

# National Marine Science Strategy 2025-35

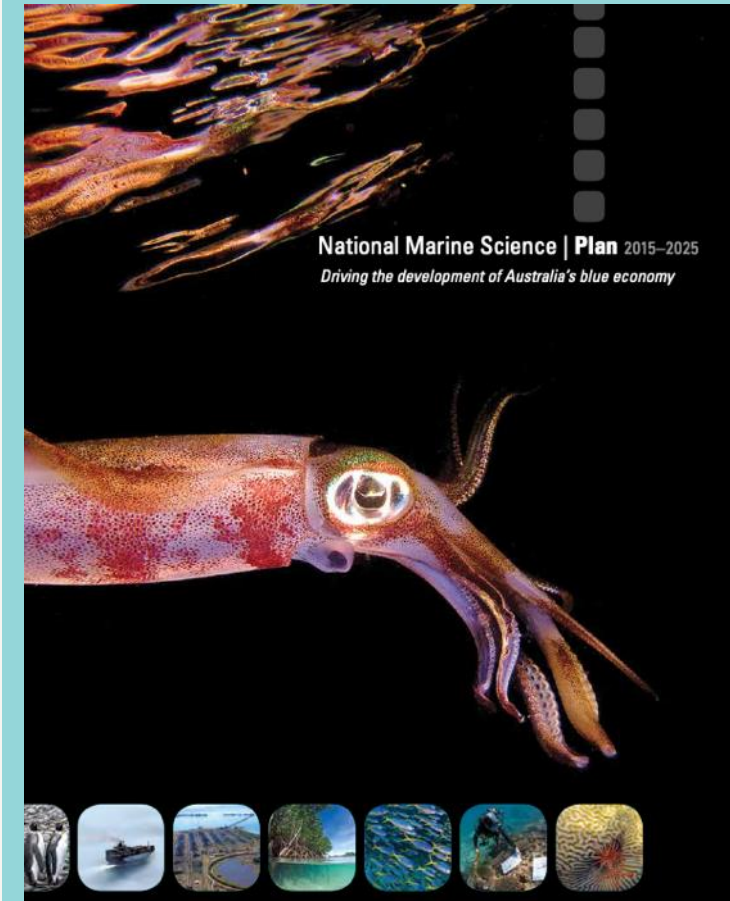
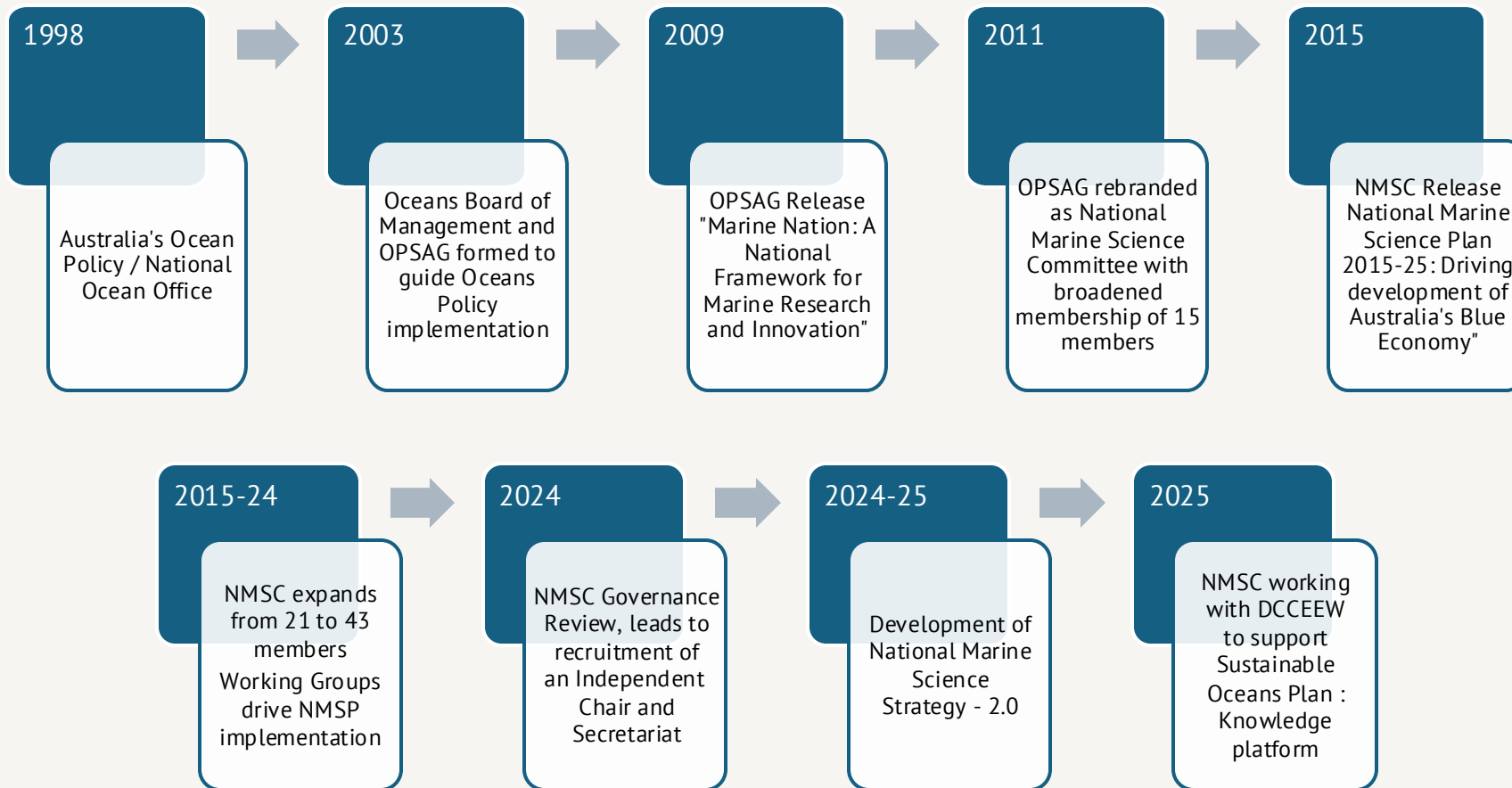


NATIONAL  
MARINE  
SCIENCE  
— COMMITTEE —

**Lyndon Llewellyn**  
**NMSC Deputy Chair**

Forum of Operational Oceanography  
Fremantle  
19 September 2025

# NMSC History



# NMSC



**VICTORIAN MARINE  
& COASTAL COUNCIL**



**Department of  
Primary Industries and  
Regional Development**



**WESTERN AUSTRALIAN  
MARINE SCIENCE  
INSTITUTION**



**Primary Industries  
and Regions SA**



**UNSW  
SYDNEY** | Australia's  
Global  
University



**Department of  
Primary Industries**

**UNESCO**  
Intergovernmental  
Oceanographic Commission  
Perth



**Australian Government**

**Department of Agriculture,  
Fisheries and Forestry**  
Australian Bureau of Agricultural  
and Resource Economics and  
Sciences  
Australian Fisheries Management  
Authority

