Smith, *CSIRO*

**Lead Author Biography:**

Dr Tanja Strive is based at CSIRO Health and Biosecurity in Canberra. Since 2002 she has worked on a series of projects investigating lethal and non-lethal biocontrol options for a range of feral animal species, including foxes, mice, cane toads and rabbits. During the past 15 years Tanja has led a project portfolio aimed at developing a pipeline of biocontrol tools for European rabbits, exploring both classical viral biocontrol and, more recently, genetic control technologies.

**Abstract:**

European rabbits are one of Australia's most damaging environmental and agricultural pests. They affect over 300 native species through competition, land degradation, and by sustaining high levels of feral predators such as cats and foxes. Self-spreading viral biocontrol agents such as the Myxoma virus and rabbit haemorrhagic disease viruses (RHDVs) have proven to be the only effective means of sustained, continental-scale rabbit control since the 1950s, allowing many fragile ecosystems to partially recover from the devastating impact of rabbits. The most recent rabbit virus to have a significant impact on rabbit numbers was a variant RHDV (RHDV2) that arrived in Australia in 2014 and has since reduced rabbit populations by 60% on average. However, most biological control agents will eventually lose their effectiveness due to resistance development in the rabbit and/or changes in population immunity levels. A pipeline that can generate new biocontrol agents every ten to 15 years is therefore critical to maintain the long-term benefits of continent-wide sustainable rabbit suppression.

In line with the rabbit biocontrol pipeline strategy, we recently developed a robust cell culture system that supports the replication and passaging of RHDVs outside of rabbits for the first time in over 40 years. The new culture system that can also be used to confirm the species specificity of RHDVs, provides an experimental platform for the guided and accelerated evolution of novel RHDV variants as possible future biocontrol agents. An economic ex-ante assessment suggests that a hypothetical new self-spreading virus variant with impacts similar to RHDV2 would generate AUD$ 1.43 billion in economic benefits over 40 years, with a benefit-cost ratio of 88:1. If successful, this approach could be used repeatedly for the selection of additional virus variants for subsequent releases as registered biocontrol agents in ten-year intervals.

# NGOOLYARK AND GNOW IN THE NEIGHBOURHOOD

**MR JOHNNY RODD,** BADGEBUP ABORIGINAL CORPORATION

**Co-authors:**

Ms Robyn Nicholas,

Derani Sullivan,

**Lead Author Biography:**

Robyn is a Biologist who is the Program Manager - Environment for South West NRM. Robyn has 35+ years experience in Project Management in the environmental sustainability industry and is responsible for developing project concepts for investment on environmental conservation, including to develop, manage, and implement budgets to achieve program outcomes. Robyn is a strong collaborator and is responsible for fostering and maintaining stakeholder relationships at a local and regional level.

**Abstract:**

Effective biodiversity conservation outcomes increasingly depends on inclusive approaches that recognise and integrate Indigenous knowledge systems. South West Natural Resource Management (SWNRM) have partnered with Badgebup Aboriginal Corporation (BAC), Birdlife Australia and National Malleefowl Recovery Group (NMRG) Inc. to deliver the "Ngoolyark and Gnow in the Neighbourhood" project. Birdlife Australia and BAC rangers conduct annual surveys of Carnaby Black Cockatoo (Ngoolyark) known nesting sites, locally to Badgebup to determine breeding activity status. SWNRM and BAC are engaging with landholders to undertake fencing and revegetation activities to increase Carnaby's foraging habitat. The actions implemented align with the Carnaby's Cockatoo Recovery Plan.

This project also surveys potential Malleefowl (Gnow) habitat in local nature reserves through Lidar surveys, followed by ground truthing by the BAC Rangers. NMRG and SWNRM provide training to BAC rangers to build their capacity and engagement in the management of threatened species. SWNRM are engaging with local landholders to create habitat corridors to benefit Malleefowl. These activities align with the recovery actions in the National Malleefowl Recovery Plan. Since the late 1940s the species has suffered a 30% contraction in range, 50% decline in population, and disappeared from more than a third of its breeding range (Saunders 1990; Johnstone & Storr 1998; Saunders & Ingram 1998; Garnett et al. 2011).

This project provides a collaborative approach while combining traditional ecological knowledge with scientific methods while enhancing knowledge on two threatened bird species. The shared decision making has enhanced trust and capacity amongst project partners. This presentation will share outcomes, challenges and lessons learned while offering an opportunity for ethical and impactful threatened species conservation.

# SAFEGUARDING ENDEMIC AQUATIC SPECIES IN URBAN RIVERS

**MS SUZANNE THOMPSON,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Ms Michelle VanCompernolle, *Department of Biodiversity, Conservation and Attractions*

Mr Thomas Ryan, *Murdoch University*

Dr Peter Novak, *Department of Biodiversity, Conservation and Attractions*

Ms Amie Gillies, *Department of Biodiversity, Conservation and Attractions*

Dr Kerry Trayler, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Suzanne is an environmental officer with Rivers and Estuaries Science at Dept of Biodiversity, Conservation and Attractions. Her career in river and estuary management has shifted from estuarine water quality monitoring and interventions, to focus more on freshwater ecology. Her research supports efforts to better understand and protect aquatic ecosystems in the face of growing urban and climate pressures.

**Abstract:**

Urban rivers face a wide range of anthropogenic threats, such as pollution, sedimentation, loss of habitat, altered flow regimes, invasive species and continuing pressure from climate change and reduced rainfall. In Perth, the Canning, Southern and Wungong rivers are vital freshwater habitat which is under increasing pressure from urbanisation. The rivers are known to support aquatic biodiversity endemic to the region, but the impact of urbanisation on the viability of their aquatic communities needs to be better understood to target management and potential interventions. To address this, we intensively surveyed the biodiversity of ten river pools for a period of one year, focusing on fish, crayfish, turtles, macroinvertebrates and the threatened Carters freshwater mussels (*Westralunio carteri*), together with water and sediment quality, river flow and in-stream habitat. Overall, we documented >20,000 fish and crayfish spanning ten endemic and nine introduced species, including one introduced fish species (*Empire gudgeon*) not previously detected in the system. We used visible implant elastomer (VIE) and passive integrated transponder (PIT) tags to understand residency and population sizes within pools as well as document connectivity between pools for native species. We found that populations of the iconic freshwater cobbler (*Tandanus bostocki*) and the oblong turtle (*Chelodina oblonga*) were more connected and in higher numbers than expected. Through these biodiversity, habitat and water quality surveys, we better understand the minimum habitat criteria for healthy communities of endemic freshwater fauna. These criteria will be applied in a trial intervention in one of the pools to improve habitat and aquatic biodiversity. Our study will form the baseline data to which post-intervention surveys can be compared to evaluate the success of the intervention in meeting ecological objectives.

# GPS TRACKING OF THE PILBARA GHOST BAT

**MR JOHN TRAINER,** *RIO TINTO*

**Co-authors:**

Mr Scott Reiffer, *Rio Tinto*

Mr Robert Bullen, *Bat Call WA*

**Lead Author Biography:**

BSc Zoology UWA Zoologist undertaking research and monitoring of threatened fauna in the Pilbara for Rio Tinto

**Abstract:**

The Ghost Bat (*Marcroderma gigas*) is a threatened species, and little is known about its foraging habits. This is especially true in the Pilbara, where the arid environment differs greatly to the environment in the rest of the species range.

Recent developments in technology have allowed GPS tags to be light enough for use on Ghost Bats and for batteries to last long enough to capture useful and accurate ecological information. Rio Tinto Ecologists partnered with Robert Bullen to explore the use of this new technique.

This study presents the findings of over 60 GPS tracked individuals at multiple sites across the Pilbara, providing a detailed look into this enigmatic species pattern of life.

Foraging occurred across a varied and broad range of habitat and vegetation types, typically with 30-70% ground cover, which matches their foraging strategy of perch and ambush. Nightly foraging distances ranged from 2km to 26km from the roost with a one-way dispersal of 16.5 km also being recorded.

Additional data presented includes foraging strategies, foraging site fidelity, time spent outside of the roost, roost site fidelity, intraspecific competition, and resource partitioning.

This data is hoped to provide better conservation outcomes for the species not only in the Pilbara but across its range.

## WAMSI WESTPORT MARINE SCIENCE PROGRAM SYMPOSIUM

**DR LUKE TWOMEY,** *THE WESTERN AUSTRALIAN MARINE SCIENCE INSTITUTION &* ***MR PATRICK SEARES****, WESTPORT*

**Co-authors:**

Mr Cameron Dodd, *University of Western Australia*

Ms Shelby Middleton*, Edith Cowan University*

Mr Jake Newman-Martin, *Curtin University*

Dr Linette Umbrello, *Western Australian Museum*

**Lead Author Biography:**

Luke is chief executive of the Western Australian Marine Science Institution and has been leading WAMSI's strategic research programs and initiatives since 2017. He is a phytoplankton ecologist with experience across the fields of environmental impact assessment, management, research and teaching in estuarine, nearshore and offshore environments, both in Australia and internationally.

Patrick Seares has extensive environmental expertise and engagement experience. He is the managing director of the cross-government Westport team which works with the Department of Transport in planning the future port at Kwinana's Outer Harbour, supporting road/rail network, the transition from Fremantle Inner Harbour, and supporting key government priorities such as the Western Trade Coast's Global Manufacturing Hub and future growth of Kwinana.

**Abstract:**

The WAMSI Westport Marine Science Program is the largest and most comprehensive marine research initiative undertaken in Cockburn Sound, Western Australia. In this talk, Dr Luke Twomey, CEO of the Western Australian Marine Science Institution (WAMSI), and Patrick Seares, Managing Director of Westport, will discuss its structure, key outcomes, and important legacy.

The program comprises 32 projects under nine interconnected themes - benthic habitats, fisheries and aquatic resources, sediment and water quality, coastal processes, hydrodynamics, apex predators, underwater noise, and social values. Central to the program is Theme 1: Ecosystem Modelling and Integration, which turns outputs from all other themes into predictive tools and conceptual models to support port design and environmental assessment. More than 150 researchers have produced a huge body of scientific knowledge, including baseline environmental data, ecological thresholds, and recommendations for mitigation and restoration. These outputs are influencing Westport's planning and approvals process.

This joint presentation will highlight how the program's collaborative and integrated structure has created a model for transparent, science-informed infrastructure development. The legacy of the WAMSI Westport Marine Science Program lies in its role as a catalyst for long-term stewardship of Cockburn Sound's natural and cultural values.

# LAND SYSTEMS, SOILS AND VEGETATION SURVEY OF THE GREAT WESTERN WOODLANDS OF WESTERN AUSTRALIA AND SOUTHERN GOLDFIELDS

**MR PETER-JON WADDELL,** *DEPARTMENT OF PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT*

**Co-authors:**

Mr Peter-Jon Waddell, *Department of Primary Industries and Regional Development*

Mr Paul Galloway, *Department of Primary Industries and Regional Development*

**Lead Author Biography:**

Peter-Jon (PJ) Waddell is a landscape ecologist presently working in the Western Australian Department of Primary Industries and Regional Developments (DPIRD) Rangeland Science section. PJ holds post-graduate qualifications in Biology and Geology, and has travelled extensively throughout rangeland environments in Australia and overseas working in the exploration and pastoral industries as well as on conservation and restoration projects.

**Abstract:**

Situated in the heart of southern Western Australia (WA), the Great Western Woodlands represent the world's largest intact Mediterranean-climate woodland ecosystem. Dominated by diverse Eucalyptus species, this unique region comprises a mosaic of woodlands, mallee, shrublands, and grasslands, and supports over 4,200 plant taxa including nearly one-third of all eucalypt species in Australia (Watson et al. 2008). Despite its global ecological value, the area also referred to as the southern Goldfields has long been impacted by European colonisation, with mining and pastoralism being the primary industries. These pressures have challenged the conservation and sustainable management of the regions natural assets.

Until recently, the southern Goldfields remained the last large area in WA without a comprehensive biophysical resource condition survey. A newly completed study now addresses this gap, covering 151,753 km of the Great Western Woodlands. It delivers detailed land system mapping and refined soil-landscape zone delineation at 1:250,000 scale. The accompanying report describes the areas geomorphology, soils, and vegetation, providing both revised and new physiographic insights.

The survey advances prior studies by refining mapping in alignment with WA and national standards, enabling consistency in data presentation and analysis across regional and national scales and complementing the Biogeographic Regionalisation of Australia. Through WAs hierarchical soil-landscape mapping system, the data can be interpreted within broader regional, statewide, and national contexts.

The comprehensive baseline data generated by this survey advances understanding of ecological processes and environmental stressors in the Great Western Woodlands. It provides critical support for land use planning, resource management, conservation, monitoring, and sustainable development, ensuring that stakeholders have the knowledge needed to balance ecological preservation with economic use.

# KEEP CARNABYS FLYING NGOOLARKS FOREVER: USE OF WILDLIFE HEALTH AND ECOLOGY RESEARCH TO INFORM ON-GROUND CONSERVATION MANAGEMENT ACTIVITIES

**PROF KRISTIN WARREN,** *MURDOCH UNIVERSITY*

**Lead Author Biography:**

Professor Kris Warren has worked in the field of Wildlife, Zoological and Conservation Medicine for over 20 years and is Section Head of the Conservation Medicine Program at the School of Veterinary Medicine, Murdoch University. Prof. Warren was appointed as a Diplomate of the European College of Zoological Medicine in the Specialty of Wildlife Population Health, and is a Member of the Zoological Parks Authority Board for Perth Zoo.

**Abstract:**

Murdoch University has been conducting health and ecology research on threatened black cockatoo species in south-west Western Australia for eighteen years. We used the findings of this long-term research to inform a large-scale community engagement project, Keep Carnaby's Flying Ngoolarks Forever. Over a two-year period, this project involved Murdoch University's black cockatoo research team working alongside Aboriginal organisations and environmental and wildlife NGOs, in collaboration with eight local governments, to undertake community-based awareness raising and on-ground action to address the plight of the birds in urban and peri-urban areas. Conservation management activities within the project included revegetation using black cockatoo food trees, particularly at locations within daily foraging distance of roosts as identified by our research, and installation of Cockitrough watering stations at strategic locations, informed by research findings about the risks to black cockatoos from lack of access to clean drinking water. The research team developed locality-specific Black Cockatoo Conservation Action Plans, informed by the research data, to help councils identify how best to protect black cockatoos and their foraging and roost habitat, and mitigate local-level threatening processes. During the project, 49,317 tube stock and 592 advanced trees that are food species were planted at 40 sites, and eleven Cockitrough watering stations were installed across the eight local government areas. Local governments that participated in the project have continued to implement the recommendations outlined in their Black Cockatoo Conservation Action Plans, which align with key biodiversity conservation objectives in the councils own strategies and plans, and with national Recovery Plans for these species. The project demonstrates the value of using wildlife research data to inspire evidence-informed on-ground conservation actions.

# INTEGRATING ECOLOGICAL, SOCIAL AND CULTURAL VALUES OF WAS COASTAL WATERS: THE CASE OF DUGONGS AND TURTLES ON YAWURU NAGULAGUN

**YAGARRAJALAJALAN NAGULA BURU PROJECT TEAM**

**Co-authors:**

Dr Jenna Hounslow, *Murdoch University*

Mr Dean Mathews, *Nyamba Buru Yawuru*

Mr Lloyd Pigram, *Nulungu Research Institute, UNDA*

Mr Wil Bennett, *Department of Biodiversity, Conservation and Attractions*

Dr Jenna Hounslow, *Murdoch University*

Dr Adrian Gleiss, *Murdoch University*

Dr Halina Kobryn, *Murdoch University*

Dr Michael Hughes, *Murdoch University*

Dr Rochelle Steven, *Murdoch University*

Ms Carmela de Benito Abello, *Murdoch University*

Ms Danielle Godwin, *Murdoch University*

Dr Melissa Marshall, *University of Notre Dame Australia*

Ms Julie Melbourne, *Nyamba Buru Yawuru*

Mr Jason Richardson, *Department of Biodiversity, Conservation and Attractions*

Ms Jaz Cook, *Department of Biodiversity, Conservation and Attractions*

Dr Sabrina Fossette, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Postdoctoral Research Fellow disentangling animal movement from BIG data. Project Manager - Yagarrajalajalan nagula buru - we all care for saltwater Country.

**Abstract:**

Indigenous Knowledge and Western Scientific Knowledge are fundamentally different world views, yet both are essential for effective joint management of shared marine resources in cross cultural environments. In Northern WA, Traditional Owners have strong cultural connections to and a long-standing tradition of harvesting green turtles and dugongs, species of high conservation and economic value. Diverse stakeholders with different interests hold divergent value-systems, with conflicting perspectives acting as potential barriers to management and custodianship.

We present a transdisciplinary, cross-cultural project Yagarrajalajalan nagula buru: we all care for saltwater Country, a partnership of Traditional Owners, scientists, and conservation managers. Social-cultural- and ecological research methods are combined to provide necessary data and a blueprint to support two-way knowledge sharing for effective communication, equitable decision making and enhanced custodianship of shared marine resources.

The project will identify how turtles, dugongs, and humans all use and value Yawuru Nagulagun Roebuck Bay Marine Park (YNRBMP), in and around Broome (WA), the first jointly managed marine park in WA. Where do they go and why? Are these uses compatible with each other? How can the research be

equitably communicated? How can this help ongoing connection to Country and improve broader understanding of cultural responsibility?

In this overview, we describe the early stages of the project, including assembling of project participants, deriving project objectives, and the cultural immersion marking the official start of the project. We will also share some highlights and lessons learned from project activities, including co-designed and co-delivered field campaigns to track turtles and dugongs, and participatory mapping interviews conducted across users of YNRBMP. Our journey to date will offer important insights that lead to genuine partnerships in the future.

# NEXT-GENERATION BIOWASTE AND ENVIRONMENTAL CLEAN UP SOLUTIONS: UNLOCKING NATURE POSITIVE FINANCE AND SCALABLE ECOSYSTEM IMPACT

**HAMMAD ZULQADAR, MANAGING PARTNER, SEADRA ENERGY INC**

**Lead Author Biography:**

After completing his degrees in biomedical engineering and medical anthropology in Cleveland Ohio, Hammad started his career in medical research and technology. His passion for environmental conservation, supporting recycling of waste materials and development of the circular economy saw Syed establish Seadra Energy in 2015. The company in conjunction with specialist partners from Europe was set up with a focus to develop projects at the nexus of energy security and environmental restoration. A key focus of the organization being developing sustainability-oriented projects addressing UNSDG's 6, 7, 9, 12, 13, 14 and 15 as the key guiding principles used to deliver successful outcomes for the triple bottom line - planet, people, and profit.

**Abstract:**

Advanced biowaste processing technologies can produce cost competitive carbon-neutral or negative renewable biofuels and circular by-products, offering measurable environmental benefits across terrestrial, freshwater, and marine ecosystems. These technologies create new finance pathways for nature-positive projects and demonstrate scalable approaches to ecosystem restoration and regenerative solutions.

# ABSTRACTS

## SPEED TALKS

# CATAXIA ON THE EDGE: RANGE CONTRACTION OF MONTANE MYGALOMORPHS

**DR KARLENE BAIN,** PYTHON ECOLOGICAL SERVICES

**Co-authors:**
Ms Sarah Comer, *Department of Biodiversity, Conservation and Attractions,*
Ms Barbara York Main, Deceased, *Formerly of University of Western Australia*

**Lead Author Biography:**
Highly experienced wildlife ecologist with over 30 years in biodiversity research, survey and management. Specialising in disturbance response research, conservation strategy development, and stakeholder collaboration to increase capacity and enhance biodiversity protection across WA. Particular interest in threatened species conservation, *mygalomoph* and marsupial fauna, relictual habitats and communities, short-range endemic taxa and marine species and environments.

**Abstract:**

Large shifts in species distributions are projected under future climate scenarios, yet few studies document these changes over time, particularly for invertebrates. We report major declines in range and abundance over 22 years for four endemic trapdoor spider species (*Cataxia sandsorum, C. stirlingi, C. colesi, C. barrettae*) in Western Australia's Stirling Range National Park. Presence absence surveys in 2002 and 2024, spanning >250 km of replicated traverses, were complemented by detailed burrow density and microhabitat assessments across 293 quadrats in 17 subpopulations.

