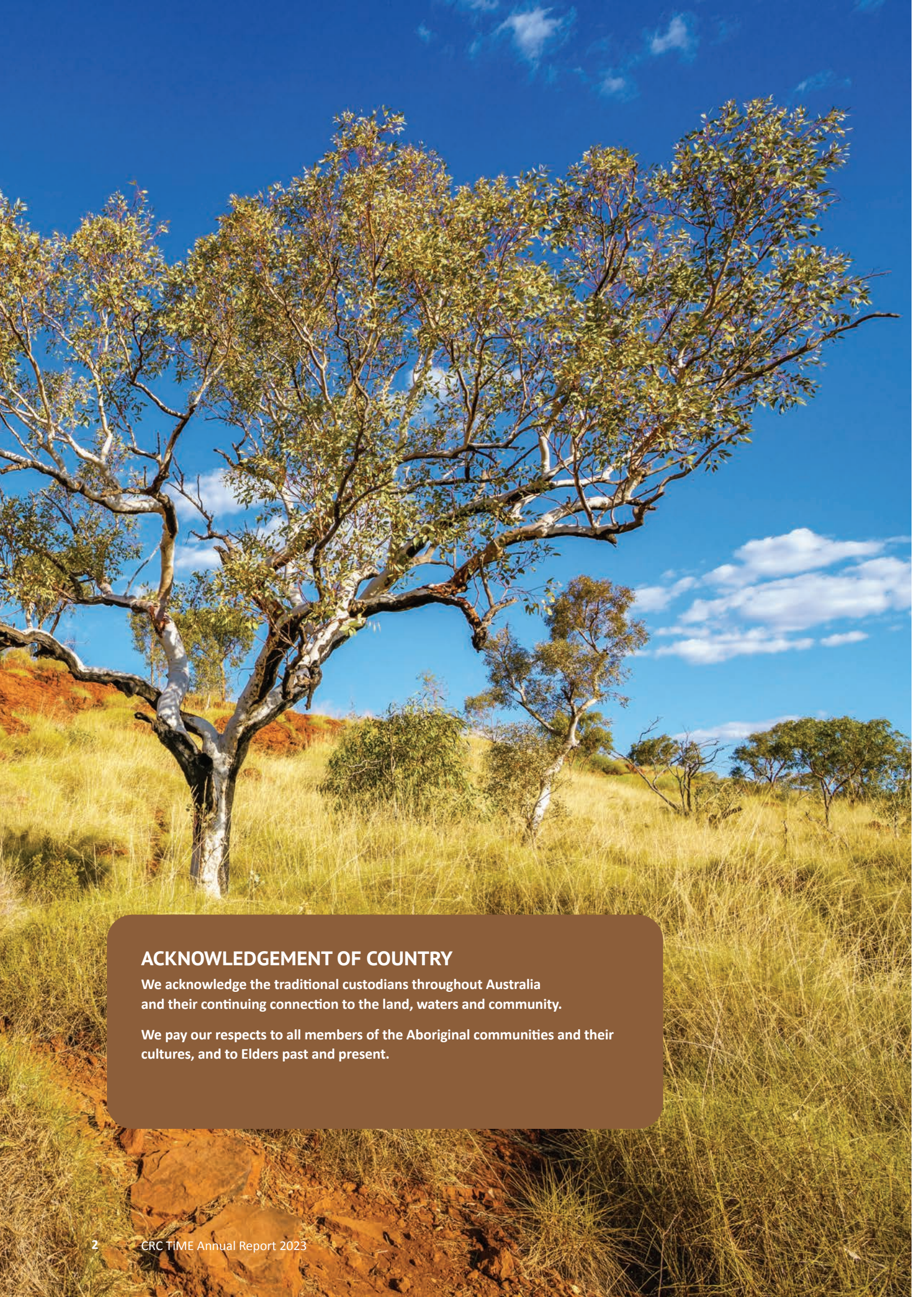


**ANNUAL
REPORT 2023**



Australian Government
Department of Industry,
Science and Resources

AusIndustry
Cooperative Research
Centres Program



ACKNOWLEDGEMENT OF COUNTRY

We acknowledge the traditional custodians throughout Australia and their continuing connection to the land, waters and community.

We pay our respects to all members of the Aboriginal communities and their cultures, and to Elders past and present.

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2022–2023 HIGHLIGHTS

Worked on impactful research

\$7,801,530 of new projects

15 journal articles and conference papers

23 projects in delivery

\$11M of in-kind support provided

10 projects in development

Shared what we learned

440+ attendees joined Dig Deeper webinars

46 new published resources

16 new fact sheets

60+ briefings and conference presentations, including for government departments, industry representative groups and regional organisations

800+ people contributed or engaged in our work

120+ delegates at our first in-person Annual Forum

Invested in education and training

- 4 new PhD students, taking total cohort to 16
- Funded development of the world-first Foundations on Mine Closure and Sustainable Transitions Mass Open Online Course
- Commissioning the Australian Mining and Automotive Skills Alliance (AusMASA) to undertake a strategic review of national education and training options

Strove for First Nations Inclusion

- Published our First Nations Inclusion Strategy with clear and measurable actions
- Welcomed Caroline Williams, a Yamatji woman, to the new position of Engagement Management (First Nations). Caroline provides strategic advice and guidance.
- First Nations VET Pathways project co-designed, with Project Leader Zane Hughes, a Waanyi man, engaging with diverse Indigenous people and organisations across Australia
- Cultural awareness training embedded into staff development
- Commenced mapping process to identify Inclusion opportunities and gaps

Working with regions in transition

- 120+ delegates at our 2022 Annual Forum
- Coordinated a pilot Cross-regional Knowledge Exchange, bringing together delegates from three regions and four sectors to meet peers in the Bowen Basin
- Networking events in Brisbane, the Latrobe Valley, Darwin and Adelaide
- Began co-design of our 2023 Annual Forum to be held in the Latrobe Valley in November 2023
- Welcomed Rae Young to the new position of Engagement Officer (Mining Regions)
- Engaged with partners and stakeholders as part of research and impact activities in Karratha, Bunbury, Darwin, Adelaide, the Bowen Basin, Kununurra and many other locations

Strengthened global connections

- CEO Dr Guy Boggs joined Professor Thomas Baumgartl as co-editor of Cambridge University's forthcoming *Research Directions: Mine Closure and Transitions* journal
- Research Director Professor Tom Measham accepted an invitation to join the Global Research Coordination Network on Coal Transitions
- Tom chaired a sold-out Special Symposium on Mine Closure and Post Mine Transitions at the World Mining Congress 2023
- Dr Jenny Pope conducting 28 interviews in 9 cities across Canada to learn from its established and diverse body of regional cumulative effects assessment practice
- Guy shared lessons at the ICMM Responsible Leaders Forum in London¹

¹ October 2023, outside of 2022-23 reporting period.

FROM THE CHAIR

Dr Bruce Kelly



I am pleased to present CRC TiME's third Annual Report, capturing a time of significant momentum in our work to support transformations in mining economies.

During 2022–23, our team and diverse partnership built on successes during our foundational stage as they worked to challenge the status quo to improve outcomes for people, communities, the environment and industry.

A time of change

Our operating context has changed significantly in the three years since CRC TiME began and continues to evolve.

The recent completion of mining at several large operations – and announcement of impending timeframes for a number of others – has brought the challenges of mine closure into sharp focus.

At the same time, First Nations communities and regional communities are increasingly able to influence new project development, existing operations and mining cessation. The investment community is also setting clearer expectations for industry environmental, social and governance (ESG) performance.

Furthermore, demand for Australia's critical minerals is accelerating with some regions transitioning into mining. The race to meet demand needs to be tempered with leading ESG practice.

These, along with other factors including decarbonisation and focus on the circular economy, reinforce the importance of reimagining and transform what happens after mining ends for the better.

Our ability to contribute to this pressing challenge is testament to the foresight and investment – of time, knowledge and resources – by our CRC partnership and stakeholders.

As the world's only dedicated research organisation examining mine closure and transitions, I believe we are uniquely placed to drive the innovation needed.

This is leading to heightened national and global interest in CRC TiME, its vision, mission, goals and deliverables. We are very much on the global radar.

Growing momentum

Action creates momentum, and the Board is pleased to report further progress towards our vision, goals and priorities in 2022–23.

I would specifically draw attention to three critical areas.

1. In October 2022, the Board endorsed our inaugural First Nations Inclusion Strategy, reflecting our genuine commitment to supporting the aspirations of First Nations people, communities and organisations. Achieving the strategy's objectives requires us all to continually question, improve and adapt how we work. Key actions and achievements during 2022–23 are highlighted on page 5.
2. Following an open process, three new projects – a world-first mass open online course, strategic education and training review and the First Nations VET Pathways – will broaden access to quality, accessible and trusted education.

Together with our Higher Research by Degree (HDR) Program, these investments will build essential knowledge and skills within and outside of industry. Building capacity and capacity for the future is critical.

3. I would like to acknowledge the significant growth of our research portfolio. As of October 2023, 23 projects – including an Australian-first study on the economic potential of the mine closure solutions industry and the National Pit Lakes Initiative – are now in delivery.

Positioning for the future

As we enter our fourth year in operation, CRC TiME is approaching its halfway mark. And the decisions we make now will further define the shape not only of our impact, but our legacy.

In 2024, the CRC TiME Board will guide a process to refresh our strategy, and aligned Research Prioritisation Plan, Impact Framework and First Nations Inclusion Strategy.

Our foundational plans were developed by drawing on the collective knowledge of our partnerships. Each was also deliberately bold and ambitious while establishing a clear path to impact.

During the next planning cycle, the Board will encourage the same honesty, ambition and boldness by our partners.

Thank you

To us, 'cooperative' is more than just a word in our title. It underpins our strategy – and our success.

On behalf of the Board, I would like to thank our partners and champions for your ongoing support, dedication and commitment to working together cooperatively for transformative change.

I commend this Annual Report to you.



CEO FOREWORD

Dr Guy Boggs



Over the past 12 months, one of the most rewarding parts of my role as CEO has been seeing relationships and collaborations formed during our foundational years grow and develop.

The strength of a cooperative research centre is demonstrated by its ability to help bridge diverse interests by providing space, time, resources and support to share, discuss and solve challenges. This is occurring across disciplines, sectors, communities, regions and priorities and between individuals, groups and organisations.

And, as this continues to strengthen, so does the power of our shared commitment to help reimagine and transform mine closure and transition processes and outcomes for the benefit of all Australians.

It's this shared commitment that led to a new tranche of critically important projects commencing in the first half of 2023.

With the commencement of these projects – some of which are discussed below – our research portfolio has grown to 23 projects in delivery.

Our new projects have a combined cash value \$7.8M, and range in scale and complexity as we deliver against our research plan. Our projects also rely on in-kind staff and non staff resources from our partners, and over the past year I am delighted that over \$11M of in-kind support has been provided to our organisation.

Together, our portfolio represents a mix of on-ground, regionally-focused, nationally-important and globally-leading research.

A locally-informed, national pathway to impact

I am pleased that CRC TiME is launching its 2022-23 Annual Report the week after our second in-person Annual Forum, which was held in the Latrobe Valley.

Regions in transition are – and must always be – at the

centre of our research and impact agenda. And, it is why – together with our valued local partners, including the Mine Land Rehabilitation Authority, Federation University and Latrobe City Council – it is important we hold our biggest annual event in a mining economy undergoing significant transformation.

Our work in the Latrobe Valley, particularly through a collaborative planning process (Project 1.7), complements other projects with a regional footprint. These include in the Pilbara and Bowen Basin, which will pilot a framework to help identify resilience factors and transition capacity drivers (Project 1.8) in 2024.

Another milestone is establishment of demonstration sites in Western Australia, Tasmania and South Australia in a global-first project to test the effectiveness of climate-adapted seed sourcing strategies (Project 4.9).

At a national scale, we are looking forward to the imminent launch of the first national study examining opportunities to grow Australia's mine closure solutions industry (Project 3.14).

It presents a compelling picture for action to unlock the full potential of the multibillion dollar opportunities available, including in the circular economy (such as waste reprocessing and asset repurposing), social performance and engagement and rehabilitation services.

The report also sets foundations for potential future work focused on specific opportunities, such as for Indigenous, regional and export businesses.