**Department of Climate Change,  
Energy, the Environment, and  
Water**  
Bureau of Meteorology  
Great Barrier Reef Marine  
Park Authority  
Australian Antarctic Division  
Parks Australia

**Department of Defence**  
Australian Hydrographic Office  
Defence Science and Technology  
Group

**Department of Education, Skills  
and Employment**

**Department of Foreign Affairs  
and Trade**

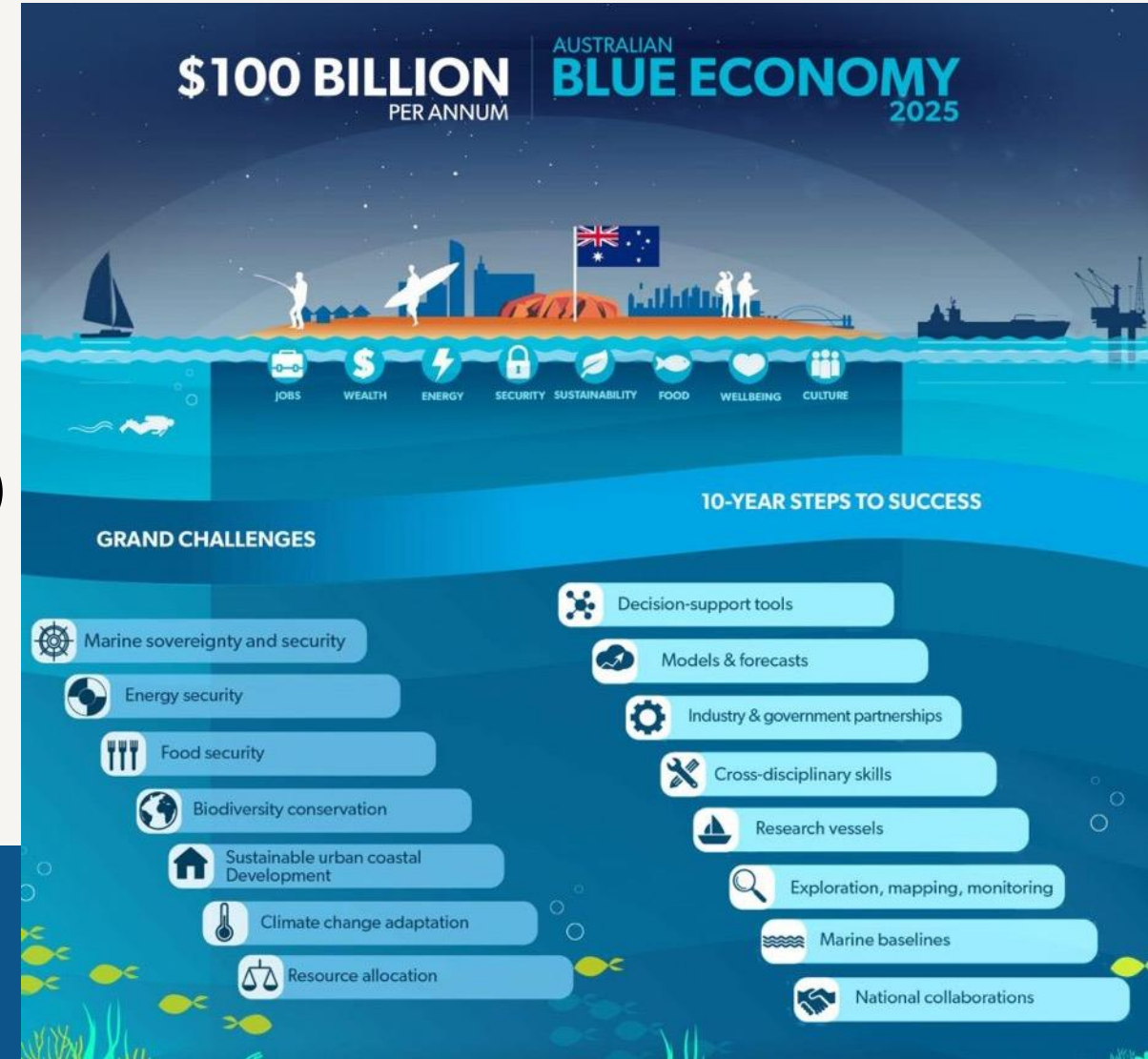
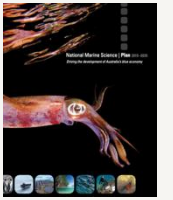
**Department of Industry, Science  
and Resources**  
Geoscience Australia

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# NMSP 2015-2025

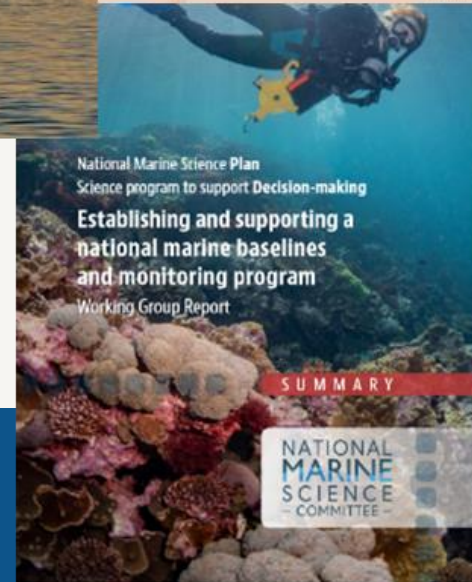
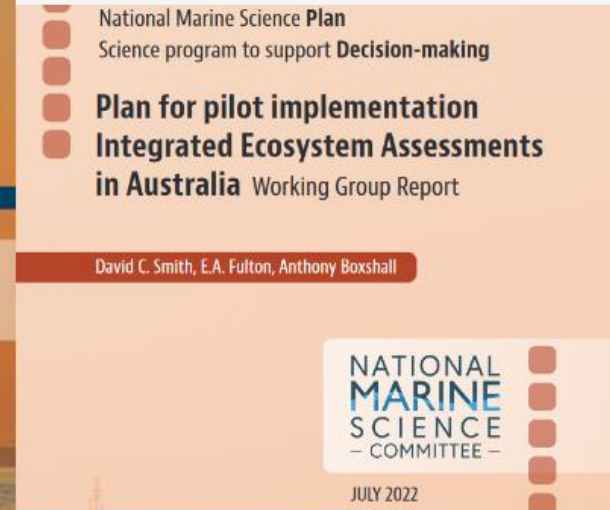
## 35 white papers focussed on 8 topics