Subpopulations ranged from dense, localised clusters (*C. barrettae*) to widely dispersed individuals (*C. stirlingi*), but all species showed 55 90% reductions in area of occupancy and >95% declines in burrow density. Losses were most severe at lower elevations and in areas affected by repeated intense fires. These sites also had fewer juveniles and recruits. Remnant populations persist in cool, moist gullies at higher elevations, where orographic cloud, rocky terrain, and microhabitat complexity offer climate buffering and fire refuge. Species distribution models highlight the environmental variables currently supporting occupancy in these refugia.

Despite historically high persistence due to their longevity and deep-burrowing habits, these species are now declining rapidly. Their narrow habitat requirements and poor dispersal capacity leave them highly vulnerable to increasing climate and fire pressures. Surface and shallow-burrowing relictual taxa may face even greater risks. Urgent conservation action is needed to prevent species extinctions and could include habitat protection and restoration, microclimate enhancement, fire regime management, assisted recolonisation, management of ongoing connectivity, long-term monitoring programs, legislative and policy integration, and community and stakeholder engagement.

# FAUNA INVESTIGATIONS IN EIA; IS THE ENVIRONMENT GETTING VALUE FOR MONEY?

**DR MIKE BAMFORD**, *BAMFORD CONSULTING ECOLOGISTS*

**Lead Author Biography:**

Mike and Mandy Bamford have run a small, independent consultancy for 40 years, specialising in wildlife research and science communication, and often engaged in investigations and monitoring for environmental impact assessment. They have conducted hundreds of surveys for EIA and have developed targeted assessment guidelines for a suite of conservation significant species including Black-Cockatoos, and for new challenges such as windfarms.

**Abstract:**
The approach to fauna investigations in EIA is guided by state and federal guidance, with an emphasis on surveys. This assumes that we need to know (and it is possible to know) what is there to assess impacts and inform the key objective of the EPA with respect to development and fauna, which is to 'protect terrestrial fauna so that biological diversity and ecological integrity are maintained.' But do surveys really provide the information we need?

With an annual budget of roughly $200 million, surveys are a large investment in the environment; but they are inefficient and consider <5% of the fauna assemblage. Typical surveys for vertebrate fauna confirm about half the species that may use an area, cannot consider annual variation, cannot address ß-diversity, and common sampling methods, such as pitfall trapping for reptiles, under-sample some groups. Invertebrate surveys address a tiny proportion of the invertebrate assemblage and disregard the estimated 80% of the invertebrate assemblage that are undescribed. Can these resources be better-directed for EIA and good conservation outcomes?

It is proposed that investigations should be an ecological assessment aimed at understanding how a proposed development will interact with the fauna assemblage and the environment that supports that assemblage. This needs some information on the fauna assemblage, the context of the site, ecosystem processes operating in the site, and a risk assessment of threatening processes. This approach is framed around the ecosystem, its context and how a proposal interacts with it via threatening processes. In such a framework, surveys assess the landscape and identify and gather data on key species, and can provide baseline data for long term monitoring of impacts and of mitigation measures. Some of the $200 million annual budget could go to monitoring a network of sites across WA, and to funding mitigation measures within and beyond the boundary of individual projects.

# CHUDITCH USE OF A POST-MINING LANDSCAPE

**DR JUSTINE BARKER**, *ALCOA*

**Co-authors:**

Dr Lucy Commander, Alcoa

Miss Melissa Jensen, Stantec

**Lead Author Biography:**

Justine is a fauna ecologist within the Environmental Research team at Alcoa of Australia. Her expertise lies in investigating the ecology of threatened vertebrate species, with a primary focus on developing strategies to mitigate potential impacts on their populations.

**Abstract:**

The Northern Jarrah Forest (NJF) in the South West of Western Australia has a long history of disturbance since European settlement including logging, altered fire regimes, and mining. The loss of suitable habitat from such disturbances can impact the behaviour and persistence of wildlife. Alcoa mines bauxite within the NJF, which involves developing small, shallow pits in a mosaic pattern interspersed with unmined jarrah forest. These pits are progressively rehabilitated as mining ends. The Alcoa research team has undertaken research over several decades into optimal post-mining rehabilitation strategies to ensure the return of a functional ecosystem. A key part of this is ensuring all faunal groups are returning and using the rehabilitated forest. Using GPS collars, we investigated how Chuditch use the mosaic landscape comprising unmined forest areas, rehabilitated forests of various ages, areas of active mining, and the roads and tracks within these areas. Chuditch selected shelter sites in both rehabilitated and remnant forest. Open areas were also readily traversed, including mining pits, young rehabilitation, and roads and tracks, but preliminary data suggests they preferentially used more dense forest as movement corridors if available. Chuditch appear to be adaptable, living alongside mining and utilising a range of different habitat types available within their home range.

# UNLEASHING THE COMPUTATIONAL POWER OF HPC FOR BIODIVERSITY RESEARCH

**DR SARAH BEECROFT**, *PAWSEY SUPERCOMPUTING RESEARCH CENTRE*

**Co-authors:**

Dr Sean Buckley, *Edith Cowan University*

Ms Aditi Subramanya, *Pawsey Supercomputing Research Centre*

**Lead Author Biography:**

Dr. Sarah Beecroft is a bioinformatics specialist at the Pawsey Supercomputing Centre, where she bridges high-performance computing and biological research. With expertise in genomics and computational biology, Sarah leads initiatives that empower researchers to leverage supercomputing for complex biological data analysis.

**Abstract:**

The explosion of biodiversity data from genomic sequencing, satellite imagery, and sensor networks creates unprecedented opportunities for research, but exceeds traditional computing capabilities. This presentation demonstrates how High-Performance Computing (HPC) infrastructure at the Pawsey Supercomputing Research Centre is transforming Western Australia's biodiversity research through enhanced computational capacity. We present exciting case studies showcasing HPC's impact on biodiversity research, accelerating science and informing management to a new scale that was previously impossible. The evolution of biodiversity-focused HPC applications has progressed from batch-processing genomes to real-time integration of diverse data streams. Recent advances in containerisation, workflow management, and user-friendly interfaces have democratised HPC access for researchers without extensive computational backgrounds, rapidly accelerating research while improving reproducibility. Pawsey further empowers researchers through comprehensive training programs, including specialised workshops in bioinformatics, data visualization, and efficient parallelisation techniques, creating a community of computationally-skilled biodiversity scientists. Looking forward, we outline emerging approaches including we outline emerging approaches including scalable deep learning models for automated species identification from field imagery, optimisation algorithms for complex ecological modelling, and federated learning for collaborative biodiversity knowledge bases. This technological roadmap illustrates how investment in computational infrastructure and cross-disciplinary training provides a foundation for addressing the biodiversity crisis through evidence-based conservation.

# OPTIMISING SEED DORMANCY ALLEVIATION AND MICROPROPAGATION TECHNIQUES TO FACILITATE BIODIVERSE RESTORATION PLANTINGS IN SOUTH-WESTERN AUSTRALIA

**MISS NGAIRE BONNINGTON**, *CURTIN UNIVERSITY*

**Co-authors:**

Dr Michael Just, *Curtin University*

Dr Simone Pedrini, *Curtin University*

Dr Shane Turner, *Curtin University*

A/Prof Chris Newell, *Curtin University*

**Lead Author Biography:**

Ree is a seed ecologist specialising in dormancy and micropropagation. She supports a research project with the Public Transport Authority on propagating difficult species from threatened communities and is completing a Master by Research on germination and propagation techniques for culturally significant and restoration-relevant species in southwest Australia.

**Abstract:**

Close to a third of flora in southwest Australia are excluded from use in ecological restoration projects due to their intractable seed ecology and dormancy mechanisms. By preventing seeds from germinating in harsh conditions these mechanisms increase the survival of seedlings in situ but also form a barrier to the use of many species in biodiverse restoration projects.

This research aims to identify and understand these mechanisms in culturally significant or otherwise under-represented restoration species, and to develop propagation approaches to enable more accessible use in restoration. Trials will analyse germination rates under various hydrothermal conditions, and include the application of treatments such as smoke, acid digestion, warm and cold stratification, and wet-dry cycling to identify optimised dormancy alleviation techniques. Sterilised explant material will be initiated onto agar-based media, treated with relevant plant hormones, and observed in controlled environmental conditions to refine micropropagation protocols. This research, and the establishment of in-vitro germplasm collections of significant species, aims to increase accessibility of currently absent species for large-scale, diverse restoration in the south-west.

# DIFFERENTIAL USE OF A FORAGING GROUND BY MALE AND FEMALE FLATBACK TURTLES: INSIGHTS FROM SEX RATIOS AND MIGRATORY PATTERNS

**MS ROSIE BROWN,** *MURDOCH UNIVERSITY*

**Co-authors:**

Jenna Hounslow, *Murdoch University*

Scott Whiting, *DBCA*

Wil Bennett, *DBCA*

Jasmyn Cook, *DBCA*

Yawuru Country Managers, *Nyamba Buru Yawuru*

Yawuru DBCA Rangers, *DBCA*

Jason Fong, *DBCA*

James Gee, *DBCA*

Karina Jones, *Murdoch University*

Glenn McFarlane, *Conservation Volunteers Australia*

Lauren Peel, *Pendoley Environmental*

Jason Richardson, *DBCA*

Jason Rossendell, *Rio Tinto*

Anton Tucker, *DBCA*

Paul Whittock, *Pendoley Environmental*

Adrian Gleiss, *Murdoch University*

Sabrina Fossette-Halot, *DBCA*

**Lead Author Biography:**

PhD candidate investigating the foraging ecology of flatback turtles (Natator depressus) in northern Australia. Research focuses include exploring the use of stable isotope analysis and eDNA to investigate diet, accelerometers to investigate habitat use and bioelectrical impedance analysis and ultrasonography to measure nutritional status.

**Abstract:**

Flatback turtles (Natator depressus) are an endemic Australian marine turtle species. Understanding how adult male and female flatback turtles use their foraging grounds is critical for assessing their energetic demands, reproductive strategies, and implications for population viability. Yet, such sex-specific patterns remain poorly documented in this species. Since foraging grounds support energetically costly reproductive activities, understanding how they are used by each sex can inform targeted conservation strategies and contribute to maintaining population stability.

The foraging ground at Yawuru Nagulagan Roebuck Bay provides a unique opportunity to assess both male and female reproductive patterns outside of the nesting context. Since 2018, data from sightings (n=363), captures (n=196), and satellite tag deployments (n=41) have been used to estimate adult sex ratios and characterise migratory patterns, including departure timing to breeding grounds and remigration intervals.

We found that the proportion of females among adult captured turtles was 61.7% in the non-breeding season and 71.8% during the breeding season, consistent with or slightly higher than adult sex ratios reported in other studies. Males departed earlier and had shorter estimated remigration intervals than

females, with a probability of 1:0.545 probability of remigrating each year. These patterns suggest sex-specific energetic and reproductive demands. Sex-specific migratory behaviours, such as males breeding more frequently, could mitigate the effects of female-biased hatchling sex ratios caused by rising temperatures, helping maintain population stability. This research provides important insights into sex-specific habitat use at foraging grounds, with implications for foraging ecology and energetic demands, and will support the development of more targeted conservation measures for this species.

# CO-DESIGNING ENVIRONMENTAL RESEARCH TO ENHANCE BIODIVERSITY AND SUSTAINABILITY OUTCOMES AT ALCOA

**DR LUCY COMMANDER,** *ALCOA OF AUSTRALIA*

**Co-authors:**

Dr Felipe Saavedra-Mella, *Alcoa of Australia*

Mr Cameron Blackburn, *Alcoa of Australia*

Dr Justine Barker, *Alcoa of Australia*

**Lead Author Biography:**

Lucy Commander manages the Alcoa of Australia Forest Research Centre, which undertakes collaborative environmental in the Northern Jarrah Forest of south-west Western Australia. In her role as Research Manager, she leads a team focused on flora, fauna, rehabilitation, two-way science and water. With over two decades of experience, Lucy has worked across various ecosystems across the state, edited best practice guidelines, and disseminated knowledge by organising conferences and workshops.

**Abstract:**

Collaborations between research institutions, regulatory bodies, and the mining industry offer significant potential to enhance environmental management practices, foster scientific advancements and deliver positive biodiversity outcomes. Alcoa of Australia, operating bauxite mines, alumina refineries and a port in Western Australia, has significantly enhanced its long-standing research commitment with the establishment of the Forest Research Centre in 2025. This program strategically employs a co-ordinated and integrated approach to advance biodiversity, sustainability, and cultural outcomes through five core pillars: fauna protection and return, First Nations two-way science, leading practice rehabilitation, enhancing forest flora knowledge, and water stewardship.

To ensure relevance and impact, the 2025 Research Plan for the Research Centre was co-designed with Alcoa's research users. Initially, a comprehensive Research Needs Assessment synthesised research requests gathered through an online register and collaborative workshops. Subsequently, research users were invited to prioritise these summarised findings based on their importance and urgency. The highest-rated requests were aligned with existing research projects, and new projects were developed to address identified knowledge gaps, aiming to deliver practical solutions for enhanced biodiversity and rehabilitation outcomes.

Key research themes driving this integrated approach include investigations into native fauna and feral mammals; innovating landscaping and erosion management; optimising topsoil management; enhancing seed germination and plant establishment; defining community ecology; understanding ecosystem resilience; developing long-term vegetation trajectories; and identification of culturally significant entities. This research program will be undertaken by the Alcoa research team and an expanding network of local, national and international partners.

# REMOTE BIOLOGICAL SURVEYS AND THEIR CONTRIBUTION TO THE UNDERSTANDING OF WA'S TERRESTRIAL BIODIVERSITY ASSETS: A FLORAL CASE STUDY

**ZACHARY BORTHWICK,** *UMWELT (AUSTRALIA) PTY LTD*

**Co-authors:**

Mr David Coultas, *Umwelt (Australia) Pty Ltd*

Ms Marlee Starcevich, *Umwelt (Australia) Pty Ltd*

**Lead Author Biography:**

Consultant botanist for 19 years with Woodman Environmental Consulting and now Umwelt, specialising in plant taxonomy and baseline flora and vegetation surveys, with particular interest in the flora of the Geraldton Sandplains, Yalgoo and Pilbara bioregions.

**Abstract:**

Western Australia is well known for its terrestrial biodiversity, particularly the south-western corner of the state. But in the arid interior, comparatively little is known, with predominant land use (pastoral leases) and accessibility presenting barriers to biological surveys. Recently, Umwelt (Australia) Pty Ltd were afforded the opportunity to undertake survey for a number of very poorly-known flora taxa apparently endemic or near-endemic to the calcrete formations of the Oakover River catchment, in a remote part of the far eastern Pilbara region currently under pastoral lease. The taxa, *Goodenia pedicellata, Lepidium amelum* and *Tribulus minutus sens. lat*. (all Priority 1 flora taxa in Western Australia), were all known from 5 or fewer locations prior to the survey (with *Goodenia pedicellata* known only from the type location), with meaningful abundance data not recorded at most locations. The results of the survey are considered to have significantly improved the knowledge of these taxa, both in a taxonomic and conservation context. The taxonomic status of *Goodenia pedicellata* was clarified, while the collection of further material will likely assist in the resolution of the taxonomic status of Tribulus minutus in Western Australia in the future. A significant volume of abundance and spatial location data for all three taxa was collected, increasing our understanding of their life histories, known and likely ranges, and population sizes. Overall, the results highlight the importance of such surveys in remote, difficult to access locations and their contribution to the broader scientific knowledge base.

# APPLICATION OF ECOLOGICAL RESILIENCE IN MINING REHABILITATION

**DR EBONY COWAN,** *MURDOCH UNIVERSITY AND CRC TIME*

**Co-authors:**

Prof Rachel Standish, *Murdoch University*

A/Prof Ben Miller, *Department of Biodiversity, Conservation and Attractions*

A/Prof Michael Hughes, *Murdoch University*

**Lead Author Biography:**

Ebony completed her PhD in 2024 on the ecological resilience to fire of mine-site restored Banksia woodlands. Through this work and support from a Cooperative Research Centre for the Transformations of Mining Economies (CRC TiME) top-up scholarship, she explored how ecological resilience concepts are used by the mining industry. Ebony aims to assist practitioners consider ecological resilience, succession, and long-term persistence of rehabilitation to support desirable rehabilitation outcomes.

**Abstract:**

Resilience is an ecological concept that helps to predict ecosystem recovery after a disturbance such as drought or fire. Resilience is achieved if an ecosystem returns to a similar state after disturbance, and is desirable because it suggests longevity of the rehabilitation efforts and that the rehabilitated ecosystem is acting like an analogue ecosystem. Therefore, the resilience concept is relevant to mine rehabilitation when the goal is to return the pre-mining native ecosystem.

This presentation shares findings on how resilience and disturbances are considered by the mining industry, based on interviews with mine rehabilitation professionals and a review of mine closure plans and regulatory guidance from Western Australia and Queensland. Although interview participants generally saw resilience as a valuable concept, this view was not reflected in closure plans or regulatory documents. A range of factors were identified as key challenges that make resilience difficult to incorporate into the rehabilitation process.

In response to these challenges, implications to support the effective integration of resilience into mine rehabilitation are outlined, focusing on terminology, disturbance context, the use of analogue sites, and metrics and monitoring of resilience. Considering these factors can enhance the assessment and application of resilience, increasing the likelihood that rehabilitation will persist in a desirable state over the long term and continue to support biodiversity values for a range of stakeholders.

# GOING UNDER THE RADAR: THE IMPORTANCE OF MAINTAINING MONITORING REGIMES FOR THREATENED SPECIES

**DR SAUL COWEN,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Dr Sarah Comer, Biodiversity, Conservation and Attractions

Dr Lesley Gibson, Biodiversity, Conservation and Attractions

**Lead Author Biography:**

As a research scientist with the Animal Science Program in Biodiversity and Conservation Science at DBCA, I'm focused on developing research programs to support the conservation management of threatened and priority fauna around Western Australia. Recent collaborative projects include work on trapdoor spiders, malleefowl, sandhill dunnart, Gilbert's potoroo and the heath mouse.

**Abstract:**

The importance of long-term monitoring for threatened species is well understood by conservation biologists and land managers. However, the allocation of resources to support these monitoring programs may be biased in favour of more iconic species, while those less well-known species may fall off the 'radar'. The heath mouse or dayang (*Pseudomys shortridgei*), sometimes known as the heath rat, is a small species of native rodent that was believed to be extinct in Western Australia until its rediscovery in 1987. Surveys during the 1990s and 2000s located populations in several reserves in the wheatbelt and the south coast, with Lake Magenta Nature Reserve near Newdegate the apparent stronghold. However, surveys ceased at Lake Magenta by 2010 and subsequently dayang were not detected anywhere in the state until 2019, when an intensive survey effort was commenced. Since 2019, just four individuals have been captured at three sites in total, with one capture at Lake Magenta. This decline may coincide with a mesopredator release of feral cats, brought about after fox baiting commenced. Subsequent camera trap surveys have resulted in a handful of detections at Lake Magenta, but the species appears to remain extremely scarce in WA. With feral cat baiting now occurring at Lake Magenta and also at formerly occupied sites at Fitzgerald River National Park, it is hoped that a recovery of dayang will be initiated. Targeted surveys will continue to try and locate animals so these areas can be better managed. While rodents, in general, may have less appeal, this should not mean that they receive any less conservation attention than other threatened species.

# SPATIAL RESOLUTION OF EDNA ANALYSES IN ARID AND SEMI-ARID ENVIRONMENTS

**DR MARINA ELISA DE OLIVEIRA,** *CURTIN UNIVERSITY*

**Co-authors:**

Dr Marina Elisa de Oliveira, *Curtin University*

Prof Paul Nevill, *Curtin University*

Dr Mieke van der Heyde, *Curtin University*

**Lead Author Biography:**

Associate researcher at the TrEnD laboratory (Curtin University). She is a molecular ecologist with a focus on applying non-invasive genetic methods to assess vertebrate biodiversity. She has more recently focused her efforts on the application of eDNA in both Brazilian and Australian ecosystems.

