Murdoch University | Harry Butler Institute



Harry Butler Institute

Annual Report 2025

Ngala kwop biddi.
Building a brighter future, together.

Harry Butler Institute

Innovating for a sustainable future through collaborative research.



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Acknowledgment of Country

The Harry Butler Institute acknowledges the Traditional Owners of Country throughout Australia. We pay our respects to Elders past and present.

Front cover: Australian Magpie.
Photo Al Bruce, HBI/Murdoch University



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Executive Director's report

Building success

Murdoch University broke ground on the long-anticipated Harry Butler Science Centre on 15 April, the culmination of years' planning and negotiation led by former HBI Director Professor Simon McKirdy. The Hub will be an important space for science engagement with community and industry.

We officially opened the Extractive Metallurgy Hub on the 23rd of July following years of work transforming our Rockingham campus into a Hub for hydrometallurgical research, collaboration and education (see **page 18**). The Western Australian Government, who provided partial funding for the Hub, have continued their support, with Premier Cook and his team utilising the space to launch the 2025 IAF funding round.

Following that success, we launched the purpose-built Algae Innovation Hub at our Murdoch campus (see **page 16**). The Hub's design provides a research and innovation space for HBI's Algae Research Group and the Murdoch University startup, Algae Harvest.

The launch of both facilities marked a new era for HBI and strengthened relationships with key government and industry partners.

Before the year's end we launched another significant Hub, the Harry Butler Education Hub (see **page 50**). The Hub, on the HBI website, provides a home for HBI's array of education programs, including Project Wetland Science, Miyawaki Pocket Forests Program, WA Barcode Blitz, and Meet the Scientist. Teachers across WA have embraced having access to our programs and free teaching resources.

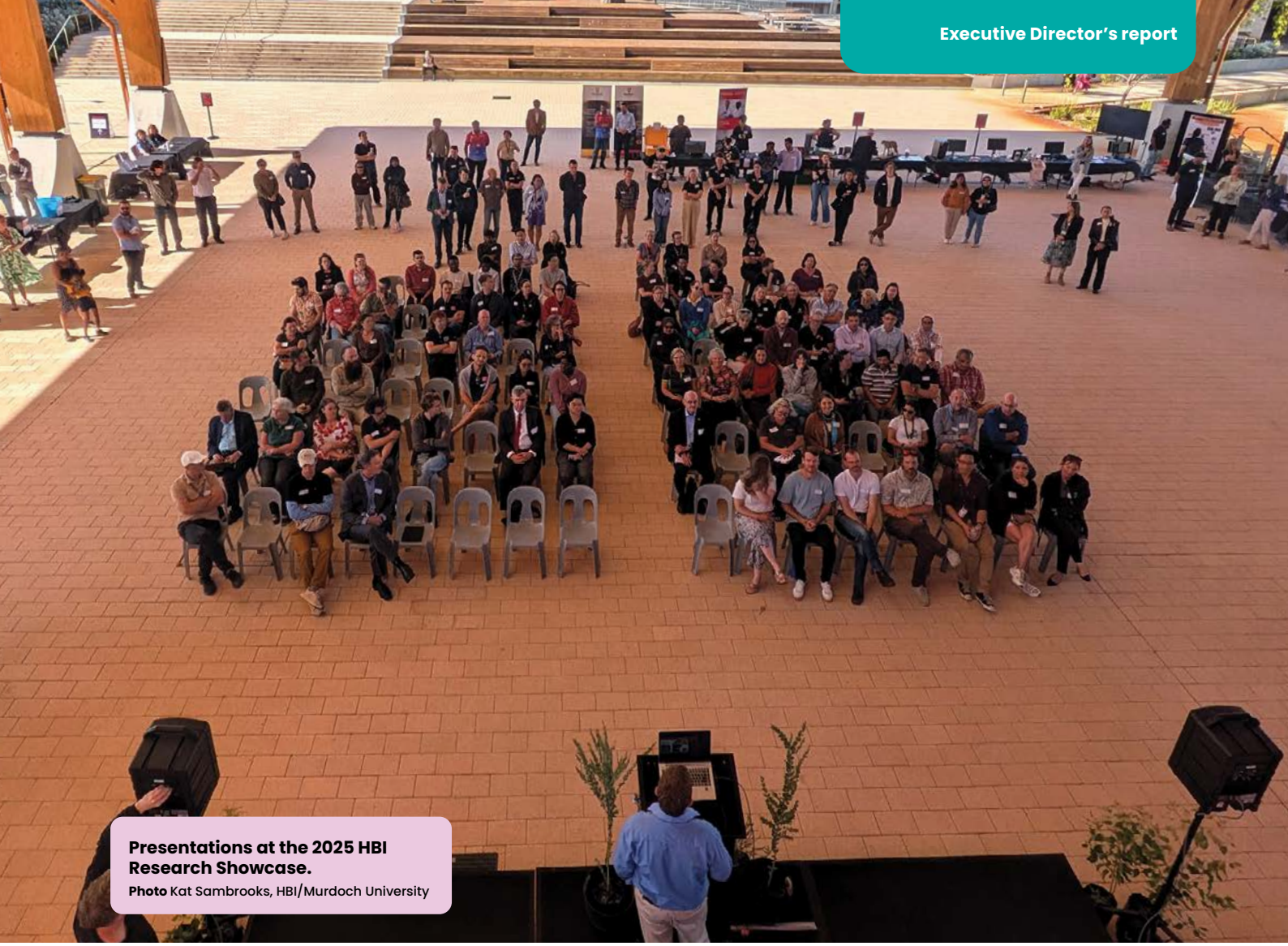


Prof Treena Burgess
Executive Director,
Harry Butler Institute

"2025 will be remembered in HBI history as the year we launched two specialised research hubs, established a strategic five-year plan for the Institute, and broke new ground in the way research is communicated and researchers celebrated."



Student undertaking research at the Algae Innovation Hub.
Photo Pierre Gildenhuys, Murdoch University



Presentations at the 2025 HBI Research Showcase.
Photo Kat Sambrooks, HBI/Murdoch University

Moving forward strategically

As an Institute we developed a five-year strategic plan which outlined our mission and the means through which we succeed in that mission. It identified our objectives as they relate to each of the five pillars; People, Partnerships, Projects, Promotion, and Policy.

The resulting document, the *Harry Butler Institute Strategy Plan 2025-2030*, is deeply aligned to both Murdoch University's *Ngala Kwop Biddi 2023-2030* strategy, and Murdoch University's *2024-2030 Research Strategic Plan*. It has been published to our website where is serves as a public statement of what we stand for.

Playing to our strengths

The strategic plan played a vital role in HBI's internal quality review (see **page 11**), conducted in 2025 as part of Murdoch University's ongoing self-assessment and improvement processes. The review provided an opportunity for HBI to critically self-reflect, with the help of affiliates within and outside the University.

Among our strengths, the process identified the Institute's strong reputation for outstanding communications, marketing and production capabilities, exemplified by our short film *Black Cockatoos: Cultural Significance* being awarded Best Overall Film at the Australia Youth Film Festival (see **page 62**).

The process also recognised HBIs dedication to engaging communities in our research through multi-faceted projects and program-based education programs. It highlighted our work with First Nations knowledge holders to integrate tow-way knowledge sharing into our research programs, such as *Yagarrajalajalan nagula buru — we all care for salt-water country.*

Most of all, it identified that the people of HBI are crucial to its success and prominent reputation. From the research and teaching academics to the students proudly representing our Institute and University, all supported by a cohesive and productive professional team. I'm proud to lead this Institute and the remarkable people it represents.



Prof Treena Burgess
Executive Director,
Harry Butler Institute



> **The People of HBI are the key to its success — from the research and teaching academics, to the students proudly representing our Institute and University, all supported by a cohesive and productive professional team.**

Merriwa PS, *Banksia menzeisii*.
Photo Grey Coupland, HBI/Murdoch University

Our people

Harry Butler Institute Leadership Team



Prof Treena Burgess
Executive Director



Centre for
Water Energy and Waste

A/Prof John Rubrecht
Director



Centre for
Sustainable Aquatic Ecosystems

A/Prof Stephen Beatty
Director



Centre for
Terrestrial Ecosystem Science and Sustainability

Prof Trish Fleming
Director



Centre for
Biosecurity and One Health

Prof Sam Abraham
Director



Centre for
Biosecurity and One Health

Prof Melissa Thomas
Acting Director

Achievements and impacts in 2025



Landscape effected by fire.
Photo Dannon Wu, HBI, Murdoch University

Scientific publications

Total publications in 2025

265*

Q1 outlets: **80%**

Top 10% of outlets: **51.3%**

Number of citations in top 10% journals by Citescore

2025

16%

2022–25

19.3%

* Published with HBI byline

Field-weighted citation impact

2025

1.5

2022–25

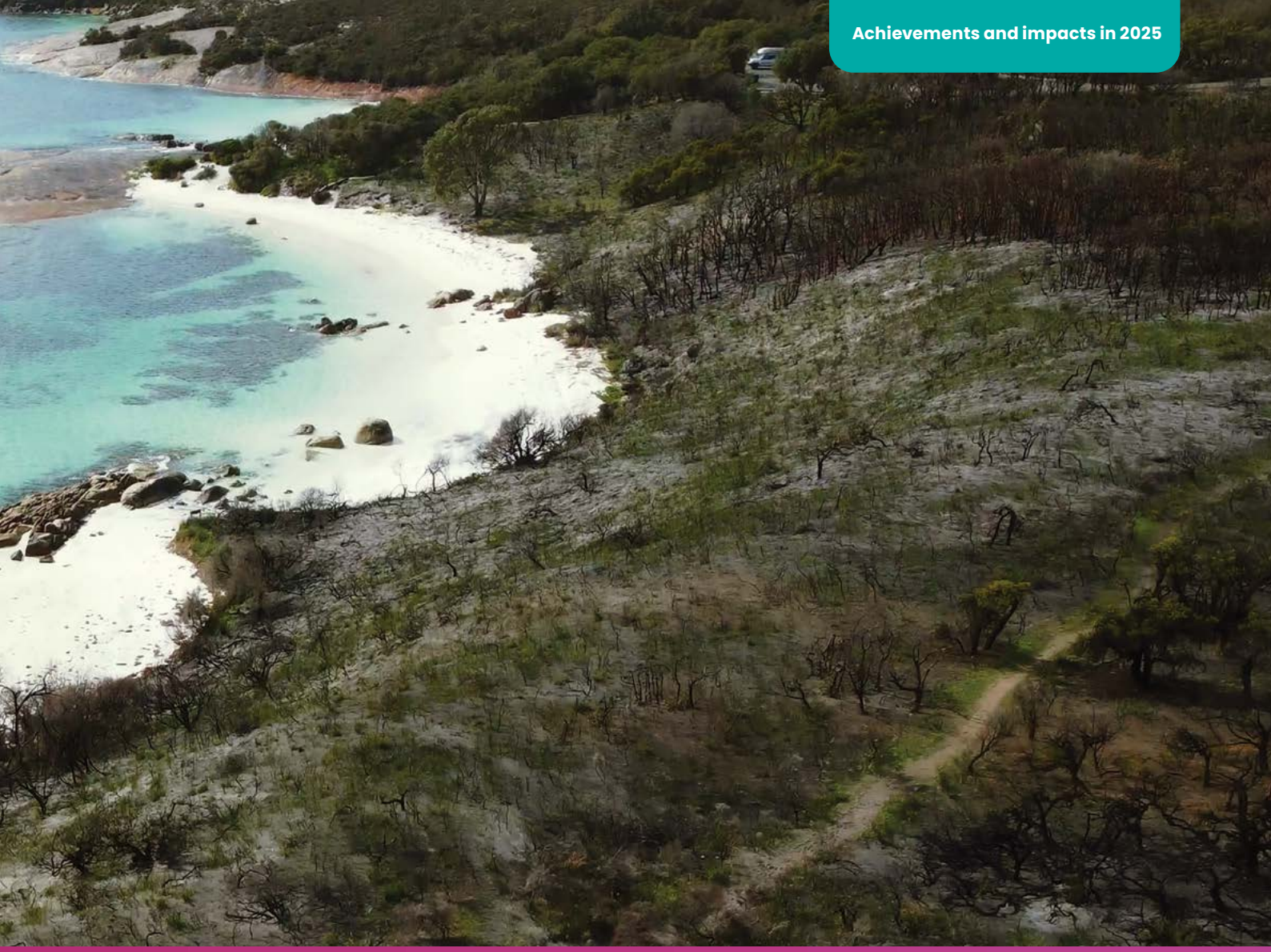
1.71

(usually done on a 5 year rolling average)

New funding Awards

2025

$19,870,355



Higher Degree Research

Load

225.5*

Equivalent Full-Time Student Load (EFTSL)

Completions

51*

(based on best available data)

Research outputs

Percentage of research outputs with international collaborators

2022–25

66.8%

Top collaborating institutions

2022–25

The University of Western Australia
CSIRO
James Cook University
The University of Queensland
Statens Serum Institut
UNSW Sydney
Curtin University
University of Melbourne
University of Tasmania
Deakin University

* Supervised by staff who identify as HBI affiliated

HBI Strategic Plan 2025–2030

In 2025, HBI's leadership team worked over multiple meetings to mould our Institute's mission, priorities, objectives and outcomes into a five-year strategic plan that would lay the path for HBI's future.

The resulting document, the *Harry Butler Institute Strategic Plan 2025–2030*, builds upon our track record of delivering real-world impact through scientific excellence, industry partnerships, and community engagement.

At the core of the strategy are the Five Ps—People, Partnerships, Projects, Promotion and Policy. These pillars reflect our commitment to doing research that matters: empowering the next generation of researchers, co-creating knowledge with Traditional Custodians, generating solutions for environmental sustainability, and translating our science into actionable outcomes.

Our strategy is deeply aligned with Murdoch University's *Ngala Kwop Biddi 2023–2030 Strategy* and the cross-cutting themes of Sustainability, First Nations engagement, and Equity, Inclusion and Diversity.

Our research centres operate across diverse domains, from biosecurity to aquatic and terrestrial ecosystems, energy and waste, and together exemplify the kind of interdisciplinary and mission-driven science that Murdoch champions.

This is an ambitious plan, and its success depends on the collective effort of the Institute's research teams and support teams. Through this Strategic Plan we will build a brighter, more sustainable future grounded in evidence, inclusion and shared purpose.

Governance

HBI operates under a governance structure led by an Executive Director, four Centre Directors, and Deputy Centre Directors, who collaboratively make management decisions.

Our core focus is on stakeholder collaboration to address real-world challenges, alongside a strong commitment to community engagement and outreach.

People	Partnerships	Projects	Promotion	Policy
Empowering Staff and Students	Building and Sustaining Relationships	Developing and Delivering Thematic Research	Communicating and Amplifying Impact	Translating Research into Policy Outcomes



Harry Butler Institute Strategic Plan 2025–2030.

