The Royal Society of Victoria

SCIENCEVICTORIA



ACCLIMATISE

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AUGUST 2021



News and notices



New RSV Members

Dr Sheridan Mayo CSIRO - SENIOR RESEARCH SCIENTIST/ GROUP LEADER

Dr / Adjuct Professor Chris Gillies

THE NATURE CONSERVANCY / OCEANS PROGRAM DIRECTOR

Dr Sebastian Quezada RMIT UNIVERSITY

Ms Lynette Allison
RETIRED / FORMER SENATOR OF VICTORIA

Mr William Comley
HARBOUR COFFEE HOUSE - DIRECTOR



Unless Members request a ballot, these will be considered by Council and, if elected, will be confirmed at the next Ordinary Meeting of the Royal Society of Victoria.



SCIENCE VICTORIA

Monthly newsletter of the RSV

THE ROYAL SOCIETY OF VICTORIA INC. The Royal Society of Victoria 8 La Trobe Street, Melbourne, Victoria 3000

EMAIL: rsv@rsv.org.au COVER IMAGE: Acclimatise

Welcome to the RSV's New Honorary Secretary

We are delighted to welcome William Buck Director, Mr Jeffrey Luckins to our governing Council as Honorary Secretary from 2021! Thanks for joining our leadership team Jeffrey - we look forward to your involvement and expert contributions to our everevolving mission.



About Jeffrey Luckins:

Jeffrey Luckins is fascinated by science and how our understanding of science continues to positively impact people, life and our natural world. Throughout his career as an accountant, auditor and governance professional, Jeffrey has been fortunate to work with people and businesses involved with life sciences, health, biotechnology, technology, engineering, manufacturing and with earth sciences. He is a thought leader, writer and presenter at conferences, events and for continuing educational programs on a wide range of topics focused on auditing, accounting, governance and capital markets.

Jeffrey joins the RSV Council as Honorary Secretary from 2021 to contribute his knowledge and skills in governance, commerce, leadership and does so with great enthusiasm to promote the Royal Society of Victoria as a leading and progressive key influencer for the promotion of science in Australia.

FUNGI FOR LAND

Practical Knowledge for Land Managers



PROJECT CLOSE

Thanks to the very generous support from RSV member Ms Susan Humphries and the Ngaruk Fund (a sub-fund of the Australian Communities Foundation), we are delighted to advise our campaign in support of this vital guide for conservation and restoration-focused land management is now complete.

AUSTRALIAN COMMUNITIES FOUNDATION

From 2019 to 2021, the Royal Society of Victoria raised a total of **\$54,408** towards the writing, editing and publication of Australia's first guide to harnessing the regenerative properties of the mysterious mycological kingdom. Our gratitude is extended to all our members and supporters for contributing to

the success of the project, which is nearing completion. You can keep up to date with the progress of the guide at the project's website at https://fungi4land.com/.

The Society continues to auspice the efforts of the *BioQuisitive*Community Lab, the Phoenix School Program, Science for All and the BrainSTEM Innovation Challenge, and we would be grateful for any further support from our community towards these commendable programs.



Yarra Ranges Council Disaster Relief – Recruitment of Roles

In mid-June this year parts of Victoria experienced a significant weather event that many say was a "once in a generation disaster".

The Yarra Ranges Region was significantly impacted. There was largescale environmental damage, flooding, damage to housing and damage to community assets.



The Council has initiated a recovery program that not only focuses on the land cleanup but also the wellbeing of its Municipal residence and rebuilding of assets along with maintenance of its community focus and livability.

Council has received support from the State and Commonwealth Governments who are assisting but is launching its own initiatives to recover the environment and provide outreach services across the municipality.

With a growing population, increasing peri urban boundaries, need to rebuild tourism, and growing expectations of ratepayers, this recovery effort as a vital part of the sustainability and growth of the Municipality. Additionally, this presents an opportunity to upgrade assets and future proof facilities and infrastructure.

Additional resources, led and supplemented by Yarra Ranges Council team members are needed to assist with the recovery.

This is a largescale effort and will be made up of people with a wide range of skills who will be rapidly mobilised for the task and allow the core team at Yarra Ranges Council to meet the demands and



expectations of business-as-usual activities.

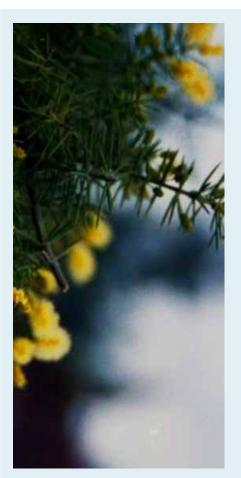
Three, six and twelve month contract opportunities are on offer for people with skills at leadership and support levels ranging through:

- Project Management
- Engineering and Infrastructure Management
- Environment and Biodiversity Management

- Business, Economic and Tourism Engagement
- Administration, Project Support, and Compliance
- Community Engagement,
 Wellbeing, and Outreach
- Financial Management
- Procurement and Contract Management



To express interest or seek further information, please contact Darral Roberts darral@robertsandassociates. com.au or Gill Holden gill@cloverlaneconsulting.com.au.



Plant Literacy

Tuesday, 17 August,

7pm (AEDT)

FREE ONLINE EVENT

TICKETS: HTTPS://WWW.EVENTBRITE.COM. AU/E/PLANT-LITERACY-WEBINAR-PART-2-TICKETS-165375096365

Join us for two free webinars hosted by Michael Johannesen who will be explaining plant function and anatomy. Spend the last of winter learning more about plants and feel empowered to plant some yourself.

Webinars will cover:

- plant evolution
- the structure of flowering plants
- the function of flowers, roots and leaves



Mick is a Victorian firefighter and student in Horticulture



Science for All is proudly auspice by the Royal Society of Victoria.



Help Us Build Victoria's Gas Substitution Roadmap

We are seeking input from the Victorian community and industry to help inform Victoria's Gas Substitution Roadmap and assist the gas sector to reach net zero emissions.

Overview

The Victorian Government is exploring sustainable alternatives and pathways for the gas sector to transition to net zero emissions and is developing a Gas Substitution Roadmap throughout 2021 to provide a strategic framework for decarbonising natural gas in Victoria.

The Gas Substitution Roadmap will detail the transition pathways and identify policy mechanisms to achieve Victoria's emissions reduction targets through reduced fugitive emissions, more efficient use of gas, electrification and increased use of alternative gases such as hydrogen and biogas.

The Victorian Government is committed to transitioning to fully sustainable sources of energy whilst maintaining energy affordability, security, reliability and safety, and creating clean energy jobs and new skills.

Read our consultation paper

A consultation paper has been prepared to seek the views of the Victorian community and industry to help us better understand the opportunities and challenges that this transition will bring. The paper discusses potential transition pathways to achieve net zero emissions in the gas sector in Victoria and the key issues that must be considered during the transition.

READ OUR CONSULTATION PAPER

Victoria's Gas Substitution Roadmap Consultation Paper Victoria's Gas Substitution Roadmap Consultation Paper -Accessible Version

How to participate

We invite written submissions on the topics and themes raised in this consultation paper. Questions are posed throughout the paper to assist you in developing your submission. You may elect to only respond to the questions of most interest to you or your organisation.

You will also find three supplementary questions below that you may choose to answer. These are optional questions that will help us understand your views on the priorities, opportunities and challenges associated with the transition to net zero emissions.

Next steps

Victoria's Gas Substitution Roadmap will be released later this year. The roadmap will provide a strategic framework for decarbonising natural gas in Victoria and detail the Government's actions to promote the decarbonisation of the gas sector while ensuring that throughout the transition, Victorians continue to have access to an affordable, secure, reliable and safe supply of energy.