Striving for First Nations Inclusion

Guided by our inaugural First Nations Inclusion Strategy and with advice from the First Nations

Advisory Team, we made progress towards our goal of facilitating a legacy that is designed with and by First Nations people.

Published in February 2023, the *'Foundations for Indigenous Inclusion'* report provides guidance to incorporate Indigenous cultural values and knowledge into work by us and other organisations.

Co-designed during the first half of 2023, Stages 1 and 2 of the *First Nations Vocational Education and Training (VET) Pathways* project is now underway. Through workshops and other activities, the Indigenous-led project will hear directly from First Nations people to understand what information they need to be equal partners in mine closure and transition decision-making and opportunities.

A research visit to Canada, as part of Stage 1 of Project 4.7, provided important insights into regional cumulative effects assessment practice globally, including by First Nations and other Indigenous Canadians. Connecting Aboriginal and Torres Strait Islander groups with these findings will be a priority in 2024.

Challenging the status quo

For decades, CRCs have worked to drive innovation for better outcomes by challenging the status quo. While evident across our portfolio, I note ongoing research on Natural Capital Accounting (NCA) in the mining sector. We were also pleased to have contributed to BHP's world-first NCA case study at its Beenup rehabilitation site.

Challenging the status quo requires not only cutting-edge research, but also connecting resulting ideas, knowledge and resources with those who need it. It is pleasing to see our team's expertise is being sought nationally and globally. Research Director Professor Tom Measham has joined the Global Coal Transitions Research Network and also chaired the highly successful Special Symposium on Mine Closure and Transitions at the World Mining Congress in Brisbane in June.

Ensuring our work is accessible and used is core business. Our team and research network delivered

more than 60 presentations and workshops during 2022–23, and produced more than 50 publications, including journal articles and fact sheets.

Reflections and next steps

In closing, I would like to take this opportunity to thank the many hundreds of people – from across our partners and beyond – that share their time, knowledge and resources with us and each other.

On behalf of CRC TiME, we look forward to continuing to work with you.





WHO WE ARE

Part of the Australian Government’s flagship Cooperative Research Centre Program, we are the world’s only research organisation dedicated to examining and helping transform what happens – economically, socially, culturally and environmentally – after mining ends for the better.

What we do

We bring together diverse partners to help reimagine and transform mine closure and transitions for the benefit of all Australians.

We unlock innovation by:

- connecting diverse ideas, people, disciplines, organisations, regions and sectors
- undertaking globally-leading and nationally important research
- developing and investing in education and training for current and future research, industry, First Nations, community and government leaders.

Who we work with

Our partnership includes the mining industry, mining equipment, technology and services (METS) businesses, governments, research institutions and First Nations and regional community organisations.



Research Priorities for 2021 – 2024

1. Regions in transition
2. Informing regulatory excellence for transitions
3. Delivering post-mining options
4. Enhancing decision systems for positive closure
5. Implementing technology for positive impact
6. Innovating supply chains for business solutions
7. Assessing and predicting cumulative impact
8. Demonstrating and data solutions

OUR VALUES

Diversity

Innovation

Impact

Our Impact objectives

- 1 Mines are closed in ways that deliver social, economic and environmental value.
- 2 Closed sites are repurposed to enable faster transition to diverse and resilient economies.
- 3 Mine closure business solutions drive new commercial or regional opportunities.
- 4 Continued investment in Australian resources.
- 5 Policy, decision and management systems reduce risks to people, communities, the environment and industry.

Where we work

Our footprint is broad, reflecting the industry's size, scale and impacts. It includes projects:

- at mine and rehabilitation sites
- within regions, such as the Latrobe Valley
- covering multiple regions
- at a national scale
- with international involvement.

We are hosted by The University of Western Australia and the University of Queensland. with offices in Perth and Brisbane.

Timing

We began in 2020 with funding until 2030.

Our partnerships

We operate with the support of the Commonwealth and over 75 partners across mining, mining equipment, technology and services (METS), industry, research, government, First Nations and regional community organisations.

How we are funded

We received \$29.5 million of Commonwealth funding through the CRC Program. Our partners have also committed significant financial and in-kind support over 10 years.



What do we mean by economies?

Our work focuses on transformations in mining economies. We use the term 'economies' broadly to encompass a range of attributes, factors and outcomes that affect the prosperity, wellbeing and sustainability of individuals, groups, industries and the environment.

Collaboration

New possibilities

Mutual respect

FIRST NATIONS INCLUSION

During 2022–23 we focused on shared benefits through a unified process of respectfully engaging with Indigenous people and organisations, partners and the First Nations Advisory Team.

Guided by our First Nations Inclusion Strategy, we strive to work in a way that is culturally aware, respectful and impactful.

Highlights across the strategy's four focus areas are noted below.

Leadership and governance

- Caroline Williams, a Yamatji woman, started as Engagement Manager (First Nations) in January 2023 to provide strategic advice and support.
- Strengthened arrangements to support FNAT to give advice with new operating procedures, regular Chair updates to the Board, a dedicated travel and engagement budget and expanded membership.
- FNAT provided advice on various projects at four meetings during 2022–23, with another in October 2023.
- Worked to develop appropriate classifications for projects, recognising current inclusion opportunities and future expectations.

Impact and translation

- Commenced process to expand staff cultural awareness through face-to-face and online training as well as recognition of cultural events.
- Developed culturally appropriate resources about us for partners and community.
- Delegates heard from Barada Barna Aboriginal Corporation as part of the pilot Cross-regional Knowledge Exchange in early July 2023.
- Continued to build relationships and share research

findings, including with visits to the Pilbara, Kununurra, Darwin and the Latrobe Valley

Research and capability

- Significant inroads in broadening First Nations Inclusion meaningfully and appropriately across project portfolio. This included:
 - * incorporating a specific First Nations and regional community aspirations component into *Project 4.9 National Pit Lakes Initiative* (underway). Caroline Williams was also embedded in the project team during 2023.
 - * Gunaikurnai Land and Waters Aboriginal Corporation joining *Project 1.7 Collaborative planning in the Latrobe Valley* (Stage 1). Stage 2 is being developed, with plans for a First Nations-led Indigenous Reference Panel.
 - * a specific module on Indigenous cultural values in addition to other critical information about First Nations partnerships as part of world-first *Mass Open Online Course on Foundations of Mine Closure and Sustainable Transitions*.
 - * provided Indigenous businesses with opportunities for input as part of research for the *Enabling mine closure and transitions: Opportunities for Australian industry* (Project 3.14) report.

Participatory frameworks

- Worked to support increased First Nations representation at events, including our own Annual Forums and the AusIMM Life of Mine Conference.
- First Nations VET Pathways project co-designed with Indigenous peoples and organisations during the period (case study on page 21).
- Working with several Pilbara Traditional Owners about the potential to support local priorities.

First Nations Inclusion Principles
Our First Nations Inclusion Principles – which recognise Indigenous Cultural and Intellectual Property (ICIP) and principles of the UN Declaration on the Rights of Indigenous People and the Nagoya Protocol) – are helping us progress implementing projects that are culturally aware.



Dr Tira Foran, Professor Fiona Haslam McKenzie, Dr Bryan Maybee, Professor Tom Measham, Caroline Williams, Zane Hughes and Dr Agnes Samper at our AusIMM Life of Mine booth in August 2023.



CRC TIME staff participating in cultural awareness training.



PHD STUDENTS

New PhD students

Savuti Henningsen



Program: Operational Solutions

Project topic: Restoring biodiverse, ecologically significant landscapes in the context of mining: overcoming seed dormancy

Partner organisation involvement: Alcoa, Kings Park Science

Savuti is a PhD student at The University of Western Australia, where she works in collaboration with Kings Park Science and Alcoa. Growing up in Botswana and moving to Perth in 2013, Savuti has been able to follow her passion and study environmental science. Currently, she is working on her thesis, 'Ecophysiology of seed dormancy and germination of Hibbertia to inform seed propagation for ecological restoration'. Her research aims to investigate the ecology of the Jarrah Forest Hibbertia and, from there, develop practical, scalable dormancy-break treatments for restoration.

Amberley Laverick



Program: Regional Economic Development

Project topic: How can the voices of Western Australian communities be captured and catalogued, to create a knowledge base for assisting optimal socio-economic transition away from mining?

Partner organisation involvement: N/A

Amberley is a PhD candidate at the University of Western Australia. Working with diverse stakeholders, including at-risk groups, non-profits, industry and the public sector, developed her interest in wider sociological issues such as power and agency. Her PhD research investigates how the voices of Western Australian communities, which will experience mine closure, can be captured and catalogued to create pathways away from mining.

Eve McCallum



Program: Operational Solutions

Project topic: Bioinformatics, focused on building workflows to analyse and interpret the role of microbial communities in restoration of mining sites

Partner organisation involvement: N/A

Eve is currently undertaking her studies at The University of Western Australia through the Centre for Engineering Innovation: Agriculture and Ecological Restoration and in collaboration with the Centre for Water and Spatial Science. Her project is under the umbrella of CRC TiME's Australian Seed Scaling Initiative and is in collaboration with Alcoa. Eve's research is looking to understand the formation and control of erosion in mine pit rehabilitation, with a focus on strip/contour mining operations.

Johan Wasserman



Program: Operational Solutions

Project topic: Dark diversity in the context of species pools and functional pools: patterns, processes, and applications

Partner organisation involvement: Iluka

Johan is a PhD student at the Harry Butler Institute, Murdoch University, where he is part of the Iluka Chair in Vegetation Science and Biogeography team. Johan's current research, 'Dark diversity in the context of species pools and functional pools: patterns, processes, and applications', applies the concepts of species pools and dark diversity as monitoring tools to inform post-mining vegetation restoration.

Fitsum S. Weldegiorgis



Program: Regional Economic Development

Project topic: Coal mining and regional economies in the energy transition context

Partner organisation involvement: Central Highlands Development Corporation

Specialising in socio-economic impacts; economic linkages and structural transformation, and resource governance, Fitsum has worked in his field for 15 years conducting applied and academic research in minerals and economic development. His research explores how Australia, and the resource-rich African countries, could leverage economic linkages of the extractive sector for economic transformation.

Rod Williams



Program: Operational Solutions

Project topic: Bioinformatics, focused on building workflows to analyse and interpret the role of microbial communities in the restoration of mining sites

Partner organisation involvement: N/A

Rod is a PhD Candidate at the School of Business, University of Queensland. He is a Bundjalung man (NSW) who has pursued a private sector career that extends across the industrial relations, financial, mining, small business, not for profit and university sectors. He is the Founding Director and Owner of Gonggan Consultancy Pty Ltd (1993) developing the Gonggan Business Model, which provides a cultural interface framework between western and Indigenous knowledge systems of the community, government and the private sector.

Consuelo Garcia Zavala



Program: Data Integration, Forecasting and Scale

Project topic: An approach to assess current and future ESG risks at regional scale for mining projects at different stages of the life of mine application to the lithium mining

Partner organisation involvement: N/A

Consuelo is studying for a Master of Environmental Management and holds a Bachelor's degree in Industrial Engineering and a Graduate Diploma in Project Management. Consuelo has six years' experience in socio-environmental management in the mining industry in Peru and Australia. Her work has been focused on environmental impact assessment, mine closure planning, assuring compliance of socio-environmental commitments, environmental monitoring and reporting, permitting for exploration and operation projects, community engagement, water management, and risk assessment.

Ongoing PhD students

Carolina Clerc Castro



Program: Regional Economic Development

Project topic: A holistic decision-making framework for water and energy resilience of remote communities in mine closure contexts

Partner organisation involvement: BHP

Carolina is a PhD student at the Sustainable Minerals Institute of the University of Queensland, where she works in collaboration with the Centre for Social Responsibility and the Centre for Water in the Minerals Industry. Supported by her environmental and energy background and multidisciplinary experience, Carolina is researching the integration of water and energy trade-offs to address the social impacts of mine closure in remote communities through sustainable strategies.

Ebony Cowan



Program: Operational Solutions

Project topic: Application of ecological resilience in mining rehabilitation practice and its regulation

Partner organisation involvement: Kings Park Science

Ebony is a PhD candidate at Murdoch University and Kings Park Science. She investigates the responses of post-mine rehabilitated banksia woodland communities, between the ages of 3 to 26 years, to fire and fire-related treatments. Ebony is passionate about promoting biodiverse environments and understanding the ability of rehabilitation to bounce back following disturbances.