Vice Chancellor
Murdoch University

R&I

Deputy Vice Chancellor
Research and Innovation

Executive Director
Harry Butler Institute

Communications and Outreach

- Education and outreach
- Community engagement
- Events
- Public lectures
- Media engagement
- Social media
- HBI website management
- Reports and newsletters
- Video production

Operations

- Institute executive support
- Office management
- Recruitment and onboarding
- Financial management
- Budgetary planning
- Business development
- Safety and facility requirements
- Research ethics oversight
- Governance frameworks
- Industry engagement

Centre for **Biosecurity and One Health**

- Environmental biosecurity
- Prediction modelling
- Early detection
- Rapid response
- Best practice quarantine
- Integrated pest management
- Protecting food systems
- Biosecurity compliance
- Plant and animal diseases
- Antimicrobial resistance

Centre for **Sustainable Aquatic Ecosystems**

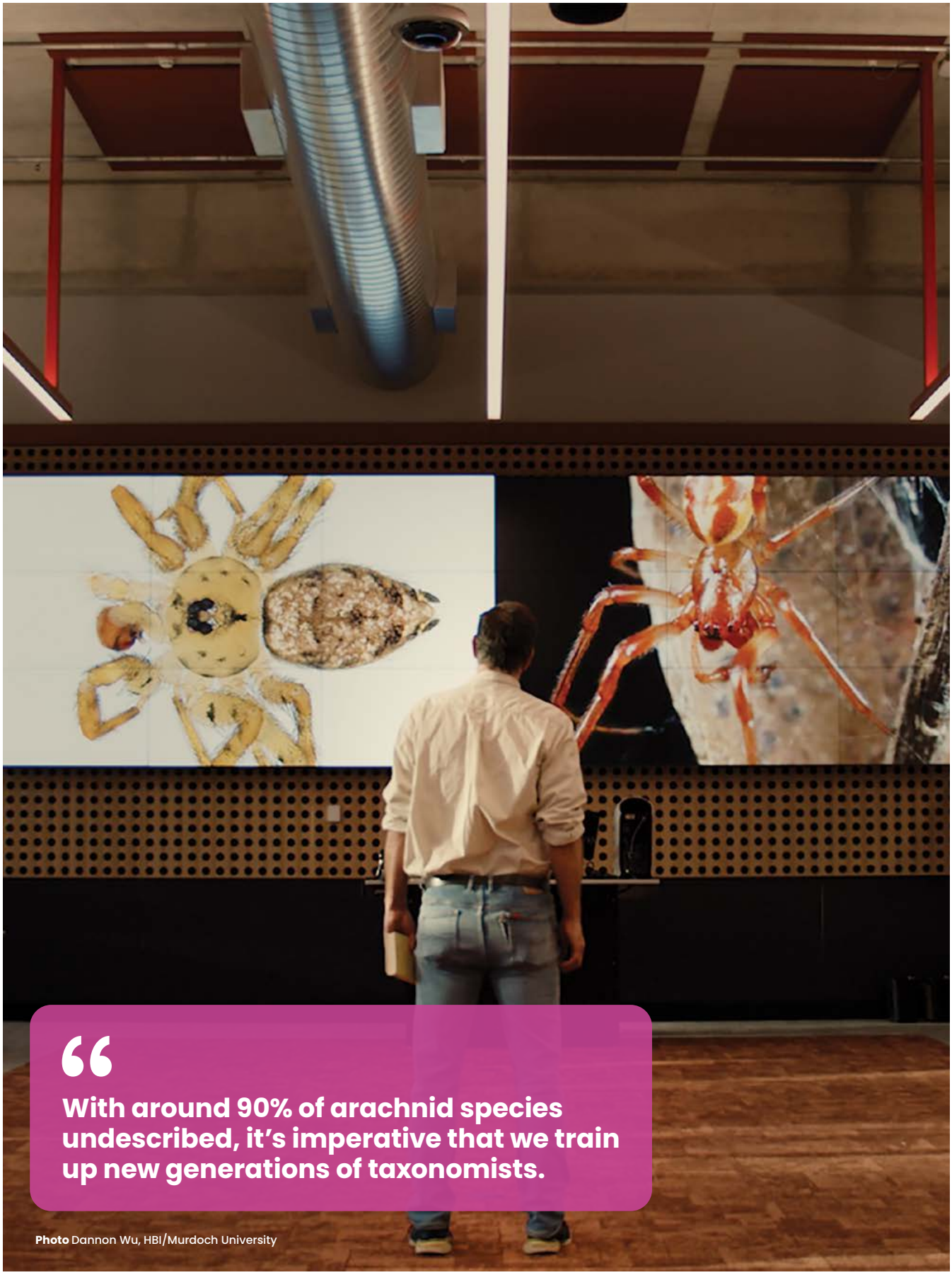
- Ecological restoration
- Megafauna monitoring
- Aquatic pest management
- Habitat assessment
- Impact of climate change
- Aquatic flora and fauna
- Marine ecosystems
- Rivers, estuaries, wetlands

Centre for **Terrestrial Ecosystem Science and Sustainability**

- Biodiversity conservation
- Climate change modelling
- Fire ecology
- Restoration ecology
- Animal morphology
- Livestock welfare modelling
- Threatened species
- Pest animal management
- Wetland ecology
- Plant health

Centre for **Water, Energy and Waste**

- Farm water supply
- Desalination and recycling
- Algal biotechnology
- Small wind turbines
- Solar panels and micro grids
- Smart cities — IoT and AI
- Extractive metallurgy
- Smart batteries
- Geopolymer concrete
- Circular economy



With around 90% of arachnid species undescribed, it's imperative that we train up new generations of taxonomists.

Photo Dannon Wu, HBI/Murdoch University

HBI Quality Review

Murdoch University undertakes quality reviews every seven years as part of its commitment to a culture of quality assurance and improvement. These reviews address governance, academic areas, research institutes and professional areas, aiming to highlight areas of excellence, opportunity and improvement. They take the format of critical self-evaluation prepared by the area under review, followed by external panel review.

In 2025, Harry Butler Institute was selected to be the first Institute to undertake a quality review. This gave us an opportunity to critically reflect on how we operate as Institute and ways that we can improve. We drew upon years of rigorous financial record-keeping, annual reports and strategic documents as well as the insights of people working for and with the Institute.

Murdoch University's Office of Quality and Standards assembled a review panel consisting of leaders of other areas within Murdoch University Institutes and senior staff within associated external organisations. The panel members included: the Chair — Associate Professor Brad Wall, Head of School for Allied Health, internal member Professor Peter Davies, PVC Food Futures Institute, external member Professor Bronwyn Gillanders, Head of School of Biological Sciences, University of Adelaide, and external member Professor Owen Nevin, Chief Executive Officer, The Western Australian Biodiversity Science Institute (WABSI).



HBI professional team photo with Director Treena.
Photo Pierre Guilde, Murdoch University

The review took place over five days in October 2025, involving the review of HBI records and documents, as well as interviews with a range of key stakeholders, and a tour of facilities (Harry Butler Institute office, Fish Health Unit, Algae Innovation Hub, and Invertebrate Lab).

Commendations

The process identified a number of areas of commendation for the Institute. In essence, it acknowledged that HBI is widely recognised for its outstanding communications, marketing and production capabilities, which have significantly elevated Murdoch University's visibility and reputation as a research leader.

HBI's strong commitment to promoting research and community engagement has enhanced stakeholder awareness, strengthened policy influence and attracted high-calibre HDR candidates.

External partners consistently describe HBI as a trusted, professional and highly responsive collaborator whose applied research delivers meaningful impact. The Institute's work aligns closely with Murdoch's strategic priorities — particularly in Research & Innovation and Sustainability — while its translational research, public engagement and industry partnerships reinforce the University's external reputation.



HBI was recognised through the review for our strong partnerships with industry and government, exemplified through events such as the Western Australian Government's launch of the Investment Attraction Fund 2025 funding round at the Extractive Metallurgy Hub.

Photo Al Bruce, HBI/Murdoch University

HBI's success is attributed to its people, whose collaborative, capable and impact-driven culture is supported by strong leadership, effective succession, and exceptional operational staff who ensure seamless project delivery. The Institute plays a pivotal role in fostering multidisciplinary collaboration across the University and beyond, and its integration of First Nations perspectives is regarded as exemplary, reflecting a genuine commitment to respectful and authentic partnership.

Areas of future priority and improvement

Through the self-evaluation and review process, several areas were identified where greater clarity, coordination, and strategic alignment would enhance the Institute's effectiveness and strengthen its integration within Murdoch University's broader academic and research framework.

Many of the issues raised, such as coordination with central professional services, recruitment and contracting processes, and safety systems for fieldwork, reflected system-level challenges rather than shortcomings within HBI itself. The panel acknowledged the Institute's constructive engagement and willingness to collaborate on solutions.

The key recommendations for HBI centred around defining our identity, structures, frameworks, and alignment with other Institutes, Schools and Colleges. They also suggested a deeper alignment with the University's portfolios in EDI, First Nations and Sustainability, and establishing formal pathways for policy translation.

The recommendations aimed to consolidate HBI's strengths, address the structural and operational challenges identified during the review, and support the Institute to realise its full potential as a leading contributor to Murdoch University's strategic goals.

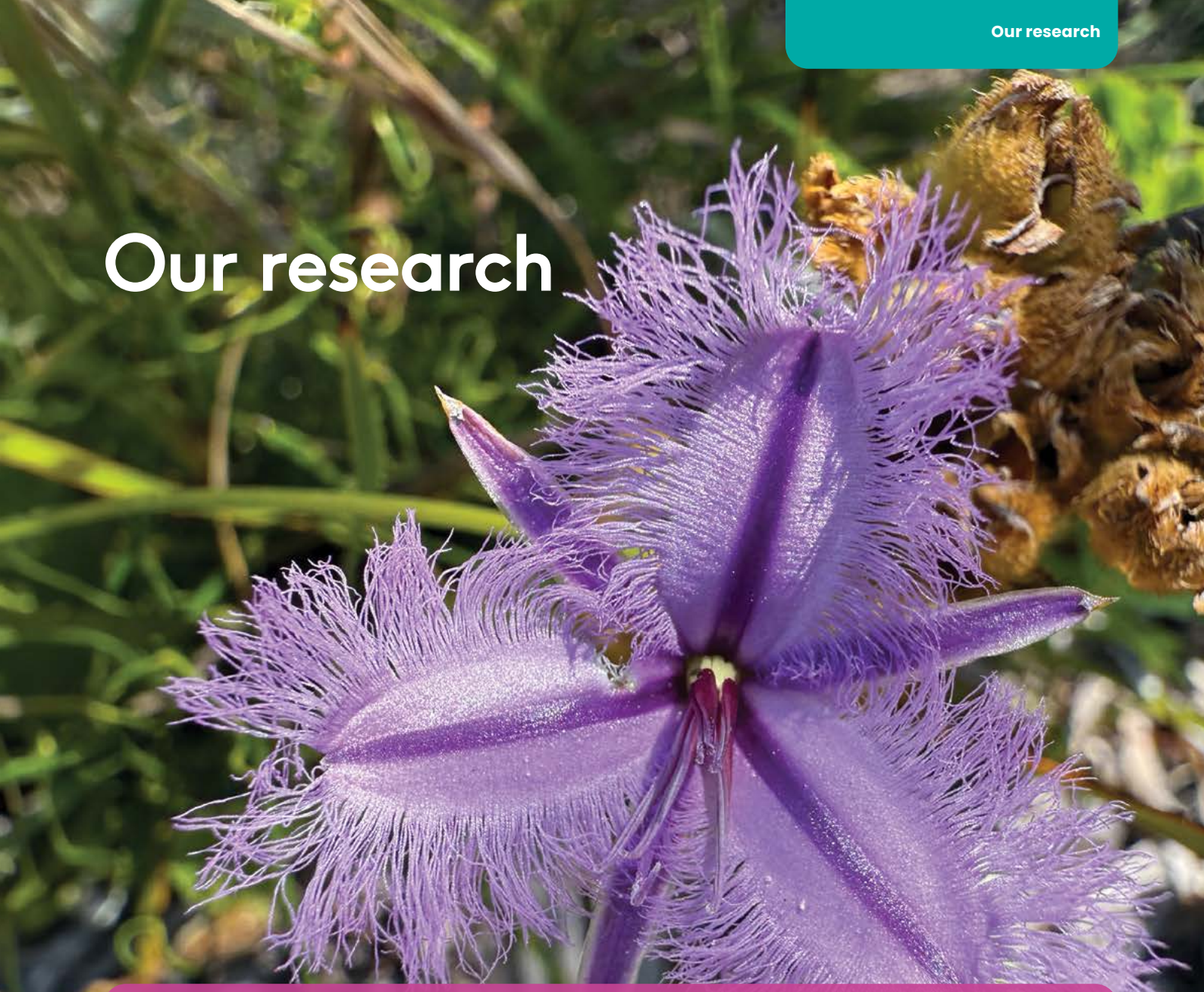
Addressing areas for improvement

Since the Harry Butler Institute Quality Review Panel Report was delivered to HBI, the Senior Leadership Team has reviewed the findings of the report and approved the *Harry Butler Institute Quality Review Action Plan*, for addressing areas which can be addressed by the Institute.

For recommendations outside of the scope of HBI, we are working with the Research and Innovation office and relevant departments to drive improvements to the relevant processes and relationships.

HBI is grateful for the opportunity to reflect, commend and improve through this quality review process. We also appreciate the time and effort contributed by the four panel members, Office of Quality and Standards, and interviewees.

Our research



14
Centre for
Water, Energy and Waste

20
Centre for
Terrestrial Ecosystem Science and Sustainability

32
Centre for
Sustainable Aquatic Ecosystems

42
Centre for
Biosecurity and One Health

Murdoch University was the first Western Australian University to sign the University Commitment to the **United Nations Sustainable Development Goals** in 2019, reiterating our commitment to do our part in addressing these global issues throughout our core business.

Our research at HBI is working to address the Sustainable Development Goals through direct and community action, knowledge gathering and sharing, and partnerships.

Centre for **Water, Energy and Waste**

Associate Professor John Ruprecht
Director

About the Centre

Supplies of water and energy are fundamental to modern life, as is the management of waste. The Centre for Water, Energy and Waste conducts research in these three related areas, ensuring human endeavours can coexist with biodiversity and sensitive ecosystems.

Two key achievements in 2025 were the establishment of the Algae Innovation Hub at the South Street campus and the Extractive Metallurgy Hub in Rockingham. However there were many more achievements in small scale desalination, geopolymer concrete, assessing cumulative impacts of mining, wind energy and smart micro grids.



Solar panels on farm.
Photo Al Bruce, HBI/Murdoch University



Drones-eye view of a WaterSmart Farm in regional Western Australia.
Photo Al Bruce, HBI/Murdoch University

Algae Innovation Hub to drive green circular economy using WA algae

Centre for **Water, Energy and Waste**	
Aim	Establish a hub for innovative algae-based solutions to environmental challenges
Focus	Algae Biotechnology
Lead	Professor Navid Moheimani
Location	Perth, Western Australia

Murdoch University has launched the Algae Innovation Hub, a landmark moment for generating a green circular economy in Western Australia.

Researchers, dignitaries, staff and students gathered at the Hub for its grand opening event, with the official opening delivered by Member for Bibra Lake Ms Sook Yee Lai MLA.

The facility will drive advancements in wastewater treatment, generate sustainable fuel and energy, and discover new ways of sequestering CO_2.

Led by the Harry Butler Institute under the research guidance of Professor Navid Moheimani, the Hub will address some of the world's most pressing global challenges.

Scientists at the Hub will harness the power of algae using state-of-the-art technology, finding applications across several industries — from improving soil quality and creating safer, cheaper supplements for people with iron deficiencies, to helping remote and regional communities treat their wastewater.



The unveiling of the Algae Innovation Hub official opening commemorative plaque. (L–R): Muhamad Hafiz Bin Ismail (Education Consul of Malaysia), Sook Yee Lai MLA (WA State Member for Bibra Lake), Professor Navid Moheimani (Algar Innovation Hub Lead), Katy Mair (Mayor of City of Melville), Professor Andrew Deeks (Vice Chancellor Murdoch University), and Hon Dr Parwinder Kaur MLC (Member of the Legislative Council of Western Australia).
Photo Pierre Gildenhuys, Murdoch University



Integral to the new facility is Algae Harvest, a Murdoch University-born company which focuses on commercialising algal biotechnology solutions for sustainable industries.

Professor Moheimani said a particularly powerful application of algae was using it to create biomass, a stable form of carbon.

"We can use the biomass for fertiliser, animal feed, and we are even looking into converting it to produce bioplastics," Professor Moheimani said.

He added that another key focus was creating high value products from saltwater microalgae, which would increase Australia's sovereign capabilities and create a circular economy that isn't dependent on using agricultural land and freshwater.

"Western Australia is by far one of the best places in the world for mass production of algae.

