OCEANWATCH
AUSTRALIA

NATIONAL MARINE NRM PLAN 2023-28

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OceanWatch Australia, version 1.0

The development of this National Marine Natural Resource Management Plan 2023-2028 was supported by OceanWatch Australia, through funding from the Australian Government's National Landcare Program.

June 2023

Australian Government | National Landcare Program

Humpback whales are a protected species in Australia, and their populations have been increasing in recent years.

ACKNOWLEDGEMENT OF LAND AND SEA COUNTRY

OceanWatch Australia respectfully acknowledges the Indigenous people to whose Land and sea country this Plan is relevant, and pays its respects to Elders past and present while recognising their important role as custodians of cultural and ecological knowledge for the benefit of all Australians.

ACKNOWLEDGEMENT OF CONTRIBUTORS

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- All individuals who participated in the workshop series and the organisations or departments they represented (find a full list in Appendix III), for their time and contribution
- All individuals who answered our public survey, for sharing their valuable perspectives

Australia is one of the world's premier surfing destinations

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NATIONAL MARINE NRM PLAN 2023-2028

In 2014 the Australian Government recognised OceanWatch Australia as the national organisation responsible for the delivery of marine Natural Resource Management (NRM). This Plan has been developed in collaboration with key marine stakeholders to guide the OceanWatch Australia Marine NRM Program for the next five years.

OCEANWATCH'S VISION

Australia's marine environment is healthy, productive, valued, and used in a responsible way.

OPERATING PRINCIPLES

- We will increase the capacity of our stakeholders to mitigate and adapt to **climate change**.
- We will encourage saltwater community and seafood industry **voices** in the design and implementation of our projects.
- Our work will leave a **legacy** of increased understanding of the dynamic relationships between human activities and the marine environment.

OBJECTIVES

- **Better coastal and marine environmental monitoring** of threats and species recovery, with nationally standardised data collection systems.
- **Better collaboration on NRM interventions** via (1) regional stewardship and Marine NRM coordination roles; and (2) supporting collaborative multi-stakeholder plan-making on a regional basis, including building the capacity of First Nations groups to participate.
- **Ecological restoration** including the re-establishment of seagrass beds, kelp forests, shellfish reefs, mangroves, saltmarsh, and where necessary building artificial reefs. Additionally, it will support opportunities for Blue Carbon investments and the protection of existing habitats and wildlife.
- **First Nations involvement**, connection, and capacity building in sea country management.
- **Marine stewardship** with a focus on building the capacity of stakeholder groups and citizen science projects.
- **Ocean literacy** improving marine stakeholders' awareness of key coastal and marine issues related to all objectives.
- **Pollution reduction** including reducing run-off from agriculture and marine debris source reduction.
- **Saltwater community and seafood industry best practices** including supporting industry extension efforts and circular economy, biosecurity, and works towards greenhouse gas emissions reduction in line with governments' targets.

1. OCEANWATCH AUSTRALIA AND THE NATIONAL MARINE NRM PROGRAM

OceanWatch Australia Ltd (OceanWatch) is a not-for-profit company limited by guarantee, a registered Charity and an environmental organisation listed on the Register of Environmental Organisations. OceanWatch's strategic direction is set out by its Board of Directors. Members of the Board are volunteers who are put forth by OceanWatch Members (NSW Fishermen's Cooperative Association Ltd, Sydney Fish Market and Master Fish Merchants' Association) and approved by existing Board members. The Board oversees the organisation's governance.

OceanWatch has been operating in the Australian marine environment since 1989. The organisation works around Australia on projects focused on the adoption of best practices for fishing and aquaculture, the encouragement of stewardship actions amongst coastal and marine users, and on the protection, rehabilitation, restoration, and enhancement of key marine habitats.

The region in which OceanWatch operates is within coastal lands under tidal influence out to the Australia's Exclusive Economic Zone boundary (Figure 1).

1.1 History of the National Marine NRM Program

In 2014 the Australian Government recognised OceanWatch as the national organisation responsible for the delivery of marine Natural Resource Management (NRM). This was in response to a perceived failure in meeting the needs of the marine environment's health and the people that work to extract its edible resources.

The National Landcare Program led by the Australian Government has been the primary source of funding. While it acknowledged the importance of the outcomes that the interim Marine NRM Plan sought, it was unable to fund all its objectives. Instead, it arranged a fee-for-service arrangement with OceanWatch, to fund mainly primary industry outcomes during 2017-2022.

It is envisaged that for 2023-2028 OceanWatch will seek Australian Government support for both Environment and Primary Industry outcomes, and additional resources by State and Territory Governments, as well as non-government, business and philanthropic organisations.

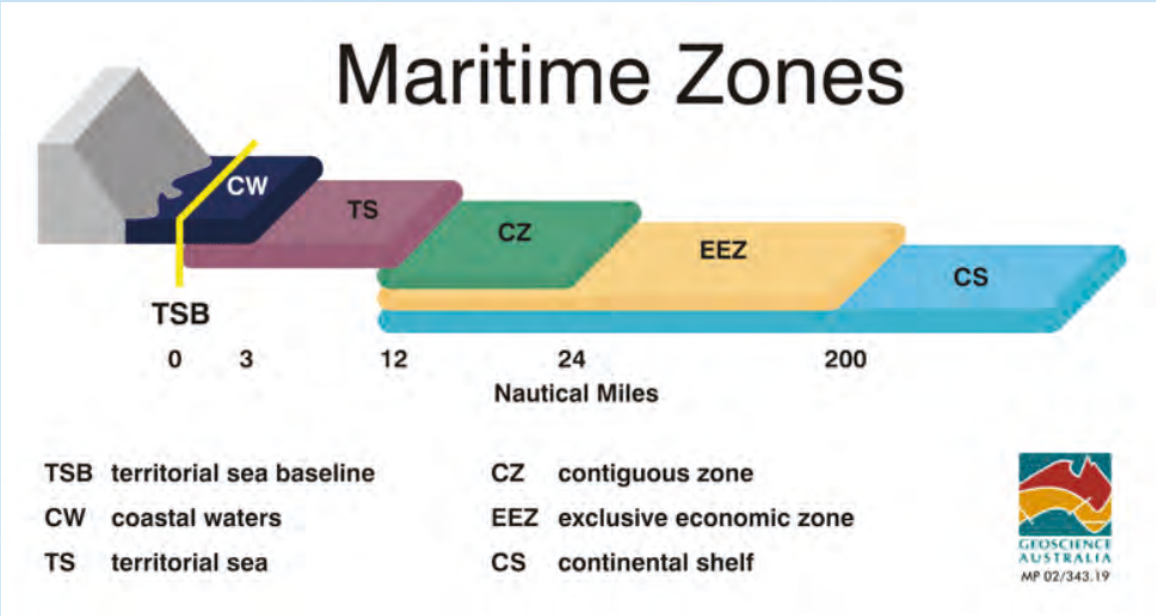


Figure 1. Maritime zone definitions

2. AUSTRALIA'S MARINE ENVIRONMENT

200
Nautical miles of EEZ[1]

>30k
Km of coastline around the country[2]

>80%
Of the Australian population lives along the coast[3]

11%
Of the world's marine wildlife species[4]

>90
Species of seabirds[5]

>5000
Species of fish[4]

45
Species of cetaceans[6]

Estimated value of the blue economy by 2025[7]

$100bn

Value of ecosystem services provided by coasts and oceans[7]

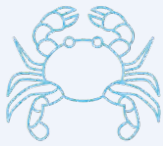
$25bn

62
Marine parks[8]

78
Species of fish, marine mammals and reptiles on the EPBC Act List of Threatened Fauna[9]

1.05°C
Sea surface temperature increase on average since 1900[10]

9
Established marine pest species[11]



3. OCEANWATCH AUSTRALIA'S VISION & MISSION

3.1 Vision

Australia's marine environment is healthy, productive, valued, and used in a responsible way.

3.1.1 Vision Values

The health of Australia's marine environment matters because…

the marine environment supports the Australian way of life and forms part of the national identity. Oceans and coasts also provide an estimated $25 billion worth of essential ecosystem services, such as carbon dioxide absorption, nutrient cycling, and coastal protection[7]. Many Australians also get artistic and spiritual inspiration from the marine environment, including the enjoyment of swimming or surfing at the local beach, snorkelling on the Great Barrier Reef or fishing and boating on local waterways.

The productivity of Australia's marine environment matters because…

Australia's marine industry contributes more than $80 billion per year to Australia's overall economy[12]. The marine environment, directly and indirectly, supports commercial industries such as fishing, shipping and resource extraction, and provides important revenue from recreational activities, including tourism and fishing. The economic value of resources provided by our marine environment is expected to contribute around $100 billion each year to Australia's overall economy by 2025[7].

Valuing Australia's marine environment matters because…

with over 80 per cent of the population living within 50 kilometres of the coast, Australians depend on the varied, social, economic[13], cultural and ecosystem benefits[14] that a healthy marine environment generates. Most marine-based recreation and tourism are nature-based and reliant on healthy and diverse ecosystems.

Responsible use of Australia's marine environment matters because…

Australians can ensure the marine environment is maintained and enhanced for future generations. Through understanding human impacts and the adoption of best practice for marine activities, all marine users can improve stewardship of the marine environment while maximising the benefits from its use.

These vision values provide the guiding principles for the Marine NRM Program.

3.2 Mission

Australians have accurate and comprehensive knowledge of the marine environment and work collaboratively towards ensuring its health and productivity.

Cultural knowledge is still underrepresented in Sea Country Management

4. ABOUT THE NATIONAL MARINE NRM PLAN 2023-2028

Marine Natural Resource Management (NRM) is the sustainable management and improvement of natural resources that make up Australia's marine environment, for the shared environmental, cultural, social and economic benefit of the community. NRM planning and delivery plays a lead role in supporting the stewardship of Australia's environmental assets. The National Landcare Program regional funding stream invests through Australia's NRM organisations, recognising the crucial role they play in delivering NRM at a local and regional level[16].

This National Marine Natural Resource Management Plan 2023-2028 (henceforth 'Marine NRM Plan' or 'Plan') has been developed by OceanWatch, in collaboration with a variety of marine stakeholders, to guide NRM investment for the next five years. The contents of the Plan were derived from seven state/territory-based workshops. Through these activities, OceanWatch engaged with a diverse range of experts who manage and/or interact with marine natural resources from both extractive and conservation backgrounds.

This Plan complements existing regional NRM plans and aligns with Australian, state, territory and Local Governments' legislation and policy, and will be implemented by OceanWatch at a scale relevant to available funding. This Marine NRM Plan is a call to action as well as a strategic document. It aims to secure a prosperous future for Australia that maintains and improves the current quality of life, by ensuring the long-term health of the marine environment.

