Australian Government

Australian Institute of Marine Science

AIMS 2026

Australia's tropical marine research agency

In Focus

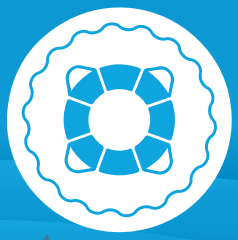
Vision

Thriving oceans through trusted science and innovation.

Mission

To deliver research and knowledge to manage, protect, and steward Australia's tropical marine ecosystems.

Values



Safety

Care for ourselves and others in all that we do

Collaboration

Together we create impact

Respect

Treat everyone with dignity, value diversity, support others

Passion

Energy that inspires excellence

Integrity

Always transparent, ethical and objective

Innovation

Vision and creativity to solve big challenges

Environment

Minimise our footprint

Cover Photo: AIMS researcher examining healthy coral growth on experimental patch reefs at Ningaloo Reef, WA. Credit: Violeta Jahnel-Brosig

Research themes

Safeguarding tropical marine ecosystems in the face of environmental change

Future Reefs

Enhancing reef resilience to climate change and environmental pressures.

Coastal Futures

Enhancing coastal ecosystems, coastal community wellbeing, and livelihoods.

Blue Economy

Supporting an inclusive and sustainable blue economy.

Digital Oceans

Enabling data science innovation, capacity, and data integration to support ocean health.

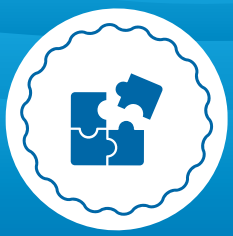
First Nations Innovation

Elevating Indigenous leadership, science and stewardship.

Enablers

People

Our highly skilled scientists and engineers, supported by efficient operations and corporate teams, deliver impactful and innovative marine science research, earning us a reputation as a trusted, impartial, and independent advisor.



Partnerships & collaborations

Our transdisciplinary approach unites diverse stakeholders and collaborators to address critical marine challenges, providing a pathway for translating our research to impact.

Infrastructure

Our world-class research infrastructure, including the National Sea Simulator, advanced laboratories, and our research vessel fleet, supports cutting-edge research in areas of national importance.

Technological innovations

Our commitment to transforming our use of digital and technology platforms enhances scientific discovery, allowing us to make our data open and accessible, driving innovation and transparency.

Lighting the right way forward

Dimming coastal lights may give baby turtles a fighting chance

Turtle hatchlings instinctively head for the ocean after clambering from the sandy nests using natural cues—such as dark dunes and the starlit ocean surface—to guide them.

Artificial lights from coastal developments can interfere with their ability to head in the right direction, making them susceptible to higher levels of predation, as well as exhaustion and dehydration.

An AIMS-led study is helping us understand more about the potential impact of artificial light at night on turtle hatchling behaviour. It aimed to better understand how green turtle hatchlings—a threatened species—respond to lights of different intensities and types.

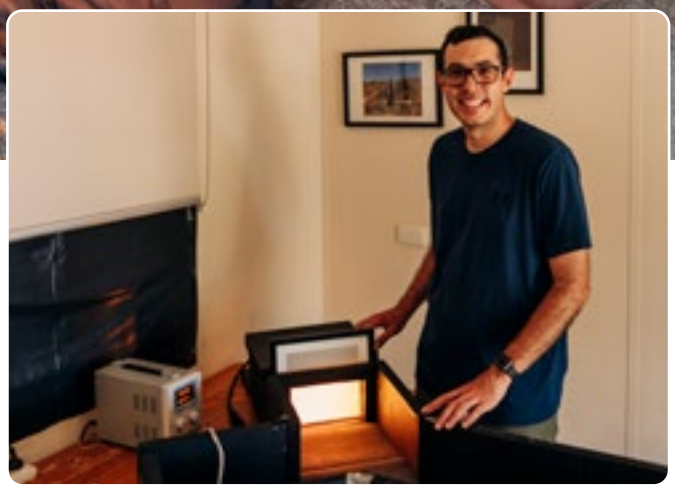
The study was a collaboration with Pendoley Environmental and the Western Australian Department of Biodiversity, Conservation and Attractions.

A range of light types was explored as well as the resultant glow from a blend of different types of lights in the environment, such as the light produced by coastal human activity.

The team collected more than 200 green turtle hatchlings from Jurabi Coastal Park, near Exmouth over seven days. They were returned to their home-grounds afterwards.

Previous studies have found different light wavelengths had different impacts on how hatchlings behaved after emerging from nests.

Green turtle hatchlings, WA. Credit: Violeta Jahnel-Brosig



This research tested how the hatchlings respond to broad-spectrum LED lighting, which is being installed widely across the world, and identifying a light threshold at which turtle hatchlings were impacted.

The study used three light types: a cool LED, a warm LED, and a light that mimicked the glow from a blend of different types of lights in the environment, such as the mixed light pattern produced by coastal towns.

Early observations were that the attraction of hatchlings to light increased with increasing light intensities. This attraction was reduced with warm compared to cool lights.

The researchers are now analysing the data to pinpoint the intensity at which attraction to the lights was not observed.

Natural mortality of turtle hatchlings is already high, with evidence suggesting that only one in 1000 turtle hatchlings make it to adulthood.

As light pollution continues to grow, it's important we understand these processes to help mitigate this threat.

The findings will inform risk assessment and provide guidance for industry, coastal developers, and management authorities to mitigate the threat to turtle hatchlings.

The project is supported by Woodside.

Main: Researcher collecting green turtle hatchlings to study under various LED lighting conditions before releasing them back.
Inset: AIMS scientist setting up the lighting experiment maze framework. Credits: Violeta Jahnel-Brosig

Mapping living reefs

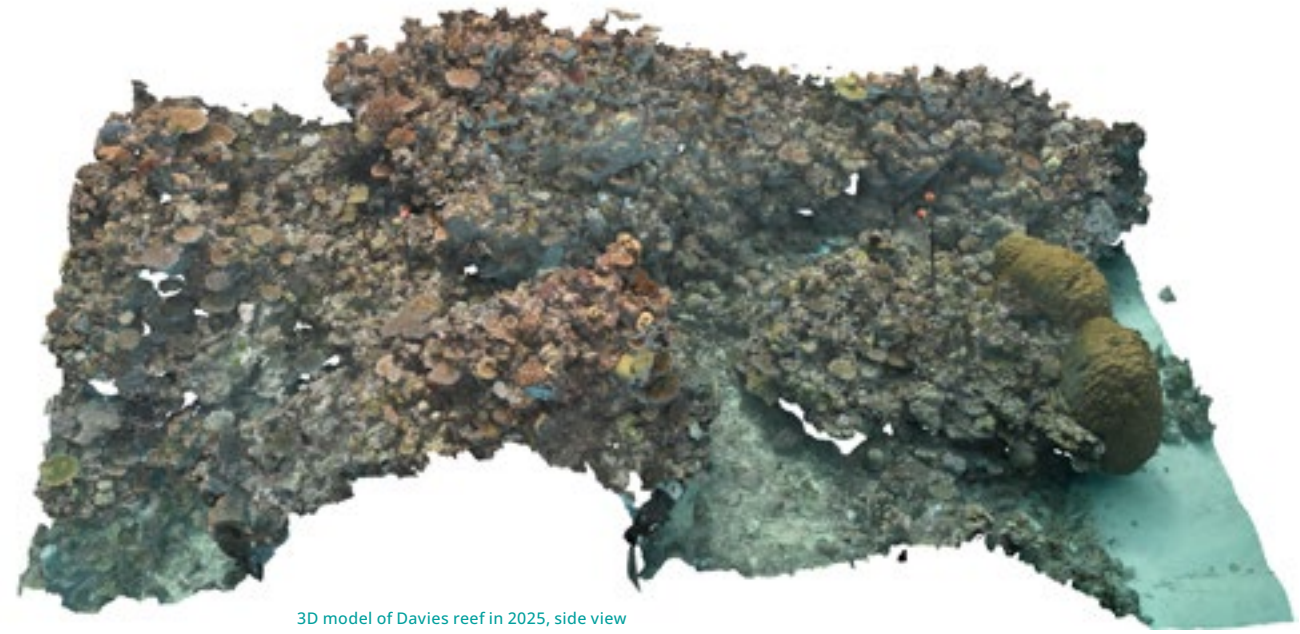
Photomosaics, 3D mapping and machine learning transforming coral science

AIMS scientists have developed and published some of the largest datasets in the world on coral vital rates, reef structural complexity, and the legacy effect of bleaching across environments on the Great Barrier Reef.

Now we can image large areas of coral reefs at unprecedented resolutions to produce 2D photomosaics and 3D models of reefs over time.

AIMS has developed novel monitoring technologies that allow users to rapidly process and classify data across large areas of the sea floor.

AIMS researcher holding a stereoscopic camera for 3D reef models Credit: Ian McLeod



3D model of Davies reef in 2025, side view

Time series of reef section at Heron Island, 2021 - 2025

By combining large-area-imaging with machine learning we can derive unprecedented and novel data (such as reef structure, coral recruitment, growth and mortality), giving AIMS scientists a better understanding of reef health and allowing them to track the fate of thousands of individual corals.

Exciting developments include:

- an automated workflow that allows us to overlay 3D models of a reef at different times, with millimetre resolution, to quantify changes to the architectural complexity of the reef over time with high precision
- a machine learning workflow to automatically segment and classify coral colonies from 2D photomosaics
- an AI-assisted workflow to automatically detect coral seeding devices across thousands of square metres of the reef.

Together, these novel monitoring tools have enabled AIMS to track tens of thousands of individual coral colonies over time, from the smallest recruits to ancient giants.

AIMS has used these large-area-imaging methods to monitor changes in seafloor cover, coral vital rates, reef structural complexity, erosion from biological processes (such as fish nibbling on a reef), and the impacts of several mass bleaching events.

Collectively, the research is challenging established assumptions in reef ecology and providing timely data to inform reef management decisions.

Large-area-monitoring allows AIMS to efficiently scale up to monitor larger seafloor areas with much less work and cost than previous methods.

