

**SUSTAINABLE
SEAS**

Ko ngā moana
whakauka



Bringing it all together for a healthy ocean and prosperous blue economy

Sustainable Seas represents Aotearoa New Zealand's largest ever group of biophysical and social scientists, economists, and experts in mātauranga Māori and policy.

The group has come together with co-development partners in a mission-led manner for the moana. Embarking on our journey nearly a decade ago as one of 11 National Science Challenges, we set out to achieve this objective:

To enhance utilisation of our marine resources within environmental and biological constraints.

This objective leads to the Challenge vision:
New Zealand has healthy marine ecosystems providing value for every New Zealander.

Our vision is set in a uniquely Aotearoa New Zealand context and places the moana, and the relationship of people with the moana, at the heart of our research and aspiration.

Implementing the recommendations and solutions generated by Sustainable Seas will enable the objective to be met, and lead to three longer-term outcomes that are critical to achieving healthier seas.

- Improved decision-making using an ecosystem-based management (EBM) approach
- Enhanced marine blue economy
- Empowered mana moana

Our research has generated the knowledge, guidance, and tools needed to reverse degradation trends and realise a healthy ocean

The vast ocean surrounding Aotearoa New Zealand is of global significance because it:

- spans subtropical to subpolar latitudes
- supports incredibly high biodiversity
- represents the seabird capital of the world
- is a marine mammal hotspot.

Unfortunately, our marine ecosystems and the resources, ecosystem services, and values they support are under the same pressures observed throughout the world. Marine ecosystems continue to degrade due to the cumulative effects of multiple activities on both land and in the sea. Ongoing degradation reveals our current fragmented management approaches are not addressing cumulative effects, and we need to be better at understanding the implications of our management decisions. To compound matters, climate change is already impacting our marine ecosystems and increasing levels of uncertainty around our ability to reverse current trends of degradation and start on a path of recovery.

Amid ongoing degradation, tension continues to grow between Aotearoa New Zealand's many users and uses of the marine environment. This tension includes the importance of the marine economy and the protection of marine ecosystems. Adding to this is an unresolved set of highly contested Tiriti o Waitangi rights and interests. Within this tension lies an incredible opportunity that can only be realised if we act now. Sustainable Seas research has generated the knowledge, guidance, and tools needed to reverse the trends of degradation and realise a healthy ocean.

A holistic approach is needed for healthy seas

The strong connections across our social, cultural, and natural systems demands a holistic approach to managing the environment. Our journey has therefore focused on developing the principles, guidance and tools needed to implement ecosystem-based management (EBM)¹ and te ao Māori approaches founded on mātauranga and tikanga Māori. Such holistic approaches are required to achieve a healthy moana, which in turn will support a prosperous blue economy.

Coming together is precisely what's required to ensure a healthy ocean for future generations. Continuing the status quo and a partitioned approach to managing activities and resources is not an option if we want to reverse the clear downward trend in the health of our marine ecosystems.

We end our journey as a National Science Challenge buoyed by knowing the research we've generated can fuel momentum and optimism for the future of the moana.



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About this document

The Challenge has produced nearly a decade's worth of research results, guidance, and tools from more than 100 projects. In our final year, we've focused on synthesising this knowledge into accessible outputs that will lead to action and support continued efforts toward the Challenge vision. This synthesis brings together key messages and recommendations from our journey and provides knowledge generated in a format intended to enable its uptake, application, and further development.

We introduce nine topics prioritised by the Challenge community as being critical to enabling holistic ecosystem-based management (EBM) and te ao Māori approaches – and ultimately realise a healthy ocean and prosperous blue economy². Detailed insights and recommendations for each of these topics can be found in separate summaries and guidance documents. This document ties together these topics while providing an overview of key messages and recommendations.

A deeper dive into the Challenge can be explored through Tohorā, an AI-assisted search tool for navigating Challenge research. Tohorā enables users to search the knowledge generated by the Challenge across the breadth of EBM, te ao Māori, and blue economy approaches. tohora.org.nz

1. EBM is a holistic and inclusive way to manage marine environments and the competing uses for, demands on, and ways that New Zealanders value them.

2. BE is the blue economy for Aotearoa New Zealand - marine activities that generate economic value and contribute positively to ecological, cultural, and social well-being.

Key messages and recommendations

In our final synthesis, with input from Māori partners and stakeholders, we have pulled together key messages and recommendations that are underpinned and guided by leading science and te ao Māori.