Key Dates

Tuesday 13 July 2021 12:00 pm - 01:10 pm

ONLINE PUBLIC FORUM

AN ONLINE PUBLIC FORUM FOR COMMUNITY TO LEARN MORE ABOUT THE GAS SUBSTITUTION ROADMAP.

Public Forum Presentation Pack

Victoria's Gas Substitution Roadmap Public Forum
Presentation

ON JULY 13, THE DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING HOSTED A VIRTUAL PUBLIC FORUM FOR COMMUNITY TO LEARN MORE ABOUT THE GAS SUBSTITUTION ROADMAP.

Contact Us

IF YOU HAVE QUESTIONS ABOUT THIS ENGAGEMENT OR WANT TO LEARN MORE ABOUT THE GAS SUBSTITUTION ROADMAP, CONTACT US BELOW:

EMAIL Gas.Roadmap@delwp.vic.gov.au



Building a climate-resilient Victoria

Have your say on Victoria's first set of Adaptation Action Plans and how we respond to climate change in key sectors

Overview

Description: Overarching program graphic that shows the seven systems, what they include and how they interact. A circle shape includes a road leading from a city, past a house, an education facility, a farm, a forest and to the ocean.

The Victorian Government is preparing Adaptation Action Plans to build our climate resilience in areas either vulnerable to climate change impacts or essential to ensure Victoria is prepared.

These areas or 'systems' are Primary Production, Built Environment, Education and Training, Health and Human Services, Transport, Natural Environment, and the Water Cycle.

We'd like your input. This is your opportunity to comment on one or more individual plans or the whole package. Your feedback will be considered in the finalisation of the Adaptation Action Plans late in 2021.

Why do we need to build our climate resilience?

Victoria's climate is changing, becoming hotter and drier. Victoria has warmed by 1.2 degrees Celsius since 1910, and these changes are expected to continue. For example, the latest climate projections for Victoria suggest that by the 2050s under a high emissions future scenario:



- annual average temperature may increase by up to 2.4 degrees Celsius compared to the 1986 -2005 average with around double the number of very hot days
- the number of high fire danger days in Victoria is expected to increase
- sea level is projected to rise by around 24 cm
- annual rainfall is projected to decrease, but extreme rainfall events are likely to become more intense.

Acting globally now will avert the worst impacts of climate change. But, even if greenhouse gas emissions stopped tomorrow, the climate would continue to warm for the next few decades due to historical emissions.



That is why we need to build our climate resilience, increase our ability to recover and make the most of future opportunities. Every dollar spent on adapting now is estimated to save around six dollars in avoided future costs.

Why are there seven Adaptation Action Plans?

The Climate Change Act 2017, requires the preparation of Adaptation Action Plans for the seven systems every five years until 2050 to ensure Victoria is resilient as the climate continues to change. This first set of plans are guided by the adaptation priorities outlined in Victoria's Climate Change Strategy.

Each Adaptation Action Plan is different because each of the seven systems has its own unique climate change risks and opportunities. The plans also address challenges common to all systems, such as sea-level rise, managing emergencies and ensuring energy resilience.

What about community priorities for adaptation?

Adapting to the impacts of climate change will look different for every community, business and household. This is why the Government is also working in partnership with communities to develop six Regional Adaptation Strategies, which complement Adaptation Action Plans. You can find more information on Regional Adaptation Strategies here.

How to provide feedback on the Adaptation Action Plans

Step 1: Click on the tiles below to learn more about each of the seven Adaptation Action Plans and to provide your feedback on any of them.

Step 2: If you have any general feedback on the whole package of work, you can provide this via the survey below. **The survey is open until Friday 6 August 11:59pm.**



Read the Health and Human Services AAP 2022-2026





Read the Built Environment AAP 2022-2026 Primary production



Read the Primary Production AAP 2022-2026 Transport



Read the Transport AAP 2022-2026

Natural environment



Read the Natural Environment AAP 2022-2026 **Water cycle**



Read the Water Cycle AAP 2022-2026 Education and training



Read the Education and Training AAP 2022-2026



Events for the month



UPCOMING LECTURES:

Thursday 19 August, 2021 6:30 PM - 9:30 PM



Young Scientist Research Prizes Competition: Presentations, Judging And Prize Ceremony

To foster and recognise excellence in Victoria's early career scientists, the Royal Society of Victoria has established four prestigious competitive prizes open to Victorian students in their final year of doctoral candidature, in all areas of the Biomedical & Health Sciences, Biological Sciences (Non-human), Earth Sciences and Physical Sciences.

Emily Roycroft Presenting 2019Following assessment of applications across the four categories, we have selected eight PhD finalists to present their work to us during National Science Week, on the evening of Thursday, 19 August, 2021. Join us to hear about the latest science from our emerging scientists, and to support and celebrate the achievements of Victoria's upcoming high achievers in the following categories:

Earth Sciences:

Owen Missen
MONASH UNIVERSITY

Kimberley Reid
THE UNIVERSITY OF MELBOURNE

Biological (non-human) Sciences:

Sike Li

MONASH UNIVERSITY

Sarah McDonald
THE UNIVERSITY OF MELBOURNE

Physical Sciences:

Sumaiya Kabir RMIT UNIVERSITY

Mark Vidallon
MONASH UNIVERSITY

Biomedical & Health Sciences:

Lauren Bleakley
THE UNIVERSITY OF MELBOURNE

Ronnie Low
THE UNIVERSITY OF MELBOURNE



UPCOMING COLLABORATIVE EVENTS:

Friday 13 August, 2021 6:30 PM - 7:45 PM

Indigenous Food and Agriculture

Luke Williams

RMIT UNIVERSITY

Kerrie Saunders

YINARR-MA,

Joshua Gilbert

RECONCILIATION NSW

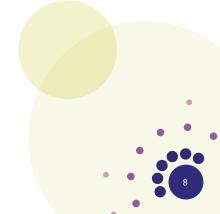
Karlie Noon

SYDNEY OBSERVATORY

Join us for a special webinar on Indigenous agriculture, where we'll yarn about native foods and Indigenous farmers — everything from practising agriculture as a traditional custodian, growing bush foods and making sure they're safe

to eat, preparing amazing meals and getting Australian native foods to market!

Registration is available below to participate in the webinar via Zoom and/or Eventbrite. Alternatively, you can watch along via Facebook Live at the appointed time without needing to register.



Advance Notice





LECTURE

Thursday 23 September, 2021

6:30 PM - 8:00 PM

General Registration

A\$6.36

incl. A\$1.36 Fee & Tax

Sales end on 23 Sep 2021 General Admission for non-members

Foodprint Melbourne: Building The Resilience Of Melbourne's



Food System

Dr Rachel Carey

LECTURER IN FOOD SYSTEMS AT THE UNIVERSITY OF MELBOURNE'S FACULTY OF VETERINARY AND AGRICULTURAL SCIENCES

We tend to think of Melbourne and other cities in Australia as places that are food secure; nationally, we produce enough food to support 60,000,000 people, more than twice our population, in service of our role as a major exporter of primary goods and food products. Supermarket shelves are usually filled with food, all year around. But in the last 18 months we've seen images of sparsely-occupied shelves, crops being dug back into their fields and students queueing for food vouchers. The compounding crises of bushfire

and pandemic have revealed some of the cracks in our food supply system, flaws that make our population vulnerable to scarcity.