**Abstract:**

From a single sample, eDNA analyses can provide information on the presence of multiple taxa across the tree of life, but until recently, this method has been more extensively used to monitor aquatic biodiversity. Among terrestrial ecosystems, arid and semi-arid lands in particular are often overlooked when developing eDNA methods despite their unique biodiversity and challenges. To better understand the spatial resolution of different sampling methods in arid and semi-arid lands, and inform eDNA sampling guidelines, we collected three sample types (soil, air, vegetation swabs) across two different adjacent land uses at two locations. For each study area we distributed ten sampling points (five in each land use) across six parallel transects distributed among both land uses. Sampling points were placed at 0m, 10m, 50m, 150m and 500m from the dividing line between land uses, totalling 60 sampling points per sample type. Three metabarcoding essays were used, targeting bacteria (16S), eukaryotes (18S) and invertebrates (CO1). Preliminary results suggest that the spatial resolution of eDNA species detections is complex and that certain substrate/ taxa combinations have a more localised signal then others. This means that sampling approaches will need to be carefully tailored to the study goals.

# LEVERAGING DISPARATE DATASETS TO REVEAL THE FIRE RESPONSES OF A GLOBALLY SIGNIFICANT MAMMAL COMMUNITY

**DR TIM DOHERTY,** *FIRE SCIENCE PROGRAM, DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Dr Billy Geary, *University of Melbourne*

Ms Marika Maxwell, Animal Science Program, *Department of Biodiversity, Conservation and Attractions*

Dr Adrian Wayne, Animal Science Program, *Department of Biodiversity, Conservation and Attractions*

Mrs Julia Wayne, Warren Region, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Tim is a wildlife ecologist, specialising in disturbance ecology and predator-prey ecology, and he mainly works on mammals and reptiles. HIs current work is focussed on threatened fauna, fire management and fire regimes, particularly in forest ecosystems.

**Abstract:**

Appropriate fire management is crucial to biodiversity conservation but is often hampered by sparse knowledge of how animals respond to fire, particularly at the community level. This study leverages multiple existing datasets to determine how a globally significant mammal community responds to time since fire in forests of the Upper Warren region. The community comprised eight medium-sized and large marsupials (four threatened) and two introduced eutherian predators. Camera trap data from 10 projects over 10 years (>1 million detections) were assigned to 2400 site-surveys spanning 055 years since fire. Generalised linear mixed effects models showed that two marsupials were most common at the oldest fire ages and three were most common at the youngest fire ages. Two other marsupials and one introduced predator peaked at 2025 years since fire, and one marsupial and the other introduced predator showed no relationship with time since fire. These results shed new light on the fire responses of these species and challenge previously untested assumptions about the fire responses of certain species. Further analyses that account for detectability, spatial autocorrelation and fire severity are planned. These results can inform appropriate fire return intervals for threatened fauna in the southern jarrah forest.

# SECURING THE FUTURE OF THE CRITICALLY ENDANGERED MARGARET RIVER HAIRY MARRON

**DR MARTIN DZIMINSKI,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Mr Kim Williams, *Department of Biodiversity, Conservation and Attractions*

Dr Harriet Mills, *Department of Biodiversity, Conservation and Attractions*

Mr Andrew Beer, *Department of Primary Industries and Regional Development*

Ms Kathryn Schell, *Department of Biodiversity, Conservation and Attractions*

Ms Belinda Howe, *Department of Biodiversity, Conservation and Attractions*

Ms Amy Robey, *Department of Biodiversity, Conservation and Attractions*

Ms Christine Taylor, *Department of Biodiversity, Conservation and Attractions*

Ms Peta Lierich, *Department of Biodiversity, Conservation and Attractions*

Ms Tammy Goad, *Department of Biodiversity, Conservation and Attractions*

Ms Kerry Ryan, *Department of Biodiversity, Conservation and Attractions*

Ms Emily Greenhalgh, *Department of Biodiversity, Conservation and Attractions*

Mr Paul Reggetz, *Department of Primary Industries and Regional Development*

Dr Jacqui Richards, *Department of Biodiversity, Conservation and Attractions*

Ms Amie Raycraft, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Martin Dziminski is a research scientist with the Department of Biodiversity, Conservation and Attractions in Western Australia. He has over 25 years experience undertaking research in the fields of ecology, evolution and genetics within government, academia and private industry. His work involves research on threats and the recovery of threatened species, and his work has involved a suite of taxa including amphibians, reptiles, mammals and invertebrates.

**Abstract:**

The Margaret River Hairy Marron (*Cherax tenuimanus*) is an iconic, Critically Endangered, large freshwater crayfish, found only in the Margaret River in southwestern Australia. Introduction of Smooth Marron (*Cherax cainii*) into the river has led to the decline of the Hairy Marron through hybridization and competition. The Hairy Marron is at high risk of extinction. Historically, captive breeding attempts have been sporadically successful but not reliable. However, Perth Zoo together with the Department of Primary Industries and Regional Development have recently had some success in breeding and nursery culture of juveniles. This has provided an opportunity to expand the breeding program and commence work to establish insurance populations in the wild. Despite previous efforts to reduce the abundance of Smooth Marron in the Margaret River, it remains unsuitable and locations without Smooth Marron are required to create insurance populations. Research is underway to determine the suitability of alternative waterways

and undertake a trial translocation. This presentation outlines the collaboration between agencies to progress the recovery of the Margaret River Hairy Marron, and the challenges encountered.

# OH THE PLACES YOU'LL GO, OH THE PLACES WELL KNOW: GPS TRACKING NORTHERN QUOLL (DASYURUS HALLUCATUS) IN A MOSAIC OF HISTORICAL MINING DISTURBANCE

**MR RYAN ELLIS,** *BIOLOGIC ENVIRONMENTAL*

**Co-authors:**

Mr Brighton Drozario, *Biologic Environmental*

Ms Lisa Dinis, *Biologic Environmental*

Ms Judy Dunlop, *Rio Tinto Iron Ore*

Mr Ashleigh Kimpton, *Mineral Resources*

Mr Chris Knuckey, *Biologic Environmental*

Mr Shane Mcadam, *Rio Tinto Iron Ore*

Mr Thomas Rasmussen, *Biologic Environmental*

Mr John Trainer, *Rio Tinto Iron Ore*

**Lead Author Biography:**

Ryan Ellis is a Principal Zoologist at Biologic Environmental. In this role, he is involved in a broad range of vertebrate fauna surveys and threatened species ecological studies throughout Western Australia. He is also a member of the Western Australian Threatened Species Scientific Committee and Research Associate with the Western Australian Museum.

**Abstract:**

Northern quoll (*Dasyurus hallucatus*) occurrence and abundance of throughout Pilbara is variable; however, is often determined by the presence of undisturbed natural critical habitats. The species is also known to utilise areas of anthropogenic disturbance and artificial habitats. In the Robe Valley area near Pannawonica, northern quoll occurs broadly across a range of disturbed and undisturbed areas, including areas of active and historical mining disturbance associated with mesa formations along the Robe River. Here we present GPS and VHF tracking data for 16 northern quoll (11 males and 5 females) within a mosaic of historic mining disturbance in 2021 (n = 4) and 2023 (n = 12). Individuals were fitted with Lotek Lite Track GPS/ VHF collars and tracked for up to 53 days during the species breeding season (June August) to reveal movement ranges and denning locations. Of the 13 individuals where sufficient data points were obtained, movement range averaged 106.93 hectares for males and 13.15 hectares for females, with an average nightly distance travelled of 1,294.36 meters. Overall, approximately 87% of GPS fixes occurred within undisturbed habitats. The majority of fixes (~39%) were located within major drainage habitat associated with the Robe River, followed by stony plain (~16%) and rocky hill (~11%) habitats adjacent. Multiple denning locations were identified for 11 individuals in natural and disturbed rock formations, hollow logs, and woody debris. While movement area was often associated with undisturbed habitats, which are likely to support greater prey abundance, the occurrence of denning sites within disturbed and undisturbed areas provides further insight into the species adaptability and utilisation of various denning opportunities. Additionally, the results highlight the potential for the creation of artificial critical habitat as mitigation tool in response to the modification or removal of natural habitat associated with mining activities.

# WHY MONITORING LESSER-ACCESSIBLE LIFE STAGES IS CRITICAL TO UNDERSTAND LONG-TERM TRENDS IN MARINE TURTLES?

**DR SABRINA FOSSETTE,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Andrea Whiting, *Wild Outlook Pty Ltd*

Casper Avenant, *Edith Cowan University*

Wil Bennett, *Department of Biodiversity Conservation and Attractions*

Jasmyn Cook, *Department of Biodiversity Conservation and Attractions*

Jason Fong, *Department of Biodiversity Conservation and Attractions*

Glenn Hyndes, *Edith Cowan University*

Malindi Gammon, *Cawthron Institute*

Corrine Douglas, *Department of Biodiversity, Conservation and Attractions*

Ryan Douglas, *Department of Biodiversity, Conservation and Attractions*

James Gee, *Department of Biodiversity, Conservation and Attractions*

Jason Richardson, *Department of Biodiversity Conservation and Attractions*

Tony Tucker, *Department of Biodiversity, Conservation and Attractions*

Scott Whiting, *Department of Biodiversity, Conservation and Attractions*

Yawuru Country Managers, *Nyamba Buru Yawuru Environmental Services Unit*

Yawuru Rangers, *Department of Biodiversity Conservation and Attractions*

**Lead Author Biography:**

Senior research scientist working for the North West Shelf Flatback Turtle Program at DBCA for the past 10 years.

**Abstract:**

Long-lived, migratory marine species are notoriously hard to monitor making detecting long-term population trends a challenge. For some species like sea turtles, easier access to one life stage, in this case nesting females, has translated into a strong monitoring focus on that stage to the detriment of other life stages. Here, we present results from both long-term monitoring data of female flatback turtles nesting on Thevenard Island in the Pilbara region of northwest Australia and data focusing on lesser-studied life stages for this species, i.e. hatchlings and post-hatchlings, bringing a different view to the story. While nesting female abundance seems to have remained stable over the past 8 years with high survivorship, monitoring of eggs and hatchlings showed a survival rate from laying to hatchlings reaching the water (i.e. egg-to-surf survival) of only 44%, raising questions about future recruitment rates into this population. In addition, the recent discovery of post-hatchling flatbacks in Roebuck Bay suggest these turtles remain in shallow coastal waters during their most vulnerable stages with very limited understanding of the threats they face and rate of survival. Our results suggest that focusing monitoring on one life stage may hide other trends present in a population, potentially leading to mis-targeted management actions.

# EFFECTS OF LARGE HERBIVORE EXCLUSION ON ABOVE AND BELOWGROUND FOREST PROPERTIES

**DR CLAIRE FOSTER,** *THE AUSTRALIAN NATIONAL UNIVERSITY / EDITH COWAN UNIVERSITY*

**Lead Author Biography:**

Claire is an ARC DECRA fellow at the Fenner School of Environment and Society at the ANU, and a Visiting Fellow at The School of Science, Edith Cowan University. Her research focuses on ecological disturbances and species interactions, and in particular, how interactions between different processes affect ecosystem structure, function and composition.

**Abstract:**

Native and exotic large herbivores play an important role in shaping the structure and function of ecosystems. Yet, in Australia, comparatively little is known about the role of large herbivores in ecosystem function, particularly for forested ecosystems, and especially for belowground properties. Large herbivores have been found to cause important changes in soil properties and belowground biodiversity, but monitoring effects on soils is costly and time consuming. In this study, we use large herbivore exclosure sites to investigate the influence of large herbivores (predominantly macropods and introduced deer) on soil and vegetation properties. In particular, we test the extent to which measured effects on the plant functional community can indicate differences in belowground properties. Developing a generalized understanding of the functional role of large herbivores in Australia's forest ecosystems will help identify priority areas for herbivore management efforts.

# BURNING BRIDGES: EARLY ERADICATION AND MANAGEMENT OF INVASIVE SPECIES

**MS NORMANDIE GONZÁLEZ-ORELLANA,** *CURTIN UNIVERSITY*

**Co-authors:**

Dr Benjamin Phillips, *Curtin University*

**Lead Author Biography:**

Normandie González-Orellana is a field ecologist and data scientist with and interest in Conservation Ecology and Science Education/Communication. Her research aims to develop models for early eradication and management of invasive species to help with the advancement of informed biosecurity strategies in Australia.

**Abstract:**

Early intervention of invasive species is often cited as the best course of action because the costs from long-term management and damages caused by the species are less when it is less abundant and/or constrained to a small area. Literature suggests that there is a point in the invasion curve after which management becomes too expensive, and eradication unfeasible (hereon referred to as critical point). Interventions before this critical point are referred to as early. Nonetheless, the definition of early is not clear. In fact, given the complexities and circumstantial nature of biological invasions, this critical point is not static. Here, we propose a mathematical description of this critical point by arguing that it is influenced by time, population dynamics, and the budgetary constraints of the management program. We use computer simulations to evaluate the robustness of this definition to a more stochastic model. Identifying the critical point in the invasion process before which intervention can be classified as early could aid policy makers and managers to take informed decisions on how to allocate resources given the population dynamics of the invasive population and the budgetary constraints of the management program.

# BACK FROM THE BRINK: A PROTECTION AGENDA FOR NATURE

**MS RHIANNON HARDWICK,** *CONSERVATION COUNCIL OF WA*

**Co-authors:**

Ms Eloise Hogg, *Conservation Council of WA*

Ms Mia Pepper, *Conservation Council of WA*

Mr Liam Lilly, *Conservation Council of WA*

Kelly Duckworth, *Conservation Council of WA*

**Lead Author Biography:**

Rhiannon Hardwick is the Nature Program Manager at the Conservation Council of Western Australia, working with member groups and partner organisations on campaigns to strengthen environmental laws and protect WAs unique biodiversity. With a background in advocacy and community organising, she works at the intersection of policy reform, environmental campaigning, and supporting grassroots activism.

**Abstract:**

Western Australia's biodiversity is under increasing threat from land clearing, climate change, and resource extraction, yet its environmental laws and policies remain inadequate to meet these challenges.

Back from the Brink: A Protection Agenda for Nature is a forthcoming report that compiles policy recommendations and case studies from academics, environmental groups, and campaigners. It emerged as a collective response to the WA Government's proposed amendments to the Environmental Protection Act, which prioritised 'streamlining' and 'efficiency' over strengthening nature protections amid a worsening biodiversity crisis.

The report highlights how weak legislative and regulatory frameworks, coupled with declining government investment, are accelerating habitat loss, species decline, and ecosystem degradation. It outlines a series of policy reforms to deliver the environmental protections necessary to halt and reverse biodiversity loss in Western Australia.

# A GLOBAL REVIEW OF BEACH-NESTING SHOREBIRDS: THREATS, HABITATS, AND CHARACTERISTICS

**MS KIRRIL HASTINGS,** *EDITH COWAN UNIVERSITY*

**Lead Author Biography:**

Kirrily is an environmental scientist who has worked in government and consulting roles in the southwest of WA for over 25 years. She is passionate about developing practical and science-based solutions to threatened ecological values and believes that the start of any solution begins with an understanding of the problem. She is currently researching the breeding occupancy of a priority listed coastal shorebird, the Western Hooded Plover in the Cape Naturaliste to Cape Leeuwin Coastline.

**Abstract:**

Shorebirds are recognised as a highly threatened group of birds globally. Among these, beach-nesting shorebirds face the unique conservation challenge of coastal squeeze caused by sea level rise, storm surges and human pressures, resulting in the decline of many beach-dependent taxa. Most research has focused on only a few species and there has been no comprehensive global review of beach nesting birds. This review identifies beach-nesting shorebirds from the global taxa, their traits, degree of dependence on beaches, breeding range and threats. Beach-nesting shorebirds comprised 58 taxa and occur in all continents of the world, except Antarctica. A similar proportion breed in each hemisphere, though more beach-obligate species occur in the southern hemisphere. Over half of beach-breeders were plovers (*Charadriidae*); followed by oystercatchers (*Heamatoptidae*), thick-knees (Burhinidae) and few sandpipers (*Scolopacidae*). Obligate beach nesting shorebirds were rare (only seven species) and of these the majority were of conservation concern. Forty eight percent of all beach nesters were either resident or undertook only small regional movements. Bare to open nesting microhabitats were strongly favoured, reflecting a preference for visibility of surroundings. The key threats overall were beach recreation, storm surge, or sea level rise, habitat loss, depredation and over vegetation of dunes through planting or weeds. Strategic restoration of key nesting habitats involving retention or re-creation of bare spaces in foredunes is a likely crucial action to enable beach-nesting shorebirds to adapt to climate change and increased human use of beaches by nesting higher in the landscape.

# NON-INVASIVE SAMPLING OF IDIOSOMA WEB COLLECTED FROM ACTIVE BURROWS FOR THE PURPOSES OF TAXONOMIC IDENTIFICATION

**MISS YVETTE HITCHEN,** *HELIX MOLECULAR SOLUTIONS*

**Co-authors:**

Dr Zoë Hamilton, *Helix Molecular Solutions*

**Lead Author Biography:**

I am the senior molecular biologist for Helix Molecular Solutions and have more than 15 years of molecular experience specialising in wide range of techniques, sample types and taxonomic groups. Of relevance to the current presentation, I have specialised expertise in non-invasive extraction and analysis including the development of qPCR probes for eDNA detection such as other Vulnerable species including the Pilbara Olive Python, Blind cave eel and Blind Gudgeon.

**Abstract:**

The *Idiosoma nigrum* species group are an iconic and threatened component of the Australian mygalomorph spider fauna. Of long-standing conservation significance, the species is afforded vulnerable species status under the Commonwealths Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act). Fifteen new species have recently been described, and the conservation status of two *Idiosoma* species have been upgraded to Endangered under WA State Legislation. With *Idisosoma* species impacting resource development proposals and the process of environmental impact assessment for more than 15 years, they are fast becoming the face of terrestrial invertebrate conservation in Western Australia.

This study originated with the assessment of roadside habitat reserves for the presence of the shield - backed trapdoor spider (*Idiosoma nigrum* species group). As species identification isn't possible from burrows architecture alone, and morphological taxonomic identification requires retrieval of the specimen, the novel use of web DNA was studied. Development of species-specific qPCR probes and *Idiosoma* specific COI (Cytochrome oxidase I gene) and Cyt B (Cytochrome b gene) primer sets have allowed for non-invasive identification and validation of these threatened species in a highly fragmented landscape. In combination with the development of recent non-destructive sampling of mygalomorphs (direct comms Cowen, S and Lymbery, R., 2005), these conservation genetic techniques allow for the extension of the species knowledge base for the purposes of impact assessment in a vastly developing landscape.

# URBAN RESERVES AS CASE STUDIES FOR RESEARCH AND TEACHING IN ECOLOGY

**DR ANNA HOPKINS,** *EDITH COWAN UNIVERSITY*

**Co-authors:**

Harriet Mills, *Perth Zoo*

Rebecca Quah, *Edith Cowan University*

Rachyl Stover, *Edith Cowan University*

Sean Buckley, *Edith Cowan University*

Danielle Bowler, *City of Joondalup*

Nicole Adams, *City of Joondalup*

Harry Moore, *Department of Biodiversity, Conservation and Attractions*

Leonie Valentine, *The University of Western Australia*

**Lead Author Biography:**

Anna is a conservation biologist and fungal ecologist, with experience working with soil microbes, plant-fungal-fauna interactions and fungal plant pathogens in eucalypt and other broadleaved forests and pine plantations in both Australasia and Scandinavia. More recent interests include understanding the link between mycorrhizal fungi, fauna conservation and plant ecology, and using next-generation sequencing of microbes to answer broad ecological and management-based questions.

Abstract:
Bushland reserves in urban areas are usually overlooked for conservation research because they are often small with modified landscapes. Here, we provide a case study of an urban reserve in Perth, Western Australia, that highlights the rich opportunity of such reserves for research and education. In 2013, a total of 46 quenda were translocated into Craigie Bushland, a 42-hectare, predator proof exclosure in northern Perth containing regionally significant Banksia and Tuart woodland. Post-release monitoring of the quenda population has been undertaken continuously over twelve years to ensure population persistence and to investigate the ecological impact of reintroducing an ecosystem engineer. The reserve is easily accessible, being in metropolitan Perth, and this has allowed over 800 university students to participate in quenda trapping and studies of vegetation, fire, soil, and population genetics, thereby gaining practical experience and contributing valuable data to local government managers. A close partnership with the local government managers has also allowed us to present our research at many community events. With fewer opportunities to run remote fieldtrips for students, urban reserves deserve greater attention for ecological education and research.