Three key messages apply across the Challenge and to implementing our recommendations:

We need to act now

Our world-leading research has vastly increased our understanding of the ongoing degradation of our coastal and marine ecosystems occurring because of multiple stressors and the cumulative effects of multiple activities. This degradation ranges from highly degraded estuaries inundated with land-derived silt, to loss of shellfish populations in coastal waters, to entire conversions of kelp forests into bare kina barrens. The compounding effects of climate change on our marine environment are increasingly apparent, further raising the urgency of acting now to increase the health of the moana and its resilience to long-term environmental change.

We have the knowledge, guidance, and tools

Our world-leading science and te ao Māori-led research provides a clear understanding of the drivers impacting our marine environment. Equally, we understand the opportunities, steps, and interventions required to promote recovery of the ecosystems underpinning our marine economy and wellbeing for future generations. Sustainable Seas has amassed a comprehensive knowledge base and solutions from which to:

- facilitate change
- enable EBM, te ao Māori and blue economy approaches
- realise a better future for our ocean and people.

We do not need to wait for more research or new legislation to get started. Case studies using the approaches and tools generated by the Challenge have demonstrated how they can be implemented now to enable EBM and te ao Māori and begin building a thriving blue economy (BE)².



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We need to work together in a holistic manner

Our estuaries, coasts and wider ocean ecosystems continue to be impacted by our activities on land and in the sea. Implementing holistic approaches that engage communities, regional and central government, and business sectors is required to address cumulative effects and implement the changes needed. Our natural systems, our people, and their use of the moana are all interconnected – only by working together and through holistic approaches to marine management will we realise a healthy moana.

Below we present six high-level recommendations that umbrella the more focused insights and recommendations provided in summaries and guidance for each of our nine priority topics. All our recommendations align with the underlying principles we've developed for enabling EBM, te ao Māori approaches, and a blue economy. These recommendations set the foundation to implement the knowledge and tools generated by Sustainable Seas.

- Empower ocean leadership
- Embrace the connectivity of our natural and social systems
- Work collaboratively and be inclusive
- Implement place-based EBM and te ao Māori approaches
- Build capacity to enable and sustain EBM and te ao Māori approaches
- Foster development of the blue economy

Empower ocean leadership

Aotearoa New Zealand shoulders enormous responsibility for the stewardship of our coastal marine area and large Exclusive Economic Zone. Despite this responsibility and our continued use and impacts on the marine environment, we lack clear and empowered ocean leadership with the mandate to ensure a healthy moana for future generations. The urgency for ocean leadership is analogous to the climate crisis and the role of the ocean in regulating and mitigating the effects of climate change is clear, highlighting the importance of aligned solutions enabled through bipartisan agreements and mitigation plans.

As highlighted in our guidance *Marine governance – sustaining ocean outcomes for future generations*¹, establishing an effective and appropriate framework is key to implementing the changes needed to sustain ocean outcomes for future generations. Empowering courageous leadership is a critical ingredient for establishing, maintaining, and improving the marine governance models and functions needed for long-term outcomes. As described in our guidance documents on *Enabling ecosystem-based management in Aotearoa New Zealand's marine law and policy*² and *Marine governance – sustaining ocean outcomes for future generations*¹, empowering such leadership can be achieved in part by developing Fundamental Marine Principles to establish clear objectives for the marine environment and ensuring consistent and integrated governance arrangements. A legal entity for the ocean, such as a Ministry or an independent commission could be established to lead, facilitate, and oversee these principles, which can build on those the Challenge has developed for EBM, te ao Māori, and the blue economy. Placing mātauranga and tikanga Māori at the forefront of marine policy design and sharing marine governance and authority with Tangata Whenua through Tiriti-led marine law and policy approaches would further strengthen Aotearoa New Zealand's position as a global leader in transformative EBM.

Ultimately, we're all connected with, and depend on the moana. Ocean leadership and governance will require diverse representation to obtain the collective buy-in and engagement needed to effectively implement holistic management approaches and realise their benefits including healthier communities and a more prosperous economy. Leadership in our regions and within local communities is particularly important because EBM, te ao Māori, and blue economy activities are largely place-based. Communities need to be empowered and incentivised to implement the actions needed. As demonstrated throughout the life of the Challenge and in our case studies, providing for mātauranga and tikanga Māori is a critical step to empowering local communities to act. Contributing to this is the development of principles for Tiriti-led decision-making, guidance for which is provided in *Empowering Māori knowledge in marine decision-making*³.

