

CBCS NEWS

A quarterly newsletter
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The Price of Neglect

Why It's Time to Invest in Australia's Biodiversity: CBCS-hosted event at Customs House

Dr Brooke Williams , Hannah Thomas , and Associate Professor Carissa Klein 

Australia is facing enormous biodiversity and conservation challenges. On Wednesday 12 July 2023, the Centre for Biodiversity and Conservation Science (CBCS) was joined by over 170 friends and partners at Customs House in Brisbane to discuss “The Price of Neglect: Why It's Time to Invest in Australia's Biodiversity”. The event aimed to shed light on the importance of biodiversity conservation, emphasise the urgent need for investment to safeguard Australia's natural heritage, and mobilise public support and enthusiasm for biodiversity conservation and sustainable practices.

Panel discussion

The event featured an insightful panel discussion, where CBCS experts and affiliates shared their knowledge and perspectives on the price of neglect. The panel comprised:

- Dr Laura Sonter, who leads UQ's research on ecologically responsible mining
- Professor Hugh Possingham, currently a Chief Councillor with the Biodiversity Council and Chief Scientist of Accounting for Nature (and recently global Chief Scientist of The Nature Conservancy and Chief Scientist of Queensland)
- Associate Professor Justine Bell-James from UQ's TC Beirne School of Law
- CBCS alumnus Dr Eddie Game, who is Lead Scientist and Director of Conservation at The Nature Conservancy Australia.

The panel discussion was facilitated by Tegan Taylor, a health and science reporter for the ABC and co-host of the ABC's multi award-winning show Coronacast and Radio National's Health Report.

So, what do our panellists think the price of neglect is? They emphasised that it extends far beyond monetary value, encompassing crucial aspects of our existence. From the vital ecosystem services that sustain life, including clean air and water quality, to the intangible yet invaluable aspects like culture – such as music inspired by bird songs, and the visual arts – our very way of life is intertwined with the health of our planet's biodiversity. The panellists stressed that neglecting biodiversity threatens not only our own quality of life but also that of future generations, as the decline of species and ecosystems undermines the foundation of essential ecosystem services.



Images (L–R) The panel at Customs House, left to right: Moderator Tegan Taylor, Dr Eddie Game, Dr Laura Sonter, Professor Hugh Possingham and Associate Professor Justine Bell-James. Associate Professor Carissa Klein introducing the event.
Credit Glenn Hunt.

Amid the challenges we face, the panellists highlighted messages of hope and pathways forward, touching on everything from sustainable food production to minimising the impacts of mining required for sustainable energy on biodiversity to environmental policy reform. This year marks a critical juncture for environmental law as the Commonwealth EPBC Act (Australia's main piece of legislation for environment protection) undergoes a major review. A startling statistic is that over 99% of projects engaging with the Act are approved, raising concerns about the effectiveness of environmental protection measures. This review presents a significant opportunity to strengthen the legal foundations of biodiversity protection, ensuring that future projects are scrutinised with utmost care to safeguard our natural heritage and secure a sustainable tomorrow.

Through collective effort and thoughtful reform, we can instil hope for a brighter and greener future for Australia and its diverse ecosystems. Years of campaigning for the government to better invest in biodiversity hasn't improved the situation very much, so it's time for conservation and industry to become allies. By fostering collaboration, we can harness the power of these sectors to work in harmony for the benefit of our planet.

Posters

Attendees of the event were impressed by the incredible research being carried out by CBCS PhD and early career researchers (ECRs), as showcased by **Ilyas Nursamsi**, **Dr Chris O'Bryan**, **Dr Valerie Hagger**, **Shu Chen**, **Dr Nick Leseberg** and **Tin Buenafe**.

- **Ilyas** studies land-use change and protected area effectiveness in Indonesia.
- **Chris** researches invasive species management and how governments can make better decisions to maximise cost-effectiveness to protect biodiversity and social values.
- **Valerie** researches coastal ecosystem conservation and restoration.
- **Shu** studies how private land conservation programs can be better communicated to engage private landholders effectively to conserve biodiversity on their lands.
- **Nick** looks at the conservation biogeography of night parrots.
- **Tin** studies how conservation practitioners can transition to more climate-smart spatial planning approaches.



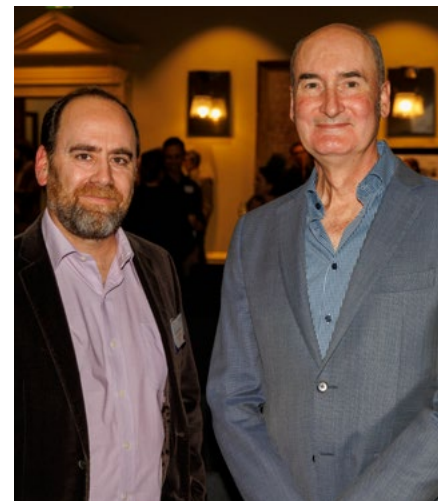
We can instil hope for a brighter and greener future for Australia and its diverse ecosystems.

These are just a few of the many examples of the incredible projects being undertaken by CBCS students and ECRs.

Organisers and support

The event wouldn't have been possible without the hard work of so many members of the CBCS management committee and broader community, but especially **Associate Professor Carissa Klein** (project leader), PhD candidate **Hannah Thomas**, **Dr Amelia Wenger**, and **Dr Brooke Williams**, who make up the CBCS management committee engagement team, and **Kate Donnelly** who supported all aspects of running the event. We were also lucky enough to be supported by UQ's Advancement team, with special thanks to **Marlin Othman** and **Brenda Tournier**, who made the event very smooth and successful.

We hope that while the event strengthened ties between CBCS and friends and colleagues, it also served as a catalyst for change, inspiring action and commitment to create a harmonious balance between human development and the protection of the natural world. This will be the first of hopefully a series of events aimed at strengthening ties between CBCS and industry and the wider community.



Images (top to bottom) CBCS PhD candidate Tin Buenafe explaining her research to event guests. CBCS Director Associate Professor Daniel Dunn, left, with Professor Mark Blows, UQ Deputy Vice-Chancellor (Research and Innovation) and Vice-President (Research and Innovation). CBCS ECR Dr Chris O'Bryan at his poster. Credit: Glenn Hunt.



PROFILE

Bridging science and design for sustainability impact

Dr Ray Maher

Deputy Director of Engagement and Lecturer,
School of Architecture, Design and Planning
Research Fellow – Sustainable Development Strategy,
Centre for Policy Futures

Passion and learning

My sustainability journey began as a kid, chasing mudskippers under the lush canopies of the Daintree rainforest, then growing up in the foothills of the Mt Warning caldera. For me, the sights and sounds of thriving nature were normal. Once I moved to Brisbane to study, I felt the severe absence of nature – every bare hillside or roadside embankment was a profound loss and an untapped opportunity for life to thrive.