We have a series of algae that can grow in a very wide range of salinity. We can use seawater, and we can also recycle the water throughout the process so that we are not wasting the fertilisers.

Murdoch University's Vice Chancellor Professor Andrew Deeks said the launch of the Algae Innovation Hub was a continuation of the University's sustainable legacy.

"For 50 years, Murdoch University has been a leader in sustainability," Professor Deeks said.



The facility will drive advancements in wastewater treatment, generate sustainable fuel and energy, and discover new ways of sequestering CO_2.
Photo Pierre Gildenhuys, Murdoch University

"The launch of the Harry Butler Institute in 2017 was a renewed commitment to supporting the co-existence of human development and biodiversity. Today, the opening of the Algae Innovation Hub marks another milestone in our 50-year sustainability journey."

Contact **Professor Navid Moheimani**
Email: N.Moheimani@murdoch.edu.au

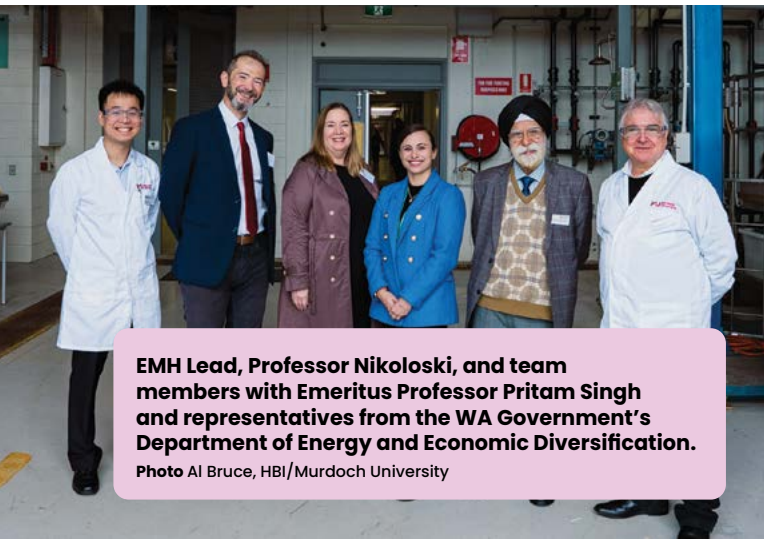
This research hub supports the **United Nations Sustainable Development Goals 6**, **7**, **11**, **12**, **13** and **17**.

WA's clean energy future boosted with launch of new metals hub

Centre for **Water, Energy and Waste**	
Aim	Boost the capacity of hydrometallurgical research and innovative solutions through the establishment of a new hub
Focus	Hydrometallurgy, battery recycling
Lead	Professor Aleks Nikoloski
Location	Rockingham, Western Australia

Murdoch University has unveiled a new Extractive Metallurgy Hub in Rockingham, marking a major milestone in Western Australia's transition to sustainable metals production technologies and a low-carbon economy.

The new facility will be a flagship for research, education and industry collaboration, focusing on the extraction, processing and recycling of critical minerals essential to battery technologies and green steel production.



EMH Lead, Professor Nikoloski, and team members with Emeritus Professor Pritam Singh and representatives from the WA Government's Department of Energy and Economic Diversification.
Photo Al Bruce, HBI/Murdoch University

"This hub represents a significant step forward — not just for Murdoch University, but for the entire state," said Professor Aleksandar Nikoloski, head of hydrometallurgy research at Murdoch.

It's about creating the technologies and skills needed to support a sustainable future, powered by clean energy and circular economies, and promoting collaboration between industry, academia and government.

Western Australia already produces more than half the world's lithium and holds globally significant stores of vanadium — two metals central to battery production. As global battery demand grows at 34 per cent per year, the time is now for the state to establish its role as key player.

The Harry Butler Institute will operate the hub, which will open with research projects already underway in collaboration with major industry players, including Rio Tinto, IGO, Lynas, Tronox, Thorion Energy and South Korean raw materials giant POSCO.

This project received support from the Minerals Research Institute of Western Australia and grant funding from the State Government's Investment Attraction Fund, administered by the Department of Energy and Economic Diversification.

Located near Rio Tinto's green iron plant in Rockingham, the facility will also play a key role in developing green steel technologies, extending Murdoch's five-year partnership with the miner on lithium innovation.

"We're looking at the entire lifecycle of critical minerals — cleaner reagents, cleaner processes, and scalable technologies," Professor Nikoloski explained.

The Hydrometallurgy Research Group located at the new facility, led by Professor Nikoloski, specialises in extracting critical metals like lithium, nickel, cobalt, rare earths and vanadium from both primary sources (ores) and secondary sources (electronics and used batteries from urban waste, and slags, processing residues and tailings from mining waste).

Their work is central to building a circular economy for metals, where materials are reused indefinitely to support sustainable technologies.

According to the Future Battery Industries CRC Final Report, Australia has the potential to build a $17 billion domestic battery industry by 2030, supporting over 61,000 jobs. Murdoch's new hub has the potential to be a cornerstone of that growth.

The hub will also serve as a training ground for the next generation of metallurgical engineers and scientists, embedding industry-relevant research in a developing precinct to accelerate innovation and practical solutions.

It aims to enhance the University's industrial chemistry and process engineering programs in critical minerals processing, advancing from mining to extraction to battery manufacturing and recycling.

This will strengthen Australia's sovereign capability, leveraging our world-class mineral resources and skilled workforce, with the Hub serving as the focal point for industry, academia and government to deliver these benefits.

We will find innovative solutions and new ways of extracting and processing critical minerals such as lithium and rare earths and developing technologies such as vanadium flow batteries for storing of clean renewable energy.

The strategic location of the Extractive Metallurgy Hub, coupled with deep research expertise, decades of experience in metallurgy education and pedagogical development and strong industry ties, presents a major opportunity to rapidly progress sustainability initiatives for Western Australia and beyond.

"My vision is for technology to improve life today without degrading the earth for future generations," Professor Nikoloski said. "I welcome the engineers and scientists of the future to join me in delivering this vision."

Contact Professor Aleks Nikoloski
Email: A.Nikoloski@murdoch.edu.au

This research hub supports the **United Nations Sustainable Development Goals 7, 11, 12, 13,** and **17.**



The unveiling of the Extractive Metallurgy Hub commemorative plaque at the official opening. Pictured (L–R): Professor Treena Burgess (Executive Director Harry Butler Institute), Professor Aleksander Nikoloski (Extractive Metallurgy Hub Lead), Magenta Marshall MLA (Member for Rockingham), Professor Andrew Deeks (Vice Chancellor Murdoch University) and Deb Hamlin (City of Rockingham Mayor).
Photo Alastair Bruce, HBI/Murdoch University

Centre for **Terrestrial Ecosystem Science and Sustainability**

Professor Trish Fleming
Director

Professor Rachel Standish
Deputy Director

About the Centre

The Centre represents a collaboration of academic research staff working with community, industry and management partners towards a shared vision of maintaining sustainable and biodiverse ecosystems through scientific excellence.

This centre captures the outputs of 43 academic staff and over 100 current HDR students, with a shared vision to carry out robust science underpinning biodiversity conservation. These staff sit across different schools, including Environmental and Conservation Sciences, Agricultural Sciences, Engineering & Energy, Mathematics, Statistics, Chemistry & Physics, Information Technology, and Medical, Molecular & Forensic Sciences.

Our research strengths — in wildlife, plants and processes — are applied to ecosystems influenced by urbanisation, extraction industries, and primary production. Underpinning this research is our cross-cutting research themes, strong education linkage, and substantial industry and community engagement.



Geraldton wax flowers.
Photo Kat Sambrooks, HBI/Murdoch University



> Through our Fauna Portal, citizen scientists are filling vital information gaps about Australia's invertebrates.

Dragonfly with a high vantage point.
Photo Angus Dempster, HBI/Murdoch University

Global dark diversity study reveals hidden impact of human activities on nature

Centre for **Terrestrial Ecosystem Science and Sustainability**	
Aim	Quantify the impact of humans on native vegetation through the absence of suitable species in native ecosystems
Focus	Terrestrial ecosystems
Lead	Professor Ladislav Mucina and Dr James Tsakalos
Location	Global

A global study involving Murdoch University researchers shows that in human-disturbed regions, many native plant species are absent from their natural habitats, contributing to the missing "dark diversity".

Professor Ladislav Mucina and Dr James Tsakalos (Adjunct Lecturer) from Mudoch University's Harry Butler Institute were part of this research, published in *Nature Journal*.

Natural vegetation often lacks many species that could be present, especially in regions heavily affected by human activities, according to a new study coordinated by researchers at the University of Tartu and published in Nature.

Over 200 scientists from the research collaboration DarkDivNet studied plants at nearly 5500 sites in 119 regions around the world. At each site, local researchers recorded all plant species and identified the dark diversity — native species that could live there but were absent.

This allowed them to understand the full potential of plant diversity at each site and measure how much of the potential diversity was actually present. This way of measuring biodiversity revealed the hidden impact of human activities on natural vegetation.

In regions with little human impact, ecosystems typically contain over a third of potentially suitable species, with other species remaining absent mainly due to natural reasons, such as limited dispersal.

By contrast, in regions heavily impacted by human activities, ecosystems contain only one out of five suitable species. Traditional biodiversity measurements, like simply counting the number of recorded species, did not detect this impact because natural variation in biodiversity across regions and ecosystems hid the true extent of human impact.

The DarkDivNet collaboration started in 2018, based on an idea by Prof. Meelis Pärtel, lead author of the study.

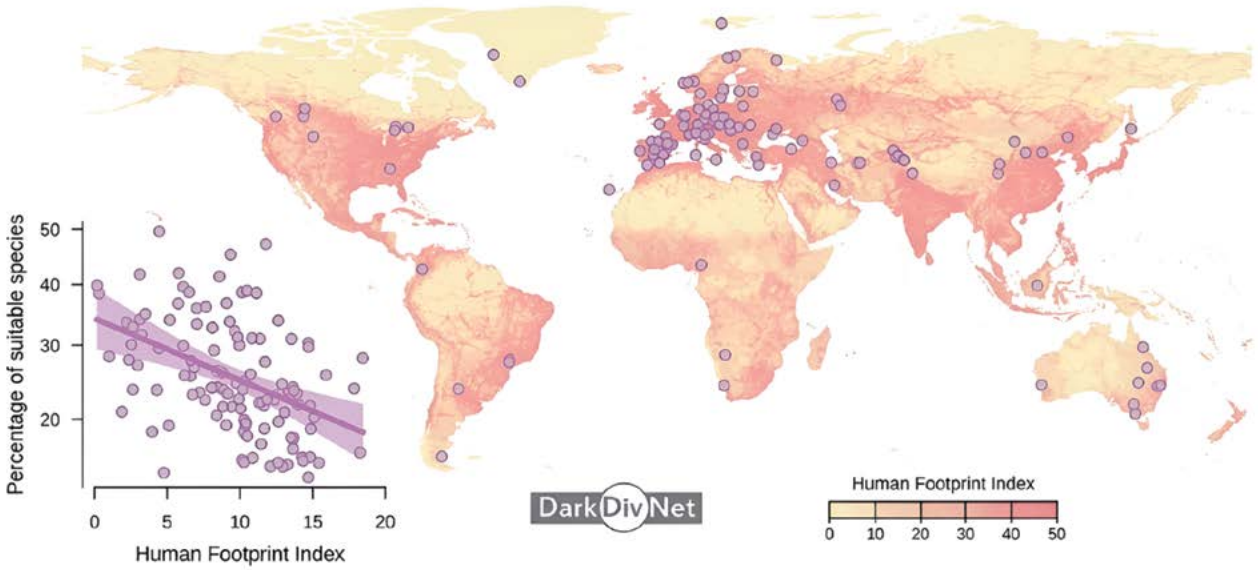
Prof Pärtel recalls, "We had introduced the dark diversity theory and developed methods to study it, but to make global comparisons we needed consistent sampling in many regions. It felt like an impossible mission, but many colleagues from different continents joined us."

Despite the challenges posed by COVID-19 and global economic and political crises, data were gathered over the years.

Prof Pärtel adds, "I am very grateful to all DarkDivNet participants for their hard field work and enthusiasm. Everybody found a way to contribute data without central funding. We only had a grant for my team at the University of Tartu in Estonia to coordinate the network and analyse the data."

The level of human disturbance in each region was measured using the Human Footprint Index, which includes factors like human population density, land-use changes (such as urban development and agriculture), and infrastructure (roads and railways).

The study found that plant diversity at a site is negatively influenced by the level of the Human Footprint Index and most of its components in a surrounding area, up to hundreds of kilometres away.



World map overlaid with the human footprint index and the study regions from *Global impoverishment of natural vegetation revealed by dark diversity*.
Source: Pärtel *et al* 2025

Professor Pärtel summarises:

"This result is alarming because it shows human disturbances have a much wider impact than previously thought, even reaching nature reserves. Pollution, logging, littering, trampling and human-caused fires can exclude plants from their habitats and prevent recolonisation."

"We also found that the negative influence of human activity was less pronounced when at least one-third of the surrounding region remained pristine, supporting the global target to protect 30% of the land," Prof Pärtel said.

The study highlights the importance of maintaining and improving ecosystem "health" beyond nature reserves. The concept of dark diversity provides a practical tool for conservationists to identify absent suitable species and track progress in restoring ecosystems.

Contact: **Professor Ladislav Mucina**
Email: Ladislav.Mucina@murdoch.edu.au
Publication link: www.nature.com/articles/s41586-025-08814-5

This research supports the **United Nations Sustainable Development Goals 15** and **17**.



Birch forest.
Photo Katie Bellaschi, via Pixabay

Bats get fat to survive hard times. But climate change is threatening their survival strategy

Centre for **Terrestrial Ecosystem Science and Sustainability**	
Aim	Understand how bats survive climatic extremes
Focus	Multiple bat species
Lead	Dr Nicholas Wu
Location	Pilbara region and globally

Dr Nicholas Wu, Lecturer in Wildlife Ecology in Murdoch University's School of Environmental and Conservation Sciences wrote the following article for *The Conversation*.

Bats are often cast as the unseen night-time stewards of nature, flitting through the dark to control pest insects, pollinate plants and disperse seeds. But behind their silent contributions lies a remarkable and underappreciated survival strategy: seasonal fattening.

Much like bears and squirrels, bats around the world bulk up to get through hard times — even in places where you might not expect it.

In a paper published in Ecology Letters, we analysed data from bat studies around the world to understand how bats use body fat to survive seasonal challenges, whether it's a freezing winter or a dry spell.

The surprising conclusion? Seasonal fattening is a global phenomenon in bats, not just limited to those in cold climates.



Fishing bats (*Myotis macropus*) resting upside down in a culvert.
Photo Jasmine Vink

Even bats in the tropics, where it's warm all year, store fat in anticipation of dry seasons when food becomes scarce. That's a survival strategy that's been largely overlooked. But it may be faltering as the climate changes, putting entire food webs at risk.

Climate shapes fattening strategies

We found bats in colder regions predictably gain more weight before winter.

But in warmer regions with highly seasonal rainfall, such as tropical savannas or monsoonal forests, bats also fatten up. In tropical areas, it's not cold that's the enemy, but the dry season, when flowers wither, insects vanish and energy is hard to come by.

The extent of fattening is impressive. Some species increased their body weight by more than 50%, which is a huge burden for flying animals that already use a lot of energy to move around. This highlights the delicate balancing act bats perform between storing energy and staying nimble in the air.

Sex matters, especially in the cold

The results also support the "thrifty females, frisky males" hypothesis.

In colder climates, female bats used their fat reserves more sparingly than males — a likely adaptation to ensure they have enough energy left to raise young when spring returns. Since females typically emerge from hibernation to raise their young, conserving fat through winter can directly benefit their reproductive success.

Interestingly, this sex-based difference vanished in warmer climates, where fat use by males and females was more similar, likely because more food is available in warmer climates. It's another clue that climate patterns intricately shape behaviour and physiology.

