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Adaptive management is critical for effective underwater noise management of offshore energy projects and activities

Effects of Noise on Aquatic Life

Raquel Carter

A/Manager – Offshore Projects and Seismic Team

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NOPSEMA's role

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The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) is Australia's independent offshore energy regulator.

Our challenge – scientific uncertainty

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Ensuring that the environmental impacts of noise generating projects and activities are managed to an acceptable level when faced with scientific uncertainty

Whales

- Abundance, distribution, seasonality
- Behavioural responses to noise
- Biological consequence of noise disturbance on important life stages
- Validating effectiveness of whale detection and mitigation technologies

Fish and invertebrates

- Noise dose - response relationships for relevant noise effects
- Biological and ecological implications including for commercial fisheries

Marine reptiles

- Noise dose -response relationships for relevant noise effects
- Biological and ecological implications at various life stages
- Implications for species recovery

The extent of the Challenge

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The development pipeline

Key
- Fixed or floating offshore wind
- Transmission infrastructure/interconnectors
- Offshore wind and land-based solar development

Northern Territory
- Australasian ASEAN power link (transmission export)

Western Australia
- Mid-west Wind and Solar 1.1 GW
- Bunbury Offshore Windfarm 2 GW
- Leeuwin OWF 3 GW
- Perth Array 500 MW
- WA OWF Project 300 MW

South Australia
- SA OWF Project 600 MW

Tasmania
- Marinus Link
- Bass Offshore Wind Energy 1 GW

New South Wales
- Eden OWF 1.8 GW
- Hunter Coast OWF 1.4 GW
- Illawarra OWF 2 GW
- Novocastrian OWF 2 GW
- Ulladulla 1.8 GW
- Woolongong OWF 1.6 GW
- Port Kembla OWF 3 GW

Victoria
- Star of the South 2.2 GW
- Seadragon OWF 1.5 GW
- Portland OWF 750 MW
- Great Southern OWF 1 GW
- Spinifex OWF 1 GW
- Greater Gippsland OWF 1.3 GW
- Victoria Offshore Windfarm project 495 MW
- Great Eastern OWF 2.5 GW

Addressing the Challenge

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Three key solutions to address the challenge

- ➔ Conservative decision making - precautionary management measures
- ➔ Reducing uncertainty - science designed to support environmental assessments and decision making
- ➔ Monitoring and adaptive management

NOPSEMA's environment plan assessment process

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ENVIRONMENTAL APPROVAL PROCESSES

- Understanding the environment that may be affected
- Predicting and evaluating underwater noise impacts and risks
- Determining management measures needed to ensure impacts are appropriately managed to acceptable levels
- Establishing environmental performance outcomes and standards

POST APPROVAL / ADAPTIVE MANAGEMENT REQUIREMENTS

- Environmental management system designed to monitor for and adapt to changes
- Environmental performance outcomes and standards must continue to be met over time

