



Diana Fisher takes out 2020 AERA

Diana doing fieldwork at Mt Zero Taravale. Photo: Diana Fisher

CBCS's Associate Professor Diana Fisher, a mammal ecologist, is this year's winner of the Australian Ecology Research Award (AERA). This award is given by the Ecological Society of Australia for a body of outstanding ecological research. Past winners include CBCS's Professor Richard Fuller.

Diana's award covers her work in CBCS and The University of Queensland's School of Biological Science and as a project leader in the Threatened Species Recovery Hub, which is supported through funding

Antechinus and young. Photo: Andras Kesai



by the Australian Government's National Environmental Science Program. The latter includes saving the Endangered northern bettong with fire; climate refuges and the causes of distribution limits for antechinus; prioritising refuges; rocky refuges for mammals; using detection dogs to conserve Endangered species; feral cat control; and determining the survival and recovery of threatened animals in the fire-affected Gondwana Rainforests. Diana is a strong supporter of fieldwork in ecology: nearly all of her 24 past and present PhD students, nine Masters and 10 Honours students at The University of Queensland have done field ecology projects, many with industry and agency partners. In conservation science, Diana and her group investigate causes and detectability of extinction, and threatened

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.

CBCS has 22 Chief Investigators drawn from four UQ schools, 30 postdoctoral researchers and over 120 PhD students.

cbcs.centre.uq.edu.au

and declining bats, tropical mammals, and marsupials, including macropods and carnivorous species such as antechinuses. For antechinuses and their relatives, this work is on both evolutionary ecology and conservation, which are connected.

Solving ecological puzzles

Science communication about antechinus research leads to headlines like "Sex, sex and more sex, then death", because all males in the dozen or so species die synchronously after a single frantic mating season. Several antechinus species are threatened; two have tiny mountain-top ranges and are among Australia's top 20 mammals most likely to go extinct. Over the past two decades, Diana has solved some major puzzles of their ecology. She has identified seasonal predictability and the timing of peak insect abundance as the crucial evolutionary driver of their extreme life history and population dynamics, because compressing male competition into a brief window ramps up benefits of sperm competition. In Endangered Queensland species restricted to mountain-tops, this window depends critically on winter rainfall, which is being eroded by climate change.

Diana is co-chair of the IUCN Marsupial and Monotreme Specialist Group (John Woinarski is the other co-chair), and Vice President of the Australian Mammal Society. Her conservation research in CBCS and the School of Biological Science includes developing new approaches to study causes and detection of extinction:

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at large scales (e.g., survival models to find species characteristics associated with rates of rediscovery in mammals feared to be extinct); at the species level in Australia (e.g., how vegetation structure alters predation risk, explaining how mammal species persist depending on grazing, climate and fire regime); internationally (e.g., how rainforest logging in Melanesia disproportionately harms ecological specialist bats); and in terms of practical field methods (e.g., close-focus, detailed time-lapse camera-trap methods to assess changing abundance of insects and small mammals).

Reaching out in the Pacific

The AERA includes recognition of outreach and service to ecology. In the IUCN Species Specialist Commission, Diana is working to increase the membership of our Pacific neighbours. She has conducted and supervised field projects on threatened species in Melanesia since the 1990s, and has a strong interest in building the capacity of Melanesian students in ecology. In the past five years, she has supervised six RHD students from the Solomon Islands and Papua New Guinea, run training workshops at Solomon Islands National University, and initiated collaborations that make use of Indigenous ecological knowledge for conservation.



In the Solomon Islands. Photo: Diana Fisher



What does a Queensland Chief Scientist do?

CBCS's Professor Hugh Possingham, newly appointed to the role, answers the question on everyone's lips.



Good question; I should know by the end of my first year.

The Queensland Government

website gives you the official answer: [here](#). Now that I am a very obedient servant of the state (and also servant of you, the public of Queensland), I would be foolish to depart from this version of the truth. But maybe I can mention a few of the things I would like to help Queensland achieve.