- Biodiversity, Conservation, Ecosystem Health (12)
- Dealing with climate change (7)
- Energy security (1)
- Food security (4)
- Sovereignty, Security & Safety Theme (1)
- Optimal resource allocation (1)
- Urban coastal environments (6)
- Infrastructure (3)

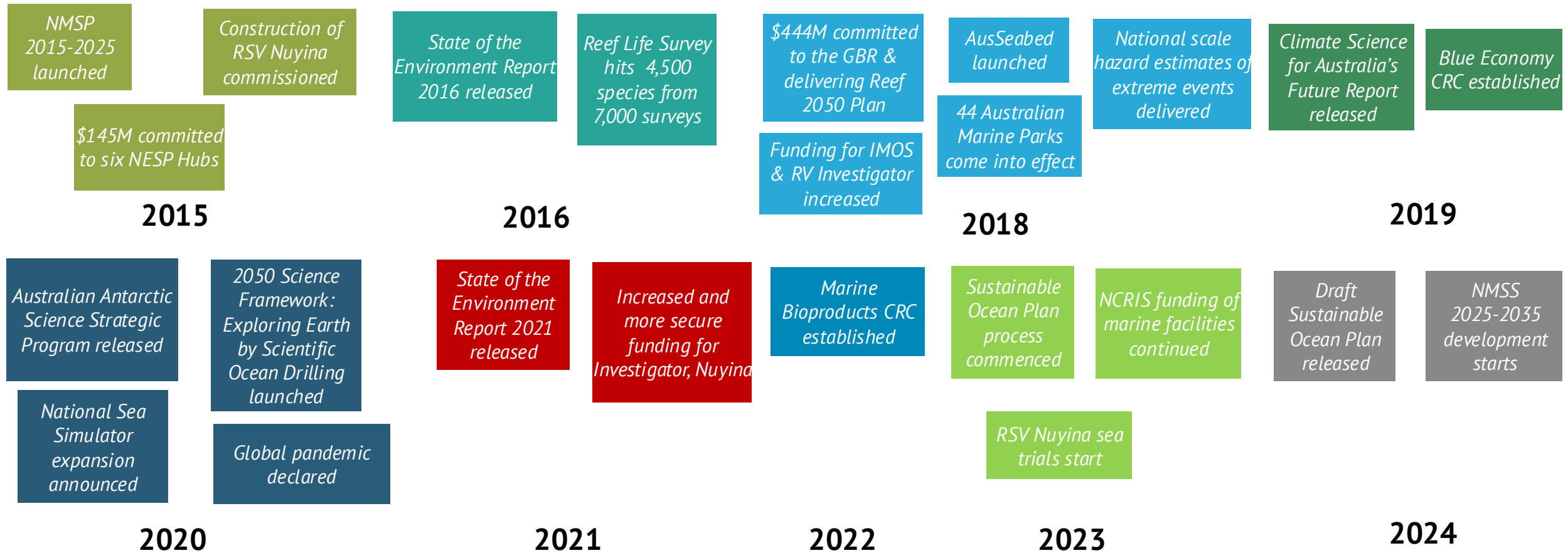




# Direct Outputs from Working Groups



# NMSC Portfolio Key Milestones 2015-25



# 2025 Landscape

**First Nations**

**Ranger Programs**

**Traditional Knowledge Systems**

**Sea Country Management**

**Industry Development**

- NCRI
- 100%
- 2 new
- Phila
- Marine

... as % GDP  
... underway

... shortfall  
... marine science

**Marine Industry Economic Output (2023)**

**\$229 Billion**

(AIMS Index of Marine Industry 2025)

# Marine Industry Economic Value FY23

- \$203 B Value Added (6.3% GDP)
- \$229 B Economic Output (9.1% GDP)
- 24% Growth over last 2 years.
- 712K jobs : 312K Direct, 380K Supply
- Ecosystem Services (coastal) \$228 B
- \*Agriculture 2.4% GDP





# Looking Forward

## NMSC STRATEGY 2025-35 : OUTCOME FOCUSSED / PRIORITY ACTIONS.

- Building on national capability/IP assets/partnerships developed over last decade
- **Designed to support Sustainable Ocean Plan**

# Process and Progress

1

## ***Expression of Interest:***

- Online form
- Express interest in participating in or leading WP development in focus area(s).
- NMSC to identify champions and build communities

2

## ***White Paper Writing and Submission:***

- Online portal for collaborative work on documents, enabling transparency, progress tracking, and access to other WPs.
- WPs submitted via online form 13 May 2025.

3

## ***Synthesis of White Paper Submission:***

- A designated NMSC Task Team will review and synthesize the submitted WPs into key, high level recommendations for the next NMSS.

## ***NMSC Symposium:***

- A platform for the community to gather, review the WPs, and discuss the priority recommendations for the NMSS.
- Key event for refining the strategic direction of the new NMSS based on collective input.

4

## ***Strategy Development and Review:***

- The NMSC Executive Drafting team developing final text.
- Professional editing, design, and international expert review before publication.

5

## ***NMSS Launch:***

- Parliament House Canberra : March 2026.

6

## ***Publish Articles:***

- WPs published as part of a special issue Australian Journal of Maritime & Ocean Affairs (due out mid-2026)
- Possibility for Conversation article(s) to highlight the new NMSS.

7

# White Paper Development

- Broad **Community Input** (460 individual Eols + groups; multi-disciplinary-career stage)
- **Greater breadth of WP Science Foci** than in 2015.
- **Inclusion of Enabling Foci** WPs – next technology frontiers, building critical mass in emerging areas, making case for major investments.
- Emphasis on matching science priorities to **what users want** (or we think they will need) and **outcomes**.
- Sought input and building community consensus on the "**why, what and how**" for marine science over next 10y.

# Leadership

## 21 White Papers

## 59 Lead Authors

## 25 Institutions

- *10 Universities*
- *3 Industries*
- *Research Institutes/Programs*
- *4 Government Departments*
- *1 Foundation*