# HOW NATIONAL TRUST COVENANTS CONTRIBUTE TO NATURE POSITIVE

**MRS MONICA HUNTER,** *NATIONAL TRUST OF WESTERN AUSTRALIA*

**Co-authors:**

Ms Diana Papenfus, *National Trust of Western Australia*

**Lead Author Biography:**

The National Trust of Western Australia aims to awaken the community to the value of heritage by engaging its support for the conservation of our natural, Aboriginal and historic heritage for the present and the future. Natural heritage protection and stewardship is undertaken by establishing restrictive covenants over parcels of private land. Covenants place restrictions over private land and hold landholders account for the protection and stewardship of that land in perpetuity.

**Abstract:**

As the first covenant program in WA, the National Trust and its covenant landholders are equipped with 25 years of experience in protecting and halting the loss of natural heritage and biodiversity. A recent Lotterywest funded review of the program and of the covenant situation in WA has made it very clear that in order to be nature positive, private land covenants require:

1. Full commitment from landholders; and

2. Strong government and stakeholder support and understanding.

This presentation will include:

- Case studies of landholders and their support networks who are actively protecting their bushland on which they live and work.
- Challenges faced by covenant landholders and the National Trust.
- Requirements for future proofing the nature positive commitment of current covenant landholders.
- Proposed solutions to these challenges and requirements.
- Risks if not supported, including:
    a) Inability to maintain current commitment/s.
    b) Lost opportunities to protect unique ecosystems.
    c) Potential dissolution of the covenant program and associated implications (including wastage of earlier commitment and resources).

# A PRELIMINARY STUDY ON FERAL CAMEL FOOD HABITS IN THE PILBARA BIOREGION OF WESTERN AUSTRALIA

**DR PALI JAYASEKARA,** *GHD*

**Lead Author Biography:**

Trilingual ecologist offering 28 years experience (14 years in Western Australia) in delivering multidisciplinary Natural Resource Management Projects including ecological surveys (level one and two, targeted flora surveys), plant taxonomy (Western Australia and some parts of Northern territory), rehabilitation monitoring and restoration. Feeding trials, food habit analysis, plant-animal interaction, fauna surveys, and biological invasion. These studies resulted in many scientific publication.

**Abstract:**

Australia is the home for the largest wild population of camels in the world, most of which are Dromedary Camels (Camelus dromedarius, one hump). They are recognised as pests in terms of the negative effects on the environment as well as human economy (Biosecurity and Agriculture Management Act 2007). Nevertheless, their effects on the vegetation are still poorly understood, and scientific studies are needed.

This preliminary study was conducted to understand the food habits of the camels from two habitats in the eastern Pilbara bioregion of Western Australia. The camel scats were collected from a cracking clay grassland and a mixed Acacia shrubland over Triodia dominant grassland. Scat samples were microscopically analysed by the point frame method. The analysis revealed that Camel's diet in the both places primarily consisted of graminoids, 75% and dicots accounted for only 25%. Furthermore, in both these habitats, 31 different intact seed species were recovered. Among them, 12 were identified at the species level, and the rest were identified at the genus level.

This study showed that the camels are grazers and potentially function as seed dispersers. It is likely that they modify and degrade plant communities, whilst at the same time disperse seeds. If the plants are undesirable, the camels effects will function negatively. This preliminary study has suggested a significant ecological role of the camel, and more studies are necessary to determine the impacts on the ecosystem.

# RESTORATION OF TEC SCP3A: A COLLABORATIVE CASE STUDY WITH THE PUBLIC TRANSPORT AUTHORITY

**DR MICHAEL JUST, *CURTIN UNIVERSITY***

**Co-authors:**

A/Prof Chris Newell, *Curtin University*

Dr Simone Pedrini, *Curtin University*

Dr Shane Turner, *Curtin University*

**Lead Author Biography:**

Michael is a plant biologist specialising in seed dormancy, germination, and restoration ecology. His research focuses on conservation strategies for threatened ecological communities in southwest Australia, collaborating with researchers, agencies, and industry to improve native species restoration.

**Abstract:**

This case study details a collaborative project developing restoration methods for a Threatened Ecological Community (SCP3a) in Western Australia. Working in partnership with the Public Transport Authority, the project focuses on building industry capacity in seed collection and propagation and ensuring a robust supply of diverse local species.

Collected seed material undergoes systematic assessments of dormancy and germination requirements, facilitating the development of species-specific protocols that increase germination success. For species identified as having either limited seed availability or complex dormancy mechanisms, tissue culture programs are employed to propagate these difficult-to-source plants and safeguard genetic diversity, ensuring a steady supply of healthy specimens for future planting.

This approach leverages both traditional horticultural knowledge and innovative scientific methodologies, including advanced germination testing and plant tissue culture, to overcome bottlenecks in species availability. By emphasising knowledge transfer and capacity-building in the commercial seed collection sector, the project aims to establish a reproducible framework for restoration initiatives. The results thus far demonstrate that integrating targeted seed biology research and advanced propagation techniques can lead to a more reliable and cost-effective model of SCP3a restoration, providing insights for broader ecological restoration programs across Australia.

# REMOTE WILDLIFE RESPONSE AND MONITORING CONSIDERATIONS DURING OIL SPILL EMERGENCIES

**MR JULIAN KALAU**, CHEVRON AUSTRALIA

**Co-authors:**

Mr Stuart Field, *AMOS*

Miss Sarah Hyland, *AMOS*

**Lead Author Biography**:

Julian is an ecologist working withing the Chevron Australia Environment Team and leads the Oiled Wildlife Response and Operational and Scientific Monitoring Response Capability for Australian Operations.

**Abstract:**

The North West of Western Australia is visited by an array of migratory species, inhabiting the region in significant numbers for months each year as part of seasonal mating a birthing/hatching cycles. These mass migration phenomena have been occurring for thousands of years across a range of taxonomic groups including marine mammals, reptiles and avifauna.

Most of the region is remote with relatively few established townships with extensive areas of uninhabited coastline and few if any established wildlife response facilities.

The threat of oil spill on these migratory populations in these remote locations poses unique challenges including: the seasonally extreme weather conditions; challenges of both mobilising and maintaining equipment and personnel resources; and the establishment and maintenance of wildlife response facilities.

Should a significant spill align with the peak of a mating or birthing/hatching cycles in these species, the volume of individuals impacted by the oil will likely quickly overwhelm the response capacity. In such cases, wildlife response methods need to be tailored to processing the largest number of individuals in the shortest time period with critical decisions needed around the focus of the response effort for the greatest good for the population survival of the impacted wildlife. In parallel, operational and scientific monitoring of these species and the habitats where they reside needs to be practical, rigorous and coordinated.

In this presentation we use the example of threatened sea turtles and seabirds at highly populated nesting sites on remote Islands of the Pilbara region of WA to explore options for wildlife response and monitoring methodologies that would ensure the greatest response success with the resources available.

# OPTIMISING SEED SOURCING FOR RESTORATION OF DEGRADED SUBSTRATES UNDER A CHANGING CLIMATE

**DR SIEGY KRAUSS,** *KINGS PARK SCIENCE, DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Dr Libby Trevenen, *University of Western Australia*

Dr Michael Renton, *University of Western Australia*

Dr Martin Breed, *Flinders University*

Prof Erik Veneklaas, *University of Western Australia*

Prof Rachel Standish, *Murdoch University*

Dr David Merritt, *Department of Biodiversity, Conservation and Attractions*

Dr Jake Robinson, *Flinders University*

Ms Nikki Maher, *Department of Biodiversity, Conservation and Attractions*

Dr Suzanne Prober, *CSIRO*

Dr Mark Dobrowolski, *Iluka*

Mr Vern Newton, *Heidelberg Materials*

Ms Sarah Broomfield, *Tronox*

**Lead Author Biography:**

Principal Research Scientist at Kings Park Science, DBCA. Conducting research underpinning practical outcomes in biodiversity conservation and restoration.

**Abstract:**

Ecosystem restoration is key for addressing two major global challenges: biodiversity loss and climate change. However, where seeds should be sourced for restoration remains intensely debated. Climate-adjusted provenancing sourcing seed from populations currently experiencing climatic conditions expected at restoration sites has been promoted as a solution to enhance resilience against climate change, yet, its benefit over alternative seed sourcing strategies remain largely unknown and untested empirically.

To address this, we established a large provenance trial using 32,000 seeds from two key tree species commonly used in restoration. Seeds were sourced from 20 provenances across a ~400km climate gradient where mean annual rainfall doubles. Trials were established at four locations across this gradient, under two substrate conditions, in 2021 and 2022.

Most trial sites saw no relationship between seed provenance and seedling survival and growth. Occasionally, relationships were observed, but were inconsistent across species, years, locations, and substrates. Consequently, we found no predictable benefit of a climate-adjusted provenance strategy. Rather, all source populations were similarly resilient to environmental stressors associated with harsh

climates and novel substrates. We suggest our results reflect ancient evolutionary lineages that have evolved a high capacity for stress through adaptive plasticity. Our results also highlight that under certain scenarios post-mining substrate changes can overwhelm provenance issues. Critically, these trials are established in secure sites to enable the ongoing assessment of provenance effects.

# PATTERNS IN THE POND: INVESTIGATING COLOUR AND TEXTURE VARIATIONS AMONG SPECIES OF FROGLETS (CRINIA SPP.) IN SOUTH-WESTERN AUSTRALIA

**MR JOSHUA LEMMON,** *POPULATION BIOLOGY AND GENOMICS*

**Co-authors:**

Dr Brenton von Takach, *Curtin University*

**Lead Author Biography:**

I am an Honours student at Curtin University under the supervision of Dr Brenton von Takach. my research aims to investigate variation in colour and texture patterns among species of froglets (Crinia spp.)

**Abstract:**

Phenotypic variation in colour and pattern offers valuable insight into the evolutionary processes shaping biodiversity. This study investigates the distribution of colour and pattern morphs across four species of small frog within the genus Crinia (*Myobatrachidae*) species *C. insignifera, C. subinsignifera, C. pseudinsignifera, and C. glauertifrom* selected sites in south-western Australia. Using high-quality, standardised photographs processed through image analysis software, we quantified key morphological variables to assess whether specific morphs occur at sex- or species-specific frequencies within and among populations. By integrating this morphological data with species-level identifications, the study aims to refine our understanding of phenotypic differentiation and explore potential evolutionary drivers of variation within the genus. Results are currently being finalised and are expected to be completed by October 2025 will provide a foundation for further taxonomic and ecological investigation into morph diversity in Crinia.

# JUST WHAT SHOULD WE BE TEACHING UNDERGRADUATE BIODIVERSITY SCIENTISTS?

**DR KRISTINA LEMSON,** *SCHOOL OF SCIENCE, EDITH COWAN UNIVERSITY*

**Lead Author Biography:**

Dr Lemson is a botanist specialising in plant systematics and experienced educator at both undergraduate and postgraduate level.

**Abstract:**

"Biodiversity Science" is a term gaining increasing use, but there is surprisingly little explicit discussion of how it is conceptualised. This is important because the amount of biodiversity-related data, the breadth of its application and need for professionals who understand its generation, structure and curation are all increasing. I compared my pilot bibliometric study of 'biodiversity science' with the skills and conceptual knowledge expected of recent graduates entering biodiversity-related fields, and found some important gaps, mismatches and opportunities. My work suggests that those of us practising in the field should be asking what kind of education is required to meet the challenges of biodiversity science, and raises some important questions about not only content but also methods and frameworks within which this learning can occur.

# FOSTERING INSPIRATION AND HOPE WITHIN SUSTAINABILITY TRANSITIONS: INSIGHTS FROM BRIGHT SPOTS IN LARGE LANDSCAPE-SCALE RESTORATION

**DR EMMA LIGTERMOET,** *CSIRO*

**Co-authors:**

Dr Peat Leith, *CSIRO*

Mr Keith Bradby, *Gondwana Link*

**Lead Author Biography:**

Emma Ligtermoet is a human-environment geographer working in transdisciplinary science at CSIRO. Emma's current action-research examines governance aspects of large landscape scale restoration programs, in collaboration with Gondwana Link. Emma's research interests span knowledge co-production and decolonising methods, governance for navigating social-ecological change and climate adaptation in aquatic and Indigenous land and sea management contexts. She also loves science-art collaborations.

**Abstract:**

Inspiration and hope are fundamental to achieving beneficial change on a troubled planet, yet are under-explored and under-applied in broad environmental management and sustainability transitions. Yet inspiration and hope play important roles in fostering collaborative and distributed networked initiatives. Intermediary, or backbone organisations, as important catalysers within action-networks can play a critical role inspiring, connecting and translating diverse actions to support distributed networks. We applied a bright spots approach to understand how large-scale restoration initiatives can generate hope together with inspired, innovative action and just approaches to landscape restoration. We present findings from research undertaken in collaboration with Gondwana Link, a large landscape-scale restoration backbone organisation entraining ecological and social connectivity across south-western Australia. Bright spots in these initiatives included holding an ambitious yet achievable vision, taking relational and co-producing approaches that respects knowledge and operational plurality and attends to issues of social and environmental justice, while diversifying learning to intentionally foster environmental care, place-attachment and reconciliatory understanding. Adaptive management has long emphasised learning as critical process, but is yet to commonly adopt such diversified learning approaches, that include storying in partnership with the arts and humanities, into environmental management. Lessons from these bright spots in restoration provide insights for diverse contexts where adaptive and transformative change is required.

# TRACKING THE KILLER'S KIN: ESTIMATING DISPERSAL OF FERAL CATS WITH CLOSE-KIN GENETIC TECHNIQUES

**MR IAN LIM,** *CURTIN UNIVERSITY*

**Co-authors:**

Prof Ben Phillips, *Curtin University*

Dr Brenton von Takach, *Curtin University*

**Lead Author Biography:**

Ian has a background in genomics and bioinformatics, with experience in population genomics of falcons and seahorses. His previous work spans industry placements at: antimicrobial resistance, microbiome science, and cancer genomics. He is pursuing his passion in conservation and wildlife genomics. His current PhD research involves developing computational methods to estimate dispersal and gene flow of invasive species such as feral cats and Portuguese millipedes using genomics and spatial data.

**Abstract:**

Investigating effective dispersal in invasive animal populations is crucial to manage population spread and resilience, particularly for taxa that possess long-range and high dispersal such as feral cats (Felis catus) a high-priority invasive species in Western Australia. Promising avenues may arise from approaches utilizing genomics to detect close kin pairs and estimate dispersal distances using these pairs.

We applied genetic inference tools to generate natal dispersal kernels for over 300 feral cats in the Dryandra Woodland. Our study represents one of the first applications of close-kin mark-recapture (CKMR) genetic inference in an invasive terrestrial carnivore in Australia and provides novel insights into the scale and shape of gene flow in a landscape heavily impacted by feral predators. We also compare our estimates of dispersal against ecological movement data from GPS tracking. This allows us to separate movement (for foraging and mating) from natal dispersal, providing us with an unusually comprehensive understanding of the spatial ecology of feral cats. Such understanding provides important information for monitoring and management efforts of an established invasive apex predator.

Our findings fill a key knowledge gap in the ecology of feral cats and provide a methodological blueprint for using close-kin genetics in invasive species management. Ultimately, refined estimates of dispersal distances will enhance predictive models and inform spatially targeted control strategies in biodiversity hotspots like Dryandra.

# TOWARD THE DEVELOPMENT OF GENETIC BIOCONTROLS FOR MANAGING INVASIVE MAMMALS

**DR LUANA LINS, *CSIRO* HEALTH & BIOSECURITY.**

**Co-authors:**

Tanja Strive, *CSIRO Health & Biosecurity.*
Kevin Oh, *CSIRO Health & Biosecurity.*

**Lead Author Biography:**

Dr Oh is an evolutionary ecologist with keen interests in genetics and genomics. As the Genetic Biocontrol Team Leader within CSIRO Health & Biosecurity, he applies concepts from evolutionary biology and population genetics along with modern whole-genome sequencing and bioinformatic analyses to address problems in invasive species management, wildlife conservation, and the development of new biocontrol technologies, primarily for mammalian pest species.

**Abstract:**

Introduced mammalian pests pose severe threats to biodiversity, economic enterprise, and both livestock and human health. Conventional management methods such as toxic baiting, shooting, and trapping are often costly, ineffective or impractical, have unacceptable impacts on off-target species, and can raise ethical concerns due to mechanisms of lethality. Genetic biocontrols, wherein pest animal genomes are manipulated to impact normal reproduction, offer potential alternatives that are species-specific, and in the case of synthetic gene drive, highly efficient due to mechanisms that cause biased inheritance of the engineered elements. Here we present a framework and research pipeline to accelerate development of genetic biocontrol for invasive mammals in Australia, with a focus on three of the most notoriously harmful invasive species: house mice, rabbits, and feral cats. We discuss recent translational experiments aimed at progressing a laboratory proof-of-concept gene drive to a deployable tool for managing mice on oceanic islands. We also summarise key enabling research to establish more efficient genome engineering approaches and carry out genetic biocontrol feasibility assessments in rabbits. Third, we introduce initiatives to build new genomic resources to kickstart genetic biocontrol technologies for more challenging and high priority species including feral cats. Each of these research programs provides unique insights that are progressing the realisation of genetic biocontrols as critical new tools for mitigating the devastating impacts of these species in Australia.

# WHO LET THE BOODIES OUT?

**DR CHERYL LOHR,** *DEPARTMENT OF BIODIVERSITY CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Ms Bethany Pittway, *Department of Biodiversity Conservation and Attractions*

Dr Deanne Cummins, *Department of Biodiversity Conservation and Attractions*

**Lead Author Biography:**

Cheryl has a wide array of experience in wildlife ecology and invasive species management with degrees from The University of Western Australia and the University of Hawaii at Manoa. Cheryl has researched feral cat baits, and wildlife contraceptives, studied the human dimensions, cultural aspects, and cost-benefit analysis of managing introduced animals, and developed island biosecurity models, species-interaction models, and systematic conservation planning software.

**Abstract:**

Fenced fauna refuges are essential for protecting many reintroduced populations of marsupials. Small, fenced refuges can cause problems when species such as boodies (Mitika*, Bettongia lesueur*) become over-abundant causing over-browsing of the vegetation, competition with other species, and negative health outcomes for boodies. Ideally, excess boodies should disperse away from the fenced refuge and establish new populations. Boodies are a highly social species with very high site fidelity: traits that may have negatively impacted attempts to translocate individuals to unconnected sites. We designed and tested a series of two-way gates and tunnels against captive feral cats and boodies to identify a design that would allow boodie dispersal without allowing feral cats to enter the fenced refuge. Ultimately, three, 2m tunnels, 100mm in internal diameter were inserted into the fence on the Matuwa Kurrara Kurrara National Park. Automated microchip readers and camera-traps are used to monitor the tunnels and nearby relic boodie warrens. Since September 2024, over 120 boodies have investigated the tunnels, 40 have explored outside the fence, and all four relic warrens have evidence of resident animals that are renovating burrow entrances. To date, we have had 8 months of successful dispersal of boodies outside a fenced fauna refuge.

# THE CHALLENGES AND OPPORTUNITIES OF BIODIVERSITY MONITORING IN CITIES: INSIGHTS FROM A PARTICIPATORY WORKSHOP IN PERTH

**DR LIZZY LOWE,** *EDITH COWAN UNIVERSITY*

**Lead Author Biography:**

Dr Lizzy Lowe is a Vice Chancellor's Research Fellow at Edith Cowan University. Her research interests include environmental management, integrated pest management, behaviour change, and urban ecology. Her current work uses social and ecological methods to develop strategies to improve the monitoring and management of biodiversity in cities.

**Abstract:**

Urban green spaces, including parks, gardens, nature reserves and verges, provide critical social and environmental benefits, such as reducing the urban heat island effect, improving liveability, supporting resident wellbeing, and creating wildlife habitat. As Australian cities grow and face increasing heat stress, interest in the conservation and management of urban green space has risen. While many government bodies, industry groups and conservation organisations have developed plans to enhance urban ecosystems, most organisations are limited in their ability to collect and use evidence that these efforts deliver positive environmental outcomes. In particular, a lack of biodiversity monitoring means that planners and managers often do not have the local data they need to develop effective restoration and conservation interventions.

To better understand the challenges associated with urban biodiversity monitoring, the Conservation and Biodiversity Research Centre of ECU hosted a participatory workshop with 150 participants from 55 organisations involved in urban biodiversity monitoring and management across Perth. Discussions at the workshop raised key questions around the effectiveness of citizen science, barriers to data sharing from private enterprise, the accessibility of biodiversity data in government and consultancy reports, and ways to work respectfully with Traditional Owners. Participants also questioned whether existing urban biodiversity data is sufficient for management under rapid global change, and partook in round table discussions on how to work together to collect high-quality biodiversity data to ensure it usefully informs future actions. This workshop was the first step towards stronger collaborations and knowledge-sharing among stakeholders to improve the biodiversity outcomes of urban greening initiatives in Perth.