Pursuing my passion for creativity and solving complex problems, I studied architecture at The University of Queensland. Here, I learned how the demands of our cities cause many global sustainability problems and offer many of their solutions. I also learned the power of design for unlocking new ways of thinking to overcome entrenched problems.

Applying this knowledge, I co-founded a sustainable building design business with my wife. This inspired a new passion of mine: working closely with clients to achieve their goals while also advancing sustainability outcomes. Keen to expand the scale of my work, I was invited by a great research mentor to co-author the *Australian National Rail Station Design Guidelines* – a critical tool for urban sustainability. These experiences inspired me to pursue a PhD alongside many CBCS colleagues. By combining design methods (from architecture) and systems thinking (from ecology and earth systems), my thesis designed new tools and approaches for creating initiatives that achieve multiple sustainability goals. Its ability to guide interdisciplinary research resonated with the Future Earth global research network, who invited me to present to international sustainability leaders at Resilience 2017 in Stockholm. A new perspective emerged.

Image MetaMAP, a graphical tool I developed for designing initiatives to support multiple sustainability goals. **Credit** Ray Maher.

The power of collaboration

While academia is an incredible place to generate knowledge, I recognised that the big decisions that shape our world are made beyond research institutions. Still in the final stages of my PhD (and starting a family, building our home, and teaching sustainable design!), I was recruited to UQ's **Centre for Policy Futures (CPF)**. There, I could directly engage with government and industry stakeholders to inform policies and strategies. Working at the intersection of academia and decision-making highlighted the importance of navigating power dynamics to effect change. At the same time, I experienced a shift in the drives of universities from sometimes inward-looking intellectual cultures to “creating change” and providing “knowledge leadership for a better world”. A great time for applied sustainability research!

Collaboration was the cornerstone of our work at CPF, forging partnerships across diverse academic disciplines, government departments and industry sectors. Experiencing the breadth of sustainability expertise from across UQ gave me the confidence to pursue large, impactful research partnerships, knowing that we could build a team to tackle anything.

Research impact for sustainability

On the strength of these collaborations, I had the privilege of contributing to major strategies and policies in Australia and the region (often with a steep learning curve). First, I worked with Queensland Government and industry stakeholders to develop an *Adaptation Plan for the Energy, Mining, and Manufacturing Sectors*, part of the Queensland Climate Adaptation Strategy.

By integrating knowledge from diverse experts, we can tackle complex sustainability challenges together.





This is an exciting opportunity to drive sustainability outcomes.

Building on this, our research team developed the foundational project on climate change for the **Cooperative Research Centre for Transformations in Mining Economies (TiME)**. More recently, I have worked with UQ's Sustainable Minerals Institute, The Pacific Community (SPC), the United Nations Development Programme (UNDP), and Fiji's national government on *Building disaster and climate resilience through Development Minerals*.

In another body of research, I worked closely with SPC to co-develop their 10-year Strategic Plan using systems, design and foresight methods. This collaboration also informed UQ's Pacific Engagement Strategy and the 2050 Regional Strategy for the Blue Pacific Continent, a long-term regional strategy endorsed by 18 member nations.

Following this, I was invited to a multi-institution collaboration to inform Queensland Health's 10-year reform strategy.

Again, broad collaboration was critical, so we used systems methods to integrate knowledge from diverse stakeholders, identify leverage points and create long-lasting impact in an organisation with 120,000 staff.

Last year, our team of 15 researchers from across UQ (including two brilliant CBCS researchers, **Professor Rich Fuller** and PhD candidate **Nicola Sockhill**) was engaged by one of the largest developers in south-east Asia to inform their ~\$20B development of a new city. In this partnership, we created an Urban Sustainability Framework which provided research-informed guidance on urban biodiversity, efficient buildings, low-carbon transport, resilient water systems, renewable energy and sustainable materials. We are now seeking to guide its implementation and build new partnerships to apply this research in other major urban developments.

Most recently, I have embraced a new academic position in the rapidly growing School of Architecture, Design, and Planning. This is an exciting opportunity to drive sustainability outcomes alongside incredible researchers from CBCS and across UQ.

Looking back to go forward

While diverse, these experiences highlighted three core strategies for addressing complex sustainability challenges through applied research. First, by *partnering with governance and industry organisations*, we can ensure the best research is put to good use. I have found that, as in family life, to be good research partners we must listen to the needs of others. By listening, we can develop strategies which align sustainability and conservation goals with the commercial and governance objectives of our partners.

Second, I think that forging *collaboration across diverse academic disciplines* is the only way to shift our trajectory towards a more sustainable future. No-one has all the answers, and as soon as we think we do, we quickly find our work irrelevant or obsolete (aka "Why is no one listening to me?!"). Instead, by integrating knowledge from diverse experts, we can tackle complex sustainability challenges together.

Third, *design and systems approaches are essential tools* for leveraging these partnerships and collaborations to address sustainability challenges. We wouldn't make financial decisions without applying mathematics, so why try to solve complex and contested problems without applying design methods? Design methods are uniquely suited for providing creative responses that achieve multiple contradictory goals simultaneously amid real-world complexity. If we want to create a thriving future for life on earth, integrating design methods with leading science holds the key.

So that's where I'm heading: bridging design and science for sustainability impact. Let's hope the next chapter is as much fun!

Images (clockwise from top left) Site visit to a challenging development with ambitions for urban sustainability. Working with the Fiji Government and UQ's Sustainable Minerals Institute on climate transition and resilience. Celebrating the launch of our Urban Sustainability Framework to Pasay Government, the Philippines. Credit Ray Maher.





Carissa Klein receives a 2023 Queensland Young Tall Poppy Science Award

CBCS Deputy Director Associate Professor Carissa Klein is one of 10 University of Queensland researchers who have been recognised in the 2023 Queensland Young Tall Poppy Science Awards for their outstanding early career research.

The awards recognise excellence in science and science communication and are considered an indicator of Australia's future scientific leaders.

Carissa leads the Ocean Conservation Team, a group of students and postdoctoral researchers that is motivated by real-world conservation management and policy problems. They collaborate closely with non-governmental organisations, such as Wildlife Conservation Society and Minderoo, and government departments, such as Queensland's Department of Environment and Science.

Her research generally falls into four themes: land-sea conservation planning, ocean zoning and protected area design, social equity in conservation, and sustainable seafood.

The researchers from UQ are among 13 state winners who are in the running for Queensland Young Tall Poppy of the Year, which will be announced at the Queensland Young Tall Poppy awards ceremony to be held on Wednesday 18 October 2023.