## Challenges and Opportunities

- Valuing and Incorporating First Nations traditional knowledge and management approaches: Libby Evans-Illidge (AIMS), Cass Hunter (CSIRO), Chels Marshall (Deakin), Duane Fraser (NESP)
- Climate and Oceans: Bernadette Sloyan (CSIRO) and Merk Hemer (CSIRO)
- Protecting Biodiversity and Ecosystem Health: Piers Dunstan (CSIRO), Richard Pillans (CSIRO), Cathrine Lovelock (UQ)
- Enabling a Sustainable Blue Economy: Nico Adams (JCU), Chris Frid (Griffith), Angela Williamson (BECRC)
- Planning Urban and Coastal Development, Infrastructure, and Services: Ryan Lowe (UWA), Pascal Perez (AURIN/UMel)
- Maintaining Food Security: Sean Tracey (UTAS), David Smith (UTAS), Dirk Zeller (UWA)
- Energy Security, Diversification, and achieving Net-Zero: Christophe Gaudin (UWA), Naomi Campbell (Energise Renewables Pty Ltd), Alan Jordan (UTAS), Luke Twomey (WAMSI)
- Maintaining Sovereignty, Securing, and Defending Australia: Sarah Lothian (ANCORS), Prakash Gopal (ANCORS)
- Protecting Australia's Cultural Heritage: Toni Massey (Queensland Museum), Emily Jateff (Australian National Maritime Museum)
- Climate and Green Engineering: Bronte Tilbrook (CSIRO), Lennart Bach (UTAS), Andrew Lenton (CSIRO), Kerry Brent (CSIRO)
- Integrated Ocean Management: Beth Fulton (CSIRO), Alistair Hobday (CSIRO)
- Ocean Accounting: Ben Milligan (UNSW), Philip James (UNSW), Rowan Trebilco (CSIRO)
- Ecosystem Restoration and Repair: Megan Saunders (CSIRO), Melinda Coleman (NSW DPI), Line Bay (AIMS)

## Enablers

- Education, Training, Ocean Literacy: Prue Francis (Deakin), Louise Swanson (Harbour School Sydney), Rachel Kelly (UTAS)
- Research Infrastructure: Michelle Heupel (IMOS), Mike Steer (SARDI), Ilona Stobutzki (CSIRO)
- Engineering, Prototyping, and Technology Development & Robotics, Autonomy, and Automation: Andreas Marouchos (CSIRO), Melanie Olsen (AIMS), Stefan Williamson (USYD)
- AI and Machine learning: Kamran Shaffi (AIMS) and Ariell Friedman (Greybits Engineering)
- Data through to information: Mark Rehbein (AODN), Tim Moltmann (NESP), Alekandar Zivaljevic (AIMS)
- Omics, Synthetic Biology, and Biotechnology: Matthew Nitschke (AIMS), Oliver Berry (CSIRO)
- Modeling and Quantitative Science: Emlyn Jones (CSIRO), Christopher Brown (UTAS), Louise Bruce (BMT)
- Understanding Marine Science and Society: Pedro Fidelman (UQ), Carla Sbrocchi (UTS), Emily Ogier (UTAS)



Institutes	#
CSIRO	81
UTAS	62
JCU	30
UWA	29
AIMS	28
UQ	16
UNSW	16
Sydney Uni	11
BOM	11
UOW	9
Uni Melbourne	8
UTS	8
Flinders	7
ANU	7
Deakin	7
Macquarie Uni	7
Griffith	6
BMT	6
DCCEEW	4
Adelaide Uni	4
DPI NSW	4
SIMS	3

IMMIGROV	2
GBRMPA	2
Monash	2
Cesar Pty Ltd ( <a href="https://cesaraustralia.com/">https://cesaraustralia.com/</a> )	2
Wollongong Uni	2
RMIT Uni	2
JASCO	2

Frankston City Council	1
NRM South	1
EnviroDNA	1
Harbour School Sydney	1
Charles Sturt University	1
Charles Darwin University	1
Energise Renewables Pty Ltd	1
Ecofutures <a href="https://ecofutures.com.au/">https://ecofutures.com.au/</a>	1
AFF	1
Hydrobiology <a href="https://hydrobiology.com/">https://hydrobiology.com/</a>	1
Great Southern Reef	1
ALPIM	1

# White Paper Topics

- Energy Security, Diversification, and Achieving Net-Zero
- Optimizing Resource Allocation and Management
- Maintaining Food Security
- Oceans and Climate
- Protecting Biodiversity and Ecosystem Health
- Planning Urban and Coastal Development, Infrastructure, and Services
- Maintaining Sovereignty, Securing and Defending Australia
- Natural Hazards and Early Warning Systems

# White Paper Topics – new challenges & opportunities

- First Nations - Sea Country
- Ecosystem Restoration & Repair
- Climate and Green Engineering
- Enabling a Sustainable Blue Economy
- Integrated Ocean Management
- Ocean Accounting
- Protecting Australia's Marine Cultural Heritage

# White Papers - Enablers

- Research Infrastructure
- Engineering, Prototyping, and Technology Development
- Robotics, Autonomy and Automation
- AI and Machine Learning
- Education, Training, Ocean Literacy
- Data into Information
- Modeling and Quantitative Science
- Omics, Synthetic Biology & Biotechnology
- Understanding Marine Science and Society





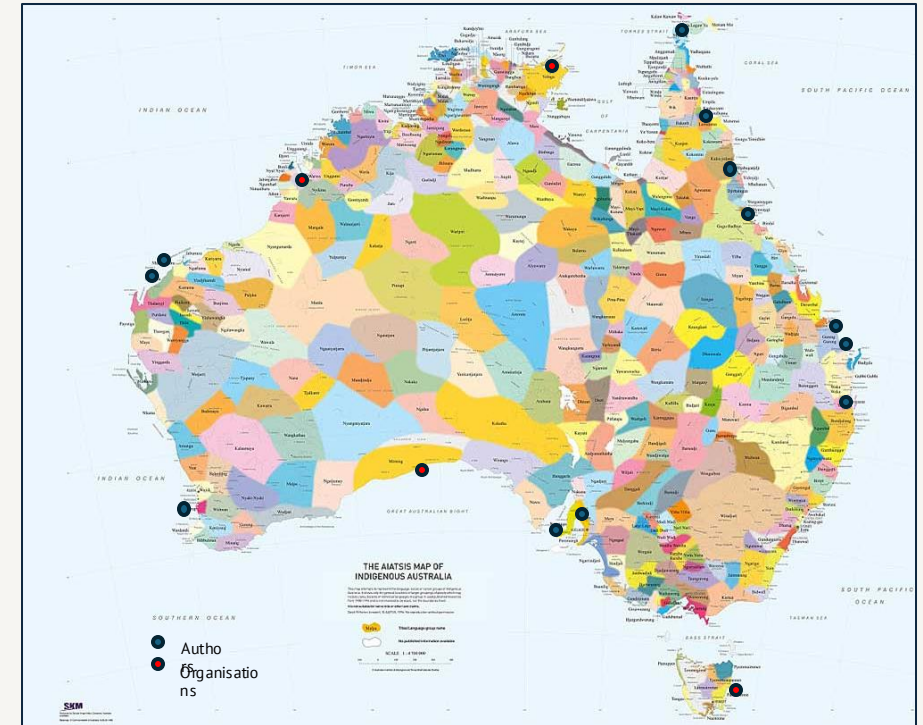
## Flipping the Tide:

# A First Nations vision for Indigenous leadership in sustainable ocean culture

**Authors:** Cass Hunter, Chels Marshall, Jodi Edwards, Stan Lui, Manuwuri Forester, Duane Fraser, Doc Reynolds, Gary Goldsmith, Esther Montgomery, Raelene Cooper, Emmalene Richards, Leah Talbot, Mibu Fisher and Elizabeth Evans-Illidge.

