

Future Reef 2.0

Testing the waters:
a unique floating lab



Future Reef 2.0 is the only research project monitoring ocean chemistry along the length of Australia's Great Barrier Reef Marine Park. CSIRO scientists are running an advanced sensor system from a Rio Tinto vessel to collect and monitor water measurements and data along the Reef.

The twin perils brought by climate change – an increase in the temperature of the ocean and its acidity – if they continue to rise at the present rate the reefs will be gone within decades and that would be a global catastrophe.

Sir David Attenborough



Great Barrier
Reef Foundation

Since 2013, Rio Tinto, CSIRO and the Great Barrier Reef Foundation have been working together to gather this vital information on a scale not previously possible. With the success of the three-year Future Reef MAP project, the partners extended the collaboration to initiate Future Reef 2.0 which will enable this valuable source of data collection to continue through to 2019.

Ocean acidification: a threat

Climate change is a significant threat to the Great Barrier Reef. The world's oceans absorb at least 25% of the carbon dioxide released into the atmosphere by humans. As levels of carbon dioxide in the atmosphere increase, the amount of dissolved carbon dioxide in the ocean increases too. This results in an increase in ocean acidity and a shift in water chemistry – this is called ocean acidification.

The delicate balance between reef growth and reef erosion will be disrupted as oceans become more acidic. This will limit the ability of corals to deposit their limestone skeletons, and their ability to form reefs may be compromised.

Future Reef 2.0: knowledge for Reef managers

Using a unique 'ship of opportunity', the innovative Future Reef 2.0 project is helping to build a comprehensive picture of how ocean chemistry is changing across Great Barrier Reef habitats.

It's important to understand how factors like water chemistry, including ocean acidity, can influence the growth of corals and other marine organisms across the Reef's many different habitats.

Delivering data on a scale and frequency not previously possible, the Future Reef 2.0 project – a partnership between Rio Tinto, CSIRO and the Great Barrier Reef Foundation – is empowering Reef managers with information about where, when and how ocean acidification is having the greatest impact. This knowledge can assist Reef managers to assess the level of the ocean acidification threat and make appropriate decisions.

As well as continuing the important ocean monitoring program, Future Reef 2.0 will enable more analysis and synthesis of the data by CSIRO which will then be used to produce models that predict the long-term health of the Reef.

How it works

The Rio Tinto vessel, the RTM Wakmatha, travels the length of the Reef, between Weipa and Gladstone, on a regular basis.

Future Reef 2.0 uses a custom-built ocean sensor, installed on the RTM Wakmatha, to regularly collect ocean chemistry data along the length of the Reef during its normal voyages.

The sensors sample surface waters every 1-2 minutes, taking measurements of carbon dioxide, pH, temperature, salinity

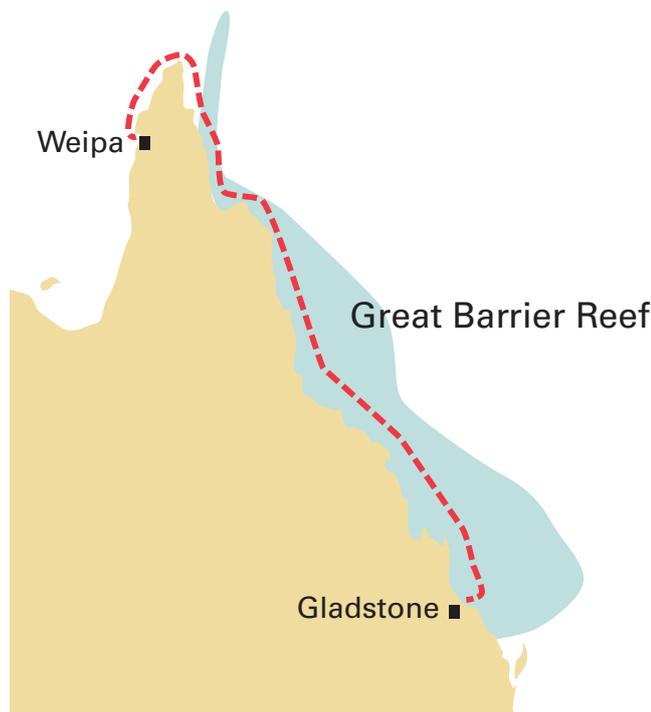
Future Reef 2.0 will fill an important knowledge gap to help protect our Reef for future generations.

and dissolved oxygen. Data is transmitted to a CSIRO server in near-real-time via communication equipment installed on the bridge of the vessel. Water samples are also collected and returned to shore for analysis. This information is shared globally, making it easily accessible for scientists and managers.

The sensor system is installed on a specially built platform inside the ship. It took engineers 12 months to design, build and install the mezzanine platform that the sensor sits on, to ensure it meets safety standards.

The ship has been collecting this valuable ocean acidification data since 2013, creating a valuable record of ocean chemistry across seasons and locations.

The results from this work to date indicate that the ocean chemistry on the Great Barrier Reef remains positive for the growth of coral. This is important because it indicates that, at least in terms of water chemistry, reefs can recover from short term events such as bleaching and cyclones.



Future Reef MAP is a collaboration between:



Great Barrier Reef Foundation



About Rio Tinto

Rio Tinto is a leading global mining group that focuses on finding, mining and processing the Earth's mineral resources. With global headquarters in the UK and Rio Tinto Limited listed on the Australian Securities Exchange, the company is strongly represented in Australia and North America, and also has significant businesses in Asia, Europe, Africa and South America. Rio Tinto has more than 40 years experience in shipping safely through the Great Barrier Reef.

About the Great Barrier Reef Foundation

Established in 2000, the Great Barrier Reef Foundation is the lead charity for the Great Barrier Reef, dedicated exclusively to funding solutions through science, technology, engineering and on-ground action to ensure its long-term conservation. The Foundation leads the collaboration of business, science, government and philanthropy to fund projects with large scale impact that go to the heart of protecting the Reef and building its resilience in the face of major threats.

About CSIRO

CSIRO, the Commonwealth Scientific and Industrial Research Organisation, is Australia's national science agency and one of the largest and most diverse research agencies in the world. CSIRO's marine research – delivered through the Oceans and Atmosphere business unit – focuses on understanding our oceans and their biodiversity, resources and relationships with the climate system.