Jake Eckersley



Program: Risk, Evaluation and Planning

Project topic: Multi-scale quantification of vegetation productivity-stream linkages across the Fortescue Basin

Partner organisation involvement: Rio Tinto, BHP, Fortescue and the Department of Biodiversity, Conservation and Attractions

Jake is a PhD candidate at the University of Western Australia. His work as a researcher and as a botanical consultant has focused on riverine ecosystems in Pilbara and understanding how changes to hydrology as a result of mining practices may alter ecological functioning. Jake is working to improve his understanding of litterfall, which is a major component of nutrient recycling in semi-arid environments.

Alex Hayes



Program: Operational Solutions

Project topic: Improving the understanding of Acid & Metalliferous Drainage (AMD) from active and legacy mine sites in Tasmania

Partner organisation involvement: MMG

Alex is a PhD student at Flinders University in South Australia. His PhD is focussed on improving the understanding of Acid & Metalliferous Drainage (AMD) from active and legacy mine sites in Tasmania. AMD is a widespread, evolving research problem with a significant environmental impact. It is imperative that we address the errors of our past, to secure the sustainability of our planet.

Babul Hossain

Program: Operational Solutions

Project topic: Repurposing mine site revegetation for carbon sequestration

Partner organisation involvement: Iluka

Babul is a PhD student at the University of Western Australia. Babul is exploring the potential value of utilising closed mine sites that have been revegetated, for carbon sequestration. The results of this project will benchmark the soil carbon sequestration potential of revegetated areas and monitor soil carbon dynamics; assess the effects of carbon storage on rehabilitated soil physical, chemical, and biological properties; and evaluate the effects of carbon storage on soil stability, soil salinity and microbial diversity and their potential impact on mine site rehabilitation success.

Maryham Kahe

Program: Operational Solutions

Project topic: Beneficial use of final voids for catchment-scale water management

Partner organisation involvement: N/A

Maryam is a PhD candidate at the University of Queensland where her research focuses on the beneficial use of final voids for catchment-scale water management. She constructs conceptual and numerical groundwater-pit lake models considering innovative approaches to representing the interface between pit lakes and groundwater systems.

Benedictor Kemanga

Program: Operational Solutions

Project topic: Future climate change impact on Pit Lake water balance

Partner organisation involvement: N/A

Benedictor is a PhD candidate at the University of Queensland where his research focusses on future climate change impacts on pit lake water balance. Understanding the pit lake mine water balance is critical for mine planning and operations as well as for post-closure regional sustainable development, where it is important to determine whether a pit lake may become a liability in future due to climate change impacts.

Bhavya Nalagampali Papudeshi

Program: Operational Solutions

Project topic: Bioinformatics, focused on building workflows to analyse and interpret the role of microbial communities in the restoration of mining sites

Partner organisation involvement: N/A

Bhavya is a PhD candidate at Flinders University, South Australia, where she works in Flinders Accelerator for Microbiome Exploration (FAME). Her research is in bioinformatics, focused on building workflows to analyse and interpret the role of microbial communities in the restoration of mining sites. Her work with CRC TiME will develop a bioinformatic pipeline to rapidly analyse the microbial communities, via metagenomic sequencing.

James Purtill



Program: Regional Economic Development

Project topic: More and better mine rehabilitation – combatting inertia and enabling innovation in Queensland’s coal mining industry

Partner organisation involvement: N/A

James is the Queensland Mine Rehabilitation Commissioner. He has held numerous Director-General roles in Queensland including with the Environmental Protection Agency and Department of Natural Resources, Mines and Energy. In his private sector career, James was General Manager Sustainability for an ASX-listed energy company, Managing Director of a mine rehabilitation and environmental management company, and Director of an Australian subsidiary of an environmental consulting firm.

Liz Wall



Program: Regional Economic Development

Project topic: Evaluating the mining industry’s view of their success in delivering a positive legacy for host communities at the time of mine closure

Partner organisation involvement: MRIWA

Liz is an independent consultant with more than 20 years of global experience assessing and addressing social and environmental impacts associated with large extractive sector projects in developing countries. She has also been a non-executive director for a number of mining companies. She believes that development requires a comprehension of the social, environmental and economic factors at play in every project.

Amelia Lee Zhi Yi



Program: Regional Economic Development

Project topic: Exploring integrated socio-technological approaches for adaptive land-uses in mining economies

Partner organisation involvement: Mining3

Amelia is a PhD student at the Sustainable Minerals Institute of the University of Queensland. As a multi-disciplinary environmental scientist trained in the USA, Japan and Austria, Amelia’s researching the socio-technical paradigms between community, government and corporate stakeholders in the evaluation and testing of innovative post-closure land-use options.



INVESTING IN EDUCATION AND TRAINING

During 2022–23, we made great steps towards one of our most important actions – increasing the availability of education and training in mine closure and transformations in mining economies.

Our program now includes:

- the Higher Research by Degree (HDR) Top-Up Scholarship scheme to help develop current and future executive talent. As of October 2023, we have 20 students within our program – almost halfway to our goal of 50 students
- a Mass Open Online Course on the edX platform to make quality, easily accessible information available
- the First Nations VET Pathways project
- a strategic review of education and training options.

- identifying a new work pathway to address the limited options for Aboriginal and Torres Strait Islander people about mine closure and transitions, which impacts the ability of communities to be active and equal partners in processes.

CRC TiME’s Mining College partners committed a portion of their allocated funds to projects. These are Alcoa, BHP, Hanson, Iluka, MMG, Newmont, OceanaGold, Rio Tinto, Roy Hill, EnergyAustralia, Fortescue and South32.

The process resulted in:

- contracting of the University of Queensland and Curtin University to develop a world-first Mass Open Online course. Users from across Australia will be able to access a free (40 hours) or assessed (60 hours) version of the course.
- contracting of Australian Mining and Automotive Skills Alliance (AUSMASA) to deliver a strategic education and training options review. The Minerals Council of Australia and Business Skills Viability are project participants.
- an Indigenous-led project, hosted by Curtin University, to understand community demand and needs for vocational education and training (VET) in mine closure and transitions. Going beyond supporting employment opportunities, its offerings could support land use negotiations and economic development. Currently, few VET modules cover mine closure.

What’s next?

- The first *Foundations of Mine Closure and Sustainable Transitions* MOOC began on October, 2023. It covers seven key topics over 10 weeks, including economics, finance, planning, environmental stewardship, Indigenous cultural values and community engagement. Importantly,

CASE STUDY

An open process leads to investment in diverse education and training projects

Despite being central to the mining lifecycle, education and training options to support professionals – especially those outside of the core discipline - to upskill are limited.

Additionally, there are few – if any – accessible education options for First Nations people and regional community members to learn about mine closure and transitions. Addressing this gap will assist First Nations and regional communities as they work with companies and governments on mine closure, making informed decisions that support positive outcomes.

Led by our Research Director, in late 2022, we called for Expressions of Interest for proposals to help address these needs. Benefits of the two-step approach included:

- encouraging a diversity of ideas to be presented for consideration
- allowing for feedback and further work to refine the final proposal

content can be added as new information becomes available.

- Community workshops to hear directly from First Nations people about what information they need will commence soon. The workshops will inform preparation of a proposal for the development of a suite of VET options that meet a range of community needs and align with forecast demand.
- Once complete, the strategic education and training review will provide the first assessment of current offerings, and gaps and opportunities. Findings will help to target future CRC TiME activities.

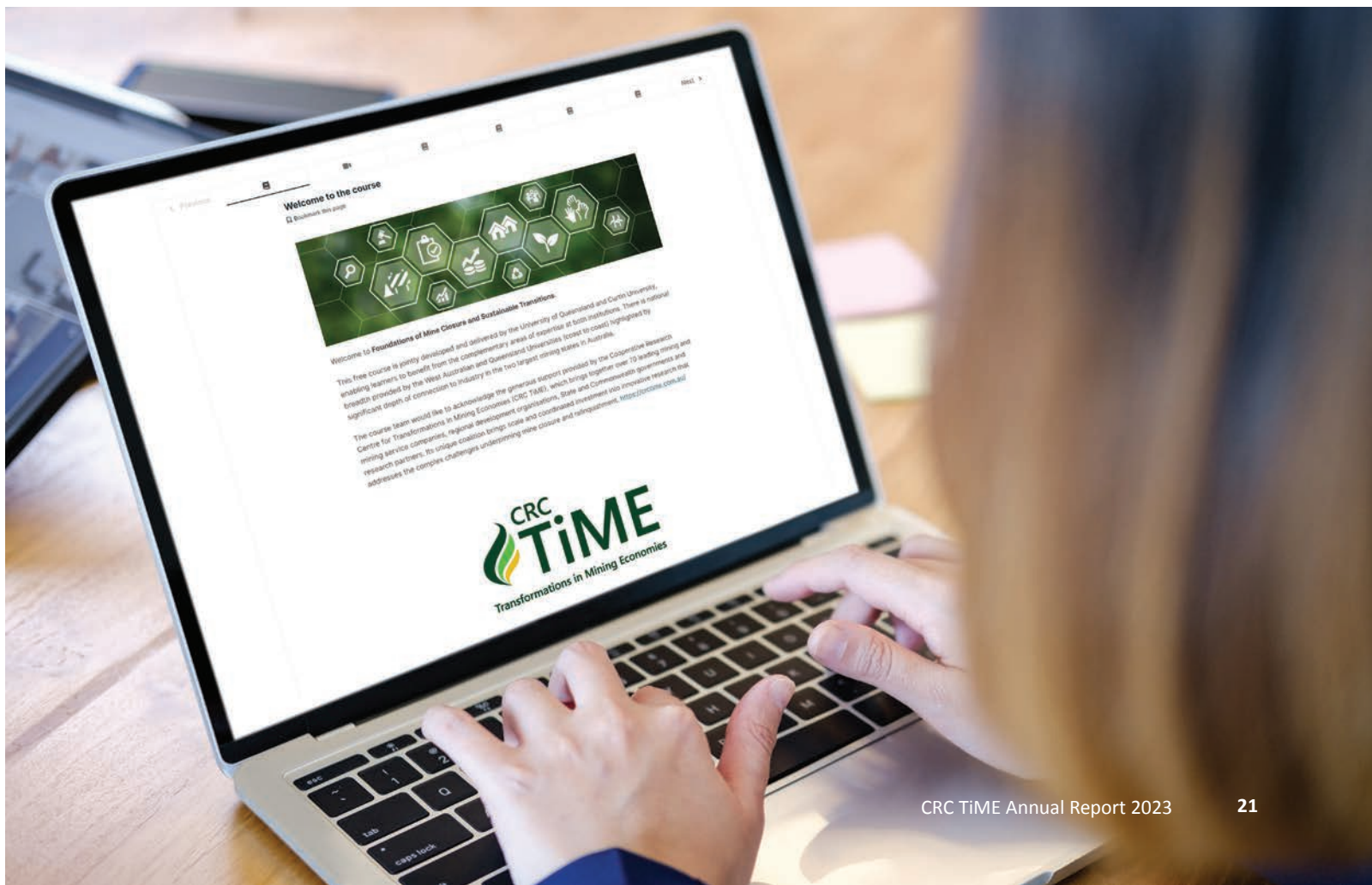
First Nations VET pathway

Guided by an Indigenous Steering Committee led by Zane Hughes, a Waanyi man with decades of resources industry experience, Stages 1 and 2 of the project involve:

- understanding what enables Aboriginal communities to participate, lead and benefit from mineclosure and post-mine transitions through a series of workshops
- undertaking a needs assessment of what skills are required, projected demand, gaps and opportunities and potential delivery options.

Future stages are expected to involve developing delivery and learning resources and submitting a proposal for accreditation of a nationally-recognised qualification or suite of units in mine closure (Certificate II, III, IV and possibly a Diploma).

The first Foundations of Mine Closure and Sustainable Transitions MOOC began on 23 October, 2023





RESEARCH DIRECTOR'S REPORT

Professor Tom Measham



Strategic research: building on strong foundations

Building on the success of the foundational research portfolio, CRC TiME continues to invest in a suite of strategic projects. A key highlight for the Research Office was to review all the reports from the foundational portfolio and distil key themes to guide the next phase of projects.