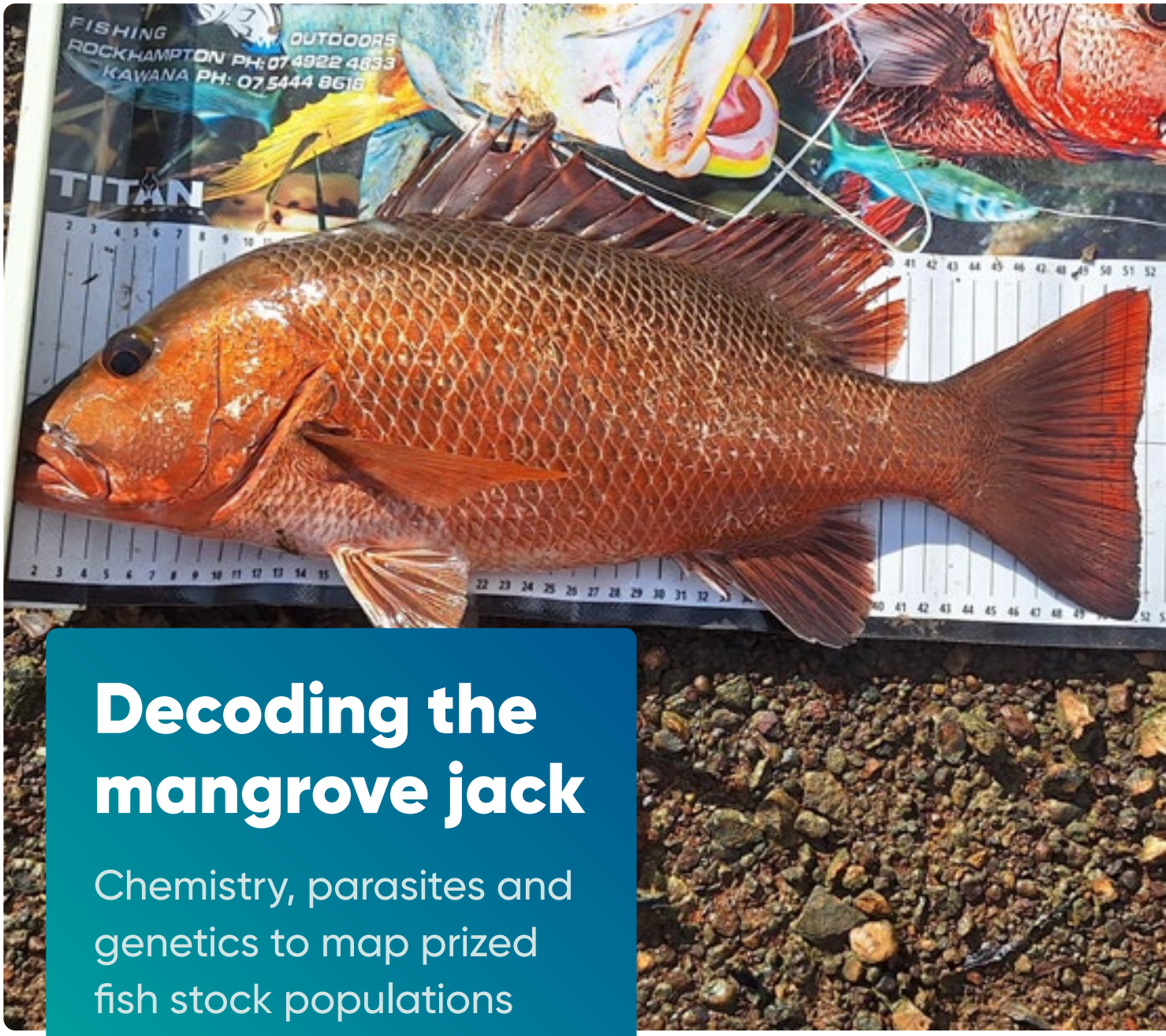
This year the AIMS photogrammetry team is embarking on a new challenge to monitor the ecological impact of the Pilot Deployment Program (see page 19) across several reefs on the Great Barrier Reef.

AIMS has presented these novel tools using a virtual reality experience developed by AIMS for exploring oceans across many forums and at national and international conferences.

The research is supported by the Reef Restoration and Adaptation Program funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation, and by the Australian Institute of Marine Science. The virtual reality experience development was supported by an AIMS@JCU Leviathan grant.

Photo: EcoRRAP

Two dimensional photomosaic of Davies Reef in 2025 showing detailed coral cover across the reef platform. Credit: EcoRRAP



Decoding the mangrove jack

Chemistry, parasites and genetics to map prized fish stock populations

Parasitic analysis, micro-chemistry and genetics are being combined to help ensure the future of Australia's mangrove jack fish.

The popular mangrove jack, or red snapper, (*Lutjanus argentimaculatus*) is found in northern Australian waters.

It's highly prized by anglers for its strong fighting instincts, by diners as an excellent eating fish and is valued by Indigenous Australians as an important totem species.

Up until now, mangrove jack was thought to be a single genetic population across northern Australia.

However, as fish stock discrimination techniques have improved, it's now thought likely that there could be separate stocks in Australia.

Understanding population boundaries would help inform sustainable management practices, particularly in areas where they are heavily targeted by fishers.

AIMS researchers in Darwin are leading a collaborative project to resolve this uncertainty about Australia's mangrove jack stock structure.

More than 100 commercial and recreational fishers, as well as Indigenous rangers and school students, provided ~1500 fish frames and information about where they were caught.

Mangrove jack fish collected to study fish stock structure. Credit: NT Fisheries, Darwin

The researchers used three different techniques to analyse them:

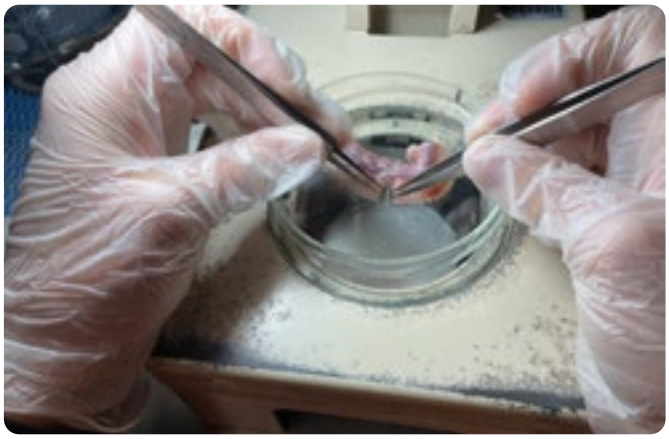
1. Micro chemistry—the otolith, or fish ear bones, were analysed. Much like trees, otoliths acquire rings throughout their life that indicate the chemical composition of the water in which they dwell.
2. Parasitic analysis—the unenviable task of analysing the parasites of the fish's gut.
3. Genetics—genetic analysis of the fish.

Each of these techniques tells the researchers something subtly different about the scale of movement and the timeframe in which it occurred:

- genetics indicate movement across generations (over longer timeframes)
- otolith micro-chemistry determines natal origins along with migration patterns
- parasites provide insights into movement and connectivity within the lifespan of the fish being analysed (within a generation).

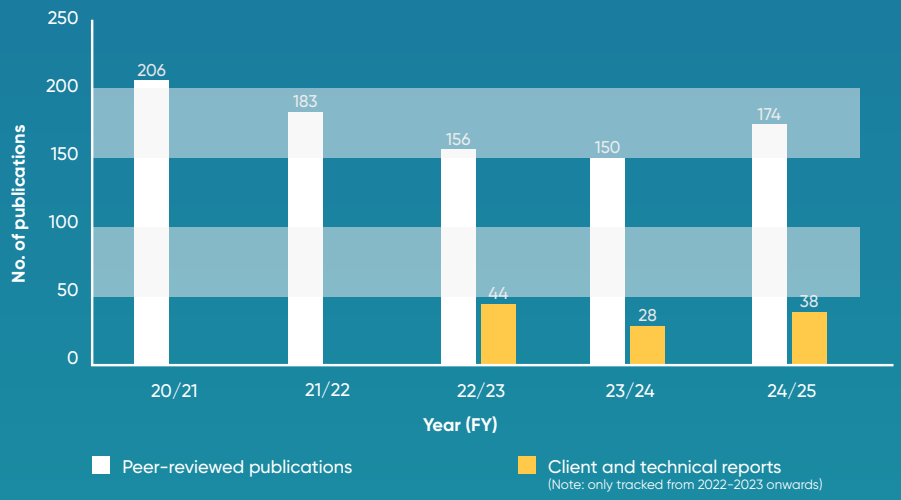
AIMS scientists are analysing this data to determine if there are different mangrove jack stocks in Australia, and if so, how many and where they are found. This research is expected to be finalised by late 2026.

Fisheries Research and Development Corporation (FRDC) funded the research. Partners included Northern Territory Department of Agriculture and Fisheries, Western Australia's Department of Primary Industries and Regional Development, Queensland's Department of Primary Industries, the Amateur Fishermen's Association of the Northern Territory, Recfishwest, and the McArthur River Mine.