The state winners join a national alumni network of science ambassadors who engage with students, teachers, government and the community to promote and develop Australia's current and future science leaders.

The Queensland Young Tall Poppy Science Awards are an initiative of the Australian Institute of Policy and Science in partnership with the Office of the Queensland Chief Scientist.

Employability: a journey of self-discovery

Sai Meghna Reddy Gaddam
CBCS Master of Environmental Management graduate

When I travelled ~9000 km from India to Brisbane to pursue my Master of Environmental Management, the only thing I thought I would do was study. While studying in itself was rewarding, as a person trying to find her place at The University of Queensland, I was hungry for more. I was looking for ways in which I could make the most of my time at UQ and become my highest self.

Enter the UQ Employability Award! This program was the perfect path for the voracious learner within me. The ideals of this program, that most holistic development for students happens outside the classroom, struck deep chords within me. I set out on a journey to empower myself to perform efficiently while creating positive economic and social impacts.

Discovering research

I completed 75 hours of work experience and 75 hours of volunteering. I also completed five other supplementary activities that showcased my development in both personal and professional skill sets. One of these activities that changed my life was the UQ Summer Research Program.

As an Ex-Goldman Sachs employee whose background is in business administration and human resource management, I never saw myself as a "researcher".

But I knew this was a good space to try. So, I took a good run and leapt into the world of research. I found a topic that was close to my heart: microplastics in Moreton Bay. As a huge advocate of reducing/eliminating single-use plastics, I was confident that this research would help build stronger advocacy to reduce plastic pollution.

Somewhere between learning how to use a microscope and sharing the results of this research at the World Science Festival, I fell in love with research. My life can now be divided into "before research" and "after research". I enhanced my resilience, science communication and problem-solving abilities. With an extremely supportive supervisor (Associate Professor Helen Bostock) and team, I also went on to present the finding of this research at the Australian Marine Sciences Association (AMSA) 2023 Conference.

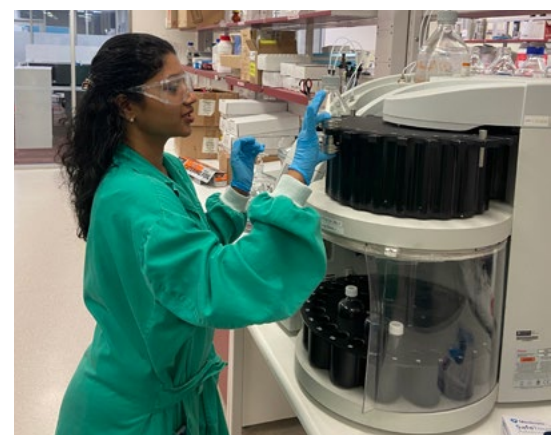
Being awarded – and the gift of self-reflection

In between all this, I also ended up receiving the UQ Employability 2023 Award. What began as a path to upskill myself now became a path of discovering the best version of myself. The universe definitely conspires in the favour of your every tiny courageous step. While receiving recognition for my professional and personal growth was gratifying, the ability to self-reflect and evaluate my growth was the greatest gift I received. I am grateful to every event and individual who helped me in achieving this milestone in my life.

I now stand on the other side of this journey with deepened competencies, meaningful connections and an innovative mindset to engage in lifelong learning.



Images (L-R) Sai presenting the poster with the findings of the research at the AMSA 2023 conference. Credit Alice Twomey. Sai setting up samples within accelerated sample extraction cells for pressurised liquid extraction at the Queensland Alliance for Environmental Health Sciences, in the second half of her summer research. Credit Yee Hang Yip.





Images (clockwise from left) A male palm cockatoo drumming during a territorial display. **Credit** CNZdenek. Christina in the bird hide, quietly and patiently waiting for palm cockatoos to arrive at the display hollow. They never arrived! Such is life, working with palm cockatoos. **Credit** Daniel Meier. Christina meeting with the Directors of the Kuuku Ya'u Aboriginal Corporation, discussing the future of palm cockatoo conservation and research in the region. **Credit** CNZdenek.

Behind the scenes: a wildlife film shoot and conservation endeavour

Dr Christina Zdenek 
CBCS Postdoctoral Research Fellow

In the heart of one of Australia's last "frontier" landscapes, I recently embarked on a thrilling four-week film shoot that blended work, adventure and a vital conservation mission. This captivating wildlife film endeavour unfolded near the remote town of Lockhart River on Cape York, offering a rollercoaster of experiences. With a smaller crew but an unyielding passion, my colleague Daniel Meier and I managed to capture breathtaking footage for an upcoming BBC wildlife series. But that's not the end of the story – amid the cinematic pursuits, an equally important conservation mission unfolded, focusing on the preservation of the Endangered palm cockatoo and its precious habitat.

Revealing the enchantment of film-making

This marked the second film shoot for a massive and ambitious project. Although I must keep the specifics under wraps, what I can share is that our focus revolved around crafting a mega-top (blue-chip) wildlife series for the esteemed BBC. With a projected air date between July and December 2024, there's anticipation for a series that promises to unravel the astonishing beauty of the natural world, including showcasing the wonders of Queensland.

Unlike the previous year's substantial team of five people, this time around it was just Daniel Meier and me – the two camera operators. Despite the scaled-down crew, our commitment remained unshaken, and we managed to capture awe-inspiring visuals that we hope make the final cut into the series.



A call to conserve

Yet, our journey extended beyond the camera lens; it resonated with an unwavering call for conservation. Nestled within the expansive embrace of this remote region, the Endangered palm cockatoo is facing a dire predicament. With its population dwindling and its habitat under threat, urgency demands action.

Guided by a 15-year journey of dedication and the relentless pursuit of research and conservation funding, I came to deeply understand the profound significance of the opportunity that lay within the heart of this remote wilderness. Equipped with the expertise to pinpoint crucial nesting trees (which I published last year), we embarked on a mission (in between filming during the bookends of the day) to safeguard these habitats from the devastating impact of unnaturally intense fires that can occur during the late dry season (October to December). Collaborating closely with local partners, including national parks and the Kuuku Ya'u Aboriginal Corporation, we orchestrated the installation of firebreaks around the ancient nesting trees. These irreplaceable hollows are crucial for the survival of palm cockatoos, who invest countless hours in meticulously crafting nests within them and are willing to fight to the death for them – a testament to the immeasurable importance of every preservation endeavour we undertook.

The fruits of our labour are evident in the numbers: in 2023, we successfully saved 18 trees across the landscape.

This accomplishment adds to the impressive tally of 34 trees preserved the preceding year, all done completely on volunteer time with zero funding! Collectively, a total of 52 nesting trees within the Iron Range region have now been safeguarded over the course of both years, and I suspect this work will have protective effects for multiple years, as woody debris takes years to accumulate. Our accomplishment represents a significant stride towards ensuring the survival of this precious population and the species as a whole.