Embrace the connectivity of our natural and social systems

The connectivity of our natural and social systems has been a common theme spanning our research. This ranges from our ancient connectivity to the moana as a tupuna, to the connectivity of land and sea, to the connectivity among habitats along our coasts, to the connectivity of our researchers, decision makers, and people within our communities.

The close connectivity of our natural systems and their response to multiple human activities on land and the sea is what drives the challenges we must overcome to ensure a healthy moana for future generations.

Marine ecosystems are highly connected networks of interacting components and their responses to stressors may differ in space and time. Cumulative effects assessments must account for this connectivity, and we need to manage for ecological responses to multiple interacting stressors that exist now, and in future. The guidance for *Addressing cumulative effects in marine management decisions*⁴ outlines the concept of ecosystem response footprints and establishment of ecological and stressor principles to be incorporated within decision-making frameworks. In our guidance for *Addressing risk and uncertainty in decision-making*⁵, we've developed stepped approaches to help enable decision-making when we have limited or 'imperfect' data and to help identify appropriate management interventions that address cumulative effects.

Ecosystem connectivity means that environmental stressors can have negative impacts on multiple ecosystem components, but it also means that small efforts to restore one component can result in wider positive impacts to other connected components. Our guidance for *Restoring marine ecosystems through better management and financing*⁶ provides recommended actions focused on shifting our efforts from managing single activities and stressors to managing ecological responses to support ecosystem recovery.

Restoration activities at the hapū and community scale can help meet New Zealander's need to strengthen, and in many ways rediscover our connections to the moana. Empowering mana moana has been a large focus of our research and we have developed models, principles, and guidance on how we can enhance our relationship with te ao Tūroa (the long-standing environment) to in turn inform our relationship with the moana.



Work collaboratively and be inclusive

The problems facing the ocean are bigger than any one organisation's ability to solve. Just like cumulative impacts from multiple stressors are contributing to the ocean's decline, the cumulative impacts of actions by many can set us on the path to recovery. Sustainable Seas has provided a platform for collaboration and enabled new teams to be formed with the active participation multiple partners. We've learned and demonstrated the importance of developing and nurturing relationships. Co-development is key to successful uptake of research outputs and takes time and the right participatory processes and frameworks that result in meaningful engagement, partnership and leadership from the very beginning. Collaboration and inclusiveness underpin multiple benefits and outcomes – from maximising impacts of science investments to collective decision making and building enduring capacity for enabling effective marine governance.

Sustainable Seas has produced many tools and processes for enhancing collaboration and inclusiveness. This is exemplified through participation across various stages of decision making and use of tools, such as those for *Enabling effective marine spatial planning for ecological and economic wellbeing*⁷. Marine Spatial Planning (MSP) can be very effective for bringing people together around common objectives. As identified in the summary brief, effective MSP incorporates multiple objectives, values and uses, and is open to a wide variety of participants (iwi, hapū, government agencies, research institutes, environmental non-governmental organisations, local communities, industry representatives), knowledge systems, and disciplines. As a collaborative and inclusive tool, MSP can be very effective at enabling decision-making and planning for marine spaces where interests may vary among participants and multiple types of activities could occur. In addition, MSP can help us to understand the implications of our decisions and the ability to make trade-offs in a more informed, inclusive way. Undertaking government-led MSP could also help to shift away from a siloed, sector-by-sector approach to management.

Effective management of the moana must draw on different forms of knowledge and, importantly, te ao Māori approaches. The inclusion of mātauranga Māori alongside science-led solutions is essential to collective decision making within holistic EBM approaches. Mahi tahī (collaborative observation, action and reflection) and kaitiakitanga (active guardianship, combining of knowledge) are foundational to supporting diversity of thought (intergenerational) for guiding our future. Further details on enabling and diversifying knowledge used in decision making is provided in our guidance for *Empowering Māori knowledge in marine decision-making*³ and *Enabling a broad knowledge base for marine management decisions*⁸.



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Implement place-based EBM and te ao Māori approaches

Ecosystem-based management and te ao Māori are holistic, place-based approaches, with the processes, activities and those involved likely to vary according to the challenges and opportunities in each location. Through case studies, we've produced sufficient knowledge and tools to begin reversing degradation and creating positive environmental, cultural, and economic impacts through such activities at local to regional scales. Scaling implementation of these approaches throughout New Zealand will take investment, time, and money, and incentivising blue economy development within our regions will lead to the types of activities and resources needed to support the improved wellbeing of our moana.