The first theme distilled focused on the **concept of transition**, noting our foundational projects revealed that there is limited recognition of transition and what it means in the context of mine closure. In response to this first theme, we progressed new projects including one focused on *future-proofing small communities* (Project 1.6) and one focused on a comparative of *mine closure guidance* (Project 1.9).

The second theme was on **values**, emphasising that the role of values is crucial in recognising economic, social, cultural and environmental dimensions. During the year, we progressed post-foundational projects including *reviewing the appropriateness of traditional NPV measures for closure provisioning* (Project 2.8) and taking a *systematic approach to regional cumulative effects to support transitions in mining economies* (Project 4.7).

The third theme that emerged from reviewing the outputs of the foundational research portfolio was that the key issues for biophysical research are **integration, scale and forecasting** to meet transition aspirations. Two examples of projects developed on this theme are an *evaluation of an ecosystem forecasting system* for rehabilitated arid landscapes (Project 4.8) and a project on *mine pit lake assessment and management*, recognising the need for an integrated approach to assessing pit lakes and their crucial role in post-mining economies (Project 4.9).

In addition to these three themes, we recognise the critical role of **enabling projects**, which support

system integration and facilitate wider access to information, and enable diverse input into planning processes. As such, we commissioned a suite of education and training projects including a *micro-credential course on the foundations of mine closure and transitions* (Project 5.4) that is available for all partners and stakeholders to access. In addition, we commissioned an innovative project focused on *First Nations vocational education and training pathways* (Project 5.6), an Indigenous-led project aimed at better aligning training options to the needs of diverse First Nations groups.

Expanded international reputation

CRC TiME's international reputation for collaborative research on transformations in mining economies grew substantially over the year. In May 2023, I was invited to join a cohort of global social science leaders in England and Poland for a series of workshops and site visits of the Global Steering Committee of the Coal Transitions Research Coordination Network. It became clear from engaging with this network that CRC TiME is seen as a leading model for undertaking research on post-mining transitions. In June 2023, we hosted a special symposium on closure and transition at the World Mining Congress. One of the highlights of this event was an all-Indigenous panel led by our First Nations Advisory Team Chair, Jim Walker, who focussed on Indigenous perspectives of sustainability and post-mining transition. We were also well represented by the CEO, Program Leaders and Project Leaders at the 2023 OECD Meeting of Mining Regions and Cities in Karratha. These events highlight the growing international reputation of CRC TiME as a leading provider of research on post-mining transitions.





HIGHLIGHTED ACTIVITY

Learning from Canada to support regional cumulative effects assessment lessons

Project 4.7:

A Systematic Approach to Regional Cumulative Effects Assessment to Support Transitions in Mining Economies (Stage 1)

Jointly led by Dr Renee Young, Western Australian Biodiversity Science Institute (WABSI) and Dr Jenny Pope, Murdoch University

Co-project leader, Dr Jenny Pope, spent a few weeks over May and June 2023 learning about different ways of assessing regional cumulative effects from Canadian colleagues.

Canada has a vast body of practice in regional cumulative effects assessments. The visit was important to support the Project's aim to demonstrate, through analysis of Australian and international case studies how RCEA in various forms can add value and lead to better regional-scale planning. It builds on Foundation Project 1.1, 'Towards a framework for regional cumulative impact assessment'.

Jenny's research included 28 interviews in nine cities around Canada as she travelled from Vancouver as far east as Ottawa and as far north as the Yellowknife in the North West Territories. She also attended the annual conference of the Indigenous Centre for Cumulative Effects (ICCE), an organisation that supports First Nations and other Indigenous groups to conduct cumulative effects assessments within their territories.

The interviews highlighted the emergence and growth of Indigenous-led cumulative assessments and the importance of integrating western approaches and traditional knowledge.

A number of challenges and enabling factors were identified for implementing cumulative assessments. An overarching lesson was the importance of having a clear purpose for assessments and ensuring that processes are aligned to that purpose.

On the way home, Jenny stopped in Canberra to conduct further interviews for Australian case studies. She participated in an EIANZ Impact Assessment Symposium panel on regional planning, contributing some project preliminary findings to the discussion of how regional planning might be better undertaken as part of the Nature Positive agenda.

The final report for Stage 1 is expected in the first half of 2024. Stage 2 is being developed, and expected to include development of an RCEA toolkit, including a decision tree. ■

Related projects

Project 1.1 Towards a framework for regional cumulative impact assessment (completed)

Project 1.8 Identifying future economic development pathways for mining regions and increasing transition capacity (underway)

Project 1.7 Collaborative planning for post-mining development in the Latrobe Valley (Stage 1) (underway)

Project 1.9 Mine closure guidance: review and comparative analysis (underway)



Dr Jenny Pope at the Indigenous Centre for Cumulative Effects conference in Canada.



 HIGHLIGHTED ACTIVITY

Bringing mine closure and transitions to the World Mining Congress

Drawing on his extensive experience and knowledge, Research Director Professor Tom Measham was invited to convene a Special Symposium on Mine Closure and Post-mining Transitions at the 2023 World Mining Congress in Brisbane in June.

A major event on the global mining calendar, the 2023 congress was the first time this event had been held in Australia. More than 2,500 attendees representing more than 1,000 organisations and 50 countries attended.

Tom's prestigious invitation meant mine closure and transitions – a fundamental part of the mining lifecycle – were brought to the forefront of WMC discussion. It also showcased the critical role of research in improving practice and outcomes.

Participants heard from experts and delegates from Canada, Finland, Ghana, India, Mongolia, Slovakia and the USA as well as Australia.

Each brought their own perspective, expertise and vision for the future through panel discussions and presentations, including case studies.

The opening panel focused on a First Nations perspective. Chaired by Jim Walker from CRC TiME's First Nations Advisory Team, the panel included Nalaine Morin from Skeena Resources, CRC TiME Board Director Vanessa Elliott, and Jonathan McLeod from the Northern Land Council.

Respecting timeframes was an overarching theme. Rushing exploration, development and approvals, and failing to adequately understand and consider First Nations concerns and aspirations, has led to substantial harm.

The risk of this re-occurring in the accelerated timelines to develop critical minerals appears

substantially overlooked, with the current focus on meeting global resources needs.

Described as a 'Congress highlight', the Symposium brought together the Environmental Sustainability, Social Performance and Governance streams.

Additionally, CRC TiME Board Director Professor David Brereton co-chaired the WMC Social Performance and Governance stream. And, inaugural CRC TiME Research Director Professor Anna Littleboy also chaired the WMC Environment and Sustainability stream. ■



World Mining Congress Symposium panel, June 2023.





HIGHLIGHTED ACTIVITY

Critical minerals: Developing knowledge, tools and resources to begin with the end in mind

The enormous economic opportunity for Australia associated with increasing global demand for critical minerals is well-documented.

At the same time, the scale and speed of likely development presents social, economic, environmental and governance challenges, particularly at regional scale.

And, while many mines extend over decades or even generations, all mines are based on finite resources. Even planned or expected closures create significant closures. Further changes associated with commodity price and other fluctuations can also cause flow-on effects.

During 2023, CRC TiME has sought to highlight one of the most important lessons from the development of Australia's traditional resources.

That is, the need to plan and act across a mine's life for what happens after mining ends.

This goes beyond environmental and rehabilitation planning to consider how to leverage economic and social gains over a mine's life, for long-term wellbeing, prosperity and resilience.

Practical tools and resources

Different parties have different roles, responsibilities and capacity to support transitions.

Our research and impact portfolio will provide a suite of knowledge, tools and resources that can equip regional and First Nations organisations, as well as industry, business, government and non-government organisations, to collaborate, make informed decisions and maximise benefits.

CRC TiME funded projects will assist by:

- **Providing case studies and tools to help understand, manage and monitor regional cumulative effects.** This includes learning from Canada about the role and opportunities for Indigenous-led assessments in Australia (Project 4.7).
- **Making free or cost-effective, quality and easily accessible education available to all** by commissioning a world-first Mass Open Online Course on Mine Closure and Sustainable Transitions.

- **Supporting an Indigenous-led project to understand the information First Nations people and communities need to make decisions**, protect country and ensure economic and social benefit during mine closure and transitions, with a view to developing a nationally-accredited training suite.
- **Supporting strategic decision-making** by regional and government organisations by developing new frameworks, tools and resources to support long-term resilience planning (Project 1.8).



Dr Rebecca Rey, CRC TiME Communications Manager and Professor Fiona Haslam McKenzie, Program Leader – Regional Economic Development, in Karratha in October 2023.

Related projects

Project 1.6 Future-proofing a small local government authority against the impacts of the mining boom and bust cycle (underway)

Project 1.8 Identifying future economic development pathways for mining regions and increasing transition capacity (underway)

Project 1.9 Mine closure guidance: review and comparative analysis (underway)

Project 3.1 Opportunities for growth in Australia's mine closure solutions industry (complete)

Project 4.7 A systematic approach to Regional Cumulative Effects Assessment (RCEA) (Stage 1 underway)

Education and training: Mass Open Online Course on the Foundations of Mine Closure and Sustainable Transitions & First Nations VET Pathway (underway)



HIGHLIGHTED PROJECT

Dr Rebecca Jordan at work in the field.

Planting to test the effectiveness of climate-adapted seed sourcing strategies

Project 4.6:

Evidence for effective climate-adapted seed sourcing strategies

Led by Dr Rebecca Jordan from CSIRO

Project Partners

- BHP
 - Murdoch University
 - Flinders University
 - Department of Biodiversity Conservation and Attractions
 - Australian Genome Research Facility Limited
 - Hanson Australia
 - Newmont
 - Revegetation Industry Association of Western Australia
 - Ecoplant Australia
 - Anglo American
 - CSIRO
-

This project will provide evidence for climate-adapted seed-sourcing strategies through a network of experiments at five mine sites. These experiments will enable direct comparisons of traditional local versus alternative climate-adapted seed-sourcing approaches.

The study is world-leading, among the first globally to empirically test the effectiveness of alternative seed-sourcing strategies in the field.

Since commencing in September 2022, the project has focussed on the large amount of preparation work required to establish these plantings, including seed sourcing, growing seedlings, site preparation and establishing a common experiment design for the whole network.

Between July and September 2023, the project witnessed the exciting achievement of two of the five experimental sites being planted out (Boddington WA in July, South Australia in August).

Field experiments bring challenges of factors that cannot be controlled. This includes variation in seed availability and seedling growth as well as rainfall and weeds across the sites. The project is actively managing these to achieve our goal of five experimental sites. For example, plantings at Boddington (WA) and the Bowen Basin (Qld) involve a two-stage planting, with some species planted this year and additional species next year when seed becomes available. In the Pilbara, some plots will be irrigated to mitigate rainfall variability. Watch this space. ■

“This project is an exciting opportunity to test different revegetation strategies in practice. One challenge for revegetation in a changing world is understanding how to create plantings that will be resilient now but also in 10, 50, or 100 years, when conditions may be quite different. This project works to create real-world data that contributes to achieving this goal of long-term revegetation success.”

Dr Rebecca Jordan, CSIRO

Related projects

Project 2.7: Natural Capital Accounting (NCA) in the mining sector (underway)

Project 3.13: Australian Seed Scaling Initiative (underway)

Project 3.9: Climate change, vegetation & risk for rehabilitation success (underway)

Project 3.14: Opportunities for growth in Australia’s mine closure solutions industry (underway)

Project 4.8: Evaluation of an ecosystem forecasting system for rehabilitated arid landscapes (underway)



Planting out seedlings in Tasmania.

EXTERNAL RELATIONS AND IMPACT DIRECTOR'S REPORT

Jillian D'Urso



Sharing what we have learned

During 2022–23, it was important to distil, contextualise and share key findings, case studies and resources from CRC TiME's landmark Foundational Project Portfolio.

To do so, we developed an engaging suite of clear, accessible resources and activities. These included:

- establishing a new quarterly Partner Update, providing a short, sharp CRC TiME update
- 16 fact sheets summarising foundation projects
- identifying and extracting case studies, diagrams and tools to create standalone resources
- publishing open access research journal articles and reports on our website
- recommending our successful Dig Deeper research communication webinars.