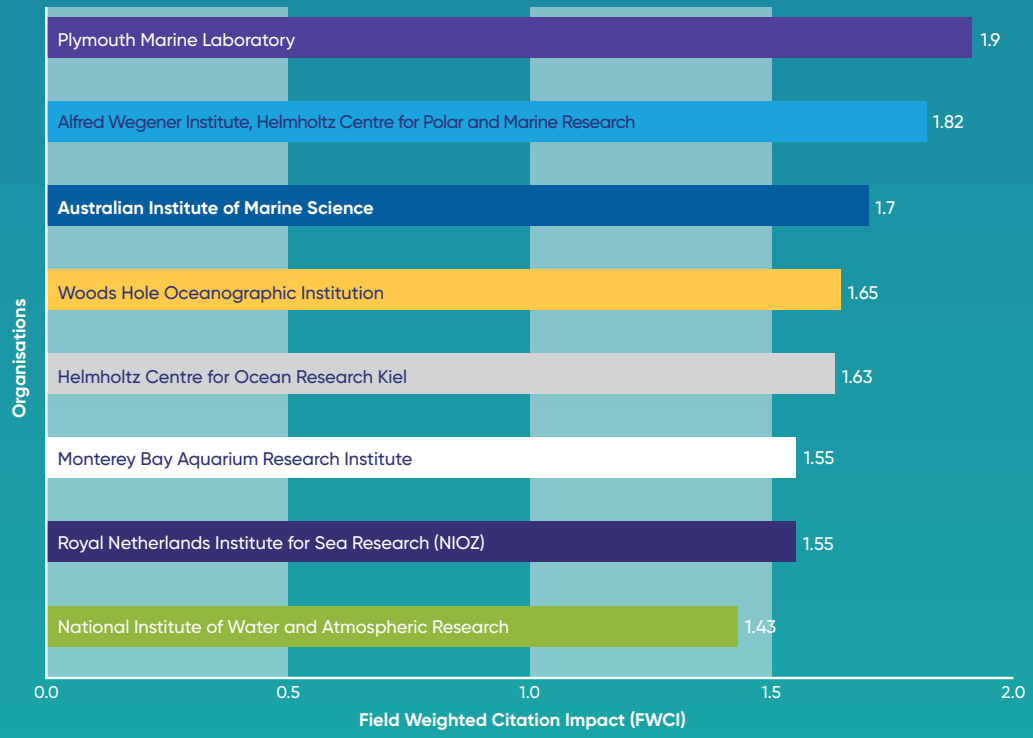
Fish samples laid out for scientific analysis. Credit: NT Fisheries, Darwin

Research performance



Number of AIMS publications by type, (2020 – 2024; Financial Year)

The main types of publications produced by our research staff are peer-reviewed publications (including journal articles, reviews, and book chapters) followed by client and technical reports. The current publication trend lags behind delivery of core research project outcomes, due to AIMS' shift into larger, more integrated and longer-term research programs which will deliver greater numbers of research outputs as they mature.



Citation impact ranking, 2020-2024

Top eight organisations as indicated by the Field Weighted Citation Impact (FWCI) factor, where a FWCI equal to 1.00 is the world average. Graph shows a five-year rolling average. (Comparison of Field Weighted Citation Impact (FWCI), SciVal)

New era of reef volatility charted

Impacts of climate change driving boom and bust reef cycles

Record levels of hard coral cover on the Great Barrier Reef in 2024 followed by record declines in 2025 underscore a new era of volatility and an ecosystem under stress.

AIMS researchers conducting underwater surveys for the Long-Term Monitoring Program (LTMP) in the summer of 2023-24 recorded continued increases in coral cover in all three regions of the Great Barrier Reef. Coral cover reached its highest levels on record in the Northern and Central regions since AIMS began monitoring the Reef 39 years ago.

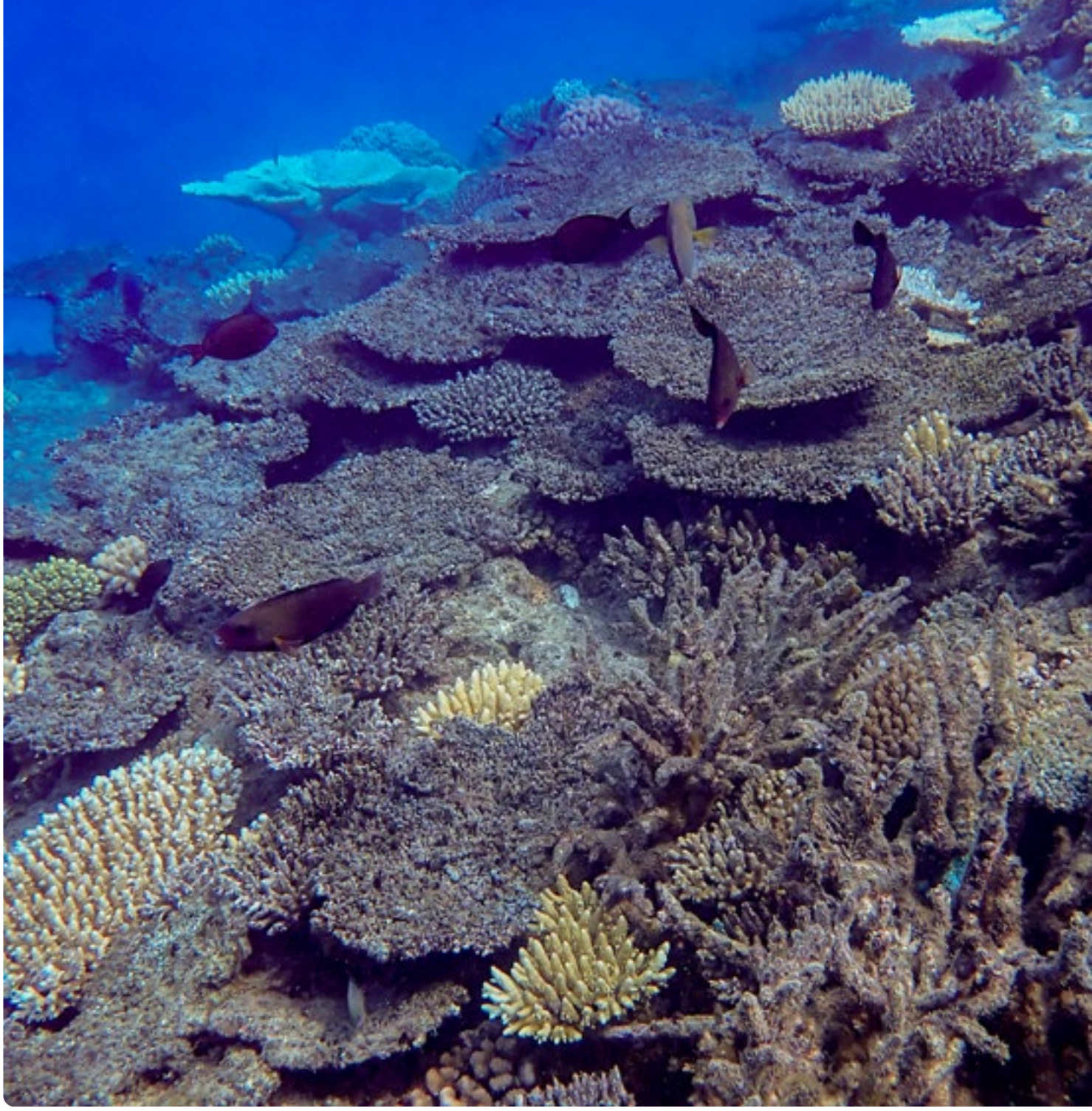
In 2024-25, results were dramatically different and LTMP researchers recorded substantial declines in all three regions. This included the largest annual decline in coral cover in the Northern and Southern regions since the inception of monitoring. These declines were driven by climate change-induced heat stress leading to coral mortality from the 2024 mass bleaching event, and to a lesser extent by the impacts of cyclones and crown-of-thorns starfish outbreaks.

Volatile coral cover

The 2025 losses coming off the high levels of 2024 meant that coral cover in all three regions returned back to near long-term average levels.

After reaching elevated levels in 2024, coral cover declined in 2025, indicating the pronounced volatility that continues to characterise reef condition.

Davies Reef in 2023, healthy live coral cover. Credit: LTMP



Such volatility has emerged over the past 15 years, with hard coral cover oscillating between record lows and record highs in a relatively short amount of time. Previously such fluctuations were moderate.

Coral reefs dominated by coral of the genus *Acropora* —the main table and branch forming corals— were among the most impacted as Acropora are fast to grow and the 'first to go'; being susceptible to heat stress, cyclones and the predatory crown-of-thorns starfish.

The 2024 mass bleaching event was part of a global event that began in 2023 in the Northern Hemisphere.

It was the fifth mass bleaching on the Great Barrier Reef since 2016 and had the largest spatial footprint recorded, with high to extreme bleaching prevalence across the three regions.

Western Australia's reefs also seriously impacted

In 2025, Western Australian reefs also experienced the worst heat stress on record.

The 2024-25 marine heatwave that brought prolonged and intense heat stress to most of the Western Australian coast resulted in the most geographically widespread and severe coral bleaching event ever recorded there.

Lizard Island 2024, coral bleaching mortality impacts. Credit: LTMP

It was the first time researchers had seen a single global mass bleaching event affect almost all coral reefs in Australia.

Ocean warming, caused by climate change, is driving substantial and rapid impacts.

Mass coral bleaching events are becoming more intense and are occurring with more frequency.

The future of the world's coral reefs relies on strong greenhouse gas emissions reduction, management of local and regional pressures, and development of approaches to help reefs adapt to, and recover from, the impacts of climate change and other pressures.

While the full extent of impacts in Western Australia are still being assessed, the Great Barrier Reef remains in comparatively better condition than many other coral reefs in the world following the global mass coral bleaching event. However, this relative condition should not detract from the gravity of cumulative pressures faced by coral reefs as rising ocean temperature continue to drive increasingly frequent mass coral bleaching events.

