SDG 14 Life Below Water

Overview

UQ has a strong and multidimensional capability to advance SDG 14, with world-class research, education and sustainable campus operations. UQ is internationally recognised for its marine science expertise, supported by dedicated research stations at Heron Island and Moreton Bay, and for its leadership in coral reef restoration and ocean ecosystem resilience.

Through specialised teaching programs and global capacity-building initiatives, UQ equips the next generation of marine scientists and conservationists with the practical skills and knowledge required to safeguard our marine and freshwater ecosystems.

The University's campus operations contribute to SDG 14 by focussing on sustainable water management, waste reduction and environmental governance.

Together, these activities reflect UQ's commitment to protecting marine and aquatic environments and supporting global efforts to sustain life below water.

Progress made in 2025 towards SDG 14 is reported here with reference to the following domains and enablers from UQ's Strategic Plan 2022-2025:

- learning and student experience
- research and innovation
- enriching our communities
- our global profile
- our people.

Related SDGs

- SDG 1 No poverty
- SDG 2 Zero hunger
- SDG 6 Clean water and sanitation
- SDG 12 Responsible consumption and production
- SDG 13 Climate action
- SDG 15 Life on land.

Learning and student experience

UQ provides a dynamic and supportive environment that responds to modern needs through practical experiences and partnerships, both on and off campus. Students address SDG 14 through both classroom learning and extra-curricular activities.

Curriculum

UQ offers several programs and courses focused on coastal and ocean science and marine biology, with significant opportunities for hands-on experience at Heron Island Research Station on the Great Barrier Reef and Moreton Bay Research Station on North Stradbroke Island. These programs, primarily within the Bachelor of Science, allow students to study coastal processes, oceanography, ecology, marine geology and conservation.

In 2025, the undergraduate course on Living Oceans (MARS1001) included a 1-day field trip to Moreton Bay Research Station providing practical, hands-on experience in investigating ocean and coastal ecosystems for 200 students. Similarly, Coral Reef Ecology and Conservation (BIOL3215) took 80 students to Heron Island Research Station for an immersive week of research during which they conducted independent studies and wrote a report. The Masters of Conservation Biology also spent a week at Heron Island learning practical field techniques, their limitations and context for conservation decision-making. These learning opportunities allow students to directly study the biodiversity and health of marine environments, enabling them to:

- gain field-based experience investigating ocean and coastal interactions, ocean habitats and life in the ocean
- learn a range of field sampling techniques and analyse biological samples
- gain appreciation of the importance of healthy oceans to human wellbeing and global biodiversity.

Extra-curricular activities

How we achieved this

- The Marine Society UQ (MSUQ) a UQ Union society established in 2020. Its aim is to connect undergraduate students, postgraduate students and academics to maintain marine ecosystem health and wellbeing. Throughout 2025, MSUQ encouraged students to gain skills, joined the conversation on marine issues and topics and facilitated opportunities for the UQ community to protect marine environments, including:
  - running iNaturalist Bioblitz project competition throughout both Semester 1 and Semester 2, encouraging participants to identify and log all marine animals found within the Moreton Bay region.
  - hosting 5 SEQUEST (South East Queensland Underwater Environmental Survey Teams) events between March and October to support the long-term monitoring of the biological diversity of marine invertebrates at different areas of the bay.

  - organising Snorkelling tripes, such as to the Tangalooma Wrecks on Moreton Island on 5 May and 18 October, where participants enjoyed fish identification activities and birdwatching.

- CoralWatch is a UQ-led, non-profit global coral reef monitoring program, working with volunteers worldwide including students to increase understanding of coral reefs, coral bleaching and climate change while also collecting critical data on coral reef health. In 2025, participants were involved in several ways:
  - by monitoring reefs using the Coral Health Chart to record data and submit it online.
  - by taking part in the CoralWatch Ambassador program, which encourages community participation and fosters a sense of responsibility for reef conservation. In 2025, funding supported the delivery of 2 youth ambassador workshops designed to build skills, knowledge and confidence in promoting climate behaviours.
  - by engaging in the 'What can I do' program in partnership with the Great Barrier Reef Foundation. The program aims to foster climate action and empower communities for reef protection by quantifying changes to their carbon emissions and discovering new strategies and resources to help reduce their carbon footprint. Since January 2025, 1,126 participants have saved over 3,076 tonnes of Carbon.