Adaptative management cycle

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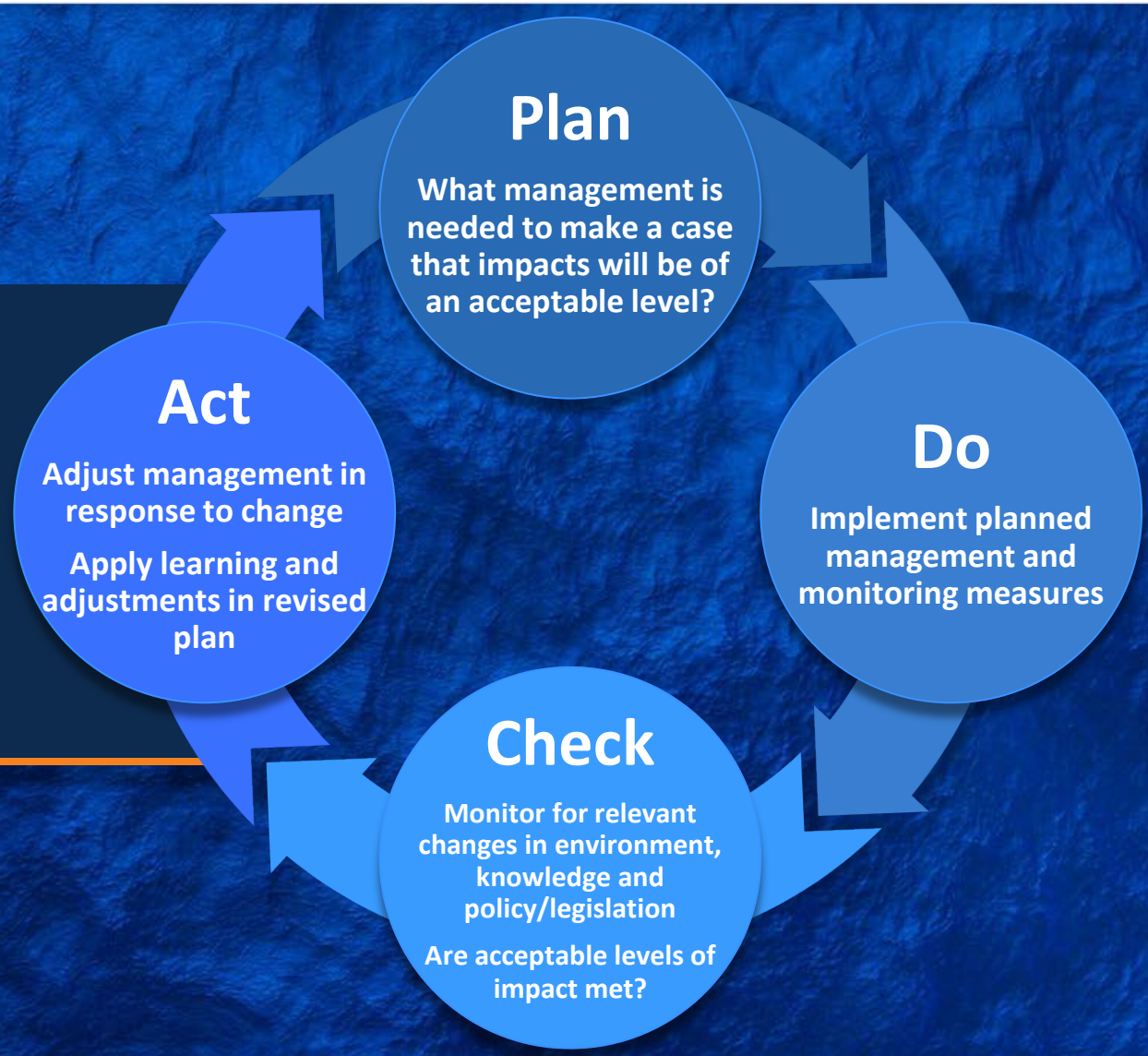
- ➔ Set and forget approach not compatible for underwater noise management
- ➔ Need for ongoing monitoring and adaptive action



Adaptive management case studies

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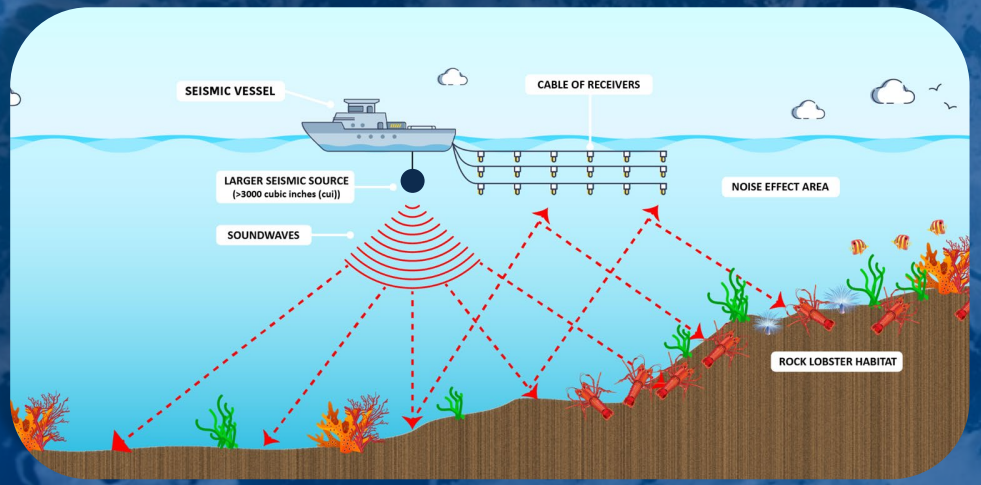
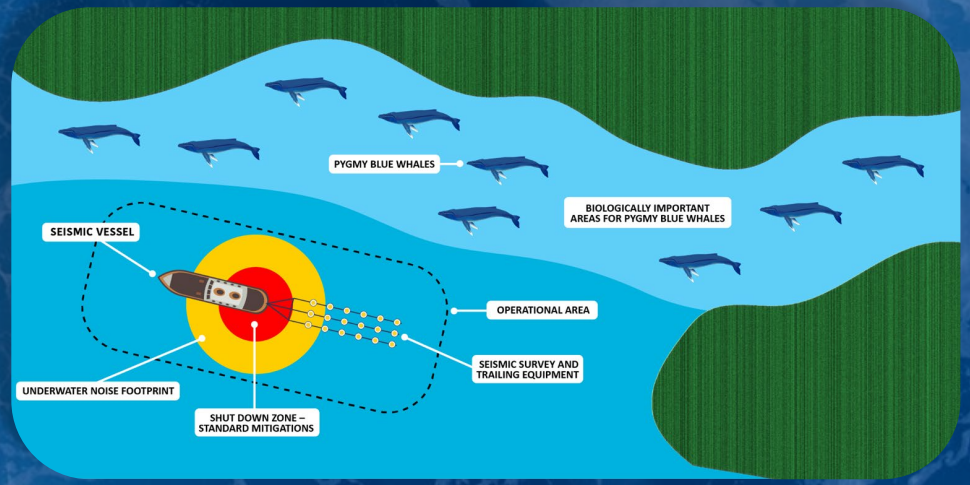
Two case studies to illustrate adaptive management in practice