Join Dr Rachel Carey, who will be exploring what we need to do to strengthen the resilience of Melbourne's food system to future shocks and stresses, particularly those related to climate change and pandemic, seeking a more nuanced conversation about matching up available resources with the healthy, sustainable diets we want our population to be maintaining.

We can leverage the lessons from the pandemic to transform the way we manage our food system, through strengthening local and regional food supply chains; sustaining the productivity of fertile land on the urban fringe; building efficient, circular food economies to minimise waste; promoting resilient, sustainable production systems adapted to a changing climate, such as regenerative or agri-ecological approaches; building livelihoods through addressing insecure employment, low wages and poor working conditions in the food

industry; and redesigning systems of food relief to ensure equitable, dignified access to healthy, sustainable, culturally-appropriate food during times of system stress.

About the Speaker

Dr Rachel Carey is a Lecturer in Food Systems at the University of Melbourne's Faculty of Veterinary and Agricultural Sciences, where her teaching and research focuses particularly on the governance of resilient and sustainable food systems.

Rachel leads the Foodprint
Melbourne project, which is
investigating the resilience of
Melbourne's food system to shocks
and stresses and the role of
Melbourne's foodbowl in increasing
the resilience of the city's food
supply. The project team is working
with a wide range of stakeholders
to plan interventions to increase the
resilience and sustainability of the

city's food system. Project partners include the City of Melbourne, Resilient Melbourne, Port Phillip and Westernport Catchment Management Authority, the Interface Councils and the Peri-Urban Group of Rural Councils. The project is funded by the Lord Mayor's Charitable Foundation.

One of Rachel's key research interests is the resilience and sustainability of city food systems in the face of growing challenges from climate change, pandemic, population growth, urban sprawl and from declining supplies of natural resources, such as land, water and fossil fuels. Rachel's research has also focused on analysis and development of food policies and the governance of 'free range' and other higher animal welfare labelling. She has a particular interest in integrated food policies and in cross-sector and collaborative approaches to

developing food policy.

Rachel has worked on food policies for the City of Melbourne and the City of Greater Geelong, and she is a member of the Melbourne Food Alliance. Rachel is a member of the Editorial Board of the journal Agriculture and Human Values. She has a PhD from the University of Manchester (UK) and a Masters degree in Food Policy from City University (UK).

Tickets are available below to participate in the webinar via Zoom and/or Eventbrite.

RSV Members are prompted to enter their promotional code to access a member's ticket. Alternatively, you can watch along via **Facebook Live** at the appointed time without buying a ticket.

STREAMED ONLINE AS PART OF THE INSPIRING VICTORIA INITIATIVE IN 2021.



Upcoming EVENTS

Event type	Title	Presenter & Details
LECTURE Thursday 23 September, 2021 6:30 PM - 8:00 PM	Foodprint Melbourne: Building The Resilience Of Melbourne's Food System	Dr Rachel Carey LECTURER IN FOOD SYSTEMS AT THE UNIVERSITY OF MELBOURNE'S FACULTY OF VETERINARY AND AGRICULTURAL SCIENCES



Inspiring Victoria

ACCLUSTATISE. The Science of Sustainability & Adaptation



Welcome to National Science Week

August 14-22

inspiringvictoria.org.au

Welcome to Science Week 2021! We have had to pivot some of our program and community events to ensure the recent restrictions. Please check the individual events to see what changes have been made to the safety of activities across the state. Wherever you are in Victoria, we hope you are able to enjoy something on offer this Science Week, 14-22 August.

We acknowledge the Traditional Owners from all First Nations communities across Victoria. To you we convey our deep respect.

ACCLIMATISE is a series of live audience and broadcast events presented in collaboration with Museums Victoria, Royal Botanical Gardens Victoria, Zoos Victoria, Public Libraries Victoria, Parliament of Victoria, State Library of Victoria, Philip Island Nature Reserve, Neighbourhood Houses Victoria and Royal Society of Victoria.

Follow us on all social media channels via #ACCLIMATISE

ONLINE PROGRAM:

inspiringvictoria.org.au/programs/ national-science-week-victoria/ acclimatise/

Earth's climate is incredibly complex and essential to sustaining all life on our planet. In just a few short centuries, the global land use and energy consumption practices of the human species have disrupted the balances in a system that had remained stable and conducive to human activities for thousands of years. Confronted with the existential threat of a warming, drying climate system that could even prove inhospitable to life on Earth if left unchecked, our global civilization has embarked on a search for creative solutions through multidisciplinary fields of science.

Join us as we explore the science at the center of this critical physical, intellectual, social and economic frontier; the physics of weather, our First Nations peoples knowledge of Country, the citizen scientists measuring and managing local impacts, the foundation of the sustainability movement, the Victorian researchers assessing and working to slow the threat of plant and animal extinction, and the scientists charting the impacts of bushfire, drought and sea level rise in our state and beyond.

Featuring scientists from Victoria's major public scientific and cultural institutions with a strong broadcast focus for our regional audience engagement, alongside local Victorian communities working towards solutions, ACCLIMATISE seeks to delve into the Sciences of Sustainability and Adaptation and the pathways they offer towards our future.









ACCLIMATISE – finding ways to adapt to the changing climate

How do we fire-proof our forests? How do we protect endangered species? How do we build our collective future?

Droughts and bushfires are becoming more common. Around one million native species are on the brink of extinction. As Australia is confronted with the existential threat of a warming, drying climate system, we need to consider how we will acclimatise.

ACCLIMATISE is a curated suite of National Science Week events exploring the challenges of Earth's complex climate and the search for creative, innovative solutions. Learn about insights into sustainability and adaptation from experts at renowned institutions, take part in community discussions, or be a citizen scientist and aid a local sustainability project.

We encourage you to think about how you can look after Country. First Nations people have long lived in balance with nature, having been custodians of this land for over 65,000 years. They are also the first scientists of this land in their endeavour to understand the earth, sky and waters. *ACCLIMATISE* includes several yarns with First Nations people who will share Indigenous knowledge of land management, food and agriculture.

Australia has embraced flavours and cuisines from around the globe, but what about the flavours of our local landscape? River mint, wattle seed, lemon myrtle, bush tomato - these are rarely seen in grocery stores. Bushfood grows naturally on this land and is capable of surviving the tough Australian climate without the same resources and care needed for introduced crops. Inspiring Victoria and Inspiring the ACT are bringing together a panel of speakers to deliver a webinar on Indigenous agriculture and getting Australian native foods to market.

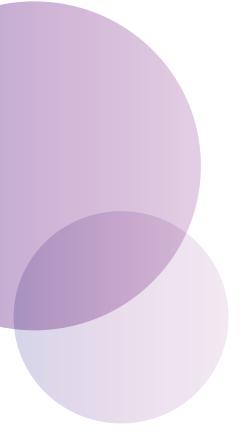
Explore climate change from First Peoples' and researchers' perspectives. Museums Victoria invites you to join a conversation with scientists and Indigenous youth at the forefront of climate action and leadership. They will touch on the complexity and beauty of Earth's climate, how it is changing, and hopeful messages as we move into an uncertain climate future. The Royal Botanic Gardens Victoria also welcomes you to celebrate Country and become versed in Indigenous land management and culturally important species on a First Nations Climate Change Justice Walk.

The Royal Botanic Gardens is also diving into the future of fungi. There are several million species of fungi on the planet, offering a plethora of uses. We are familiar with mushrooms, baker's yeast, moulds in food (whether it's in cheese or food that is too old to consume). But there is much more to the fungal world than meets the eye. Some form invisible yet vital relationships with plants to support the "wood wide web", some are recyclers that break down organic matter

and return nutrients to the soil, some are the source of medicines such as antibiotics, and some are used as biomaterials to replace plastics. Discover the role of fungi in ecosystems and how they will fare in future climates.

