



THE UNIVERSITY OF
WESTERN
AUSTRALIA

**FLOURISHING
OCEANS**

Program

MINDEROO-UWA DEEP-SEA RESEARCH CENTRE



National/Global

(Global)



Vision

We are committed to increasing our understanding of the deep ocean by discovering new species, assessing marine biodiversity, mapping the ocean floor and charting deep-sea habitats. The Centre specialises in depths beyond 6 kilometres deep, the most extreme marine frontier.

Goal

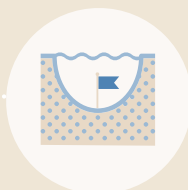
To bring the deepest ecosystems on the planet to the forefront of marine science whilst approaching our research holistically across all depths, both nationally and internationally.

Objectives



Develop technology to descend to any depth and challenging the technology inhibitors that have limited progress in the past.

Increase presence in the deep sea, spatially and temporally, to provide a fuller understanding of how the ocean functions.

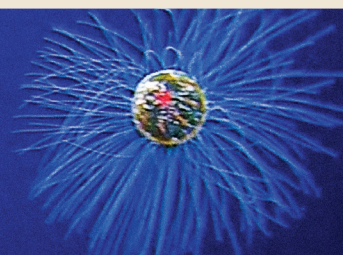


Map large swathes of seafloor over large geomorphological scales and smaller local habitat scales.



Figure 1: Objectives.

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Trachymedusa
Photo credit: Georgette Douwma via Gettyimages.



The deep sea

The deep sea often refers to depths greater than 200 metres, making it the largest living space on Earth.

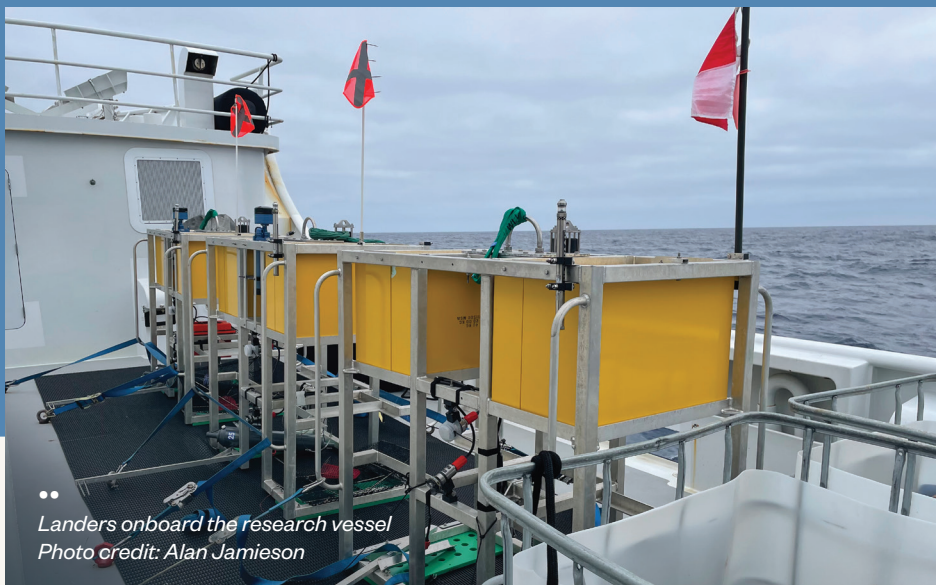
The deep sea is thereafter constrained into depth-defined biozones with 'bathyal' (200-3,000m), 'abyssal' (3,000-6,000m) and 'hadal' (6,000 – 11,000m). While over half the planet is at abyssal depth, 45 per cent of the total depth range is found within the hadal zone. These two habitats are largely made up of vast abyssal plains that stretch for tens of thousands of kilometres and hadal trenches that suddenly plunge from 6,000m to 11,000m in places.

Even though most of Earth is deep sea - total average depth + altitude of the planet is ~4000m underwater - our understanding of the deep sea and its role in regulating climate change and global biodiversity severely lags behind that of the shallower and more easily accessed marine environments.

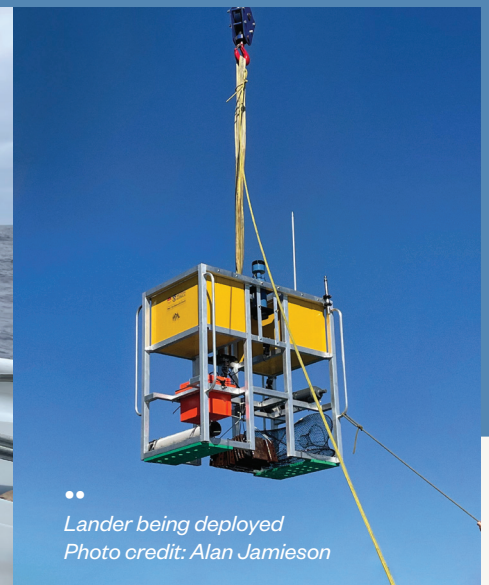
This lag is not through lack of effort by deep-sea scientists but rather a multitude of challenges:

- **Scale** - The deep sea is 70 per cent of the planet resulting in many and/or lengthy expeditions.

- **Technical** - Pressure at full ocean depth is one tonne per square centimetre and near freezing.
- **Access** – Deep-sea research requires an open ocean research vessel, of which there are relatively few.
- **Finance** – All the above are inherently very expensive.
- **Perception** – The deep sea is often viewed as 'out of sight/ out of mind' with no immediately perceived value.



Landers onboard the research vessel
Photo credit: Alan Jamieson



Lander being deployed
Photo credit: Alan Jamieson

Our approach

As one of the only research groups in the world specialising in the most extreme marine frontier, the Minderoo-UWA Deep-Sea Research Centre has an exceptional track record in accessing the deepest places on Earth, often in manned submersibles.

The approach is to overcome the technical and access challenges of the past and develop research programs that treat the deepest parts of planet in the same manner as our most familiar, shallower equivalents. To do this requires a disruptive approach:

- Through innovative design, we develop technology to unlimited depth to access anywhere in the ocean.
- Through healthy collaborations we work with international initiatives to access the latest expeditions and unique deep-diving submersible technology.
- We aim to support the broader goals of Minderoo Foundation's Flourishing Oceans initiative, using the knowledge to drive meaningful assessment of global biodiversity.

Game-changing resources

Minderoo-UWA Deep-Sea Research Centre's ambition is accelerated by three catalysing resources:

- Regular access to vessels capable of the deep-sea research and exploration.
- Access to the deep-sea technology to explore and sample deep-sea environments.
- A unique multi-disciplinary team that spans biology, genetics, ecology, geosciences and the humanities.