4.1 Scope and Scale

Australia's marine domain is one of the largest in the world, with a total marine area of around 10 million square kilometres[1]. Australian species and our natural marine treasures such as the Great Barrier Reef in Queensland, Lord Howe Island in New South Wales, the Great Australian Bight in South Australia and Ningaloo Reef in Western Australia stand as icons of Australia's national identity and support important revenue from marine tourism[7].

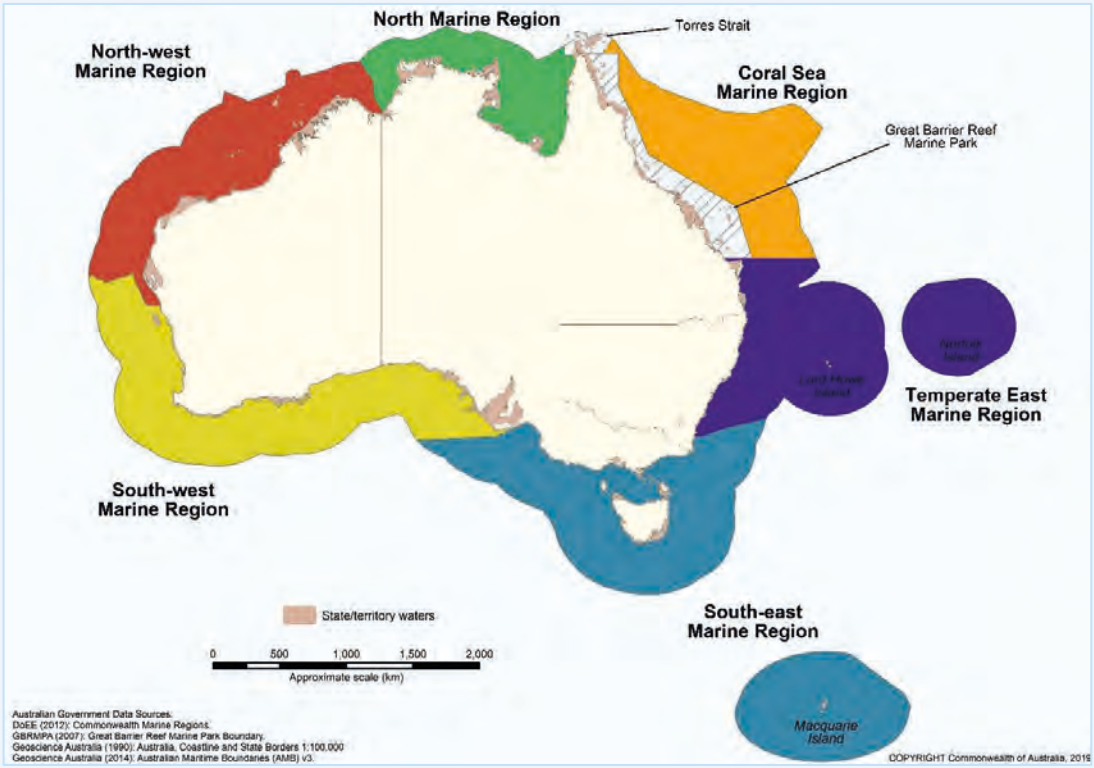


Figure 2. Australia's Commonwealth marine regions

The extensive length of Australia's continental coastline (>30,000 kilometres, 7th longest globally), spanning 35 degrees of latitude, creates great diversity in habitat, ecosystems, and species. Shorelines include coral reefs, temperate rocky and sandy shores, more than 1000 estuaries, 10,000 beaches, and 8,000 diverse islands[3]. The Australian Government's marine bioregion planning process (2012)[15] defined six marine bio-regions for Australia's marine and coastal environments (Figure 2).

Marine, estuarine and associated terrestrial ecosystems provide habitat for a diverse range of species of fish, mammals, birds, reptiles and invertebrates. These ecosystems are highly connected, with many wildlife species utilising a variety of wetland, estuarine and marine habitats while migrating large distances as an integral part of their life cycle. The health and productivity of the marine environment are subject to many pressures related to human activities both on land and on water. For practical purposes, the responsibility for the management of the marine environment rests with the Australian, State and Territory Governments. However, it remains a community owned asset and a level of responsibility for its stewardship lies within the community.

Historically, the regional NRM planning and delivery model has been based on catchment boundaries, with resultant marine-related activities focusing on reducing land-based impacts from catchments on the marine environment. This regional NRM model is limited in its ability to address many of the challenges for the marine environment. This is mainly due to the difficulty in dealing with seascape-scale environmental, social, economic and cultural connectivity issues from within a geographically constrained coastal catchment jurisdiction. Consequently, to optimise Marine NRM planning and delivery, this Plan will be implemented through an approach to marine challenges across multiple catchments, that enables and promotes connectivity across terrestrially-focused regional NRM boundaries.

The role of OceanWatch as the national Marine NRM organisation is to deliver practical solutions to benefit the marine environment, the seafood industry, and the community.

OceanWatch recognises that the key pressures on Australia's marine environment (and the focus of our work), include[17] but are not limited to:

- climate change and extreme weather events
- marine pollution, including nutrients, contaminants, plastics, and debris
- the intensity of recreational and commercial fishing activities, including aquaculture
- marine industries involving vessel activities, mineral, oil and gas extraction, and producing noise
- marine biosecurity
- coastal development, land use and dredging
- the cumulative effects of all the pressures listed above.

Recreational fishers are part of the saltwater community.

4.2 Plan Design Methods

The design of this Plan involved two activities:

- An internal review of the interim Marine NRM plan (2017-2022)
- Seven State/Territory based workshops

The results of these two activities were synthesised to form this Plan.

OceanWatch completed an internal review of the Interim Plan (2017-2022) to identify areas that needed updating or renewing, and to ensure alignment with current plans and strategies relevant to Marine NRM in Australia. OceanWatch's vision and mission remained the same, while most other sections were updated. This review also made sure that the new objectives were aligned with other current plans and strategies relevant to Marine NRM in Australia.

In November 2022, OceanWatch conducted seven online workshops, one for each coastal State and the Northern Territory. These workshops were facilitated by an independent professional. They were attended by 95 individuals representing 75 organisations or government departments, from various sectors (Figure 3, Appendix III). The most attended was the NSW workshop, followed by the Tasmania workshop (Figure 4), with an even gender representation overall.

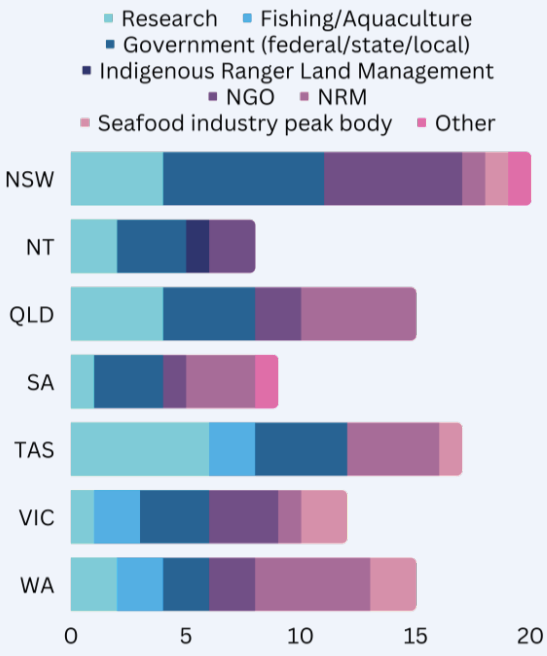


Figure 3. Workshop participants' organisations.

Out of all participants, only 7 identified as Aboriginal or Torres Strait Islanders (Figure 5).

The workshops gathered feedback from local experts and stakeholders on OceanWatch's draft objectives, creating fundable actions responding to pressures on the marine environment, which were then ranked by the participants. The actions listed in section 7 are voted actions compiled during the workshops and curated by OceanWatch, as well as relevant actions from the interim plan.

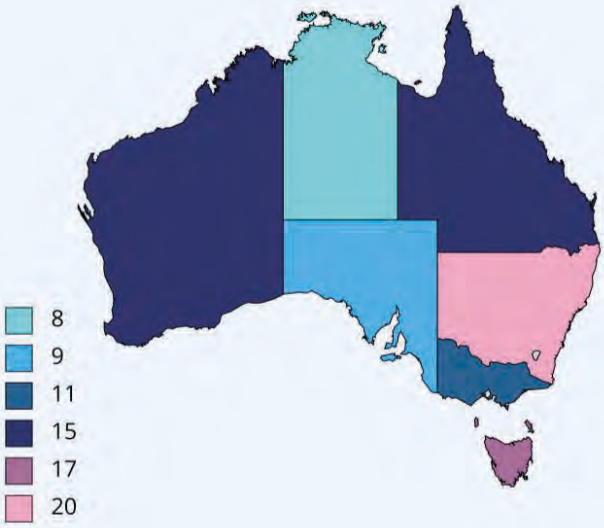


Figure 4. Number of workshop participants.

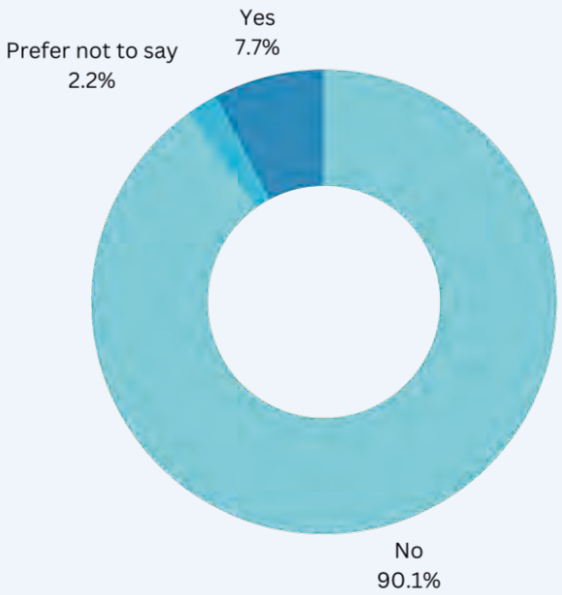


Figure 5. Answers to "Do you identify as Aboriginal or Torres Strait Islander?"

In 2018–19, the national gross value of production for the oyster industry totalled ~$106m (Oysters Australia, 2020)

5. OPERATING PRINCIPLES

Working towards our objectives, OceanWatch Australia aims to operate following the below principles. These sit above the Marine NRM Program Objectives, as they apply to all OceanWatch's NRM work.