Monitoring Western Australia's reefs

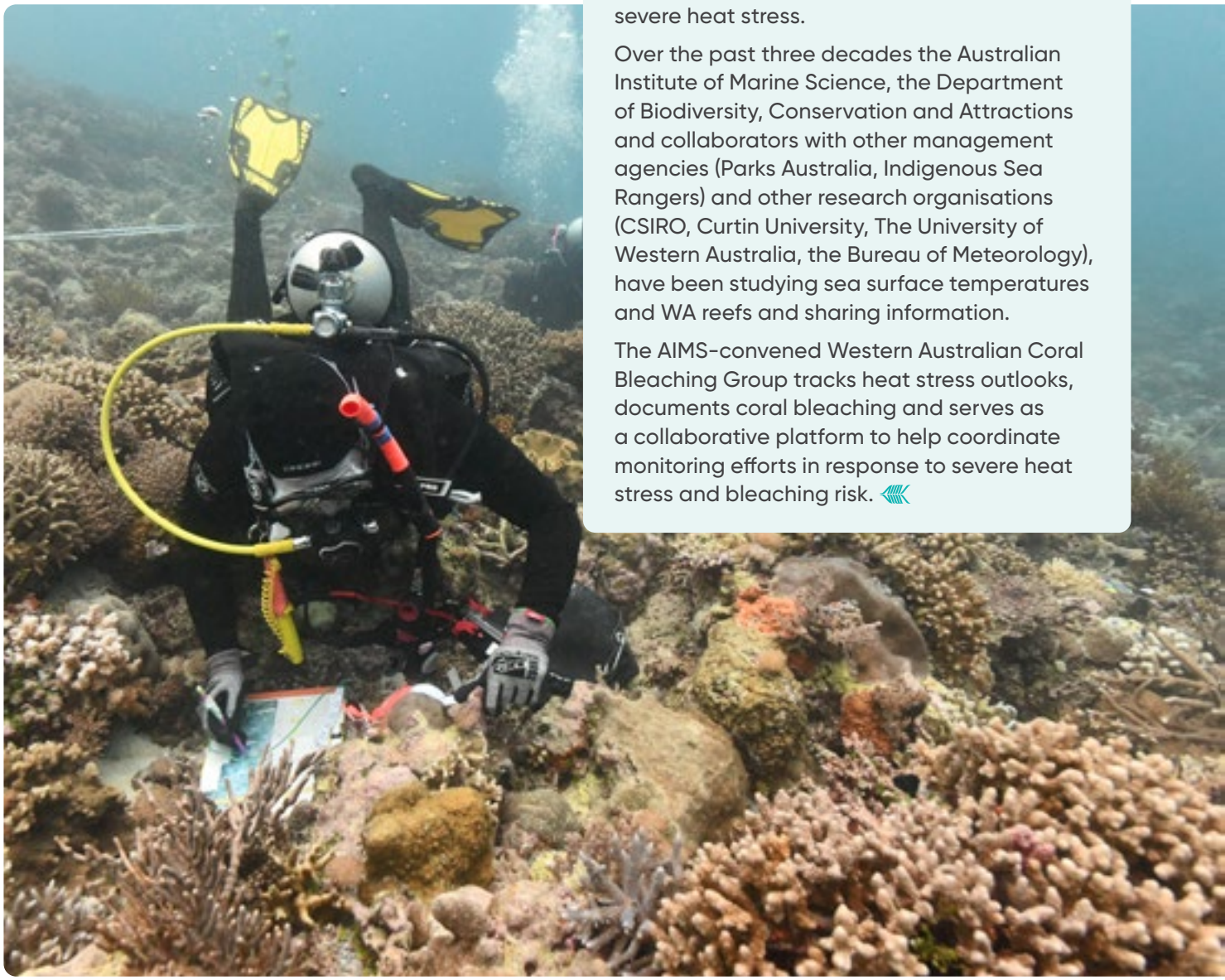
Western Australia's coral reefs are unique and diverse and as geographically extensive as those of the Great Barrier Reef.

They are also well managed systems with protections in place—via marine parks—and include two World Heritage sites.

Their remoteness means they escape many of the local pressures affecting the Great Barrier Reef, and in recent years have suffered patchier bleaching events while demonstrating their ability to persist despite severe heat stress.

Over the past three decades the Australian Institute of Marine Science, the Department of Biodiversity, Conservation and Attractions and collaborators with other management agencies (Parks Australia, Indigenous Sea Rangers) and other research organisations (CSIRO, Curtin University, The University of Western Australia, the Bureau of Meteorology), have been studying sea surface temperatures and WA reefs and sharing information.

The AIMS-convened Western Australian Coral Bleaching Group tracks heat stress outlooks, documents coral bleaching and serves as a collaborative platform to help coordinate monitoring efforts in response to severe heat stress and bleaching risk.



Researcher assessing bleaching impact at Ashmore Reef in 2025, WA. Credit: James Gilmour

AIMS researcher observing a bleached boulder coral colony as part of bleaching surveys at Rowley Shoals, WA. Credit: Anna Cresswell

Science alongside Traditional Owners

A blueprint for deeper engagement and long-term impact

An AIMS-led research project set a new benchmark for collaboration between government agencies and Traditional Owners, creating significant social, economic and cultural value, according to a not-for-profit consultancy.

The five-year, $11 million Woppaburra Coral Project investigated coral reef restoration strategies in reefs around the Keppel Islands, in the southern inshore Great Barrier Reef.

It was undertaken in partnership with the Woppaburra people, the Traditional Owners of the Keppel Islands who lost their connection to Country when they were removed from the islands in 1902.

Beyond its scientific aims, the project embedded partnership activities designed to foster mutual respect, cultural exchange, and long-term impact.

Activities included on Country workshops with 99 Woppaburra descendants, 28 of whom were visiting Country for the first time. They undertook hands-on coral spawning and aquaculture research.

The project was one of the first to use AIMS' Indigenous Partnership Plan (IPP) approach, developed in 2019, to facilitate an organisation-wide shift from engagement to genuine partnership. It was driven by recognition Traditional Owners have inherent rights and responsibilities for Sea Country.

Woppaburra community members participating in cultural mapping activities on Konomie Island, QLD. Credit: Gus Burrows

AIMS engaged Social Ventures Australia (SVA) to collaborate with the Indigenous Partnerships team and undertake a social value analysis of the Woppaburra Coral Project when it concluded in June 2024. This was done through a document review, participant interviews and valuation activities.

We found that for the Woppaburra people, the opportunity to return to Country was deeply healing and strengthened connections to family, culture and sea Country.

The project also supported aspirations for training and employment, with tangible outcomes including new roles, Vocational Education and Training opportunities, and increased confidence to pursue careers on Country.

For AIMS, the project catalysed institutional change. It demonstrated the value of Indigenous partnerships, not only in achieving scientific outcomes but in enhancing cultural competence, ethical research practices, and organisational reputation.

The social values analysis identified 24 material outcomes across six themes: establishing a genuine partnership, returning to Country, building pathways, learning about marine science, learning about Woppaburra culture and sharing the partnership model.

While a single monetary figure couldn't capture the depth and complexity of the outcomes, the social values analysis did explore financial proxies where possible, to help tell the story of value creation. For example, the return to Country activities alone were valued at approximately $6.4M, based on comparable healing programs.

The project demonstrated that when partnerships are grounded in trust, respect and openness, they can generate profound and lasting change.

The Woppaburra Coral Project was part of the Australian Coral Reef Resilience Initiative, in partnership with BHP.

Main: Researchers looking after coral spawning tanks on board the Sci-barge. Credit: Jo Hurford.
Inset: Cultural activities were shared between researchers and community. Credit: Gus Burrows

Environmental performance

Water usage

Water usage was 38.9 megalitres (ML) for 2024-2025, down 2.8 ML from previous year, and a 30% reduction from base year (2017-18).

Recycling & waste

This year we have achieved a reduction in solid waste to landfill of 9.5 tonnes compared with 2018-19. The represents a 6 per cent reduction from the 2018-19 base year. In 2024-25 we recycled 41.1 Tonnes of paper, cardboard and plastic products. This is a 21% increase on the previous year, and 132% increase from 2018-19.

Energy usage

Our total electricity usage across the sites that we operate was 7035 MW for 2024-25. This represents a 27% reduction from 2017-18. We also avoided 1067T of emissions through PV solar generation at our Townsville and Darwin sites.

Radiation safety

During the year, AIMS continued to hold a source licence issued by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). This licence is subject to conditions including quarterly reporting, maintaining a source inventory and complying with relevant regulations, codes and standards.

Gene technology

Two proposals for dealings involving genetically modified organisms (GMOs) were assessed by the AIMS Biosafety Committee this year.

AIMS has two active dealings with GMOs. Both projects are Notifiable Low Risk Dealings (NLRDs).

Understanding risk of radiation and mercury contaminants in offshore decommissioning

The challenge

In Australia, the cost of decommissioning offshore oil and gas infrastructure at the end of its operational life is estimated to be AUD$57 billion involving approximately 1000 wells and more than 8000km of pipeline.

To help inform decommissioning decision making, scientists are working to understand the impacts of removing the infrastructure, leaving it partly in place, or repurposing it after it has reached the end of its operational life.

This includes investigating the potential impact on the marine environment of contaminants such as NORM (naturally occurring radioactive material) and mercury, which can accumulate in structures such as pipelines to reach higher levels than found in nature.

The approach

To help manage the risk of NORM and mercury contaminants in offshore decommissioning, researchers from AIMS and ANSTO (Australian Nuclear Science and Technology Organisation) co-developed a risk assessment framework on behalf of the National Decommissioning Research Initiative (NDRI).

They worked with experts from an independent advisory group comprising regulatory, risk and contaminant specialists.

The framework provides a structured approach to assess contaminant risks from leave in-situ decommissioning options and has been tailored specifically to the offshore oil and gas sector.

Key features include a focus on end-of-life offshore infrastructure decommissioning and its application to in-situ decision-making for NORM and mercury. It supports alignment with Australian and international regulatory expectations and promotes data-driven, scientifically grounded evaluations. The framework has been presented to several industry conferences and workshops, ensuring stakeholders are informed.

The impact

The framework contributes to decision making around whether to remove disused oil and gas structures, or leave them fully, or partly in place, enhancing our national capacity to responsibly manage offshore decommissioning.

AIMS and ANSTO have been engaged to help apply the framework both within and outside Australia. The framework has highlighted knowledge gaps that AIMS and ANSTO are now researching.

2500
OFFSHORE STRUCTURES TO END OPERATIONS

MORE
INFORMED DECISION MAKING ON DECOMMISSIONING

MANAGE
THE RISK OF CONTAMINATING THE MARINE ENVIRONMENT

RESEARCH
TO FILL KNOWLEDGE GAPS UNDERWAY

AIMS researcher deploying coral seeding devices on the Northern Great Barrier Reef. Credit: Marie Roman

Sowing the seeds of collaboration

AIMS takes first shot at largescale reef restoration with marine industry and rangers

AIMS, Traditional Owners, and marine industry collaborators successfully completed the first of three largescale reef restoration efforts under the Pilot Deployments Program (PDP) in the summer of 2025-26.

Over the past few years, under the Reef Restoration and Adaptation Program (RRAP), AIMS and research collaborators have been developing a toolbox of interventions to help coral reefs recover from the effects of climate change.

One of the biggest challenges to effective reef restoration is applying interventions at scale, particularly in areas as vast as the Great Barrier Reef.

To meet this challenge, the PDP is translating reef interventions from research and development to largescale deployment reality.

The three-year PDP has a two-fold mission: trial industrial-scale reef restoration techniques while establishing the capacity of the marine industry and Indigenous rangers to undertake the restoration field work.

Researchers and marine industry partners deploying coral larvae collection pools. Credit: Gus Burrows

During December and January, 14 community and industry groups joined PDP science and engineering teams to apply reef restoration techniques at scale on reefs off Cairns.