New research / new information



Change in environmental setting

Case study 1 – Approved approach
Noise and commercially important species

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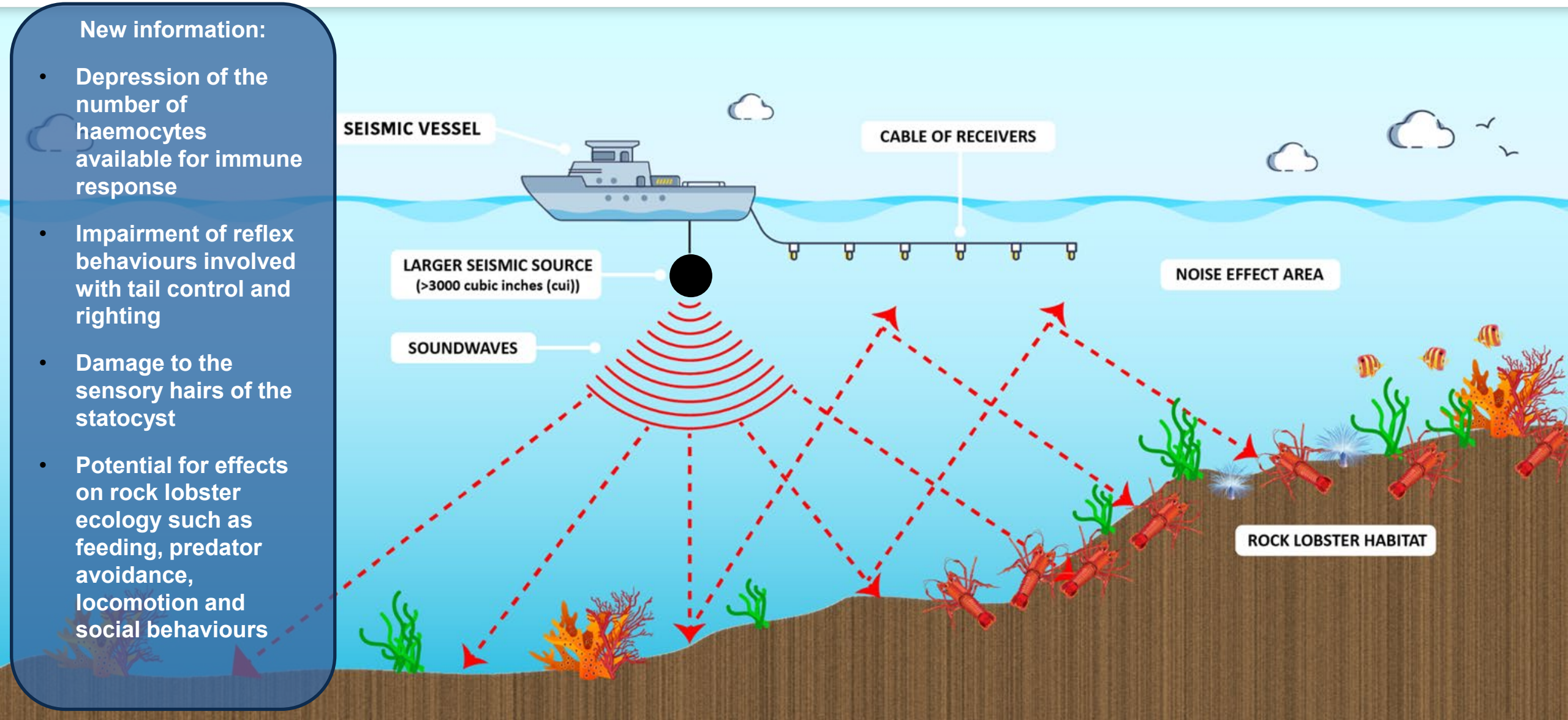
New information:

- Depression of the number of haemocytes available for immune response
- Impairment of reflex behaviours involved with tail control and righting
- Damage to the sensory hairs of the statocyst
- Potential for effects on rock lobster ecology such as feeding, predator avoidance, locomotion and social behaviours



Case study 1 – Post approval adaptive management
Noise and commercially important species

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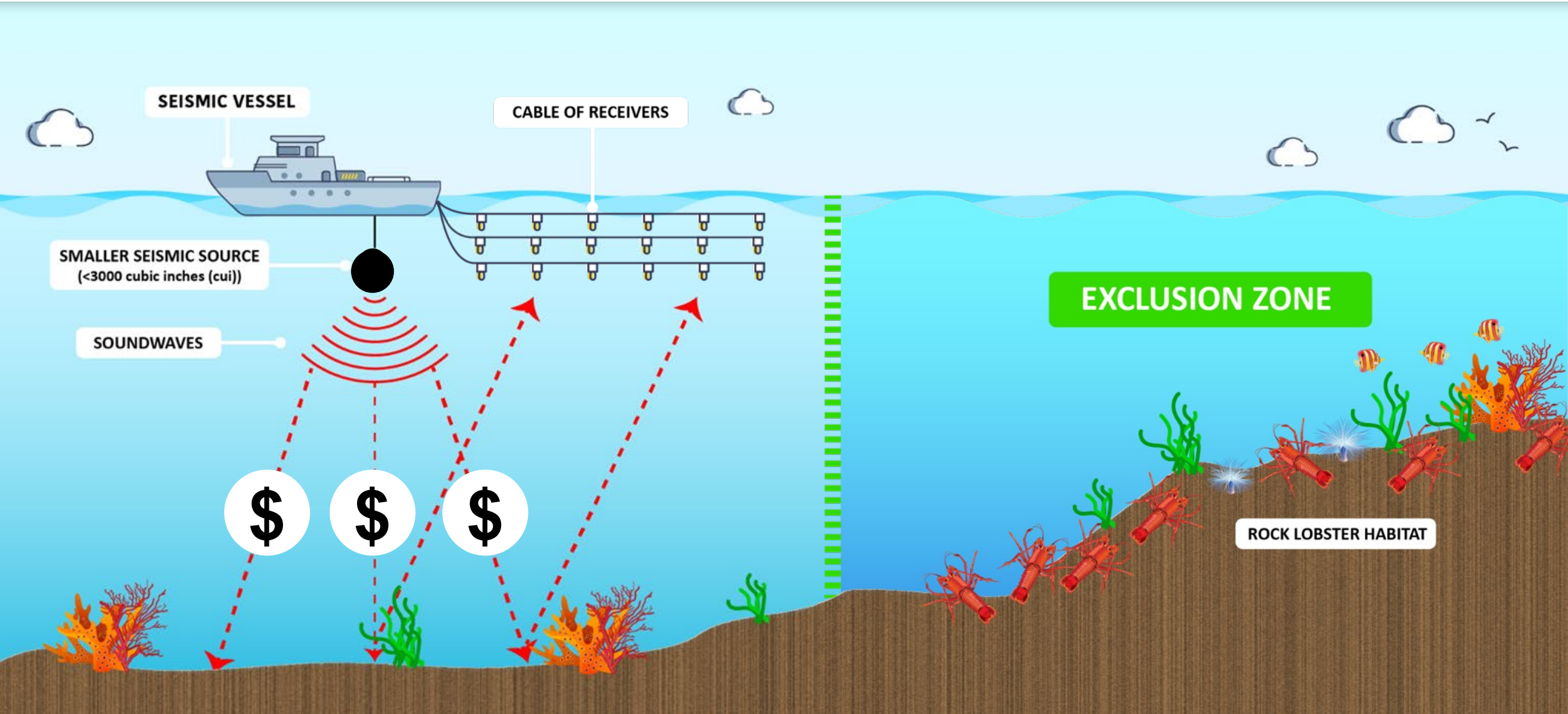