In a beautiful, emotional combination of art and science, *Climate Notes* is a multimedia installation that invites you to explore and communicate how you feel about climate change through music, letter writing and video. The work features new compositions by violinist Anna McMichael and contemporary percussionist Louise Devenish. It builds on collections of handwritten letters by leading science researchers from all over the world – and you.

Along with your letter, you might like to create a climate pledge. Museums Victoria invites families to unpack the science that explains why our climate is changing and what this means for humans and our natural environments, and to create a pledge of actions to help us all have a thriving future.





With one million species on the brink of extinction, hear about Victorian conservation efforts. From bushfires to climate change, find out how they are working together with partners to tackle the many challenges that come with wildlife conservation. The Baw Baw Frog now has an estimated wild population of less than 500. Zoos Victoria presents a panel of experts working in the field in a race against the clock to prevent the extinction of local frog species in the Central Highlands of Victoria. And how are Australian fur seals and penguins adapting to warming and acidified waters? At 32,000 penguins, the colony at Phillip Island Nature Parks is one of the largest in the world, and marine scientists will discuss their efforts to keep it that way.

Natural history illustrations have helped communities worldwide to document biodiversity, track changes in our environment and keep records of species that may go extinct. Before photos, we relied on illustrations to show us what plants and animals look like. Join State Library of Victoria for chat with field experts about the history of documenting nature through illustration.

Public Libraries Victoria is also blending arts and science with a focus on storytelling. They aim to raise awareness of Australian fiction and creative non-fiction that tackles the big scientific issues of the day – including climate change, mass extinctions and pandemics. A enviable line-up of authors will discuss strategies for using stories to stimulate conversations within our communities.

National Science Week will then close with the ACCLIMATISE special event, Collecting insights: environmental adaptation in Victoria at Parliament of Victoria. When you visit Melbourne Museum or Melbourne Zoo or the Royal Botanical Gardens, it is a fun day out, yet many don't realise that, behind the scenes, they are also important hubs of environmental research. Ending a four-part series of discussions hosted by Parliament of Victoria, this panel dives into future environmental adaptation and biodiversity, highlighting the collections and research of our bestloved public science engagement institutions.

Be part of the change as we *ACCLIMATISE*. Explore the physics of weather, First Nations peoples' knowledge of Country, conservation efforts to slow the threat of plant and animal extinction, and the impacts of bushfire, drought and sea level rise in our state and beyond.



Neighbourhood Houses Victoria's Sustainability Showcase: communities fighting climate change as one

In the face of climate change, the future of the planet depends on our collective actions. The extent to which sea levels will rise, temperatures will warm, and natural ecosystems will change, depend on what we do as a community.

Climate change has been a key priority for Neighbourhood Houses Victoria this year. Supported by Inspiring Victoria grants, 20 Neighbourhood Houses across Victoria are delivering events to encourage communities to come together to showcase local initiatives and build a sustainable future as part of the National Science Week ACCLIMATISE program.

Being sustainable can start right in your own home – in your kitchen and garden. Some neighbourhood houses are inviting members of their communities to learn how to keep themselves and their gardens

healthy in a series of workshops. From composting and recycling, to growing vegetables at home and the science of cooking, residents will be empowered to cook from garden-to-kitchen.

In Aspendale Gardens, Balla Balla, Rosewall and Yarram, pick up sustainability tips and tricks through gardening. Yarram is holding a Community Garden Expo, teaching people to grow winter veggies and cook with their produce. In Balla Balla, community members will also learn to ferment yoghurt, kimchi, kombucha and sauerkraut to keep their gut bacteria happy. Growing your own vegetables and making your own fermented goods not only is environmentally friendly, but is also low cost and encourages a more healthy, diverse diet.

Building on these, Castlemaine Community House is bringing in Permaculture Design experts to guide residents in permaculture principles. These land management practices combine the best of wildlife gardening, edible landscaping, and native plants into one low-maintenance, productive ecosystem in your backyard. As a treat, fresh garden produce will be used by the Murnong Mammas Aboriginal Catering Social Enterprise to cater for the event.

To promote healthy soils, Yarram and North Melbourne are running sessions on composting and setting up worm farms. Compost and worm wee add nutrients and valuable organisms to your soils. By saving organic waste, not only can you nourish your garden, but you also reduce greenhouse gas emissions. As food waste breaks down in landfill, it emits carbon dioxide and methane – rather than letting them go into the atmosphere, composting returns these carbon products to the earth.

Hamilton, Iramoo, Japara,
Pakenham and Whittlesea are all
exploring the world of decomposers
and pollinators. Look at organisms
found in soil and compost under

the microscope, build bee hotels to encourage native bees to visit your garden or make beeswax wraps. Learn about the role of bees and other insects in the environment. After all, one out of every three or four bites of food you eat is thanks to bee pollination.

Haddon is taking a look at fungi. View fungi under microscopes and test DNA from fungi to spot the difference between invasive or endangered fungi in your backyard as a citizen scientist. Or perhaps learn about minibeasts in the Bugtopia Tent in South Kingsville, playing with stick insects, butterflies, yabbies and more little critters.

While the previous workshops foster relationships between organisms and our gardens, Wycheproof is defending their region against a particular pest: the fruit fly. Over the past three years, the Queensland Fruit Fly has spread rapidly across the district, destroying crops and

home gardens. Learn how to protect your garden from this insidious pest.

Some communities are banding together to eliminate rubbish that causes serious health and safety concerns for humans, wildlife, and the general environment. Litter, for example, can be breeding grounds for bacteria, or be fatal to animals by ingestion or entanglement. The Aireys Inlet Rubbish Rangers and the Society for the Preservation of Flora and Fauna will come together to encourage the Anglesea community to collect rubbish around town. They will also create an art installation from the litter to serve as an inspirational reminder to take care of the environment.

Dyes are another devastating environmental pollutant, with tonnes of toxic and carcinogenic chemicals, dyes, and heavy metals constantly being dumped into waterways. These chemicals harm marine ecosystems, disrupt food chains, and pollute essential sources of

drinking water. The fashion industry alone is responsible for up to one-fifth of industrial water pollution. Alphington is teaching their community members to sustainably dye wood, cotton and silk using colourful plants and flowers from around the neighbourhood.

Greenhill and Rosewall are running workshops to encourage residents to upcycle – repurposing fabric from old clothing or broken crockery to make something new. Instead of throwing away items, learn how to patch them up. In a workshop with Boomerang Bags at Greenhill, learn to sew and make bags from diverted waste. The Swan Hill/Bendigo Sustainability Group at Kerang will also host a workshop to promote waste reduction by discussing how they can create a circular economy.

Meanwhile, Charlton residents can travel the globe and experience live events using virtual reality – perhaps the more sustainable way to travel given the large carbon footprint of flying around.

Attend any one of these workshops to learn how you can be more sustainable and be part of community action to halt climate change. You might be inspired to start a compost bin or grow your own produce, or to upcycle your waste into a work of art or fashion statement, or start using beeswax for everyday things. How will YOU science this National Science Week?





Build, play, learn – how libraries are sharing science in Science Week

National Science Week is approaching, and Victorian libraries are bringing science out of the books on their shelves to life. With interactive workshops, activities, and talks covering all aspects of science, technology, engineering and mathematics (STEM), there will be opportunities to discover new areas of science with experts. conduct experiments, build and program robots, and engage your creative side to make science-themed arts and crafts to take home.