The two innovative intervention methods, developed through RRAP, were:

1. Slick Collection and Release: where genetically diverse coral spawn slicks are collected and resulting coral larvae delivered to target reefs to accelerate recovery.
2. Conservation Aquaculture: spawning wild-collected coral colonies in AIMS' National Sea Simulator and two privately-owned aquaculture facilities to produce young coral for delivery to target reefs.

The results

Despite the curveballs of bad weather and unexpected early coral spawning, PDP participants deployed a total of 44,608 seeding devices on four reefs off Cairns, Port Douglas and the Keppel Islands in the 2025-26 coral spawning season.

Corals were settled on seeding devices and deployed using 13 vessels from industries such as tourism, charter fishing and the coral harvest industry.

In November, Indigenous rangers from six Traditional Owner groups met on Woppaburra sea Country in the Keppel Islands to train in two advanced reef restoration techniques, as part of the Indigenous Futures Project, before deploying the devices back into the area's reefs.

At the same time, corals collected from the Keppel Islands were spawned in aquaculture tanks and their larvae reared in the National Sea Simulator (SeaSim), before they were returned to their home sites.

In total, around 130 people were trained in aspects of either Slick Collection and Release restoration or Conservation Aquaculture. They collected an estimated 14.6 million coral eggs during spawning.

A complex undertaking

The first PDP trial was a complex undertaking with many components that were still being developed needing to come together.

Indigenous Partnerships team at Heron Island assembling coral seeding devices. Credit: Marie Roman

Contingency planning was required for every step of the process, particularly as elements such as weather and spawning could be unpredictable.

Another mammoth effort was the complex contractual arrangements and permitting needed.

Monitoring

The trial reefs will be monitored to assess the effectiveness of the restoration methods in terms of coral survival, growth and response to stressors such as bleaching and competition with algae.

Industry partners and Indigenous rangers will be upskilled in monitoring activities, including the use of video camera systems and diver-based monitoring techniques.

The PDP team is also undertaking a detailed review and assessment to enhance performance in the next trial later this year.

Capacity-building trial

In the summer of 2024-25, a smaller capacity-building trial was held with industry in reefs off Cairns in Far North Queensland using the Slick Collection and Release method.

Similarly, under the Indigenous Futures Program, Indigenous rangers were trained in aspects of coral seeding on Heron Island, in 2024.

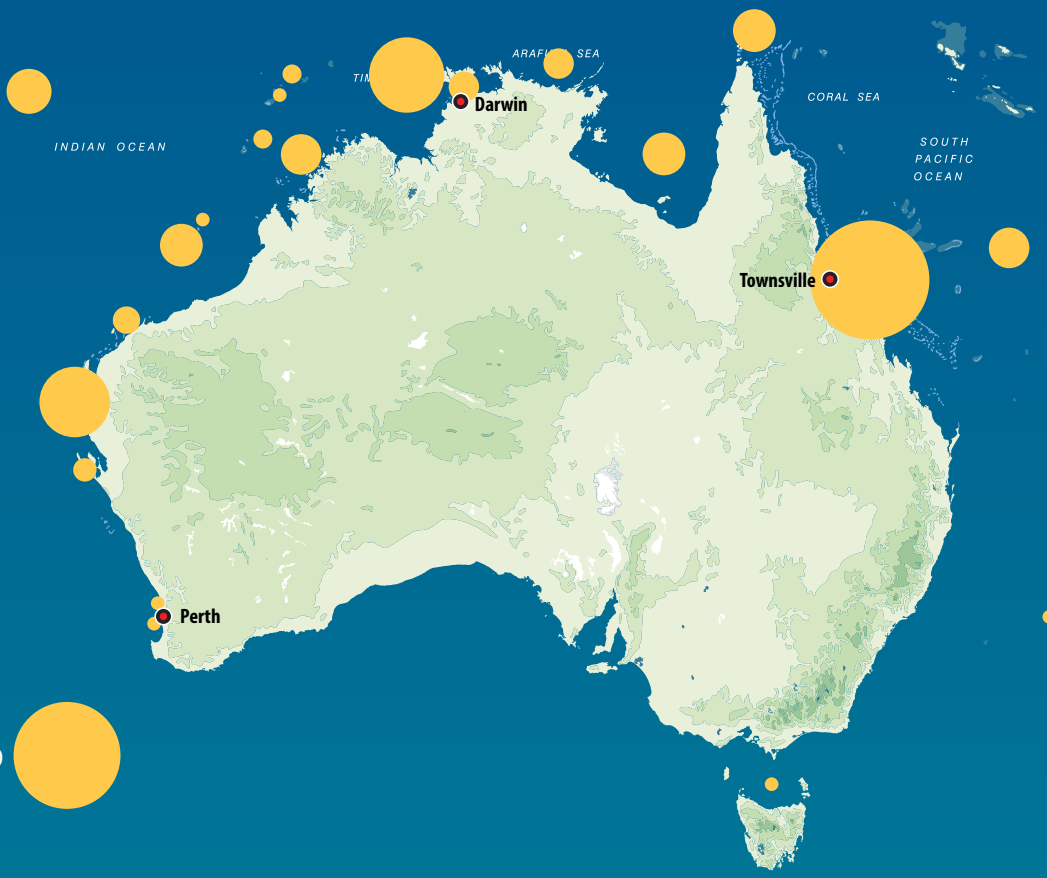
The Pilot Deployments Program is funded by the Australian Government's Reef Trust and led by AIMS. RRAP is funded by the partnership between the Reef Trust and the Great Barrier Reef Foundation.

Main: Indigenous rangers collecting wild coral spawn to transfer into pools. Credit: Marie Roman
Inset: AIMS researcher and Indigenous ranger looking at a test tube containing coral eggs. Credit: Gus Burrows

Project scopes

Project geography

AIMS researchers worked on 140 projects during the 2024-2025FY, conducting research across Australia's tropical locations. Many of the projects cover multiple locations, as shown by the graphic.



Project numbers

1 10 25 50

Project categories

AIMS research covers a broad range of science topics that can be grouped into general categories. Many projects cover two or more categories, demonstrating the connectedness and integration of all that we do.

Reef restoration science on the move

AIMS' mobile coral spawning system making waves in the Maldives

A portable coral aquaculture system that can be packed away and moved in sea containers to remote areas to help with coral reef restoration was put through its paces in the Maldives during the 2025 coral spawning season.

As the climate warms, coral loss from coral bleaching is a global issue.

The trial of the AIMS-developed, self-sufficient system called ReefSeed took place at Maniyafushi Island, in the South Male Atoll, during coral spawning. This is a time when many corals reproduce, helping coral reefs to repair and recover.

AIMS was supporting Maldivian reef restoration efforts while helping develop local coral restoration capacity.

Activities included hosting Maldives Marine Research Institute (MMRI) biologists and technicians at AIMS' National Sea Simulator during coral spawning on the Great Barrier Reef in late 2024. They were trained to operate ReefSeed and learned about reef restoration techniques developed and refined by AIMS.

Researchers observing the portable ReefSeed coral aquaculture units in the Maldives.
Credit: Ministry of Fisheries and Ocean Resources | Naaish

On Maniyafushi Island, AIMS and MMRI scientists and technicians collected corals to bring into ReefSeed units in readiness for coral spawning, which happens over several months in the Maldives.

Coral egg and sperm bundles were fertilised and reared into coral larvae in ReefSeed units before being settled and transferred to reefs on specially designed ceramic devices.

MMRI successfully operated ReefSeed and completed the deployment with only remote support from AIMS. Corals were seeded to eight sites, and the first survey of the monitoring and evaluation plan was in late 2025.

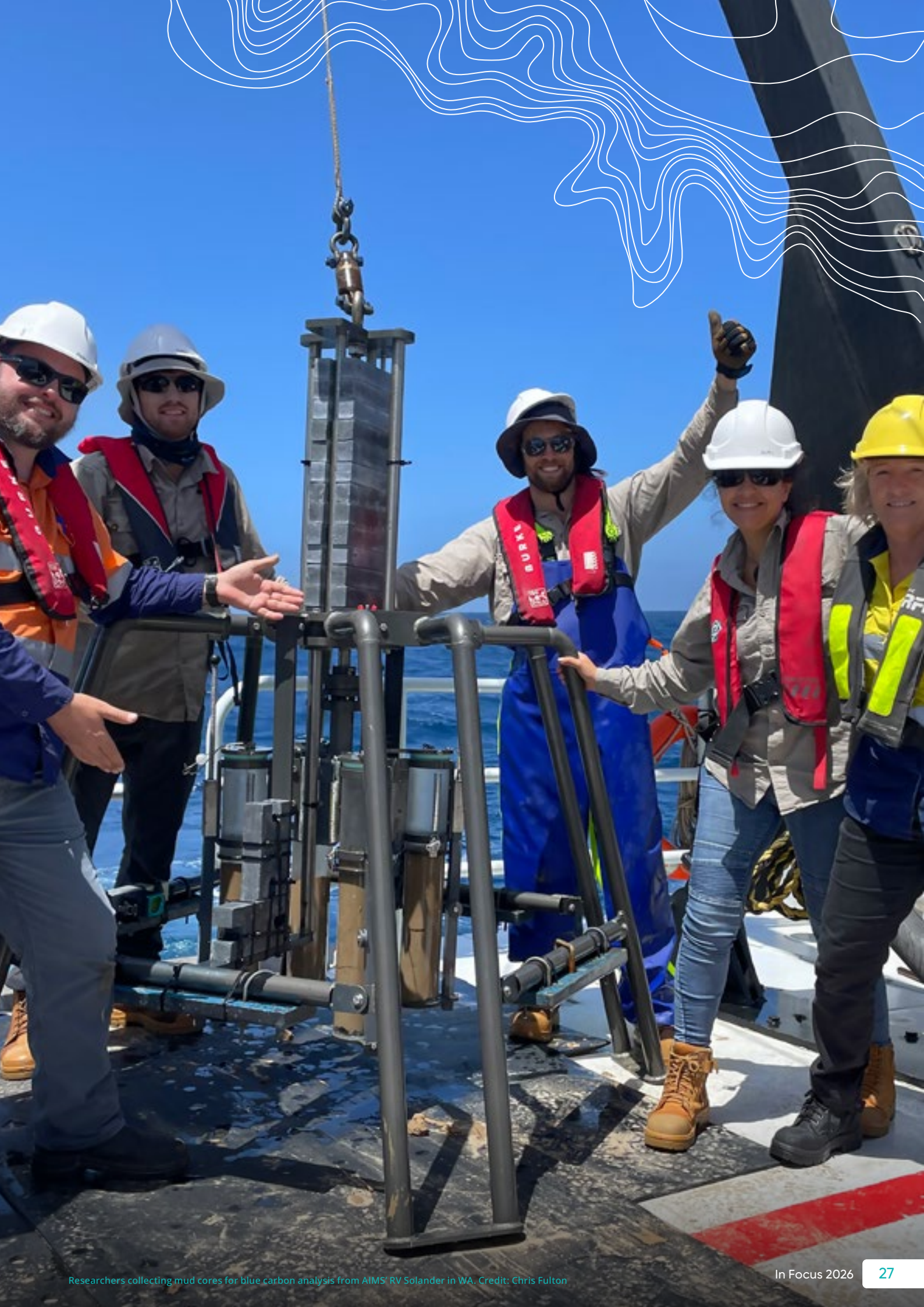
The AIMS team will return to Maniyafushi to work with MMRI in April 2026 and undertake another, larger spawning and deployment.

