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Integrated system assessment and reporting for marine ecosystem-based management

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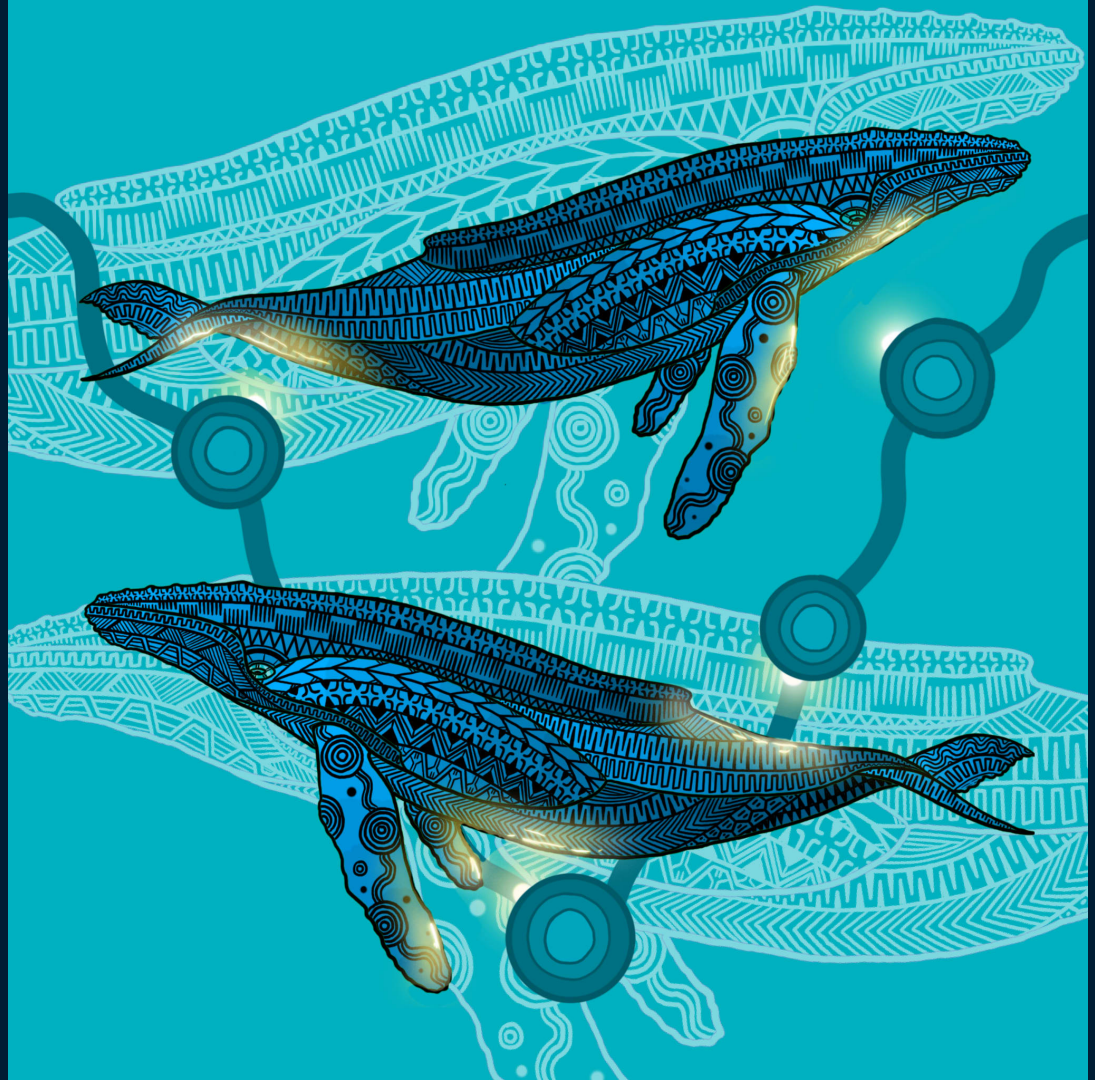
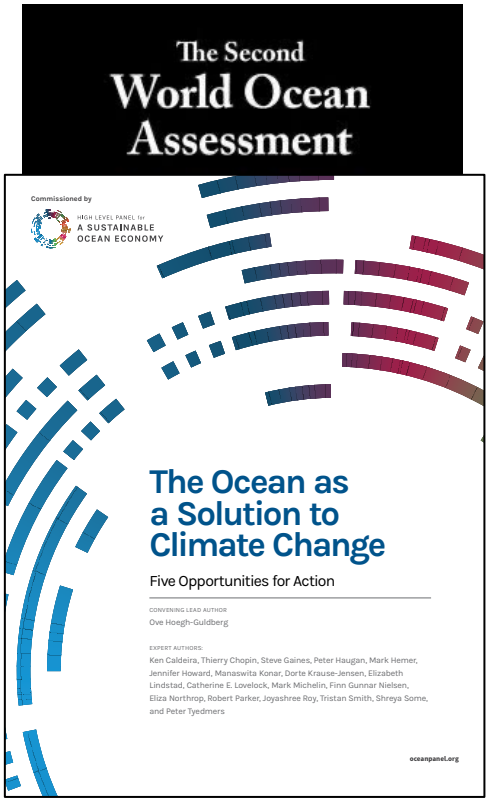
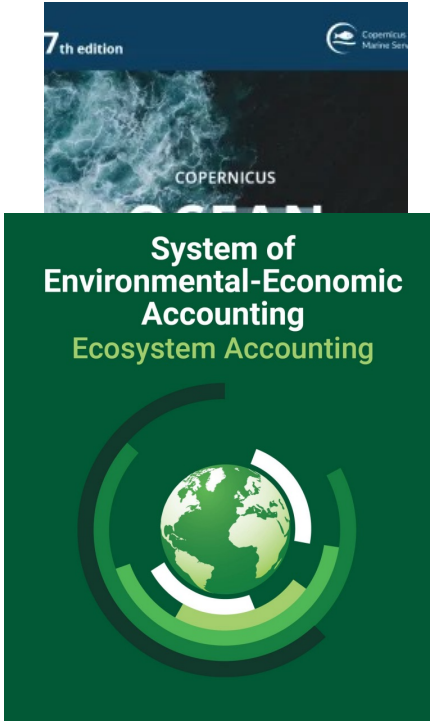
Rowan Trebilco, Piers Dunstan, Mibu Fischer, Cass Hunter, Alistair Hobday, Karen Evans, and Beth Fulton