Climate change is shifting the rules

Beyond the biology, our study points to a more sobering trend. Bats in warm regions appear to be increasing their fat stores over time. This could be an early warning sign of how climate change is affecting their survival.

Climate change isn't just about rising temperatures. It's also making seasons more unpredictable.

Bats may be storing more energy in advance of dry seasons that are becoming longer or harder to predict. That's risky, because it means more foraging, more exposure to predators and potentially greater mortality.



Bat being examined by researchers.
Photo Kelly Sheldrick, HBI/Murdoch University

The implications can ripple outward. Bats help regulate insect populations, fertilise crops and maintain healthy ecosystems. If their survival strategies falter, entire food webs could feel the effects.

Fat bats, fragile futures

Our study changes how we think about bats. They are not just passive victims of environmental change but active strategists, finely tuned to seasonal rhythms. Yet their ability to adapt has limits, and those limits are being tested by a rapidly changing world.

By understanding how bats respond to climate, we gain insights into broader ecosystem resilience. We also gain a deeper appreciation for one of nature's quiet heroes — fattening up, flying through the night and holding ecosystems together, one wingbeat at a time.

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Publication link: https://doi.org/10.1111/ele.70155

This research supports the **United Nations Sustainable Development Goal 15**.

Effects of extreme drought on vital plant ecosystems

Centre for **Terrestrial Ecosystem Science and Sustainability**	
Aim	Uncover the effects of extreme drought on grassland and shrubland ecosystems
Focus	Grassland and shrubland ecosystems
Lead	Professor Rachel Standish
Location	Global

New research from Murdoch University shows despite evidence grasslands and shrublands can adapt to periods of moderate drought, they can't withstand prolonged periods of extreme dryness.

Despite evidence grasslands and shrublands can adapt to periods of moderate drought, they can't withstand prolonged periods of extreme dryness, latest research shows.

An international collaboration, including researchers from Murdoch University, has found even native systems capable of acclimatising to moderate drought are no match for more extreme conditions.

Published in the journal *Science*, the research quantified the combined effects of drought on 74 grasslands and shrublands in locations across the world.

Researchers warn the findings foreshadow alarming impacts on vegetation as extreme drought becomes more common due to climate change.

The research found that while the grassland and shrubland productivity subject to moderate drought stabilised after the first year, extreme drought over several consecutive years significantly impacts plant growth.

Murdoch University Professor Rachel Standish, from Murdoch University's School of Environmental and Conservation Sciences, said the findings were concerning for the future of ecosystems, given the likelihood of increase extreme droughts due to climate change.

"We found that productivity reduced by 77% by year four when plants were subjected to consecutive years of extreme drought," Professor Standish said.

"Grassland and shrubland ecosystems cover around 40% of the earth's terrestrial surface."

The research is part of International Drought Experiment which brings together researchers from across the world to measure the impact of reduce rainfall on ecosystems.

The full study Drought intensity and duration interact to magnify losses in primary productivity can be found in the journal *Science*.

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Publication link: www.science.org/doi/10.1126/science.ads8144#editor-abstract

This research supports the **United Nations Sustainable Development Goals 13** and **15**.



Dry landscape.
Photo Engin Akyurt, via Pexels

Review of the ecological impacts of solar farms

Centre for **Terrestrial Ecosystem Science and Sustainability**	
Aim	Identify the ecological impacts of solar farms and ways to mitigate those impacts
Focus	Bird, bat and insect species
Lead	Professor Trish Fleming
Location	Global

Murdoch University researchers call for wildlife-friendly solar farm design to protect biodiversity amid global renewable energy expansion.

Solar energy plays a central role in the race toward a low-carbon future. But while solar farms help reduce greenhouse gas emissions, a new study warns that their rapid expansion may come at a cost to biodiversity — particularly for birds and bats.

The research by wildlife ecologist Professor Trish Fleming explores the ecological consequences of large-scale solar facilities.

It reveals that while solar panels offer environmental benefits, they also pose unique challenges to wildlife that must be addressed to ensure a truly sustainable energy transition.

In 2023, solar panels covered approximately 37,886 square kilometres of land — or about 0.025% of the Earth's surface. As solar capacity rapidly increases each year, the land required for new installations is significantly expanding. Typically, two to six hectares of land are cleared for every megawatt of solar power generated, resulting in significant habitat disruption.

This new research undertaken by the Harry Butler Institute with funding from Fortescue Metals Group has found these vast, flat surfaces can interfere with animal movements in unexpected ways.

"The reflective glare from solar panels mimics the appearance of water bodies, confusing migrating birds and leading them off course," Professor Fleming said.

"This phenomenon, known as polarised light pollution, can also attract insects, inadvertently creating new feeding grounds for birds and bats.

"While this may seem beneficial, it can alter natural foraging behaviours and increase collision risks."

Trapped by design

Another concern is the fencing commonly used around solar farms.

While intended to protect infrastructure, these barriers can entrap wildlife, leading to injury or death. Migratory species may find their traditional routes blocked, disrupting nesting and feeding patterns.

However, the study also highlights promising mitigation strategies. A solar facility in Nevada, USA, offers a model for wildlife-friendly solar design.

During construction, native plants and natural washes were preserved and openings were left in fences to allow desert fauna to pass freely. Early monitoring shows that animals are using these openings, suggesting that thoughtful design can reduce ecological harm.

Innovations to make solar safer

There are also technological solutions to the problems that show promise.

"Nano-coating solar panels to reduce polarised light pollution is one change that could help prevent birds from mistaking panels for water," Professor Fleming said.

"These coatings alter the way light is reflected, making the panels less visually disruptive to wildlife."

The study calls for greater consideration of biodiversity conservation in solar farm planning.



Pilbara spinifex pidgeon.
Photo Angus Dempster, HBI/Murdoch University

We can mitigate greenhouse gas emissions without sacrificing biodiversity. It's not a choice between clean energy and conservation — we can have both.

As governments and industries invest heavily in renewable energy, the findings underscore the importance of integrating ecological awareness into infrastructure development.

The study urges planners, policymakers, and developers to adopt wildlife-friendly practices and technologies to ensure that solar energy remains a truly sustainable solution.

The study adds to a growing body of work advocating for responsible renewable energy development — one that protects both the planet and its inhabitants.

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Publication link: www.sciencedirect.com/science/article/pii/S1364032125006689

This research supports the **United Nations Sustainable Development Goals 7** and **15**.



Horizon Power Esperance Power Project.
Photo Alastair Bruce, HBI/Murdoch University

What's driving southwest WA's cool season rainfall decline

Centre for **Terrestrial Ecosystem Science and Sustainability**	
Aim	Review drivers of cool season rainfall in southwest Western Australia
Focus	Climate science
Lead	Associate Professor Jatin Kala and Dr Kerryn Hawke
Location	South-west of Western Australia

The southwest of Western Australia has been on a persistent trend of rainfall decline since the 1970s. Climate scientists have sought to unravel the factors driving this concerning downward trend.

Southwest Western Australia (SWWA) is a globally significant Mediterranean climate biodiversity hotspot characterized by cool, wet winters and hot, dry summers. Since the mid 20th century, the region has experienced a marked decline in cool season (April–October) rainfall, with step decreases around 1970 and the late 1990s. This drying trend is having a critical impact on natural ecosystems, agriculture (especially wheat production), and water resources, and is projected to continue under all climate scenarios.

Winter rainfall dominates SWWA's climate, and its long-term decline has led to reduced streamflow, more frequent and intense droughts, and stress on biodiversity and farming systems. While paleo-climate evidence shows that similar declines in rainfall have occurred in the past, , the current drying trend is unusually strong and likely lies at or beyond the boundaries of natural variability.

Key synoptic (weather system) drivers

Rainfall in SWWA occurs primarily during the cool season and is primarily delivered by mid-latitude weather systems. Changes in these systems are central to the decline.

Cold fronts, which account for around 50% of annual rainfall, have seen a southward shift and/or weakening of fronts, leading to fewer and less intense rain events, especially longer-duration systems. This shift is linked to changes in atmospheric circulation and reduced storm development.

Both Southern Ocean low-pressure systems influencing southwestern Australia, and non-tropical cyclones originating in the Indian Ocean have decreased in frequency since the mid 20th century. However, while overall intensity has declined, paradoxically the strongest events, while less frequent, show signs of becoming more extreme.

Cut-off lows contribute significantly to rainfall (especially inland) but are under-researched, whereas anticyclones (or high-pressure systems) have increased in frequency and persistence, which suppresses rainfall by blocking storm systems and promoting dry continental airflow.

Large-scale climate drivers

Large-scale atmospheric circulation changes strongly influence regional weather systems, including the subtropical ridge (STR), the Southern Annular Mode (SAM), the El Niño–Southern Oscillation (ENSO), Indian Ocean Dipole (IOD), and their interactions.

The STR is a dominant driver of SWWA climate. Its intensification and poleward shift increases surface pressure over the region, suppressing rainfall and reducing the penetration of rain-bearing systems. This change is closely linked to global climate change.

SAM governs the position of westerly winds. A trend toward positive SAM shifts storm tracks poleward, reducing rainfall. Its influence has strengthened in recent decades, partly driven by ozone depletion and greenhouse gases.

ENSO has a been found to have a weak and inconsistent influence on SWWA rainfall compared to eastern Australia, though it may act indirectly through other drivers.

The IOD also has a limited but complex influence. Positive IOD events tend to coincide with drier conditions, but the relationships are inconsistent. Recent increases in positive IOD frequency may contribute to drying.

Interactions between these large-scale climate drivers are complex and add uncertainty to understanding and predicting rainfall trends.

Land use change effects

Large-scale land clearing for agriculture has land altered surface properties, influencing local climate processes. For example, reduced surface roughness and altered heat fluxes affect cloud formation and the transport of moisture. Additionally, increasing salinity at the surface due to land-clearing has increased the number of salt lakes, which contribute large numbers of very small salt aerosols which can inhibit cloud droplet formation and potentially contribute to rainfall decline.

Regional climate models suggest land-use change has contributed to reduced winter rainfall, although estimates vary and global models show mixed results. Overall, it's more likely that land use amplifies the drying trend but does not fully explain it.

Key conclusions and research gaps

Our review concludes that the decline in SWWA rainfall results from interacting drivers across multiple scales. The strongest evidence points to changes in atmospheric circulation driven partly by anthropogenic climate change.

Changes in regional synoptic weather patterns and larger scale Southern Ocean atmospheric dynamics (SAM) can directly reduce rainfall, while other modes of natural climate variability (IOD, ENSO) play a secondary but complex role. Land use change has local effects but it's contribution to rainfall decline needs to be better quantified.

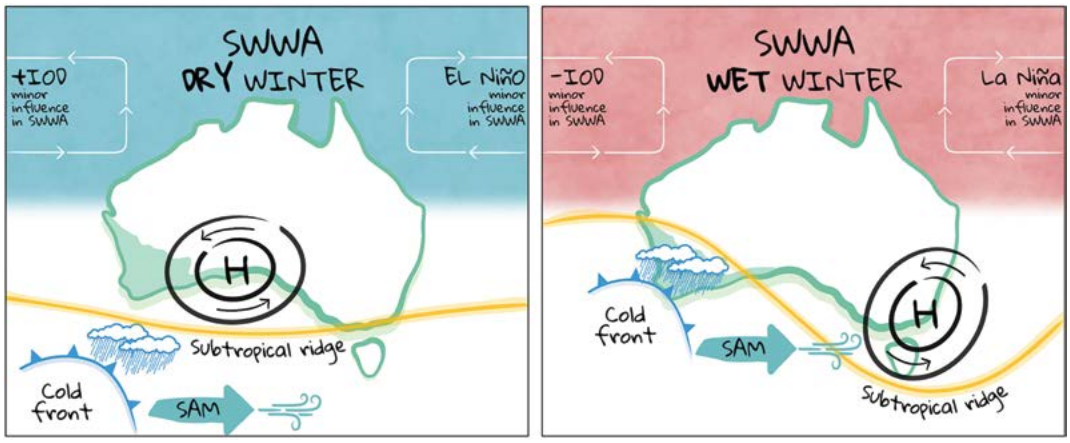
Essentially, SWWA's cool-season rainfall decline is a multi-factor, climate-driven phenomenon dominated by large-scale atmospheric changes linked to global warming, with additional contributions from regional weather shifts and land-use change.

Continued drying is highly likely, making improved understanding essential for adaptation and water management planning.

Future research needs to address major uncertainties, such as our understanding of changing storm dynamics and long-duration rainfall events, and interactions among climate modes.

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This research supports the **United Nations Sustainable Development Goal 13**.



Model outputs depicting different combinations of influences on rainfall in Australia between June and November.

Centre for **Sustainable Aquatic Ecosystems**

Associate Professor Stephen Beatty
Director

Dr Adrian Gleiss
Deputy Director



About the Centre

The Centre leads research to ensure healthy and productive freshwater, estuarine and marine ecosystems to support vibrant communities across Australia and the Indo-Pacific. We take an integrative socio-ecological approach, with our research focused on ensuring ecosystem health and biodiversity through the sustainable use of aquatic resources.

Uniquely situated on the rim of the Indian Ocean within a Global Biodiversity Hotspot, the Centre brings together experts in aquatic biology and ecology, physiology, marine mammal ecology, fisheries, aquaculture, algal biotechnology, oceanography, social science, bioinformatics, economics and spatial sciences.

Our research spans all levels of biological organisation from the genome to the ecosystem, and aquatic systems from inland lakes to beyond the continental shelf.

Yabbi captured by researchers.
Photo Stephen Betty, HBI/Murdoch University



> As filter feeders, molluscs provide essential cleaning services for aquatic ecosystems.

Carter's mussel.
Photo Jake Daviot, HBI/Murdoch University

A new method for detecting algal bloom toxins in blue swimmer crab

Centre for **Sustainable Aquatic Ecosystems**	
Aim	To effectively detect and reduce toxins in blue swimmer crabs
Focus	Alexandrium Minutum dinflagellate algae
Lead	Dr Cherono Kwambai
Location	Western Australia

Toxic algal blooms are of increasing concern in Australia.

South Australia's coastal waters feeling their impacts in the forms of damaged marine environments and widespread fish deaths since early 2025.

But what happens when the crustaceans and fish that encounter the toxins end up on our plates?

Dr Cherono Kwambai from Murdoch University's Algae Innovation Hub developed and validated an analytical method to detect the toxins in the most popular seafood crustacean and successfully trialled methods of reducing the toxin load.

The results of this research will help to inform best practice for seafood storage and preparation, bloom treatment, and toxin detection — which are critical to both environmental and public health.

Dr Kwambai's research focused on the toxic bloom, Alexandrium Minutum, and she quickly realised its impact could be hazardous not just ecologically, but also for public health.

The Blue Swimmer Crab is the most harvested edible crab species in Australia — with 500–800 tonnes harvested commercially per year, and around the same numbers recreationally.

As toxins from the bloom make their way through underwater ecosystems, they enter the bodies of aquatic animals such as the Blue Swimmer Crab. Historically, the toxin has been difficult to detect.

"I found that these toxins accumulate exclusively in the hepatopancreas, a vital organ found in anthropods and molluscs," Dr Kwambai said.

Upon validating her method of detection, Dr Kwambai trialled methods of both reducing the toxin upon harvesting, and the removal of toxic Alexandrium cells from water.

I also examined the effects of cooking and freezing on toxin levels, discovering that freezing and thawing can significantly reduce concentrations.

Dr Kwambai conducted small-scale controlled trials using a PAC-modified clay on the bloom, which achieved up to 100% removal within two hours at low concentrations.

The efficiency of this modified clay in saline water slurry offers significant cost and operational benefits.

Dr Kwambai said this combined with the clay's minimal risk to organisms living along the floorline of underwater environments supported the case for larger-scale, in-situ testing.

She added that this research gave her the chance to contribute practical solutions to real-world problems.