Beginning with stories and tackling bewildering questions, the much-loved *Best Australian Science Writing* anthology selects the most riveting, poignant and entertaining science stories and essays from Australian writers, poets and scientists. Editor of the 2020 anthology, Sara Phillips, will be joined in conversation with 2021 Editor, Dr Dyani Lewis,



at Geelong Library and Heritage Centre. Who better to navigate us through National Science Week than Australia's best science writers?

Wangaratta Library is hosting a journey among the stars with a special visit from Rick Tonello, Chief Astronomer of the Gravity Discovery Centre & Observatory in Gingin Western Australia. Satiate your curiosity and thirst for knowledge as you learn why stars are different colours, the importance of stars, and how they are born, live and die.

Keeping to an astronomy theme,

regional library communities can take a tour of the Universe with an immersive virtual reality (VR) experience. Dr Rebecca Allen and Professor Alan Duffy, renowned astronomers at Swinburne University of Technology, will virtually guide people on an exploration of planets and distant galaxies. Start at Alexandra, Castlemaine, Ivanhoe, Kinglake, St Arnaud, Stawell, Wangaratta, and Yea libraries, and travel to Mars as you explore it from the perspective of the Perseverance rover and Ingenuity helicopter.

Instead of VR, you might like the more traditional film experience, in which case SCINEMA is for you. Several libraries will be showcasing the best in science cinema from around the world. Alexandra, Campaspe and Thomastown libraries have curated a selection of SCINEMA films that inspire the young, satisfy the curious, explain the baffling, and explore the impossible. Get your popcorn ready!

For some science-y food for thought, *Ballarat* and *Sebastopol* libraries are hosting a Little Foodies Lab and Lunchbox Learning. Pop in for some food-themed talks to fuel your brain while you munch your lunch. Ever thought about whether the colour of the cup influences the taste of your coffee? Ever considered why eating insects might be the way to go? Ponder these questions and experiment with food and other common household substances – some delicious and others not so much.

After munching on fruits and vegetables, you might like to save the seeds to grow and replenish your stock. Indigo Shire Libraries is launching their Seed Library during Science Week, and you can learn how to save seeds from vegetables, flowers and native plants at Beechworth and Chiltern libraries. But if you don't have a green thumb, you might instead like to learn about the traditional art of making homemade cheese with Coldstream Dairy at Rowville Library. Make cheeses of your own while you snack on some made by the masters.

Food meets technology at Mill Park Library in their robotic food fight. Fighters choose a wholesome food source packed with vitamins and compete in a sumo wrestling challenge with programmable Edison robots to see who will be the last one standing in the ring. With different robots at Watsonia Library, you can code an Evo robot to follow



a food map of your own creation.

Meanwhile, Sphero robots will be rolling around Swan Hill and Ivanhoe libraries. Participants are challenged to race or navigate a maze of their creation, learning how to code to make the Sphero bots talk, move and change colours. There is a chance to bring your creativity into the mix by making Wobble Bots at Lalor Library. By attaching a vibrating motor to CDs, plastic cups or other household items, these DIY Wobble Bots can wiggle, wobble and whiz around. Or, at Ferntree Gully Library, leave the art to the robots instead as you use them to make pictures and patterns - instead of a paintbrush, you can code a robot to do the art for you.

If you like building things and fancy yourself an engineer, test out your skills in *Ivanhoe Library's* bridge building challenge. Can you design and build the bridge that holds the most weight? For a challenge that could come in handy when working from home, learn how to build your own computer – or patch it up when it breaks down. *Yarra Junction Library* will take workshop participants through the parts needed to assemble a computer and help them build one.

You might also invent something completely new. My invention, My story workshops at Boronia, Croydon, Knox and Realm libraries will encourage children to create a prototype of an invention uniquely their own. These workshops, run by Girls Invent, particularly aim to

empower young girls to believe in their ideas and turn them into something successful as future women in STEM.

In a workshop that would make Isaac Newton proud, Warragul and Wonthaggi Libraries are investigating how push and pull forces make toys move. With Fizzics Education, children can also explore friction, rotational forces and inertia as they play. One toy in particular that might be sitting on your shelf in the "too hard" basket might be a Rubik's Cube. Rosanna Library is teaching tips and tricks to solve them so that you will be able to solve the puzzle every single time – plus you get one to keep.

'The breadth and creativity of Science Week activities demonstrates public libraries' commitment to lifelong learning, their capacity to make that learning fun, and their willingness to explore new technologies and share them with their communities,' says Angela Savage, CEO of Public Libraries Victoria. 'We are proud to be part of this celebration of science in local communities.'

With so much on offer, it is impossible to be bored during National Science Week. There are many events that will enlighten, enthral and entertain – from astronomy to physics, and robots to food science. Whether you're learning new STEM skills or want to test out your scientific knowledge, find out what's on offer at your local library, and get involved in the largest science festival in Australia!



Science Week at the Cathedral

Each August, St Paul's Cathedral engages with National Science Week and runs several activities that explore the chosen theme from the perspective of the science-religion interface.

In an increasingly global and secular scientific culture, saturated with technology and the market, the science-faith conversation is at the cutting edge of Christian engagement. Our purpose is to help equip Christians for that engagement.

NATIONAL SCIENCE WEEK 2021:

14th - 22nd of August.

Food: Different by Design.
NATIONAL THEME FOR 2021

We are approaching this theme by engaging with missionary agronomist, Tony Rinaudo, of World Vision whose work is transforming huge stretches of land in Africa, by growing forests!

A rapid, low-cost, scalable solution to climate change? This year's annual Science Week at the Cathedral (SWAC) will feature the revolutionary work of Melbourne missionary agronomist Tony Rinaudo. Millions of hectares of Africa have been regenerated through Tony's work, which now offers great hope for communities

producing their own food and also for climate change.

Science Week at the Cathedral (SWAC) is a partnership between St Paul's and ISCAST – Christians in Science and Technology.

SCIENCE WEEK IN THE CATHEDRAL EVENT 2021

Presentation and Q&A with Tony Rinaudo

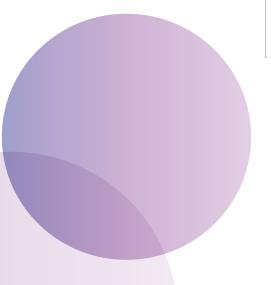
6.30 pm, Wednesday 25th

August 2021 at St Paul's Cathedral

Tickets (\$10 General / \$5 Students) are available here:

https://iscast.wildapricot.org/event-4404047

Read more about Tony's work here >>







Transactions



A silver buckshot for energy transition

by Simon Holmes à Court (University of Melbourne)



THIS ARTICLE FOLLOWS A JOINT PRESENTATION TO THE ROYAL SOCIETY OF VICTORIA AND AUSTRALIAN ACADEMY OF TECHNOLOGY AND ENGINEERING (VICTORIAN DIVISION) ON 8TH JULY 2021 TITLED "DECARBONISING ENERGY: AT THE TIPPING POINT" DELIVERED BY SIMON HOLMES À COURT (UNIVERSITY OF MELBOURNE). ALL IMAGES USED HERE WERE CAPTURED DURING HIS PRESENTATION.

We might not be experiencing drastic leaps in global average temperatures in our lifetimes, but our children and their children certainly will. They will be saddled with the decisions that we have made, and our actions (or inaction).

As we endeavour to become more sustainable, energy transition towards more renewable sources is accelerating. Solar and wind energy are displacing coal. Australia has installed more renewable generation infrastructure in the last three years than the thirty years prior. Yet, we also have the highest per-capita greenhouse gas emissions than any other advanced economy and are nowhere near close our Paris Agreement goals.