# Indigenous Authors (13/14)

Collective leadership from across our Country





# The Big Picture: Why this theme matters and to whom?

## A Paradigm Shift in Sustainable Development Culture

**Flipping the script** to address these realities:

- Effective investment into collective leadership
- Decision making forums with the right actors at the table.
- A Marine Science agenda no longer driven solely by government regulators, and research organisations and associations
- An authentic backbone for equitable and accountable sustainable development



# Secure and scale up

- Research vessel funding
- IMOS funding
- Seabed mapping

# Establish

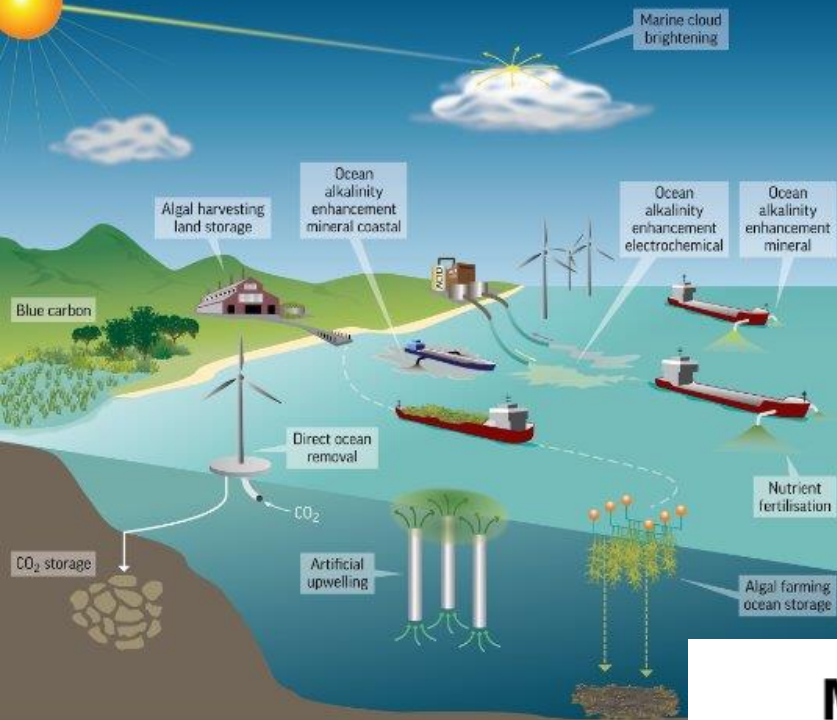
- Modular and Green Fleet Design
- Integrated coastal research infrastructure
- Coordination mechanisms
- Specialised training programs

# Improve

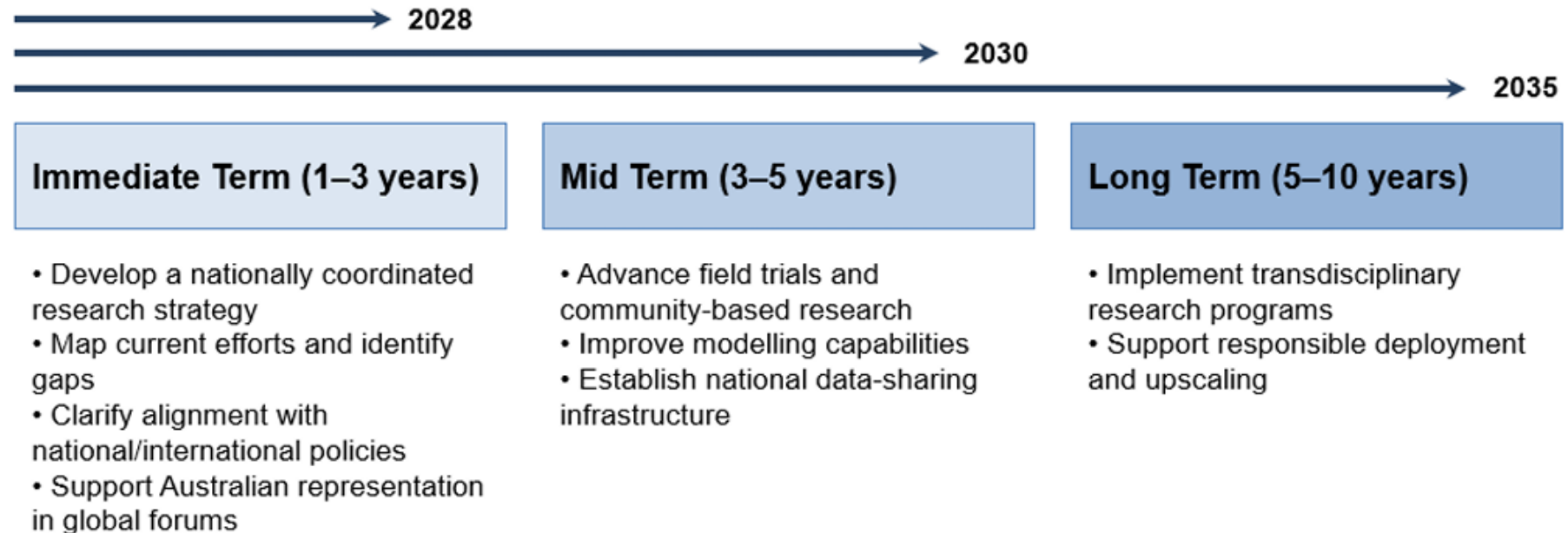
- Integration of First Nations
- Connectivity and communication
- Next-generation sensors