We will increase the capacity of our stakeholders to mitigate and adapt to **climate change**

We will encourage saltwater community and seafood industry **voices** in the design and implementation of our projects

Our work will leave a **legacy** of increased understanding of the dynamic relationships between human activities and the marine environment

5.1 Act on Climate Change

Climate change is the challenge of this decade. It is already affecting fundamental aspects of our marine environments and increasing the impact of other pressures[17], with marine heatwaves, changing current patterns and ocean acidification impacting commercial and non-commercial marine species. Climate change will also have significant impacts on our coasts, particularly through sea level rise[17]. Therefore, it is critical that climate considerations are streamed into every environmental and social initiative planned as part of the Marine NRM Program.

The most effective way of reducing the impacts of climate change is to reduce greenhouse gas emissions[23]. Concurrently, it is important to increase social and environmental resilience, to facilitate adaptation to the expected changes.

5.2 Incorporate Community & Industry Voices

Collaborating with a great diversity of stakeholders is one of OceanWatch's greatest strengths. Particularly, we endeavour to co-design our projects with saltwater community and seafood industry members, to ensure the uptake and championing of change and the positive impact of environmental initiatives.

Fostering collaboration and cooperation between different stakeholder groups is important for all Marine NRM work.

5.3 Leave a Legacy for the Future

This Marine NRM Plan has a national scope. In its application, local legacy outcomes beyond the funded period must always be foremost in project execution, for OceanWatch and other delivery partners.

6. OBJECTIVES

These objectives emerged from OceanWatch's internal review, workshop feedback from independent experts and stakeholders in the marine environment, from all coastal states and the Northern Territory.

OceanWatch's Marine NRM Program will invest in projects that achieve the following outcomes over the next 5 years.

2022 estuary clean up led by the NSW oyster industry

Better **coastal and marine environmental monitoring** of threats and species recovery, with nationally standardised data collection systems.

Improve **collaboration on NRM interventions** via (1) regional stewardship and Marine NRM coordination roles; and (2) supporting collaborative multi-stakeholder plan-making on a regional basis, including building the capacity of First Nations groups to participate.

Expand **ecological restoration** including the re-establishment of seagrass beds, kelp forests, shellfish reefs, mangroves, saltmarsh, and where necessary building artificial reefs. Support opportunities for blue carbon investments and the protection of existing habitats and wildlife.

Advance **First Nations'** involvement, connection, and capacity building in sea country management.

Increase **marine stewardship** with a focus on building the capacity of stakeholder groups and citizen science projects.

Enhance **ocean literacy** to improve marine stakeholders' awareness of key coastal and marine issues related to all objectives.

Reduce pollution including reducing run-off from agriculture and marine debris source reduction.

Support **saltwater community and seafood industry best practices** including assisting industry extension efforts and circular economy, biosecurity, and works towards greenhouse gas emissions reduction in line with governments' targets.

Responsible, Professional Master Fisherman graduates fishing in Queensland waters.

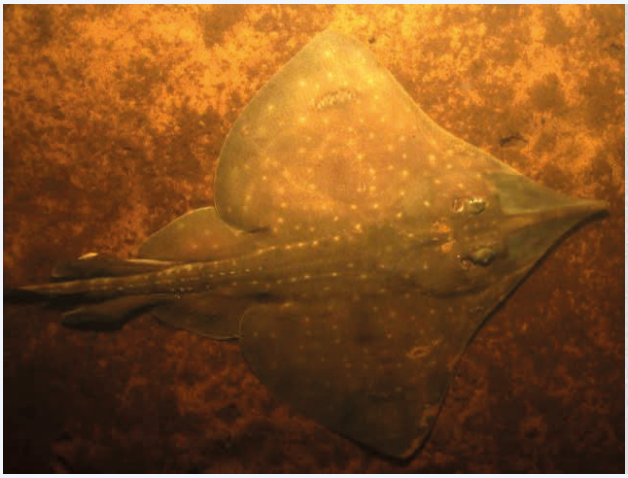
7. RECOMMENDED ACTIONS

The actions listed below are project concepts that OceanWatch Australia aims to deliver or support to reach its Marine NRM Program objectives. These actions originated either from suggestions of participants in the seven State/Territory workshops (see a full, raw list in Appendix I), which were then edited by OceanWatch staff for clarity and relevance (73), selected actions listed on the Marine NRM Interim Plan (4), or identified by OceanWatch staff (1).

Some actions include recommended locations, while others are relevant nationwide and appropriate at various scales across the country. The recommended locations were put forward by the workshop participants for that specific action.

ACTIONS	RECOMMENDED LOCATIONS
Better coastal and marine environmental monitoring of threats and species recovery via nationally standardised data collection systems.	
• Monitor marine pest range extension	National
• Create a national shoreline monitoring program focused on ecological indicators of change, including tidal wetlands, beaches and rocky shorelines	National
• Monitor beach nesting bird populations long term	South Australia
• Gather baseline data regarding water quality in south coast estuarine systems	Western Australia
• Map habitat and nutrient flows	Pilbara Coast (WA)
• Monitor of rocky reef communities to understand impact of proposed desalination plants that will be developed	Boston Bay, Proper Bay and Spencer Gulf by Whyalla (SA)
• Set up and handover of water quality sensors to the aquaculture industry, with the establishment of an accessible portal	Port Stephens, Manning, Wallis Lake (NSW)
• Monitor rivers, estuaries and coastal foreshores, including impacts of upstream development on water quality	Gulf of Carpentaria (QLD, NT)
• Identify and reduce local threats to seagrass habitat	Tamar estuary, Georges Bay, Anson's Bay and the Northeast Inlet on Flinders Island (TAS)

The picturesque coastline of North Western Australia.



Left: a Maugean skate, photo by Neville Barrett. Right: Nick Tyson's 'Skating on the edge of extinction', artwork exposed as part of the SKATEx event by Cradle Coast NRM, Tasmania, an art competition to raise public awareness about the threatened Maugean skate which is now only found in Macquarie Harbour.

ACTIONS	RECOMMENDED LOCATIONS
Improve collaboration on NRM interventions via (1) regional stewardship and Marine NRM coordination roles; and (2) supporting collaborative multi-stakeholder plan-making on a regional basis, including building the capacity of First Nations groups to participate.	
• Develop a strategic marine habitat rehabilitation plan per state considering climate change using variety of habitat rehabilitation techniques	National
• Establish guidelines for how to restore mangroves, and assist NRM groups to understand and implement this method	National
• Support for collaboration between Landscape Boards and LGAs to develop local coastal 5-year management plans with biodiversity and marine ecosystem outcomes	South Australia
• Support the development of a stormwater planning policy, and the adoption of water sensitive urban design principles	Tasmania
• Develop marine spatial plans for key regions, species and habitats	Tasmania
• Create a coastline action plan for protection of biodiversity and cultural values	Rocky Cape National Park (TAS)
• Develop mechanisms for collaborative management	Gulf St Vincent and Murray Mouth (SA)
• Support RAMSAR wetland establishment and management plan	Robbins Passage, Boullanger Bay (TAS)
• Develop an action plan for protection of biodiversity and cultural values	Bass Strait Islands (TAS)
• Create a rehabilitation plan with Maugean skate as sentinel species	Macquarie Harbour (TAS)
• Implement a new Framework for planning and management. This includes a plan, a dedicated fund and a partnership.	Western Port Bay and immediate hinterland (TAS)

ACTIONS	RECOMMENDED LOCATIONS
Expand ecological restoration including the re-establishment of seagrass beds, kelp forests, shellfish reefs, mangroves, saltmarsh, and where necessary building artificial reefs. Additionally, it will support opportunities for Blue Carbon investments.	
• Protect habitats and food for migratory shorebirds along the path of migration (national and international focus and RAMSAR sites)	National
• Develop community-scale blue carbon restoration guidance and best practice	National
• Protect and enhance seahorse and black rock cod populations	National
• Support fisher-led (commercial, Indigenous and recreational) fish habitat enhancement and restoration initiatives	National
• Support the use of artificial reefs to increase biomass and increase fishing opportunities	Northern Territory and Victoria
• Monitor dugong populations and protect/restore their food source (seagrass)	Queensland
• Support the development and execution of regional long-spined sea urchin management plan, encompassing the varied ecological/social/cultural/economic values across the urchin's endemic and extended ranges	Tasmania
• Restore habitat/establish population parameters and trends of Maugean skate, including communications to increase public awareness	Tasmania
• Restore habitat for spotted and red hand fish, establish population parameters and trends, and protect from external effects such as pollution, Northern pacific sea star and sea urchins	Tasmania
• Develop a *Centrostephanus rodgersii* urchin species control and management collaboration to assist growth of sustainable management of harvest and rehabilitation	Great Southern Reef (NSW, VIC, TAS)
• Rehabilitation of riparian vegetation	Wet tropics coastal floodplain (QLD)
• Support and sponsor carbon neutral industries (tourism, fishing, shipping)	Great Barrier Reef (QLD)
• Identify sites for blue carbon restoration	Hills & Fleurieu Region (SA)
• Restore shellfish reef	Glenelg and Kangaroo Island (SA), Wallis lake (NSW), QLD and VIC
• Provide restoration efforts and management plans to support restoration of kelp communities following the Threatened Species Action Plan, including golden kelp restoration	Tasmania, Port Phillip Bay (VIC)
• Invest in nature-based shoreline protection structures, marine and coastal restoration (seagrass/shellfish/multispecies)	Port Phillip Bay western side and Western Port (VIC)

ACTIONS	RECOMMENDED LOCATIONS
• Restore and enhance seagrass meadows	Cockburn sound (WA), Southern Fleurieu peninsula (SA), and along the Adelaide coastline (SA), Queensland
• Develop habitat improvement projects for Ramsar Wetlands	Port Phillip Bay and Western Port, and for Phillip Island and French island (TAS)
• Conduct rocky reefs and giant kelp forest monitoring, restoration, and identify priority areas to reduce local threats from sea urchins. *C. rodgersii* urchin control and spiny lobster protection	East coast (e.g., Fortescue Bay) and northeast coast of Tasman Peninsula (TAS)
• Conduct weed control for increase sea bird populations	Fleurieu islands (TAS)

Advance First Nations' involvement, connection, and capacity building in sea country management.

• Record climate change impacts in remote communities, particularly involving elders	National
• Support for TOs to engage local communities to understand culturally important marine species and take steps to monitor and conserve them	National
• Develop a cross cultural knowledge exchange program between Indigenous Rangers and Landcare groups	National
• Support a regional coordinator to bring together all Sea Country related partners in a regional approach	Northern Territory
• Work with First Nations groups to identify priority actions in the marine environment	South Australia
• Support the establishment of Sea Country ranger groups	South Australia
• Support the development of Regional Sea country plan	Darwin Daly sea country region (NT)

Dugongs are large mammals subject to a range of threats, including degradation and loss of seagrass meadows.