HOW CAN WE TURN THIS AROUND?

For Simon Holmes à Court, it began with a house he built in Daylesford. Off the main power grid, it was powered by a solar battery. While the battery would be fully charged by early morning during summer, he found that had to rely heavily on his diesel backup in winter. He wanted to be able to use wind power instead.

Simon and others in the local community formed a cooperative, *Hepburn Wind*, with the goal of powering the area with wind energy. (Somehow, Simon accidentally became the Founding Chair after their first meeting.) Within 24 months, they had raised \$10 million for two wind turbines, Gale and Gusto. In 2011, they were connected to the grid as Australia's first community-owned wind farm, producing enough clean energy for over 2000 homes. At the centre of the project, Simon was exposed to the engineering, energy market, politics



finances, and communication, and it sparked his interest in this space.

In 2017, Australia's former Chief Scientist, Dr Alan Finkel, published a review into the future of the National Electricity Market. The Finkel Report determined that the electricity sector was Australia's largest source of pollution, accounting for 35% of our greenhouse gas emissions and created a blueprint to take us in a different direction by ramping up renewables and energy storage uptake. Simon was heartened that it showed coal rapidly being phased out as Australia transitioned to other sources of energy, with wind and solar become the champions.

But for times when "the wind doesn't blow and the sun don't shine", we will still need to rely on dispatchable generation to keep the lights on. Just like our food, energy can come in "fresh" or "frozen" forms – either being fed directly into the grid and used as it is produced or being stored in power systems that can be turned on and off at will. Moving forward, Simon hopes that we will rely on solar batteries and hydro power as cleaner forms of "frozen" energy.

Australia has three pumped storage hydro schemes which can provide several days to a week's worth of energy in a pinch. But we have so few as the infrastructure to support hydropower requires terrain in an area that is not environmentally sensitive and access to the grid, and each hydro dam is bespoke. Instead, it is easier and cheaper to produce solar panels as they are simply copies of each other. Australia now has the highest adoption of rooftop solar per capita than anywhere else, and they are also highly effective. Even if a solar panel is placed on the wrong (south-facing) side of an Australian house, it will still generate more electricity than one in Germany. It therefore makes both environmental and economic sense for us to shift to solar energy.

With a shift to solar and wind energy and decrease in coal usage, the electricity sector is reducing carbon emissions. However, the gains in this sector are being overwhelmed by emissions from others. Simon therefore advocates for a reduction across the whole economy: 'we should electrify everything and move to 100% renewables,' he says.

The transport industry is a major contributor to greenhouse gas emissions. Compared to other developed nations, Australia's standards for fuel quality, efficiency, and emissions standards are well behind – being less friendly to both the environment and motorists' wallets. With population growth, more people are using cars with poor standards – it is unsurprising that emissions are on the rise.

'There is no silver bullet for carbon change,' says Simon, quoting Bill McKibben. 'Only silver buckshot – we need a combination of many transitions, not in the electricity sector alone'.

Simon believes that we have much to learn from other countries that have much more advanced thinking in this space as they have spent the past decade, not thinking about whether they should transition, but *how*.

Two new Australian projects demonstrate that we, too, can be leaders in energy transition. The Sun Cable Project aims to build the largest solar energy infrastructure network in the world. The solar farm and battery storage facility will be built in one of the most reliably sunny places on the planet in the Northern Territory by the end of the decade. The goal is to supply Darwin, Singapore and ASEAN markets with reliable and competitively priced renewable energy via a 4,500km transmission system (including 3,750km of sub-sea cable). Additionally, the Tasmanian Government's Renewable Hydrogen Industry Development Funding program envisages the construction of a green hydrogen plant to produce one of the world's largest green hydrogen plants to supply both Australia and Japan.

As Australia becomes a renewable energy superpower with these projects and more, the cost of energy will fall. The plans exist, but if we are to reach our Paris Agreement targets, we need the political and financial support as well as coordination between sectors and governments. We have so much potential to be world leaders in energy transition as we fire silver buckshot to hit net zero.







Coastal Resilience: shifting sands and battered beaches

by Associate Professor David Kennedy (University of Melbourne).



THIS ARTICLE FOLLOWS THE 2021 HOWITT LECTURE, CO-HOSTED BY THE ROYAL SOCIETY OF VICTORIA AND GEOLOGICAL SOCIETY OF AUSTRALIA (VICTORIA DIVISION) DELIVERED BY ASSOCIATE PROFESSOR DAVID KENNEDY (UNIVERSITY OF MELBOURNE).

Sand is never lost from our beaches. It is simply shifted from one place to another, responding to the waves that wash over it.

Beaches are dynamic systems in a constant state of flux as they interact with waves breaking on the shore. It might slightly counter intuitive that beaches have remained in place for tens of thousands of years in more or less the same position, despite the fact that they are comprised of loose piles of sand. Yet the looseness of sand on a beach is key to its survival.

Sand is continually moved along or across shore over annual to decadal cycles to balance wave energy that impacts the coast. Coastal geomorphologist, Associate Professor David Kennedy, spends his time monitoring and studying coastal landforms. He endeavours to understand the dynamics of beaches, which is critical for sustainable environmental management of the coast.

Around the world, infrastructure is threatened by seas flooding land – and this is predicted to only increase due



In Kiribati, sand is shifting from the ocean (left) towards the lagoon (right)

to climate change. Coupled by increasing populations and human activity at the coast, more and more homes and buildings are at risk. We have already seen disasters occur.

In 2016, huge waves and tides pummelled into the NSW coast in a storm, eroding about 50 metres of Collaroy Beach, where waterfront properties partially toppled



Credit Peter Rae, Fairfax Media (in ABC website and Sydney Morning Herald).

into the sea. This was the beach where David learned to swim – yet he never expected to see a swimming pool literally fall onto the beach.

The sand dunes leading up to those waterfront houses fell away as the sand moved to counter the strength of the waves.

The active part of a beach can extend kilometres – as far offshore as where waves can stir up the seabed. What we walk on at the shore is merely the store of sand, ready to buffer waves and storms. Beaches adjust to the energy of high waves rolling in by transferring sand from above to below sea level – becoming shallower offshore as sand moves out to even out the gradient of the seabed. This process constantly occurs, and has for millennia, but problems arise when massive waves hit the shore and a great amount of sand moves in areas populated by people.

Understanding the dynamics of the change – the beach envelope – and its overlap with human infrastructure is fundamental for coastal management.

David studies impacts and movements of beaches in the past so that we know how to manage them moving into the future. Beaches along the NSW coast have been studied for decades as that is where Australian coastal geomorphologists and military personnel have traditionally lived and worked. Using data dating back to the 1970's, David and other coastal geomorphologists have tracked the seasonal and decadal movement of

sand on and off shore, as well as along the embayment. But we know much less about Victorian beaches.

Victorian beaches tend to differ as they are not completely sandy systems and are much rockier. One only has to travel down the Great Ocean Road to see the rocks and cliff faces that line the Victorian coast. According to David, our sandy beaches are 'thin veneers covering the rock face that are almost live rivers of sand, hugging the coastline'. What sand we have merely comes from the eroding rock – the beach at the bottom of the Twelve Apostles, for example, is there thanks to the fact that they have eroded.