Momentum player

From a state that, 25 years ago, probably wasn't renowned for being intellectual, Queensland has come a long way. Science (technology, engineering and maths) is booming, both in the rankings of universities and in science-based industries such as vaccine manufacture, aerospace and precision agriculture. As Chief Scientist part of my job is to maintain this momentum – as enthusiast and facilitator. We need to ensure that government supports science, coordinates and builds collaborations, and sells our science on a global stage.

Evidence-based action

Governments set policies and regulations and take actions. Another major part of my job is to ensure that these functions are all based on credible evidence. Evidence-based policy is easy to talk about and hard to deliver – all government decisions should be explicable in plain

English with transparent lines to credible information in all its forms. Additionally,

I will take a keen interest in helping Queensland use good decision-making processes for making policies and allocating resources.

While I am a public servant in the Department of Environment and Science, I also have a special role in speaking truth to power and have access to all the senior politicians in the state. As such, my office (of about 10 staff) can be called on to provide frank and fearless

advice on contentious issues that cut across multiple government departments. This might be on issues from climate change adaptation to nuclear power.

Cheerleading

And, finally, I am a cheerleader for science across the whole state. While my office has a small staff and budget, we have invested in promoting and encouraging citizen science as a way to engage the broader community in science. Further, we have a growing role in promoting diversity in science – see [here](#).

So – not unlike my Nature Conservancy job – there are a million opportunities. Success will depend on our ability to deliver the greatest outcomes by investing a lot of effort in a few of those million opportunities.

The role of Queensland Chief Scientist provides an almost limitless set of opportunities. Success is about choosing where we can have greatest impact.



Hugh at four, the budding Chief Scientist.



From village adventures to global ambitions



Clockwise from top left: The village Zunyi grew up in; field work in Tibet; and Zunyi enjoying Bronte Beach, Sydney. Photos: Zunyi Xie



PROFILE

Dr Zunyi Xie
CBCS Postdoctoral Research Fellow

and still the only one in my village to go to university. At university, earth and environment science was my first choice – for the simple reason that as a child I had developed a love of nature and I understood it better than anything else.

Remote sensing, a life-long interest

I fell in love with remote sensing straight away. I thought it was super cool, as it enabled me to do exactly what I had dreamed of doing when I was a child: seeing the whole world from the sky. Without hesitation, I chose it as my specialisation after graduation.

For my Master's research, I used high spatiotemporal resolution satellite images to develop an early-warning index of outburst flood for a large alpine glacial lake that floods every year in Tibet. I am proud that this work has since been adopted by the local government in Tibet to forecast the specific outburst timing of the glacier lake, preventing disasters for the environment and communities downstream.

From China to Australia, and from Australia to the world

My curiosity about the world brought me to this fascinating country – Australia. My PhD work at the University of Technology Sydney focused on integrating gravitational observations (GRACE) with other satellite, spatial and field data to study hydrological dynamics, ecological functions and their interactions under the impacts of Australia's increasing hydroclimatic extremes.

I came to The University of Queensland as a postdoc, and I have been so lucky

to work in CBCS with world-leading conservation scientists such as my mentor Associate Professor Eve McDonald-Madden. My postdoc project's ambitious goal is to conduct global-scale research. I have been developing a novel approach to combine remote sensing big data techniques with socioeconomic analysis and decision-making to identify global uncontested farmlands and prioritise their use for SDGs of renewable energy, poverty, food and conservation.

Currently I am collaborating with TNC on a project that will produce the world's first high-resolution map of rangeland condition change. We are building an open-source platform that will facilitate decision-makers to track rangeland condition, assess management, and trigger interventions at large and small scales.

The future: remote sensing of conservation

I have developed a great interest in conservation during my postdoc at CBCS. Previously, my research focused more on ecohydrological monitoring but I now see wonderful opportunities to connect remote sensing techniques with conservation management and policy decision-making. My long-term research goal is therefore to harness the analytical power of remote sensing and big data technologies to advance conservation science and sustainability outcomes.