ACTIONS	RECOMMENDED LOCATIONS
Increase marine stewardship focusing on capacity building of existing groups, including First Nations Sea Rangers, Coastcarers, and citizen science projects.	
• Support for development of citizen science projects for priority species to monitor and restore key ecological communities, while building capacity in local communities	National
• Provide blue carbon extension services (including extension officers) and advice for private landholders	National
• Engage and assist seafood consumers to make purchasing decisions which support the responsible use of marine resources.	National
• Maintain, inform and engage a national marine NRM network that engenders a multi-disciplined and collaborative approach to marine NRM activities.	National
• Support citizen science projects, to allow expansion and continued environmental monitoring	National
• Invest in coastal care groups for community-led action on coastal protection/restoration	South Australia

Volunteers helping mangrove recovery following the 2019-20 bushfires.

Enhance ocean literacy to improve marine stakeholders' awareness of key coastal and marine issues related to all objectives.	
• Increase seafood and maritime industries awareness of their impact on the marine environment through ocean literacy for industry projects	National
• Develop and deliver an early childhood and/or school environmental educational program covering a suite of marine topics and issues, and linked to local projects and community groups	National
• Improve community literacy on coastal erosion, climate impacts, and how land-use, catchments and marine ecosystems interact	National
• Create a community awareness and social licence campaign around commercial fishers	Northern Territory

ACTIONS	RECOMMENDED LOCATIONS
Reduce pollution including reducing agriculture run-off and marine debris source reduction.	
• Increase promotion and encouragement of reducing plastic waste into the environment	National
• Reduce marine debris from marine industries	National
• Build capacity to understand and limit residential sewage infrastructure flows into environment in view of climate change and increased rainfall events	National
• Manage land-based marine impacts such as bank erosion, pesticides and nutrient runoff	New South Wales, Queensland
• Prevent marine debris	Botany Bay, specifically Towra Point Aquatic Reserve and RAMSAR wetland (NSW)
• Improve habitat and water quality	Moreton Bay (QLD)
• Rehydrate and rehabilitate the landscape and reduce nutrient run-off, sediment flows and turbidity	Gascoyne and Pilbara regions (WA)
• Address runoff and land activity threats to estuarine health (e.g., sewage)	East Coast (Georges Bay), (TAS)
• Improve water quality, reduce pollution, reduce industrial run-off, reduce marine debris	D'Entrecasteaux channel (TAS)
• Address agricultural runoff to benefit local oyster industry and environment	Duck Bay and Smithton (TAS)

Volunteer oyster farmers in Wonboyn taking stewardship action in their estuary to ensure clean waters.

ACTIONS	RECOMMENDED LOCATIONS
Support saltwater community and seafood industry best practices including assisting industry extension efforts and circular economy, biosecurity, and works towards greenhouse gas emissions reduction in line with governments' targets.	
• Set up a grants program to support the seafood industry to develop, update and/or improve codes of practice, drawing on evolving international best practice	National
• Develop bycatch mitigation gear and support its adoption	National
• Assist marine businesses in a reduction of their greenhouse gas emissions in line with governments' targets	National
• Identify capacity gaps for industry adaptation to climate change	National
• Incentivise capacity and scale for aquaculture and fisheries plastics to enter the circular economy	National
• Develop and extend recreational fishing best practices for snapper fishers	National
• Establish, support and extend new and innovative technical solutions as they relate to improving the health of the marine environment and growing the blue economy.	National
• Provide incentives for seafood producers to improve business practices by working in collaboration with businesses within the seafood supply chain and seafood consumers.	National
• Engage and extend best practices for the seafood industry by marine NRM officers	National
• Develop and extend industry-specific best practices for land-based water pollution	NSW
• Work on marine biosecurity focusing on the eradication and control of new and emerging invasive species	Queensland
• Conduct education activities and support expansion of recycling projects for recycling marine plastics to other key fishing towns	Whyalla and Port Augusta (SA)

Australia's wild-caught prawn industry is very important for the local economy of many coastal areas.

Whitehaven beach, QLD, is a popular tourist destination at an international level.

8. IMPLEMENTATION

8.1 Funding and partnerships

The 2023-2028 Marine NRM Plan identifies the objectives and actions to guide the development of projects. The activities' list is intended as a starting point, to highlight the local appetite and needs of groups at appropriate scales. Each project will need to be further developed and explored upon funding opportunity scope and scale. This will be done to meet funders' guidelines, in collaboration with project partners and following consultation of stakeholder groups to ensure maximum impact on-ground at a local/regional level and identify the most appropriate delivery model.

8.2 Measuring success

If resourced, OceanWatch will track progress towards the objectives by monitoring the indicators on Table 1. These measures are summations of project-level data. A MERI (Monitoring, Evaluation, Reporting and Improvement) framework will be used to assess progress on achieving outcomes of funded projects. This framework enables adaptive management, and will be developed on a project-basis following the Australian Government's guidelines.

Table 1. Progress indicators

Objective targeted	Measures of Actions supported by marine NRM funding
Better coastal and marine environmental monitoring	• N of environmental monitoring/citizen science projects • Km of coastline covered by projects • N of species monitored
Better collaboration on NRM interventions	• N of collaborative efforts plans developed • N of projects that involved First Nations partners
Ecological restoration	• N of sites where projects completed • Ha/km of sites where projects completed
First Nations	• N of groups assisted • N of Indigenous people employed • N of projects including Indigenous content
Marine stewardship	• N of stewardship projects completed • N of stewardship participants • Km of coastline covered by stewardship initiatives • N of citizen science projects completed • N of citizen scientists engaged
Ocean literacy	• N of awareness raising communications activities • N of social media engagement metrics • N of attendees at events
Pollution reduction	• N of initiatives completed • Weight or volume unit of marine debris removed
Saltwater community and seafood industry best practices	• N of codes of practice/adoptions of EMS • N of boats, sites that participate in completed projects • Kg of greenhouse gases' emissions reduced • N of fishers and aquaculturists with improved awareness of industry best practice

9. THE PUBLIC SURVEY

The National Marine NRM public survey aimed to ground-truth the workshop outputs (i.e., objectives and actions) and thus enable OceanWatch Australia to better serve Australian marine environments and those who live and work in coastal areas.

The wider Australian community (beyond 'experts' and 'key' stakeholders) was invited to consider the objectives and key actions identified in the Plan. The survey sought key information about community understanding and endorsement of the Plan, their awareness of and engagement with the Plan, and their engagement with OceanWatch Australia more generally. For full results please see Appendix IV, and for a complete list of questions see Appendix V. A total of 730 survey responses were collected.

Participants

The survey sample were well-balanced in terms of gender and adult age groups. The sample represented responses from all states and territories in Australia (excluding offshore territories), although NSW (30.2%) and QLD (25%) were most represented. Overall, respondents indicated their strong interaction with Australian coastal and marine areas. Almost two-thirds (63.3%) reported frequenting marine and coastal areas at least once per week.

Awareness of and engagement with OceanWatch Australia

Almost two-thirds of survey respondents (64.1%) were aware of OceanWatch Australia. However, three-quarters of respondents (75.6%) were not aware that OceanWatch runs the National Marine NRM Program. This is likely because the previous Marine NRM Plan was not funded in full (in contrast to many other NRM organisations), and therefore likely had reduced capacity to engage and achieve a footprint within the community. This is further illustrated by the outcome that half of respondents (49.9%) do not engage with OceanWatch. Of the half that did, they cited the OceanWatch newsletter and seafood industry stakeholder connections as their primary routes to engagement.

Understanding of the Marine Natural Resource Management Plan

Overall, respondents indicated they had at least some understanding of the National Marine NRM Plan objectives (Figure 6). They best understood the objective *Pollution reduction*, followed closely by *Ecological restoration* and *Coastal and marine environmental monitoring*. These objectives reflect the current focus of other OceanWatch Australia programs (i.e., up to 2023) and might be better understood by those who engage with OceanWatch as a result.

Still, one-fifth of respondents indicated they did not properly understand the objective *Collaborations on NRM interventions*, a result that was further reflected in the relatively poor understanding of other related objectives, including *First Nations involvement* (15.9%), *Marine stewardship* (12.5%), and *Ocean literacy* (12.2%).

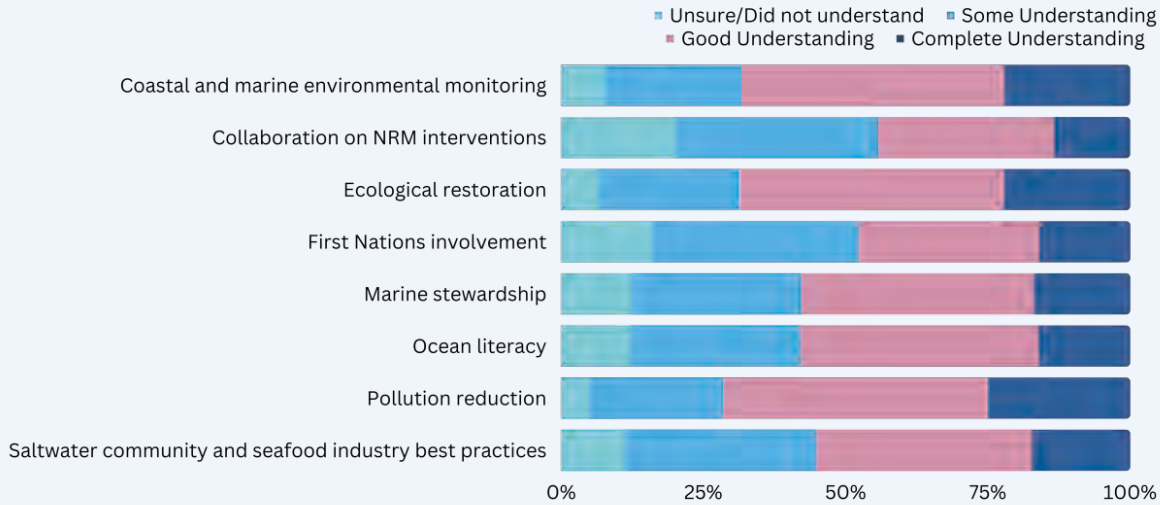


Figure 6. Understanding of the National Marine NRM objectives.

These results highlight marine issues and topics that OceanWatch Australia can seek to engage their stakeholders on in the implementation of the new Marine NRM Plan.