I wanted to bridge the gap between academic knowledge and everyday application — turning science into action that safeguards ecosystems, supports sustainable fisheries.

Dr Kwambai's PhD was co-funded by the Department of Biodiversity, Conservation and Attractions, the Department of Primary Industries and Regional Development and the Department of Health.

The results of this work will help to refine future research focuses across WA.

Primary supervisor and head of the Algae Innovation Hub Professor Navid Moheimani said this study showed what could be achieved when research was focussed on locally relevant environmental challenges.

Blue swimmer crab.
Photo ManojMk Brucelee, via Pexels

"Strong collaboration with local government is essential," Professor Moheimani said.

"They are key to implementing practical interventions and ensuring that innovative science leads to meaningful outcomes for our coastal ecosystems and industries."

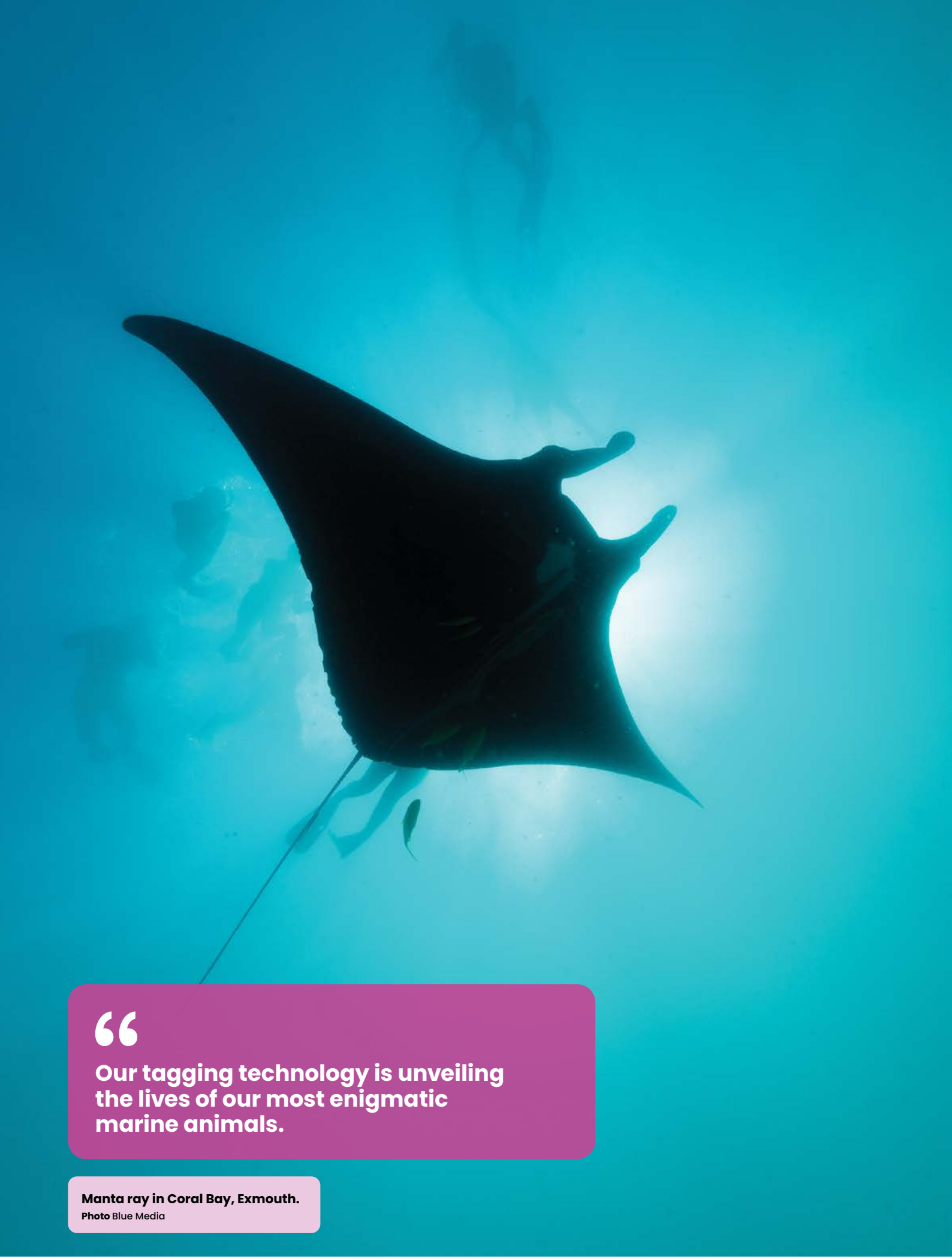
Read the article *Toxic Alexandrium Treatment in Western Australia: Investigating the Efficacy of Modified Nano Clay* published in the October 2025 issue of the journal Toxins.

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This research supports the **United Nations Sustainable Development Goals 6** and **14**.



Blue manna crab.
Photo Jaradah Fish, via Pexels



> **Our tagging technology is unveiling the lives of our most enigmatic marine animals.**

Manta ray in Coral Bay, Exmouth.
Photo Blue Media

Deep diving manta rays building 'mental maps' of the ocean

Centre for **Sustainable Aquatic Ecosystems**	
Aim	Uncover the purpose of deep-diving behaviour in manta rays.
Focus	Oceanic manta rays (*Mobula birostris*)
Lead	Dr Calvin Beale
Location	Indonesia, Peru and New Zealand

New research led by Murdoch University has found oceanic manta rays may dive more than a kilometre deep to orientate themselves and build "mental maps" of the ocean.

The study, which was published in *Frontiers in Marine Science*, tracked 24 oceanic manta rays in Indonesia, Peru and New Zealand, between 2012 and 2022.

An international team of researchers tagged the deep diving animals to learn more about their behaviour.



Manta Ray on the ocean floor Coral Bay.
Photo Blue Media

They found manta rays are capable of diving to depths of more than 1,200 metres — far further than initially believed.

Lead author Dr Calvin Beale, who completed his PhD at Murdoch University, said the manta rays may go on these deep dives to gather information before deciding where to go on long distance travels.

"These dives, which are linked with increased horizontal travel afterwards, may play an important role in helping mantas gather information about their environment and navigate across the open ocean," he said.

He said the deep dives could help manta rays sample the environment, such as the Earth's magnetic field, oxygen, temperature and light levels.

"By diving down and 'sampling' these signals, they could build a mental map that helps them navigate across vast, featureless stretches of open ocean," Dr Beale said.

"They can be in up to 8,000 metres deep water and there's no way for them to really navigate. There are no landmasses or anything nearby within days, so it seems like they're building a mental compass, a map."

The full study Deep diving behaviour in oceanic manta rays and its potential function can be found in the journal *Frontiers in Marine Science*.

Funder: Rolex Awards for Enterprise, Whitley Fund for Nature, the Nausicaá Charitable Foundation. Bertarelli Foundation, MAC3 Impact Philanthropies, the Henry Foundation, the Save the Blue Foundation, Harbig Family Foundation, Daniel Roozen, and Katrine Bosley.

Publication link: www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2025.1630451/full

This research supports the **United Nations Sustainable Development Goal 14**.

Perth's dolphins eat what's in season and are loyal to their groups

Centre for **Sustainable Aquatic Ecosystems**	
Aim	To examine the ecology, behaviour, and population dynamics of Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) in Perth metropolitan waters, with an emphasis on informing conservation and management strategies
Focus	Indo-Pacific bottlenose dolphin (*Tursiops aduncus*)
Lead	Dr Delphine Chabanne
Location	Perth, Western Australia

They eat seasonal food, rest half of their brain at a time, are loyal to their communities but occasionally migrate across town and are known to be able to survive shark bites.

Perth's two dolphin groups in the Swan-Canning Rivers and further south in Cockburn Sound have been studied for more than a decade by Murdoch University researcher Dr Delphine Chabanne, who is a passionate champion of the marine mammals' welfare.

Dr Chabanne, from Murdoch University's Harry Butler Institute, was born and raised in France and owes her name to the animal she's been fascinated by since childhood (Delphinus is the Latin word for 'dolphin'). She has spent her career studying dolphins and is often joined on the water by citizen scientist volunteers.

She gave a presentation to students on Perth's coastal dolphins in late 2025 as part of Western Australian Marine Science Institution's (WAMSI) education outreach program Thinking Blue. The program connects school students with leading researchers from WAMSI's partnership through online talks.

"There are three species of coastal dolphins in Western Australia and here in Perth the only species present is the Indo-Pacific bottlenose dolphins," Dr Chabanne said.

"There are about 120 dolphins who live primarily in Cockburn Sound and Owen Anchorage and about 25 who use the Swan Canning estuary."

"Sometimes dolphins from the Swan Canning estuary will be seen with Cockburn Sound dolphins, potentially mating," Dr Chabanne said.

"While rare, movement between communities has also been observed. One example is 'Hugs' who was born from a resident mum in Owen Anchorage but has been spending most of her time in the lower reaches of the Swan Canning estuary since having her first calf in 2021."

How are dolphins studied?

Dr Chabanne said dolphin surveys involved travelling by boat in either parallel lines or zig-zag to look for groups of dolphins. When they are spotted, researchers take photos, record the group composition and monitor the animals' behaviour. Environmental conditions are also collected, when possible, such as water temperature and depth in the area.

"We photograph the dorsal fins because each one is distinctive. Dolphins are born with smooth fins, but over time individuals get nicks, scars and notches that allow us to track them."

"Since 2011, we have been issuing a 'Finbook' on the River Guardians website which helps identify local dolphins residing in the Swan Canning estuary."

She said sometimes dolphins had bigger injuries such as shark bites.

Dolphins are generally resilient to shark bites, unless they were bitten on their softer bellies where their vital internal organs are located.



Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) breaching in Perth's coastal waters, displaying the active behaviours and strong social interactions characteristic of this species.
Photo Delphine Chabanne, HBI/Murdoch University

Seasonal diets

Perth's dolphins are opportunistic with food. Dr Chabanne said their preferences changed with the seasons: In summer they tended to eat more benthic detritivore fish, such as mullet, while in winter they prefer cuttlefish and octopus. Although dolphins have teeth, they often toss octopus into the air to break it into smaller pieces before swallowing it.

Threats to dolphins

"One of the biggest dangers is fishing lines and nets in the water that can tangle dolphins," Dr Chabanne said.

"Removing the gear can be very difficult, and because of their size, thinner blubber, and their limited awareness of their environment, dolphin calves are particularly vulnerable to fishing gear entanglement."

She said boat strikes were another threat to the mammals and because they relied on sound, loud noises underwater can disturb their behaviour.

Keeping the waterways clean and free of pollution was also important for their overall health.

"Cetacean Morbillivirus, which weakens the animals' immune system, has killed dolphins around Perth. Some of six dolphins found dead in 2009 were infected with the virus, and another five died in 2019."

Interesting dolphin facts

Females can live for about 40 years, while males live around 35 years.

They emit clicking sounds and listen to the returning echoes as sound waves bounce off surfaces to understand their surroundings and search for food.

Dolphin pregnancy lasts 12 months, with calves staying with their mothers for 3 to 5 years as they learn essential skills.

Dolphins rest one half of their brain at a time, allowing them to stay alert for predators or danger and to surface for air.

How to protect dolphins?

- Keep the oceans/estuaries/coast clean and tidy.
- Have a beach clean up to stop rubbish going into the water.
- Carefully dispose of fishing line and other gear.
- Slow down in boats.
- Don't feed dolphins.
- Join a citizen science program.

This article was authored by WAMSI and is reproduced with permission.

Funding: This work draws on a long-term research program supported by multiple funding bodies over time, including the Swan River Trust, the Department of Biodiversity, Conservation and Attractions, Fremantle Ports, and the WAMSI Westport Marine Science Program.

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This work supports the **United Nations Sustainable Development Goal 14**.

Freshwater mussels in a changing landscape: new insights into the conservation and function of *Westralunio carteri*

Centre for **Sustainable Aquatic Ecosystems**	
Aim	Quantify the ecosystem services provided by freshwater mussels in southwestern Australia
Focus	Carter's freshwater mussel (*Westralunio carteri*)
Lead	Jake Daviot
Location	Southwestern Australia

Freshwater mussels are among the most threatened animals globally, yet they play vital roles in maintaining healthy aquatic ecosystems. This research sheds light on both the conservation potential and ecological importance of the region's endemic, and Vulnerable freshwater mussel, *Westralunio carteri.*

Experiments showed that *W. carteri* is an effective biofilter, capable of removing algae and other suspended particles, including *E. coli* from the water column. Carter's mussel exhibited high clearance rates that increased with temperature. Maximum filtration rates were estimated at over 1 litre of water, per mussel, per hour.

These filtration rate estimates are comparable to those recorded for other freshwater mussels worldwide, suggesting that our endemic mussels may play an important role in maintaining water quality in the intermittently flowing rivers of southwestern Australia. This function is likely to become increasingly important as climate change reduces streamflow and refuge pools become smaller, warmer and more isolated.

Alongside their ecological role, this research also explored the conservation potential of artificial habitats. Human development has dramatically altered river systems, creating numerous artificial waterbodies such as drains, reservoirs and dams. By comparing mussel populations across natural and artificial habitats, researchers found that several artificial sites supported large populations of *W. carteri*, including individuals of multiple size classes and evidence of recruitment.

Although some populations in both habitat types showed signs of decline, the results demonstrate that artificial habitats can provide viable refuge when conditions resemble those of natural systems.



Jake Daviot with a carter's mussel.
Photo HBI/Murdoch University



Carter's mussel.
Photo Jake Daviot, HBI/Murdoch University

Together, these findings highlight both the ecological value and conservation potential of *W. carteri*. Protecting existing populations and recognising the role that well-managed artificial habitats can play may help support this Vulnerable species while also preserving the important ecosystem services it provides.

Funding: Water Corporation of Western Australia

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Related publications:
https://doi.org/10.1007/s10750-025-05815-3
https://doi.org/10.1071/PC25073

This research supports the **United Nations Sustainable Development Goal 6** and **14**.

Centre for **Biosecurity and One Health**

Professor Sam Abraham
Director

Professor Melissa Thomas
Deputy/Acting Director

About the Centre

The Centre for Biosecurity and One Health recognises the linkages between health, biosecurity and the environment.

It comprises research across themes including One Health, antimicrobial resistance, biosecurity of environmental and production systems, vector and water-borne diseases, epidemiology, food safety and zoonotic diseases. Policy, legislation and social science perspectives for each of these areas are a feature of our research outputs, with a transdisciplinary approach taken to address complex problems that relate to the health of animals, wildlife, plants, humans and eco-systems.



Looking through the microscope.
Photo fotografyarte, via Pixabay



Shipping containers at port.
Photo Jan van der Wolf, via Pexels

New technology start-up poised to change how we monitor and treat antimicrobial-resistant diseases threatening livestock and livelihoods

Centre for **Biosecurity and One Health**	
Aim	Provide rapid and accurate testing for AMR to protect livestock from AMR diseases
Focus	Antimicrobial-resistant diseases
Lead	Professor Sam Abraham
Location	Perth, Western Australia

Cutting edge data and automation technology is poised to change the way we monitor and treat the most challenging diseases threatening livestock and livelihoods.

Murdoch University biotech startup Aquila Scientific has been awarded a $3 million Cooperative Research Centre Project grant to deliver world-first automated diagnostic solutions for animal health.

Led by leading biotechnology expert Professor Sam Abraham, the startup promises to radically increase the speed and accuracy with which animals are diagnosed with diseases and how effective they are treated.

"Antimicrobial resistance is one of the major global health challenges — for people, for plants and for animals — and we're setting up to tackle it by combining our biotech expertise with leading edge robotics," Professor Abraham said.

Antimicrobial resistance occurs when bacteria no longer respond to medicines, like antibiotics.

"Antibiotics have been curing disease in animals for decades. However, as the bacteria they treat change over time, so does their response to the once-revolutionary treatments," he said.

"This results in resistance to these medicines."