I live in Australia now, far from my remote village, and I have developed from a small, curious village boy to a scientific researcher. However, in a way nothing has changed: I grew up in nature and I still live in and love nature.

“ I grew up in a remote village in north-east China, close to the Russian border, where I had the happiest childhood. The village was surrounded by a mountain range, a river and a large reservoir. My village and surrounds were the world for me, which I was always eager to explore. In summer, I would swim in the river, fish in the reservoir, collect mushrooms in the mountains, chase rabbits and deer in the forest and count different kinds of insects. I felt as free as the wind. Sometimes, though, my parents would scold me for going too far into the mountains, where boars and bears roamed. But while the summers were warm, the winters were bitterly cold. The whole village would be covered by snow for around four months, sometimes up to a metre deep, and the temperature could fall as low as -40°C . I often had to collect firewood with my parents to heat our cottage, but I made it fun by sleighing from the top of the mountain all the way back to the village.

Happy as I was as a child, deep in my heart, I wondered what the world beyond the mountains was like. I first began to satisfy my curiosity by attending high school in the nearest town. There I was lucky enough to win a scholarship to study in Harbin, becoming the first person

NEWS IN BRIEF

Unveiling the environmental benefits of reducing sugar

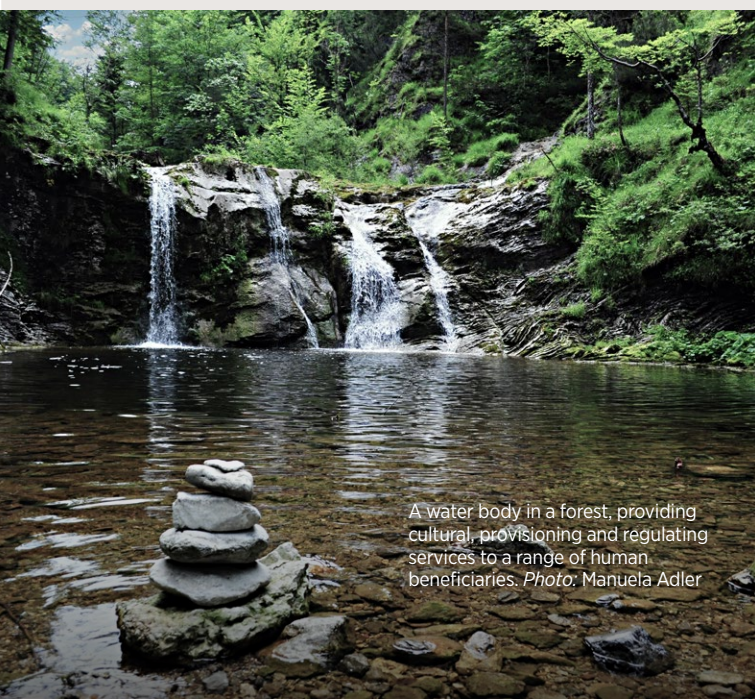
Sugar tax on soft drinks could release sugarcane feedstock to satisfy demand for bioethanol without further loss of biodiversity and carbon-dense natural ecosystems. In a comment piece for *The Lancet Planetary Health*, Milton de Andrade Junior, James Watson and Sean Maxwell argue that better coordination of policies concerning sugar and bioethanol could benefit human health while avoiding the climate and biodiversity impacts that come from expanding farmland into native ecosystems. Read more [here](#).



Bioethanol is a low-carbon, cost-effective alternative to petroleum-based fuels. Photo: Brooke Williams

To protect nature's benefits, focus on people

A new paper calls for the consideration of people's diverse needs in order to better develop nature-based policies and investments in ecosystems. The work was led by Lisa Mandle from The Natural Capital Project and co-authored by CBCS's Laura Sonter. For more information on the project, its key findings and recommendations for ecosystem service scientists, read the [full paper](#) and [press release](#).