Endorsement of National Marine NRM Plan

Consistent with respondents' understanding of the objectives reported above, 82.8% of respondents thought that actions focused on pollution (grouped in the theme *Reducing or eliminating marine and coastal pollution, both from land and marine sources*) were very important or critical.

Whilst most respondents did support *First Nations involvement*, this objective was less prioritised than all others: 8% of respondents considered the objective *First Nations involvement* as not at all important (Figure 7). It is unclear why this objective was less prioritised. Respondents' poorer understanding of the objective (and thus topic and context; Figure 6) may partly offer an explanation.

Ocean literacy was reasonably prioritised: 70.1% thought this objective was very important or critical. 78.7% of respondents indicated their view that its corresponding actions - grouped in the theme *Increasing people's understanding of the ocean's influence on them and their influence on the ocean* was also very important or critical.

Almost three-quarters of respondents (70.7%) were interested in the idea of becoming involved as volunteers or collaborators in OceanWatch Australia Marine NRM projects.

Implications: looking ahead

The survey results overall highlight opportunity for OceanWatch Australia to better engage and connect with the wider Australian community. Two-thirds of respondents did not know that OceanWatch Australia runs the National Marine NRM Plan and Program – as such, community and stakeholder engagement should be a future focus to retain the relevance and impact of the Plan and Program. For example, almost three-quarters of respondents were interested in the idea of collaborating or volunteering in OceanWatch Australia Marine NRM projects, which presents a future avenue for interactive engagement – and an opportunity for potential dialogue and education about the Marine NRM Plan objectives and actions, as well as OceanWatch Australia programs and initiatives happening on-the-ground.

Further, whilst only half of the survey respondents were aware of OceanWatch Australia, the survey reach achieved indicates the potential reach for OceanWatch Australia program and initiative engagement.

Community support and understanding of the importance of pollution reduction in marine and coastal environments was apparent and likely a reflection of contemporary cultural awareness of ocean plastic and pollution issues – as well the current focus and effort of several OceanWatch Australia projects, including Tide to Tip. OceanWatch can celebrate the success of engagement on this issue and consider how lessons learned from this project (and others) might bolster future efforts to improve engagement on other objectives set out in the National Marine NRM Plan.

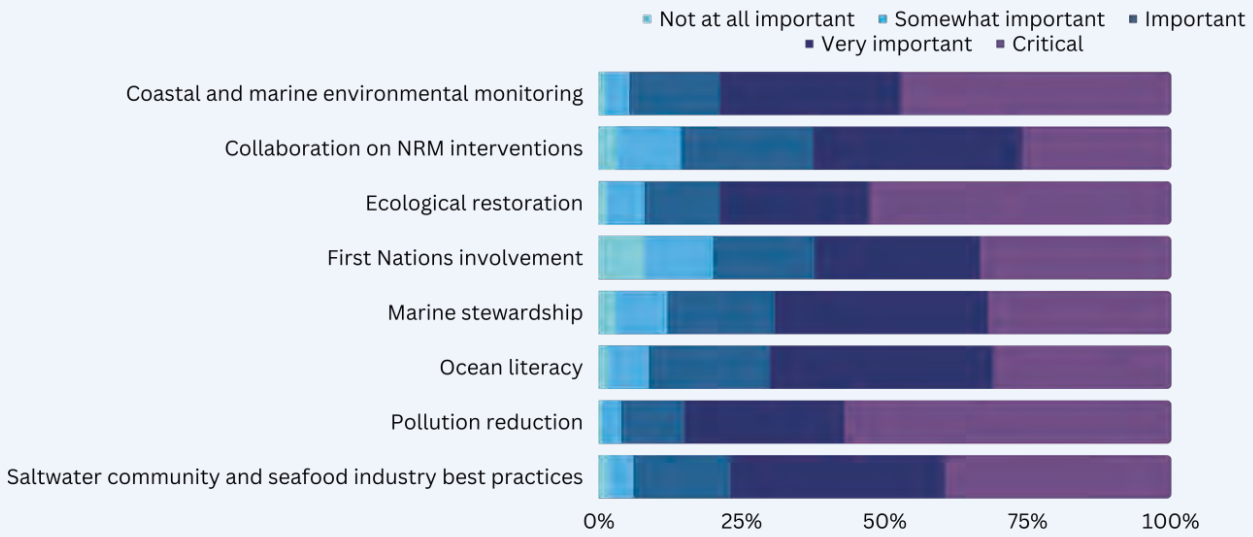


Figure 7. Importance rankings of the National Marine NRM objectives.

10. GLOSSARY

For this Marine NRM Plan, the following definitions apply:

Australians – includes all people living either permanently or temporarily in Australia, regardless of their citizenship.

Blue economy – refers to sectors such as ports, offshore oil and gas, ecosystem services, tourism, shipbuilding, fishing and aquaculture, that contribute ~$50 billion per year to the Australian economy and social benefits which are efficient, equitable and sustainable. The blue economy includes the estimated $25 billion worth of ecosystem services provided by the ocean and coasts, flow-on benefits to the wider economy such as carbon dioxide absorption[7].

Ecological sustainability – the use, conservation and enhancement of the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.

Ecosystem resilience – the capacity of an ecosystem to respond to changes and disturbances, yet retain its basic functions and structures[18].

Environmental best practice – operating using the best available knowledge and technology to protect and conserve the environment.

Healthy marine environment – ecological processes are operating to ensure stable and sustainable ecosystems, critical habitats remain intact and water quality is appropriate for the plants and animals that live in or on it, and it is safe for human activities like swimming, boating, surfing or fishing.

Indigenous people – refers to Aboriginal and Torres Strait Islander people, communities, knowledge holders and Elders.

Indigenous customary fishing – accessing and utilising seafood resources by Indigenous fishers according to custom. This includes ceremony, exchange, trade or barter and consumption.

Marine environment – from areas under the tidal influence to the limit of Australia's Exclusive Economic Zone (EEZ).

Natural Resource Management (NRM) – the management of natural resources such as land, water, soil, plants and animals.

Productivity – the rate of production of new marine biomass.

Recreational fishing – the fishing of aquatic animals (mainly fish) that do not constitute the individual's primary resource to meet basic nutritional needs and are not generally sold or otherwise traded on export, domestic or black markets (UNFAO 2012).

Responsible use – legal activities which follow all prescribed laws and regulations and are ecologically sustainable. It implies respect for marine biodiversity and cultural heritage, permitted commercial activities, and the provision of social amenities for individuals and the community.

Saltwater community – includes the >80% of Australians who live within 50 km of the coast[19] and represents all Australians who use and value the marine environment. It includes coastal Indigenous communities, recreational fishers, surfers, swimmers, boaters, tourists, seafood consumers as well as recreational and Indigenous customary fishers.

Seafood industry – people involved in activities conducted in or from Australia concerned with the commercial taking, culturing, processing, preserving, storing, transporting, marketing or selling of fish or fish products. The industry comprises the following three sectors: commercial wild-catch, aquaculture and post-harvest.

Stewardship – the responsible use and protection of the natural environment through conservation and sustainable practices.

Ecological restoration – the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. It aims to re-establish a self-organizing ecosystem on a trajectory to reach full recovery[20].

Adaptation – adjustment in natural or human systems in response to a new or changing environment that exploits beneficial opportunities or moderates negative effects[21].

Right to self-determination – At a minimum, it entails the entitlement of people to have control over their destiny and to be treated respectfully. This includes people being free to pursue their economic, social and cultural development[22].

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Many fish species rely on kelp as a vital habitat; however, rising temperatures pose a significant threat to its survival.

APPENDIX I

FULL LIST OF STATE/TERRITORY-BASED ACTIONS FROM THE WORKSHOPS

Below are all the in-scope investment ideas from each state/territory (participants' votes in brackets. Every workshop participant was given 15 votes, with the instructions not to give more than 2-3 per Action).

All Actions are reported in their original form, unedited. Some Actions were not retained in this list because considered by OceanWatch staff as outside of Marine NRM scope.

VICTORIA

- Support fisher-led (commercial and recreational) fish habitat engagement and restoration initiatives e.g., OzFish, corner inlet sea urchin management. (5)
- Program to help industry reduce their impact on the marine environment (ports etc.) - Ocean Literacy for Industry. (5)
- Grants program to support industry to update and improve - & where not in place develop - codes of practice etc. drawing on evolving international best practice. (5)
- Marine and coastal restoration in Western Port (huge potential for seagrass/shellfish/multispecies). (4)
- Western Port Bay -implement a new Framework for planning and management of the whole Bay (and immediate hinterland). This includes a plan, a dedicated fund and a partnership (similar to an EMP that PPB has, with own Fund for restoration efforts, monitoring, planning decisions etc.). (4)
- Habitat improvement projects for Ramsar Wetlands within Port Phillip Bay and Western Port. (3)
- Restoration of shellfish reefs. Investment in artificial reefs. (3)
- Investigate & identify high conservation values (and actions) areas across the state. (3)
- Habitat Improvement projects for Phillip Island and French island. (2)
- Golden kelp restoration Port Phillip Bay. (1)
- Investment in nature-based shoreline protection structures (like shellfish reefs) within Port Phillip Bay western side and Western Port. (1)
- Rural land Sediment reduction programs for Western Port. (0)
- Investing in more sea country projects and joint management initiatives with Traditional Custodians. (0)
- Support for traditional owners and other Indigenous Victorians to practically engage in NRM-related planning and consultation processes across agencies and sectors. (0)
- Investigate Blue Carbon sites within Western Port. (0)
- Helping Victoria to implement marine spatial planning (funding Victoria's first marine spatial plan?) (maybe Western Port Bay?). (0)

WESTERN AUSTRALIA

- Targeted biosecurity program. (5)
- Indigenous/Traditional owners & groups included in decisions and assisted to build capacity and time on sea country (e.g., coastal ranger or stewardship programs). (5)
- Gascoyne & Pilbara - rehydration, landscape rehabilitation and reduction of nutrient run-off (reducing sediment flow and turbidity in fragile marine environments). (4)
- Training programs for community groups to build awareness and engagement of ocean literacy. (4)
- Reduce marine debris from marine industries. (3)
- Gathering baseline data regarding water quality in South coast estuarine systems. (3)
- Migratory shorebirds protection of habitats and food along the path of migration (both national and international focus and RAMSAR sites). (2)
- Cockburn sound, Seagrass meadows, Improving overall MPA network. (1)
- Supporting improved coastal erosion and climate impacts literacy amongst community. (1)
- Pilbara Coast: Habitat mapping, Nutrient flows. (1)
- Australian Sea Lions, Little Penguin (Penguin Island) protection and monitoring programs. (0)
- Collection, sorting, logging and identification of the source of the marine debris on the South Coast shores, involving community and Traditional Owners. Creation of a plan to reduce the marine debris. (0)