# Marine Climate Interventions



## Marine Climate Intervention Research Roadmap (2025–2035)





# Coastal Ecosystems

Line K. Bay,

12 contri



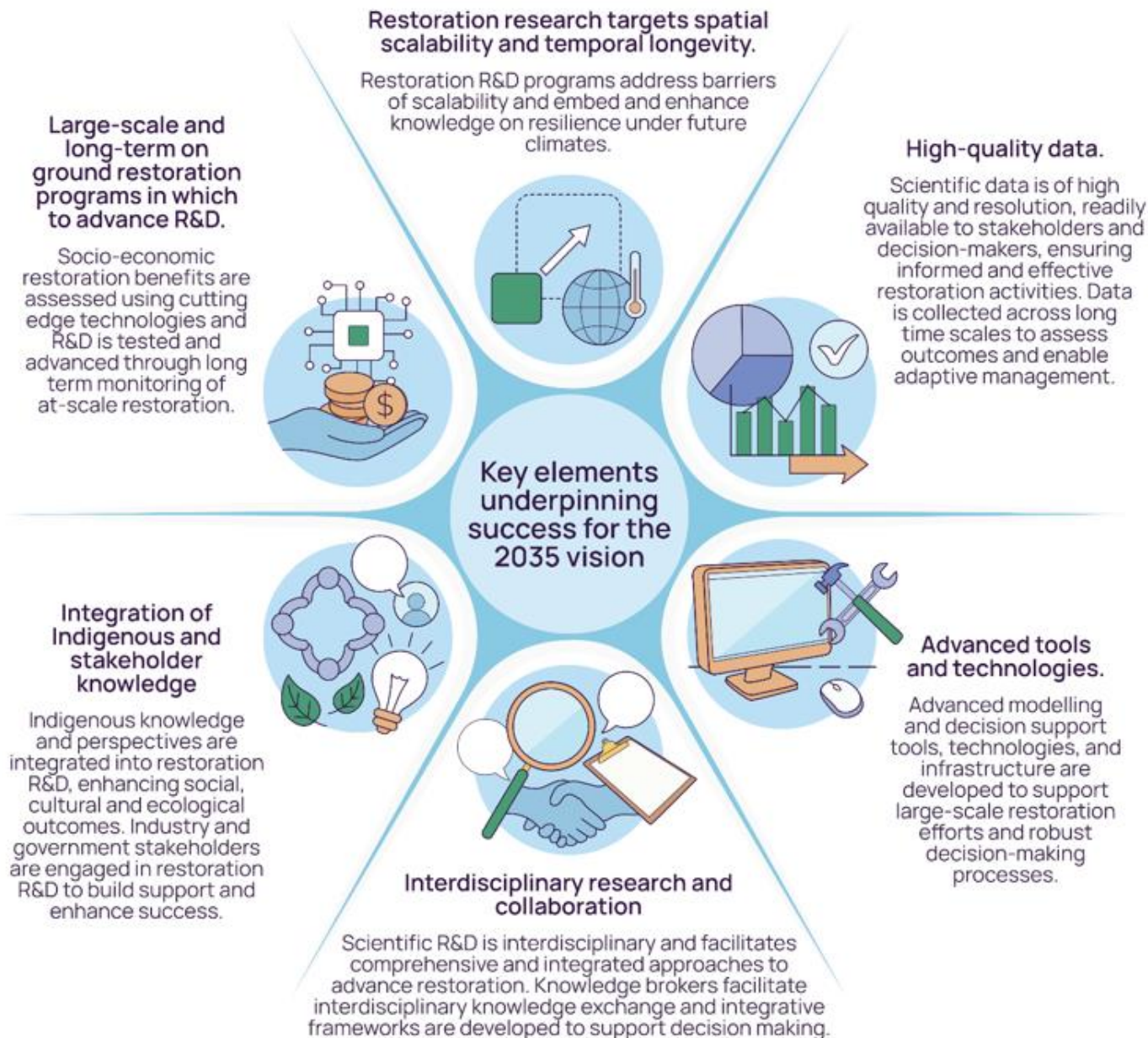
Australian Government



AUSTRALIAN INSTITUTE  
OF MARINE SCIENCE

NATIONAL  
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SCIENCE  
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1Alpha



**Figure 2.** Key elements underpinning success for this vision by 2035.



# Mari Mee'

Carla S

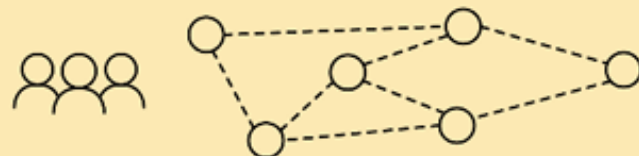
Kate Bar  
Georgina  
Thomas,  
Stacey, M

## 2025 status

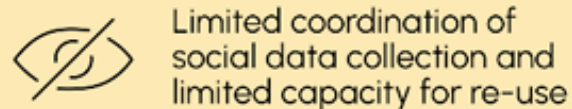
Challenges and opportunities



Connecting and discovery



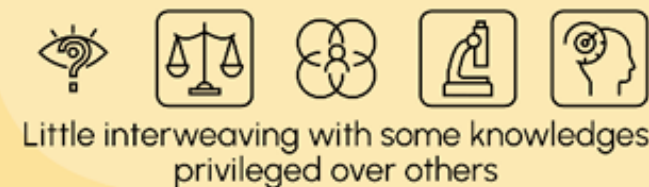
Research and data infrastructure



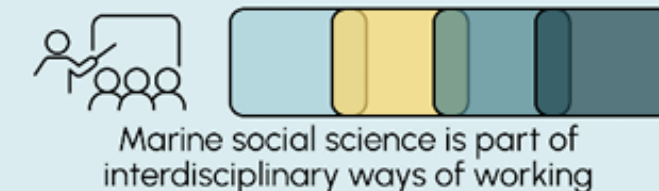
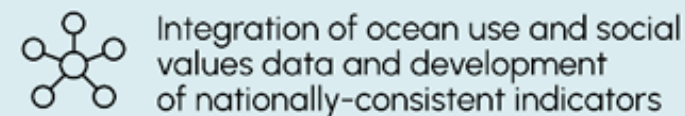
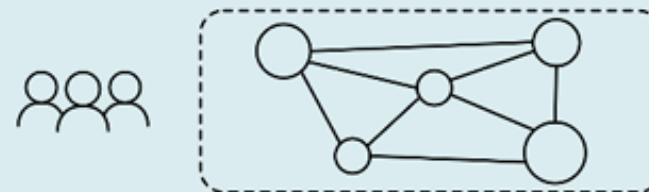
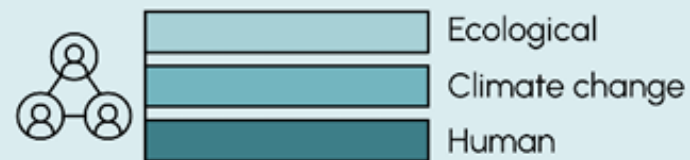
Capability development