We also coordinated tailored briefings for government agencies, regional development organisations and other groups, and delivered presentations at target conferences and events.

Facilitating connections

Stakeholder engagement is a key feature of CRC TiME projects with the External Relations and Impact team helping to support activities where needed. Highlights during 2022–23 included supporting the *Opportunities for Growth in Australia's Mine Closure Solutions Industry* (Project 3.14) to facilitate diverse input, informing development of projects on regional cumulative effects assessments, mine closure guidance and education and training.

Strengthening engagement

During the first half of 2023, we began adjusting our regional engagement approach to reflect the next phase of CRC TiME's life. This occurred alongside expansion of our team to include a new Regional Engagement Lead.

Important changes included retiring the term 'Hubs' and prioritising targeted local engagement as well as facilitating connections between regions. This change allowed us to focus on our successful pilot project Cross-regional Knowledge Exchange in Mackay and Moranbah in July 2023 and plan for our second in-person Annual Forum in the Latrobe Valley in November.

Striving for First Nations Inclusion

While all CRC TiME staff are responsible for First Nations Inclusion, our team plays an additional role in providing advice and support. Highlights included:

- providing secretariat support for the First Nations Advisory Team, which held four meetings during the period.
- being part of the Mine Pit Lake Assessment and Management team (Project 4.9), working to facilitate connections with First Nations organisations, build shared understanding, and support recruitment of an Aboriginal Liaison Officer.
- supporting co-design of the First Nations VET Pathways project.
- developing tailored information about CRC TiME for First Nations organisations.
- engaging with Traditional Owner representatives and Indigenous organisations from the Pilbara, Bowen Basin and the Latrobe Valley.
- commencing mapping of First Nations Inclusion across our project portfolio to provide advice on gaps, opportunities and leading practice.

Positioning for the future

We held workshops with our METS, Mining, Government and Communities & Regions Colleges in May to understand what has changed, and what this means for them and CRC TiME's program. The process identified key considerations such as:

- the importance of supporting 'transitioning into' critical minerals development as well as mine closure and transitions
- recognition of the criticality of including diverse Indigenous voices, experiences and priorities
- the opportunity to develop a national framework for mine closure and transitions to guide leading practice.

In addition to informing our current work, these insights will shape and inform a refresh of CRC TiME's strategy and other plans in 2024.

Working across Australia

Listening, learning, sharing and collaborating with people and organisations across Australia is important to ensure our work is relevant, meaningful, impactful and sustainable. To support this:

- In August, Research Director Tom Measham visited the Bowen Basin as a guest of Isaac Regional Council
- In February, the CRC TiME team visited southwest Western Australia, including meeting with the South West Development Commission
- In April, our CEO Dr Guy Boggs joined the Peel Regional Growth & Major Projects conference
- In May, External Relations and Impact Director Jillian D'Urso and Engagement Manager (First Nations) Caroline Williams visited the Latrobe Valley
- In May, Guy visited Kununurra as a guest of Gelganyem Limited
- In June, the CRC TiME Board was fortunate to visit the Rum Jungle, a former uranium mine in the Northern Territory. While there, the Board learned about the expected 15-year rehabilitation project to restore environmental and cultural values
- In June, Guy, Program Lead Professor Fiona Haslam McKenzie and Caroline Williams visited Karratha, meeting with partners and stakeholders alongside the OECD Meeting of Mining Cities and Regions.



HIGHLIGHTED ACTIVITY

Pilot regional knowledge exchange in the Bowen Basin

Our partners have told us one of the most valuable aspects of CRC TiME is being able to connect, learn and collaborate across regions, sectors and interests. To further support this, we piloted a cross-regional knowledge exchange in July 2023. A knowledge exchange is a process of bringing together people to share ideas, knowledge and experience for shared benefit.

The goal was to connect people from regions that are or will experience a transition away from thermal coal mining over time. The Bowen Basin was chosen as the location as CRC TiME partners will visit the Latrobe Valley for our 2023 Annual Forum.

Five delegates from Collie, Western Australia, the Latrobe Valley, Victoria and Brisbane, Queensland joined CRC TiME's Professor Tom Measham and Rae Young in Mackay and Moranbah. Ohio University's Professor Jeffrey Jacquet – in Australia as a guest of CRC TiME, and an expert in transitions in coal regions – also joined the delegation.

On day one delegates toured the Mackay Resources Centre of Excellence and participated in a virtual regional roundtable chaired by Research Director Professor Tom Measham. Panellists included experts from the Greater Whitsunday Alliance, Central Highlands Development Corporation, Isaac Regional Council, and Ohio State University. 20 attendees joined in person and 37 stakeholders dialled in from around the country to hear about the region's economic diversification and vision for the future.

On day two in Moranbah, delegates toured the town to view mining camps and the Moranbah Miner's Memorial, then a visit to the Isaac Regional Council

Offices to hear from the Council's Mayor and the Barada Barna Aboriginal Corporation. The day concluded with a site visit to Stanmore's Isaac Plains Complex for a presentation on rehabilitation.

The group came away with new connections, and a stronger understanding of the cultural, social, economic and environmental dimensions of coal transitions nationally and globally. The key message that came through many times over the two days was: collaboration is the key.

There is strong interest for future regional knowledge exchanges. These multi-day group events are founded on authentic connections, deep and honest conversations, and quality time spent in regions. Stay tuned for more in 2024.

Related projects

Project 1.7 Collaborative planning for post-mining development in the Latrobe Valley (Stage 1) (underway)

Project 1.8 Identifying future economic development pathways for mining regions and increasing transition capacity (underway)

Project 3.14 Opportunities for growth in Australia's mine closure solutions industry (underway)

Project 4.7 A systematic approach to regional cumulative effects assessment (underway)



Above and below: Delegates at our pilot Cross-regional Knowledge Exchange in July, 2023.





HIGHLIGHTED PROJECT

Lessons from a small regional community's work to future-proof against commodity cycles

Project 1.6:

Future-proofing a small local government authority against the impacts of the mining boom and bust cycle (completed)

Project leader: Regional Economic Development Program Leader
Professor Haslam McKenzie

Project Partners

- Shire of Coolgardie
 - Ausralian Venture Consultants
-

Understanding how local governments can diversify their economy to support long-term resilience can help enable better outcomes for communities.

In 2022–23, Professor Haslam McKenzie sought to understand the steps the Shire of Coolgardie has taken to ensure a self-directed and strong future. Working with the local government, Fiona noted the tenacity of the local population and the Shire's keenness to drive its own future. She interviewed Shire councillors and senior management, local businesses, rate payers and organisations, and conducted site visits to review future-proofing strategies.

As the location of the first Western Australia gold rush, mining has underpinned the regional economy for over 130 years. Yet, the size of the population has declined substantially over time to just 3,478 people by the 2021 census.

Facing significant financial challenges, the Shire developed a suite of strategic projects that addressed the issues of mining revenue dependency by leveraging investments in local infrastructure and generating revenue from these activities.

Several of the Shire's solutions to seek new paths of revenue include building their own transit worker accommodation, bringing Kambalda airport up to compliance and increasing use, converting an abandoned mining void to a sophisticated waste management facility, and facilitating small businesses to broker arrangements with mining companies and support services.

The success of these initiatives depends upon strong and consistent leadership and local confidence in their leadership. A thorough orientation and training of elected members regarding the purpose and operationalisation of the own-source revenue strategy was also key. Another factor for success was the ability to secure contractual commitments from clients to underwrite initial investments.

The strong relationships fostered with Coolgardie locals is evident by the feedback from the President of the Shire of Coolgardie, Malcolm Cullen: “Back in early 2022, the Shire agreed to partner with CRC TiME to better understand and document the journey the Shire has been on to secure its future. The learnings from the CRC TiME project, we hope, will assist other Local Governments throughout Australia and globally to be courageous, innovative, forward thinking, and take an “open for business” approach. The Shire is thankful to CRC TiME for taking an interest in our journey.”

Related projects

Project 1.8 Identifying future economic development pathways for mining regions and increasing transition capacity (underway)

Collaborative project: Navigating the regulatory framework impacting the economic transformation of mine affected capacity (underway)



THE YEAR AHEAD

Refreshing our strategy and plans

By design, our vision, mission and goals are bold and ambitious.

This reflects both the complexity and importance of our shared challenge as well as the scale of potential benefits associated with rethinking mine closure and transitions.

Our 2021-2024 Strategic Plan, Research Prioritisation Plan and Impact Framework have guided our decisions over the past three years. Together, they represent the collective knowledge of our diverse partnership to provide a considered, focussed and clear pathway to impact.

Underpinning this are our Commonwealth Milestones. These are our commitments we made to the Australian Government to deliver research and innovation in return for its support.

And, in October 2022, we added our First Nations Inclusion Strategy to this suite. It sets out our approach, defines measures of success and provides accountability as we strive to support the aspirations of partner First Nations organisations and groups.

As we come to the end of a three-year cycle, it will be time in 2024 to review and refresh our strategic suite.

Led by the CRC TiME Board, this process will involve:

- reflecting on progress to date
- seeking input and feedback from across our diverse partnership and broader stakeholder network
- further understanding what such a substantially changed context means for our purpose and work, including how to leverage new investments, policies and commitments
- helping to sharpen our focus on the research areas, engagement and impact activities that can best drive transformative change
- refreshing our priorities, objectives and approach where necessary.

Investments, focus and partnerships during our next phase are crucially important, and will set the course for CRC TiME's legacy.



CRC TiME Board and management at the NT Government Batchelor site receiving a briefing from Jackie Hartnett about the Rum Jungle mine rehabilitation project.



CRC TiME Annual Forum 2022, in Perth.



University of Queensland Lighthouse Project Development Workshop participants.

JOIN US

‘Cooperative’
is more than
just a title.

It’s how we work and what enables us to research some of the most challenging and complex mine closure and transition challenges.

If you share our
vision, join us.

crctime.com.au



OUR PARTNERS

We bring together a unique consortium of mining companies, technology and service suppliers (METS), state and local governments, regional and community representative bodies and research institutions.

Consultation and collaboration underpins every stage of research from project scoping, investment decisions and research delivery, through to uptake and adoption.

Thank you to our partner organisations for supporting our work.





OUR BOARD

Dr Bruce Kelley: **Independent Chair**



As the former Global Head of Environment for Rio Tinto, Bruce is a respected global authority in his field and is involved with numerous industry and university working groups, panels and Advisory Boards. Bruce has a PhD in Agricultural Biochemistry and has worked extensively in the field of bioremediation, leading the development of bioremediation technology and site remediation at treatment facilities in various iron ore, coal and aluminium smelting operations.

Dr Paul Vogel: **Deputy Chair (represents the Government College)**



With a PhD in chemistry, Paul has extensive knowledge and experience across a broad range of environmental and sustainability issues, organisational and regulatory reform and the delivery of strategic environmental and business outcomes. Paul is the current chairperson of the Northern Territory Environmental Protection Authority and chairperson of the National Cooperative Research Centre on Contamination and Remediation of the Environment.

Professor Christine Charles: **Non-Executive Director (represents the Regions and Communities College)**



Christine is an independent chair and director in mining and energy and has held a variety of senior positions with non-governmental organisations, the community sector, academia and in both the private and public sectors. Christine currently chairs the SMI'S Centre for Social Responsibility in Mining (CSRSM) Advisory Board at the University of Queensland. She is also a member of the CSIRO resource Sector Advisory Council and Chair of the South Australian Government's Resources and Engineering Skills Alliance (RESA).

Tony van Merwyk: **Non-Executive Director (represents the METS College)**



As a former partner of Herbert Smith Freehills, Tony has been involved with all aspects of environment, planning and hospitality law. He was a key development approvals advisor to many of the projects that fuelled the WA mining, oil and gas boom. And he's held a range of industry and government positions including Director of Greening Australia (WA), Member of the Marine Parks and Reserves Authority, Member of the Advisory Council to the EPA, Councillor of the Urban Development Institute (WA), Board Member of Surfing WA, and member of the environment committees for the Mineral Council of Australia, the Chamber of Minerals and Energy, and the Association of Mining and Exploration Companies.