Acknowledging gratitude

This conservation work would not have been possible without the combined efforts of numerous individuals and organisations, all of whom merit heartfelt recognition. I extend my sincere gratitude to:

- The BBC, for providing a platform that facilitated this crucial conservation work.
- The Greenhouse – Cape York Accommodation, whose support played a pivotal role in making one week of this endeavour attainable.
- National Parks, for their dedication to creating firebreaks and aiding in the protection of nesting trees.
- Daniel Meier, Claire Watson, Chris Hay and others, for their active involvement in the firebreak efforts.
- Collaborators and supporters like Laurie Ross, Gary Featonby, David Clarke, Cal Thomas, Chris Hay, Gayle Collings, and Doug Harrington, who lent their support in various capacities.

A call to rally

For those for whom this noble cause resonates, there is an opportunity to contribute. Just \$300 donated [here](#) will protect one old-growth palm cockatoo nest tree for one year. Every contribution is a step towards safeguarding these remarkable birds and the irreplaceable old-growth nesting trees that they need to breed and persist. Grants are thin on the ground and unreliable (often just a 10% success rate) – I've been denied three times just this year.

In closing


Beyond the realms of the camera, this film shoot journey transformed into a tale of dedication, conservation and collaborative endeavour. Beyond the forthcoming wildlife series that promises to captivate audiences, we hope this behind the scenes account will show the conservation need of this species and how a little support goes a long way.

In 2023, we successfully saved 18 trees across the landscape. This accomplishment adds to the impressive tally of 34 trees preserved the preceding year.



Images An example of the tree protection work we do. 1. Before any work. 2. After manually making a firebreak using a rake-hoe. 3. Further protection via a back burn around the old-growth nesting tree. **Credit** CNZdenek.

Battle for the skies: drones and Endangered birds

Joshua Wilson 
CBCS PhD candidate

Flight, fight or freeze

Imagine you're nestled comfortably in bed, drifting off to sleep, when suddenly a noise jolts you awake. Your eyes shoot open only to reveal your worst nightmare, a dark shape scuttling across the ceiling towards you. Terrified, you sprint out of your room screaming. Your housemate, who's not normally easily scared, is woken by the commotion and is now running out of their room too. After a few tears and some deep breaths, you gather the courage to return to your room and there's no dark shape to be seen, but the fear lingers, and sleep remains elusive as the night is haunted by unease.

You've just experienced a stress response perhaps similar to that which the Critically Endangered shorebird the eastern curlew experiences as it flees from an approaching drone, dragging less jumpy shorebird species along with it.

Oh, and by the way, the eastern curlew migrates over 10,000 kilometres to breed, so also imagine that you're preparing for a marathon, and the dark shape comes back two or three times a night, and sometimes it's an eagle and it eats your housemate...

Birds of a feather flee together

Alongside the Queensland Wader Study Group and The Moreton Bay Foundation, I've been studying the responses of birds to an approaching drone. My hope is that my research can help inform the regulation of drones near critical bird habitats so that they can rest without constantly being jolted awake by a drone scuttling across the sky.

Under strict ethical conditions, I approached shorebird flocks in Moreton Bay with a drone, unveiling a detailed picture of how they respond to drones, how close a drone can be before each species takes flight and how the species interact with each other in mixed flocks.

The most alarming finding from my research was that the Critically Endangered eastern curlew is extremely sensitive to drone disturbance. Even when I approached with a tiny drone at the maximum legal altitude of 120 metres, they were still terrified and flew away.

Most other shorebird species were unlikely to take flight when approached, provided the drone was small and flown above 60 metres. However, in our imagined scenario, your reaction woke your housemate too, which is exactly what we saw with different shorebird species.

When eastern curlews took flight, screeching out alarm calls, nearby species, who were not typically scared by the drone, would also flee. This interaction between species means that drone regulations need to account for the domino effect of disturbing highly sensitive species in mixed-species flocks.

Drone regulations need to account for the domino effect of disturbing highly sensitive species in mixed-species flocks.

Image A drone approaching a flock of shorebirds in Moreton Bay. Credit Joshua Wilson.





Images (clockwise from left) The eastern curlew is a Critically Endangered shorebird that is highly sensitive to drone-induced disturbance. **Credit** JJ Harrison. Within Queensland's Moreton Bay Marine Park, it is an offence to disturb shorebirds. **Credit** Des Thureson. Shorebirds are a diverse group of birds commonly found along coastlines. **Credit** Birdlife.



The impact of disturbance

Heartbreakingly, the global population of shorebirds has plummeted as they continue to battle habitat destruction, sea level rise, hunting and disturbance. Just as our sleep was interrupted in our imagined scenario, disturbance can interrupt birds as they try to rest or feed, which could contribute to population declines. This is particularly concerning for species such as the eastern curlew, which migrate thousands of kilometres to breed.

While it's unlikely that drone disturbance has contributed much to this decline so far, drone use has already increased dramatically in the past decade, and this increase is set to continue, leading to concerns that drones may become yet another source of disturbance for birds that are already Critically Endangered, like the eastern curlew.

Drones may become yet another source of disturbance for birds that are already Critically Endangered, like the eastern curlew.

Sharing the skies

On the other hand, I was surprised by how comfortable many species were with a drone being flown over them. Shorebirds spread out across vast mudflats to feed, making it very difficult to survey them on foot and identify critical foraging habitats. My research shows that, for certain species, drones may overcome this barrier, providing information that may be pivotal in arresting shorebird population declines.

In fact, drones are already being used to survey birds in remote locations, such as seabirds breeding on inaccessible islands in the South Atlantic Ocean, or penguins nesting on freezing Antarctic outcrops.

Drones can be beneficial in many ways, but we must identify where they're appropriate. In some Australian national parks, drone use is already prohibited or restricted. But managers need to understand how drones affect wildlife to inform these regulations. My findings identify how much space to give birds to keep drone disturbance to a minimum.

The Moreton Bay Marine Park, where this research was undertaken, is the single most important site in Australia for the eastern curlew.

Disturbing shorebirds within the marine park is an offence that can result in fines. The Queensland Parks and Wildlife Service has already used my findings to place conditions on research projects and media activities involving drones.

I recommend that organisations with influence on this issue, such as the Civil Aviation Safety Authority and national parks authorities, regulate drone use near bird flocks – especially those containing at-risk and highly sensitive species. I also encourage those researchers considering adding drones to their conservation toolkit to carefully evaluate the risk of disturbance before using them to conduct wildlife surveys.

