

# NERP Tropical Ecosystems Hub Project Factsheet

## Characterising the cumulative impacts of global, regional and local stressors on the present and past biodiversity of the GBR

Project leaders: Prof. Jian-xin Zhao & Prof. John Pandolfi (UQ)

### Project summary

Using pioneering high-precision geological dating and palaeoecological techniques, combined with high-resolution geochemical analysis of coral records, this project will investigate how coral communities have historically responded to acute (e.g. cyclones) and chronic (e.g. water quality) disturbances.

### Why this research is needed

Nutrient loading and discharge from agricultural and other land uses are putting increasing pressure on coral communities. More recent threats to the Great Barrier Reef (GBR) include global warming, coral bleaching, ocean acidification and coral disease. This research will provide valuable knowledge that can be used to assess the effects of existing management strategies on the GBR ecosystem.

### Outcomes

Key outcomes of the project will include:

- Long-term records of coral reef community structure along the length of the GBR to evaluate the ecological effects of run-off from agricultural activities and changes in climate.
- High resolution chronological records of parameters such as sea-level, sea-surface temperature, salinity, pH value, and cyclone frequency on different time scales over the past 1-2 millennia which will enable us to predict future climate scenarios and the responses of coral communities to such changes.
- Long-term trends in coral calcification in response to changes in climate and water quality over the past hundreds to thousands of years.

Project Partners:



Find this project at [www.nerptropical.edu.au](http://www.nerptropical.edu.au)

Theme 1: Assessing ecosystem condition and trend

Program 1: Historical and current condition of the GBR

Project: 1.3



Dead coral fragments are dated using uranium-series at the Radiogenic Isotope Facility, The University of Queensland, to determine the timing of coral mortality events and other important ecological changes in reef communities.



To understand how coral communities have changed over time we use reef cores collected at approximately 5m depth by a team of divers using a percussion coring technique. These cores can retrieve up to 3000 years of reef development.

### Research-user focus

The project will deliver outcomes that are useful to a range of stakeholders including local, State and Australian Government bodies, the tourism sector and conservation planners/managers. Specific research-users include the Department of Sustainability, Environment, Water, Population and Communities, the Great Barrier Reef Marine Park Authority and the Queensland Department of Environment and Heritage Protection.

Photos (from top): J. Zhao; T. Clark.