Research and innovation

Throughout 2025, UQ made significant contributions to SDG 14 through research activities, especially in strengthening marine ecosystem resilience and providing monitoring, data and decision support for marine and aquatic ecosystem management.

Strengthening marine ecosystem resilience

How we achieved this

- The Reef Restoration and Adaptation Program (RRAP)'s Regulatory Subprogram aims to establish a robust, forward-looking and enabling regulatory environment to support novel adaptation and restoration interventions within the Great Barrier Reef World Heritage Area. Working within this initiative to improve Australia's regulatory capacity and investigate existing policy frameworks, researchers from the UQ Centre for Policy Futures published a paper in February 2025 titled The governance of marine and coral reef restoration, lessons and paths forward for novel interventions. This work reviews approaches and recommendations to the governance of marine and coral reef restoration, explores challenges and solutions of governing novel coral reef intervention activities in a changing climate and discusses how themes from the literature may be applied more effectively in practice to govern novel reef interventions.
- From 25 to 28 November 2025, UQ convened global marine scientists, policymakers and industry leaders at the 3rd West Pacific Marine Biology Symposium to accelerate collaboration on ocean resilience. The event showcased the Western Pacific's extraordinary biodiversity, strengthened UQ's strategic partnership with France's CNRS Biologie and highlighted urgent climate challenges facing Pacific Island nations.

Delegates also had the opportunity to tour UQ's world-class facilities, including at Heron Island Research Station on the Great Barrier Reef and the Moreton Bay Research Station. The symposium reinforced the growing Indo-Pacific research network and advanced shared strategies for safeguarding marine ecosystems vital to food security, climate regulation and biodiversity. Researchers from UQ's School of the Environment and Centre for Biodiversity and Conservation Science published a paper in 2025, titled Near-global spawning strategies of large pelagic fish, demystifying ocean 'hotspots', which are specific areas of the Indian and Pacific Oceans that large pelagic fish consistently return to each year to spawn. The study calls for a more holistic and ecosystem-based approach to fisheries management, showing that conserving and effectively managing these areas through Marine Spatial Planning and the development of offshore Marine Protected Areas has multiple benefits towards fisheries and conservation.

- The crown-of-thorns starfish (CoTS) control innovation Program, involving researchers from UQ's School of the Environment, progressed work to understand the effectiveness of control measures for CoTS under increasing environmental pressures. Using a spatially explicit ecosystem model to simulate 3,806 individual reefs across the Great Barrier Reef's 2,300 km, researchers found that controlling CoTS led to increased coral cover in about 85 per cent of cases. This simulation highlights the effectiveness of proactive management in enhancing coral resilience across the 2,300-kilometer network. It was also discovered that the benefits of programs to kill or remove the predatory starfish grew over time despite increasing climate change pressures. The research is important for identifying the key ecological and management factors that influence when and where control is most effective, which can help guide management decisions.
- UQ holds a Memorandum of Understanding with the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF), which is the intergovernmental body that coordinates activities in coral reef management among Malaysia, Indonesia, the Philippines, Timor Leste, the Solomon Islands and Papua New Guinea. In 2025, UQ was approved to develop a full project proposal by the Global Environmental Facility (GEF) and secured funding of US$150,000 for the project 'Sulu-Sulawesi Seascape Approach to Coral Reef Livelihoods (SEACONNECT)', which aims to strengthen connectivity-informed and climate-resilient governance of coral reefs, fisheries and coastal ecosystems in the Sulu-Sulawesi Seascape. This includes catalysing sustainable livelihood and knowledge partnerships across Berau in Indonesia, Semporna in Sabah, Malaysia, and Apo Island, Negros and Tawi-Tawi in the Philippines.
- Associate Professor Carissa Klein from UQ's School of the Environment continued work on the project 'What's the catch? Social and environmental sustainability of seafood' throughout 2025. The research generates new knowledge in the area of seafood trade and sustainability using interdisciplinary approaches that account for social sustainability concepts and the displacement of fishing impacts, leading to improved sustainability and mitigating destructive fishing practices globally. It has already equipped Australia with new strategies to become a global leader in the production and consumption of sustainable seafood, which is core to Australia's