rowan.trebilco@csiro.au



System assessment and reporting for marine ecosystem-based management: **The need**



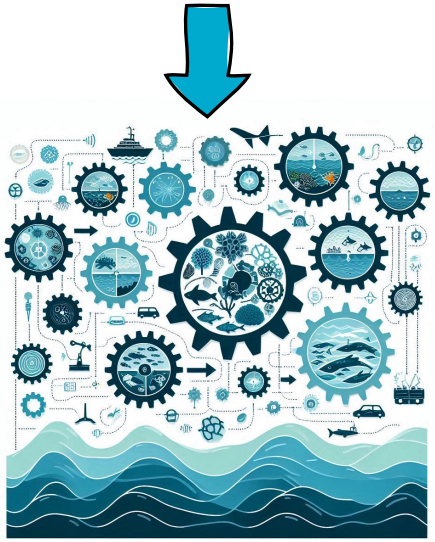


System assessment and reporting for marine ecosystem-based management: **Challenges**

- Status quo is a ‘compartmentalised’ approach (lack of accounting for system-level processes)
  - → Resultant inability to capture/account for:
    - Feedbacks, non-linearities and tipping points
    - Cumulative pressures and risks
  - Dissonant with Indigenous world views, in which all aspects of the environment and culture are linked
    - → Barrier to inclusive assessment and reporting processes

- Limited capacity and understanding of need

- Lack of required governance frameworks and infrastructure



Australia's State of the Environment Report

What?

- An independent, evidence-based and comprehensive assessment of the health of Australia's environment
- Developed through collaborative partnerships with industry, government, NGOs and Indigenous groups to draw from the latest scientific, traditional and local knowledge systems
- Legislated under the *Environment Protection and Biodiversity Conservation Act 1999* and released by the Australian Government every five years (moving to 2 year cycle).

soe.dcceew.gov.au

Why?