# INVESTIGATING THE CONSERVATION BIOLOGY OF TRAPDOOR SPIDERS IN THE DARLING RANGE

**DR ROWAN LYMBERY,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Dr Saul Cowen, *Department of Biodiversity, Conservation and Attractions*

Dr Jeremy Wilson, *Western Australian Museum*

Dr Mark Harvey, *Western Australian Museum*

Dr Cameron Blackburn, *Alcoa Australia*

Dr Justine Barker, *Alcoa Australia*

**Lead Author Biography:**

I have been employed as a Research Scientist with DBCA since 2023, initially as a fauna geneticist on the Climate Adaptation Initiative, and currently as invertebrate ecologist in the Animal Science Program. Prior to my roles at DBCA, I completed a PhD and several postdoctoral positions in ecology and evolutionary biology at the University of Western Australia. Outside of research, I have previously held positions as Principle Biologist at Bennelongia Environmental Consultants.

**Abstract:**

Trapdoor spiders (*infraorder Mygalomorphae*), like many of south-west Western Australia's invertebrates, are poorly studied and little is known about their biology or ecology. We know that many trapdoor spiders are naturally restricted to discontinuous refugial habitats that are locally cool and wet, which allows their burrows to maintain appropriate conditions to avoid desiccation and overheating. This means that the warming and drying of our climate are major concerns for the persistence of these species. The expected increase in fire frequency and severity is likely to be an added threat to many trapdoors, given their restricted dispersal abilities and often shallow burrows. Here, focusing on key groups of idiopid trapdoor spiders in Western Australia's northern jarrah forest, we are investigating population genetics, habitat requirements, and drought and fire responses, to help inform conservation management. We provide the first update of findings from our genetic sampling and habitat surveys across the landscape, and their implications for connectivity and persistence of populations. Our ultimate goal is to guide and test the feasibility of management approaches, such as translocations and relocations, which are likely to be important for ensuring the persistence of these refugial-reliant species under climate change.

# EVALUATING FOX AND FERAL CAT PRESENCE IN A BAITED LANDSCAPE: A SNAPSHOT FROM THE NORTHERN JARRAH FOREST

**DR HARRY MOORE,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Ms Hannah Kilian, *Department of Biodiversity, Conservation and Attractions*

Dr Michelle Drew, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Harry Moore is a research scientist at DBCA. His work focuses on how fire, predators, and climate change impact threatened species, as well as how these threats interact.

**Abstract:**

Effective control of invasive predators is critical for conserving Australia's unique biodiversity. In Western Australia's south-west region, broadscale baiting using 1080 poison has been implemented for nearly three decades to suppress red fox (Vulpes vulpes) and feral cat (Felis catus) populations. In this study, we deployed 360 camera traps across 180 sites (evenly distributed inside and outside the baited area) to assess predator presence. Foxes were detected at 12% of sites, with detections 6.5 times more likely outside baited zones. A clear spatial gradient in fox occurrence was evident, with increasing distance from baited areas associated with a higher likelihood of detection. In contrast, feral cats were only detected at one site, limiting our ability to assess baiting effects for this species. Our findings provide evidence that broadscale 1080 baiting likely remains effective in reducing fox presence in this region. However, more intensive or targeted monitoring is likely required to evaluate feral cat responses. These results will inform ongoing predator management efforts and support conservation strategies for threatened species in this biodiversity hotspot.

# EXPANDING FLORA SURVEYS IN THE NORTHERN GASCOYNE: NEW DISCOVERIES AND OPPORTUNITIES

**MS NATALIE MURDOCK,** *RIO TINTO IRON ORE*

**Lead Author Biography:**

Natalie is a Senior Ecologist with Rio Tinto's Pilbara Environment and Cultural Knowledge team. With over 17 years of experience in botany and ecology within the consulting and mining industries, she excels in problem-solving for species, leading surveys, technical reviews, and developing research programs with industry partners. Currently, Natalie leads flora and fauna technical surveys for Rio Tinto's renewable energy projects in the Pilbara and Gascoyne regions of Western Australia.

**Abstract:**

Compared to the Pilbara, the northern Gascoyne region has seen significantly less survey effort, primarily due to the lack of substantial mineral resource development. However, this does not imply that conservation-significant flora species are confined to the Pilbara.

In 2024, the Rio Tinto Pilbara Environment and Cultural Knowledge team embarked on a mission to locate and improve knowledge of the Pilbara Priority 1 flora species, *Hibiscus campanulatus*, in the northern Gascoyne. The findings exceeded expectations, revealing not only the target species but also other priority species, new species, and additional records of Pilbara species. These included: *Eremophila naaykensii* (P3), *Grevillea saxicola* (P3), *Sida sp. Barlee Range* (S. van Leeuwen 1642) (P4), *Acacia sp. nov*., *Hibiscus sp. nov., Eremophila rigens* (P3), and *Eremophila coacta* (P3).

The most remarkable discovery was a new population of the endangered species Aluta quadrata, previously thought to be restricted to the Paraburdoo area after over a decade of searching in the Pilbara. This population was found on sandstone and granite outcroppings and cliffs, rather than the commonly associated banded ironstone geology.

This discovery prompted a second survey, which further extended the known distribution of Aluta quadrata at Mt Bresnahan and even further east. These northern Gascoyne findings challenge our understanding of Pilbara flora and highlight the need for increased survey efforts in under-explored regions. Through these, and future surveys, Rio Tinto's Pilbara Environment and Cultural Knowledge team is striving to enhance our understanding of regional biodiversity and improve conservation outcomes.

# PRACTICAL CONSIDERATIONS FOR TERRESTRIAL VERTEBRATE EDNA SAMPLING

**MR JOSHUA NEWTON,** *CURTIN UNIVERSITY*

**Co-authors:**

A/Prof Paul Nevill, *Curtin University*

A/Prof Bill Bateman, *Curtin University*

Prof Morten Allentoft, *Curtin University*

**Lead Author Biography:**

Josh is a researcher within the Trace and Environmental DNA (TrEnD) Laboratory at Curtin University. He recently completed his PhD at Curtin University which focused on the development and application of eDNA for biomonitoring of terrestrial fauna. He is passionate about improving how we apply eDNA technologies to terrestrial environments and demonstrating their benefits for conservation and management.

**Abstract:**

Environmental DNA (eDNA) is increasingly being used to monitor biodiversity, but for terrestrial vertebrates, sample collection methods remain highly diverse, with numerous possible sampling strategies, substrates, and preservation methods. Given the range of study aims, environments, and target species, it's clear that no single eDNA sampling approach suits all situations; each design must be context dependent. So, if there is no one size fits all approach, what should be considered? This talk outlines five key factors to guide the design of eDNA sampling strategies for detecting terrestrial vertebrates beginning with the fundamental question: should eDNA be used at all? As eDNA continues to expand into terrestrial biodiversity research, these considerations aim to support more informed and effective decision-making when using eDNA as a monitoring tool.

# FAUNA MONITORING AND ADAPTIVE MANAGEMENT AT A LOCAL SCALE

**CORINNE OMACINI,** *CITY OF ARMADALE*

**Lead Author Biography:**

Born and raised in New Zealand, Adrienne relocated to Perth in 2012 with a strong commitment to her culture and kaitiakitanga, the preservation, and protection of natural areas. She studied Human Geography and Planning, and Environmental Science at UWA. Joining the City of Armadale in 2019, she has worked across both Planning and the Environment team, now employed as the Senior Environmental Officer, specialising in strategic environmental planning and has overseen Feral, Fire, Fauna, & Dieback

**Abstract:**

The City of Armadale, a peri-urban Council located ~40km south of Perth WA, manages over 1,500 hectares of natural areas vested for conservation purposes, supporting numerous threatened and endangered species. These fauna populations face significant anthropogenic and ecological pressures, including dieback, habitat modification, altered fire regimes, and feral animals. In response, the City implemented a five-year Fauna Project to establish baseline data on species richness and abundance, evaluate the efficacy of current environmental management strategies, and inform adaptive management techniques.

Monitoring efforts, undertaken by several leading WA fauna specialists employing varied methodologies, produced a robust dataset for assessing faunal trends across Bungendore Park and Armadale Settlers Common. Key management interventions arising from this program included intensified feral animal control; habitat tree mapping; habitat supplementation; *Phytophthora cinnamomi* (dieback) management; adjustments to fire mitigation strategies; and the implementation of a Recreation and Signage Strategy in Bungendore Park.

Results revealed significant increases in native fauna abundance and a significant decrease in feral animal presence in Bungendore Park between 2018-2022. Conversely, Armadale Settlers Common recorded an overall decline in fauna abundance over the monitoring period 20172022.

Future actions include the continued application of successful management strategies to Bungendore Park, with follow up monitoring scheduled for 2028/2029. In addition, the intensification of management strategies, including the implementation of a Recreation Plan and Signage Strategy to Armadale Settlers Common, with follow up monitoring scheduled for 2027/28. Other initiatives to be explored include expansion of feral animal control and habitat management programs, and participation in collaborative initiatives to address regional and catchment scale conservation challenges.

# OPTIMISING GREEN INFRASTRUCTURE PLANNING: A MULTI-SCALE, MULTI-SPECIES FRAMEWORK FOR URBAN WILDLIFE CONNECTIVITY IN PERTH

**MR TAYLOR PAGE,** *MURDOCH UNIVERSITY*

**Lead Author Biography:**

Taylor is an ecologist undertaking masters research with NatureLink Perth at Murdoch University. He has nearly 5 years of experience in environmental consultancy, education and design, applying his ecological and sustainability services to enhance infrastructure, development and government projects across WA and Australia. With a unique but valuable combination of skills, Taylor dwells at the interface between design and ecology to transform how we situate in and relate to nature.

**Abstract:**

Perth is located in a globally recognised biodiversity hotspot, hosting many endemic and increasingly threatened species. Urbanisation has created great challenges for our urban biodiversity conservation, as a once continuous natural environment has been reduced to isolated patches of habitat, often too small to support stable populations. While green infrastructure (GI) can offer habitat value and opportunities to enhance ecological connectivity allowing wildlife to access critical resources coordinated planning is lacking. This research develops a multi-scale, multi-species framework to prioritise the placement and design of GI to enhance wildlife connectivity in urban Perth.

This study integrates spatial analysis at regional and local scales. At the regional scale, it prioritises naturelinks (ecological linkages between protected areas) for rehabilitation based on environmental value distribution, connectivity attributes, and route characteristics that affect connectivity potential. At the local scale, the connectivity modelling tool Circuitscape is used to assess functional connectivity of various wildlife guilds, informing where rehabilitation is most needed to support multiple species. Scenario analysis is utilised to compare various GI interventions to validate and refine the ability of the framework to improve connectivity outcomes.

Research findings will identify regional and local spatial priorities for GI rehabilitation to support ecological connectivity in Perth. The research will also set a foundational framework for planners and local governments to strategically plan GI for biodiversity in Perth and other biodiverse cities. This study addresses critical research priorities regarding landscape scale conservation in a changing urban world. It offers a framework for planners and local governments strategically plan for biodiversity in novel urban ecosystems, directing efforts to optimise conservation outcomes where time and resources are limited.

# WESTERN AUSTRALIA NATURAL RESOURCE MANAGEMENT ACHIEVEMENTS AND FUTURE DIRECTIONS

**DR MANDA PAGE,** *SOUTH WEST NRM*

**Co-authors:**

Ms Renata Paliskis, *Wheatbelt NRM*

Ms Jane O'Malley, *PHCC*

Ms Debra Tarabini, *Rangelands NRM*

Mr Kane Watson, *NACC*

**Lead Author Biography:**

Manda Page has worked in conservation and threatened species recovery for over 30 years, spanning the public and private sector, and academia. She has worked in State government in both Qld and WA but is now CEO of the not for profit South West NRM.

**Abstract:**

For over 25 years seven Natural Resource Management Organisations (NRMs) have been operating in WA. Our super power is partnerships. We work with Landcare and community groups, Federal, State and Local Governments, NGOs, research institutions, businesses and First Nations organisations to deliver biodiversity conservation outcomes across WA. Each WA NRM organisation is unique and works locally, but together we have national impact. We will showcase some of our key achievements and discuss the importance of the NRM model in a nature positive future.

# A SEED ENHANCEMENT JOURNEY FROM AGRICULTURAL TECHNOLOGIES TO NATIVE SEEDS FOR SEED PROCESSING, DIRECT SEEDING AND NURSERY PRODUCTION

**DR SIMONE PEDRINI,** *CURTIN UNIVERSITY*

**Lead Author Biography:**

I am a senior lecturer in environmental restoration at Curtin University and project lead of the Native Seed Technology and Innovation Hub for Western Australia. I was co-founder and managing director of the first Italian native plant nursery and seed supplier, Flora Conservation. I am a certified Ecological Restoration Practitioner, Past Chair of the International Network for Seed-Based Restoration, and Co-founder and advisor of the European Native Seed Producers association.

**Abstract:**

The agricultural sector has developed numerous technologies, equipment, and approaches to optimise seed logistics and enhance seed performance and seedling establishment. However, due to the much higher trait variability and diversity of native seeds, there's the need to adapt, customise and sometimes re-invent agricultural approaches to native seeds. For example, acid digestion, developed for cotton seed delinting, has proven successful in processing and improving the germination of some grass species; however, more development is needed to test the scalability of such treatment.

Another agricultural technology that has been broadly tested on native seeds is seed coating. Specifically, the type of coating that allows a higher degree of modification, seed pelleting, has proven to be effective in improving the cost-effectiveness of automated nursery seedling production, especially when working on small-seeded species.

Direct seeding can also be improved by seed pelleting; by standardising the shape, size and density of seeds in a multispecies mix, it would be possible to perform direct seeding using traditional large-scale agricultural seeding equipment.

# GENETIC ALLEE EFFECTS FOR THE MANAGEMENT OF INVASIVE SPECIES

**PROF BEN PHILLIPS,** *CURTIN UNIVERSITY*

**Lead Author Biography:**

Ben is a population biologist with a background in ecology and evolution, and is particularly interested in how spatial processes influence population and evolutionary dynamics. Ben started his professional life as a field biologist, but has slowly morphed into a modeler. He is interested in developing models describing population and evolutionary dynamics, and applying these to real problems in agriculture, health.

**Abstract:**

The Allee effect describes a situation in which population growth rate is low at low density. Something about the biology of the population means that highest growth rates are achieved at some intermediate density. Theory tells us that populations experiencing Allee effects should be easier to eradicate, and slower to spread through space. Thus, Allee effects could be a powerful tool for management, but there are very few examples (if any) of management actions designed to manipulate the Allee effect. In this talk, I explore the idea that we might be able to impose an Allee effect on populations through the novel use of genetic technology.

# HIGH GENETIC DIVERSITY AND DIFFERENTIATION IN AUSTRALOCYPRIS GIANT OSTRACODS FROM AUSTRALIAN SALT LAKES

**DR MAHABUBUR RAHMAN,** *MURDOCH UNIVERSITY*

**Co-authors:**

Dr Mahabubur Rahman, *Murdoch University*

Dr Jennifer Chaplin, *Murdoch University*

**Lead Author Biography:**

I am an aquatic ecologist with a PhD in Environmental and Conservation Sciences from Murdoch University, specializing in the taxonomy, phylogeography, and ecology of giant ostracods from Australian salt lakes. With experience in both academia and industry, I have published several peer-reviewed articles. My research focuses on molecular taxonomy, aquatic ecology, and biodiversity conservation, driven by a passion for understanding and preserving aquatic ecosystems.

**Abstract:**

Salt lakes are prevalent in Australia and harbour a highly diverse suite of endemic fauna, including *Australocypris*, a genus of giant ostracod in the subfamily *Mytilocypridinae* that is only found in these lakes. However, information about genetic diversity and phylogeographic structure of this fauna is poor. This study used a mitochondrial DNA marker (COI) to investigate genetic diversity, phylogeography, and population genetic structures of three widespread species of *Australocypris*, namely *A. bennetti, A. insularis, and A. robusta*. All three species exhibited high genetic diversity, with many populations, especially in *A. bennetti*, showing evidence of recent population expansions. All three species were also highly-subdivided, even over small spatial scales, implying that the assemblages in different salt lakes are typically independent, self-sustaining populations. To protect genetic diversity in these ostracods, conservation efforts should prioritize maintaining multiple populations across a range of spatial scales throughout the species' distributions.

# THE LIFE AND TIMES OF THE YORK GUMS OF CHARLES DARWIN RESERVE

**DR FIAMMA RIVIERA,** *BUSH HERITAGE AUSTRALIA*

**Co-authors:**

Dr Richard Thomas, *Bush Heritage Australia*

Dr John Koch, *Bush Heritage Australia*

Mr Marcel Hollenbach, *Gottfried Wilhelm Leibniz University of Hannover*

Dr Michelle Hall, *Bush Heritage Australia*

**Lead Author Biography:**

I am currently the Flora Restoration Ecologist for the Mid West for Bush Heritage Australia, working across Eurardy, Hamelin and Charles Darwin Reserves. I am also an adjunct with the School of Biological Science at the University of Western Australia. I have previously worked in both consulting and academia as a botanist and restoration ecologist. I am particularly interested in understanding the dynamics of different WA vegetation communities in restoration settings, informing best practice.

**Abstract:**

York Gum woodlands (YGW) of the Western Australia wheatbelt region are complex and rich ecosystems which have been largely cleared for agriculture, with most remnants being small, isolated and degraded. However, on the northeast boundary of their distribution, where agriculture is too marginal, landscape-scale, good condition YGW still remain, such as those of Bush Heritage Australia's (BHA) Charles Darwin Reserve (CDR).

CDR is a 68,000 ha, ex-pastoral property 350 km northeast of Perth. Since acquisition in 2003, BHA has managed CDR for conservation, aiming to improve ecosystem health by mitigating threats: Healthy Country. Protected Forever. Managing the YGW, especially in the face of climate change, entails understanding the demography and dynamics of York Gum (YG) trees, particularly in relation to fire.

In 2007, 11 transects 20 m wide and between 420 and 900 m long were established across YGW based on fire scar mapping from 1969 onwards, with individual YG trees identified. Circumference at breast height and a canopy condition score were recorded for each tree. The trees were reassessed in 2017 and again in 2024. Such a longitudinal data set is allowing us to investigate mortality and survival rates, growth rates and the impact of tree density on these, and whether the accepted knowledge that YG trees are resprouters is consistently true. We present initial results of each and pose further opportunities for research and collaboration.

# TRENDS AND DETERMINANTS OF NEST FAILURE IN FLATBACK TURTLES (NATATOR DEPRESSUS) ACROSS THE NORTH WEST SHELF GENETIC STOCK

**MS EVA ROBINSON,** *MURDOCH UNIVERSITY*

**Co-authors:**

Dr Adrian Gleiss, *Murdoch University*

Dr Malindi Gammon, *Cawthron Institute*

Dr Sabrina Fossette, *Department of Biodiversity, Conservation and Attractions*

Dr Stephen Beatty, *Murdoch University*

**Lead Author Biography:**

Eva Robinson recently graduated with a Research Masters with Training from Murdoch University, where her thesis focused on the trends and drivers of nest failure for the North West Shelf genetic stock of flatback turtles (Natator depressus). Currently employed as a technical officer by the Department of Biodiversity, Conservation and Attractions, she applies the techniques and knowledge that she is investigating strategies for improving the nest success outcomes for loggerhead turtles.