Science and Research Priorities and Fisheries Policy and United Nations 2030 SDGs. Specifically, it has led to uptake in 3 policies in Australia:

1. the Department of Agriculture, Fisheries and Forestry's seafood policy to reduce illegal, unregulated and unreported products from entering its borders
2. the phase out of destructive gillnet fishing in the Great Barrier Reef
3. the reform of Australia's Environmental Protection and Biodiversity Conservation Act.

This policy influence has impacts for Australia's fishing communities who are incentivised to improve and maintain more sustainable practices and sets a precedent for those communities outside of Australia.

Translating monitoring and data into decision support for ecosystem management

How we achieved this

- In 2025, UQ researchers from the School of the Environment continued to enhance public understanding of the impacts of pesticide toxicity to reef environments through the Pesticide Reporting Portal and Pesticide Risk Metric Dashboard. Part of the Reef Catchments Science Partnership (RCSP), this data gathering collaboration with the Queensland Government provides freely available data to government and non-government stakeholders, landholders, managers and the general public to help collect, measure, monitor and analyse land-based pesticide runoff affecting coastal waters, supporting sustainable management and conservation efforts.
- As a parallel project within the RCSP initiative, researchers at the Faculty of Science countinued the Pesticide Projector project in 2025, collaborating with Farmacist, the Queensland Government and Truii to reduce pesticides in aquatic ecosystems. The interactive web tool helps users select pesticide active ingredients that are less harmful to plants and animals in waterways, contributing to healthier and more resilient aquatic environments. It is available to all communities that recommend, purchase and apply pesticides to agricultural crops in Australia.
- In 2025, the Great Reef Census visited more than 350 reefs, generating over 80,000 images to help scientists and reef managers better understand reef health. Co-founded by UQ, this highly scalable and cost-effective initiative has operated for 6 years, involving hundreds of citizen scientists to collect field data and images across the Great Barrier Reef. These data and images are then analysed through a combination of artificial intelligence (AI) and a global volunteer network from more than 85 countries. As the largest contributor to reef reconnaissance data, the program is used to help target where the Reef Authority undertake control of coral-eating crown-of-thorns starfish. The program enables almost anyone, locally or worldwide, to contribute to the health of the Great Barrier Reef and reefs globally. The Great Reef Census is a collaboration between UQ, Citizens of the Reef, the Great Barrier Reef Marine Park Authority, James Cook University and the tourism industry, with support from Dell Technologies, Disney, the Cotton On Foundation and others.
- The Australian government spends approximately A$25 million each year controlling crown-of-thorns starfish (CoTS) on the Great Barrier Reef, but operators began reporting difficulties finding starfish during heatwaves. With funding from the Australian

Government's CoTS Control Innovation Partnership, Professor Peter Mumby's team analysed all historical control data and found strong evidence of an 80 per cent reduction in effectiveness at sites experiencing profound heatwaves. These results have stimulated additional collaboration between the Government, CoTS control operators and UQ researchers to seek solutions and alternative activities during heatwaves.