- Help shape policy and action
- Influence behaviour
- Assists in assessing our interventions as stewards of the Australian environment.

Australia
State of the Environment

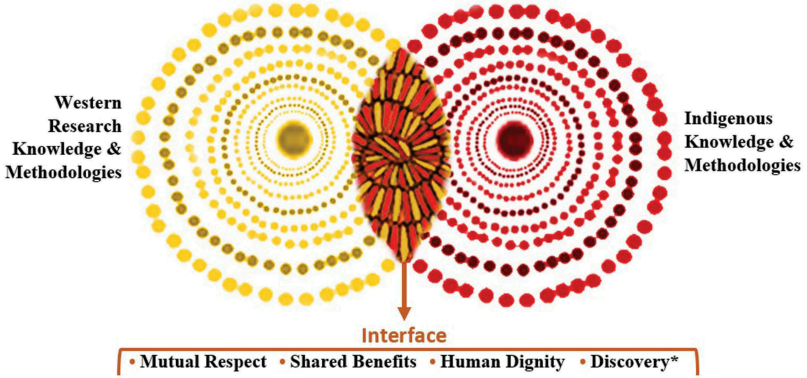
Read the report. Make an impact. Heal Country.
Our future wellbeing and prosperity depend on it.

SoE 2021 – Australia's Marine Environment

Approach

- **Transparent and repeatable** assessment process (consistent and comparable with SoE 2016 Marine thematic report).
  - Assessments and case studies by invited experts (guided by templates)
  - Assessments and case studies peer reviewed
  - Metadata records for assessment and case studies open access on the Australian Ocean Data Network with DOIs (citeable)

- Weaving Indigenous knowledge with "western science"
  - Indigenous co-authors collaborated in developing all content, and
    - Indigenous-led assessments and case studies
    - Yarning circles based on assessments



From: Durie, M. (2004). Exploring the interface between science and indigenous knowledge. 5th APEC Research and Development Leaders Forum, Christchurch, New Zealand.

SoE 2021 – Australia's Marine Environment

Findings

1. Climate change is affecting fundamental aspects of our oceans and increasing the impact of other pressures

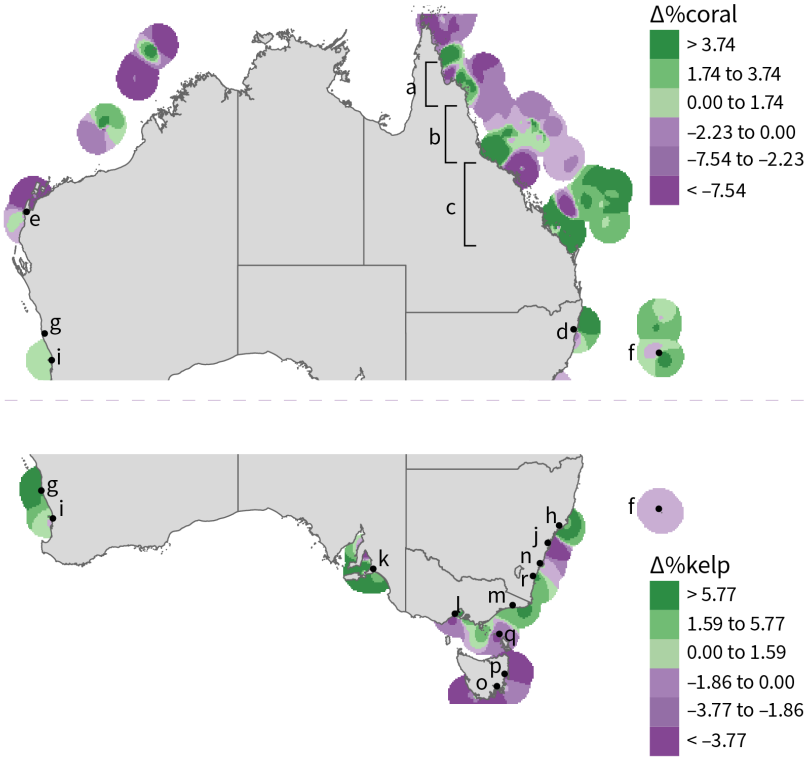
2. Many Australian marine habitats are healthy, but our reefs are declining