A water body in a forest, providing cultural, provisioning and regulating services to a range of human beneficiaries. Photo: Manuela Adler



Intact land in Kakadu National Park. Photo: Liana Joseph

Loss of intact ecosystems

CBCS researcher Brooke Williams has led a paper published in *One Earth*. Using the new human footprint maps, the paper quantifies the loss of intact ecosystems over a 13-year period. The research team found that between 2000 and 2013, 1.89 million km² of intact land – an area approximately the size of Mexico – became highly modified. The findings suggest that greater efforts are urgently required to proactively protect valuable remaining intact land. Read more [here](#).

Ecological damage caused by mining Brazil's Indigenous Lands

CBCS visiting PhD student Ms Juliana Siqueira-Gay from the University of São Paulo has estimated the ecological damage that may be caused by a proposed policy to allow mining activities in Brazil's Indigenous Lands. The study found that mining may affect an additional 863,000 km² of tropical forests – 20% more than under current policies – that are home to culturally diverse human communities, and provide US\$5 billion annually to the global economy. Read more [here](#).



Illegal mining in the Amazon near Menkragnoti Indigenous Lands, Pará, Brazil. Photo: iStock.com/Marcio Isensee e Sa

Systematic conservation planning for ecosystem services

Systematic conservation planning can help ensure long-term prosperity for both people and nature. However, current applications are based on an incomplete integration of the components and characteristics of ecosystem services that relate to benefit delivery. As such, landscape plans may fail to generate positive and equitable outcomes for people. A paper led by Jaramar Villarreal-Rosas emphasises the need to build decision problems that explicitly include benefits to different people in space, time and socioeconomic status. Read more [here](#).

NEWS IN BRIEF

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Ambitious goals for biodiversity and sustainability

In a paper led by Sandra Díaz, CBCS-ers Martine Maron and James Watson argue that to achieve recovery of ecosystems, there is a need for distinct goals, which must be woven together into a safety net and reflect a high level of ambition. As the facets of nature are interlinked, the goals must be defined and delivered holistically, not in isolation. And only the highest level of ambition for setting each goal, and implementing all goals in an integrated manner, will give a realistic chance of “bending” the curve of nature’s decline by 2050. Read more [here](#).

Area-based conservation in the 21st century

Sean Maxwell has led a great team of authors to a consensus message that expansion of protected areas since 2010 has had limited success in improving coverage of elements of biodiversity and ecosystem services. For example, it remains that 78% (9438) of the threatened species assessed have inadequate levels of protection. We must now ensure that all area-based conservation efforts contribute meaningfully to biodiversity conservation and the review outlines how this can be best achieved. Read more [here](#) or listen [here](#).



Copper ore, which is needed in many renewable energy technologies and infrastructure, including wind turbines, solar panels and energy storage batteries. Photo: iStock.com/wingedwolf

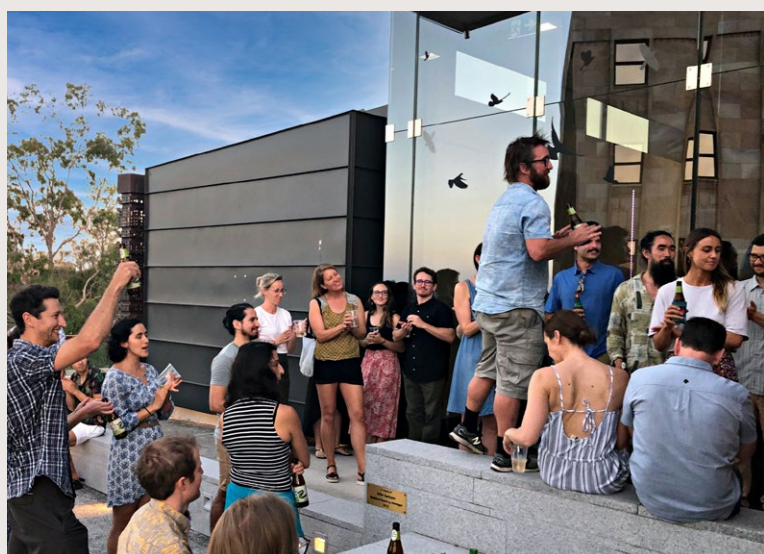
Mapping mining threats to biodiversity conservation areas

Switching from fossil fuels to renewable sources of energy is an important part of climate change mitigation strategies. But doing so will require mining more minerals and metals to develop renewable technologies and infrastructure. In a recent [paper](#), Laura Sonter and colleagues show that these resources sometimes exist within protected areas, key biodiversity areas and the world’s remaining wilderness. Careful planning is needed to ensure renewable energy production doesn’t inadvertently damage species in mineral-rich landscapes. A short article about the work was also published in [The Conversation](#).