**Abstract:**

To effectively manage long-lived species such as flatback turtles (N. depressus), it is imperative to understand the baseline status of the population, identify threats, and discern how they may act upon the longevity of the population. Assessing population-wide nest success, or the proportion of hatchlings that successfully emerge from nests each season, enables managers to understand population trends, and identify both at-risk and resilient areas for directing management efforts. The aim of this study was to produce a baseline assessment of the nest success for the North West Shelf (NWS) flatback turtle genetic stock, investigate the drivers of nest failure, and explore the implications for the stock in the face of global climate change. We interrogated a long-term dataset, comprising the fate of 2,411 nests (113,804 eggs), across up to sixteen seasons at seven rookeries extending along the coastline of the Pilbara region. We found that although overall mean hatching (76.0 26.3 SD) and emergence (72.9 27.9) success (%) for the NWS stock was within a normal range for the species, the emergence success at several NWS rookeries were the lowest recorded. Although fluctuations in success were exhibited between seasons, Delambre Island was the only rookery with a significant change over time (2.82-= T, $p < 0.001$), while consistently high values were recorded at the Mundabullangana and Barrow Island rookeries. Mortality was strongly associated with higher mean ambient air temperatures. These outcomes provide insight into the current status of the NWS genetic stock, indicating that some rookeries may already be exceeding their upper thermal tolerance thresholds, with others potentially at high risk of further declines with progressing climate change. Further, these findings provide a baseline for ongoing monitoring of trends in nest success and can inform management strategies for maximising the conservation outcomes for the species.

# UNDERGROUND COLLABORATIONS BETWEEN AUSTRALIA AND THE UNITED STATES: DIGGING INTO BURROWING CRAYFISH ECOLOGY

**MR JAMES RODGERS,** *AUBURN UNIVERSITY*

**Co-authors:**

Mr James Rodgers, *Auburn University*

Mr Nicholas Barnes, *Auburn University*

A/Prof James Stoeckel, *Auburn University*

Dr Quinton Burnham, *Edith Cowan University*

Ms Renee Hintz, *Auburn University*

**Lead Author Biography:**

I specialize in sustainable management of freshwater ecosystems with a particular focus on the preservation of crayfish populations in imperilled waterways and small pond ecosystems. I am eager to apply my skills in fieldwork, environmental conservation, and data analysis to contribute to the long-term health of freshwater environments.

**Abstract:**

Freshwater crayfish are native to every continent except for Antarctica and mainland Africa. They are ecologically important as ecosystem engineers and economically important as a valued food item. Nearly every crayfish taxa burrows to some extent some only rarely while others spend their entire lives underground. The burrowing phase of crayfish life-histories is notoriously difficult to study due to its underground nature. However, knowledge of burrowing crayfish ecology is needed worldwide for conservation of native species as well as for control of invasive species (and the diseases they carry). Researchers from Edith Cowan University, Australia, and Auburn University, U.S.A. have initiated a collaborative effort to study burrowing crayfish ecology and share insights from both continents. Recent studies using artificial burrowing chambers designed and built at Auburn University have examined the effect of groundwater level and energetic health on burrowing behaviour on one of the most invasive crayfish worldwide: Procambarus clarkii (Red Swamp Crayfish). This is important information for invasive species control programs because the reproductive phase of P. clarkii typically takes place in underground burrows. A similar burrowing crayfish ecology lab is currently under construction at Edith Cowan University. The focus of this lab will be the impact of climate change and habitat modification on native species persistence. Initial investigations will center on energetic health on burrowing behaviour by species affected by groundwater declines in southwestern Australia. The design of these labs allows for the experimental manipulation of factors such as groundwater level, soil compaction, air temperature, etc., so that projected climate scenarios can be investigated before they actually occur. In a Western Australian context these data will contribute to efforts to assess river and wetland health and will be directly relevant to water allocation planning.

# STYGOFAUNA IN EMPODISMA PEATLANDS IN SOUTHERN WESTERN AUSTRALIA

**DR PHIL RUNHAM,** *BIOLOGIC ENVIRONMENTAL*

**Co-authors:**

Mr Syngeon Rodman, *Biologic Environmental*

Mr Brad Durrant, *Biologic Environmental*

**Lead Author Biography:**

I am a principal Zoologist with Biologic Environmental and have been working with subterranean fauna since the early 2000s. Being based in Denmark on the south coast of WA, I have a strong interest in research focused on the ecology and biological and conservation values of the southwest, and particularly the south coast and hinterland.

**Abstract:**

Stygofauna are known from saturated subterranean habitats worldwide and are characterised by a lack or reduction of pigment, poorly functioning or non-existent eyes, and elongated sensory appendages. They are prone to short-range endemism, often having poor dispersal capabilities and highly specific habitat requirements. In Western Australia, stygofauna habitats include aquifers in calcretes, alluvial formations and fractured rock. The Pilbara and Yilgarn regions have diverse stygofauna assemblages but are also the regions where most surveys have been conducted. The far south of the state has seen few recent surveys with less than fifteen stygal taxa recorded, predominantly from fractured rock aquifers.

In early 2025, a pilot survey for stygofauna was conducted across three superficial Empodisma peatlands in the vicinity of Walpole, Western Australia. The local distribution of these peats is restricted and as such they represent habitat for potential short-range endemic fauna. Additionally, while the water quality is fresh, it is distinctly acidic with pH levels around 4.

Preliminary taxonomic analyses of the specimens collected identified seven stygofauna genera, including representatives of known stygobitic families, including *Parabathynelidae* and *Harpacticoida*. Repeat sampling of the original three peats and others are ongoing, with additional surveys planned. Molecular analysis of specimens, and comparison with specimens collected from proximal groundwater bores will be conducted following the first phase of survey work. Molecular divergence analyses will be used to delineate taxon distributions and to evaluate genetic relatedness between stygofauna collected from the peatlands and proximal groundwater sources. While only in its nascent stages, this study provides further evidence of the conservation value and uniqueness of potentially restricted stygal communities utilising these highly unusual habitats.

# ALCOA'S INTEGRATED BIODIVERSITY APPROACH TOWARDS A NATURE POSITIVE FUTURE

**MR FELIPE ANDRES SAAVEDRA MELLA,** *ALCOA*

**Co-authors:**

Dr Felipe Saavedra, *Alcoa of Australia*

Dr Justine Barker, *Alcoa of Australia*

Ms Bianca Lockley, *Alcoa of Australia*

Mr Stephen White, *Alcoa of Australia*

Ms Gay Landwehr, *Alcoa of Australia*

Mr Cameron Blackburn, *Alcoa of Australia*

Dr Lucy Commander, *Alcoa of Australia*

**Lead Author Biography:**

Felipe holds an undergraduate degree in biology from Universidad de Concepci along with a Master of Environmental Management and a PhD in environmental engineering, geology, and geochemistry from The University of Queensland, Australia. He is currently an Environmental Rehabilitation Scientist at Alcoa, where he leads research to support sustainable mining operations and closure.

**Abstract:**

Globally, Alcoa is moving beyond post-mining impact minimisation to life-of-mine improvements in ecosystem health and biodiversity resilience, seeking to contribute to a nature-positive future. A key objective is working towards a goal of no net loss of biodiversity for new sites and major expansion projects, aligned with the ICMMs Mining Principles. This approach is implemented across Alcoa's Global operations.

The following actions summarise its implementation, particularly in Western Australia's Northern Jarrah Forest, and highlight key aspects of its global efforts. Alcoa's Biodiversity Policy ensures no exploration, mining, or operations in World Heritage sites, old-growth forests, gazetted national parks, and other areas recognised for their high conservation significance. In Western Australia, a mining exclusion zone of 8,344-ha was established around Dwellingup, enhancing protection of local environmental, lifestyle, ecotourism, and recreational values. Two conservation areas have been identified to date that represent high value habitat for black cockatoos, and have been removed from the mine plan. These areas were protected due to their high density of current and future nest trees, abundant foraging resources and accessible drinking sites.

Supported by over 50 years of research, progressive rehabilitation is key to returning self-sustaining jarrah forest ecosystems in mined areas. Through pioneering techniques, Alcoa has successfully re-established diverse flora and facilitated the return of key faunal groups. Achievements include exceeding a rehabilitation-to-disturbance ratio of 1:1 in 2023 and rehabilitating nearly 75% of cleared land over 60 years. Long-term monitoring indicate that rehabilitated areas are on a trajectory toward meeting government-agreed goals and targets.

Vital collaboration and research underpin Alcoa's biodiversity outcomes. The Alcoa Forest Research Centre plays a key role in leading this research.

# BATS, TRAPS & ACOUSTICS: SURVEYING BATS FOR CONSERVATION IN THE SOUTHWEST

**MS KELLY SHELDRICK,** *CONSERVATION COUNCIL OF WA*

**Co-authors:**

Dr David Hill, *Kyoto University*

**Lead Author Biography:**

Kelly Sheldrick is an ecologist and science communicator, currently serving as Citizen Science Program Manager at the Conservation Council of Western Australia. Her work centres on community-driven conservation, environmental education, bat ecology, and acoustic monitoring. She is First Vice President of the Australasian Bat Society and a committee member of the Australian Citizen Science Association (WA Chapter).

**Abstract:**

Acoustic monitoring and trapping are the main methods used to survey bats in the field, but each has strengths and limitations. Trapping provides direct evidence of species presence, sex and age class, but can be resource-intensive and biased towards certain species. Acoustic surveys are effective for detecting some species but may miss others due to environmental noise, species-specific behaviour, and call overlap.

This study evaluates the effectiveness of these methods by comparing trapping and acoustic monitoring results over 25 nights at 14 locations across southwest Western Australia. The focus was on species detectability and identifying strategies to improve capture rates. To enhance trapping success, we tested the use of Autobat acoustic lures to attract bats to harp traps. Fieldwork was supported by citizen scientists, who assisted with nightly surveys, equipment setup, and data collection.

Results show lures significantly increased capture rates for all eight species captured and overall increased our capture rate by 4.8 times. We found lures were particularly effective for Long-eared bats *(Nyctophilus spp.*), which were the species least frequently detected in our paired acoustic surveys and the Western falsistrelle (*Falsistrellus mackenziei*). These taxa include endemic species and subspecies whose distributions, habitat requirements and conservation status are poorly understood.

Our findings highlight the benefits of integrating trapping and acoustic methods for more comprehensive assessment of bat communities. We propose that a dual-method approach is used for surveys of bat diversity wherever feasible, emphasising that no single technique is sufficient. Survey methods should take into account species-specific behaviour, habitat use, and the strengths and limitations of each technique. Our findings have important implications for bat monitoring programs, environmental impact assessments, and the refinement of survey methods.

# FENCE AND TRAP DESIGN FOR CANE TOADS

**MISS CARINE SIEW,** *CURTIN UNIVERSITY*

**Co-authors:**

Prof Ben Phillips, *Curtin University*

Dr Judy Dunlop, *Curtin University*

**Lead Author Biography:**

I am passionate and always curious about the environment. As the environment is a complex ecosystem, I am still trying to figure out what I am interested in.

**Abstract:**

Invasive species are the key drivers of global change in both terrestrial and marine environments where their impacts are becoming more widespread and severe due to global trade, habitat modification and climate change. Invasive species such as cane toads (*Rhinella marina*) were introduced to Australia in the 1935s as a biological control, but have failed as they have caused the population of native fauna to decline. Controlling the cane toad population is challenging across a large region, remaining logistically complex and resource-intensive due to their high reproductive rate and broad environmental tolerance. Management and research efforts are now concentrated in the Toad Containment Zone (TCZ), a narrow corridor between Kimberley and Pilbara regions of Western Australia, which is the only place where it is feasible to halt the toad invasion. Control methods such as trapping, fencing and hand removal have provided a short-term solution, but their long-term effectiveness is uncertain. Exclusion fences around artificial water points have been shown to restrict cane toads movement and reduce population densities, as they cannot survive without water for more than five days. However, the current fence design only lasts a year and requires regular maintenance. There has been limited information on the most effective fence design for amphibians like cane toads and limited studies on aspects of fences that enhance their effectiveness. This study investigates different fence designs and trap types to improve the effectiveness of cane toad management strategies.

# GROUND BEETLES OF THE PILBARA REVISITING THE PILBARA BIOLOGICAL SURVEY

**DR NIKOLAI TATARNIC,** *WESTERN AUSTRALIAN MUSEUM*

**Co-authors:**

Dr Renee Catullo, *University of Western Australia*

Prof Kipling Will, *University of California Berkeley*

**Lead Author Biography:**

I am an entomologist, specialising on the evolution, behaviour, taxonomy and systematics of Australian insects.

**Abstract:**

From 2002 to 2007, extensive invertebrate pitfall sampling was undertaken across the Pilbara region through the Pilbara Regional Biological Survey. A vast number of specimens were collected, furthering our knowledge of many taxa, yet the bulk of material remains unstudied. Among the many specimens collected, 223 species of ground beetles (*Carabidae*) were identified, 140 of these being undescribed. It is now 2025 and almost all of these 140 species are still undescribed! Here we introduce a new partnership between Fortescue Metals Group, the Foundation for the WA Museum, and the WA Museum, to continue where the Pilbara survey left off, beginning with the carabid beetles. Using NextGen genomic sequencing and tried and true morphological techniques, we aim to reconstruct the phylogeny of Pilbara carabids, describe new species, and answer questions of their evolution and biogeographical history.

# TOTAL EVIDENCE APPROACH TO TAXONOMY. USING GENETICS, MORPHOLOGY AND SUBFOSSILS TO DISCOVER NEW SPECIES AND HELP WITH CONSERVATION DECISION MAKING

**DR KENNY TRAVOUILLON,** *WESTERN AUSTRALIAN MUSEUM*

**Co-authors:**

Mr Cameron Dodd, *University of Western Australia*

Ms Shelby Middleton, *Edith Cowan University*

Mr Jake Newman-Martin, *Curtin University*

Dr Linette Umbrello, *Western Australian Museum*

**Lead Author Biography:**

Kenny is the Curator of Mammalogy at the Western Australian Museum where he specialises in the evolution of marsupials, including taxonomy (modern and fossil), functional morphology, palaeontology and palaeoecology.

**Abstract:**

Australia has the worst recent mammal extinction record with 40 species currently listed as extinct since European arrival. As a result, there is an urgent need to fully understand the diversity of Australia's mammal species, and taxonomy is critical for identifying all species to aid in their conservation. While taxonomy has traditionally relied mainly on morphology, molecular data has revolutionised species discovery and helped resolve taxonomic uncertainty. Although, there are limitations as some species are only represented by historical specimens with poor or no genetic data. The current study will discuss case studies of species discovery in Australian marsupials including bandicoots, bettongs, dunnarts, kultarrs, mulgaras, planigales and possums, using a combination of morphology from modern and subfossil material, and genetics. Multidisciplinary approaches in taxonomy help to strengthen species descriptions, better understand species physiology and ecology, reconstruct past distributions, and discover extinct taxa. This information is essential for conservation decision making of threatened species, such as translocations of extirpated populations or extinct species as replacement of an ecological analogue.

# MODELLING COMPLEX HABITAT USE FOR THREATENED BATS IN THE PILBARA TO SUPPORT INFORMED DECISION MAKING

**DR LINETTE UMBRELLO,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS AND* **DR ROBYN SHAW,** UNIVERSITY OF CANBERRA

**Co-authors:**

Dr Kym Ottewell, *Department of Biodiversity, Conservations and Attractions*

Mr Chris Knuckey, *Biologic Environmental Survey*

Mr Robert Bullen, *Bat Call WA*

Dr Robyn Shaw, *University of Canberra*

**Lead Author Biography:**

Linette is a research scientist in Biodiversity and Conservation Science at the Department of Biodiversity, Conservations and Attractions working on the conservation genomics of Pilbara MNES bat species.

**Abstract:**

Decision making for environmental impact assessment (EIA) is difficult when landscape scale information across multiple land tenures is lacking. This has been the case for both the Pilbara ghost bat (*Macroderma gigas*) and the Pilbara leaf-nosed bat (*Rhinonicteris aurantia*), obligate cave roosting species that are Matters of National Environmental Significance. Both are listed as Vulnerable due to threats from development activity, as critical roosting habitat directly overlaps with ore-bearing strata of high economic interest. Multiple stakeholder workshops have identified that understanding the distribution and habitat requirements for both species are crucial knowledge gaps to fill to enable effective conservation and EIA decision-making. However, because bats use different landscape elements for roosting and foraging, standard habitat modelling approaches fall short. Given that both activities are vital for the persistence of these species in the Pilbara, how can we capture this complexity in our models?

We brought together occurrence records, consulting reports, spatial resources, and expert knowledge to address these knowledge gaps. We created new spatial outputs using a neighbourhood approach that incorporates known roosting locations and daily foraging movements. These were then incorporated into ensemble species distribution models (SDM) to predict where roosting and foraging habitat for both species occurs in the Pilbara and to assess the degree of overlap between species, and across different land tenure types (i.e., mining tenements and conservation areas). We worked with EIA decision makers across agencies to produce a spatial tool that enabled better landscape-scale habitat context for decision making for each bat species. We discuss the importance of collaboration to determine end-user needs, gauge the level of understanding of modelling outputs, and identify potential unintended uses, to ensure spatial tools for EIA are fit for purpose.

# PRIVATE LAND CONSERVATION A MODEL FOR SUCCESS

**DR EDDY WAJON,** *WAJON PUBLISHING COMPANY*

**Lead Author Biography:**

Dr Eddy Wajon is an environmental scientist. He is past President of the Wildflower Society of WA. He is an advocate for environmental issues and the protection of remnant native vegetation and is the National Conservation Officer for the Australian Native Plants Society Australia. Eddy has photographed, written, published and distributed five Colour Guides to Spring Wildflowers which have had sales of 65,000. He has also published two books for a friend on How to Enjoy WA Wildflowers.

**Abstract:**

Eddy and Donna Wajon bought two bush blocks in 2002 a 46ha uncleared site in Tenterden and a 572ha previously cleared site in Jerramungup. These were the first purchases in the Gondwana Link project in WA.

There are at least 400 and 700 native plant species, and 300 and 900 native fauna species, on the two sites respectively.

With funding and in-kind support from conservation organisations, philanthropists, government and volunteers, 80% of the remaining cleared portions of one property was restored with local native plants. These sources also supported the erection of artificial Carnaby's Cockatoo nesting tubes, and Pygmy Possum and Brush-tailed Phascogale nest boxes.

Flora and fauna management and monitoring, including fox, cat and rabbit baiting, weed removal, bird surveys, photographic time-line revegetation growth, studies of the ecological and genetic viability of planted native species, motion sensitive camera monitoring, fauna pit trapping, moth light trapping and track maintenance have been undertaken using the same funding model.

Restoration plant survival and biodiversity are high, and the canopy has closed. Species not in the seed mix have germinated.

Malleefowl, which were barely sighted initially, are now seen on every visit. At least 3 malleefowl mounds have been built in the restored area since at least 2017. We have seen eggs laid and chicks hatch. Honey Possums, more than 35 bird species and many reptiles are resident in the revegetation. Pygmy Possums are using the boxes and rearing families. More than 75% of the Carnaby's Cockatoo artificial hollows have been used regularly since 2007, and we have witnessed many chicks fledging.

We have eradicated more than 98% of the Bridal Creeper along a creek line on one property.

Thousands of visitors, including Noongar neighbours, have visited both properties to enjoy and learn about nature, and contribute to their management. They have seen a successful model of land management and conservation.

# CARBON ADDITION FOR ECOLOGICAL RESTORATION: USING SUGAR TO SUPPRESS INVASIVE PLANT SPECIES

**MR JACK WALLACE**, *CURTIN UNIVERSITY*

**Co-authors:**

Mr Michael Just, *Curtin University*

Mr Shane Turner, *Curtin University*

Mr Simone Pedrini, *Curtin University*

**Lead Author Biography:**

Jack Wallace is an Honours student in Environmental and Coastal and Marine Science at Curtin University. His research focuses on sugar-based carbon additions to suppress invasive species through microbial nitrogen immobilisation. He's worked on cleaner wrasse ecology in Coral Bay, seed dormancy at the NASTI lab, and environmental planning with the PTA's Metronet project at OMTID. Jack is passionate about practical, science-based solutions for ecological restoration.

**Abstract:**

Invasive plant species pose major challenges to ecological restoration by altering soil nutrient dynamics, establishing persistent seed banks, and creating feedback loops that suppress native vegetation. Traditional control methods, such as mechanical removal, herbicides, and prescribed burns, have demonstrated variable success and often require high resource investment and ongoing management. A promising alternative approach involves adding carbon-based (e.g. sucrose, sawdust or biochar) to stimulate microbial nitrogen immobilisation, reducing nitrogen availability and facilitating native plant establishment. This research investigates the efficacy of sugar-based carbon additions in suppressing invasive species and promoting native plant establishment in degraded bushland ecosystems in Western Australia. The study employs a combination of Petri dish germination assays, glasshouse experiments, and field trials to assess how sugar influences weed biomass, soil nitrate availability, and microbial activity. It also evaluates the role of microbial interactions by comparing sterilised and unsterilised soil. Findings from this research will inform the use of carbon amendments as a restoration tool and contribute to the development of scalable, nutrient-based strategies for invasive species management.