While I'm rarely kept awake at night by things scuttling in my room, I do sometime lie awake disturbed by the dramatic decline in biodiversity. Hopefully this research can lead to measures to mitigate drone disturbance and help us all sleep a little easier at night.



Flyways: stories of anguish and of hope

Professor Rich Fuller 

I've often wondered why there are so many happy people in conservation. Watching the biodiversity we love declining and disappearing can take a huge emotional toll, especially when the losses become tangible over one's own lifetime. Several of the places I used to go and watch nature as a kid have now been destroyed. Species have disappeared from places I have known during my lifetime – on my watch. Over the years, I've found myself progressively limiting my consumption of environmental news because I just can't cope with it any more.

So it was with mixed feelings that I embarked on a journey to help brilliant film-makers Randall Wood and Rebecca McElroy tell the story of the majestic eastern curlew. My favourite bird has declined by over 80% in 30 years, owing to massive habitat loss along its migration route from Australia to Russia and China. Randall and Rebecca's *Flyways* film interweaves the story of the eastern curlew with those of several other migratory shorebirds around the world. The film simultaneously communicates the beauty of the birds, the incredible feats of migration they undertake, but also the enormous pressures they are under from human activity.

Fervour, science – and storytelling

I remember attending a shorebird conference in Hobart 15 years ago. Talks from all around Australia made it abundantly clear that migratory shorebirds were declining fast, and many were heading rapidly toward extinction unless something could be done. People were literally in tears.

A general sense of helplessness gave way to fervent discussions about what could be done. Yes, we needed more science, and we all did a bunch of that. But to effect real change, way more people needed to be aware and talking about this issue than ever before.

Yet we felt powerless – as scientists we are not always the best storytellers.

Gradually over the ensuing decade, growing numbers of artists and broadcasters became interested in these birds. Their stories began to be told, culminating most recently in *Flyways*. Randall and Rebecca had a vision for a film that was cinematically brilliant, but also communicated something of what it is like for the scientists who study biodiversity that is declining so fast. They followed the thrills and (mostly) spills of us trying to catch eastern curlews to fit them with satellite tags. They showed the connections that the birds make between countries, between people and cultures, from the urban shores of Moreton Bay to the sweeping Wernadinga coast in the Gulf country to China and beyond.

The return of hope

Threats abound for these birds, from the destruction of their feeding grounds in Queensland to make way for ports and marinas, to hunting, and rapid climate change. But as the film relates, hope is building, with a series of landmark conservation decisions in China and Korea safeguarding much of the remaining habitats for the birds. Telling the stories of nature, and telling them loud, is surely a fundamental part of conservation progress.

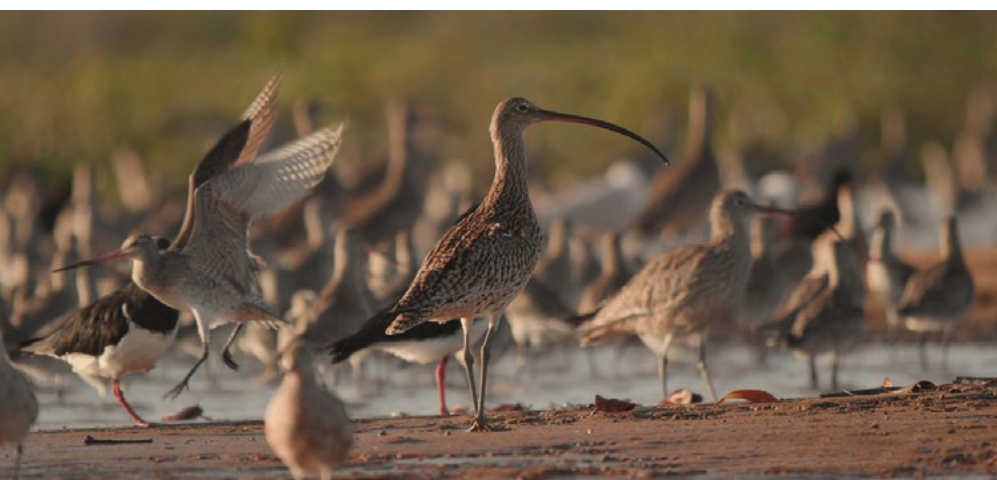
Massive thanks to Randall and Rebecca for the enormous impact they have made.

The film showed on the “big screen” at more than 40 cinemas around Australia, as well as on the ABC and many overseas television stations. Thousands of people have been touched by the “plea for mankind to respect nature and to consider just how we impact the living world around us. With a soaring score by Cezary Skubieszewski, and gentle narration by Mia Wasikowska, *Flyways* is a soul-nourishing film that deserves to be seen on the big screen” (Andrew Peirce, *The Curb*).

In Randall's words, “Shorebirds, the wayfarers, are truly the most exquisite species on the planet. On their epic journeys shorebirds tell us so much about ourselves, our world, and our quest for a better future. The film features the deep and enduring connection humans have with these wild creatures, their ethereal song, the vibrancy and hope they bring to our lives”.

And indeed, there is hope – recent CBCS research by **Dr Andrew Rogers** and **Dr Tatsuya Amano** is showing that the decline of the eastern curlew is finally slowing down. For the first time in my career, I feel like this species and its amazing migration might just still be around for the coming generations to tell stories about.

Images (clockwise from left) Eastern curlews stand tall in this flock of shorebirds in Boonooroo. Richard Fuller with shorebirds ready to be tagged to study their migration. Jon Coleman watches closely as a cannon net is used to safely capture shorebirds for tagging. Credit *Flyways*.








Images (L-R) The Ecological Cascades Lab research team in the Pasoh rainforest. Left to right: Dr Calebe Pereira Mendes, Dr Matthew Luskin, Dr Tom Bruce and Zoë Lieb. We found the weathered skulls of pigs whose carcasses were monitored last year. Credit: Matthew Luskin.



Happy as a (dead) pig in mud

Tracking the impacts of African Swine Fever in Malaysia

Dr Tom Bruce 
CBCS Postdoctoral Research Fellow

Together with other members of CBCS's Ecological Cascades Lab  (ECL), PhD candidate Zoë Lieb , postdoc Dr Calebe Pereira Mendes and Chief Investigator Dr Matthew Luskin  and I embarked on a journey this July to explore the impacts of African Swine Fever (ASF) on the natural rainforests of Malaysia.

Given its origins, ASF doesn't sound like a disease that would devastate the economies and ecosystems of Asia. ASF is like Ebola for suids (pigs) – only worse. The symptoms include internal bleeding that fills the lungs and ends in a 99% mortality rate. In 2018, ASF was introduced to Asia via the Chinese domestic pork industry, where it caused losses of more than USD100 billion in 2019 and 2020. Since its introduction, the disease has progressed southward into wild native pig populations in countries like Malaysia. Unlike Australia, the wild boar (*Sus scrofa*) is endemic to much of Eurasia and North Africa and is not considered invasive. However, the species can still significantly impact ecosystem structure and function even in its natural range.

