



# NORTHERN DEPTHS OF THE GREAT BARRIER REEF



## #EdgeGBR

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## Expedition Objectives



### Exploring a Frontier

The northern range of the Great Barrier Reef was poorly mapped prior to this expedition and no ROV surveys had been conducted in the region.



### Understanding the Past

The mapping aimed to prove the existence of any possible fossil fringing reefs and wave-cut caves that might indicate where sea level was shallowest during the Last Glacial Maximum.



### ROV Expedition

Using ROV SuBastian, we gained a better understanding of the depth trends and habitat preferences of deep and cold water coral communities and mesophotic coral ecosystems of the far northern Great Barrier Reef.

The Cape York Peninsula lies in the far northern Great Barrier Reef Marine Park. The peninsula is one of the most isolated regions of the Australian continent and prior to this expedition, little was known about what was beneath the offshore deeper waters. Sparse information from previous mapping expeditions indicated complex deep sea canyons, massive landslides, and seven detached mesophotic reefs rising up from 500 meters below the sea surface. Mapping revealed complex undersea bathymetry and an eighth detached reef was discovered. Subsequent ROV surveys documented thriving new reef ecosystems, significantly expanded the ranges for multiple species, and captured live footage of rare organisms for the first time.

The 49-day project focused on the offshore Cape York Peninsula area through multibeam mapping of the shelf edge and upper continental slope adjacent to the barrier reefs, and around the seven detached reefs in the Great Barrier Reef Marine Park. The expedition was split into three legs and there were ten ROV dives. The Leg 1 transit northward from Brisbane to Cairns mapped the newly-discovered 'Swain Slide,' a 20 km long underwater landslide that was partially mapped. Mapping the debris field to completion provided understanding of the entire slide area, and was important for understanding the natural hazards which shaped the Great Barrier Reef edge in the geological past.

The offshore Cape York Peninsula area was the focus of Leg 2. The upper continental slope and shelf edge was thought to preserve a record of drowned reefs that now represent a key habitat for

*The Ram's Horn Squid was recorded in situ for the first time and confirmed previously held suspicions around its swimming orientation and behavior.*



**49**

days at  
sea



**10**

ROV  
dives



**1**

CTD  
cast



**158**

samples  
collected



**70**

ROV dive  
hours



**28,248**

km<sup>2</sup>  
mapped

modern mesophotic reef communities. The expedition also mapped around the seven detached reefs to better understand the platform they sit on. A new 500 meter detached reef was uncovered during this leg of the expedition. ROV dives took place in the midwater and along multiple geologic habitats including an undersea landslide area, deep plunge pool environments, contrasting submarine canyons, and drowned reefs. Several dives demonstrated a variety of mesophotic reef habitat with different ecological communities based on how steep or gentle the slope was. Potential new species were documented, many species ranges were extended, and several other species were recorded alive for the first time.

The Leg 3 transit from Cairns to Brisbane provided an opportunity to map a long (~70 km) section of the Swain Reefs shelf edge and upper slope that had no previous multibeam data. The location was important because we did not know where the edge of the Great Barrier Reef was in the very remote Swain Reefs area. Leg 3 was also an opportunity to map around the steeper flanks of the Coral Sea Marine Park's Saumarez, Frederick, Kenn, Wreck and Cato Reefs. These coral reefs grow upon the remains of extinct volcanoes: the Tasmantid Seamounts. Visits to several of the reef's islands were conducted to provide visual records of their present condition for Parks Australia marine managers. Overall, the project addressed knowledge gaps for the Great Barrier Reef Marine Park Authority (GBRMPA) in terms of mapping and characterizing a poorly known frontier area of the Great Barrier Reef Marine Park.



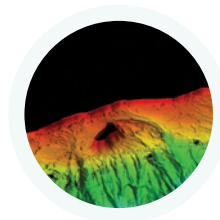
### NEW 500-METER TALL DETACHED REEF

A ~500 m tall detached reef was discovered, the first in over 100 years, bringing the total number of detached reefs in the Cape York area to eight.



### HEALTHY REEFS & NEW CORAL SPECIES

There was no evidence of mass bleaching in the corals observed within the mesophotic zone to ~50 m and at least three suspected new black coral species were collected.



### AUSTRALIA'S GEOLOGIC PAST

High definition mapping of seafloor features and rock/sediment samples provide data for understanding the formation of the Australian continent and the Great Barrier Reef.