- Associate Professor Chris Roelfsema collaborated with an Indonesian research team to map nationwide seagrass habitats, delivering critical data to support evidence-based marine management decisions. As a major milestone of this initiative, the Indonesian Seagrass Mapping Partnership (ISMP), comprising UQ's team, Universitas Gadjah Mada, the National Research and Innovation Agency (BRIN) and the Ministry of Marine Affairs and Fisheries (KKP), officially launched the updated National Coral Reef and Seagrass Map 2025 on 4 December 2025, marking the historical release of the nation's first high-resolution distribution map. Expanding this framework, he is also collaborating with researchers globally to map and monitor seagrass on a global scale to build a global seagrass alliance. Working alongside organisations such as The Nature Conservancy, Florida International University, Earth Genome, Arizona State University and the Smithsonian Institution, these global partnerships aim to protect vulnerable seagrass ecosystems and preserve their ecological value.
- The federal release of Australia's Sustainable Oceans Plan aims to drive a thriving blue economy, a national objective that coincides with the development of the new National Marine Science Strategy 2025–2035. This overarching strategy is being developed by the National Marine Science Committee, a peak body uniting 38 organisations, universities and Government departments. Within this landmark national process, researchers from UQ's Centre for Policy Futures provided critical strategic direction by co-authoring two peer-reviewed white papers to inform Australia's new National Marine Science Strategy:
  - Social Science for Meeting Australia's Ocean Goals, co-authored by Associate Professor Pedro Fidelman, ensures the national strategy accounts for human and cultural factors. It advocates for embedding cultural, social and economic perspectives into top-level ocean decision-making while deeply respecting Aboriginal and Torres Strait Islander Peoples' traditional connections to Sea Country.
  - National Marine Research Infrastructure: An Enabler for Australia's Sustainable Ocean Future, co-authored by Dr Sandya Gunasekara and Dr Danielle Smith, delivers the technical blueprint for the strategy. This work outlines that future-ready infrastructure, including advanced research vessels, observing systems, laboratories and data platforms, remains critical for accurate ecosystem forecasting, monitoring and marine innovation.

  Australia's upcoming marine strategy will place a strong emphasis on building a thriving blue economy, underpinned by an interdisciplinary approach to marine science. The plan calls for collaboration across both natural and social sciences to drive sustainable development while strengthening economic, environmental and social resilience.

Enriching our communities

UQ supports and advances SDG 14 in teaching, research and external engagement through inclusive access to debates, public lectures, cultural events and other community learning opportunities.

In particular, the University enriches regional communities in 2025 by driving sustainable development and long-term economic resilience, partnering with local industries to transition vital infrastructure into environmentally resilient facilities.

Community outreach and education

UQ owns and operates 2 marine research stations, Moreton Bay and Heron Island, which are critical to delivering outcomes for SDG 14 through research, education and engagement.

Moreton Bay Research Station on North Stradbroke Island supports marine and land-based research addressing environmental degradation, habitat loss and climate change. Heron Island Research Station, located on the southern Great Barrier Reef, has supported world-class coral reef research and education for over 70 years. Both stations facilitate marine science education for Australian and international student cohorts from pre-university to postgraduate levels, promote global collaboration and deepen understanding of marine ecosystems and conservation.

In 2025, the stations continued to offer education resources, programs and opportunities. UQ undergraduate and postgraduate students spent more than 4,500 learning days at the stations and non-UQ tertiary students spent over 1,200 learning days at the stations. Combined, the sites hosted over 1,900 students from non-tertiary institutions such as high schools, alongside more than 350 international visitors. The Hidden Vale Research Station also supported student learning throughout 2025.

Demonstrating a strong commitment to Indigenous partnership, Heron Island Research Station hosted 8 Traditional Custodians from the Bailai, Gooreng Gooreng, Gurang and Taribelang Bunda Elders Council from 25 to 28 July 2025. They were joined by a range of staff from UQ's Faculty of Science, Heron Island Resort, the Australian Institute of Marine Science (AIMS) and University of Sydney One Tree Island Research Station. Over 4 days, these groups workshopped cultural awareness training and knowledge sharing, yarning around the table and out on the reef with the aim to work closer together learn from Indigenous culture, learn from the reef and island and learn from each other.