The project is a collaboration between the AIMS, MMRI and Australia's national science agency, CSIRO.

ReefSeed was awarded US$1.5m (AUD$2.3m) over three years by the G20 Coral Research and Development Accelerator Program (CORDAP), the only international organisation fully dedicated to funding global research and development for tropical and cold water coral restoration and conservation.

ReefSeed uses science and technology developed under the Australian Government's Reef Restoration and Adaptation Program (RRAP). RRAP is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.

Researchers observing the portable ReefSeed coral aquaculture units in the Maldives. Credits: Crystle Wee (main); Ministry of Fisheries and Ocean Resources | Naaish (inset)



Researchers collecting mud cores for blue carbon analysis from AIMS' RV Solander in WA. Credit: Chris Fulton

Solving the seascape carbon puzzle

Tracing organic carbon in coastal wetland soils

The world is closer to understanding how marine ecosystems could help curb the impacts of climate change thanks to the work of AIMS' Blue Carbon Seascapes Project.

The five-year project aims to help answer fundamental questions in blue carbon science. Blue carbon refers to the 'capture' and 'storage' of carbon dioxide from the atmosphere by coastal and marine ecosystems through natural plant growth and decay.

During photosynthesis, coastal plants absorb some of the carbon dioxide they take from the air and water around them into their biomass. When this plant carbon becomes buried in soils it is locked away from the atmosphere for hundreds to thousands of years, a process known as carbon sequestration.

An important step in protecting and enhancing this natural carbon sequestration pathway is determining the contributions of different coastal plants to this 'blue carbon' pool.

AIMS Researchers collecting soil and plant samples for blue carbon analysis. Credit: Violeta Jahnel Brosig

The team set themselves the grand challenge of teasing apart the sources of organic carbon stored in coastal wetland soils; a task likened to trying to unravel the ingredients of a cake when you don't have the recipe.

They created a mathematical model that standardised and analysed data from hundreds of measurements taken in soils beneath saltmarsh, mangrove, and seagrass wetlands around the world.

They found that while the source of the organic carbon varied depending on the location and conditions, generally more than half the organic carbon stored in these soils came from plants outside the wetland such as seaweeds and land plants offshore and upstream.

This underscores the need for holistic coastal management to protect the diversity of organic carbon sources.

It also shows we can enhance blue carbon sequestration by including a diversity of plants in the seascape to sequester carbon within a restored wetland.

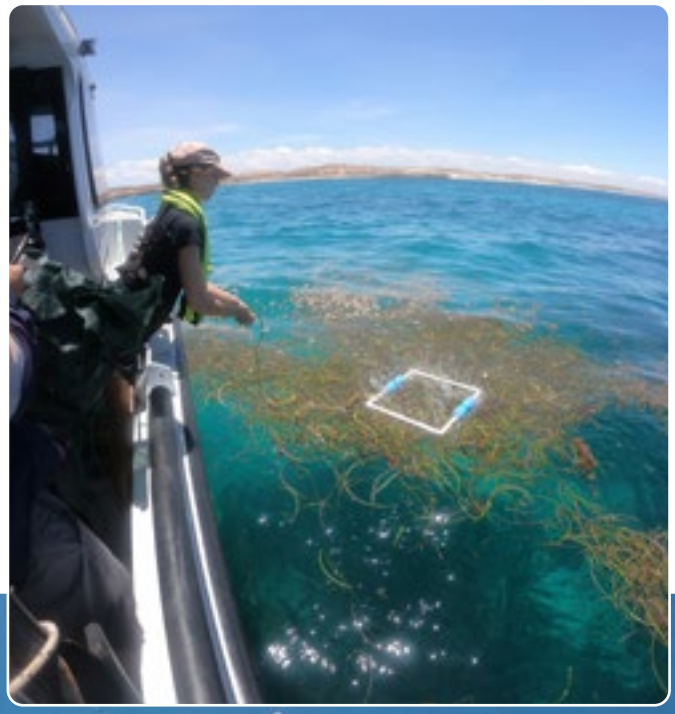
Excess carbon in our atmosphere is driving extreme climate events, from marine heatwaves to floods and fires.

As part of reaching net zero emissions targets, the world is seeking carbon capture and storage solutions.

Helping our coastal plants continue burying carbon in the soil could play an important part in these efforts while we work on reducing greenhouse gas emissions.

In 2025 the team published 'Tracing blue carbon flows across diverse seascapes' in *Global Change Biology* (https://doi.org/10.1111/gcb.70420), providing vital insights into how marine ecosystems can naturally contribute to climate abatement on a global scale.

The project is a joint funding partnership between AIMS and BHP.



Main: AIMS studying Sargassum algae along a transect line. Credit: Camille Grimaldi
Inset: AIMS researchers deploying a quadrat to study surface algae. Credit: Eric Treml

AIMS researcher studying a coral inside a rearing tank at the National Sea Simulator Credit: Marie Roman

Mimicking starfish signals

Synthetic peptides that starfish love to follow

Researchers have worked out how to mimic an attractive scent to lure the coral-eating crown-of-thorns starfish (COTS) to an area where they can be culled.

COTS are a major cause of hard coral loss on the Great Barrier Reef. Although native to the Reef, the starfish can occur in plague proportions, consuming vast swathes of hard coral during outbreaks.

COTS control programs rely on divers searching for the starfish and manually injecting them with bile salts or vinegar. This task is made challenging by their cryptic nature—many starfish are hidden within the reef's structure, making them difficult to find and cull.

The research team from AIMS, the University of the Sunshine Coast and Japan's Okinawa Institute of Science and Technology identified the new, naturally derived technology that could be used to efficiently control COTS outbreaks.

Based on a discovery that COTS use their characteristic spines to 'smell' peptides released by other individuals and communicate with one another, the team created synthetic peptides (short chains of amino acids involved in messaging between cells and between organisms) that consistently attracted COTS in the laboratory.

Researcher holding an adult Crown of thorns starfish to use in a flume study looking at peptides. Credit: Jo Hurford

Developing this lure-inspired technology to draw starfish to a single location could be an efficient, targeted and environmentally safe control strategy.

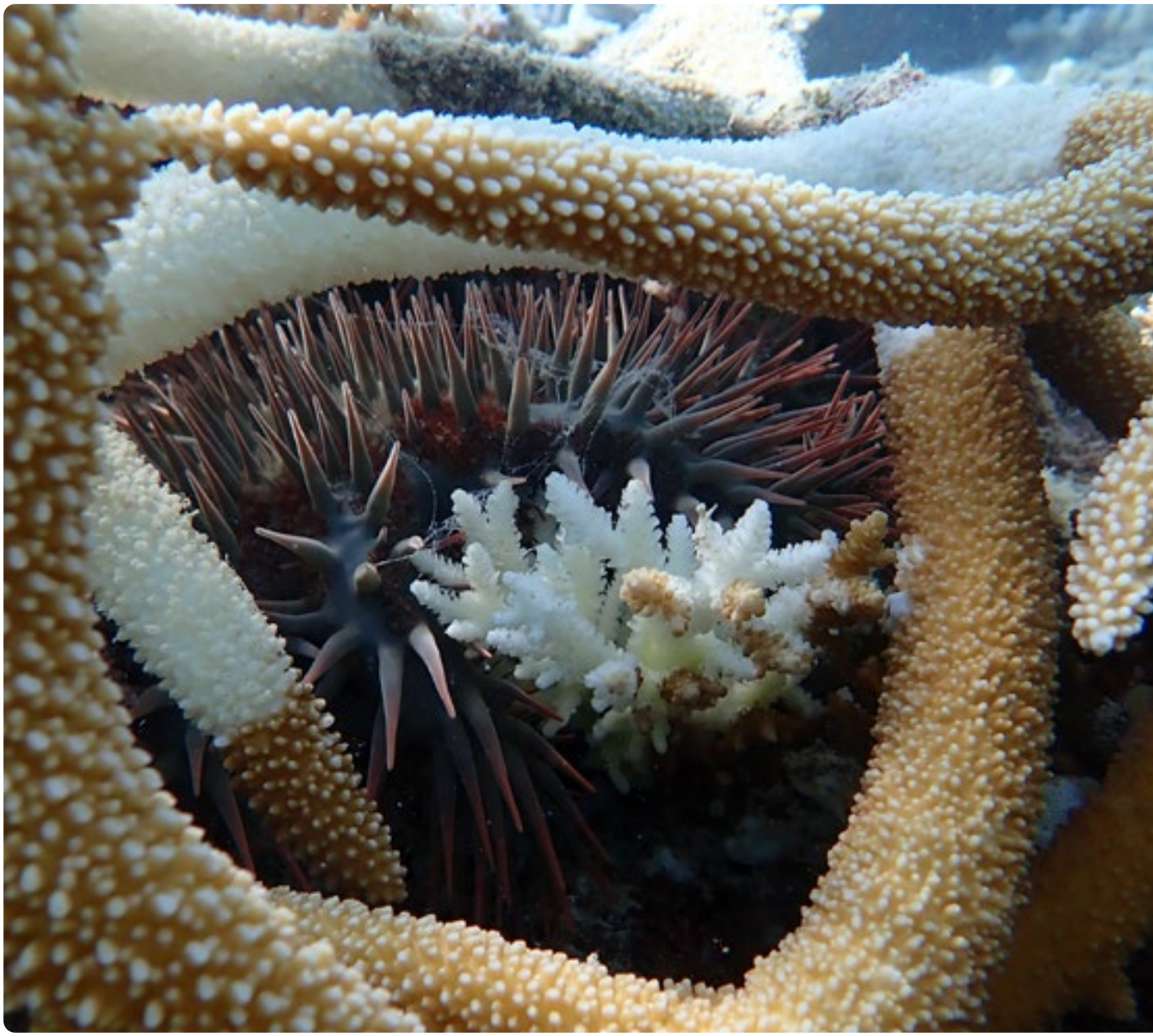
Genomic and proteomic analysis by the research team led to the discovery that COTS use their spines to both sense and secrete a wide range of peptides—not just defensive toxins.