Vanessa Elliott: Non-Executive Director (represents the First Nations College)



Vanessa is a Jaru woman from the Kimberley region of Western Australia with more than 20 years' experience working in strategic leadership roles across economic development, community services, regional and remote project management, town planning, headworks, energy, mining and service commissioning. Vanessa has worked on some of the major project developments in Australia across the resource industry, regional development and town planning, specialising in project lifecycle – land access, regulatory approvals, social performance, local content and diversity and inclusion.

Gavin Price: Non-Executive Director (represents the Mining College)



Gavin is Head of Environment for BHP's Minerals Australia Regions. He has worked across the minerals and processing sectors for over 30 years and has strong operational experience in research science application in industry. Specialising in environmental science, Gavin has worked on numerous major mine closures including managing the decommissioning and remediation of sites for RGC (now Iluka), incorporating both radioactive and contaminated sites, and established the first program with the local community toward long-term closure.

Emeritus Professor David Brereton: Non-Executive Director (represents the Research College)



As Deputy Director of the Sustainable Minerals Institute, David had responsibility for driving cross-disciplinary research addressing technical, environmental and social dimensions of mining and sustainability. He also led the University of Queensland's Centre for Social Responsibility in Mining as it became a leading global centre for applied research and professional education relating to social performance management in the mining and minerals sector.



FIRST NATIONS ADVISORY TEAM

Jim Walker: Chair, First Nations Advisory Team



Jim Walker is an Aboriginal man of the Yiman and Goreng Goreng First Nations peoples of Australia. He is a lecturer within the School of Earth and Environmental Sciences within the Faculty of Science at the University of Queensland. He is also a member of the Science Advisory Committee of Earthwatch Australia and Bush Blitz, Chair of the Murri Mura Aboriginal Corporation and Board of Advice member of the Queensland Aboriginal and Torres Strait Islander Foundation.

Bep Uink: Committee Member, First Nations Advisory Team



Bep Uink (Master of Applied Psychology (Clinical), PhD) is a Noongar woman from Perth, WA. She is a Senior Research Fellow at Kulbardi Aboriginal Centre, Murdoch University, where she co-leads the Aboriginal Culture, Education and Equity (ACEE) Lab. Her research focuses on understanding how socially determined disadvantage impacts the social emotional wellbeing of young people, both Indigenous and non-Indigenous, and how social systems such as higher education can support young peoples' wellbeing.

John Briggs: Committee Member, First Nations Advisory Team



John is a proud Yorta Yorta man from Cummrugunja, part of the Barmah Forest on the Murray River border region between Victoria and New South Wales. John's industry experience is a national portfolio of achievement in the construction and resources sector, where he has spent a large portion of his career, growing Aboriginal people and capability. His leadership and knowledge is widely recognised and he participates on a number of Boards and committees.

Christian Miller-Sabbioni: Committee Member, First Nations Advisory Team



Christian Miller-Sabbioni is a research assistant for ARC Centre Healing Country based at Curtin University. He works at the knowledge interface and is interested in the theoretical components of traditional cultural and modern scientific approaches to restoration and conservation. He is in his third year of a BA majoring in Philosophy, Political Science and International Relations at UWA.

Liz Santo: Committee Member, First Nations Advisory Team

Liz Santo is a proud Gudjala/ Waanyi women from northwest Queensland and to the banks of the Lawn Hill Gorge where her grandmothers were born. Liz has a background in Native Title, Commonwealth Government-Indigenous Business procurement. She has represented Indigenous Businesses in resource, private and government sectors on a global platform. Liz is a proud business owner in a consultant and civil construction company, and is passionate about Indigenous business growth and development with long term sustainable futures to enhance economic participation of Indigenous enterprises, communities, and people.

Gerry Turpin: Committee Member, First Nations Advisory Team

Gerry Turpin is an Mbabaram Traditional Owner from north Queensland with familial links to Wadjanbarra Yidinjii, Nadjon and Kuku Thaypan. He is an Indigenous Ethnobotanist with the Australian Tropical Herbarium, Department of Science (DES) and has been employed by the state government for about 30 years. As an Indigenous ethnobotanist, Gerry has a strong cultural commitment to facilitating effective partnerships that support Indigenous communities to protect, manage and maintain their cultural knowledge on the use of plants.



RESEARCH AND IMPACT COMMITTEES

Impact Committee

- Adjunct Professor Christine Charles, CRC TiME Board (Chair)
- Jordy Bowman, Bowman Advisory
- Vanessa Elliott, CRC TiME Director
- Terry Hill, Pilbara Development Commission, Department of Primary Industries and Regional Development
- Dr Bruce Kelley, CRC TiME Board
- Gavin Price, CRC TiME Board

Research Committee

- Professor David Brereton, CRC TiME Board (Chair)
- Professor Andrew Beer, University of South Australia
- Adjunct Professor Christine Charles, CRC TiME Board
- Ben Forsyth, 3RZ Contracting
- Dr Bruce Kelley, CRC TiME Board
- Professor Stephen van Leeuwen, Curtin University
- Professor Rae Mackay, Mine Land Rehabilitation Authority
- Melanie Stutsel, Rio Tinto

Audit and Risk Committee

- Tony van Merwyk, CRC TiME Board (Chair)
- Dr Paul Vogel, CRC TiME Board
- Vanessa Elliott, CRC TiME Board
- Irene Costello, Chamber of Minerals and Energy Western Australia

Nominations and Remunerations Committee

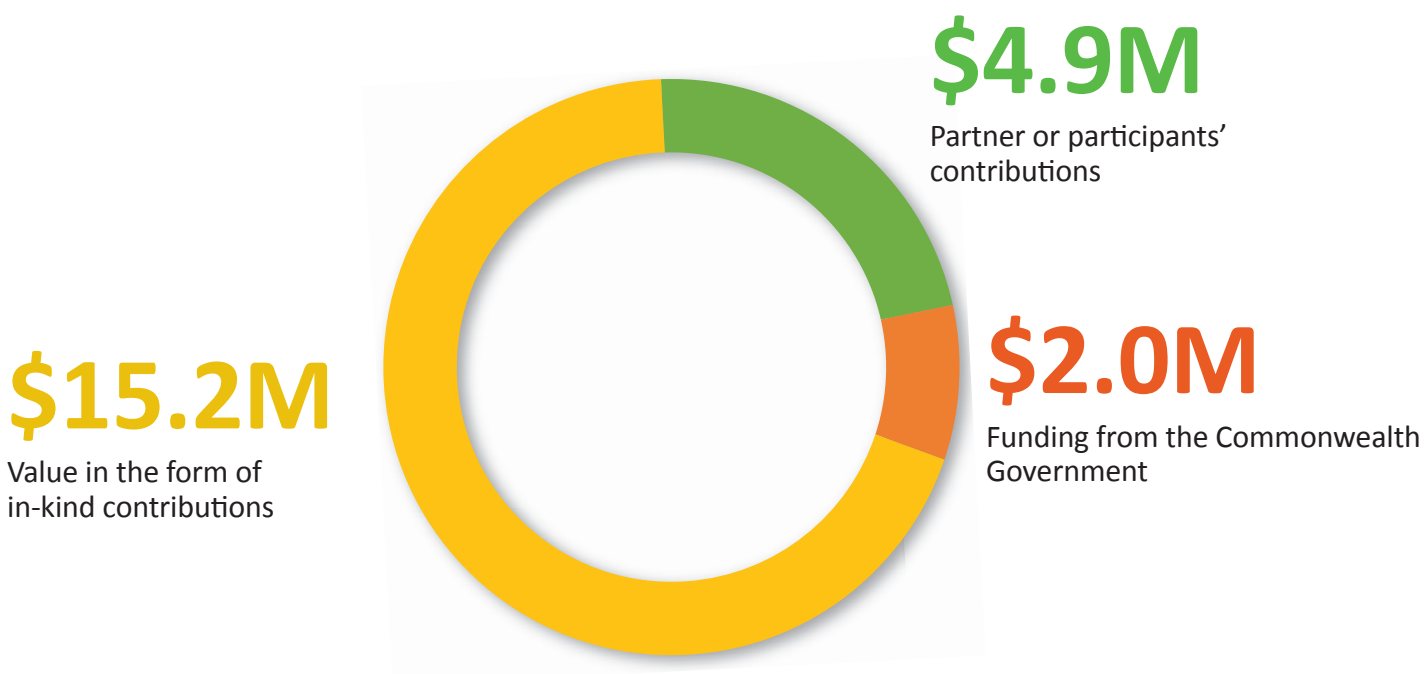
- Paul Vogel, CRC TiME Board (Chair)
- Bruce Kelley, CRC TiME Board
- Christine Charles, CRC TiME Board

FUNDING

2022–2023 Financial Year

CRC TiME continues to receive financial and in-kind support as committed by our partners.

In the 2022/2023 financial year, the following funding was received:



At the end of the 2022/2023 financial year, CRC TiME is well-positioned to fund upcoming programs and commitments, with cash on hand of \$12 million.

During the year, CRC TiME further developed its position as a valued project delivery agent. Since the CRC TiME commenced, we have attracted \$3.1 million of new funding into projects.

Please note these figures are for illustrative purposes. The full audited financial statements for 2022/2023 are available at crctime.com.au.

2022–2023 PROJECTS

RESEARCH PROGRAM	PROJECT ID	PROJECT TITLE	PROJECT PARTNERS
Regional Economic Development	1.6	Future proofing a small community from the impacts of the mine lifecycle	Shire of Coolgardie
	1.7	Collaborative planning for post-mining development in the Latrobe Valley (Stage 1)	Federation University; CSIRO; Department of Energy, Environment and Climate Action (Victoria); Energy Australia; University of SA; Gunaikurnai Land and Waters Aboriginal Corporation; Hazelwood Power (Engie); Latrobe City Council; Latrobe Valley Authority; Loy Yang B; Mine Land Rehabilitation Authority (Vic); GHD
	1.8	Identifying future economic development pathways for mining regions and increasing transition capacity	CSIRO; BHP; Geoscience Australia; Rio Tinto; University of WA; Greater Whitsunday Alliance (GW3); Isaac Regional Council; MMG; University of Queensland; WA Development Commissions; Central Highlands Development Corporation
Risk, Evaluation and Planning	2.4	Quantifying risks and opportunities from mine closure	University of Queensland; CSIRO; Federation University; Quantified Strategies.
	2.7	Natural Capital Accounting in the mining sector (includes multiple projects)	Curtin University; Murdoch University; University of SA; Alcoa; BHP; Hanson; Syrinx Environmental, CSIRO
	2.8	Reviewing the appropriateness of traditional NPV measures for closure provisioning: A survey of the literature	Curtin University; Mine Land Rehabilitation Authority (Vic)
Operational Solutions	3.10	Improved prediction, remediation and closure of acid and neutral metalliferous drainage (AMD/ NMD) sites by examination of mine waste behaviour at the meso-scale	Flinders University; Australian Genome Research Facility; BHP; Fortescue; Minerals Research Institute of Western Australia; MMG; Newmont; Okane Consultants; Rio Tinto; University of Queensland; University of WA; Blue Minerals Consultancy; Teck; University of Windsor (Canada); Department for Energy and Mining (SA); Department of Climate Change, Energy, the Environment and Water; Department of Water and Environmental Regulation (WA)

RESEARCH ACTIVITIES INCLUDE:	COMMONWEALTH OUTPUTS	PROJECT TIMEFRAME
<ul style="list-style-type: none"> Analyse data and information already available Review alternative income-generating initiatives 	1.1 Roadmap for co-developed relinquishment policy 1.2 Decision tools for regional planning of post-mine uses 1.3 Frameworks, tools and capacity building to enable shared vision development	2022–2023 (completed)
<ul style="list-style-type: none"> Review and synthesise previously discussed post-mine development options Identify institutional arrangements required to implement different options Assess options feasibility as perceived by stakeholders 	1.3 Frameworks, tools and capacity building to enable shared vision development	To be completed early 2024 with Stage 2 proposed to follow
<ul style="list-style-type: none"> Develop an analytical framework to support the identification of transition capacity drivers and regional resilience components Create stakeholder-based construction of potential future development scenarios 	1.3 Frameworks, tools and capacity building to enable shared vision development	2023–2025
<ul style="list-style-type: none"> Produce a document outlining relevant nomenclature Develop the prototype model based on a selected case study Run the model and analyse results Compile all results in final deliverables 	2.1 Advanced evaluation framework for long-life assets 2.2 Real time predictive models 2.3 Planning tools to identify transferrable residual risk 3.1 Smart architecture for closure design	2022–2023 (completed)
<ul style="list-style-type: none"> Develop industry guidance Develop a business case for creating and using an NCA framework Develop case studies Conduct gap analysis to understand where further research is needed 	2.1 Advanced evaluation framework for long-life assets; 2.2 Real time predictive models 2.3 Planning tools to identify transferrable residual risk	2022 to Dec 2023
<ul style="list-style-type: none"> Conduct literature review on traditional ways that NPVs are calculated Develop a decision metric on the pros and cons of NPV Summarise research findings and make recommendations for moving forward 	2.1 Advanced evaluation framework for long-life assets; 2.3 Planning tools to identify transferrable residual risk	2023
<ul style="list-style-type: none"> Monitor baseline meso-scale studies Conduct microbial and mineralogical characterisation Make assessment Improved testing strategies for better predictive capability Disseminate information, training, and improve awareness 	3.1 Smart architecture for closure design	2022–2027