In addition, UQ delivered the following opportunities to share knowledge about aquatic ecosystems, ocean sustainability and SDG 14 in 2025:

- the biannual Talkfest, which was hosted by the Centre for Marine Science in February and July of 2025, uniting researchers, students and external experts to exchange insights and build collaboration in marine science. The July session focussed on Moreton Bay, co-hosted by the Moreton Bay Foundation. Topics discussed included habitats, fauna, pollution and current challenges for the bay. The event was followed by a workshop to advance a priority action from the Blueprint for a Sustainable Moreton Bay (2025–2035). The session explored how a digital Knowledge Hub could enhance collaboration and knowledge sharing between researchers, Bay managers and the public, including the role of AI in data integration, with insights informing the

design of a connected, interdisciplinary platform to advance science and management for a thriving Moreton Bay.

- a student-led tour of the UQ Lakes at the St Lucia campus on 3 May 2025 showcased ongoing efforts to restore aquatic health on campus, giving alumni, staff, students and community members insight into the creation of a self-sustaining ecosystem and renewed habitat for native species.

Coral reef conservation with free online courses

With funding from the Global Environment Facility, UQ continued to offer free online courses in 2025 to support the conservation of climate-resilient coral reefs, alignment with the aims of the GEF 7 Coral Reef Rescue Project and the broader Coral Reef Rescue Initiative. These courses are now available in both English and Bahasa Indonesia on UQ's Edge online learning platform:

- CRRI104x Coral Reefs: Climate Resilient Communities: guiding participants through key concepts, tools and approaches needed to engage in meaningful, community-led climate adaptation efforts.
- CRRI103x Coral Reefs: Sustainable Blue Economy: exploring how to analyse the blue economy within the learner's own context, evaluating the risks associated with business-as-usual for coral reef ecosystems and the planet and identifying opportunities to transition towards a more sustainable, reef-positive future.

The curriculum covers reef ecology, marine conservation strategies and the role of the blue economy in sustainable development, remaining openly accessible to global learners interested in sustainability, coral reef conservation and community resilience.

Sustainable port infrastructure for regional communities

Launched in June 2025, a multi-year project 'Trade and Circular Economy Opportunities for Port Infrastructure' is being led by UQ's Sustainable Infrastructure Research Hub (SIRH) alongside North Queensland Bulk Ports Corporation (NQBP) and iMOVE. Operating 4 trading ports in Queensland, 3 of which are uniquely located within the sensitive Great Barrier Reef World Heritage Area, NQBP must balance necessary maritime trade facilitation with strict environmental stewardship. This collaborative research explores future trade diversification, future fuel hubs, alternative energy precincts and circular port models embedded in future commodity supply chains. Drawing on international expertise through SIRH's global academic partnerships, the project enhances evidence-based frameworks to improve supply and demand forecasting and integrate closed-loop principles. By delivering a future fuel and circular economy model for the Port of Mackay that incorporates economic growth alongside social and environmental considerations, this UQ-led project establishes a vital framework transitioning traditional bulk commodity ports into low-carbon, environmentally resilient industrial facilities.

Our global profile

UQ seeks to enrich communities in Queensland and around the world. As part of SDG 14, UQ is committed to global development, harnessing its expertise to support Australia's commitment to capacity building across the Indo-Pacific.