The researchers synthesised the peptides they suspected functioned like pheromones and found that they consistently affected the trajectories of the starfish. Further behavioural trials were conducted in AIMS' National Sea Simulator.

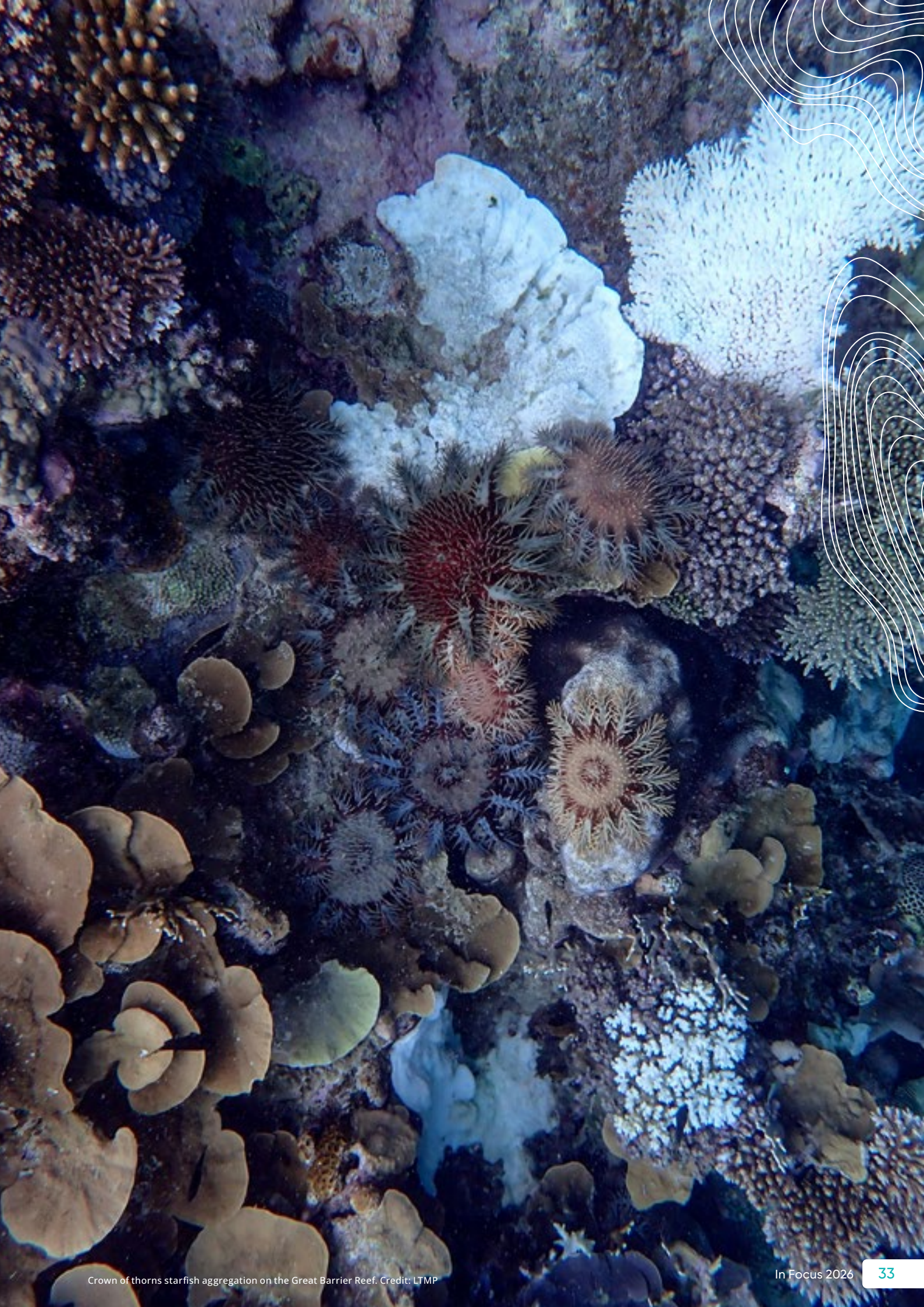
The synthetic peptides, confirmed to be non-toxic, consistently altered the movement patterns of COTS in predictable and measurable ways, even at low concentrations.

The results were published in *iScience*.

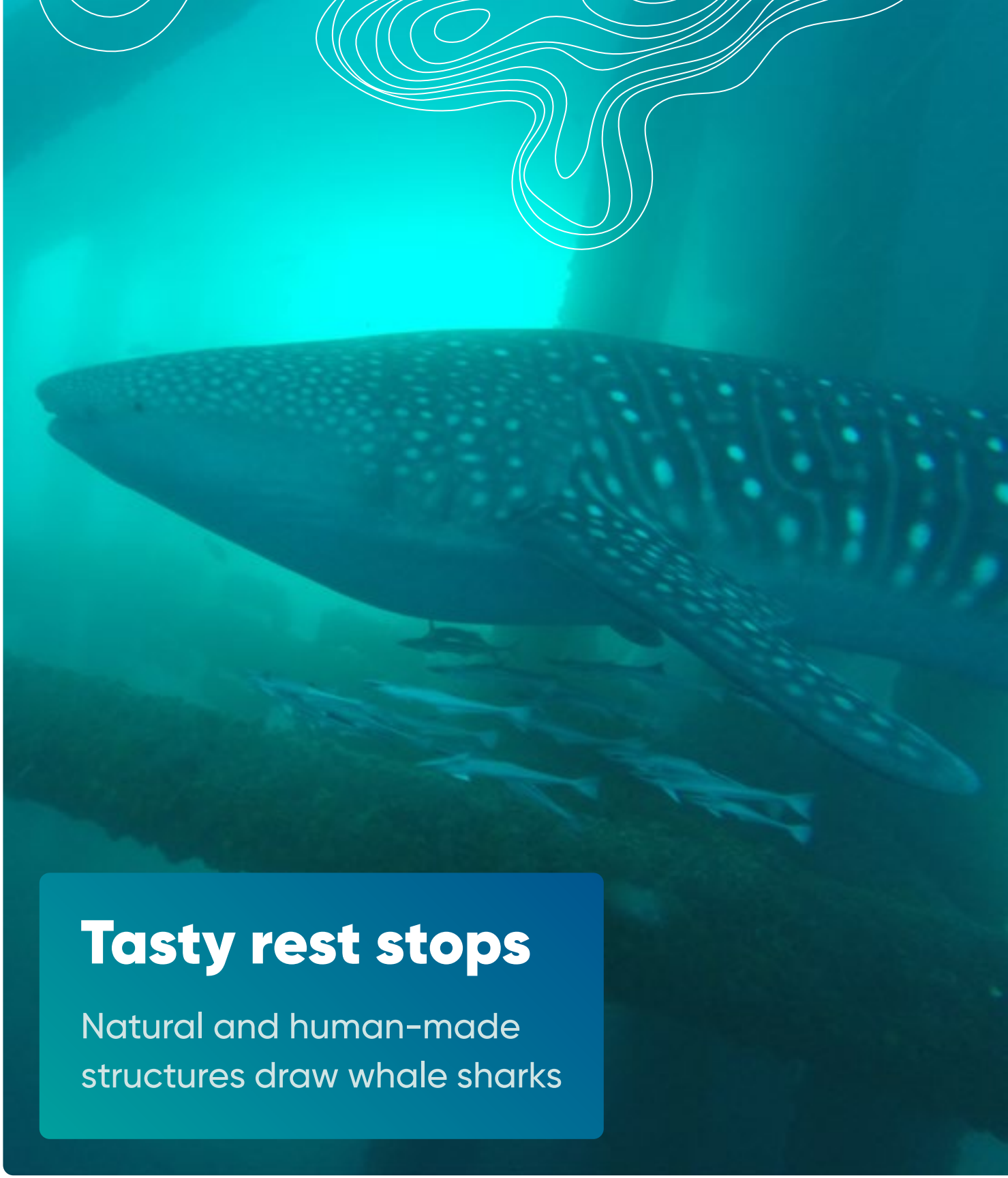
This research is part of the COTS Control Innovation Program (CCIP), funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.



Close up of a Crown of thorns starfish hiding in in a branching coral. Credit: Sven Uthicke



Crown of thorns starfish aggregation on the Great Barrier Reef. Credit: LTMP



Tasty rest stops

Natural and human-made structures draw whale sharks

Whale sharks (*Rhincodon typus*) are drawn to both natural and artificial underwater features as migratory stepping stones, AIMS and the University of Western Australia researchers have found.

They analysed satellite tracking data from 78 whale sharks tagged over 14 years at Ningaloo Reef and Shark Bay off the Western Australian coast.

They found both natural structures, such as seamounts and canyons, and artificial features, like offshore oil and gas platforms, offered foraging and feeding opportunities.

Whale shark swimming around oil and gas pylon structures, WA. Credit: Dianne McLean

Whale sharks are the world's largest living fish. They can grow to 18 metres, weigh up to 34 tonnes and may live for 100 years.

They travel large distances across the oceans, using undersea pinnacles and sea mounts as stepping stones. The currents that flow around these features help to enhance food availability like plankton.