RESEARCH PROGRAM	PROJECT ID	PROJECT TITLE	PROJECT PARTNERS
Operational Solutions	3.12	Long-term performance of 'store and release' cover system and slope treatment on potentially acid forming (PAF) waste rock dumps at Kidston Gold Mine, Queensland	University of Queensland; Kidston Hydro; Highland Environmental
	3.13	Australian seed scaling initiative: Large-scale deployment of diverse, enhanced seed mixes using customised precision seeding technologies	University of WA; Alcoa; Department of Biodiversity Conservation and Attractions (WA); BHP; Peel-Harvey Catchment Council; Rangelands NRM (WA); Rio Tinto; WA Development Commissions
	3.14	METS Mine Closure Roadmap – scoping study	CSIRO; Department of Energy, Environment and Climate Action (Victoria); Intract; METS Ignited; Queensland Department of State Development; University of Queensland
	3.16	Revegetating iron-ore mine waste using a novel eco-engineering pioneer plant-microbe system	University of WA; Fortescue
	3.17	Opportunities for growth in Australia's mine closure solutions industry	CSIRO; Deswik; Ecocene; Ecoplant; Fortescue; GHD; K2Fly; Landloch; Minerals Research Institute of Western Australia; Okane Consultants; Sustainable Solutions Global; Department of State Growth (Tasmania); EnviroMETS Qld; Intract; METS Ignited; Queensland Department of State Development (Qld); University of Queensland

RESEARCH ACTIVITIES INCLUDE:	COMMONWEALTH OUTPUTS	PROJECT TIMEFRAME
<ul style="list-style-type: none"> • Improve understanding of the long-term performance of store and release covers in reducing residual AMD risks at closure • Improve design criteria • Improve understanding of the slope treatment applied 	2.3 Planning tools to identify transferrable residual risk 3.1 Smart architecture for closure design 3.2 Prototype risk management technologies for successful post-mine futures 3.4 Training for integrating post-closure outcomes into the workforce	2022–2023 (completed)
<ul style="list-style-type: none"> • Demonstrate applicability of precision seeding machines in a variety of rehabilitation sites • Further develop understanding of optimal seed treatments and methodologies for problematic species 	3.2 Prototype risk management technologies for successful post-mine futures 3.4 Training for integrating post-closure outcomes into the workforce	2022–2025
<ul style="list-style-type: none"> • Define and scope the challenges to be explored in the roadmap • Development of an engagement and impact plan • Hold industry surveys and workshops • Conduct preliminary economic analysis 	3.3 Business solutions for supply chain development	2022
<ul style="list-style-type: none"> • Hold site investigations of mined waste, tailings issues, and local plant communities • Conduct laboratory and glasshouse experiments, followed by experiments using a rain-out facility and field trials under mine site conditions • Conduct literature review, followed by lab incubations and plant bio-assay glasshouse experiments 	3.2 Prototype risk management technologies for successful post-mine futures	2023–2024
<ul style="list-style-type: none"> • Identify growth opportunities for MCS businesses that deliver economic or social value, including for First Nations businesses • Support the case for investment in the MCS ecosystem as a mechanism to both reduce environmental risks and closure-related financial liabilities 	3.3 Business solutions for supply chain development	2023

RESEARCH PROGRAM	PROJECT ID	PROJECT TITLE	PROJECT PARTNERS
Operational Solutions	3.2	Transforming disparate approaches to remote sensing and monitoring to industry best practice	Department of Climate Change, Energy, the Environment and Water; Curtin University; University of Queensland; Department for Energy and Mining (SA); Department of Resources (Qld); Department of Water and Environmental Regulation (WA); Ecocene; Fortescue; Geoscience Australia; K2Fly; Newmont; Rio Tinto; Roy Hill
	3.4	Returning ecosystem resilience	Department of Biodiversity Conservation and Attractions (WA); Australian Genome Research Facility; Flinders University; Murdoch University; University of Queensland; Alcoa; BHP; Department for Energy and Mining (SA); Department of Resources (Qld); Fortescue; Hanson; Iluka; MMG; Newmont; Okane Consultants; Rio Tinto; Roy Hill; South32; WSP Golder
	3.5	Mined landform stability for regional benefit	University of Queensland; Department of Biodiversity Conservation and Attractions (WA); Federation University; Aurecon; BHP; Department for Energy and Mining (SA); Department of Energy, Environment and Climate Action (Victoria); Department of Resources (Qld); Deswik; Ecocene; Energy Australia; Landloch; MMG; Newmont; Rio Tinto; Roy Hill; WSP Golder
Operational Solutions	3.9	Climate change induced risks for the performance of vegetation on mine rehabilitation soil covers in the Latrobe Valley	Federation University; Department of Energy, Environment and Climate Action (Victoria); University of Queensland

RESEARCH ACTIVITIES INCLUDE:	COMMONWEALTH OUTPUTS	PROJECT TIMEFRAME
<ul style="list-style-type: none"> • Create a cluster of METS companies working on and interested in remote sensing and monitoring • Facilitate a forum and connect user groups (mining companies, METS and government regulators) for constructive discussions • Collate and organise current remote sensing and monitoring platforms • Undertake a review of the scientific literature to determine the current capability and potential applications of these remote sensing platforms • Source relevant information and data of remote sensing and monitoring technologies, which can be easily updated or adapted to account for the changing nature of the technology • Undertake analysis and interviews with government regulators • Evaluate currently available technologies to build a comprehensive database • Present outcomes from the project in a range of formats 	3.1 Smart architecture for closure design	2022–2023 (completed)
<ul style="list-style-type: none"> • Develop a co-designed framework document that outlines research opportunities and industry translation pathways • Provide the basis for a communication channel between researchers and industry 	3.1 Smart architecture for closure design	2022–2023 (Near completion)
<ul style="list-style-type: none"> • Collect and collate information and data on the geotechnical, erosional and geochemical stability, and acceptability for closure, of past and current mined landforms in a range of site settings and for a range of mineral commodities • Develop a conceptual model of the often overlooked physical, chemical and biological interactions determining effective mined landform stability post-closure • Make preliminary recommendations for effective mined landform design, construction and sustainability in the Australian context, and recommendations for further research • Present the results to industry and publish the key findings 	3.1 Smart architecture for closure design 3.2 Prototype risk management technologies for successful post-mine futures	2022–2023 (completed)
<ul style="list-style-type: none"> • Literature review of the state of the art, in prediction of the consequence of climate change on plant growth, composition of vegetation communities and biodiversity • Conduct soil-plant study • Apply hydrological modelling • Sample plant and soil information at actual soil-plant field conditions to accompany laboratory tests 	2.2 Real-time predictive models 3.1 Smart architecture for closure design	To be completed in 2023








RESEARCH PROGRAM	PROJECT ID	PROJECT TITLE	PROJECT PARTNERS
Data Integration, Forecasting and Scale	4.6	Evidence for effectiveness of climate-adapted seed sourcing strategies for revegetation success and transition to mine closure in a changing climate	CSIRO; Anglo American; Australian Genome Research Facility; BHP; Department of Biodiversity Conservation and Attractions (WA); Ecoplant; Flinders University; Hanson; Murdoch University; Newmont; Revegetation Industry Association (WA); Department for Energy and Mining (SA)
Data Integration, Forecasting and Scale	4.7	A systematic approach to regional cumulative effects assessment (RCEA) to support transitions in mining economies (Stage 1)	Western Australian Biodiversity Science Institute; Hanson; Iluka; Murdoch University; Newmont; Rio Tinto; Roy Hill; Conservation Council of Western Australia; Department of Climate Change, Energy, the Environment and Water; Department of Water and Environmental Regulation (WA); Federation University; MMG; Pershke Consulting; Queensland Resources Council; Rangelands NRM (WA); University of Queensland; University of SA; WA Development Commissions; WA Development Commissions
Data Integration, Forecasting and Scale	4.8	Evaluation of an ecosystem forecasting system for rehabilitated arid landscapes	University of WA; BHP; Rio Tinto; Matisse Consulting; Department of Water and Environmental Regulation (WA)
Data Integration, Forecasting and Scale	4.9	Mine pit lake assessment and management: a national initiative to support mine closure and regional opportunities	Chemistry Centre (WA); BHP; BM Alliance; CSIRO; Curtin University; Energy Australia; Flinders University; GHD; Iluka; Minerals Research Institute of Western Australia; Rio Tinto; South32; University of Queensland; University of WA; Mine Land Rehabilitation Authority (Vic); Premier Coal; Aurecon; Department for Energy and Mining (SA); Department of Mines, Industry Regulation and Safety (WA); Department of Water and Environmental Regulation (WA); Eco Logical; Fortescue; Greater Whitsunday Alliance (GW3); Isaac Regional Council; Office of the Queensland Mine Rehabilitation Commissioner; WA Development Commissions; Central Highlands Development Corporation

RESEARCH ACTIVITIES INCLUDE:	COMMONWEALTH OUTPUTS	PROJECT TIMEFRAME
<ul style="list-style-type: none"> • Develop a trial design that embeds seed sourcing strategies in rehabilitation contexts at three to four sites • Establish and monitor trials • Apply hydrological modelling • Analyse results from year two 	<ul style="list-style-type: none"> 2.2 Real time predictive models 3.1 Smart architecture for closure design 3.2 Prototype risk management technologies for successful post-mine futures 3.4 Training for integrating post-closure outcomes into the workforce 	2022–2025
<ul style="list-style-type: none"> • Develop a shared understanding of diversity in RCEA practice and potential application • Develop a decision-tree to guide use of RCEA in different forms • Generate preliminary insights, including regional definitions, governance, stakeholder engagement, Indigenous involvement 	<ul style="list-style-type: none"> 1.2 Decision tools for regional planning of post-mine uses 1.3 Frameworks, tools and capacity building to enable shared vision development 	2023–2024
<ul style="list-style-type: none"> • Evaluate an ecological forecasting model system developed for rehabilitated arid landscapes in the Mid-West and Pilbara regions, WA • Hold a workshop with CRC TiME industry, government, and research partners on the role, expectations, and pathway for uptake/adoption of ecological forecasting tools for closure and relinquishment planning • Undertake a pre-feasibility study of the ecological forecasting model system 	<ul style="list-style-type: none"> 2.2 Real-time predictive models 3.1 Smart architecture for closure design 3.3 Business solutions for supply chain development 	2022–2023
<ul style="list-style-type: none"> • Explore Traditional Owner, community and industry aspirations for post-mining use of pit lake water • Produce common language tools • Develop guidance to assess risk categories • Model opportunity and risk scenarios • Make recommendations on technical data and approaches required for fit-for-purpose modeling • Evaluate uncertainty of model prediction 	<ul style="list-style-type: none"> 1.2 Decision tools for regional planning of post-mine uses 1.3 Frameworks, tools and capacity building to enable shared vision development 2.3 Planning tools to identify transferrable residual risk 3.1 Smart architecture for closure design 3.4 Training for integrating post-closure outcomes into the workforce 	2023–2027