Aquila Scientific will pioneer diagnostic solutions to address this resistance and other diseases in animals with fast, large-scale testing for the agricultural sector.

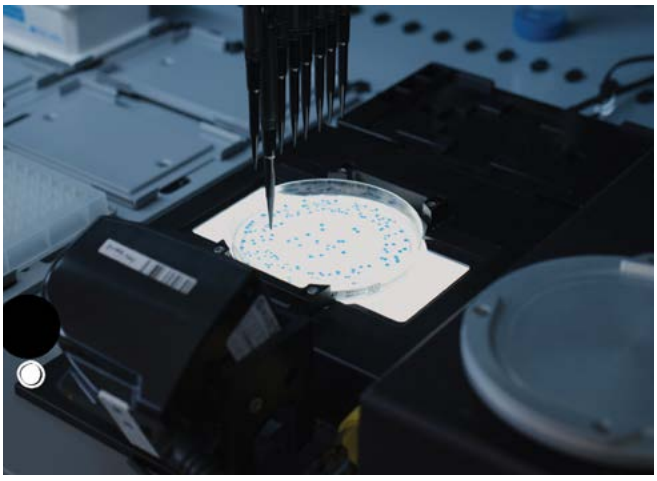
Professor Abraham said improving the health of livestock was of national importance because food sits at the interface between humans, animals, and the environment.

"Bacteria are developing resistance to antibiotics faster than new antibiotics can be produced, and with livestock able to move bacteria through the food supply chain, we need to eliminate them at the earliest possible point," Professor Abraham said.

Aquila Scientific has been set up to do exactly that, with automated robots able to not only process animal samples at greater scale than ever before but also harness the data from that processing.

Artificial Intelligence models will be deployed to constantly improve the accuracy of diagnosis and inform the development of treatment recommendations.

Our robots are also able to manufacture diagnostic kits for use on-farm, which puts our cutting-edge technology into the hands of farmers.



Automated system in operation.
Photo Murdoch University

"It's all about making our food chain more secure, our farms more resilient, and our animals happier, healthier and more productive."

Global testing for infectious diseases on medical, veterinary and environmental samples is currently time-consuming, labour-intensive and costly. The new biotech developed from this project aims to change all that with the first ever Australian made tests.

The three-year project will see Aquila Scientific collaborate with a global leader in laboratory automation Tecan, Denmark's Statens Serum Institut, University of Sydney's School of Veterinary Science, and University of South Australia's School of Pharmacy.

Together, the consortium will develop and commercialise the Aquila Azure™ — a compact, AI-driven, three-in-one diagnostic platform — and the Aquila SmartView™ antimicrobial susceptibility testing module.

These promise to build sovereign capacity in laboratory automation, creating high-value jobs, and deliver practical tools to combat antimicrobial resistance and emerging infectious diseases.

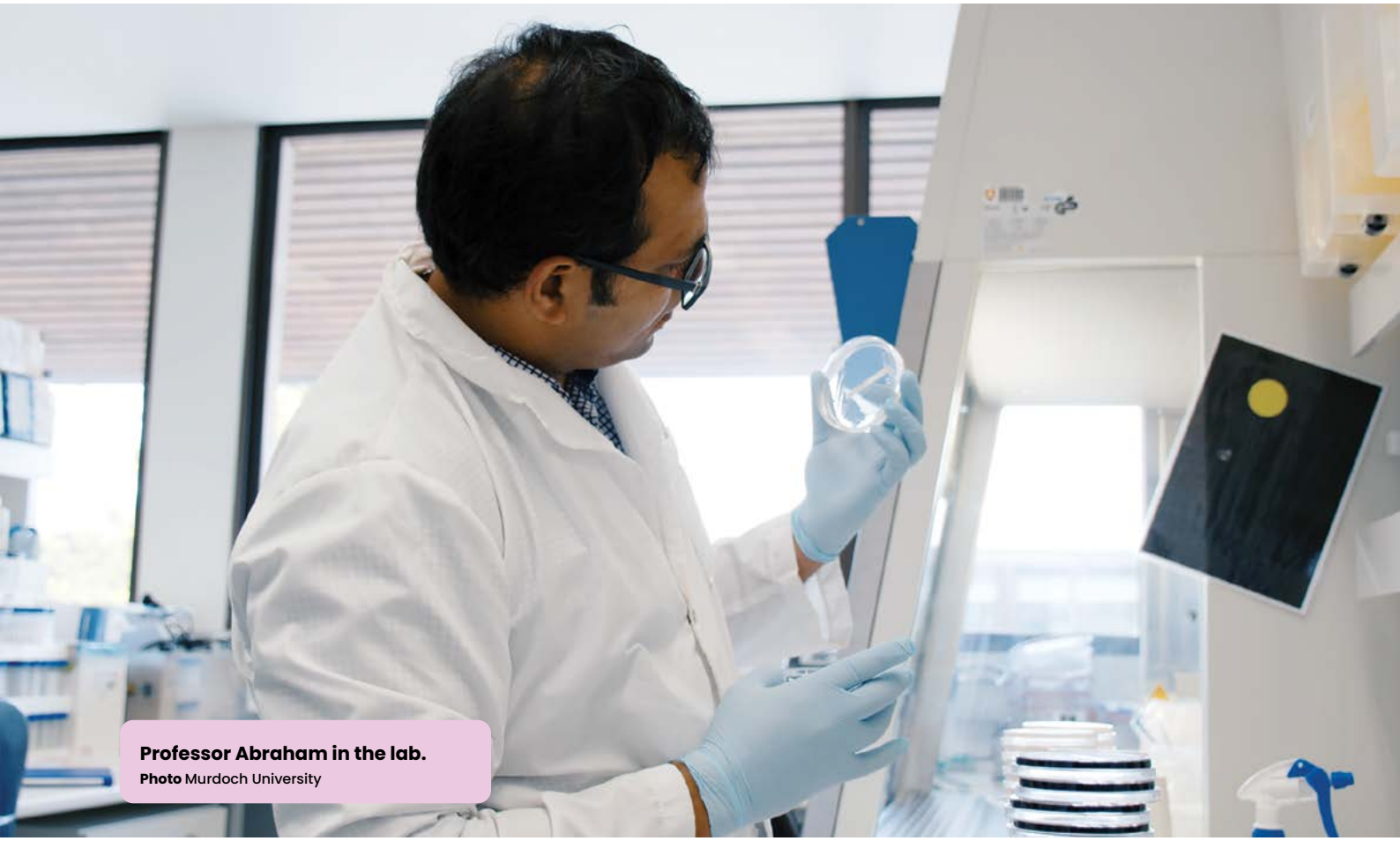
Aquila Scientific was born out of Murdoch University's antimicrobial resistance and infectious diseases laboratory, where Professor Abraham undertakes research as part of the Harry Butler Institute and School of Medical, Molecular and Forensic Sciences.

Inspired by the latest innovations in biotech lab automation, genomics, and mass spectrometry, Professor Abraham brought the disciplines together to develop novel testing solutions for animal health.

He was joined on the journey by his wife and drug discovery and microbiology expert, Dr Rebecca Abraham and his long-time mentor, veterinarian and epidemiologist, Professor David Jordan.

Contact: **Professor Sam Abraham**
Email: S.Abraham@murdoch.edu.au

This research supports the **United Nations Sustainable Development Goals 2**, **3**, **15**, and **17**.



Professor Abraham in the lab.
Photo Murdoch University

Research continues on causes of neurological condition impacting WA's magpies

Centre for **Biosecurity and One Health**	
Aim	Uncover the causes black and white bird disease
Focus	Black and White bird disease
Lead	Dr Bethany Jackson
Location	Western Australia

Murdoch University researchers have given an update on their investigation into the mysterious neurological syndrome affecting magpies in Western Australia.

In April 2025, Murdoch University partnered with WA Wildlife to conduct an intensive investigation into the mysterious neurological syndrome affecting magpies in WA.

Using the last known cases, researchers carried out a comprehensive study to uncover possible causes of this unusual condition.

While the research team is yet to find a definitive cause of neurological syndrome, ongoing molecular testing and pathology have provided some leads.

Dr Flaminia Coiacetto, Senior Lecturer at Murdoch University's School of Veterinary Medicine, said the investigation so far had allowed the team to rule out several possible causes.

"This is an important step forward," Dr Coiacetto said.

"While we don't yet have a definitive answer, the progress we've made is guiding our next steps.

"This work is complex, but every piece of information brings us closer to understanding what's happening and how best to respond."

What the research involved

The investigation involved three major steps:

1. Molecular testing for known and unknown pathogens, including viruses, bacteria, and parasites, as well as screening for important notifiable diseases through DPIRD.
2. Environmental contaminant screening, testing liver samples for approximately 250 substances such as heavy metals, pesticides, herbicides, and rodenticides.
3. Post-mortem and pathology, examining organs and tissues under the microscope for signs of disease or infectious agents.

What we know so far

Dr Bethany Jackson, from Murdoch University's Centre for Biosecurity and One Health and School of Veterinary Medicine, said testing has ruled out notifiable diseases such as bird flu and Newcastle disease.

Botulism was not detected, although this remains difficult to exclude completely.

Glyphosate was absent from all samples, and while low levels of legacy pesticides (such as dieldrin and DDT byproducts), rodenticides, and some heavy metals were found, these were similar in both affected and unaffected birds.



Australian Magpie.
Photo Al Bruce, HBI/Murdoch University

"As with other contaminants that persist, we are not surprised that second-generation rodenticides are present," Dr Jackson said.

"This reinforces the importance of using all pesticides, herbicides, and rodenticides sparingly and with thought for secondary toxicity and environmental impacts."

What's next

The team will continue investigations into potential infectious agents, including blood parasites and insect-borne viruses, and will focus on comparing 'normal' cases to those showing neurological signs.

Further testing and possible treatment trials are planned for the next season.

"Complex wildlife diseases like this often take multiple seasons to investigate, and sometimes no definitive cause is found," Dr Coiacetto said.

"Our team is committed to continuing this work into the next season and building on what we've learned so far.

"We thank the public and our wildlife sector colleagues for their continued support as we respond to this challenging and unusual condition."

Public guidance

Do not collect or report deceased birds to wildlife centres or Murdoch University for research use. We require very specific and time-sensitive samples for our work.

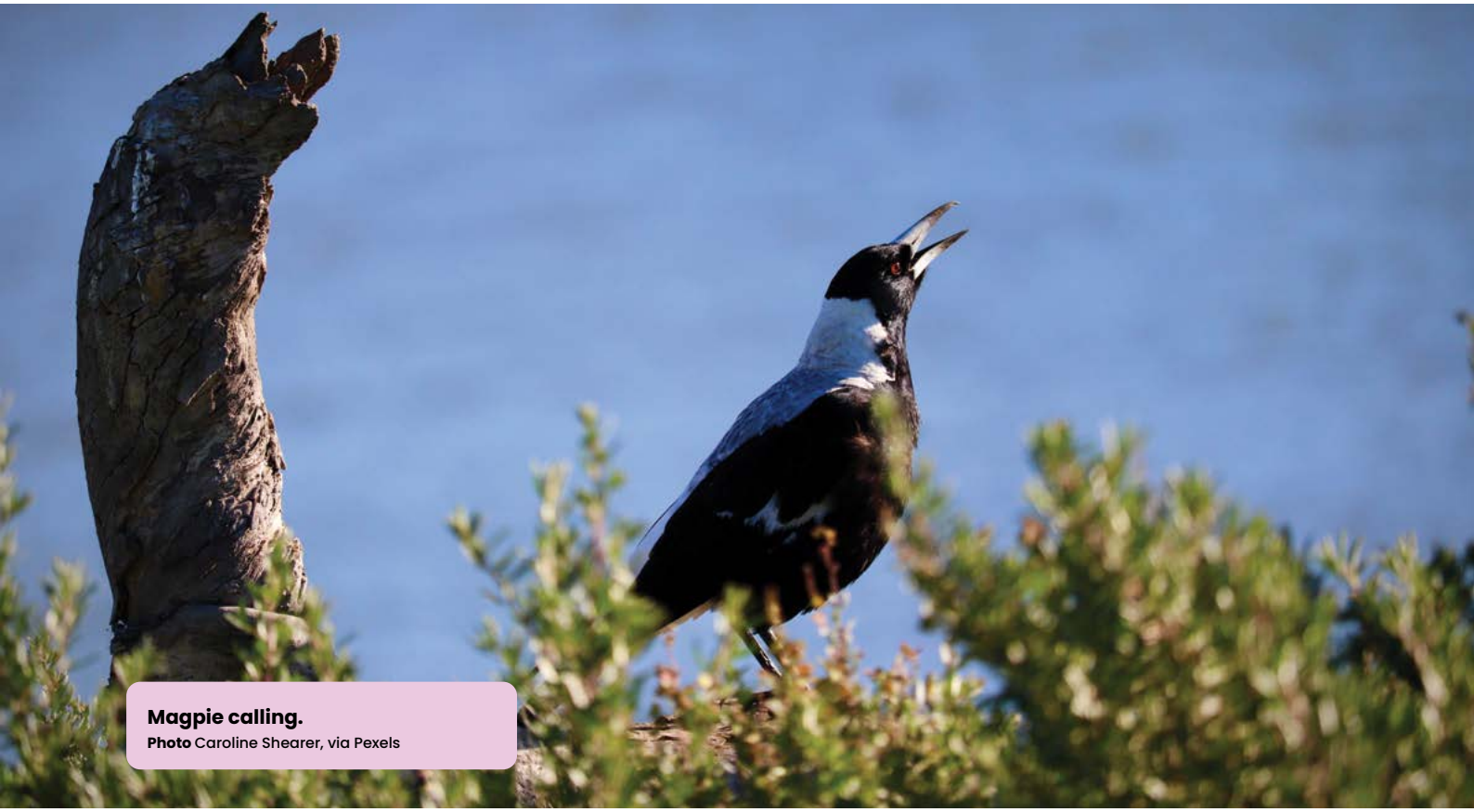
If a live bird shows signs of paralysis, call the Wildcare Helpline on (08) 9474 9055 or take it to a wildlife carer or hospital.

If five or more sick or dead birds are found in one area, report this to the Emergency Animal Disease Hotline: 1800 675 888.

The project was made possible thanks to the support of NMI laboratories, DPIRD, wildlife centres and volunteers — including Darling Range Wildlife Shelter, Kanyana Wildlife, Perth Wildlife Hospital, and WA Wildlife — as well as private donors and Murdoch University research staff.

Contact: **Dr Bethany Jackson**
Email: B.Jackson@murdoch.edu.au

This research supports the **United Nations Sustainable Development Goal 15**.