Case study 2 – Approved approach
Noise and endangered whales

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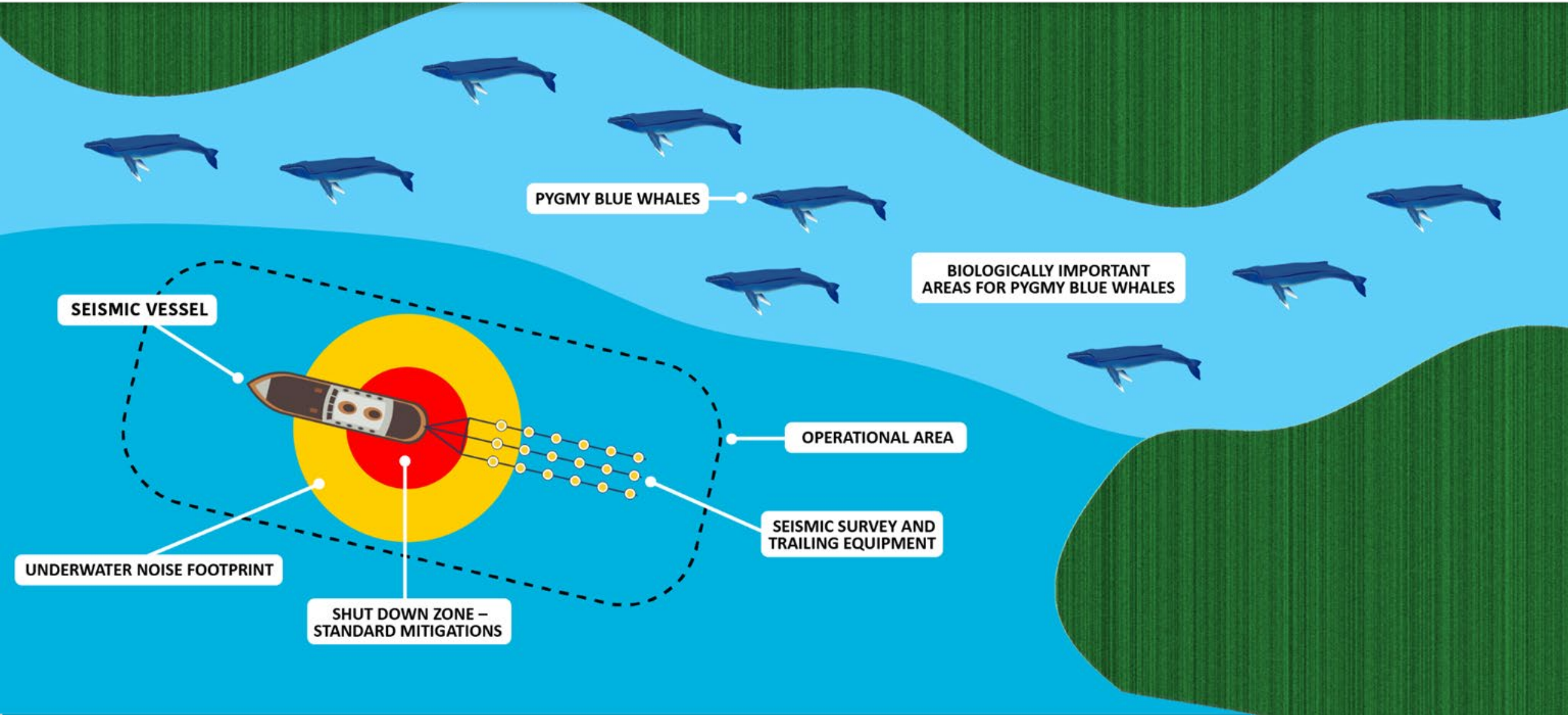

