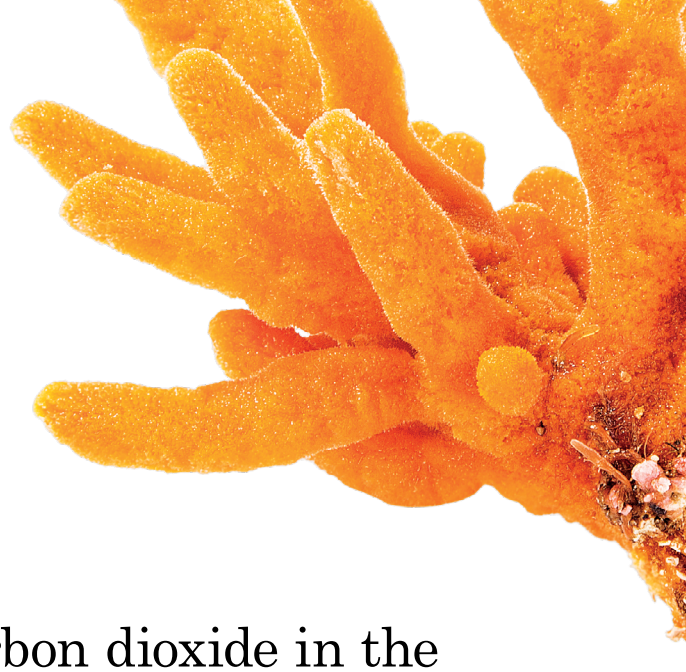
Future Reef MAP



Elevated carbon dioxide in the atmosphere increases carbon dioxide in the ocean and shifts the ocean's chemistry

Ocean acidification disrupts the delicate balance between reef growth and reef erosion

Great Barrier Reef Foundation

The Great Barrier Reef

The iconic Great Barrier Reef is a vast area, spanning more than 2300 km along the Queensland coast.

The coral and marine species that make the Reef so special live in many and varied habitats across this vast area.

Ocean acidification: a threat

Climate change is a significant threat to the Great Barrier Reef. The world's oceans absorb approximately 25% of the carbon dioxide emissions released into the atmosphere by humans. As levels of carbon dioxide in the atmosphere increase, this increases the amount of dissolved carbon dioxide in the ocean. 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 MAP: knowledge for Reef managers

The innovative Future Reef MAP project is helping to build a comprehensive picture of how ocean chemistry is changing across Reef habitats.

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

How it works

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

The $1 million Future Reef MAP project, uses a custom-built ocean sensor, installed on the RTM Wakmatha, to continuously collect ocean chemistry data along the length of the Reef during its regular voyages.

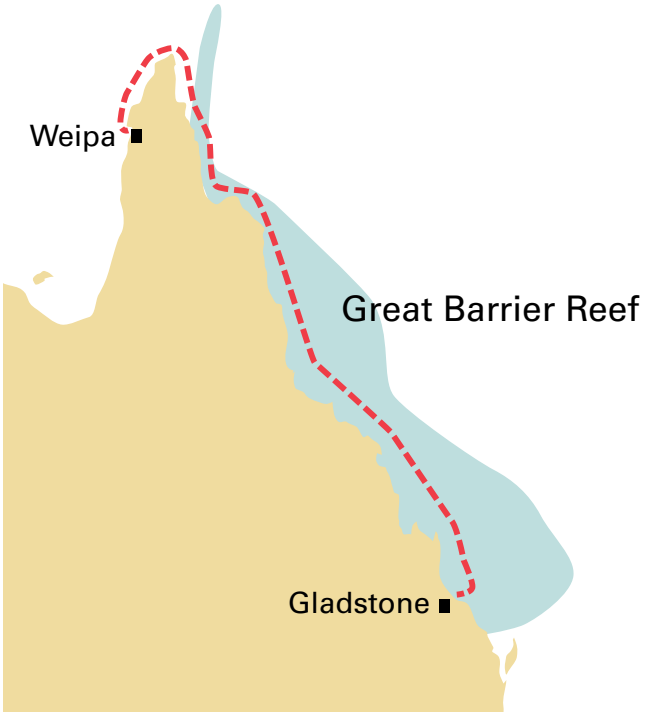
The sensors sample surface waters every 1-2 minutes, taking measurements of carbon dioxide, pH, temperature, salinity and dissolved oxygen. Data is transmitted to a server in near-real-time via communication equipment installed on the

Ocean pH affects the chemical stability of calcium carbonate in sea water — a vital compound in reef building limestone skeletons.

bridge of the vessel. Water samples are also collected and returned to shore for analysis.

The sensor system has been installed on a specially built platform inside the ship and has been fully operational since February 2013. It took engineers 12 months to design, build and install the mezzanine platform that the sensor sits on, to ensure it meets safety standards.

With sensors now installed, the ship has begun collecting this valuable ocean acidification data. To date, 14 voyages have been completed. This covers a year of data collection and includes the first full cycle of seasonal data along the length of the Reef. Preliminary results show that the patterns in the carbon chemistry are strongly influenced by the flow of waters from the Coral Sea. Repeat sampling will allow investigation into the role of temperature, freshwater inputs and offshore mixing in influencing carbon chemistry and changes in ocean acidification.



Future Reef MAP is a collaboration between:

Great Barrier Reef Foundation

RioTinto Alcan

CSIRO