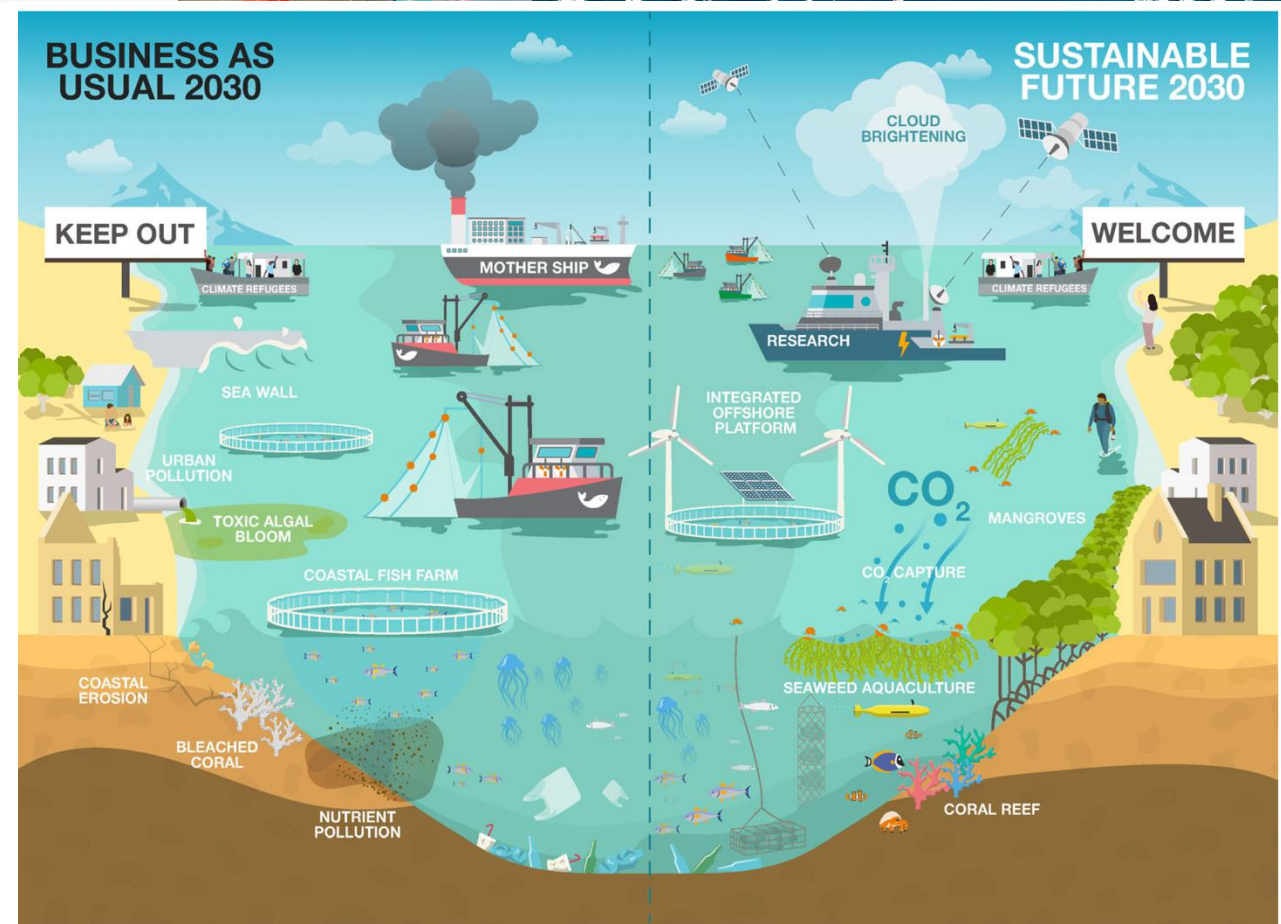
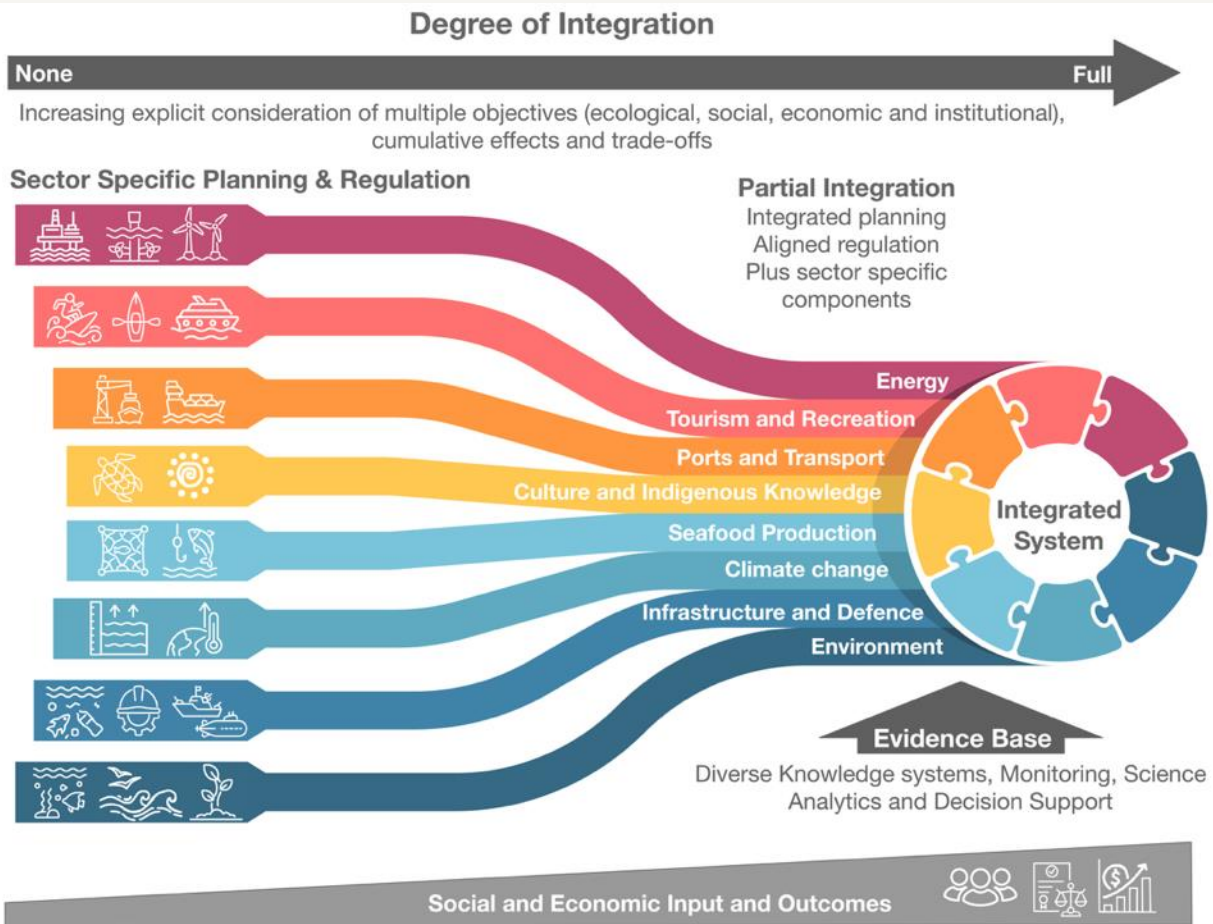
Knowledges