# TRACKING THE GHOSTS OF THE COASTS: MOVEMENT, DISPERSAL AND BEHAVIOUR OF GREEN AND DWARF SAWFISH IN A GLOBAL HOTSPOT

**MS MARIE WINDSTEIN,** *MURDOCH UNIVERSITY*

**Co-authors:**

Ms Marie Windstein, *Murdoch University*

Dr AlastaiR Harry, *DPIRD*

Dambimangari Rangers, *Dambimangari Aboriginal Corporation*

Karajarri Rangers, *Karajarri Traditional Lands Association*

Nyangumarta Rangers, *Nyangumarta Warrarn Aboriginal Corporation*

Uunguu Rangers, *Wunambal Gaambera Aboriginal Corporation*

Yawuru Rangers, *Nyamba Buru Yawuru*

Dr Jenna Hounslow, *Murdoch University*

Dr Dean Thorburn, *Indo-Pacific Environmental*

Dr Stephen Newman, *DPIRD*

Dr Michael Travers, *DPIRD*

Dr Adrian Gleiss, *Murdoch University*

**Lead Author Biography:**

https://forrestresearch.org.au/profiles/marie-windstein/

**Abstract:**

Sawfishes are amongst the most threatened vertebrate taxa globally, having seen their range contracted by 30%-81% and giving them the monicker of ghosts of the coasts. While the ecology of neonates and small juveniles is increasingly well understood, the ecology of sub-adult and adult animals remains elusive. Here, we present the first satellite tracking data for green and dwarf sawfish from the northern coast of Western Australia, a global hotspot for sawfishes. Individuals were equipped with either SPOT or SPLASH tags, which provided movement data of up to 6 months, revealing habitat-specific movements and dispersal patterns, with subadult animals attached to a central place and nomadic movements in adults. Sub-adults occupying tidal creek systems had exceptionally small activity spaces with a linear extent of movement of no more than 6 km, while animals occupying open coasts had linear extents of movement in excess of 80 km. Together, these data shed light on the lifestyle of an elusive and relatively understudied taxon and provide important data for conservation and management.

# WESTERN AUSTRALIA'S RESTORATION ECONOMY - A RESEARCH PRIORITISATION

**DR RENEE YOUNG,** *THE WESTERN AUSTRALIAN BIODIVERSITY SCIENCE INSTITUTE*

**Lead Author Biography:**

Dr Renee Young is the Program Director, Conservation and Restoration at the Western Australian Biodiversity Science Institute. She is an experienced manager and environmental scientist specialising in ecological restoration, with recent projects showcased at UNCC COP26, COP28 and UNBC COP 15. Working with government, industry and research, Renee collaborates widely to ensure outputs are applied and readily implementable. Renee is this year's Biodiversity Conference Chair.

**Abstract:**

Western Australia is responding to the needs of the Restoration Economy, but while building and implementing policy to support the industry, there is a need to advance our learning and understanding of the ecological recovery of the systems and the enabling environment that supports it. As such, it was recognised that a Western Australian Restoration Economy Research Prioritisation was needed to identify knowledge gaps to target for potential investment opportunities.

A process to scope, define and prioritise research needs was undertaken. We engaged stakeholders through online surveys, one on one consultations, and workshops to define and refine the program scope and priorities. Given the complexity and scale of the Western Australian Restoration Economy the prioritisation is presented in two parts.

Part A captures strategic issues that impact the functioning of a Restoration Economy across the state. Key themes and focus areas of the Restoration Economy research prioritisation are presented across four key themes including purpose, plan, deliver and knowledge. Common to each theme is the priority to support Indigenous Australians in the Restoration Economy to help heal Country. Within each theme a number of research focus areas, outcomes and objectives are identified to address critical knowledge gaps.

In addition to the overarching research prioritisation presented in Part A, stakeholders from individual industries (mining, carbon, NRM, forestry, infrastructure, pastoral rangelands and broadacre agriculture and livestock) articulated key challenges that were largely common across actors within their respective groups. Thus, Part B provides insight into these specific challenges.

This presentation will provide on overview of both State wide strategic issues and industry specific challenges when it comes to scaling restoration.

# ABSTRACTS

## POSTERS

# THE UPDATED THREATENED AND PRIORITY PLANTS OF THE PILBARA APP

**MR HAYDEN AJDUK,** *RIO TINTO*

**Co-authors:**

Mr Steven Dillon, *Department of Biodiversity, Conservation and Attractions*

Mr Hayden Ajduk, RTIO

**Lead Author Biography:**

Field botanist with over 15 years experience undertaking floristic surveys across Western Australia with a particular focus on the arid zones.

**Abstract:**

The updated edition of the Threatened and Priority Plants of the Pilbara field guide provides a comprehensive overview of the regions conservation significant flora. This revised edition includes recently identified species, newly listed flora, and revised distribution maps. Enhanced with photographs and detailed descriptions, the guide serves as an essential resource for botanists, conservationists, and nature enthusiasts. This guide was joint project between Rio Tinto Iron Ore and the Department of Biodiversity, Conservation and Attractions and aims to foster greater awareness of significant flora within the Pilbara region.

# SOCIAL AND ECOLOGICAL BENEFITS OF INCORPORATING BUSH TUCKER CULTIVATION TO RESTORATION: ASSESSING THE SAVANNAH ENRICHMENT MODEL IN THE WEST KIMBERLEY

**MR SARA CAVALCANTI MARQUES,** *MURDOCH UNIVERSITY*

**Lead Author Biography:**

Sara's PhD research at Murdoch University explores the socio-ecological potentials of incorporating native bush tucker to land stewardship practices involving Indigenous participation. With a Bachelor's degree in Ecology, Sara seeks to assess co-benefits of diversifying high-demand ecology initiatives to enhance social and environmental outcomes in regions. Her key research interests include restoration, biodiversity conservation, food cultivation and community development.

**Abstract:**

There is an urgent need to restore ecosystems, halt biodiversity loss and mitigate the effects of climate change, with a range of nature-positive initiatives underway to incentivise meeting these goals. With this, new opportunities emerge for Traditional Owners to be remunerated for stewardship activities on Country. However, these tend to focus predominantly on narrow environmental goals with limited emphasis on socio-cultural considerations. In parallel, the demand for native bush foods and medicines continues to grow, calling for new systems of sustainable cultivation to cater to the global appetite. But despite the critical contribution Indigenous Knowledge has afforded the industry, the substantial gap in Indigenous leadership and engagement in the sector sees minimal benefits flow back to knowledge-holders.

This study thus explores opportunities to merge bush tucker cultivation with land stewardship to address both issues combined, amplifying benefits for community and Country. To meet these aims, a partnership was developed with North Regional TAFE to monitor the Savannah Enrichment model, an emerging horticultural concept that grows native bush tucker plants within degraded landscapes to recover plant diversity and promote Indigenous enterprise opportunities. To date, the model's implementation has been restricted to small areas in the West Kimberley, the absence of a systematic assessment inhibiting broader uptake. In response, this study carried out extensive ecological monitoring of existing enrichment trials and hosted yarning circles with Aboriginal Rangers interested in implementing the model on Country to quantify the practice's ecological and social benefits. This presentation provides insight into the robust analysis comparing enriched areas with degraded and healthy savannah, and sheds light on Indigenous perspectives on the benefits of the practice, highlighting the model's potential to be used as a tool for multifunctional ecosystem restoration.

# 'MONITORING COUNTRY': A WEB-BASED SYSTEM PROVIDING RESOURCES TO SUPPORT INDIGENOUS LAND AND SEA COUNTRY MANAGERS

**MR MARK COWAN,** *CURTIN UNIVERSITY*

**Co-authors:**

Prof Stephen van Leeuwen, *Curtin University*

Dr Vanessa Westcott, *Curtin University*

Dr Haylee D'Agui, *Curtin University*

Ms Georgie Anderson, *Curtin University*

Ms Carly Moir, *Curtin University*

Mr Evan Hallien, *Curtin University*

**Lead Author Biography:**

Mark Cowan is one of Western Australia's leading ecologists, based at Curtin University in Perth and working within the Resilient Landscapes Hub of the National Environmental Science Program. He has over 30 years of experience in biological surveys and biodiversity conservation at State, National, and International levels. Mark has a long history of collaborating with Indigenous land managers in WA to support joint management and conservation decision-making.

**Abstract:**

Indigenous Land and Sea Country managers protect, manage, and monitor vast areas of Country. A recurring challenge they face is accessing straightforward, science-based techniques and tools for on-Country environmental monitoring and management. There is also a need for guidance on managing monitoring data in a secure and enduring way that respects and upholds the sovereignty of that data.

To help address these challenges, this project, being undertaken as part of the NESP Resilient Landscapes Hub, is developing a web-based system ('Monitoring Country') designed to provide:

- fit-for-purpose environmental monitoring methods suited to local contexts and species of interest.
- guidance on the selection of which of these methodologies could be used to meet specific environmental monitoring needs.
- interactive guidance, including peer-to-peer instructional videos on how, why, when, and where to deploy these monitoring methods.
- guidance on culturally safe and enduring storage of monitoring data.

This system, along with its resources, is being co-developed through a consultative process. The project team is working with both Indigenous and non-Indigenous environmental management practitioners who are providing insight and technical advice, including through the identification and provision of methods, protocols, standards, and guidelines relevant to Indigenous-led land and sea Country management, and by highlighting gaps in current procedures where there is a need for more guidance.

Monitoring Country is intended to support Indigenous land and sea Country managers in producing and delivering outputs, including reporting, that affirm the exceptional quality and impact of their on-ground activities. This is essential for ensuring the ongoing support and growth of Indigenous land, water, and sea Country management programs.

# CONSIDERING RESPECTFUL DATA SHARING PROCESSES FOR CULTURALLY IMPORTANT SPECIES IN YAWURU NAGULAGUN ROEBUCK BAY MARINE PARK

**MISS CARMELA DE BENITO ABELLÓ, *MURDOCH UNIVERSITY***

**Co-authors:**

Mr Lloyd Pigram, *University of Notre Dame*

Mr Dean Mathews, *Nyamba Buru Yawuru*

Mr Jason Richardson, *Department of Biodiversity, Conservation and Attractions*

Dr Rochelle Steven, *Murdoch University*

Dr Jenna Hounslow, *Murdoch University*

Dr Michael Hughes, *Murdoch University*

Dr Halina Kobryn, *Murdoch University*

Dr Christophe Cleguer, *James Cook University*

Dr Sabrina Fossette, *Department of Biodiversity, Conservation and Attractions*

Dr Adrian Gleiss, *Murdoch University*

**Lead Author Biography:**

Carmela is a marine ecologist and PhD candidate at Murdoch University, studying how environmental conditions influence the behaviour and spatial use of marine species. Her current research focuses on the foraging ecology of green turtles in Yawuru Nagulagun Roebuck Bay Marine Park, Western Australia. She uses tools like stable isotope analysis and passive acoustic telemetry to examine how environmental variability shapes diet and habitat use.

**Abstract:**

Indigenous Knowledge, built on generations of lived experience and deep cultural connection to land and sea, offers a unique and essential perspective on ecological processes and stewardship. When paired with Western scientific approaches, it can support more holistic, equitable management of marine parks. However, differences in worldviews, values, and relationships to Country can influence how knowledge is shared and how decisions are made.

As part of Yagarrajalajalan Nagula Buru: We all care for saltwater Country a collaborative project grounded in two-way knowledge exchange to support shared custodianship and equitable marine park co-management we worked with Yawuru Traditional Owners of Country around Broome, WA, to ensure cultural priorities and perspectives shape research design and implementation.

Using animal tracking devices, we monitored species of high ecological, cultural, and spiritual significance. The resulting datasets can reveal culturally sensitive locations and require careful consideration of how data are presented and shared. Working closely with Yawuru community members, we explored how different visual representations (i.e., maps, formats, levels of detail) are perceived and valued. Facilitated workshops using semi-structured group interviews explored the acceptability, risks, and benefits of sharing animal location data, helping guide future processes and outputs.

This approach will support the development of ethical and culturally responsive guidelines for cross-cultural research and data governance. These guidelines aim to uphold Yawuru decision-making and offer a framework for sharing sensitive information appropriately with management bodies, community members,

and the scientific community. In doing so, this work contributes to a growing global movement recognising Indigenous rights and leadership in environmental monitoring and management, offering a worldwide model for respectful, co-developed approaches to caring for Country.

# HOW HIGH DO BATS FLY?

**MRS LISA DINIS,** *BIOLOGIC ENVIRONMENTAL*

**Lead Author Biography:**

Lisa has more than 20 years experience in modelling and statistics. She holds degrees in Mathematics and Statistics, Zoology and Environmental Science and has advised on a wide variety of ecological projects in both government and private industry, in Australia and the UK. Lisa has a complex understanding of the interface between biology and mathematics and has extensive experience in statistical modelling of populations.

**Abstract:**

Understanding and accurately tracking the vertical space use of the vulnerable Ghost bat (Macroderma gigas) is critical for informing conservation strategies, particularly in light of proposed wind farm developments in the Pilbara region of north-western Australia.

To investigate flight behaviour, lightweight Druid tags were affixed to individual bats to record both horizontal position and altitude. Flight height above ground level was calculated as the difference between recorded altitude (referenced to a fixed elevation) and the underlying terrain elevation. However, this approach is subject to several sources of uncertainty:

- Error in altitude measurements,
- Error in estimating ground elevation,
- Horizontal position error, which influences the accuracy of both altitude and terrain estimates.

These combined errors introduce considerable variance, often manifesting as heavy-tailed distributions, in the estimated flight heights. Such distortions can lead to misinformed ecological inferences, ultimately affecting conservation management decisions.

To address this, we implemented a state-space modelling framework that distinguishes between true biological variability in flight height and observation error. This approach improves the reliability of height distribution estimates by explicitly modelling and separating sources of uncertainty.

# SEX AND SEASON INFLUENCE DAILY ACTIVITY PATTERNS IN A FRESHWATER TURTLE SPECIES

**MISS KIERA GORDON,** *MURDOCH UNIVERSITY*

**Lead Author Biography:**

Kiera is a PhD student at Murdoch University whose research focuses on investigating the fine-scale ecology of freshwater turtles and the impacts of aquatic infrastructure on turtles, with a particular focus on urban rivers. She uses animal-borne tagging technologies to research turtles, namely tracking tags and acceleration biologgers.

**Abstract:**

Freshwater turtles worldwide are facing rapid and concerning population declines driven by urbanisation, among other factors. One such species is the southwestern snake-necked turtle, Chelodina oblonga, which inhabits natural and modified wetlands and river systems in the southwest of Western Australia. The majority of research on this species to date has examined movement patterns and habitat use of C. oblonga in wetland systems, however, it is suggested that permanent riverine habitats may become particularly important for this species in the future, given drying trends in Australia's southwest.

This study is investigating the ecology of C. oblonga in the Canning River (*Djarlgarro Beelier*), an urban, modified river system in Perth, WA. Flow, salinity, and habitat connectivity in this river system have been altered by a weir and multiple dams in its higher catchment. Here we use biologging tags with a combination of VHF, environmental, and activity sensors to investigate turtle habitat use and behaviour in this river. Specific aims include determining turtle movements between habitats and around anthropogenic barriers and how environmental conditions affect turtle behaviour, activity patterns, and habitat use.

This work will provide crucial data for understanding how C. oblonga use riverine habitats, including how they interact with anthropogenic modifications such as weirs, dams, and altered shorelines. This information is essential in identifying conservation priorities within the Canning River to reduce the ecological impacts of human modification on this system. By ensuring the Canning River, as a permanent aquatic habitat for this species, is suitable for turtles, we can help to promote the species' persistence in the Perth area, considering that many of Perth's wetlands are predicted to dry permanently due to climate change.

# THINKING INSIDE THE BOX - ENHANCING ARBOREAL MARSUPIAL MONITORING IN A POST-MINING LANDSCAPE USING ENVIRONMENTAL DNA

**MR AUSTIN GUTHRIE,** *CURTIN UNIVERSITY*

**Lead Author Biography:**

Austin is a PhD candidate at Curtin's Trace and Environmental DNA (TrEnD) laboratory, with a keen interest in terrestrial ecology, conservation and science communication. His PhD research explores the use of terrestrial eDNA as a monitoring tool for vertebrate populations in mine restoration areas within the Northern Jarrah Forests of Western Australia.

**Abstract:**

Restoring faunal communities is a key goal in post-mining rehabilitation, yet monitoring cryptic species such as arboreal marsupials remains challenging. Artificial habitat structures such as nest boxes have been widely used to support hollow-dependent fauna in regenerating landscapes, particularly where natural tree hollows are scarce. This study examined nest box occupancy on the South32 Worsley Alumina bauxite mine, located in the Northern Jarrah Forest bioregion of south-western Australia, using a multi-method approach. Environmental DNA (eDNA) metabarcoding was used to detect the presence of four arboreal marsupials the red-tailed phascogale, brush-tailed phascogale, yellow-footed antechinus, and the western pygmy possum from swab samples collected inside 90 nest boxes. Sampling was conducted every six months over a two-year period across a rehabilitation gradient (1980s2010s) and reference forest. eDNA results were compared with conventional monitoring techniques, including motion-activated camera traps and visual nest box inspections. The findings highlighted the complementary strengths of each method, with eDNA metabarcoding providing increased species detectability relative to visual and camera-based observations alone. This study demonstrated the value of integrating molecular tools into ecological monitoring frameworks for cryptic fauna. Ongoing analyses are assessing the role of vegetation structure and rehabilitation age in shaping species presence, to provide further insight into habitat quality and restoration success.

# NATURE-BASED TOURISM ON PUBLIC LANDS IN WESTERN AUSTRALIA

**MS SHANNON HASSELL,** *DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Ms Jacinta Overman, *Department of Biodiversity, Conservation and Attractions*

Ms Sveva Falletto, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

I have a BSc (Hons) in Ecotourism and work in the Nature-based Tourism Division of the State Government department that manages national parks and other public lands and waters for biological conservation, Aboriginal heritage values and public enjoyment (DBCA).

**Abstract:**

Western Australia is blessed with a wide range of spectacular flora and fauna species, ecosystems and landscapes, which are primary attractions for tourists and locals alike. Management of visitors to natural areas is essential to minimise negative impacts and provide opportunities for environmental conservation education and the fostering of increased stewardship and respect for the environment. The Department of Biodiversity, Conservation and Attractions (DBCA) Parks and Wildlife Service manages around 34 million hectares of lands and waters in Western Australia, including national parks, nature reserves and marine parks. DBCA recognises that people and the natural environment are intrinsically connected. DBCA has made significant shifts in recognising Aboriginal connection to Country, and many lands and waters are now managed or vested jointly with the Aboriginal Traditional Owners. These partnerships provide opportunities for DBCA to learn about traditional land management, as well as opportunities for tourists to learn about Aboriginal culture directly from those who speak for that Country, which is consistently cited as a desired experience by visitors to Western Australia. Nature-based tourism is intertwined with ecology and is reliant on biodiversity and healthy ecosystems and is strengthened by the authentic voices of the Traditional Owners of the land. DBCA has created a Nature-based Tourism Division to support nature-based tourism, including Aboriginal cultural tourism, and to help deliver outcomes in conservation through outstanding visitor experiences of Western Australia's parks.

# EXPLORING AIRBORNE FUNGAL DIVERSITY AND ITS IMPACT ON PLANT HEALTH

**MRS DIMAN KRWANJI,** *EDITH COWAN UNIVERSITY*

**Co-authors:**

Dr Mary Hanson, *Edith Cowan University*

Dr Carla Zammit, *Edith Cowan University*

Dr Kristina Lemson, *Edith Cowan University*

**Lead Author Biography:**

I am a PhD candidate in Environmental Microbiology at Edith Cowan University, focusing on microbial diversity and plant-microbe interactions. I hold a Master of Science (Research) from the University of Southern Queensland, where I explored the diversity and phylogeny of phylloplane yeasts. With academic experience as an Assistant Lecturer and Agricultural Engineer, I have contributed to teaching and research in plant pathology.