- Protect shorebird habitat in the Capes region from impacts from increased users and development. (0)
- Long-tern funding for coastal dune restoration (more than 1 year). (0)
- Restoring the health of Stokes Inlet and associated rivers to bring back shellfish. (0)
- Swan River microplastics pollution impacting coastal environments - need to implement linkages back to industry, funding for drain traps etc. (0)
- Collaborating with Indigenous ranger programs in the Pilbara for monitoring and research purposes to build capacity within Indigenous organisations/groups etc.(0)
- Behaviour change campaign for shared use of coastal environments for 4WD users and protection of sand nesting birds including plovers and terns. South coast of WA. (0)
- Support for networks across NRM, NGOs and community and industry stakeholders to increase connectivity. (0)
- Education and infrastructure to protect the coast and dune ecosystems from ORRV activities. (0)
- Recreational and Cultural impact Monitoring Project - develop systems to engage local communities that can be broadly implemented in non-indigenous and Indigenous communities. (0)
- Seagrass meadows in Cockburn and Warnbro sound-understanding current status of restoration and if there needs to be greater effort or change in management. (0)
- Vasse-Wonnerup RAMSAR site and drainage network - near shore water quality data. (0)
- Shark Bay: Develop a climate change adaptation plan for environment and community. (0)

QUEENSLAND

- There needs to be an encompassing national shoreline monitoring program focused on ecological indicators of change - starting with tidal wetlands but also including beaches & rocky shorelines. (6)
- Restoration of oyster reefs in QLD. (5)
- Best practice of landholders adjacent to estuaries in terms of localised impacts of first flush runoff - best practices for both land and sea. (4)
- Carbon neutral industries (tourism, fishing, shipping, etc.) on the Reef: research, support and sponsorship. e.g., Small scale carbon neutral tourism program in the Whitsunday up and running now. (4)
- Bycatch mitigation - gear and operation of gear. (4)
- Increased promotion/encouragement ($) of reducing waste into environment. Use less stuff, less ends up in environment e.g., disposable plastics. (4)
- Establish guidelines for how to restore mangroves, and assist NRM groups to understand and implement this method. (3)
- Habitat and water quality improvements in Moreton Bay e.g., oyster reef rehabilitation, Bris river runoff. (3)
- Funding to existing citizen science projects, to allow expansion and continued monitoring such as reef check or seagrass watch. (3)
- Gulf of Carpentaria - rivers, estuaries and coastal foreshores, monitoring including impacts of upstream development (water quality). (3)
- Enhancing and prioritising recovery of sea grass beds. (2)
- Supporting marine industry best practice.(2)
- Wet tropics coastal floodplain - rehabilitation of riparian vegetation. (1)
- Marine biosecurity - with a focussing on the eradication and control of new & emerging invasive species. (1)
- Dugong monitoring and food source protection and restoration (Note existing GBRF prog in QLD). (1)
- Improved support for Indigenous ranger programs including integrating traditional and western knowledge. (0)
- Citizen scientists are linked up with NRM managers and scientists within a catchment and coastal area, and target the knowledge gaps needed to understand where to prioritise rehabilitation. (0)
- Develop priority list of places for protection or rehabilitation based of specific values, e.g., fisheries productivity, listed threatened species. (0)

TASMANIA

- Maugean Skate is critically endangered and only exists in Macquarie Harbour, yet they are still allowed to use nets for recreational fishing which often trap the skates. A public awareness project would be a good start. (6)
- Monitor remnant populations of giant kelp habitat in the Kanamaluka/Tamar estuary and on the northeast coast and identify priority areas to reduce local threats from sea urchins. (5)
- Bass Strait Islands action plan for protection of biodiversity & cultural values. (5)

- Regional *Centrostephanus* Strategy (East Coast Tasmania - Rocky Reef Ecosystems). Development and execution of a regional Long spined Sea Urchin management plan, encompassing the varied ecological/social/cultural/economic values across the urchin's endemic and extended ranges. Proposal for funding of $50 million to support scalable solutions to: i. increasing resilience of kelp beds through urchin harvesting and predator stock rebuilding. ii. restore kelp where it has been lost to urchin overgrazing causing extensive barrens. iii. enhance urchin fisheries nationally, including product, by-product and export market development. (8)
- Spotted and red handfish habitat restoration and protection from external effects such as pollution. (4)
- Duck Bay/Smithton - land ag runoff/potential to plant vegetation buffers to reduce impact to marine environment? oyster industry impact. (4)
- The D'Entrecasteaux channel, improve water quality, reduce pollution, reduce industrial run-off, reduce marine debris. (4)
- Kelp communities - restoration efforts + management plans to support restoration (Following the Threatened Species Action Plan). (4)
- Identify and reduce local threats to seagrass habitat in the Kanamaluka/Tamar estuary, Georges Bay, Anson's Bay and the Northeast Inlet on Flinders Island. (4)
- Macquarie Harbour Rehab Plan with Maugean Skate as sentinel species. (4)
- East Coast (Georges Bay) - runoff/land activity threat to estuarine health (sewage and forestry chem?) oyster industry impact. (3)
- Following the Commonwealth Threatened Species Plan: Maugean skate, Red handfish: habitat restoration/establishing population parameters and trends. (3)
- Monitoring marine pest range extension e.g., *Undaria*, *Mya japonica*, *Asterias* etc. (3)
- Reduce threats to endangered Spotted and Red Handfish i.e., Northern Pacific Sea star and sea urchin control programs. (2)
- Collaborate on the development of state-wide stormwater planning policy and promote the adoption of water sensitive urban design. Increase community awareness of the use of raingardens and improve industry knowledge of soil and erosion control practices in new developments. (2)
- Climate change & increased rainfall events - capacity to understand/ limit residential sewage infrastructure flows into environment. (2)
- Development of Marine spatial plans for key regions, species and habitats. (2)
- RAMSAR wetland establishment & management plan for Robbins Passage-Boullanger Bay. (2)
- Rocky Cape NP coastline action plan for protection of biodiversity and cultural values. (2)
- Identification of capacity gaps for industry adaptation to climate change for prioritising actions for building capacity. (2)
- East Coast rocky reefs and kelp forests - restoration as well as urchin control. (1)
- Tasman Peninsula (e.g., Fortescue Bay), giant kelp recovery, large lobster protection, long spiny urchin eradication. (1)
- Incentivise capacity/scale for recycling of aquaculture/fisheries plastics (oyster baskets/feed bags/pipes). (1)
- Undertake control actions for *Spartina anglica* in identified priority saltmarsh sites to maintain the rice grass free zone in the northern end of the Kanamaluka/Tamar estuary. (0)
- Increase the extent of woody cover and the density, diversity and extent of native riparian vegetation in the Georges River to reduce bed and bank erosion and sedimentation. (0)
- Monitor and report on change in key rocky reef communities. (0)

NORTHERN TERRITORY

- Regional coordinator to bring together all sea country related partners in a regional approach. (8)
- Early childhood / school enviro educational program - cross issue (oceans, lands, biodiversity). Educators can link to local projects / community groups. (7)
- One consolidated 'list' (website) that describes the different programs / initiatives being delivered in NT – region. (5)
- Funds to support volunteer community groups to deliver projects – i.e., insurance, tools. (4)
- Cross cultural knowledge exchange program between Indigenous Rangers and Landcare groups - on site. (4)
- Engagement / extension role for commercial fishing industry. Supporting responding to R&R, innovation, training etc.(3)

- Recording Climate change in remote communities – impacts from elders' minds. (3)
- The use of artificial reefs to increase biomass and increase fishing opportunities. (2)
- Community awareness (social licence) campaign around n.t commercial fishers. (2)
- Development of Regional sea country plan for the Darwin Daly sea country region. (2)
- Supporting the development of key individuals in pro/rec/Indigenous/ aquaculture/training to network and train interstate. (0)
- Develop Apps to improve feedback of particular sea country activities to key agencies for sea country activities. (0)
- Darwin Harbour management plan (a govt plan, has an advisory body). (0)

SOUTH AUSTRALIA

- Coast & Marine officer for each Landscape (NRM) Region. (12)
- sea country rangers around the state. (7)
- Funding for Review/ update of each regions Coastal Action Plans including near shore marine habitats land-based impacts). (7)
- Seagrass restoration southern Fleurieu. (6)
- Work with First Nations groups to identify priority Ngartjs. (6)
- Community Scale Blue Carbon Restoration Guidance/Best Practice. (5)
- Support for collaboration between Landscape Boards and LGAs to develop local coastal 5-year management plans with biodiversity and marine ecosystem outcomes. (5)
- Investment in Coastcare groups for community-led action on coastal protection/restoration. (4)
- Blue carbon extension officers. (4)
- Native Oyster Shellfish Reef restoration Glenelg, Kangaroo Island. (3)
- Fleurieu islands weed control for increase sea bird populations. (3)
- identification of carbon footprints of marine businesses to set baseline. (3)
- Recreational Fishing Best Practice Snapper (i.e., Tuna Champions). (3)
- Education and support to expand recycling project for recycling marine plastics (project started in Port Lincoln by private developer) to other key fishing towns like Whyalla and Port Augusta. (3)
- Blue carbon restoration site identification in the Hils & Fleurieu Region. (2)
- Invasive pest and disease monitoring. (2)
- Native Oyster bed restoration/Blue Carbon. (1)
- Support for development of citizen science projects for priority species (don't know what these are yet from NLP perspective) to monitor and/ restore key ecological communities. Need to build capacity in the communities so projects have ongoing life and don't end when gov funding ends. (3)
- Seagrass (Posidonia) habitat on Adelaide coastline. (1)
- Mechanism (MOU) for collaborative management of Gulf St Vincent and Murray Mouth (shared resources and funding). (1)
- Investment in long term monitoring of Beach nesting bird populations. (1)
- Rocky reef communities - start monitoring communities in Boston Bay / Proper Bay and also in head of Spencer Gulf around Whyalla to understand impact of proposed desal plants that will be developed at Port Lincoln and Whyalla there. (1)
- Coffin Bay - Project to support initiatives to improve water quality coming into the Bay. This can build on research project looking into causes of reduced water quality in the bay. (0)
- National Marine NRM CoP. (0)
- Education programs with local rec groups/ etc. around impacts of beach driving – possible support through LGAs. (0)
- Investment to support KI Schools programs to help develop stewardship. (0)
- Annual Coastal Marine NRM Workshop. (0)
- Eyre Peninsula - Hooded Plovers. Provide support for communities/volunteers to continue monitoring and breeding site management program, that has been initiated through NLP project that will come to an end in 2023. (0)
- Investment in monitoring programs to ensure water quality/species diversity is maintained (North Coast Kangaroo Island). (0)