In our summary on *Enabling ecosystem-based management in Aotearoa New Zealand's marine law and policy*², we highlight opportunities to enable EBM actions now, and support them through marine governance structures that are adaptive and flexible to accommodate a range of relationships likely to change over time. Being place-based, EBM will require local and regional authorities to be invested and supportive in developing and implementing coastal plans that give effect to EBM. Scenarios for implementing EBM in real-world applications such as restoration planning and trade-offs for fishing were explored with Challenge partners and can be accessed through Tohorā.

Māori-led approaches grounded in mātauranga and tikanga Māori alongside leading science, have proven highly effective at implementing community-based activities that result in better environmental outcomes while revealing opportunities to grow the blue economy. As described in our guidance on *Restoring marine ecosystems through better management and financing*⁶, the Ōhiwa harbour case study exemplifies iwi-led restorative action at place, which was supported by researchers, community, and regional and central government to improve the health of the ecosystem via the restoration of important shellfish to the harbour.

Build capacity to enable and sustain EBM and te ao Māori approaches

Throughout the life of the Challenge, we've experienced limited capacity on many fronts including areas of specialist expertise, capacity within regional and central government agencies, capacity within businesses to stray beyond factors affecting their bottom line, and capacity among iwi to properly engage, partner and lead in the Challenge. We are limited in the spaces and capacity to develop and implement Indigenous-led approaches and need to actively provide for the leadership of Māori in marine governance and management, as well as the Māori cultural capability of everyone.

Our recommendations and actions will only be successful if the necessary capacity is in place for the long-term. For example, implementing a national marine governance framework will require the capacity to withstand changing short-term political and economic priorities by ensuring an authorising environment that is stable and by ensuring necessary information is available to inform decision-making and action. Equally important is promoting change at an organisation level, and providing support from the top down for nurturing workplace cultures that are collaborative and inclusive and embrace a diversity of knowledge.

The time is now to invest in our people and build on what Sustainable Seas has achieved. As a country, we are well positioned to lead exemplary, end-user driven research that supports holistic management approaches and that's transferable internationally. Extensive scientific expertise, strong international links, and developing working relationships bringing together science and indigenous knowledge are all important components in the development of holistic management strategies. These attributes, among others, identify New Zealand as the ideal location for developing innovative and transferable approaches to sustaining a healthy moana.

The range of expertise and skillsets required to enable holistic EBM and te ao Māori approaches is incredibly diverse and goes beyond traditional disciplines. Indeed, Sustainable Seas has engaged many students and early career researchers, and in the process, they have developed new skillsets and ways of working aligned with the transdisciplinary and highly participative nature of EBM. This has led to the development of university courses and curriculum tailored to the skills needed in future, as well as inspiring programmes for youth as exemplified through our collaboration with Marlborough Girls College. We must continue to build capacity for EBM researchers and practitioners, as well as capacity in Māori-led research and mātauranga Māori to stay on the journey toward a healthy moana.

Foster development of the blue economy

Sustainable Seas defines the blue economy as marine activities that generate economic value and contribute positively to social, cultural, and ecological well-being. This implies taking a holistic view of economy that values diverse uses of marine resources from recreational uses to spiritual engagement, customary take, community livelihood, as well as commercial use.

Developing a blue economy will require collective investment strategies ensuring sustainable management of our marine environment through a focus on future opportunities for all rather than short-term gain for some. Our engagements and partnerships with industry reveal many users of marine resources share a desire for sustainability and are keen to embrace further commitments to bring about a blue economy. Blue economy futures are inextricably bound up with regional and Māori economic development, and the existing leadership of Māori marine enterprise in this space is instructive.

As highlighted in the summary for *Developing pathways to a flourishing blue economy*⁹, a key ingredient for building a prosperous blue economy is the adoption of core blue economy principles, such as those developed by the Challenge for guiding investment, policy, and business activities. Also critical are Māori and regional development strategies for guiding marine resource use and management and the support of institutions for initiating and coordinating innovation and collective effort.

Sustainable Seas' co-funding of Moananui, a blue economy agency based in Nelson, is an example of the type of organisation required to drive a blue economy forward. Community driven, participatory initiatives such as those organised through the Te Tau Ihu Intergenerational strategy and Te Korowai o te Tai Marokura in Kaikoura or through Māori development organisations such as the Hikurangi Trust and the Ōnuku Rūnanga represent alternative Models for place-based and regional development initiatives. Such regional initiatives and development strategies are an integral part of forward-looking investment strategies.

