# Integrated Marine Observing System



# **IMOS STRATEGY** 2025 – 2035



### EXECUTIVE DIRECTOR'S MESSAGE

#### As an island nation, Australia's oceans are essential to our economy, lifestyle, and future.

Our blue economy is projected to exceed \$100 billion annually and we rely on the ocean for food, recreation, and connection. This growing dependence highlights the urgent need to better understand and protect our marine environments.

Australia's Integrated Marine Observing System (IMOS) is a world-leading program playing a critical role in creating ocean information. Through a national-scale network, IMOS delivers invaluable, long-term data and knowledge that deepens our understanding of marine ecosystems.

As our climate and oceans continue to change, this coordinated approach is essential for monitoring the health of ecosystems and assessing whether interventions are achieving their goals.

The challenges facing our oceans are immense and complex, but through increased connection and collaboration we can work collectively to understand the issues and identify solutions. No single organisation can achieve this objective - it will take a coordinated community to secure our ocean futures, and IMOS embodies that community.



**Dr Michelle Heupel Executive Director, IMOS** 

### INTRODUCING IMOS

#### IMOS helps monitor and understand ocean conditions and trends at national, regional, and global levels.

We work with a range of organisations to deliver benefits to society, including marine researchers, industry, and government. Internationally, IMOS is part of the Global Ocean Observing System and collaborates with regional alliances, particularly in the Indo-Pacific. IMOS data support key efforts such as climate modelling and ocean health reporting, managed through our highly accredited Australian Ocean Data Network, which serves as Australia's National Oceanographic Data Centre under UNESCO.

Since 2006, IMOS has operated a variety of observing equipment across Australia's coastal and open oceans. Designed as a fully integrated national system, IMOS collects data at oceanbasin and regional scales, measuring physical, chemical, and biological aspects of the ocean.





Australia's Integrated Marine Observing System (IMOS) is enabled by the National Collaborative Research Infrastructure Strategy (NCRIS). It is operated by a consortium of institutions as an unincorporated joint venture, with the University of Tasmania as Lead Agent.



IMOS acknowledges the Traditional Custodians and Elders of the land and sea on which we work and observe, and recognise them as Australia's first marine scientists and carers of Sea Country. We pay our respects to Aboriginal and Torres Strait Islander peoples past and present.

1.1001.1.1.0.1.10.1 The second secon 1.1.10.1.1001.1.1.1.1.1.1.1.1.1. Environmental data delivered by IMOS is critical to improving sustainability and profitability of Australian fishing and aquaculture industries. We rely on IMOS information to help inform our operations and support stewardship of our resources. - Daniel Casement, CEO. Australian Southern Bluefin **Tuna Industry Association** 11111110101010



All data collected by IMOS is openly and freely available, supporting scientists, industries, and international partners in understanding and managing our oceans.

By applying marine observations, IMOS creates cumulative benefits for Australia and its neighbours, helping to address complex environmental, economic, and social challenges.

IMOS supports:

- Weather and climate forecasting, including extreme events like marine heatwaves
- Maritime industry safety and operations
- Australian Defence Force information needs
- Understanding of coastal processes and their impacts on communities
- Collaboration with First Nations to enhance the management of Sea Country.







Australia's healthy oceans, thriving blue economy, and climate actions are underpinned by a sustained, world-class marine observing system.

### **IMOS ACHIEVEMENTS**

IMOS is an end-user driven program designed to meet the needs of many users and sectors.

IMOS has delivered over one billion freely available ocean measurements which are critical to weather and climate forecasting, industry operations, biodiversity management and conservation, and much more. These data encompass 27 of 34 Essential Ocean Variables and address eight of the United Nations Sustainable Development Goals.

#### IMOS data have played an important role in Australia's State of the Environment

and State of the Climate reporting, Intergovernmental Panel on Climate Change projections and reports, and numerous policy and management documents.

### **STATEMENT OF PURPOSE**



Supporting solutions to environmental, climate, social and economic challenges at national and global scales through world-leading, sustained marine and Sea Country observing.