Pig declines in Pasoh

Our focus was Pasoh Forest Reserve in Peninsular Malaysia, which boasts Asia's longest-standing tropical forest research plot. This expansive 2,500-hectare rainforest lies just a two-hour drive east of Kuala Lumpur. Since 2009, when Matthew started his PhD, the Ecological Cascades Lab has been studying the behaviour of wild boars and their influence on forest structure and vegetation dynamics within Pasoh.

Initially, our efforts revolved around documenting the remarkable population of wild boars. Over time, our research shifted to investigating how pig populations were affected by diets supplemented by crop-raiding from nearby oil palm plantations bordering Pasoh. Moreover, we delved into the cascading effects of pig behaviour on tree dynamics, such as seedling recruitment and growth.

Before the arrival of ASF, the Pasoh forest harboured a population of 27 to 47 pigs per square kilometre. However, everything changed on 10 February 2022, when ASF was officially confirmed within the reserve. Subsequent months witnessed a drastic decline in the pig population, with transect surveys revealing a staggering 100-fold increase in pig carcasses compared to pre-ASF times.

Reduced pig sightings accompanied this unsettling shift, documented by cameras placed within the reserve. The detections dropped from an average of 25.56 per 100 trap nights between 2013 and 2017 to merely 3.39 in 2022.*

Fieldwork in dense forest

Returning to Pasoh a year after our 2022 survey, we aimed to replicate the study and monitor the response of the wild boar population post the ASF outbreak. The average day for our team involved an early start to get to the forest to ensure we had enough time to deploy our daily target of cameras. We would split into sub-teams and, where possible, trek along established tracks and trails to find suitable locations to deploy cameras. When this wasn't possible, we would have to cut our paths through the forest, often through dense and tangled tree falls, where it could take up to an hour to cover just a kilometre. Once you arrive at the GPS point, the real work begins. The first task is to find a suitable tree, clear the vegetation, and finally crawl in front of the camera to check that it is working and ready to gather data. Once the camera is activated, it's time to press forward into the forest to the next point. This project was a team effort, with no job too big or too small for anyone involved; everyone took turns programming cameras, navigating through the forest and doing their best pig impressions to test the cameras.

This project was a team effort, with no job too big or too small for anyone involved.

*Luskin, M. S., Moore, J. H., Mendes, C. P., Nasardin, M. B., Onuma, M., & Davies, S. J. (2023). The mass mortality of Asia's native pigs induced by African swine fever. *Wildlife Letters*.



Image Wild boar carcasses in the Malaysian rainforest, from a previous visit to Pasoh. Credit Matthew Luskin.

Our team successfully deployed a network of 59 cameras, which will remain in the forest for about three months, to capture valuable data.

The population crash of pigs driven by ASF offers an extraordinary natural experiment to understand how the forest responds.

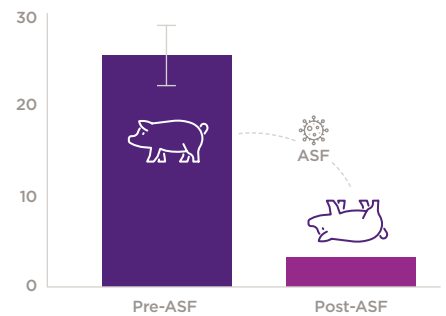
Calebe, the driving force behind the project, highlighted that “The population crash of pigs driven by ASF offers an extraordinary natural experiment to understand how the forest responds to a rapid decline of pigs following hyper-abundance, and how long it will take the pigs themselves to recover”.

Possible recovery and ASF ramifications

During our camera deployments, we encountered historical evidence of pig deaths likely due to ASF such as weathered wild boar skulls, but could not find any recent carcasses. We did, however, stumble upon fresh evidence of pig presence, including wallows and footprints, suggesting a potential recovery was underway.

The conservation implications of a mass die-off of pig populations could be far-reaching, from altering populations of species that both predate on or compete with wild pigs to affecting human economies and livelihoods.


The new survey from the ECL will provide insight into some of the ramifications of ASF. It will provide valuable data for protected area managers and decision-makers in the region.



The impact of African Swine Fever on pig detections in Pasoh

Detections per 100 camera trap nights

Uncovering the secret life of Condamine earless dragons

Laura Harms 
CBCS Honours graduate

I recently finished my Honours research project focusing on the habitat and distribution of the Endangered Condamine earless dragon (*Tympanocryptis condaminensis*). This grassland-specialist reptile is found west of Toowoomba on the Condamine River floodplain. If you haven't heard of the species before, that's probably because almost no-one else is really talking about it, nor researching it...

Prior to the past decade or so, these dragons were thought to be a disjunct population of *Tympanocryptis pinguicolla*, the grassland earless dragon species found in Victoria.

Professor Jane Melville and team described the Condamine earless dragon as a separate species in 2014, based on genetic work. The dragons occupy an extremely restricted distribution, and almost all of their native grassland habitat has been clearing for cropping.

They are now mostly observed among some crop types, such as sorghum, and on grassy road verges. We know very little about their biology and habitat requirements.



Image The Condamine earless dragon in its grassy habitat. Credit April Reside.

The Condamine earless dragon is a difficult and enigmatic species to study, but one that urgently needs our help.



Spotting the elusive dragons

Thankfully, conversations between Steve Wilson, Professor Robbie Wilson, CBCS's Dr April Reside and myself led to the formation of my Honours project on this species, with April as my primary supervisor for her habitat modelling expertise. My research was the first attempt to bring light to the species' habitat requirements at a distribution-wide scale.

I say "attempt" because these lizards are bloody hard to find, and their associations with habitat are even more elusive. Before my fieldwork, I chatted to the species expert Rod Hobson, who has been monitoring these dragons for decades. Rod recommended that the most effective survey method is active searching from a very slowly moving 4WD vehicle. The higher vantage point makes dragon-spotting easier, and the dragons seem to be less skittish towards a crawling vehicle than a human stomping through grass.

I put in about five and a half weeks of fieldwork searching for the critters in this way, along with some fantastic volunteers – and we found a total of 23 individuals. But even despite their cryptic nature, we would have expected to have found more.

Unfortunately, the La Niña rains were not conducive to successful dragon-spotting (as was also found by Professor Melville's team, when they conducted a week of surveys around the same time as my fieldwork).