Building global and regional partnerships

How we achieved this

- In collaboration with the Asian Development Bank, Professor Peter Mumby and Dr Selina Ward advanced best practice for SDG 14 by examining how parametric insurance can provide instantaneous funding to restore damaged coral reefs after cyclones or coral bleaching events. This research focused on communities dependent on marine ecosystems in the Philippines, Indonesia, Fiji and the Solomon Islands.
- Professor Peter Mumby presented a keynote address at the 3rd International Conference on 'Biodiversity, Ecology and Conservation of Marine Ecosystems' in Hong Kong in August 2025. The keynote promoted the linking of science to long-term biodiversity issues on coral reefs and has motivated a shift in focus on restoration in the waters of Hong Kong to take a more ecosystem-based approach, consistent with SDG 14 in the Ocean Decade.
- UQ has been partnering with the UN Food and Agricultural Organisation (FAO) to help countries of the Gulf of Thailand (GoT), including Thailand, Malaysia, Cambodia and Viet Nam, develop a regional fisheries management program named GoTFISH. This project is funded by the Global Environmental Facility and aligns with SDG 14 to address the key barriers to sustainable transboundary fisheries management of the GoT, resolving institutional, legal and administrative issues at both regional and national levels. Issues identified included a lack of an appropriate forum for GoT-wide multi-national dialogue for planning, monitoring and reporting to address current unsustainable practices in fisheries resource use and management and conservation of aquatic biodiversity. As the executing agency for one of the project's three core themes focusing on marine biodiversity, UQ successfully launched its component in October 2025.
- As a UQ-led non-profit global citizen science program, CoralWatch contributes to SDG 14 by supporting coral reef monitoring. In 2025, data was collected by volunteers and research partners in 29 countries, generating over 50,000 coral observations using a standardised bleaching assessment method. Over its 25-year history, the program has become the world's largest open-access coral bleaching database, utilising the Coral Health Chart across more than 2,500 reefs in over 80 countries to advance global marine conservation.
- UQ holds a Memorandum of Understanding with the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF), which is the intergovernmental body that coordinates activities in coral reef management among Malaysia, Indonesia, the Philippines, Timor Leste, the Solomon Islands and Papua New Guinea. In 2025, UQ was approved to develop a full project proposal by the Global Environmental Facility (GEF) and secured funding of US$150,000 for the project 'Sulu-Sulawesi Seascape Approach to Coral Reef Livelihoods (SEACONNECT)', which aims to strengthen connectivity-informed and climate-resilient governance of coral reefs, fisheries and coastal ecosystems in the Sulu-Sulawesi Seascape. This includes catalysing sustainable livelihood and knowledge partnerships across Berau in Indonesia, Semporna in Sabah, Malaysia, and Apo Island, Negros and Tawi-Tawi in the Philippines.

- The GEF-funded Coral Reef Rescue project, led by the UQ and the World Wildlife Fund (WWF), safeguards climate-resilient reefs in Fiji, the Solomon Islands, Indonesia, the Philippines, Madagascar and Tanzania to protect ecosystems vital to human livelihoods. In 2025, a new Coral Reef Rescue (CRR) Portal was launched, bringing together 70 existing coral reef datasets and resources in an easy-to-use platform. This tool is designed to bridge science and on-the-ground conservation. It helps marine managers and conservation practitioners make informed decisions by identifying the most suitable free resources for their projects from the vast array available online. Alongside these new resources, the GEF 7 CRR project team at UQ delivered a series of online and in-person events across all 6 countries.

Our people

The impact of UQ's academic staff and researchers in marine conservation and aquatic health is reflected in international and institutional recognitions celebrated throughout 2025:

- External Global and Field Recognitions including:
  - SCB 2025 Distinguished Service Award: Professor Richard Fuller from UQ's School of the Environment was awarded this prestigious honour by the Society for Conservation Biology. He was recognised for his impactful conservation work, policy engagement and research addressing the human dimensions of protecting threatened migratory shorebirds and coastal ecosystems.
  - Clarivate Highly Cited Researchers (HCR) Awards: Prominent marine scientists from the School of the Environment were recognised for generating globally significant, top-tier cited research focusing on ocean preservation and coral reef resilience. These included Professor Richard Fuller, Professor Hugh Possingham, Professor James Watson and reef ecology expert Professor Peter Mumby.
- Internal UQ Excellence and Research Innovation Awards: Foundation Research Excellence Award was granted to Dr Cheng Zhang from the Australian Institute for Bioengineering and Nanotechnology (AIBN) for developing technologies focused on the destruction and reuse of Per- and Poly-fluoroalkyl Substances (PFAS). This impacts SDG 14 by neutralising harmful chemical contaminants before they pollute waterways and marine habitats.
- UQ Global Partnerships Funding Scheme (2025 Round One): Multiple collaborative projects targeting global marine challenges were awarded funding via the UQ Global Partnerships Funding Scheme. These specifically targeted international efforts under the Coral Reef Rescue Initiative to build capacity for climate-resilient reef conservation.