#### IMOS helps drive and support world-

class scientific discovery with over 12,000 people from 100 countries using IMOS data to produce over 4,000 publications and other outputs.

#### The IMOS Australian Ocean Data Network is a global leader in data

delivery, including accreditation as a National Oceanographic Data Centre by UNESCO and the first NCRIS program to be approved as a Trustworthy Data Repository through CoreTrustSeal Certification.

> IMOS is an integral part of the Global Ocean Observing System and acts as a leader in the ocean observing community.

> > - Dr Joanna Post, Director, UNESCO-IOC Global Ocean Observing System

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### **OBJECTIVES**

Sustain and expand IMOS' world-leading ocean observing capability and data delivery to support healthy oceans, coastlines and communities.

- WHY Sustained ocean observations are essential for understanding Australia's marine estate. Data on the state and trend of marine processes and systems are critical for effective climate mitigation and informed government decision-making.
- HOW IMOS will continue to deliver long time-series data while expanding to include emerging priority data streams to ensure end-users have access to the data needed to understand, conserve and manage Australia's marine estate. Expanded observing into coastal areas will help inform impacts and changes to these critical habitats.

#### Empower scientific discovery and unite communities to address the impacts of ocean-driven climate change.

- WHY Our climate and oceans are changing at unprecedented rates. Scientific advances are critical for identifying opportunities for conservation, restoration and mitigation.
- HOW IMOS will collect and deliver the data that underpins research to define current conditions, model and forecast future conditions, and measure benefits of management interventions.

#### Provide data to strengthen Australia's blue economy and inform industry operations, national security, and government decision-making.

- WHY A wide range of end-users and services rely on ocean data to understand conditions and inform decision-making and planning. IMOS is a trusted source of these data.
- HOW IMOS will enhance delivery of data critical to maritime industries to better support Australia's blue economy. Transformation of data into information products will ensure use and uptake by experts and other users.

#### Achieve greater impact through partnerships with First Nations, industry, and others.

**WHY** from these partners will generate a more holistic view of our marine environment.

HOW

enhance linkages with these groups.

#### Play a leadership and stewardship role in regional and global ocean observing.

- **WHY** region will face significant challenges from sea-level rise and other climate change impacts. Building capacity and sharing data are essential for effectively managing these issues.
- HOW data use and regional collaboration.

#### Through integration and collaboration, produce data and data products to promote a better ocean future.

- **WHY** and solutions.
- HOW IMOS will increase collaboration and connection with a wide range of end-users and environmental change. Standardised, interoperable, open data is key to equitable access and use of data, as well as facilitating data integration needed to address complex climate issues. IMOS will continue to meet these developing and evolving needs through world-class data collection, management and delivery.

Australia's First Nations people hold intergenerational knowledge and observations of marine ecosystems and their change over time. Maritime industries and long-time ocean users have extensive knowledge of the environment. Sharing knowledge and learnings

By integrating the two lenses of Traditional Ecological Knowledge and innovative technological observing IMOS will support a "two-eyed seeing" approach. Through partnership with Indigenous Ranger groups and communities IMOS will increase data collection to ensure First Nations needs are considered, included and met. Increased partnership and collection of observations with industry will ensure data are relevant to industry operations. Improved and specialised data and information products will

Oceans and oceanographic processes extend across international boundaries, and Australia benefits from understanding conditions beyond its borders. The Indo-Pacific

IMOS will increase its ocean stewardship by continuing to play an important role in Global Ocean Observing System programs and leadership. Expanded partnerships and knowledge sharing with Indo-Pacific observing programs will increase data collection,

Environmental issues are increasingly complex as consequences of climate change are realised. Climate change impacts will cascade through future generations as we work to maintain and protect our environment and communities. The complexity and duration of environmental changes require a variety of information and expertise to identify options

create cross-disciplinary linkages to improve our ability to understand and manage

### **IMOS VALUES**



### SUPPORTING USER NEEDS

#### With over 50% of Australians living within 7km of the coast, we have a great need for data to understand challenges and opportunities for our nation.

