



# AUSTRALIAN MESOPHOTIC CORAL EXAMINATION



## #TwilightCoral

04/09/2021 – 04/27/2021  
Darwin, Australia  
Chief Scientist: Dr. Karen Miller  
Co-Chief Scientist: Dr. Nerida Wilson

Australian Institute of Marine  
Science, Western Australian Museum,  
University of Western Australia, Curtin  
University.

While the waters of Australia are famous for shallow coral systems like the Great Barrier Reef, the deeper mesophotic (or twilight) coral ecosystems remain largely unknown and undocumented. Mesophotic coral ecosystems exist in depths between 50-200 meters and are hard to study without advanced technology like Remotely Operated Vehicles (ROVs). Mesophotic coral ecosystems are important as they hold unique biodiversity, provide ecosystem services and are a potential refuge for shallow water-species when they are facing stressors such as climate change.

The primary goal of the voyage was to learn more about mesophotic reefs on Australia's NW shelf, particularly in Ashmore Reef Marine Park. The research conducted by Dr. Miller and collaborators helped scientists and park managers better understand the diversity and importance of the mesophotic reef ecosystems. A better understanding of these ecosystems will help inform managers of the importance of protecting and managing the naturally valuable ecosystems of the park.

## Expedition Objectives



**Understand connectivity between mesophotic coral populations**



**Improve understanding of the biodiversity and biology of mesophotic reefs.**



**Test new methods and technologies for monitoring the health of mesophotic coral ecosystems.**

*Several new species records for Western Australia, including the great spotted cowrie (*Perissersoa guttata*). Complete details of new species records will require additional laboratory assessment to confirm taxonomic status.*



**600**

specimens collected (270 sampling events)



**56**

water samples for eDNA analysis from 21 different sites



**19**

days at sea



**14**

ROV dives



**2**

CTD casts



**148**

ROV dive hours



**965**

km<sup>2</sup> mapped

R/V Falkor circumnavigated Ashmore Reef Marine Park, fully mapped its entire mesophotic zone, and ROV SuBastian captured 4K imagery of the incredible ecosystem diversity including Halimeda beds, coral habitats, sponge gardens, and sand banks. The team conducted 148 hours of ROV surveys and collected over 270 specimens for the Western Australian Museum. The team tested the use of hyperspectral and 3D model imaging systems to assess the health of the mesophotic communities and assist in identification of marine species. Additionally, the team collected and filtered 56 water samples for eDNA and collected over 100 mesophotic coral samples for onshore genetic and physiological studies.

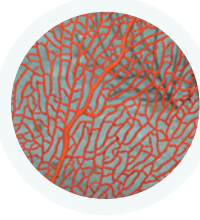
Several new species may have been documented at Ashmore Reef and new records were made in Australia for several other species. One such record was a range extension for the Great Spotted Cowrie (*Perissersoa guttata*).



The team rediscovered the lost sea snakes of Ashmore Reef with over 50 sightings of four different species of sea snakes, including one as deep as 145m.



Observations showed the mesophotic zone of Ashmore Reef is diverse, vibrant, and healthy.



The team found no evidence of coral damage, which demonstrates the marine park designation is helping preserve Ashmore reef's mesophotic zone ecosystems.