Magpie calling.
Photo Caroline Shearer, via Pexels

Event launches a new WA biosecurity network and engages next generation of scientists and practitioners

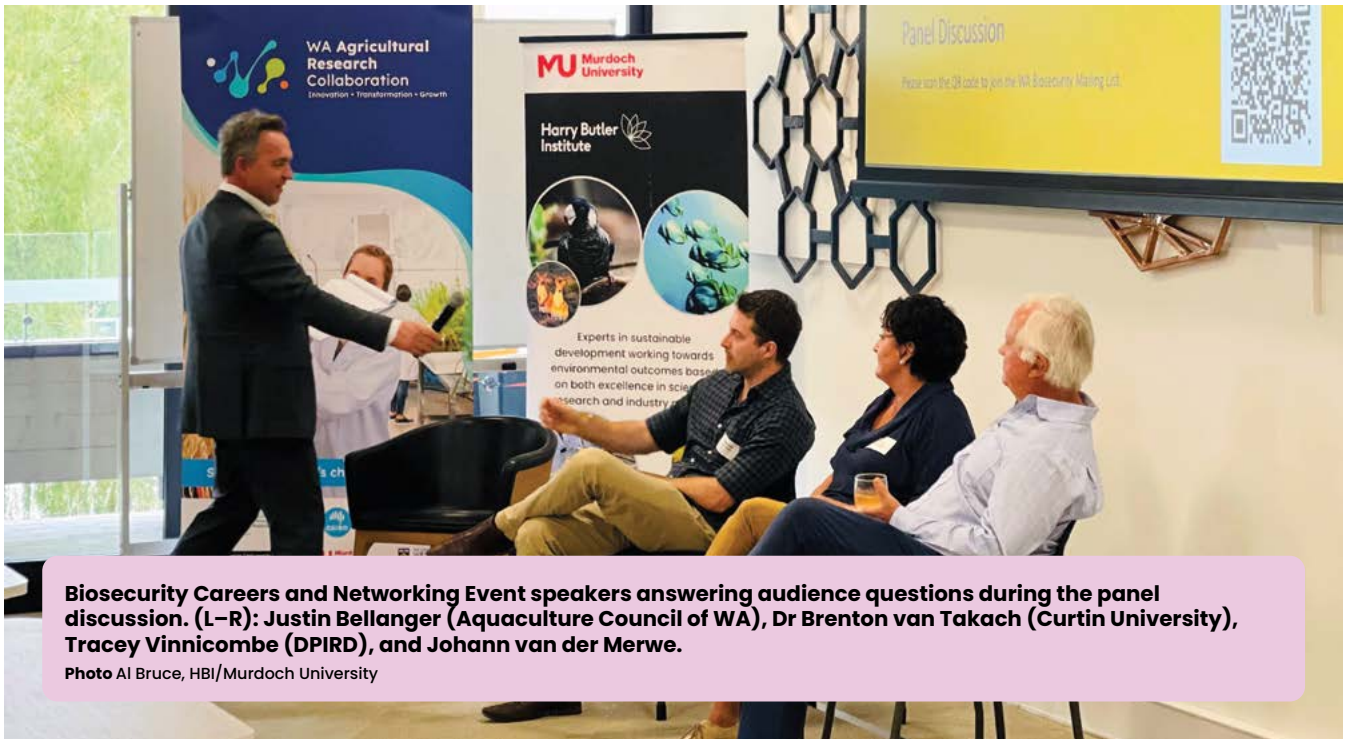
Centre for **Biosecurity and One Health**	
Aim	Bring together WA's biosecurity network and encourage biosecurity careers
Focus	WA Biosecurity
Lead	Professor Melissa Thomas
Location	Western Australia

A collaboration between Murdoch's Harry Butler Institute, the Western Australian Biodiversity Science Institute (WABSI) and the WA Agricultural Research Collaboration (WAARC) has created a biosecurity network for Western Australia, connecting researchers, professionals and students from across the state.

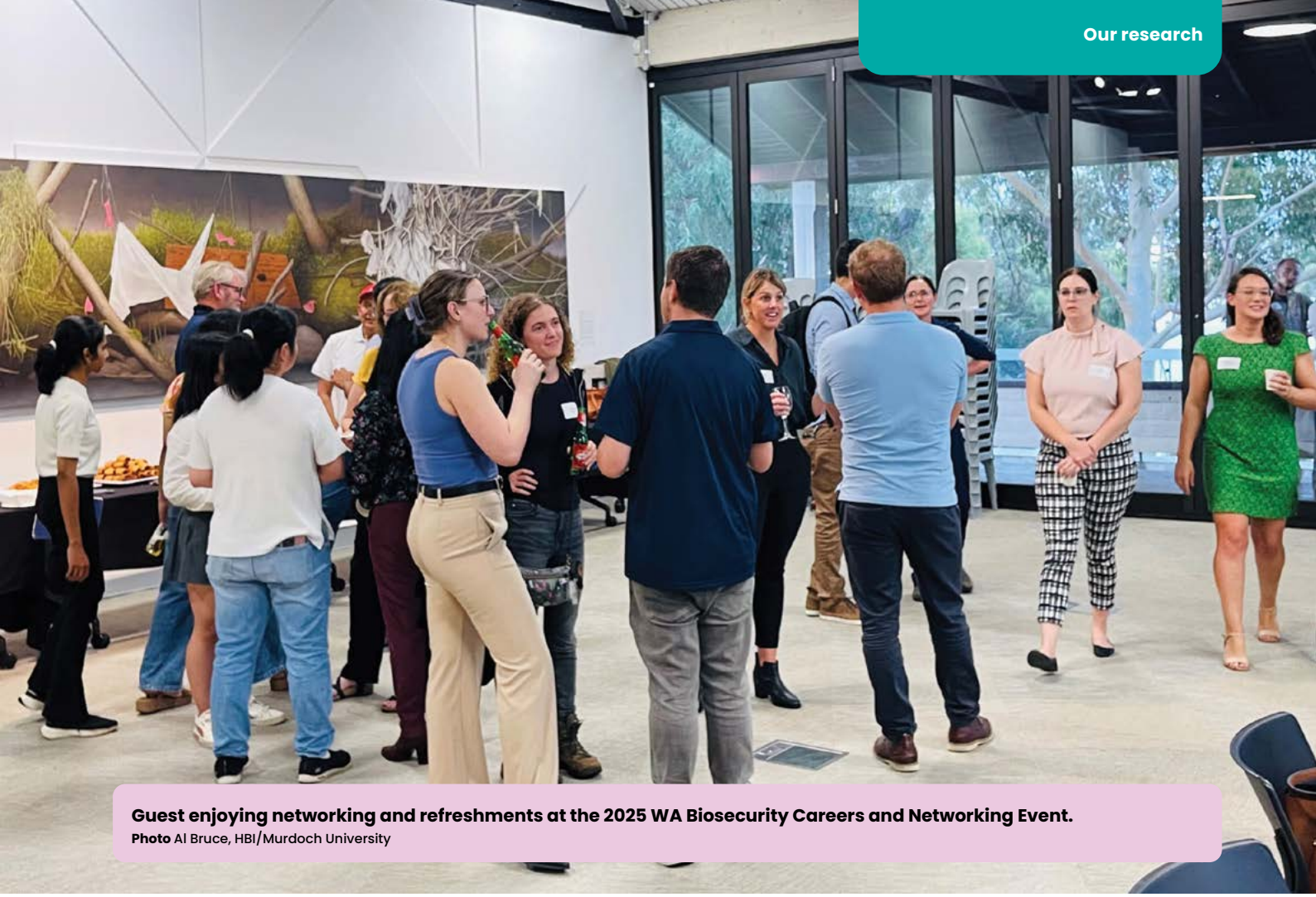
The initiative has also drawn in students and those early in their biosecurity career, exposing them to the range of career pathways available. The inaugural *Biosecurity Careers and Networking Event* was held at Murdoch University on Thursday 13th of March 2025, attracting a large and professionally diverse audience. Speakers included Dr Brenton van Takach from Curtin University, Tracy Vinnicombe from the Department of Primary Industries and Regional Development (DPIRD), and Johann van der Merwe, retired Biosecurity Manager at Chevron Australia.

Brenton, a WA Premier's EMC Fellow at Curtin University, spoke about his current research program which aims to predict how putative invasive species might spread through a novel recipient landscape, delving into patterns of gene flow and connectivity observed in long-established (native or introduced) species.

Plant and Invasive Species Biosecurity Officer, Tracey Vinnicombe, joined us from the Kimberley region of WA, where she's been based since 1999. A biosecurity



Biosecurity Careers and Networking Event speakers answering audience questions during the panel discussion. (L–R): Justin Bellanger (Aquaculture Council of WA), Dr Brenton van Takach (Curtin University), Tracey Vinnicombe (DPIRD), and Johann van der Merwe.
Photo Al Bruce, HBI/Murdoch University



Guest enjoying networking and refreshments at the 2025 WA Biosecurity Careers and Networking Event.
Photo Al Bruce, HBI/Murdoch University

generalist, she shared her story and her insights from talking weeds, plant diseases, animal diseases and exotic pests in regional WA. She highlighted the success of collaborative teams working with pastoralists and Traditional Owners.

Jahann van der Merwe spoke with more than 30 years' experience in strategic biosecurity management between Australia and South Africa, spanning government and industry roles.

The event brought together the biosecurity community and is paving the way for new biosecurity experts, while sharing some of the latest findings from research and on-ground management. "This addresses a significant gap in biosecurity within WA" say Professor Melissa Thoms, researcher at Murdoch University's Harry Butler Institute and co-organiser of the event. As a member of the WA Biosecurity Council, I'm aware of gaps that are impacting our ability to protect our state's biosecurity, now and into the future. This event is improving networking and communication between the varied groups involved in biosecurity, while helping to attract students into biosecurity careers where they are needed most.

WA Agricultural Research Collaboration Director Kelly Pearce said WAARC was proud to support the event alongside the Harry Butler Institute and WABSI, recognising biosecurity as a critical area for capacity building in WA.

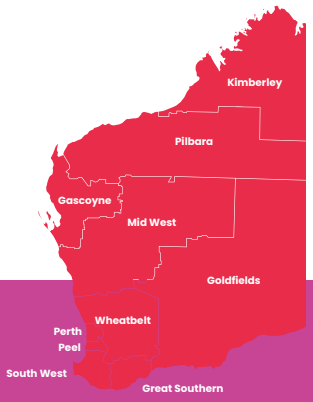
"The event's strong cross-sector attendance highlights growing interest in Western Australia's biosecurity sector and the value of a forum that inspires career pathways, strengthens collaboration and supports future careers," Dr Pearce said.

This has become an annual event, scheduled to occur every year in mid-March. Each event will feature at least three speakers discussing a range of biosecurity topics and perspectives.

Register your interest: To join the network and register your interest in the WA Biosecurity Careers and Networking Events, follow the QR code to the sign up page.

This activity supports the **United Nations Sustainable Development Goal 17**.

Harry Butler Education



Outreach programs

Number of schools: 72

Students engaged: 760

Regions our programs reached students:

Gascoyne
Goldfields
Great Southern
Kimberley
Mid West
Peel
Perth
Pilbara
South West
Wheatbelt
Offshore (Christmas Island)

Expanding access to research-connected STEM learning, HBI's education programs engaged more than 760 students from over 72 schools across Western Australia in authentic environmental science programs.

In 2025, we strengthened our reach and connection with WA schools through the launch of the **HBI Education Hub website**, providing teachers with a range of free curriculum-aligned resources linked to the institute's environmental research, and linking our range of education programs.

Participation in the **WA Barcode Blitz** program increased from 5 schools in 2024 to 16 schools in 2025, while **Project Wetland Science** expanded to include additional schools investigating wetland health through field monitoring and digital data analysis.

Together, these programs reached students across metropolitan and regional WA, including schools in **Broome**, the **Pilbara**, **Esperance**, **Albany** and **Perth**, enabling students to contribute to real-world environmental investigations connected to HBI research.



Peter Moynes School Students collecting specimens for the WA Barcode Blitz.
Photo Peter Moynes School

We also established new partnerships to broaden engagement with younger learners and community knowledge holders.

A collaboration with the **South Metropolitan Primary Extension and Challenge (PEAC)** program will connect high-achieving upper primary students with HBI research. In addition, the **Ngaparrtji Ngaparrtji Two-Way Science Program**, developed with Indigenous Elders and HBI freshwater ecologists, will formally launch in 2026 to support knowledge sharing and environmental learning with schools across the **Peel–Harvey** catchment.

Miyawaki Pocket Forest Program update

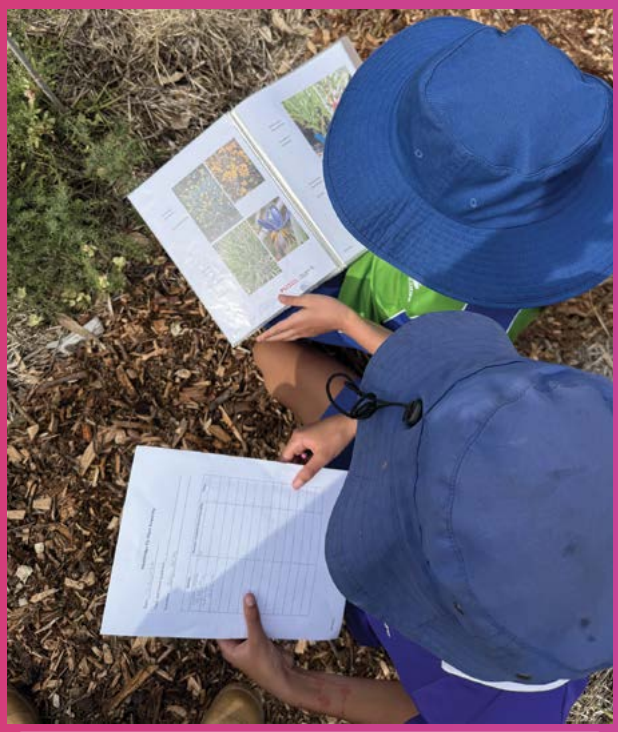
In 2025, the Miyawaki Forest Program excelled at both forest creation and education-focused outreach across Western Australia.

Between June and August, six new Miyawaki forests were established: four school forests at Alkimos PS, Ellenbrook PS, John Butler Primary College (Butler), and Heathridge PS, plus two community forests at Catalina Estate (Clarkson, with Carbon Positive Australia) and the Leederville "Black Cockatoo Forest" (with SUGi).

Alongside new plantings, the Miyawaki Forest Outreach Program continued to scale engagement, now encompassing 22 forests in total. Delivery in 2025 included hands-on school-based citizen science forest monitoring program, complemented by formal lessons delivered at 12 schools, supporting sustained student participation, learning, and stewardship.

In November 2025, the work was acknowledged through a Vice Chancellor's Award for Community Industry Impact and Engagement, and the Miyawaki Forest Program was named a finalist in two major national awards: the Banksia Foundation Awards (Biodiversity category) and the Australian Museum Eureka Prize (Innovation in Citizen Science).

The program and program lead Dr Grey Coupland were also the subject of an ABC *Gardening Australia* 'My Garden Path' segment which aired in March 2026. Together, these outcomes reflect a year of tangible on-ground impact, expanding partnerships, and growing visibility for Miyawaki forests as a model for urban biodiversity and community-led ecological restoration.



Heathridge Primary School students monitoring their forest.
Photo Grey Coupland, HBI/Murdoch University



Heathridge Primary School planting day.
Photo Grey Coupland, HBI/Murdoch University

Communications

The Harry Butler Institute aims to enhance the visibility and influence of our research though effective communication, events and outreach, as outlined in Harry Butler Institute Strategic Plan 2025-2030. We continue to make bold strides toward achieving this objective by harnessing key media and social media platforms, spearheading a range of events and initiatives and producing engaging content based on our research and the people behind it.

Digital media

HBI launched the **@harrybutlerinstitute** Instagram account on the 28th February 2025, connecting academic and public audiences with our research, outreach and events. The account has utilised the full gamut of available tools, including posts, reels, stories, buckets, tagging and collaborations, to engage relevant audiences. Unlike our presence on LinkedIn, an alternative approach was taken to communicate research in an accessible format that targeted a much more general audience.

A major benefit of modern social media platforms is the ability to reach well beyond our local community, and by showcasing the research HBI is involved with, we have connected viewers from across the nation, and the globe, to the impact we have made.

We have continued our use of LinkedIn to share professionally-targeted content including event announcements, research achievements and announcements, job opportunities, and researcher achievements. We experienced increased across all metrics despite only a marginal increase in the number of page posts. Our biggest increase was in the impressions earned by our highest scoring posts, with our most impactful post, a video post about the launch of our new Extractive Metallurgy Hub, earning a 6621 impression from 213 reactions, 15 comments and 22 reposts.