Complex habitat needs

The environmental structure of areas the dragons inhabit is heavily determined by cropping practices. So, I investigated any associations between presence of the species and multiple crop types and stages, as well as evidence of ploughing. I also looked at the width of the nearest roadside grass verge, as Rod Hobson thinks that these grass verges could be an important refuge for the dragons, particularly during harvesting operations.

I found no significant relationships between any particular crop type, evidence of ploughing or grass verge width, and presence of the species. I found that the species persists near and within a variety of different crop types, and isn't constrained to areas with nearby wide grass verges. However, as I had a lower than expected sample size, my research will function as a pilot study on which to base further research. There may still be associations here that could be uncovered with larger sample sizes.

While we haven't quite cracked the code yet on the complex habitat requirements of the Condamine earless dragon, I discovered some interesting findings about the reproductive biology and distribution of the species. I found eight gravid females; to my knowledge there was previously only one recorded observation of a gravid female (from 2015).

Every gravid female I observed had a canary yellow throat colouring, which has been reported before in the species, but not in any confirmed females. Five of these females were found in late January, which suggests that their breeding season can extend past the previously estimated September to November period. I also found the species in six new locations, three to eight kilometres from any previous record (which is fairly substantial in the context of their restricted range). Two of these sightings represented slight westward extensions of the known range, towards Cecil Plains.

Potential of detection dogs

The Condamine earless dragon remains a difficult and enigmatic species to study, but one that urgently needs our help to ensure its continued survival in these highly modified agricultural landscapes. Agricultural practices in the area are intensifying, leading to larger fields of monoculture crops. We still don't know the specifics of the Condamine earless dragon's habitat requirements, and Rod Hobson and others involved are concerned that these vast, homogenous fields may provide little habitat for the dragons.

In the next field season (starting as soon as it warms up in spring), April is enlisting the help of Dr Megan Barnes and her scent detection dogs to test whether the dogs can achieve a higher dragon detection rate than humans. Honours student Xavier Woo will be taking on this project. Masters student **Isabella Pires de Arruda Campos** will be picking up where I left off on the quest to reveal associations with presence of the species and habitat characteristics, including soil type and structure.

Images (top to bottom) Laura with a Condamine earless dragon, showing canary yellow throat colouring. Credit Peter Harms. Can you spot the elusive dragon? Credit Laura Harms.





Images (L-R) The integrated model focuses on koalas in south-east Queensland, but will be generalisable to evaluation of other offset policies. Credit pen_ash/Pixabay. Clearing of koala habitat in south-east Queensland. Credit Jonathan Rhodes.



Performance of biodiversity offsets influenced by site availability

Environmental offsetting is a widely used tool to compensate for losses of biodiversity due to development, with biodiversity gains elsewhere. Biodiversity offsets can either be delivered by public agencies (agency-led) or by developers (developer-led). Agency-led offsets, also known as “financial settlement offsets” (which most developers opt for), involve developers making financial payments to a public agency that delivers offsets on the developers’ behalf.

Benefits of financial settlement offsets

In a new article, researchers from The University of Queensland and Griffith University, including CBCS’s Professor Jonathan Rhodes, Professor Martine Maron and PhD candidate Shantala Brisbane, developed an integrated spatially explicit model of land-use change, habitat and species abundance, and environmental and offset regulation. This was applied to the Queensland Government offset policy for koalas in south-east Queensland. The performance of agency-led offsets was investigated, in particular, how outcomes are influenced by patterns of urban development and availability of offset sites.

The study shows that in some cases, financial settlement offsets can be highly beneficial. This is because the state government could use the financial payments to invest strategically in creating offsets through koala habitat restoration in areas that lead to the greatest increase in koala habitat area or numbers of koalas, whereas developers are likely to make choices to minimise costs. For example, habitat restoration activities could be located in areas that improve habitat connectivity or in places close to important existing koala populations. As a result, the study found that financial settlement offsets could deliver 50 to 100% greater gains in habitat area and koala numbers than offsets delivered by developers.

Benefits limited by site availability

However, these benefits can only be realised if there are a large number of sites available to invest in koala habitat restoration. When suitable locations are difficult to find, then the financial payments made by developers would be insufficient to cover the costs of the required offsets. If fewer than one in four of all ecologically suitable locations are available for offsets, the performance of financial settlement offsets falls dramatically.

But if only one in 100 of all ecologically suitable locations are available, payments from developers are never enough to cover the cost of the required restoration.

The limited supply of offset sites is a major issue in Australia. For example, in New South Wales, 90% of demand for offsets cannot be met through offset “credits”. In Queensland, increasing the supply of potential offset sites has been identified as a key area for reform of the state’s offsets policy. A lack of potential offset sites may be due to the unavailability of ecologically suitable sites, the offset price, transaction costs, regulatory constraints (such as requiring offset sites to be within a certain distance from impact sites) and social and economic factors influencing the land market. This issue is expected to worsen over the coming decades in south-east Queensland as the population continues to grow and competition for land for development increases.

These benefits can only be realised if there are a large number of sites available to invest in koala habitat restoration.

Generalising from SEQ koalas

The study highlights the importance of ensuring developers pay the true cost of offsetting their impacts. This will involve the methods for calculating developers' financial contributions properly taking into account the availability and costs of offset sites. By making payments in lieu of delivering offsets themselves, developers essentially transfer their financial risk to the state. If there aren't enough funds to deliver the required offset, either the state government would need to make up the shortfall (so the taxpayers essentially subsidise developers' environmental costs) or there would be a shortfall in the delivery of offsets, leading to increased pressure on koalas.

Developers are likely to choose financial settlement offsets when sites are rare since that is the most cost-effective option for them. However, the research shows this is exactly the situation when this approach performs least well. This situation risks creating significant shortfalls in actions to offset development.

While this study focuses on koalas in south-east Queensland, the integrated model developed provides a general framework for evaluating offset policies in real landscapes with complex interactions between land-use change, ecological and policy processes.



Images (top to bottom) Koala tree plantings at Minjelha Dhagun, Mt Barney, and Pullen Pullen Creek, Queensland. Credit Greenfleet CC BY-NC-ND 2.0.

Providing guidance on Australia's upcoming seafood import regulation overhaul

Dr Leslie Roberson

Over two-thirds of seafood consumed in Australia is sourced from overseas.

The Australian Government has launched a stakeholder consultation process to inform the development of new seafood import regulations aimed at reducing the amount of illegal or undocumented seafood entering the country.

Image Taking a break from seafood trade policy to enjoy a desert sunset in the Cape Range National Park, part of the Ningaloo Coast World Heritage Area. The Ningaloo hosts one of the longest near-shore reefs in the world. Left to right: Carissa Klein, Rosa Mar Dominguez Martinez, Leslie Roberson, Chris Wilcox and Gilles Hosch. Credit Rich Cottrell.