Case study 2 – Post approval adaptive management

Noise and endangered whales

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Looking forward

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Addressing the challenge through adaptive management

- **Enhancing scientific certainty** to support decision making and improve confidence in proposed management
- **Encouraging cross industry /research collaborations** – broad scale monitoring arrangements, biological and ecological implications of noise effects, developing and validating fauna detection and mitigation technologies
- Ensuring the environmental management applications of **new science are communicated** to relevant industries and regulators
- Adopting adaptive management frameworks that **account for new science, new technology, unanticipated changes in environmental factors**

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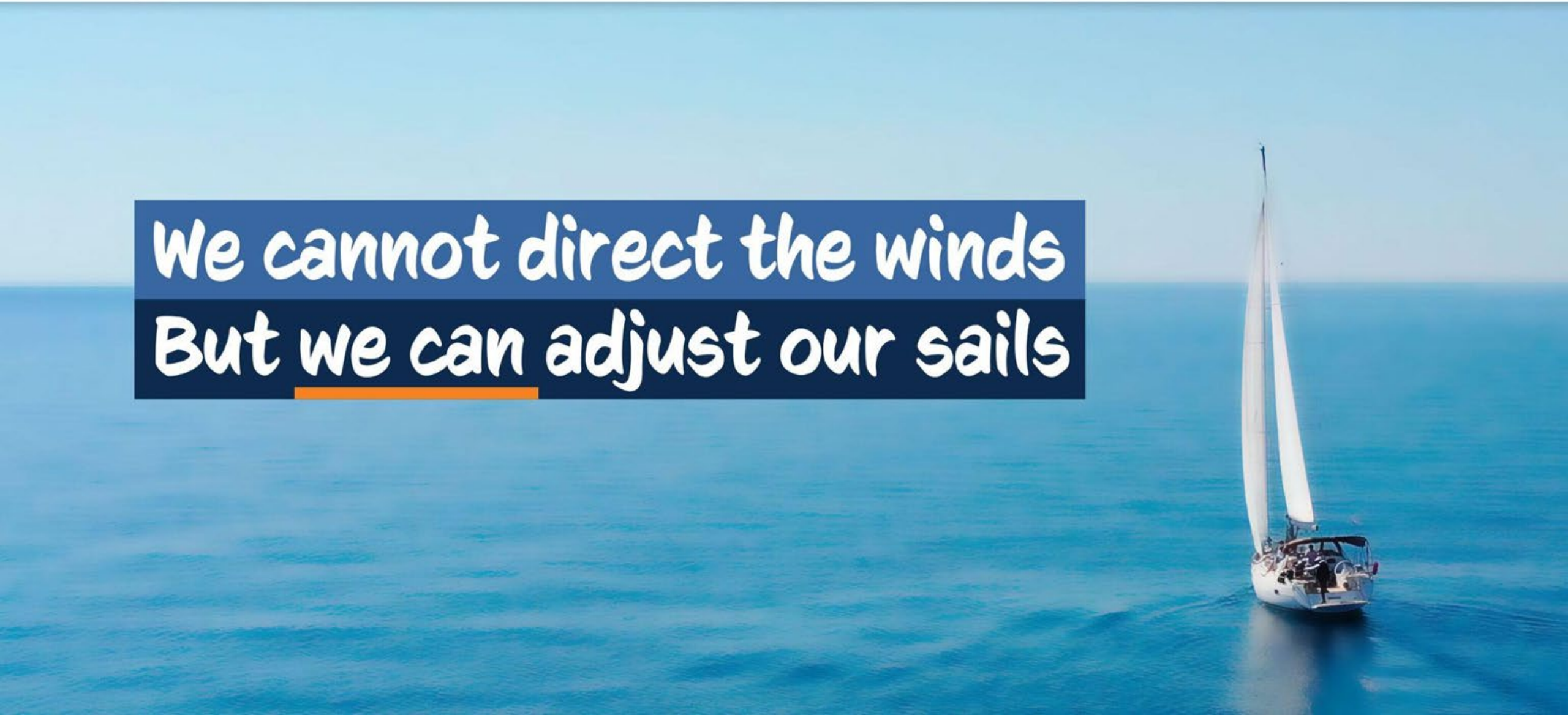

National Offshore Petroleum Safety and Environmental Management Authority

Level 8 Alluvion, 58 Mounts Bay Rd, Perth WA 6000
GPO Box 2568, Perth WA 6001 Australia

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