**Abstract:**

Airborne fungi are considered major sources of plant pathogens in natural and agricultural niches. Monitoring airborne fungi is crucial in management and conservation plans. This research will determine the airborne fungal diversity and the relationship between airborne fungi and plant pathogens, and their association in different seasons. Airborne fungi and plant disease will be analysed morphologically and phylogenetically in forest, orchard, and urban habitats in different seasons. This research is expected to improve insight into airborne fungi and plant pathogens as well as their endemicity in Australia. The outcome of this study is expected to find the direct relationship between airborne and plant disease, with variations in different seasons. It is also expected to discover numerous endemic fungi species associated with natural forest and orchard habitats. The results might confirm that natural forest and orchard habitats hold varied fungal communities and are affected by seasonal climate variation. This finding helps monitor fungal pathogens for plant conservation strategies and possibly updates fungal taxonomy by finding new species of fungi.

# SENSING COUNTRY: USING BIG DATA, SHARED KNOWLEDGE, AND STRATEGIC ASSESSMENT TO INFORM LOCAL TO REGIONAL DECISION MAKING AROUND FERAL SPECIES IMPACT

**MS HOLLY LOURIE,** *CHARLES DARWIN UNIVERSITY*

**Co-authors:**

Dr Helen Murphy, *CSIRO*

Dr Keller Kopf, *Charles Darwin University*

Dr Justin Perry, *NAILSMA*

Ms Olivia Carroll, *Mimal Land Management*

Ms Lewellyn Moulin, *Mimal Land Management*

Mr Alex Ernst, *Mimal Land Management*

Mx Mimal Rangers, *Mimal Land Management*

Dr Andrew Hoskins, *NAILSMA*

**Lead Author Biography:**

Holly is an Ecologist and joint research fellow at Charles Darwin University and CSIRO. Her research focuses on the development of multi-scalar methodologies for inclusive monitoring of feral species impacts on sites of environmental and cultural importance, and the production of digital decision-support tools for indigenous-led land management.

**Abstract:**

Arnhem Land is vast in its culture, biodiversity, and breadth. Land managers here face complex decision making around management of feral species, accounting for a plethora of views, values, knowledges, and aspirations as well as operational limitations due to seasonality, remoteness, and scale. Current monitoring strategies rely on either ground-based surveys with a focus on place and local Indigenous community engagement but with limitations in scope and scalability, or aerial surveys that provide excellent broad-scale data but lack the ability to speak to and include local communities, values, and aspirations. To fully encapsulate the impact of feral species in a manner that informs both local and regional decision making, monitoring needs to consider the importance and intricacies of place, whilst retaining the ability to scale and talk to challenges of regional and national importance. Here we propose an adaptive, multi-scalar approach for combining strategic regional scale assessments to inform and calibrate assessments of locally important, on-ground sites. Presented here are the initial results of this approach which combines a fusion of feral species aerial surveys and rapid aerial assessments of waterhole health with bioacoustics, water quality testing and on-ground values assessments. Using this approach, we supported ranger led monitoring of country and integrated broad-scale biodiversity impact assessments into a tool that provides deeper understanding of the impacts of feral species across vast and remote landscapes, thus, allowing land managers to monitor the effectiveness of land management actions against improving key biodiversity metrics.

# CANOPY CROSSINGS AND KIN CONNECTIONS: USING RELATEDNESS TO INFER DISPERSAL OF WESTERN RINGTAIL POSSUMS THROUGH A FRAGMENTED ROAD CORRIDOR

**MISS SERINA MCCONNELL,** *HELIX MOLECULAR SOLUTIONS*

**Co-authors:**

Mr Roy Teale, *Biota Environmental Sciences*

Dr Zoë Hamilton, *Helix Molecular Solutions*

Miss Yvette Hitchen, *Helix Molecular Solutions*

Mr Nathan Beerkens, *Biota Environmental Sciences*

Mr Joshua Keen, *Biota Environmental Science*

**Lead Author Biography:**

After graduating Murdoch University with a Bachelor of Science, I began my career working as a research assistant at the Murdoch University Wildlife Genetics Laboratory. A/Prof. Peter Spencer mentored me in the use of molecular techniques to study the population genetic health of endangered species. My current industry work at Helix Molecular Solutions involves the use of Sanger sequencing and microsatellites to elucidate the taxonomy and population dynamics of threatened wildlife populations.

**Abstract:**

As the scale of landscape fragmentation accelerates, it becomes increasingly important for conservation management to incorporate an understanding of the dispersal dynamics of threatened species. Information on contemporary dispersal can provide insight into potential barriers to movement, and genetic relatedness provides a means of inferring such trends through the identification of closely related individuals at disparate locations. We applied this approach to the critically endangered western ringtail possum (WRP), an arboreal folivore endemic to south-west Western Australia. WRP movement is believed to depend on the degree of continuous canopy connectivity, thereby enhancing their vulnerability to genetic isolation by fragmentation. Using 12 microsatellites, we determined the genetic relatedness of 99 individuals with abutting home ranges along a peri-urban road corridor in Bunbury. We found evidence that females disperse farther than expected, and of first-order relationships across large canopy gaps (roads, paddocks). Our result suggests that WRP can overcome canopy gaps during dispersal, and even small habitat patches in an otherwise urbanised area may act as important stepping stones for the species movement.

# DOES INCUBATION TEMPERATURE DETERMINE SEX IN THE CRITICALLY ENDANGERED WESTERN SWAMP TURTLE?

**DR HARRIET MILLS,** *PERTH ZOO SCIENCE, DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS*

**Co-authors:**

Ms Hannah Croft, *Cardiff University*

Dr Bethany Nordstrom, *Department of Biodiversity, Conservation and Attractions*

Ms Lisa Mantellato, *Department of Biodiversity, Conservation and Attractions*

Ms Helena Glinski, *Department of Biodiversity, Conservation and Attractions*

Ms Karen Cavanough, *Department of Biodiversity, Conservation and Attractions*

Dr Gerald Kuchling, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Dr Harriet Mills is a terrestrial ecologist with experience in zoological research, fauna management and animal ethics. Her research interests include reproductive biology, genetic outcomes of translocation, urban mammal ecology and invasive species management. Harriet was previously a university academic with more than 20 years of teaching experience in conservation biology and zoology at the University of Western Australia and Edith Cowan University.

**Abstract:**

For many retiles, including most freshwater turtles, the temperature during critical periods of development determines sex this is known as temperature-dependent sex determination (TSD). For the critically endangered western swamp turtle (*Pseudemydura umbrina*), research has indicated that temperature may not determine sex, but this has not been tested experimentally. Perth Zoos breeding program has adopted a precautionary approach and incubated eggs between 24-29C. The breeding program has produced over 1200 turtles for release over 1994-2024. Most turtles have been released as juveniles that cannot be sexed until they reach sexual maturity at 6-20 years old, so confirming the absence of TSD in this species relies on post-release monitoring of zoo-bred turtles over many years. We collated data on 145 zoo-bred western swamp turtles released to the wild that were later sexed as adults. We found no statistically significant difference in incubation temperature between males and females ($p > 0.05$) suggesting that, at least within the range of temperatures in this dataset (24C and 29C), temperature is not a strong predictor of sex. This finding is consistent with the handful of other *Chelidae* species whose sex-determining mechanisms have been studied, all of which have genotypic sex determination.

# KILLING COOTS: TESTING THE SUSCEPTIBILITY OF GOLDEN BANDICOOTS TO 1080 BAITS

**MISS BETHANY PITTWAY,** DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS

**Co-authors:**

Ms Kristen Nilsson, *DWER*

Ms Ashleigh Johnson, *Stantec*

Dr Megan Rodgers, WA Wildlife

Dr Cheryl Lohr, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

I am a technical officer with animal science in DBCA, mostly working at Matuwa on boodies, bandicoots, and collaborating with feral cat work. I have been with the department since 2022, working under Dr Cheryl Lohr.

**Abstract:**

The suppression of feral cat populations is critical to the successful conservation of native fauna in Australia. The aerial distribution of Eradicat baits with 4.5 mg of sodium monofluoroacetate (1080), at a rate of 50 baits km-2 demonstrably reduces feral cat populations. One of the five native marsupials that have been reintroduced to the Matuwa Kurrara Kurrara National Park (MKKNP), the golden bandicoot (*Isoodon auratus*) is thought to be at some risk from 1080 baits due to an omnivorous diet, small body size (260-650 g), and LD50 of 8.94 mg/kg. Our aim was to test the susceptibility of golden bandicoots to the Eradicat bait under the common field application protocol. We used 20 Holohil RI-2D VHF collars and 20 Holohil PD-2 subcutaneous VHF transmitters, on 40 bandicoots (34 male and 6 female) and nine 10 m stationary towers, each with two 4 element yagi antennas, connected to a Nooelec NESDR SMArt SDR VHF receiver and Raspberry Pi 3 running SDR Tracking Version 4.1 paur, to track the survival of individual animals. We hand-laid 200 Eradicat baits which also contained the dye, Rhodamark, in the south-west corner of a fenced introduced predator-free enclosure on MKKNP. The fate of 38 bandicoots and 40 VHF tracking devices was known at the end of the study, with 11% (4/38) of bandicoots showing signs of having consumed a sub-lethal amount of bait, and 3% (1/38) consuming a lethal dose. Two RI-2D VHF collars were shed by bandicoots with no further information on the fate of the animals collected. We conclude golden bandicoots are at minimal risk from 1080 baiting regimes.

# MARRI (CORYMBIA CALOPHYLLA): A KEYSTONE SPECIES OF INDIGENOUS BEE BIODIVERSITY

**DR KIT PRENDERGAST,** DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS

**Co-authors:**

Dr Nicole Willers, *Department of Biodiversity, Conservation and Attractions*

**Lead Author Biography:**

Dr Kit Prendergast is a native bee ecologist. Working with Department of Biodiversity, Conservation and Attractions, this collaboration has greatly advanced our understanding of native bees in southwest Western Australia. She even described a new species, *Leioproctus zephyr*. She has over 60 peer-reviewed publications, and was recently awarded Curtin Alumni Young Achiever.

**Abstract:**

Indigenous native bees are a diverse component of our terrestrial ecosystems, however plant-pollinator interactions that underpin biodiversity are poorly known. Whilst there is a paradigm that proposes more plant species means more bee species, there is also a theoretical paradigm that suggests that certain species occupy keystone positions in ecosystems, and support a disproportionate amount of biodiversity. We present evidence that in the context of supporting indigenous native bees, that the latter is indeed the case for the tree *Corymbia calophylla* (Marri), a Myrtaceae endemic to southwest Western Australia. To assess the role of *Corymbia calophylla* as a resource for native bees, we collated the number of species recorded from surveys across 16 sites, and supplemented this with data from host-associations from bee specimens lodged in the WA Museum. The capacity of C. calophylla to support wild bee biomass was assessed from abundance of bees visiting this species (total and relative to other plants visited) from these 16 sites as well as 8 other sites, ranging from urban streets, to bushland remnants, to the Jarrah forest and mining rehabilitation within it. We revealed that this single species is known to be visited by 81 species of native bees, and is often the main, or only, plant species visited. It blooms at a crucial time when most flower resources have dried out at the end of summer. We argue that Marri represents a crucial keystone resource for native bees, including undescribed native bee species. This species not only provides food resources for native bees, but nesting resources as well. It is evident that the protection and management of Marri is important for the preservation of native bee biodiversity.

# EGG BANKS AS BIODIVERSITY ARCHIVES: USING DESICCATION-RESISTANT EGGS TO MONITOR COMMUNITY STRUCTURE IN A SALT LAKE ECOSYSTEM

**DR MAHABUBUR RAHMAN,** *BIOLOGIC ENVIRONMENTAL*

**Co-authors:**

Dr Mahabubur Rahman, *Biologic Environmental*

Mrs Jess Delaney, *Biologic Environmental*

Mr Chris Hofmeester, *Biologic Environmental*

**Lead Author Biography:**

Mahabubur Rahman is an aquatic ecologist currently working at Biologic Environmental Survey in Perth. He completed a PhD in Environmental and Conservation Sciences at Murdoch University, focusing on the taxonomy, ecology, and phylogeography of giant ostracods from Australian salt lakes. His interests lie in molecular taxonomy, aquatic ecology, and biodiversity conservation, driven by a passion for understanding and preserving aquatic ecosystems.

**Abstract:**

Salt lakes are prevalent across Australia and are predominantly temporary ecosystems. Despite this, they support diverse aquatic invertebrate communities, dominated by crustaceans, many of which withstand dry phases by depositing desiccation-resistant eggs in the sediment. As part of ecological monitoring at Lake Way, a large salt lake in central WA, Biologic Environmental has conducted passive (sediment rehydration) and active (net sweeping) sampling to survey aquatic invertebrate communities during dry and wet periods, respectively, since 2021. This study compares communities recorded from rehydration trials with those captured by net sweeping across four years and evaluates the efficacy of sediment rehydration for assessing community structure in salt lakes.

Sediment rehydration trials were successful in all years, recovering six to nine taxa per trial, including crustaceans, dipterans, rotifers, and Turbellaria. In contrast, net sweeping recorded higher richness (2634 taxa), including coleopterans, dipterans, hemipterans, odonates, oligochaetes, polychaetes, nematodes, Hydra, rotifers, and crustaceans. As observed in other ephemeral systems, crustaceans, particularly ostracods (seed shrimp), dominated the emerging communities from sediments. Nine ostracod species were recorded overall, with eight detected through rehydration and five through net sweeping. Notably, three ostracod taxa (*Bennelongia sp., Cypretta sp., and Diacypris sp*.) and one *cladoceran* (*Daphnia wardi*) were detected only via rehydration, contributing additional species to the lakes known biodiversity. Halophilic brine shrimp (*Parartemia laticaudata*), shield shrimp (*Triops sp*.), and clam shrimp (*Eocyzicus sp*.) were also recorded through both methods.

These findings highlight the value of using egg banks as a complementary tool for monitoring aquatic invertebrate communities in ephemeral systems and for detecting species that may be overlooked through conventional active sampling methods.

# DOES PLANT DIVERSITY CONTRIBUTE TO SOIL CARBON STORAGE? INSIGHTS FROM A LONG-TERM TREE DIVERSITY EXPERIMENT IN WESTERN AUSTRALIA'S WHEATBELT

**MRS ELINA RITTELMANN-WOODS,** *MURDOCH UNIVERSITY*

**Co-authors:**

Dr Alexandre Pedrinho, *Murdoch University*

Dr Felipe Albornoz, *CSIRO*

Prof Raphael Viscarra Rossel, *Curtin University*

Prof Rachel Standish, *Murdoch University*

**Lead Author Biography:**

Elina is a second-year PhD candidate at Murdoch University and with the ARC Training Centre for Healing Country. Having moved to Perth from Germany, Elina enjoys learning about the unique Country of south-western Australia through her research. She is passionate about nature conservation, protecting biodiversity and tackling climate change. In her research, Elina explores the relationships between plant diversity, soil microbes and soil carbon storage in ecological and eco-cultural restoration.

**Abstract:**

There is great potential to align nature positive and carbon targets in revegetation projects to contribute to climate change mitigation and biodiversity conservation. Empirical data suggests that woody plant diversity can enhance carbon sequestration aboveground. Nevertheless, current carbon projects often consist of planting monocultures of fast-growing and exotic species, threatening local biodiversity and health of Country. Additionally, most carbon projects only account for aboveground biomass carbon, ignoring soil carbon. In this study, we tested the relationship between woody plant diversity and soil carbon storage, as well as underlying mechanisms, in a tree diversity experiment in Western Australia's wheatbelt. We measured soil carbon stocks, carbon inputs, microbial processes and soil characteristics in York gum monocultures and plots of varying native species and functional richness. Tree planting did not increase soil carbon stocks at the site 14 years after planting, and there was no difference in soil carbon stocks between monocultures and diverse plantings (25 species). Soil nutrient concentrations, electrical conductivity, moisture and groundcover biomass explained significant levels of variation in soil organic carbon stocks in the top 10 cm of soil. Diverse plantings had better litter quality (i.e., C:N ratios) and slightly higher, more variable decomposition rates than monocultures, indicating a difference in carbon dynamics. These differences may eventually translate into changes in soil carbon stocks, but over decadal time scales. The changes we observed in litter quality and decomposition rates are indicative of the return of woodland ecosystem function. This finding contributes to growing evidence of the benefits of biodiverse plantings for carbon storage and ecological restoration outcomes.

# BUILDING SUPPORT FOR 'NON-CHARISMATIC' SPECIES CONSERVATION THROUGH CITIZEN SCIENCE: BATS AND BIOACOUSTICS

**MS KELLY SHELDRICK,** *MURDOCH UNIVERSITY*

**Co-authors:**

Dr Rochelle Steven, *Murdoch University*

Dr Trish Fleming, *Murdoch University*

**Lead Author Biography:**

Kelly Sheldrick is an ecologist and science communicator. Her work centres on community-driven conservation, environmental education, bat ecology, and acoustic monitoring. She is First Vice President of the Australasian Bat Society, Co-lead of the WA Bat Network, and a committee member of the Australian Citizen Science Association (WA Chapter), and is completing a research masters at Murdoch University.

**Abstract:**

Bats represent approximately 20% of all mammal species and play vital roles in ecosystems. Despite their importance, bats remain under-researched in Western Australia, hindering conservation and effective management. Citizen science offers a promising approach to build local capacity and foster public appreciation and support for non-charismatic species. Informed by systematic literature reviews on Australian bat acoustic research and global citizen science bat projects, this study seeks to address key research gaps in bioacoustic methods and community engagement for bats. The global review found that 70% of citizen science bat studies utilised acoustic methods, yet only two assessed the impact of citizen science participation on volunteers. This collaborative project engaged community members in both active (transect) and passive acoustic bat surveys of urban bushland reserves in Western Australia. In-person training sessions in March 2025 were followed by Bat Week acoustic surveys in March and April 2025. The social impact of participation was assessed through three questionnaires administered before training (A), after training (B), and following survey participation (C). The responses to questionnaires evaluated changes in participation knowledge, conservation attitudes, and connection to nature. This initiative contributes ecological data to local biodiversity planning while also exploring how citizen science can build capacity and appreciation for underrepresented but ecologically vital species like bats.

# USING EDNA TO UNVEIL TROPHIC DYNAMICS OF SUBTERRANEAN INVERTEBRATES

**MISS MAHIMA TAWAL,** *CURTIN UNIVERSITY*

**Co-authors:**

Miss Mahima Tawal, *Curtin University*

Prof Tarik Meziane, *The French National Museum of Natural History*

Dr Karina Meredith, *Australian Nuclear Science and Technology Organisation (ANSTO)*

Prof Morten Allentoft, *Curtin University*

Dr Mattia Saccò, *Curtin University*

**Lead Author Biography:**

Mahima is a PhD student at Curtin University, studying groundwater ecology and trophic dynamics. She holds degrees in Biotechnology from India and a Masters in Conservation Biology from UWA. Her doctoral research focuses on subterranean ecology and trophic dynamics, utilising metabarcoding and stable isotopes to investigate ecological interactions and energy flow in groundwater systems.

**Abstract:**

Groundwater is the most abundant source of unfrozen freshwater and is often connected to surface aquatic ecosystems such as wetlands, rivers, and springs. Stygofauna, the aquatic obligate fauna in groundwaters, play a key role in maintaining the ecological integrity of these ecosystems through their biotic activities such as grazing and burrowing. However, the functional diversity of this fauna still remains poorly understood despite numerous anthropogenic and climate change-related threats.

Understanding trophic interactions and the flow of energy in groundwater ecosystems is essential for protecting this unique and often fragile subterranean biodiversity. Stygofauna are highly sensitive to environmental changes, and alterations to the temperature and nutrients can disrupt ecological niches, potentially leading to ecosystem collapse. However, direct observation of food-web dynamics in subterranean environments is challenging due to low visibility, limited access, and the cryptic nature of underground systems, and the small size of many stygofaunal species. This study explores the use of environmental DNA (eDNA) metabarcoding approaches targeting the gut contents of amphipods, decapods, and copepods to unravel the trophic links in three groundwater systems in Western Australia. By targeting the microbial, invertebrate and plant sources via high-throughput sequencing, we aim to identify stygofaunal dietary sources and reconstruct the food web interactions. This molecular approach offers a non-invasive, high-resolution method that complements traditional techniques, enhancing our understanding of trophic dynamics.

The results of this study will provide insights into key predator-prey relationships, revealing potential variations in feeding strategies across different groundwater regions. Ultimately, this research will support evidence-based conservation efforts aimed at protecting the essential but still overlooked subterranean biodiversity of Western Australia.

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