The Extractive Metallurgy Hub and the achievements of its researchers has continued to be highly engaging to our LinkedIn audience.
Photo Al Bruce, HBI/Murdoch University



LinkedIn metrics

Page followers
3,113

Increase followers
32%

Posts
76

Average Impressions score
1,150

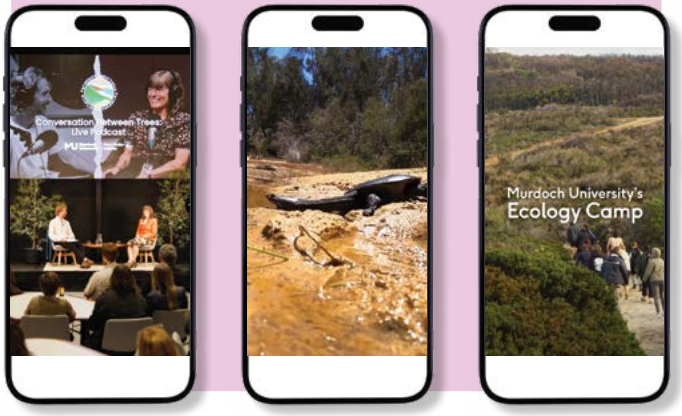
Impressions earned on the top 10 scoring post
2,106–6,621

Instagram metrics

Unique users reached
50,100

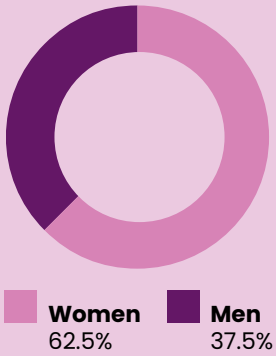
total views on content
99,300

Highest engagement rates

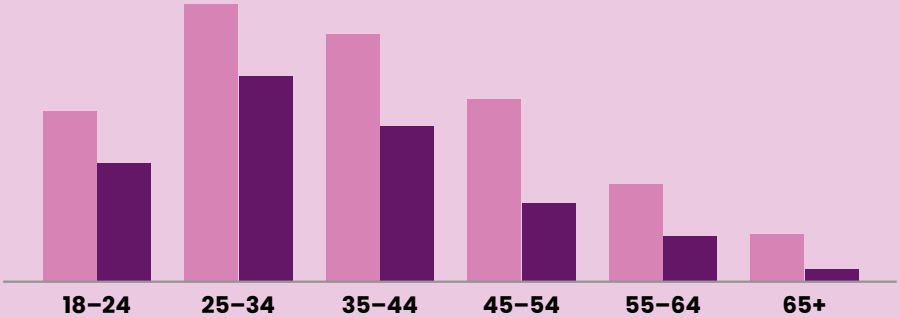


Audience demographics

Our Instagram audience is comprised of 62.5% women, particularly aged between 25 and 44, from Perth, Western Australia.



Gender



Age



Youtube video and Livestream thumbnails.
Photo Dannon Wu, HBI/Murdoch University

Videos

In 2025, HBI had its first-ever video production recognised and awarded at a national film festival. *Black Cockatoos: Cultural Significance*, a short documentary created for the *Keep Carnaby's Flying: Ngoolarks Forever* project, was nominated for Best Documentary and was awarded ABC Best Overall Film (Top Prize) at the Australian Youth Film Festival in July 2025.

HBI Video Production Officer and the filmmaker behind the short documentary, Dannon Wu, accepted the award presented by the ABC at the awards night in Melbourne before being interviewed live on ABC Weekend Breakfast the following morning. This award and recognition showcase that HBI's push into more story-driven, expansive content is having a positive impact on our research awareness among people who are not researchers/academics with an additional 2.5K views on YouTube in 2025 after its initial upload in 2024.

2025 saw fewer large video projects (short documentaries) published in favour of announcement videos, event recordings, and social media content (particularly with the launch of the HBI Instagram account). While the focus shifted to social media specific content and event operations, the video team also had several big video projects in production in 2025 for publishing in 2026. These include projects such as the WaterSmart Farms project which is testing the viability of small-scale community and farm-based water desalination units in remote and regional Western Australia. Filming for a short documentary about the project was completed in 2025 on location in Esperance and at Wongutha CAPS Aboriginal boarding school. It is aimed for release in early to mid-2026.

Production quality continues to be of a very high standard across all HBI video productions, and 2026 aims to see more of a return to form with more short documentary productions being publicised, including but not limited to the long-awaited short documentary around the *Yagarrajalajalan nagula buru* project based in Broome.

Videos published to YouTube:

6

4 to MU YouTube
2 to HBI YouTube

Highest number of views:

Murdoch University's Ecology Camp

9,000+ views

across YouTube, LinkedIn and Instagram

Highest viewed video:

Instagram reel — Blue shell who?

15,000+ views

Videos completed:

49+

4 YouTube
2 event recordings
3 Livestreams
40+ social media specific videos

Events

2025 was HBI's biggest year for events in its eight-year history, holding or supporting more than 30 events, both on and off campus. We significantly stepped up efforts to engage schools, students, professionals, academics and the public in our research and facilitate the translation of our findings into policy and action.

Key among our events were the launch of our new Algae Innovation Hub at Murdoch University's Murdoch campus, the launch of our new Extractive Metallurgy Hub based at Murdoch's Rockingham campus, and the Conversation Between Trees Live Podcast event.

We also launched a new public lecture series, the Visiting Scholar Lecture Series, an opportunity for HBI-funding scholars visiting the University to share their expertise with our staff, students and our networks.

2025 also saw the return of the HBI Research Showcase event, utilising Boola Katitjin's stunning northern plaza to showcase the range of talented researchers, innovative projects and future capabilities within the Harry Butler Institute.

We continued our support for partner events based at Murdoch University, including the annual Alcoa Forest Research Conference and the Dieback Working Group's DIG Conference. These gave us the opportunity to support well-run events within Murdoch's Boola Katitijin building and to share our research through conference presentations, tours and activities.

Our hard work throughout the year, as well as our professionalism and high standard of delivery were recognised through acknowledgement by event partners and colleagues within the University. It was also acknowledged by the Western Australian Government in choosing the Extractive Metallurgy Hub as the venue for announcing the 2025 Investment Attraction Fund.



Keith Roby Memorial Lecture 2025 committee members, speaker and Murdoch Vice Chancellor. (L-R): Professor Kris Warren, Professor Philip Jennings, Professor Treena Burgess, Dr Simon Cherriman, Vice Chancellor Andrew Deeks, and Dr Catherine Baudains.
Photo Murdoch University

HBI held and supported events 2025



June 25: The Whadjuk Sea Country Day.
Photo Claudia Franca de Abreau



July 23: Official Opening of the Extractive Metallurgy Hub.
Photo Al Bruce, HBI/Murdoch University



August 12: WA Barcode Blitz: Bugs, Barcoding & Diversity.
Photo Dannon Wu, HBI/Murdoch University

February

14
2025 WALGA Urban Forest Conference
Murdoch University
Venue host, AV support and logistical support

25
Antimicrobial Resistance and Food Safety Visiting Scholar Lecture
Murdoch University

March

13
Biosecurity Careers and Networking Event
Murdoch University
Collaborative with WABSI and WAARC

May

31
Information Session: Preparing for Avian Influenza
Murdoch University
Event support and promotion

Biosecurity Workshop: PPE in Wildlife Response
Murdoch University
Event support and promotion

June

11
Alcoa Environmental Research Symposium
Murdoch University
Venue host, AV support and logistical support

25
Woordan Gaadidjiny — Indigenous Ocean Knowledges Festival
Fremantle, WA
Collaborative with SWALS, General Oceans, Coastal Connections, and UWA

July

23
Official Opening of the Extractive Metallurgy Hub
Rockingham, WA

August

12
WA Barcode Blitz: Bugs, Barcoding & Diversity
Live from the Lab, online

17
Resources Technology Showcase
Perth, WA
Exhibition support

27
Plant Health Surveillance and Biosecurity Guidelines Visiting Scholar Lecture
Murdoch University

28
HBI Photo Competition
Murdoch University



September 4: Official launch of the Algae Innovation Hub.
Photo Pierre Guildenhuys, Murdoch University



September 19: Conversations Between Trees Live Podcast event.
Photo Al Bruce, HBI/Murdoch University



October 22: Talking Turtles.
Photo Dannon Wu, HBI/Murdoch University

September

4
Official launch of the Algae Innovation Hub
Murdoch University

5
2025 Academic & Industry Forum on Automated Vehicles
Murdoch University
Event promotion and support

9
WA Barcode Blitz Results Webinar
Online

9th National NRM Knowledge Conference
Cairns, Queensland
Collaborative exhibition

Murdoch University Senate Visit to HBI
Murdoch University

Western Australia Government Launch of the 2025 Investment Attraction Fund at the Extractive Metallurgy Hub
Rockingham, WA
Venue host, collaborator

11
HBI Poster Day
Murdoch University

19
Conversation Between Trees Live Podcast
Murdoch University
Collaborative event with Paramount Importance

24
2025 Dieback Information Group (DIG) Conference
Murdoch University
Venue host and collaborator

October

8
Australian Hydrogen Day
Murdoch University
Event support

10
App-Based Epidemic Games for Infectious Disease Research
Murdoch University
Collaborative event with Perth Epidemiology Group

11
Wonder of Wetland Festival
Mandurah, WA
Stallholder

15
Keith Roby Memorial Lecture
Murdoch University
Collaborative event

22
Talking Turtles
Murdoch University

27
Historical Biogeography with BioGeoBears Visiting Scholar Workshop
Murdoch University

November

4
2nd Western Australian Colloquium of Arachnology
Murdoch University

12
Climate Science Initiative WA
Murdoch University
Collaborative event with DWER

27
HBI Research Showcase
Murdoch University

December

9
Launch of the Harry Butler Education Hub
Online



Audience watching the film screening.
Photo Pierre Guidenhuys, Murdoch University

HBI Research Showcase

HBI held it's first research showcase since the inaugural event in 2022. We invited project partners, funder, and supporters to the Northern Plaza of Murdoch's Boola Katitjin building for an afternoon of interactive research displays, presentations and networking.

The event was a great success for HBI, drawing an audience of spanning academia, industry government agencies and community groups. Attendees enjoyed a full program of presentations by Murdoch and HBI leadership on the main stage, including a viewing of our award winning film — *Black Cockatoos: Cultural Significance*.

The breadth of HBI research was on display in the exhibition area of the plaza, providing unique means of engaging with our different research projects and people. Displays included the Miyawaki Pocket Forests Program, Saving our Snake-Necked Turtles Program, our sawfish research, innovations solutions from the Algae Innovation Hub, entomology and arachnology displays, terrestrial and marine fauna



Crowd enjoying the event.
Photo Pierre Guidenhuys, Murdoch University



Guests learning about biosecurity from HBI's Dr Am Lymbery.
Photo Pierre Guidenhuys, Murdoch University

tracking technology, black cockatoo research, our Polyphagous Shothole Borer (PSHB) research, cybernetic mussels, dolphin research, the work of the animal welfare hub, invasive species management, and our school education programs.

Research students had a chance to highlight their research through their involvement in research displays and their posters displayed in the poster display area of the plaza.

The showcase achieved its aims for engaging HBI's networks in our research, strengthening those relationships and facilitating cross-discipline research collaborations. Finally, it celebrated our people and our research achievements. We look forward to holding this annual event for years to come.



HBI's Dr Grey Coupland and Ines Zevallos Labarthe with guest Robyn Williams from ABC's Radio National.
Photo Pierre Guidenhuys, Murdoch University

HBI Visiting Scholar Scheme

The Harry Butler Institute Visiting Scholar Scheme was launched in 2025 as an initiative to facilitate collaboration between HBI researchers and key international counterparts. The scheme provides funding to bring outstanding international researchers to Murdoch University for an academic visit.

The scheme has been embraced by Harry Butler Institute researchers with the operations team receiving applications from across the Institute.

As part of the visit, the scholars are invited to join host academics on field trips and give public lectures, workshops and podcast interviews.

Before the scheme commenced, Biosecurity and One Health Centre Director, Professor Sam Abraham invited Professor Lance Price from George Washington University and Dr Marc Stegger from Statens Serum Institut to give a lecture on antimicrobial resistance (AMR) and food safety with Murdoch's Professor David Jordan.



AMR and food safety visiting scholars and speakers with Professor Treena Burgess and Professor Sam Abraham.
Photo Kat Sambrooks, HBI/Murdoch University

Murdoch University hosted the following academics in 2025:



Dr Lauren Waller

Ecologist and Lecturer
Lincoln University, New Zealand

Dr Waller was invited to Murdoch University as a guest Dr Sarah Sapsford During her visit, she delivered a talk on Surveillance tools for detecting and mapping *Phytophthora agathidicida* in New Zealand alongside HBI Adjunct Researcher Dr Trudy Paap.



Dr Ivan Magalhães

Arachnologist
Museum Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina

Dr Magalhães visited Murdoch University as a guest of Dr Pedro Castanheira and Dr Volker Framenau in October. During his visit he delivered a workshop for staff and students titled *Historical Biogeography with BioGeoBEARS*.



Asst Prof Andres Colubri

Department of Genomics and Computational Biology
University of Massachusetts Chan Medical School

Dr Bethy Jackson and Dr Mieghan Bruce invited Dr Andres Colubri to Murdoch University on behalf of HBI and the Perth Epidemiology Group. He delivered a guest lecture on *App-based epidemic games for infectious disease research* during his visit.

Awards



Dr Houda Ennaceri.
Photo Murdoch University

Black Cockatoo Project Named Science Initiative of the Year

The *Keep Carnaby's Flying — Ngoolarks Forever* project, headed by Professor Kris Warren, was awarded Science Engagement Initiative of the Year at the 2025 Premier's Science Awards.

The awards celebrate the contributions of WA's brightest and most innovative minds through their respective STEM fields.

Algae innovator wins WA Young Tall Poppy

Dr Houda Ennaceri, a Forrest Research Fellow and research at Murdoch's Alage Innovation Hub, was recognised for her outstanding contributions as a scientists when she was awarded with WA Young Tall Poppy by the Australian Institute for Policy and Science. Dr Ennaceri has been working toward low-cost solutions for microalgal biodiesel production.



The *Keep Carnaby's Flying — Ngoolarks Forever* team at the Premier's Science Awards.
Photo Premier's Science Awards



Posters on display at HBI 2025 Poster Day.
Photo Kat Sambrooks, HBI, Murdoch University

Winners announced at HBI's first poster day

Research excellence was on display at HBI's first Poster Day. The, now annual, event invited HBI students across our four centres to display and present their research projects for Murdoch University academics as well as guest judges from external organisations.

More than forty PhD and Master's research students presented their posters, with topics ranging from algae in architectural design and marsupial morphology, to mudskipper dietary composition, and bacterium databasing for rapid identification.

Students and their posters were judged by academics and by their peers based on the design and information display of the poster, as well as their ability to communicate their research.

Votes were tallied on the day and winners presented with their awards at the end of the event.



Poster Day winners (L-R): Ehsan Daryadel, Stevie Ziogos, Mnqobi Zuma, and Yinan Wang. Centre — Treena Burgess.
Photo Kat Sambrooks, HBI/Murdoch University

The four winners were: **Yinan Wang**, **Mnqobi Zuma**, **Stevie Ziogos**, and **Ehsan Daryadel**. Each received a prize of up to **$2000 worth of conference travel**.

Black cockatoo film takes out top prize

The 2025 Australia Youth Film Awards, held in Melbourne, gave the festivals highest award to HBI film *Black Cockatoos: Cultural Significance*. The award was accepted by the film's creator, HBI Video Lead Dannon Wu. It recognised the creativity, talent, and genuine moving stories that had gone into making the short form. The film is one of three Black Cockatoo films created for the *Keep Carnaby's Flying — Ngoolarks Forever* project.



Dannon Wu receiving his award for Best Overall Film alongside Festival hosts.
Photo Australia Youth Film Festival

Publications

Our innovative research has been published in some of the world's top scientific journals, including *Nature*, *Science*, *One Earth*, *Cell Reports*, *Biological Reviews*, *Phytopathology*, and *Renewable and Sustainable Energy Reviews*.

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Rex the Carnaby's black cockatoo at the HBI Research Showcase.
Photo Grey Coupland, HBI/Murdoch University

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Flask containing an algae sample.
Photo Pierre Guildenhuys, Murdoch University

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