3. Indigenous experts generally assessed state to be poorer than 'western science' assessments

4. More comprehensive and better integrated and inclusive monitoring and marine management are needed

5. Even the best management will not stop environmental decline if climate change and cumulative effects aren't addressed

6. If **4.** and **5.** aren't addressed, substantial continued and increasingly widespread degradation of Australia's marine environment is expected



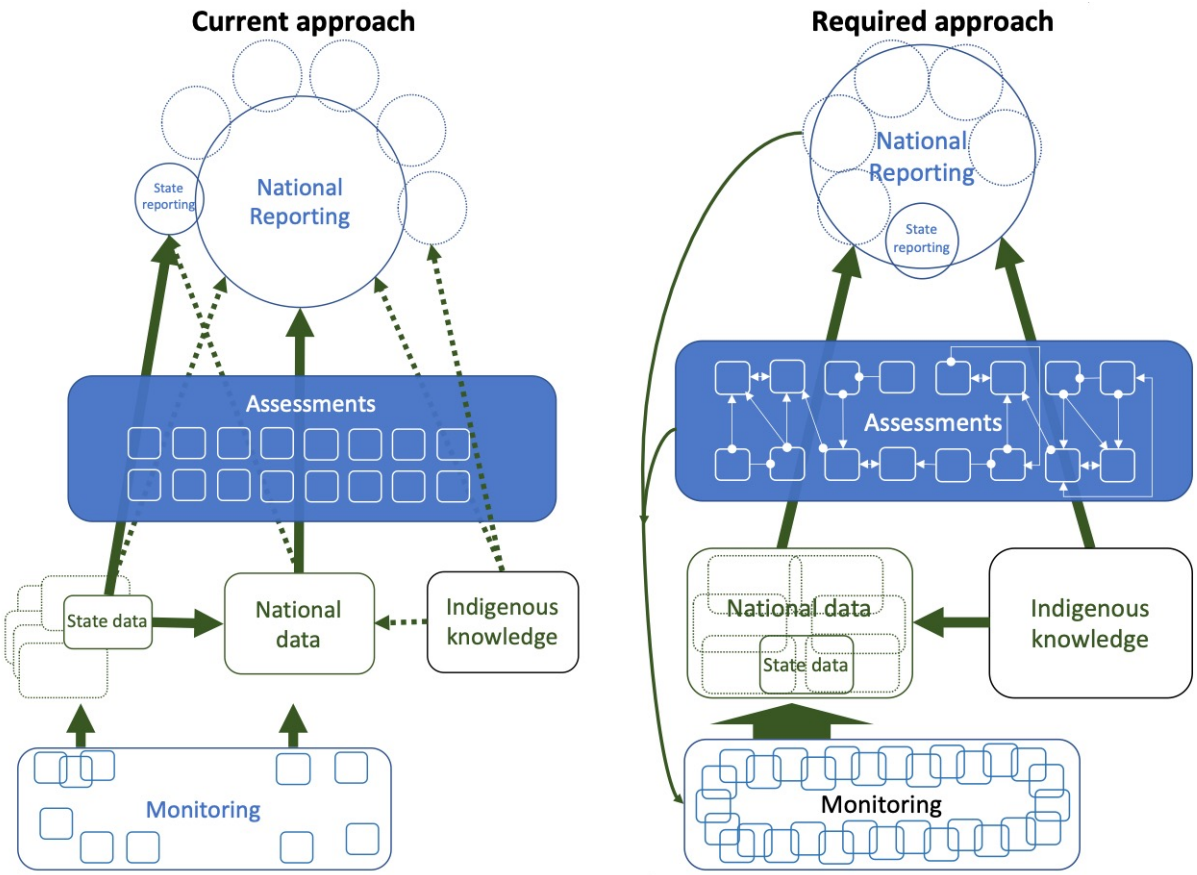
Trebilco et al 2022 Australia State of The Environment Report: Marine

soe.dcceew.gov.au/marine/outlook-and-impacts

SoE 2021 – Australia's Marine Environment

Key needs/future directions:

- A **national integrated strategy** and system for baselines and monitoring – quantifying and addressing cumulative effects
- **Improved data assimilation, assessment and reporting** pipelines – to facilitate forecasting and frequent updating based on changing conditions
- **New system-level methodologies** for assessing overall environmental health that are 'scalable' – from local/regional to national assessments, allowing cross jurisdictional standardisation, capture of system interactions and feedbacks
- **Integrated stewardship** – sustainable and inclusive monitoring and management that strengthens partnerships across sectors and acknowledges Indigenous leadership, decision-making, connections and rights



From Trebilco, Hunter, Fischer, Hobday, Thomas & Evans *in prep*

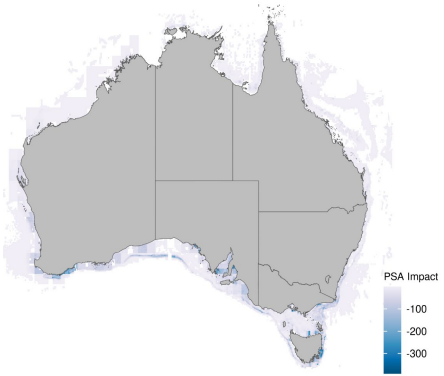
Six principles for holistic and integrated state of the environment reporting - CITRIS

Principle	Why	How (enablers)
Coordination	- Enables buy-in and uptake across jurisdictions and sectors - Supports comparable and compatible data streams - Supports Equity	- Collaboration and communication - Presence of mandates and peak bodies - Adequate investment/resourcing - Infrastructure for data sharing across jurisdictions
Integration	- Ensures assessments are fit for purpose in supporting integrated management - Helps avoid unintended adverse consequences	- Cross-sector engagements and commitments - Removing silos - Weaving knowledge systems - Identifying cross-cutting themes - Collaboration and communication
Transparency and repeatability	- Enhances broader utility of products produced in reporting - Fosters continuous improvement in reporting performance - Consistent with FAIR principles	Assessment processes that can be easily traced back to underpinning information and readily repeated/updated.
Responsiveness and adaptiveness	Ensures reporting remains fit for purpose in the face of change	- Processes that are responsive to new knowledge and changing conditions - Reporting arrangements that continually supported, rather than short-lived 'taskforces' to report in discrete 'rounds' - feedbacks between reporting and monitoring/assessment approaches
Inclusiveness	- Priority actions identified in reporting are more likely to gain traction if they reflect a shared vision, developed with an inclusive process. - Consistent with CARE principles	- Respecting different knowledge systems and knowledge holders - Open consultative processes
System-orientation	Enables understanding of cumulative impacts, feedbacks and tipping points and supports adaptive policy and management.	Frameworks and methods for system-level analysis and assessment

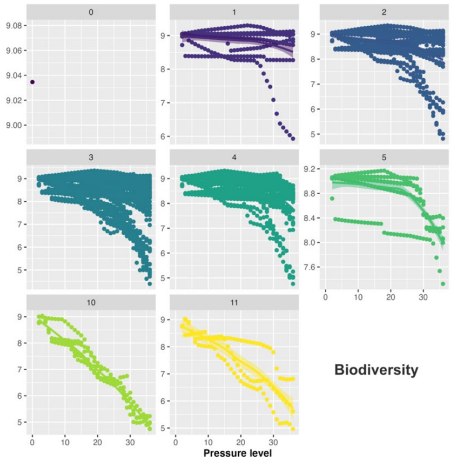
From Trebilco, Hunter, Fischer, Hobday, Thomas & Evans *in prep*

System-oriented assessment - How?

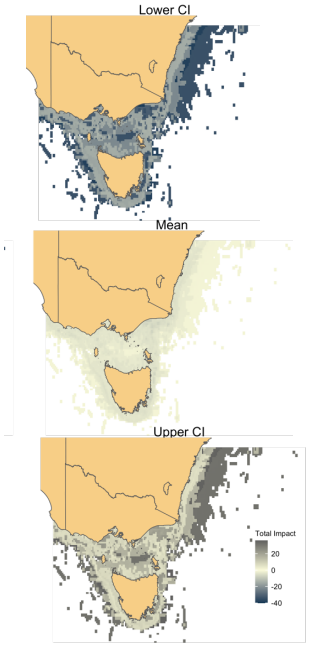
Values and vulnerability



Non-linear response functions (from ecosystem model)