Although they are much smaller than seamounts and pinnacles (which can span tens of kilometres), the industrial infrastructure found off the north-west coast of Australia can provide similar levels of feeding opportunities, with evidence, for example, that plankton are attracted by the artificial lights.

While there is still a need to better understand the relationships between whale sharks and individual oil and gas platforms, the importance of artificial features for whale shark movement and connectivity have implications for decommissioning.

Removal of platforms at the end of their productive life can change seascape connectivity by removing migratory stepping stones that link important habitats for whale sharks.

However, oil and gas platforms can also pose risks for whale sharks such as ship strikes from service vessels and the effects of pollutants from discharges and spills.

The platforms may also have indirect implications by altering migration patterns and disrupting the movements of whale sharks between natural features.

More research is needed to better understand these threats.

The research was published in Diversity and Distributions: Natural and Artificial Structures Influence the Movement and Habitat Connectivity of Whale Sharks (*Rhincodon typus*) Across Seascapes - D'Antonio - 2025 - Diversity and Distributions - Wiley Online Library .

Other co-authors were from The Australian National University, ECOCEAN, The University of Queensland and Murdoch University.

The study was supported by Santos Ltd and AIMS.

Whale shark at Ningaloo reef, WA. Credit: Andre Rerekura

In Brief
2024/2025

TROPICAL NORTHERN AUSTRALIA
FIELD OPERATIONS

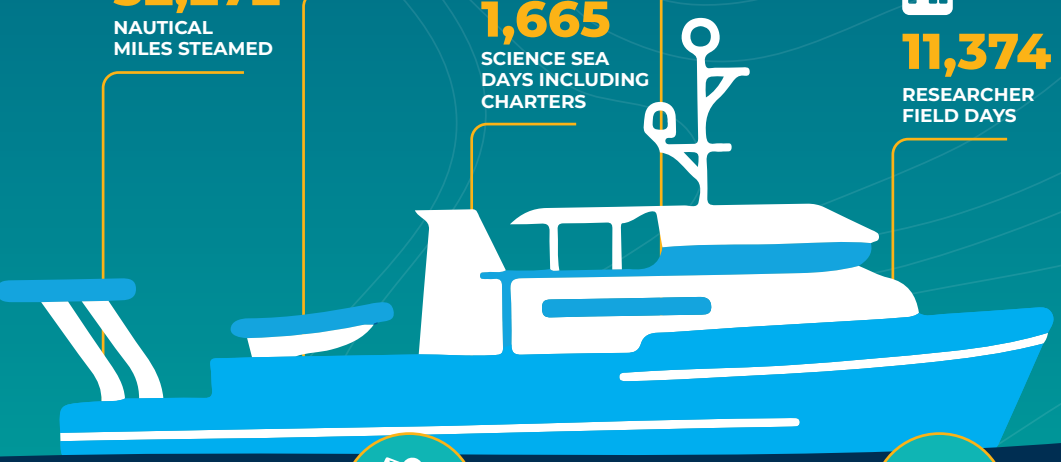
32,272 NAUTICAL MILES STEAMED

3,390 NUMBER OF DIVES

1,665 SCIENCE SEA DAYS INCLUDING CHARTERS

197 COLLABORATORS ON FIELD TRIPS

11,374 RESEARCHER FIELD DAYS



TRAINING THE NEXT GENERATION

31 POSTDOCTORAL FELLOWS

50 POSTGRADUATE STUDENTS SUPERVISED BY AIMS STAFF

15 15 OCCUPATIONAL TRAINEES AND INTERNS

FINANCES

$81.9m APPROPRIATIONS

$73.8m EXTERNAL REVENUE

$152.9m TOTAL EXPENSES

SCIENCE OUTPUT

198 PEER REVIEWED JOURNAL ARTICLES*

92% OF PUBLICATIONS ACCESSIBLE THROUGH OPEN ACCESS JOURNALS

*July 2025 data, Scival

POLICY IMPACTS

22% OF OUTPUTS CITED BY POLICY ACROSS

27 COUNTRIES

*2019-2023 data, Scival

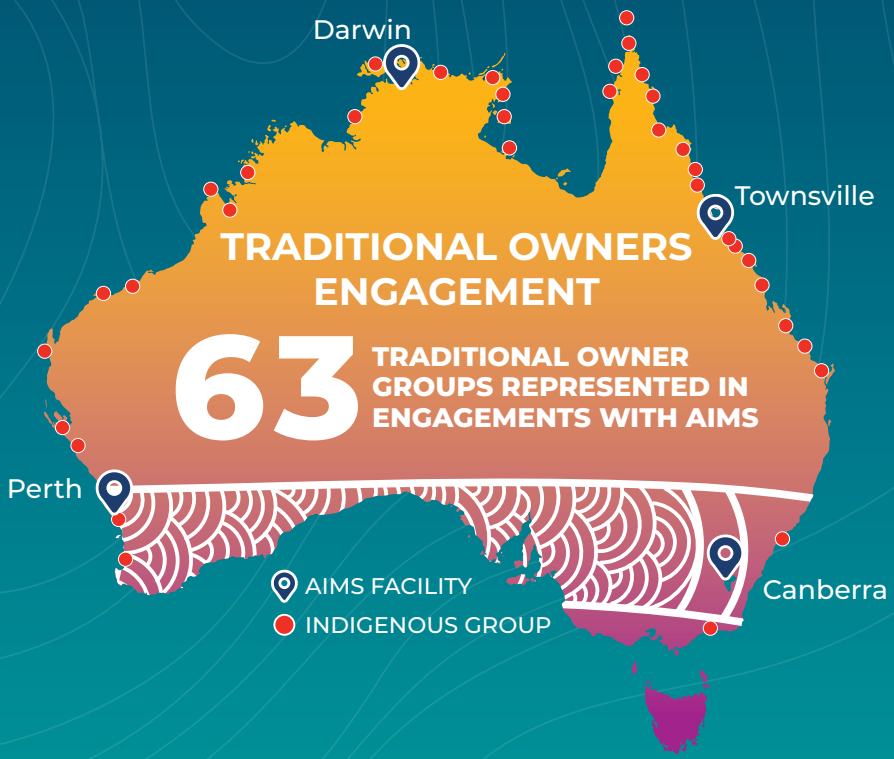
An eye on our tropical oceans: long-term biodiversity and water quality monitoring

Long-Term Monitoring Program (LTMP)
Running for 40 years, our Long-term Monitoring Program for the Great Barrier Reef (GBR) is the world's longest record of change in coral reefs - tracking coral and fish populations, crown-of-thorns starfish outbreaks, and the effects of cyclones and coral bleaching. This data is an essential resource to guide decision-making for government, industry and the science community.

Marine Monitoring Program (MMP)
AIMS continues to implement the MMP in collaboration with the GBR Marine Park Authority. Our team records water quality in inshore waters, the cover of hard and soft corals, macroalgae and coral recruitment on 30 inshore reefs. We provide the data to support the Reef and regional report cards. The MMP team undertake additional monitoring of coral reefs that inform the Gladstone Harbour and Mackay Whitsunday Isaac Regional report card.

Australian Government

Australian Institute of Marine Science



INDIGENOUS PARTNERSHIPS PROGRAM

The program weaves AIMS' science with the rights, responsibilities and knowledge of sea Country Traditional Owners across northern Australia.

We work together to

- Seek free prior informed consent for AIMS' research activities on Country
- Deliver new knowledge in areas prioritised by Traditional Owners
- Build training and employment pathways
- Co-design and co-deliver partnership projects.

SAFETY PERFORMANCE

INJURY SEVERITY RATE

1 POINT OVER TARGET

TOTAL RECORDABLE INJURY FREQUENCY RATE (TRIFR)

8 POINTS OVER TARGET

ENVIRONMENTAL PERFORMANCE

132%↑ INCREASE IN RECYCLING*

↓26% REDUCTION IN CARBON EMISSIONS ACROSS OUR OPERATIONS^*

↓6% REDUCTION IN SOLID WASTE TO LANDFILL*

*from baseline year ^Scope 1 and 2 emissions

NATIONAL SEA SIMULATOR

$42.7M INVESTED OVER THREE YEARS

NATIONAL FACILITY EXPANSION IS ONGOING THROUGH 24/25.

THE EXPERIMENTAL SPACE HAS DOUBLED, WITH A SIGNIFICANT INCREASE IN SEAWATER PROCESSING.

Marine science solutions: Reef restoration initiatives

RRAP: Reef Restoration and Adaptation Program
RRAP brings together the best in STEM, Traditional Owners and the community to develop ecologically beneficial reef interventions for the Great Barrier Reef that are cost-effective, practical, safe and acceptable.

ACRRI: Australian Coral Reef Resilience Initiative
ACRRI simultaneously uses underwater acoustics and coral seeding technologies to rebuild fish and coral populations. ACRRI researchers have developed a strong partnership with Woppaburra Traditional Owners, supporting Indigenous aquaculture trainees and participation in new coral seeding initiatives on Country.

Blue technology: innovation in marine science

ReefWorks
ReefWorks is Australia's tropical marine technology test range, enabling Australian innovators to trial new marine technologies, autonomous systems and sensors in a real-world tropical environment. With the support of the Queensland Government, in 2024/25 ReefWorks has extended its reach into the digital domain with a complementary test range digital twin now under development.

ReefCloud
ReefCloud is a collaborative platform using automated data management and artificial intelligence to optimise coral reef monitoring—empowering scientists, governments, and communities to protect and restore coral reefs on a global scale.

ReefScan
A suite of technology-based solutions for coral researchers and environmental managers to conduct in-field marine observations. ReefScan products are now used by AIMS stakeholders nationally and internationally.

Coral seeding devices; with newly settled microscopic coral larvae (right), and with grown coral colony after a few years (left). Credit: Marie Roman

Locations and assets

Australian Government

Australian Institute of Marine Science

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PMB No. 3
Townsville MC QLD 4810
Telephone: 07 4753 4444

Darwin
PO Box 41775
Casuarina NT 0811
Telephone: 08 8920 9240

Perth
IOMRC - Level 3
UWA | 64 Fairway
Crawley WA 6009
Tel: (08) 6369 4000

Canberra
Suite G7
65 Canberra Avenue
Griffith ACT 2603

aims.gov.au

3D reef mapping image showing different kinds of seafloor and life forms categories that are analysed over time Credit: EcoRRAP