IMOS strives to meet the needs of endusers through continuous involvement and consultation. End-user needs underpin the direction and priorities of IMOS. A national-scale need for data on coastal change to inform government decisions, industry operations, community and homeowner decisions is one example of how IMOS is evolving to meet end-user needs. Over the next decade IMOS will increase observing in nearshore waters to help meet this need. IMOS will continually work to understand end-user needs to meet its objective to create societal benefit for Australia.

### PRINCIPLES

## Delivering an end-user driven, end-to-end program for Australia's marine estate

- Prioritising observing infrastructure through to data and information delivery.
- Operating from the open ocean to estuaries and the Tropics to Antarctica.
- Observing capability spanning ocean and coastal dynamics to species and ecosystems.

### Create benefit through partnership and collaboration

- Catalysing the Australian marine science community to achieve and deliver marine science.
- Cooperative and trusted partnerships with industry, governments, First Nations and other end-users, including co-delivery with First Nations communities.
- Serving as a platform for national and international leadership and stewardship in marine and climate issues.

### Acknowledging people

- Infrastructure is more than equipment our people's skills and capability are critical to success.
- Empowering scientists to achieve more through integrated and accessible data and tools and enabling industry and government end-users to meet their objectives.
- Supporting development of the next generation of marine scientists through access to high quality marine and atmospheric data.

- Integration of Traditional and Western Knowledge to learn more together.
- Supporting foundational science to operational oceanography.

- Identifying and addressing the information needs of various users through established and innovative methods.
- Contributing to local, regional and global ocean, climate and atmospheric science and data delivery.

- Experts and non-experts alike acknowledge IMOS as a trusted source of independent data and information.
- Driving greater understanding of our oceans through interoperable data and supporting tools to inform decision-making as well as public perceptions.

Geoscience Australia highly values its partnerships and the data that IMOS makes available. We both have important scientific roles for providing data for informed, evidencebased decisions and advice that is so much more powerful when our work is brought together.

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 Dr Steve Hill, Chief Scientist, Geoscience Australia

## **TRACING OCEAN OBSERVATIONS TO REAL-WORLD OUTCOMES**

IMOS delivers ocean observations from across our vast marine estate, with the highest possible quality standards for the collection, treatment, management and delivery of our data streams. All IMOS data is freely available, discoverable and accessible for use by the marine and climate science research community, international collaborators, stakeholders, First Nations and other end-users to create societal benefit and impact for Australia.

### **MEASURES OF SUCCESS**



Impact and use at local, national and international levels



Growth in partnerships and co-delivery



A collaborative, invested, and inspired community

### THE NEED FOR OCEAN OBSERVING

IMOS delivers ocean observations with major benefits including:





Improved policy responses







Enhanced brand reputation and recognition



**Greater usage** of IMOS data by various end-users



Sea Country observing partnerships



**Offshore energy** operations and maritime transport



Management of commercial fisheries





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#### PRINCIPAL PARTICIPANTS



IMOS thanks the many other organisations who partner with IMOS, providing co-investment, funding and operational support, including the Tiwi Land Council, Tiwi Resources, and the Tasmanian and Western Australian Governments.

#### imos.org.au



#### 'Around the Campfire'

The design underscores the importance of preserving traditional knowledge, understanding marine ecosystems, and fostering collaboration between indigenous wisdom and modern science (data).

The campfire acts as a classroom and lessons can be taught by talking, singing, artwork and dancing. Some of the stories talk about the marine animals depicted in the artwork and tell the environmental importance as well as the cultural significance, this is what creates a connection with people and nature.

It's a powerful reminder of the interconnectedness of all life and the importance of protecting our natural environments for future generations.

Artwork by Tarquin Singleton, Yirrganydji

Cover photo credits: lan Knuckey, Antonia Cooper, David Flynn, Jakob Weis, Nick Thake, Siboni & Doszpot