As is the case for ecosystem-based management, transitioning to a blue economy is a journey – it requires facilitation and nurturing. Māori are key players in building a national blue economy – as well as Tiriti o Waitangi partners, they are major rights holders and users, leaders in blue economy thought and practice, and are actively building a specifically Māori blue economy.



Our vision

New Zealand has healthy marine ecosystems providing value for every New Zealander



Recommendations



Empower ocean leadership



Embrace the connectivity of our natural and social systems



Work collaboratively and be inclusive



Implement place-based ecosystem-based management (EBM)



Build capacity to enable ecosystem-based management



Incentivise development of the blue economy

Knowledge-driven actions

- 1 Establish a formal and inclusive **governance framework** that empowers collective leadership.
- 2 **Implement EBM within existing legislation**; begin by establishing a legal entity for the ocean and developing Future Marine Principles.
- 3 Enable a **broader range of knowledge** as evidential weight in coastal decision-making.
- 4 Create space for indigenous-led approaches and enable **te ao Māori and mātauranga Māori** in decision-making for the moana.
- 5 Manage for **cumulative effects** by assessing ecological response 'footprints' and employing our four-step action plan for decision-making.
- 6 Address **risk and uncertainty** using methods that account for cumulative effects assessments, the needs of Māori, and enable decision-making for EBM.
- 7 Support and enable **restoration and recovery** of marine ecosystems at the hapū/community scale.
- 8 Enact participatory frameworks such as **marine spatial planning** for EBM that promotes inclusiveness, enables collective goal setting, and upholds EBM and blue economy principles.
- 9 **Develop pathways to a flourishing blue economy** that will deliver economic value and contribute positively to social, cultural, and ecological well-being.

Outcomes

Healthier seas through:



- Improved decision-making using an ecosystem-based management approach
- Enhanced marine blue economy
- Empowered mana moana

Figure 1 Overview of Sustainable Seas' recommendations and actions for healthier seas

Continuing the journey

The Sustainable Seas community embarked on a journey that will continue through those that have participated in the Challenge, and those who pick up where we've left off.

Our journey is globally unique; the knowledge is embedded in our community of researchers, co-development partners, stakeholders, and iwi. We've experienced failures and successes, but most importantly, we've learned there can be a better future where the ocean and people are healthy and supported by a prosperous blue economy.

We need to come together and take up what we've learned and implement the knowledge and tools in a manner that leads to action and positive change. We ask those ahead of us to take what we've learnt and continue the journey toward a healthy marine ecosystem providing value for every New Zealander.



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References

- Sustainable Seas National Science Challenge (2024). Marine governance – sustaining ocean outcomes for future generations¹. sustainableseaschallenge.co.nz/tools-and-resources/marine-governance-sustaining-ocean-outcomes-for-future-generations
- Sustainable Seas National Science Challenge (2024). Enabling ecosystem-based management in Aotearoa New Zealand's marine law and policy². sustainableseaschallenge.co.nz/tools-and-resources/enabling-ecosystem-based-management-in-aotearoa
- Sustainable Seas National Science Challenge (2024). Empowering Māori knowledge in marine decision-making³. sustainableseaschallenge.co.nz/tools-and-resources/empowering-māori-knowledge-in-marine-decision-making
- Sustainable Seas National Science Challenge (2024). Addressing cumulative effects in marine management decisions⁴. sustainableseaschallenge.co.nz/tools-and-resources/addressing-cumulative-effects-in-marine-management-decisions
- Sustainable Seas National Science Challenge (2024). Addressing risk and uncertainty in decision-making⁵. sustainableseaschallenge.co.nz/tools-and-resources/addressing-risk-and-uncertainty-in-decision-making
- Sustainable Seas National Science Challenge (2024). Restoring marine ecosystems through better management and financing⁶. sustainableseaschallenge.co.nz/tools-and-resources/restoring-marine-ecosystems-through-better-management-and-financing
- Sustainable Seas National Science Challenge (2024). Enabling effective marine spatial planning for ecological and economic wellbeing⁷. sustainableseaschallenge.co.nz/tools-and-resources/enabling-effective-marine-spatial-planning
- Sustainable Seas National Science Challenge (2024). Enabling a broad knowledge base for marine management decisions⁸. sustainableseaschallenge.co.nz/tools-and-resources/enabling-a-broad-knowledge-base
- Sustainable Seas National Science Challenge (2024). Developing pathways to a flourishing blue economy⁹. sustainableseaschallenge.co.nz/tools-and-resources/developing-pathways-to-a-flourishing-blue-economy