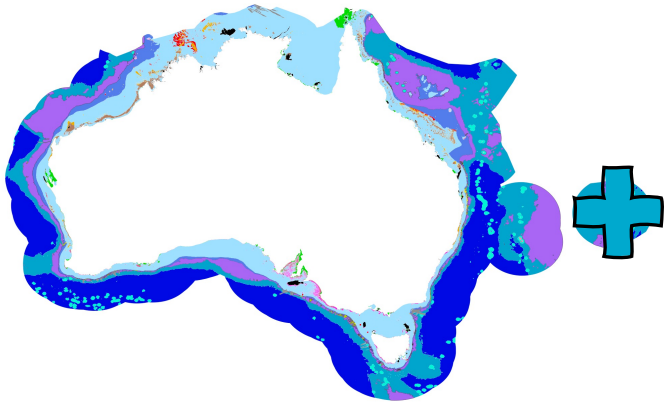
Estimate of cumulate impact accounting for system responses



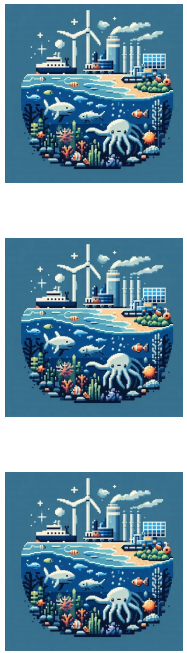
Fulton, Dunstan & Trebilco 2023 (project report, publications in prep)

System-oriented assessment - How?

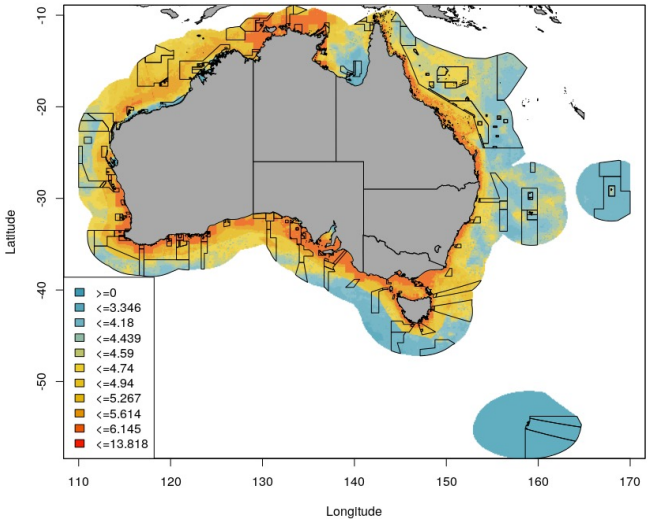
Values and exposure



Regional system models



Estimate of overall system condition and risk



Fulton, Dunstan & Trebilco 2023 (project report, publications in prep)

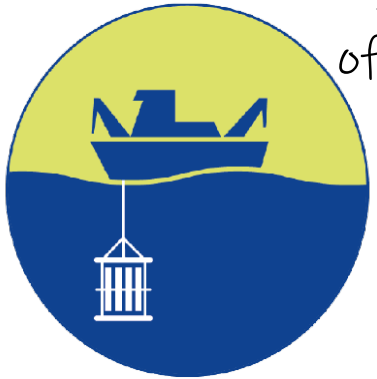
System-oriented assessment - How?

The Marine Science Supply Chain

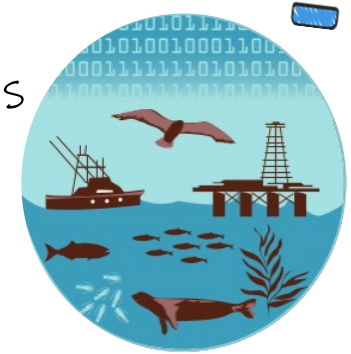
(simplified)

Demand for Understanding

Supply of Data



Synthesis and Analysis



Scott Spillias
s.spillias@csiro.au

Thank you

Rowan Trebilco

Sustainable Marine Futures
CSIRO Environment
Australia's National Science Agency

t +61 3 6232 5138
e rowan.trebilco@csiro.au
w https://people.csiro.au/T/R/rowan-trebilco