



MNF Voyage Highlights Report

Voyage #:	IN2021_V04		
Voyage title:	Biodiversity assessment of Australia's Indian Ocean Territories.		
Mobilisation:	Darwin, Friday, 25 June 2021		
Depart:	Darwin, 1000 Wednesday 30 June 2021		
Return:	Hobart, 1130 Thursday, 29 July 2021		
Demobilisation:	Hobart, Friday, 30 July 2021		
Voyage Manager:	Max McGuire	Contact details:	Max.Mcguire@csiro.au
Chief Scientist:	Tim O'Hara		
Affiliation:	Museums Victoria	Contact details:	tohara@museum.vic.gov.au
Principal Investigators:	Alan Williams (CSIRO, alan.williams@csiro.au) Shane Ahyong (Australian Museum, Shane.Ahyong@Australian.Museum) Lisa Kirkendale (Western Australian Museum, lisa.kirkendale@museum.wa.gov.au) Nerida Wilson (Western Australian Museum, nerida.wilson@museum.wa.gov.au) Andrew Hosie (Western Australian Museum, andrew.hosie@museum.wa.gov.au)		
Project name:	As above		

Voyage Highlights

The Chief Scientist

Tim O’Hara is a marine scientist at Museums Victoria in Melbourne who specialises in the biogeography, evolution, ecology, taxonomy and conservation of seafloor animals. He uses collection data and DNA from museum collections to describe large scale patterns of biodiversity around Australia and throughout the world’s oceans. His team’s achievements to date have been published in the world’s most prestigious science Journals (including two articles in ‘Nature’) and have achieved widespread media coverage. He has participated in numerous deep-sea expeditions, and prior to this voyage was Chief Scientist on the “Sampling the abyss” (IN2017_V03) voyage on the *RV Investigator*.

Title

Biodiversity assessment of Australia’s Indian Ocean Territories.

Purpose

The voyage consisted of seven main projects with the following objectives:

1. Characterise benthic biodiversity from seamounts (100-5000 m) across the EEZ in Australia’s Indian Ocean Territories (IOT) for the first time.
2. To provide specimens and tissues samples to taxonomists for species identification and descriptions.
3. Test whether the proposed bioregionalisation for the territories (Brewer et al 2009, derived from environmental data) is an adequate surrogate for patterns of seafloor diversity across a series of depth strata.
4. Assess the conservation significance of these seamount communities, particularly the presence of Vulnerable Marine Ecosystems (VMEs) including cold water coral and sponge communities.
5. Document spatial and bathymetric patterns of oceanographic characteristics and plankton distribution.
6. Substantially contribute to the AusSeabed project by maximising new Multibeam coverage.
7. Understand the biogeographical relationships of the fauna through community and evolutionary (DNA) comparisons with other Australian, west Pacific and Indian Ocean faunas.

Contribution to the nation

Australia’s Indian Ocean Territories (IOT) differ from all other Australian maritime environments in that they are remote localities in the western Indian Ocean, and support numerous ancient seamounts and islands emerging from an abyssal oceanic seafloor. They experience the full intensity of the south equatorial current, powered by the strong flows from the Pacific via the Indonesian Through Flow (ITF) as well as the circulating south and north Indian Ocean gyres. They were considered highly likely to support distinct biotic unique communities within the Australian marine estate.

In June 2021, the Australian Government announced its intention to create two new large marine parks in the Exclusive Economic Zone in Australia's Indian Ocean Territories around Christmas and Cocos (Keeling) Islands. These regions were a major geographic gap in National Representative System of Marine Protected Areas (NRSMPA).

Except for inshore waters around the islands, very little was known about marine life in this region prior to our voyage. Consequently, Parks Australia provided operational funding for voyages to the region in order to obtain data on offshore conservation values for inclusion in future management plans.

As a result of this voyage

1. We have a better understanding of the composition and distribution of seafloor fauna in the proposed Christmas Island Marine Park through sampling 20 beam trawls, 5 epibenthic sleds, a rock dredge and 2 video tows.
2. We have found the distribution of seafloor animals is heavily influenced by seafloor depth and water masses.
3. We have mapped 151,315 km² of seafloor with multibeam sonar, including 34,352 km² in the Christmas island Territory, and 19,293 km² across continental Australian Marine Parks.
4. We substantially contributed to the mapping of the Christmas Island, 'Max', Karma, 'Clara Marie', 'Apollo 8', Shcherbakov, Balthazar, and 'Ulrike' seamounts.
5. We discovered and mapped the previously unknown 'Eye of Sauron' caldera.
6. We obtained oceanographic data and eDNA water samples from 25 CTD casts to the seafloor.
7. We were the focus of 169 media items, reaching a potential national and international audience of 675M people. There was also considerable social media output from voyage participants.
8. The BushBlitz program engaged with primary and high schools in 5 states and on Christmas Island via live video feeds from the vessel and social media.

Next steps

1. Deposition of underway and lowered CTD data into CSIRO data depositories (completed).
2. Dissemination of collected specimens to researchers around Australia for taxonomic identification (pending the removal of covid19 work restrictions). Taxonomic identifications and deposition of identification data in public data depositories to be completed by 31 December 2022.
3. Update of O'Hara (2021) "An assessment of the offshore marine natural values of Australia's Indian Ocean Territories" (<https://parksaustralia.gov.au/marine/pub/iot/AMP-OHara-2021-IOT-Offshore-Natural-Values-July2021.pdf>) with data obtained from the voyage by 31 December 2021. This includes the production of a standalone 8-page summary document.
4. Production of scientific papers outlining the ecological and biogeographical patterns of the deep-sea fauna in the region by 31 December 2023.
5. Ongoing planning for a second voyage to the Cocos (Keeling) Territories.