The 2016 storm brought waves right up the shore and shifted sand out to sea. Indicated, an entire pool that fell onto the beach from private property (Images from David Kennedy)





Inverloch - sand has moved from the beach front and built up towards Anderson Inslet

While we do not have long-term records in Victoria, David and his team developed the 2020 Eureka Award-winning Victorian Coastal Monitoring program. They used machine learning, with the help of citizen scientists, to assess drone footage to produce 3D models of shoreline change. Even with about 18 months of footage showing Apollo Bay, they could spot the hot spots of erosion and accretional areas.

Sand can also be redistributed by waves in a longshore direction. In Inverloch, major erosion of the beach front over the last ten years has seen sand shift from the open ocean coast in front of the surf club to the mouth of Anderson Inlet. The surf beach has receded around 50 metres while the inlet beach has gained 450 metres. While this threatens the infrastructure at the surf club, it has created a habitat for endangered beach nesting birds.

While the original model was that sand would move out to counter waves, more recent studies have suggested another model in which sand can instead built up onshore. Examining the age and evolution 90 Mile Beach, David and his colleagues have been able to age grains of sand (quartz) by determining when they were last exposed to light (i.e., when they were on the surface). They saw the old shoreline from the last interglacial period, as well as distinct ages showing that current

dunes are on top of much older sand – the 'beach is stepping back'.

Elsewhere in the world, some Pacific Islands are in strife because of these natural processes – despite the fact that they have weathered warmer climates and higher tides over thousands of years. The difference is human activity. Overall, the entire Kiribati archipelago remains stable, but some islands are contracting while others expand. One island, for example, is shifting lagoon-ward as the sand shifts away from the ocean. This is fine for a natural landform with inbuilt resilience, but the issue arises with static buildings (such as a hospital in this case) that are vulnerable to damage if the shoreline recedes too far. Sand itself might be a valuable resource to create an armoured section of shoreline so that people will not be forcibly removed from their homes.

Beaches are dynamic over long timeframes, and human timescales are so insignificant in comparison. Islands move and coastlines shift as they respond to waves and tides. Erosion during storms is a natural phenomenon and it may take months or years for a beach to return to its pre-storm state. But seawalls and other structures that we build will impact and inhibit natural recovery. When you retreat to the beach, the beach itself might be retreating too.

Orb webs

Priya Mohandoss, RSV Member.

Spider webs are a gift of nature that have existed for more than 100 million years. They possess much perplexity in structure, and even more so when it comes to the traditional spiral or wheel-shaped form. These are aptly called orb webs as they are created through the craftsmanship of the world's third largest group of spiders, the orb weaver spiders that come from the family, Araneidae.

Orb weaver spiders have three pairs of spinneret glands (spinning organs) found at the tip of their abdomen that produce silk. Each gland has its own speciality such as the use of sticky silk for trapping prey, fine silk for enclosing prey or non-sticky silk to provide extra strength to the web.

The main purpose of orb webs are to catch flying insects such as mosquitoes, flies, bugs and beetles that hover in the openings of rocks or other types of vegetation. In general, orb webs can be compared to air filters, where small creatures unaware of the fine silk strands impeding their flight path can be captured. This tends to work particularly well in dark, unlit areas. Furthermore, orb weaving spiders tend to build their webs each day and have the ability to repair any ruptures that may be caused as a result of the caught prey.

In comparison to other types of webs, orb webs take the least amount of effort to produce. The first step in the assembling process is for the orb weaving spider is to unleash a silk thread that when blown in the wind, can fasten to an object. Once this happens, it tightens this thread, which now acts as a bridge and then adjoins more threads to brace the structure. Next, the spider



Intricacy in display. Photo courtesy of Priya Mohandoss

then goes down from the centre of the bridge to attach a thread to some object on the floor surface such as a stick or leaf litter. The central part of the web, also called the hub, is made when the spider then goes back to the bridge with a thread and carries it partway along the bridge before fixing it in position. This thread then becomes the first radius or spoke. Once all the spokes are done, the spider then retreats to the hub and creates more spirals of dry silk on the outer surfaces of the web for temporary measure. After this, the spider then moves in the opposite direction and drops tangling silk that in turn creates a thick spiral for insect capture so that it can get rid of the previous spirals. In an hour, both radii and orb have been completed with any excess silk being eaten or recycled.

With their striking beauty, orb webs are a feat of engineering that evoke a sense of curiosity to us all.







New Stewardship of Country



THIS SPECIAL ISSUE FEATURES PAPERS FROM THE 2021' STEWARDSHIP OF COUNTRY' SYMPOSIUM HELD IN PARTNERSHIP WITH THE ROYAL SOCIETIES OF AUSTRALIA, PRESENTED BY THE INSPIRING VICTORIA PROGRAM.

'We do not need to wait until everyone has accepted and understood the obligation of custodianship or until all our laws and institutions are reformed. We can act now, collectively and individually. Every small change we make adds to all the others — forming, eventually, big changes. We can act collaboratively, immediately magnifying the changes any one of us can make.'

- Dr Nelson Quinn, Law Futures Centre, Griffith University

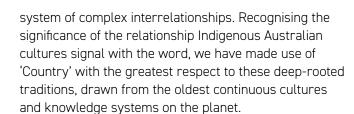
The devastating summer bushfires of 2019–20 and the COVID-19 pandemic have certainly highlighted a need for a new way forward for our relationship with our environment. It's clear that 'business as usual' is no longer an option, yet what are the alternatives?

'Stewardship of Country', a symposium in three parts presented by the Royal Societies of Australia and Inspiring Victoria, was a series of online events held for audiences across Australia in March 2021.

Eleven presentations were delivered across multiple domains of land management practice and scholarly expertise, representing an historic collaboration between Aboriginal and Torres Strait Islander experts, industry practitioners and thinkers, convened under the auspices of the Royal Societies of Victoria, Queensland and New South Wales, with support from the CSIRO.

The series posed the question: who are we becoming, as Australians faced with an increasingly unpredictable and challenging future?

'Country' is a term with layered, nuanced meaning in Australia, drawn from the traditions of Aboriginal and Torres Strait Islander cultures. Here, it is generally recognised as a sacralised term that combines land, ecosystems and human cultures in an holistic knowledge



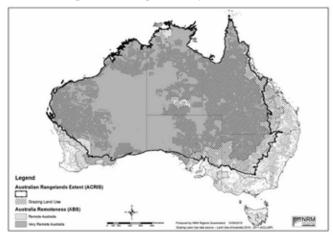
'Stewardship' is a more general term that finds its origins in the European feudal system; in its modern sense, it describes a responsibility for the health of our 'estates', which we keep in care for future generations. In practice, Stewardship may require us to reorganise around the unique characteristics of the Australian landscape. This can be achieved by significantly regenerating damaged ecosystems and deprioritising the extractive nature of constant economic growth in favour of an enduring sufficiency gathered from a productive and biologically diverse environment.

The Stewardship of Country symposium aimed to elevate a broad range of perspectives, generating a discussion on landscape and environmental management that bridges Indigenous, agricultural, scientific, economic and social perspectives with support for practical action and public good.

Bill BirchFrom the eleven presentations, six were submitted for publication as a 'Special Issue' of the Proceedings of the Royal Society of Victoria. Our colleague from the Royal Society of Queensland, Nelson Quinn has provided an overview in his paper titled 'New Stewardship of Country.' An additional paper concerned with the history and contributions of German migrant Jacob Braché to colonial Victoria during the gold rush era and beyond is included. As Editor, I wish to acknowledge the willingness of the contributors to prepare their papers and their prompt attention to the demands of the editorial process.

All papers, and past issues, are available via open access at https://www.publish.csiro.au/rs. Readers interested in learning more about the Stewardship series, including all the presentations, should visit https://www.scienceaustralia.org.au/stewardship-of-country.