RESEARCH PROGRAM	PROJECT ID	PROJECT TITLE	PROJECT PARTNERS
Data Integration, Forecasting and Scale	5.2	Foundations for Indigenous inclusion	Curtin University; CSIRO; BHP; Iluka; MMG; Newmont
Cross-cutting (education)	5.4	Foundations of Mine Closure and Transitions micro-credential	University of Queensland; Curtin University; BHP; Fortescue; MMG; Okane Consultants
Cross-cutting (education)	5.5	Strategic education and training review and options	Mining and Automotive Jobs & Skills Council; Business Skills Viability Inc; Minerals Council of Australia
Cross-cutting (education)	5.6	First Nations VET pathway (Stage 1 & 2)	Curtin University; Barada Barna; Department of Industry, Tourism and Trade (NT); Gelganyem Limited; Gundjeihmi Aboriginal Corporation Jabiru Town; Kalkadoon Indigenous Social Services; Karlka Niyaparli Aboriginal Corporation; Myuma; Northern Land Council; University of Queensland; BHP; Hanson; Mining and Automotive Jobs & Skills Council; Rio Tinto

RESEARCH ACTIVITIES INCLUDE:	COMMONWEALTH OUTPUTS	PROJECT TIMEFRAME
<ul style="list-style-type: none"> • Establish a Steering Group • Conduct a snapshot review of research guidelines, processes, protocols and structures that specifically address Indigenous-inclusive approaches to research and engagement • Develop recommendations for the appropriate and fit-for-purpose communications of the CRC to Indigenous stakeholders. • Map existing structures and networks to identify structures and relationships to promote effective partnerships and foster Indigenous inclusion • Develop a set of recommendations to inform the CRC TIME Indigenous Inclusion Strategy 	Guidance for all CRC TIME projects and operations	2022–2023 (completed)
<ul style="list-style-type: none"> • Develop flexible learning materials • Offer the content to a wide audience, providing options for learners in terms of the cost of engaging 	3.4 Training for integrating post-closure outcomes into the workforce	Online course now open for enrolments
<ul style="list-style-type: none"> • Identify the education and training needs of the following priority cohorts involved in or affected by mine closure • Identify the current education and training options available • Assess emerging skills required • Identify pathways that could enable priority cohorts to build knowledge, skills and capacity to drive successful closure transitions • Define the content, platforms and accreditation process for these pathways and partnerships required to deliver them • Consult with relevant government departments (especially state and local government) regarding local education and training options for the priority cohorts 	3.4 Training for integrating post-closure outcomes into the workforce	2023
<ul style="list-style-type: none"> • Establish a governance structure to support development of a nationally-accredited VET pathway (to 2025) • Map skills and knowledge required against existing units of competency • Provide input to the Mining and Automotive Jobs & Skills Council (AUSMASA) for planning development of new training packages and products • Develop and test draft guides • Undertake community consultation workshops • Develop a report with recommendations • Develop guide(s) for First Nations people and communities to participate in mine closure planning and post-mine transitions. 	1.4 Integrated systems and training 3.4 Training for integrating post-closure outcomes into the workforce	2023–2024







PUBLICATIONS









FINAL RESEARCH REPORTS			
Date published	Project Number	Title	Author/s
22/11/2022	2.1	 <p>Understanding the values of stakeholders in Australian post-mining economies</p> <p><i>“CRC TiME aspires to contribute to integration of mine closure planning, and regional development in mining regions, in the belief that integration of these policy domains will enable more effective investment in post-mining development.”</i></p>	Dr Tira Foran
22/11/2022	3.2	 <p>A roadmap for adapting to technological change in remote sensing and monitoring capabilities</p>	Dr Lorna Hernandez Santin
01/2/2023	3.5	 <p>A systematic and systemic review of mined landform stability and its impact on transitioning for regional benefits</p>	Professor David Williams
22/10/2022	3.6	 <p>Developing the business case for responsible acid and metalliferous drainage (AMD) management</p> <p><i>“Acid and metalliferous drainage (AMD) is currently a global environmental, social and economic problem, reported in many countries, on nearly all continents, and across a wide range of mining commodities, including coal, gold, copper and uranium.”</i></p>	Professor Carolyn Oldham
22/07/2022	3.7	 <p>Comparative closure: assessing the biophysical closure challenges of different mining methods</p>	Dr Ewan James Sellers
22/08/2022	4.1	 <p>Dynamically transforming environmental assessment through a shared analytics framework: Bowen Basin case study</p> <p><i>“The CRC for Transformations in Mining Economies (CRC TiME) is undertaking social, environmental, economic and technical research in direct collaboration with industry and community partners to define pathways to a prosperous and sustainable post-mining future.”</i></p>	Associate Professor Claire Côte
23/02/2023	5.2	 <p>The foundations for effective Indigenous inclusion</p> <p><i>“Mine closure and post-mine transitions will continue to present a number of challenges and opportunities for Indigenous Australians. CRC TiME is committed to addressing and moderating the challenges.”</i></p>	Christian Miller-Sabbioni, Dr Veronica Goerke, Mandy Downing, Professor Stephen van Leeuwen

FACT SHEETS		
Date published	Project Number	Title
28/03/2023	1.2	 Post-mining land uses
28/03/2023	1.3	 Mapping the regulatory framework of mine closure
28/03/2023	1.3	 Regulation of mine closure planning and Pilbara agreements case study
28/03/2023	1.3	 Rehabilitation of the Latrobe Valley coal mines: Integrating regulation of mine rehabilitation and planning for land and water use
28/03/2023	1.3	 Post-mining land use: Practice mapping Ensham Coal Mine case study
10/06/2023	1.6	 Future-proofing a small local government authority against the impacts of the mining boom and bust cycle
28/03/2023	2.2	 Exploring the issues in mine closure planning
28/03/2023	3.1	 Integration of biophysical aspects in mine closure planning
10/06/2023	3.5	 A systematic and systemic review of mined landform stability and its impact on transitioning for regional benefits




Continued overleaf..

.. Fact sheets continued

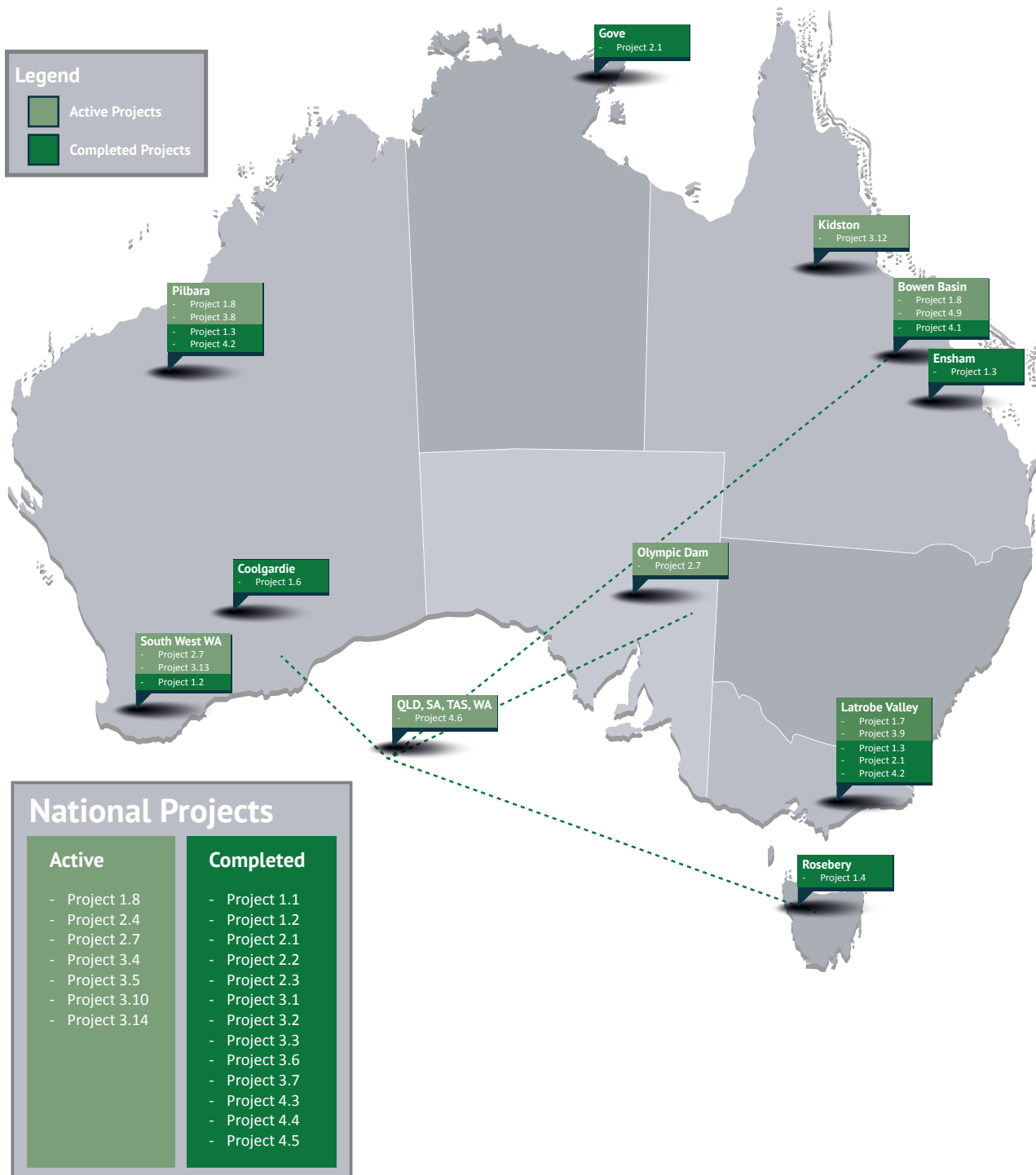
FACT SHEETS		
Date published	Project Number	Title
28/03/2023	3.7	 Comparative closure: Assessing the biophysical closure challenges of different mining methods
28/03/2023	4.1	 Dynamically transforming environmental assessment through a shared analytics framework
28/03/2023	4.3	 Network of demonstration and testing sites
28/03/2023	5.2	 The foundations for effective Indigenous inclusion
28/03/2023	5.3	 Mining transitions and climate change: A research synthesis to inform CRC TiME strategy
10/06/2023	N/A	 Foundations of post-mining transitions: Insights from our foundational research on transformations in mining economies

JOURNAL ARTICLES AND CONFERENCE PAPERS		
Date published	Title	Author/s
6/01/2023	 Time for an outcome evaluation? The experience of Indigenous communities with mining benefit sharing agreements	Liz Wall, Professor Fiona Haslam McKenzie
23/06/2023	 More and better mine rehabilitation – lessons from Queensland	James Purtill, Professor Anna Littleboy
23/06/2023	 Investigating the feasibility of a national abandoned mine database for risk and opportunity assessment in Australia”	Dr Ebrahim Fathi Salmi, Elise Bekele, Susanne Schmid, Jason Kirby
23/06/2023	 Designing a pathway to nature positive actions	Gavin Price, Stephen White, Dr Guy Boggs, Professor Owen Nevin, Dr Stephen Stewart, and Dr Antony O’Grady
23/06/2023	 Integrating mine closure and repurposing	Professor David Williams
23/06/2023	 The Role of Regional Cumulative Impact Assessment in managing for mine closure	Renee Young, Dr Lian Sinclair, Dr Jenny Pope, Vandana Subroy, Associate Professor Rachel Standish, Dr Sarah Holcombe, Donna Pershke, Marit Kragt, Professor Fiona Haslam-McKenzie
23/06/2023	 Insights to successful mine closure and land repurposing in the Australian context: A piecemeal experience	Professor Fiona Haslam McKenzie,, Professor Alex Gardner. Professor Andrew Beer
23/06/2023	 Environmental, Social and Governance (ESG) risk, uncertainty, and the mining life cycle	Associate Professor Bryan Maybee, Associate Professor Eric Lilford, Professor Michael Hitch

FINAL RESEARCH REPORTS

Date published	Project Number	Title	Author/s
12/08/2022	1.3	 Rehabilitation of the Latrobe Valley coal mines: Integrating regulation of mine rehabilitation and planning for land and water use	Professor Alex Gardner, Elda Poletti, Lauren Downes, Laura Hamblin
28/03/2023	1.3	 Regulation of mine closure planning and Pilbara agreements case study	Professor Alex Gardner
28/03/2023	1.3	 Post mining land use: Practice mapping Ensham coal mine case study	Professor Alex Gardner

REGIONAL DISTRIBUTION OF PROJECTS



Map detailing the number of active and completed Projects in each region.



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