NEW SOUTH WALES

- Manage land based marine impacts: Keep water (farm runoff) and soil (erosion) on the land through ground cover management. (9)
- On ground actions to stabilise bank erosion, fence livestock from waterways, plant riparian vegetation, restore flows. (8)
- Develop programs to involve local communities in stewardship (education, restoration, advocacy etc.). (8)
- Blue Carbon extension services / advice for private landholders. (6)
- Industry-specific approach. E.g. Dairy farms off farm water quality management. (5)

- Coastal Floodplain restoration. Consideration of areas below say, 1.5m AHD - Need to reverse historic commonwealth investment in floodplain drainage and have similar level of investment to restore wetlands through funding land use change. Location are all large coastal Floodplains in NSW (and other states). (7)
- Improve management of Marine debris in Botany Bay, specifically Towra Point Aquatic Reserve and Ramsar wetland e.g., prevention strategies as well as cleanup. (4)
- Monitor ecological performance of existing MPAs (primary goal - conservation of biodiversity and ecological integrity) and take steps to improve their effectiveness. (4)
- Strategic rehabilitation plan per state considering climate change and variety of rehab techniques. (4)
- *C. rodgersii* urchin species control and management collaboration to assist growth of sustainable management of harvest and rehabilitation of GSReef. (3)
- Consider ecosystem services in farming systems e.g., clean waterways through revegetation and fences improves cattle health. (3)
- Engage local communities to understand culturally important species (e.g., Indigenous, charismatic) and take steps to monitor / conserve them. (3)
- Improve awareness and education and awareness of how land-use, catchments and marine ecosystems interact. (3)
- Kelp and other marine habitat restoration that can assist with CC. (2)
- broker best practice knowledge to industry and saltwater community. (2)
- Water quality sensors set up and handover to aquaculture industry, set up accessible portal - Port Stephens, Manning, Wallis Lake. (2)
- Need to invest in documenting how this plan works in with the many other national and international plans that touch this space- e.g., Future Earth Australia's sustainable oceans & coasts national strategy, MEMS. (2)
- Shellfish reef restoration - Wallis Lake. (1)
- Threatened species projects, seahorse, black cod, integrate with infrastructure possibly. (1)
- More trialling of riverbank restoration methods - Wallamba River. (0)
- Lagoon pollution mitigation urban / industrial / plastics. (0)
- Erosion management replacing introduced dune grasses (marram grass with spinifex) Seal Rocks. (0)
- Rehabilitation of manmade issues in the Lake Cathie estuarine system. E.g., reducing run-off. (0)
- Fish passage projects for coastal species and connection - weir removal, FGs etc. - see MEMS project leads for details. (0)
- Work with polluting catchment industry etc. (i.e., Ag generally, Blue Berry, Cane etc.) to help them reduce their impacts on marine environment - e.g., Clean Coastal Catchment programs (statewide, industry based). (0)
- Reducing run-off into the solitary Island Marine Park by working with local farmers. (0)
- Prioritise removal of threats for habitat forming species e.g., Posidonia, seagrass generally. For example, incentive program for adoption of environmentally friendly moorings. (0)
- Issues with ownership of water quality issues: create a platform of flowchart for who to reach out to in each local LGA depending on the water quality issue. (0)
- NSW Coastal Management Policies require CMPs (Coastal Management Plans) which identifies actions for investment/management. (0)
- Identify areas for saltmarsh rehabilitation considering SLR. Removal of threats to saltmarsh e.g., 4WD access, cattle access. Community education. (0)

OceanWatch and professional fishermen teaching school students how to mend a net at the Sydney Fish Market wharf.

APPENDIX II

STRATEGIC CONSIDERATIONS FROM THE WORKSHOPS

Interactive workshop activities aimed to identify priority actions for the Marine NRM plan. Some of the actions were however identified as strategic considerations, rather than actions.

They are reported below in their original form (workshop participants' votes in brackets), unedited, for the purpose of retaining all relevant information provided by the participants.

New South Wales	Support the development of new market opportunities, like 'teal' carbon (freshwater wetlands) that have huge water quality impacts on estuarine /marine systems - i.e., blackwater pollution. (8)
	Whole-of-catchment approach. Working with key land users to identify values/uses/challenges e.g., farmers, fishers, and oyster producers. Design programs from there. (7)
	Monitor the ecological performance of existing Marine Protected Areas (primary goal - conservation of biodiversity and ecological integrity) and take steps to improve their effectiveness. (4)
	Working on country advocacy and collaborations. (4)
	Support stewardship. (4)
	Listening and engagement in sea country forums. (4)
	Invest in economic cost-benefit analysis of which activities provide the best benefits (across ALL outcomes - so multiple benefits). (4)
	Restoring natural habitats and structures in marine parks instead of artificial structures and removing artificial structures. (3)
	Consider ecosystem services in farming systems (e.g., clean waterways through revegetation and fences to improve cattle health). (3)
Western Australia	Ecological restoration based on Nature Based Solutions, State-Wide Blue Economy strategy, SAFE database. (5)
	Focus on habitat protection and ecosystem functions & services. (4)
	Indigenous/Traditional owners and groups included in decisions and assisted to build capacity and time on sea country (5)
Victoria	Undertaking multi-ecosystem restoration (i.e., not just shellfish or seagrass) but taking a seascape approach. (4)
Queensland	Monitor ecological indicators of changes in tidal wetlands (=mangroves, saltmarsh & tidal saltpans). (6)
	Integrated monitoring framework that links institutional monitoring with citizen science programs and integrates citizen science programs. (5)
	Blue carbon to generate investment into mangrove and seagrass restoration. (4)
	Threatened Species Strategy identifies high-priority 'places'. Invest in these to maximise alignment with national efforts. (3)
	Establish artificial reefs to relieve fishing pressure in overused areas. (3)
	Each NRM region has the potential to champion local projects. Helping each NRM plan understand its local priorities will mean they can seek funding accordingly. (3)
Northern Territory	Culturally appropriate resources (educating issues or projects) resources to be relevant, in language or simple English and available on a number of different platforms face-to-face or online. (5)
	Culturally appropriate community info for dispersal to empower the community and increase the feedback loop. (5)
	How to address intergenerational knowledge transfer outside the Learning on Country Program. (4)
	Educational materials in language (videos, working in commercial, processing, in 4 languages) to assist engage people when in the field. (4)
	Data system to share all information - including to people that collect the data. (3)
	Develop ways to Increase the community feedback loop more effectively (Mobile phone App). (3)

APPENDIX III

FULL LIST OF ORGANISATIONS THAT WERE REPRESENTED AT THE WORKSHOP SERIES

Western Australia
Aquaculture Council of Western Australia
Coastal and Marine Community Network
Department of Primary Industries and Regional Development
Fisheries Research and Development Corporation (FRDC)
Northern Agricultural Catchments Council
Parks & Wildlife Esperance
Perth NRM
Rangelands NRM
Recfishwest
Southwest Catchment Council
Western Australian Fishing Industry Council
Western Australian Marine Science Institution

New South Wales
Abalone Association NSW
Australian Marine Conservation Society
Australian National Centre for Ocean Resources and Security (ANCORS)
Department of Primary Industries, Fisheries
Far South Coast Landcare Association
FRDC
Future Earth Australia
Hunter Local Land Services
Landcare Australia
Living Ocean Incorporated
North Coast Local Land Services
NSW Environment Protection Authority
NSW Local Land Services
Oceanic Research Institute
ORRCA Inc.
Revive Lake Cathie Inc
Take 3 for the Sea
University of New South Wales
University of Sydney

South Australia
Eyre Peninsula Landscape Board
FRDC
Hills and Fleurieu Landscape Board
Indigenous Land and Sea Corporation
Kangaroo Island/Victor Harbor Dolphin Watch
Landcare Association of South Australia
PIRSA Fisheries and Aquaculture

Northern Territory
Bawinanga Aboriginal Corporation
FRDC
Landcare NT
Northern Land Council
NT Fisheries
sea country Solutions

Tasmania
Australia Institute Tasmania
Cradle Coast Authority
Cradle Coast NRM
CSIRO
Department of Natural Resources and Environment Tasmania
Natural Resources and Environment Tasmania
NRM South
Oysters Tasmania
Tamar Estuary and Esk Rivers Program/NRM North
Tassal Group
University of Tasmania - Centre for Marine Socioecology
University of Tasmania - Institute for Marine and Antarctic Studies

Queensland
Burnett Mary Regional Group
Department of Agriculture and Fisheries
Department of Environment and Science
Earthwatch Australia
FRDC
Great Barrier Reef Marine Park Authority
Healthy Land and Water
MangroveWatch & James Cook University
NRM Regions Queensland
Queensland Parks and Wildlife Service
Reef Catchments
Whitsunday Conservation Council

Victoria
Australian Council of Prawn Fisheries
Department of Environment, Land, Water and Planning
Eastern Zone Abalone Industry Association
FRDC
Friends Of Leadbeater's Possum Inc
Glenelg Hopkins Catchment Management Authority
Melbourne Water
Seafood industry Victoria
The Nature Conservancy
Victorian Fisheries Authority
Victorian National Parks Association

Colourful fishes inhabiting tropical Australian waters attract tourists from all over the world.

APPENDIX IV

COMPLETE SURVEY RESULTS

Awareness of and engagement with OceanWatch Australia

Whilst the majority of survey respondents (64.1%; 468 responses) were aware of OceanWatch Australia as an organisation, three-quarters of respondents (75.6%; 552) were not aware that the organisation runs the National Marine NRM Program. This is likely because half of respondents (49.9%; 364) do not engage with OceanWatch Australia at all. Of those that did, they predominately read the newsletter (21.2%; 155) or engaged as seafood industry stakeholders (10.4%; 76) which demonstrated the reasonable reach and potential engagement achieved through these activities.

Other types of engagement respondents reported included:

- via social media
- research connections as marine, coastal and environmental scientists
- interactions at sector/industry networking events and
- connecting at other stakeholder meetings.

Understanding of Marine Natural Resource Management Plan

Overall, survey results indicated that respondents largely did have an understanding of the NRM Plan objectives (determined by combined percentage scores). Respondents reported they best understood the objective *Pollution reduction* (95.2%; 533), followed closely by *Ecological restoration* (93.2%; 519), and *Coastal and marine environmental monitoring* (92.3%; 519). These objectives reflect the current work of OceanWatch Australia programs (i.e., up to 2023) and might be better understood by respondents who engage with OceanWatch as a result.