In June, a group of CBCSers (**Associate Professor Carissa Klein**, Dr Leslie Roberson, PhD candidate **Rosa Mar Dominguez-Martinez**, and **Dr Rich Cottrell**) attended a workshop at the Minderoo Foundation's Research Lab in Exmouth, Western Australia. Together with international experts in seafood regulation and endangered species trade, we worked with the Assistant Director of Fisheries Governance and Trade from the Department of Agriculture, Fisheries, and Forestry, to devise specific guidelines for the proposed policy. The discussion paper is [here](#).

This collaborative effort was particularly productive because it brought together a small, diverse group of stakeholders, including representatives from non-governmental organisations, private consultants, University of Queensland academics and government officials to focus on specific outcomes. There was a lot to learn from each other's expertise!

By tailoring the guidance to address the precise needs and inquiries of policymakers, the group aims to deliver useful advice and continued guidance to help ensure the successful implementation of the new regulations.

PROFILE

To Brisbane, the long way round

Dr Lily Bentley

CBCS ECR Representative – Education

Philopatry is the tendency of an animal to stay in, or ultimately return to, the area where it was born. After fledging, albatrosses spend up to a decade at sea before returning to the same island where their parents nested. Loggerhead turtle hatchlings ride ocean currents across the Pacific from Australia to South America, then return to nest some 30 years later – often on the very beach where they hatched.

I grew up in Brisbane and, though no-one in my family was a biologist, I did spend most school holidays traipsing barefoot across campgrounds in sclerophyll forest and on beaches. After a gap year and two miserable years of a law degree (we all make mistakes!) I started a Bachelor of Science/Arts at The University of Queensland. Research was not yet on the agenda – just enjoying what I studied was enough for me over the first two years.

Cape York to Kampala

Following a conversation in a third-year practical class, I decided to undertake an undergraduate project in the lab of Professor Craig Franklin, which led to an Honours year. My project investigated tracking data from estuarine crocodiles in the Wenlock River. I learned a lot of things that year – from doing fieldwork in remote Cape York to handling a nine million row dataset – but most of all I learned the value of a supervisory team who have your back. I also became interested in trying to understand where highly mobile animals go, and why, especially under increasing anthropogenic pressure.

There's often a sense of career inevitability that emerges in retrospect, but when I finished my Honours I had no idea what I wanted to do, aside from "a PhD overseas". So, I moved to Uganda, where my partner was working, to submit applications, do Skype interviews and hope for the best. The R skills I developed during my Honours year led to a fellowship in data science at a solar power start-up. We sold small home solar kits to the ~80% of Ugandans living without grid power, to keep their lights on at night, charge mobile phones and run small appliances using renewable energy. In this role, I worked with some brilliant women, who provided critical context for customer data to codesign a model that would support their work in the field.

I was lucky enough to then find out I'd been awarded a Gates Cambridge Scholarship to start my PhD in the UK. I was jumping from tropical reptiles to Antarctic seabirds – but continuing to work with animal tracking data to understand the behaviour of predators in the wild. It was September 2017.



It takes a village

The five years from the start to the end of my PhD were not as I expected them to be. It's always tempting to gloss over these things, but I believe it does all of us a disservice to pretend our career journeys are independent of our personal lives. Between losing a parent, becoming a parent and the COVID-19 pandemic, I spent more time away from Cambridge than in it during my PhD.

My partner and I made a snap decision in March 2020 to come back to Australia before the borders closed. It was June 2022 before we returned to the UK, and as a family of three. Without the unshakable confidence of my supervisor that I was, somehow, going to finish my thesis – through time off, time down, remote work, and maternity leave – I honestly don't believe I would have done so.

Writing up with an eight-month-old was a task made possible by a strong community of support. My husband had good parental leave and could cycle our son into my office to breastfeed. My officemate played games with the baby on the floor while I had Zoom meetings. We celebrated his first birthday two days after I handed in my thesis, in October 2022. Serendipitous timing, and a job advert spotted by a friend while on my own thesis-induced social-media ban, meant that the next time we returned to Brisbane was on our own terms.

Migratory species are notoriously difficult to protect because they face multiple, changing threats on their journeys between countries and habitats.

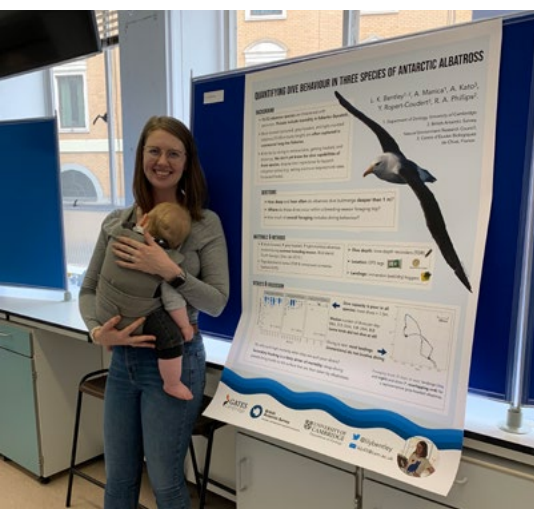


Image Multitasking while presenting a poster at the Department of Zoology seminar day, July 2022.
Credit Elizabeth Pearmain.

From theory to practice

Over a lifetime of pole-to-pole migrations the average Arctic tern travels the distance to the moon and back, three times. Bar-headed geese fly up to 8,000 metres high as they cross the Himalayas on their annual migration. The more we research, the more we find that animals travel farther and endure conditions more extreme than we ever expected.

Coming back to UQ and joining CBCS as a postdoc has been an opportunity I am incredibly grateful for. I am constantly inspired by the applied work of CBCS members – I am now shifting my focus from pure evolutionary ecology to engage more with conservation policy. Migratory species are notoriously difficult to protect because they face multiple, changing threats on their journeys between countries and habitats. I hope to help develop better conservation and management interventions for highly mobile species, so that they can continue to make their incredible migrations for generations to come.



I am constantly inspired by the applied work of CBCS members – I am now shifting my focus from pure evolutionary ecology to engage more with conservation policy.

Images (top to bottom) Honours fieldwork on the Wenlock River, Cape York Peninsula, on Taepadhigi, Tjumbundji and Warranggu Country. Credit Ross Dwyer. Heading home after a race. Taking up rowing during my PhD provided a good dose of the camaraderie needed to get through the academic year. Credit Giorgio Divitini.



About CBCS

The Centre for Biodiversity and Conservation Science (CBCS) is a world-leading solution-oriented research centre for biodiversity conservation.

Based at The University of Queensland (UQ) in Brisbane, Australia, CBCS works in partnership with scientists, governments, non-governmental organisations and industry to help solve the most important conservation problems around the world.

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