## 2035 status

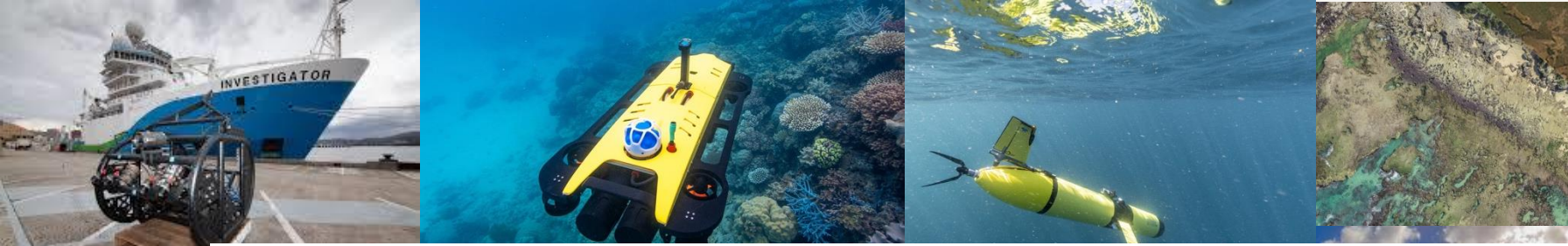








# Marine Technology



Sensing:

Single-modal -> Multi-modal



Planning:

Deterministic -> Probabilistic



Data:

Raw data -> Data products

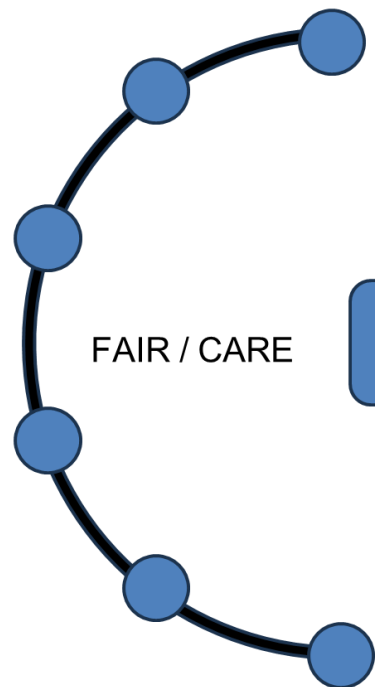


Operations:

Lead agency -> Consortia



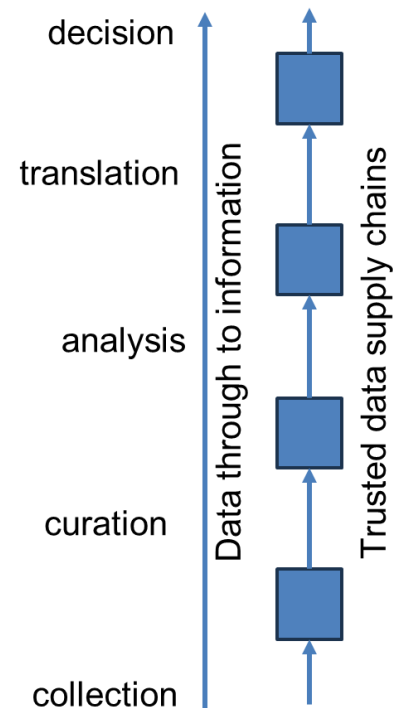
Federated network of data sources



FAIR / CARE

National Data Discoverability

Low friction  
'ready to use'



Value

Government	Reduced friction in turning data into decision ready information – better, faster and more transparent
Research & innovation	Accelerate discovery and innovation. Ready to use datasets, frees up time for analysis rather than wrangling
Indigenous partners	Culturally respectful knowledge systems. Strengthens sea country stewardship
Industry	Streamlined data sharing and compliance, efficiencies
Public	Improved ocean literacy and trust in government decisions backed by data

Data standards &  
Standard Operating Procedures

*data are open by default and restricted when necessary  
mechanisms to support sensitive / restricted or cultural significant data*

# The landscape we are navigating

1. Accelerating and intensifying environmental pressures from climate change
2. Demographic pressures from urbanisation and population mobility, industry development
3. Pressure from economic transformation and energy transition
4. Growing inequalities and pressure on governance
5. Rapidly advancing technologies including expanded and faster connectivity
6. Global competition for geopolitical power
7. Societal trust in science and its perceived value



# Key Themes

0

## FIRST NATIONS

CKS, FPIC, Sea Country Utilization, New Institutions

1

## CC FUTURES & IMPACT PREDICTION

Improved tools @ local, national and regional scales

2

## CC ADAPTATION AND MITIGATION

mCDR, Decision Support Tools (social and industry), critical data/knowledge, Technology Development

3

## BIODIVERSITY/OCEAN HEALTH

Biodiversity Conservation, Restoration, Adaptation?

4

## COASTAL ZONE

Integrated knowledge and data platforms; planning and decision support systems; at appropriate scales

5

## BLUE ECONOMY

Food Security, Fisheries & Aquaculture Futures, Ocean Energy, “Emerging Industries”

Integrated Oceans Management

6

## MARITIME SECURITY

National and regional contexts.

7

**A) TECHNICAL FOUNDATIONS/ENABLERS**

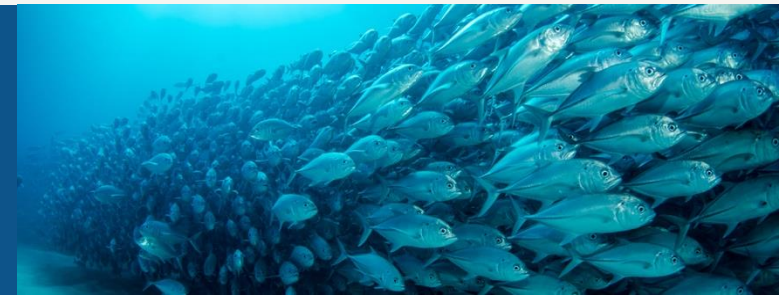
**B) CAPABILITY FOUNDATIONS/ENABLERS**

# Strategy Development and Review Process

5

NMSC Executive now distilling WPs to develop a **high-level** narrative & recommendations

1. **Priority National Benefit Foci** – Government, Industry, First Nations, Public, International/Regional
2. **Recommendations on the highest R&D priorities to address the needs.**
3. **Critical Infrastructure and Skills**
4. **Recommendations for how our R&D sector could operate more effectively & efficiently .**
  - Interdisciplinarity
  - Concepts for large scale collaborative (and cross-institutional) projects/programs
  - Addressing critical skills needs
  - Potential foci for new CRCs/CoEs/NCRIS bids/Cross-Institutional Centres





# Australian marine science needs to.....

- Be better at **thinking** and **doing** at scale ... and at **pace**
- Be more courageous and ambitious
  - Technical innovation
  - Policy innovation
  - Social innovation
- Be more resilient
  - Reduced capability and succession risks
  - Greater and more secure long-term funding
  - Policy pressures and intense demand for solutions



**John Gunn**  
*Independent Chair*



**Rebecca Zitoun**  
*Exec. Officer, IMOS*

# Thank You !



NMSC Website



WHITE PAPERS