Still, the survey results also indicated that many respondents (4.8–20.3%) were unsure of or did not understand the NRM Plan objectives. One-fifth of respondents indicated they did not properly understand the objective Collaborations on NRM interventions (20.3%; 113) the focus of which included 'regional stewardship' and 'building the capacity of First Nations groups'. This finding was echoed in the poor understanding of other related objectives, ranked in order of poorer understanding: First Nations involvement (15.9%; 89), Marine stewardship (12.5%; 70), and Ocean literacy (12.2%; 68).

Endorsement of the National Marine NRM Plan

Support for the National Marine NRM Plan was recorded by asking respondents for their view on the importance of the Plan objectives and their related actions (from somewhat important to critical, or not important at all).

Again, the objective *Pollution reduction* scored highly: 85% of respondents indicated that was very important or critical. In concordance with this result, the action theme focused on pollution (*Reducing or eliminating marine and coastal pollution, both from land and marine sources*) scored higher (combined percentages) than all other actions: 82.8% of respondents thought that this action was very important or critical.

8% of respondents (45) considered the objective *First Nations involvement* not at all important. This reflects its ranking as one of the more poorly understood objectives (above). Similarly, the action theme associated with First Nations' involvement (*Increasing Indigenous representation, employment, and recognition in marine national resource management*) received the highest score under not at all important: 9.4% (53). It is unclear why this objective was less prioritised throughout the survey; respondents' poorer understanding of the objective, and thus likely the related action, partly offer an explanation.

Ocean literacy was reasonably prioritised by respondents: 70.1% (392) thought this objective was very important or critical. As was its corresponding action theme – *Increasing people's understanding of the ocean's influence on them and their influence on the ocean* – which 78.7% believed was very important or critical.

Similarly, the results indicated respondents' perceived importance of *Coastal and marine environmental monitoring* (78.8% thought this was very important or critical; 443), *Ecological restoration* (78.8%; 443), and *Saltwater*

community and seafood industry best practice (77%; 431) objectives.

Almost three-quarters of respondents (70.7%; 398) were interested in the idea of getting involved as volunteers or collaborators in OceanWatch Australia Marine NRM projects.

Preferred avenues of engagement respondents suggested included:

- talking with community members about marine issues
- participating in beach clean-ups
- collaborating with Indigenous partner organisations
- collaborating with OceanWatch Australia through respondents' organisations and networks, and
- providing expert industry or research knowledge to OceanWatch Australia programs.

Participants

Overall, responses were gender-balanced; 49% male (263): 48% female (257): 3% other (15). This was a slight improvement on the 2015 NRM Survey. All ages groups over 24-years were well and evenly represented, which again was an improvement on the 2015 survey and demonstrated that survey reach was extended to all adult age groups. This result also indicates the potential reach of OceanWatch Australia beyond this survey.

The respondents represented a range of employment sectors, and sectors most represented included those related to NRM – i.e., science/research (16.9%; 91), government (12.9%; 70) and natural resource management (12%; 65), indicated the relevant knowledge likely held by this respondent sample. Note, a small proportion of respondents 5.9% (32) reported to be retirees.

The survey recorded responses from all states and territories in Australia (excluding offshore territories), in contrast to the NRM Plan workshops which had included input from coastal states and the Northern Territory only. Most respondents hailed from NSW (30.2%; 163) or QLD (25%; 135) which reflected the 2015 survey results (NSW 35%; QLD 20%).

Overall, the respondents indicated strong interaction with Australian coastal and marine areas. Almost two-thirds (63.3%; 341) reported frequenting these areas at least once per week. Less than 1% of respondents (4) reported they did not visit coastal and marine environments at least annually. Respondents' strong interaction was further illustrated by the multiple types of activities they reported to engage in, including beach-going (77.6%; 418), free-diving/snorkelling (52.9%; 285), boating (51.4%; 277), and recreational fishing (48.4%; 261).

Survey methodology

Approach

The survey approach consisted of an online questionnaire which included a mix of short multiple-choice and open-answer questions. The aurvey was targeted at OceanWatch stakeholders and the wider Australian community and aimed to obtain respondents' views of the Marine NRM Plan objectives and actions, and information on their awareness and engagement of OceanWatch Australia and the NRM Plan more broadly.

The survey also collected demographic information from respondents, as different demographics can be expected to have different perceptions and values in regards to the marine environment – and in the case of this survey, incorporating a more diverse sample would infer that more perceptions could be included and collated.

Dissemination and analysis

The survey questionnaire was drafted with input from the OceanWatch team and workshop facilitator, and then piloted for feedback before being finalised. The survey was administrated via the online platform SurveyMonkey and open for 4 weeks in April/May 2023. The survey was disseminated online through newsletters and Meta platforms advertising.

OceanWatch Australia stakeholders and the wider Australian marine community were invited to participate in the survey via links through the OceanWatch Australia newsletter and social media outlets. In addition, organisation contacts in recreational fishing, conservation, research, and NRM sectors were invited to forward the survey to relevant contacts and networks.

730 survey responses were collected. Survey data was analysed using SurveyMonkey and in Excel (for Mac 2022). A list of all survey questions is provided in Appendix V.

APPENDIX V

SURVEY QUESTIONS

Intro

We are OceanWatch Australia, an organisation that delivers projects focused on adopting best practices for fishing and aquaculture, encouraging stewardship actions amongst coastal and marine users, and on protecting, restoring, and enhancing key marine and coastal habitats around Australia.

This survey is being sent to groups and individuals around coastal Australia to help us better understand community understanding and support for OceanWatch, the Marine NRM Plan and its core objectives. We invite you to participate in this survey to better understand your views and priorities. The survey should take 5-10 minutes. Thank you in advance!

1. Have you heard of OceanWatch Australia before? Yes/No

2. Before you opened this survey, did you know that OceanWatch Australia runs the National Marine NRM program? Yes/No

(If yes, please specify how you were aware, e.g. info via the newsletter, website, projects, etc.)

3. How do you engage with OceanWatch Australia?

a. I have participated in projects as a volunteer
b. I have participated in projects as a staff member
c. I read the newsletter
d. I participated in an NRM Plan workshop in December 2022
e. I have been trained as a Master Fisherman/Responsible Oyster Farmer
f. I have participated as a seafood industry stakeholder
g. Other (please specify)
h. I don't engage

National Marine NRM Plan

OceanWatch Australia is working to develop the National Marine Natural Resource Management Plan 2022-2028 (Marine NRM Plan) in collaboration with key marine stakeholders. The Marine NRM Plan is a call to action - it aims to help secure a prosperous future for Australia by maintaining and improving current quality of life and ensuring marine environmental health in the long-term.

The Plan will guide OceanWatch Australia's Marine NRM programme over the next 5 years. OceanWatch Australia will invest in projects that achieve the key objectives identified in the plan. These key objectives were identified through national workshops attended by almost 100 independent marine experts and stakeholders from all coastal states and the Northern Territory.

• Better coastal and marine environmental monitoring of threats and species recovery, with nationally standardised data collection systems

• Better collaboration on NRM interventions via (1) regional stewardship and Marine NRM coordination roles; and (2) supporting collaborative multi-stakeholder plan-making on a regional basis, including building the capacity of First Nations groups to participate

• Ecological restoration including the re-establishment of seagrass beds, kelp forests, shellfish reefs, mangroves, saltmarsh, and where necessary building artificial reefs. Additionally, it will support opportunities for Blue Carbon investments and the protection of existing habitats and wildlife.

• First Nations involvement, connection, and capacity building in Sea Country management

• Marine stewardship with a focus on building the capacity of stakeholder groups and citizen science projects

• Ocean literacy improving marine stakeholders' awareness of key coastal and marine issues related to all objectives

• Pollution reduction including reducing run-off from agriculture and marine debris source reduction

• Saltwater community and seafood industry best practices including supporting industry extension efforts and circular economy, biosecurity, and works towards a target for industry of a 30% greenhouse gas emissions reduction.

4. Please indicate your understanding of each of these objectives (don't understand, unsure, some understanding, good understanding, expert understanding)

5. Please indicate your view on the importance of these objectives (not at all important, somewhat important, important, very important, critical)

The workshops also identified actions to take to achieve the key objectives of the NRM Plan. OceanWatch Australia aims to deliver on these actions to achieve the objectives set in the Marine NRM Plan.

- Capacity building and/or training, bottom-up *engagement and funding*
- *Marine NRM planning and coordination*
- *Coastal and marine research and monitoring*
- *Assist the recovery of coastal and marine ecosystems that have been degraded, damaged or destroyed*
- *Increasing people's understanding of the ocean's influence on them and their influence on the ocean*
- *Conservation and protection of coastal and marine habitats and wildlife, including work on biosecurity*
- *Work with the commercial fishing and aquaculture sectors to reduce their environmental footprint and/or improve their social licence*
- *Reducing or eliminating marine and coastal pollution, from both land and marine sources*
- *Climate change prevention, mitigation and adaptation, including blue carbon and educational initiatives*
- *Increasing indigenous representation, employment and recognition in marine natural resource management.*

6. Please indicate your view on the importance of these action themes. (not at all important, somewhat important, important, very important, critical)

7. Do you have any comments you would like to add?

8. Would you be interested in being involved in OceanWatch's NRM projects (e.g., beach clean ups, environmental restoration)? Yes/No

9. If yes, how would you like to be involved?

10. Gender: male/female/non-binary/prefer not to say

11. What is your age?

12. In what Australian state/territory do you reside in?

13. Postcode

14. What is the highest level of education you have completed?

a. Did not attend school
b. High school (year 12)
c. Bachelor's Degree
d. Master's Degree
e. Doctoral Degree
f. Certificate III
g. Diploma
h. Certificate II
i. Certificate IV
j. Other (please specify)

15. What is the sector you work in?

a. Education
b. Land-based farming
c. Professional fishing
d. Aquaculture
e. Conservation
f. Government
g. Natural resource management
h. Tourism
i. Shipping, transport
j. Retail
k. Science, Research
l. Other (please specify)

16. Do you do any of the following activities? (tick all that apply)

a. Recreational fishing
b. Surfing
c. SCUBA diving
d. Free diving / snorkelling
e. Ocean swimming
f. Beach going
g. Boating
h. Environmental/wildlife-related volunteering
i. Sailing
j. Cultural fishing activities
k. None of the above

17. How often do you frequent Australian coastal and marine areas?

a. Less than once a year
b. Once a year
c. A few times a year
d. Once a month
e. A few times a month
f. Once a week
g. A few times a week
h. I am a coastal resident.

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