CBCS events



The CBCS Tuesday morning teas and seminars attracted greater numbers than ever in 2020. CBCS-ers enjoyed meeting in person again starting from October. Here, a morning tea gathering in the Great Court, Tuesday 1 December 2020. Photo: Martine Maron



Outgoing Director James Watson addresses revellers at the CBCS end-of-year party, Goddard Building western terrace, Tuesday 1 December 2020. Photo: Martine Maron

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See you
in 2021!



CBCS 3.0?

Outgoing CBCS Director Professor James Watson reflects on the past five years.

“ It goes without saying that CBCS has an outstanding history of doing applied conservation research. Since Hugh Possingham started the Centre in 2012 at The University of Queensland with a then quite small group of conservation scientists, our collective group has flourished and grown. We now work with hundreds of practitioners and policy-makers around the world, all sharing the mission of improving the status of biodiversity. Passion and authenticity are the common ingredients to all our efforts; and I believe these two ingredients are fundamental reasons why CBCS has become one of the global “go-to” groups when it comes to tackling the challenges of conservation science.

Meeting ambitious goals

I became director of CBCS in 2016 when Hugh departed to take on the amazing role of Chief Scientist of The Nature Conservancy, one of the largest conservation non-government organisations in the world. His were obviously huge shoes to fill, and it was frankly quite intimidating, given how beloved Hugh was (and is) as a leader and mentor.

Around that time, the CBCS leadership team decided a new strategic plan that

Passion and authenticity are the common ingredients to all our efforts.

led up to 2020 was necessary, and also to secure funding to advance some elements we considered essential. These included: making new hires within CBCS to replace those who were retiring or were about to retire (including Marc Hockings and Clive McAlpine, who played large roles making conservation ubiquitous within UQ); securing co-funded postdoctoral positions with important NGO and government partners, so we could maximise these partnerships and really get to frontline of conservation action; and funding

workshops and other conservation research activities that were to be led by Early Career Researchers, to ensure we maximise diversity of ideas and enable and enhance leadership opportunities for our excellent student and postdoctoral staff.

This new strategic vision was supported by the Vice-Chancellor and the Dean of the Faculty of Science investments and, with an injection of strategic funds, our new path began. Over the past five years, “CBCS 2.0” efforts have been led by the entire wonderful leadership team I work with and the wider CBCS community. With the hire of two amazing young researchers Daniel Dunn and Matthew Luskin, the creation of 10 co-funded postdoctoral positions, over 15 ECR-led

workshops (more, if COVID hadn't struck) and a doubling of our leadership team and overall membership, we have met many of our ambitious goals set in 2016.

Looking ahead

Time is up for me. I am really pleased to announce that Daniel Dunn will be taking over from 1 January 2020, and we are all excited about the new direction the Centre will take under his leadership! It's now time for a new strategic direction for the centre, a “CBCS 3.0” that builds upon the past but also, in new and exciting ways, will diversify, grow and embrace the quite significant challenges universities and the wider conservation sector face as we start to walk out of this very strange year.

As I sign off as Director, I want to thank all those who assisted me in my role over the past few years: especially Kate, for her amazing support since she came on board; Hugh, for allowing me to have the space to push in different directions; my own research group, who have provided energy and feedback through the period (and allowed me to take on this wider role); the leadership team, who have played very active roles in our decisions to date; and all members of CBCS, for being so passionate about conservation and helping make the Centre what it is today. Though stepping down as Director, I'll continue to be very active across CBCS into the future.