PAPERS FEATURED:



Australia's rangelands, defined within the heavy black line, showing remoteness and where domestic stock are grazed (stippled).

Australian Rangeland Futures: Time Now for Systemic Responses to Interconnected Challenges

Barney Foran

Abstract: Australia's rangelands contain wildlands, relatively intact biodiversity, widespread Indigenous cultures, and pastoral and mining industries, all set in past and present events and mythologies. The nature of risks and threats to these rangelands is increasingly global and systemic. Future policy frameworks must acknowledge this and act accordingly. This paper collates current key information on land tenures and land uses, people and domestic livestock in Australian rangelands, and discusses five perspectives on how the rangelands are changing, in order to inform the development of integrated policy — climate and environmental change; the southern rangelands; the northern rangelands; Indigenous Australia; and governance and management. From these perspectives, more attention must be paid to ensuring a social licence to operate across a range of uses, acknowledging and supporting a younger, more Indigenous population, implementing positive aspects of technological innovation, halting capital and governance leakages, and building human capacity. A recommended set of systemic responses should therefore (i) address governance issues consistently and comprehensively, (ii) ensure that new technologies can foster the delivery of sustainable livelihoods, and (iii) focus capacity-building on a community of industries where knowledge is built for the long-term. All three of these should be undertaken with an eye to the changing demographics of the rangelands.

Full paper: https://www.publish.csiro.au/RS/pdf/ RS21001





Early dry season burn in Kadadu National Park, showing low-level fire intensity in Melaleuca swamp forest.

Australian Landscapes from Eocene to Anthropocene

Peter Bridgewater

Abstract: The 65-million-year journey from the demise of the dinosaurs to the present day is characterised by changing climes, periods of species extinctions and, finally, the appearance of Homo sapiens. As an island from the start of this period, Australia's landscapes were isolated from the rest of the world and to this day are characterised by a unique biodiversity. Since their arrival, First Nations peoples have somehow understood this special landscape, living in conformity with it, changing along the way as the climate and landscape changed. That all changed with the arrival of people from Europe, who were more familiar with a weedy landscape recovering from deep glaciation. Over the last 250 years, a lack of understanding of the uniqueness of the Australian landscape, and of First Nations connections with that landscape, has wrought both biological and cultural disruptions. Looking ahead, more conversations between all Australians on how to manage this country into an uncertain future, respecting the range of world views that exist, and rebuilding a viable biocultural diversity, remains a significant but achievable challenge.

Full paper: https://www.publish.csiro.au/RS/pdf/ RS21002



The Ranger Uranium Mine in Kakadu (Google Earth image).

Incorporating Indigenous Knowledge in Mine Closure – Ranger Uranium Mine

Christopher Brady, Peter Christopherson and Justin O'Brien

Abstract: The Ranger Project Area, located on the lands of the Mirarr clan, is surrounded by Kakadu National Park. After 40 years of uranium production at Ranger Mine, rehabilitation has begun, with a commitment that the land will be restored to a standard such that it could be incorporated into Kakadu National Park. Historically, mine closure has not been done well in the Northern Territory, and little if any consideration has been given to the views of Aboriginal landowners. An Aboriginal perspective of country recognises the interrelationship, via local kinship and moiety systems, of all things — the rocks, plants, animals, people, stories, weather, ceremonies and tradition. There is an opportunity for this worldview to be incorporated into the rehabilitation of Ranger Mine. The mine's operator ERA (a subsidiary of Rio Tinto) has agreed to Cultural Closure Criteria that reflect a desire of Bininj (Aboriginal people from the region) to again use the land for hunting and gathering, recreation and cultural practice. Allowing Aboriginal people to have input to rehabilitation planning demonstrates a respect for people's knowledge and connection to country. At Ranger, where the mine was imposed against the wishes of the traditional owners, this is an important step in a return to stewardship of this land and reconnecting people to place.

Full paper: https://www.publish.csiro.au/RS/pdf/ RS21003



Log weir on the NQ Dry Tropics' demonstration hub in North Queensland

Connections for Resilience: Sharing Land Management Knowledge Between Farmers and Politicians

Carolyn Hall

Abstract: Sharing knowledge is essential if Australian politicians are to effectively support farmers to be more resilient and adapt to climate change. Transformational change takes time; it can be fostered by on-ground examples of best practice in land management and innovative new approaches such as landscape rehydration. Farmers and politicians need to connect, to view and understand these methods and approaches and share their learnings. However, we need to go from connections for resilience to actions in the form of outcomes-based policy and financial support to achieve change.

Full paper: https://www.publish.csiro.au/RS/pdf/ RS21004



Dingoes on Wooleen Station. Photo: David Pollock

Managing the Unmanageable: Reinstating the Dingo for Pastoral Sustainability in Australian Rangelands

David Pollock

Abstract: The predominant grazing management system used in the arid rangelands regions of Australia, set stocking, is not conducive to sustainable land management. More appropriate grazing management systems based upon periodic rest periods for important pasture species have not been adopted by pastoralists because the unmanaged grazing pressure from animals

such as goats and kangaroos has been too high. Dingoes are the only cost-effective and long-term management solution to the effect of unmanaged grazing by goats and kangaroos. Yet government funding targets dingo eradication in pastoral areas, and it does so by adopting misleading and scientifically inaccurate terms for describing dingoes.

Full paper: https://www.publish.csiro.au/RS/pdf/ RS21005



Merino sheep beside the predator-proof fence at the Tiverton Farm sanctuary in Western Victoria. Photo: Annette Ruzicka

The Business of Biodiversity: the Role of Odonata

Nigel Sharp

Abstract: As one of the most biologically distinctive countries in the world, much of Australia's flora and fauna are endemic to the continent; however, the issue of decline is immediate and ever present in many ecological communities. Odonata, as a not-for-profit business, believes that nature-focused business solutions are the key to properly supporting Australia's biodiversity. By driving sustainable business solutions, supporting nature-focused projects and establishing predator-proof sanctuaries, Odonata looks to the role of stewardship as a means to promote healthy diversity and regenerate landscapes.

Full paper: https://www.publish.csiro.au/RS/pdf/ RS21006





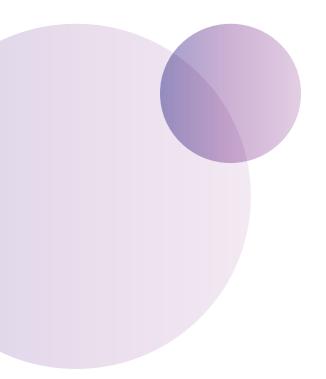
Map of the Ballarat region, showing auriferous leads and quartz reef and outcrops, compiled and drawn by Braché in 1861 (accessed from the University of Melbourne's digitalised collection: http://hdl.handle.net/11343/23725).

'A Talented Young German': Exploration of the Early Career of Jacob Braché

Gabrielle L. McMullen

Abstract: Jacob Braché (1827–1905) arrived in Melbourne in 1853, two years into the Victorian gold rush, and soon became a significant figure in local mining circles. For almost fifty years, he contributed actively to mining endeavours — during periods as a civil servant, in numerous mining enterprises, and as a consulting mining engineer. Following a summary of Braché's contributions in Victoria, this paper focuses on his education and experience prior to emigrating to the Colony, looking at the expertise that he brought to his colonial roles. It concludes with insights into why this 'talented young German' was a controversial figure over his half century of professional life in Australia.

Full paper: https://www.publish.csiro.au/RS/pdf/ RS21008



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